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ABSTRACT
        This document presents the final report of a 4-year
project (ending in 1991) which conducted six studies of the impact of
various peer-mediated interventions on the acquisition,
generalization, and maintenance of social interaction skills of
preschoolers with severe disabilities. The report covers project
objectives, the project's theoretical framework, descriptions of the
six individual studies, methodological problems, and the project's
impact. Major impacts are reported in terms of products, including
observational protocols for assessing preschool children's social and
supportive interactions, and dissemination activities such as
publication of journal articles, presentations at professional
conferences, and dissemination of classroom instructional materials.
Reports of three of the studies are attached. Titles and authors are:
(1) "Promoting Positive and Supportive Interactions between
Preschoolers: An Analysis of Group-Oriented Contingencies" (Frank W.
Kohler et al.); (2) "Using a Group-Oriented Contingency To Increase
Social Interactions between Children with Autism and Their Peers: A
Preliminary Analysis of Corollary Supportive Behaviors" (Frank W.
Kohler et al.); and (3) "The Overtures of Preschool Social Skill
Intervention Agents: Differential Rates, Forms, and Functions" (Frank
W. Kohler et al.). The other three studies dealt with the effects of
immediate and delayed reinforcement on the cross-setting
generalization of children's social interactions, analysis of
performance variability in peer-mediated interventions for children's
social interactions, and programming for generalization of
peer-mediated interventions. The overall report contains 10
references and the individual reports also contain references.
(DB)

Programmatic Research on Social Interaction Maintenance And Generalization With Severely Handicapped Preschoolers

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FINAL REPORT

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SECTION II

Abstract

Programmatic Research on Social Interaction Maintenance And Generalization With Severely Handicapped Preschoolers

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A prevailing problem for early childhood educators is the lack of generalization and maintenance associated with attempts to improve the social interaction skills of preschoolers with severe developmental disabilities. This project was designed to examine the impact of numerous peer-mediated interventions on the acquisition, generalization, and maintenance of interactions between preschoolers with severe disabilities and their typical peers. These interventions were derived from our own prior research efforts as well as the growing number of other studies conducted over the past 15 years.

This project has operated for a total of 4 years. During this time we have conducted 6 different studies within two different local preschool settings. All 6 studies experimentally analyzed the impact of peer-mediated procedures on childrens' social interactions. These studies have encompassed a wide range of different play activities, intervention procedures, and teacher and child participants. Five studies directly examined the generalization and maintenance of childrens' newly taught social exchanges. In addition, three studies examined specific strategies

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to facilitate generalization and/or maintenance effects that did not occur spontaneously. All six studies and their various outcomes are described in detail in Section VI of this report.

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SECTION III

Table of Contents

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SECTION IV

OBJECTIVES OF THE PROJECT

Two sets of objectives (including research and service oriented goals) were directed to the overall aim of this project.

Research Objectives

1) To identify social objectives that will enhance the social inclusion and acceptance of children with disabilities in integrated preschool settings;

2) To examine the effects of a modified peer-mediated strategy where an entire class of preschoolers with disabilities and their typical peers receive training for a wide range of diverse social skills and strategies;

3) To examine the impact of various play activities on the the maintenance of childrens' newly taught social interaction **skills and strategies;**

4) To examine the effects of various reinforcement procedures (including both individual and group-oriented reinforcement contingencies) on the occurrence of childrens' newly taught social exchanges; and

5) To develop and evaluate a comprehensive intervention procedure comprised of identified social skills/strategies, identified play activities, and identified type of reinforcement procedure on the acquisition, generalization, and maintenance of childrens' social exchanges.

Service Objectives (Products for on-line service providers).

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1) An observational protocol for assessing the social interactions **between preschoolers with severe handicaps and their typical peers;**

2) An observational protocol for assessing childrens' supportive exchanges within their daily play activities;

3) A list of social behaviors that are associated with target childrens' inclusion and acceptance into integrated play activities;

4) A protocol for teaching children to exchange the identified social behaviors referred to in Number 3 above;

5) A strategy for identifying play activities and materials that have an optimal impact on childrens' social exchanges;

6) Procedures comprised of both individual and group-oriented reinforcement to promote childrens' social skill acquisition and maintenance; and

7) A field-tested intervention package comprised of all of the aforementioned elements.

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Theoretical Framework For The Project

The considerable volume of research that has addressed the social standing and skills of young children with disabilities has produced several significant and consistent findings. First, these children are viewed by their typical peers to be less academically and socially competent than their actual behavior would suggest (Cook & Wollersheim, 1974; Gottlieb, 1974; Jaffe, 1966). Second, pioneering work by Gottlieb and others show that children with disabilities experience more rejection on sociometric ratings than their typical peers (Bruininks, Rynders & Gross, 1974; Goodman, Gottlieb, & Harrison, 1972; Gottlieb & Davis, 1973). Third, this sociometrically-measured rejection of youngsters with disabilities is often represented in negative social interaction patterns during childrens' daily play activities (Strain & Hill, 1979; Strain, Shores, & Timm, 1977). Viewed together, these findings suggest that the mere physical integration of children with disabilities into activities with their typical peers will not necessarily lead to either social acceptance or positive social interactions. Moreover, this general pattern of social rejection is evident across preschool, elementary, and secondary age groups as well as divergent types and degrees of impairment (Strain, 1981).

A wide variety of intervention strategies have been developed to improve the social interaction patterns between children with disabilities and their peers. One promising model involves the utilization of socially competent children to encourage and/or

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facilitate the social behavior of their classmates who exhibit delays (Strain, 1977; Strain et al., 1977). A growing number of studies have demonstrated that these peer-mediated interventions produce significant and reliable increases in the overall number and quality of target childrens' interactions with their "peer trainers".

Despite these impressive outcomes, however, a variety of unresolved conceptual and applied issues served as the premise for this project. First, only those youngsters with age-appropriate skills typically receive formal social interaction training. Following training, these youngsters participate in play activities with classmates who exhibit significant delays, but have never received formal social skills training. This unilateral model for training appears rather shortsighted, given the importance of "reciprocity" as a critical dimension of childrens' social interactions and competence. Thus, research developing a modified social interaction training protocol that includes both target children and their peers is necessary.

Second, many early efforts to improve young childrens' social skills promoted a "cart-before-the-horse" approach that led to the application of behavioral technology and the training of discrete skills prior to a full understanding of what competent social behavior was in the first place. Even in its best understood and dissected form, operant procedures will never be more than a cluster of teaching tactics that are applied to a sequence of target behaviors. Some researchers have suggested that prior

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failures to improve childrens' social interactions were a function of "faulty" procedures. While this may be the case, it is also likely that the <u>a priori</u> selection of treatment objectives has resulted in: (a) the inadvertent selection of behavioral skills that are <u>not</u> functionally related to childrens' social competence; and (b) the selection of treatment objectives that have essential behavioral prerequisites that are <u>not</u> currently exhibited by target children and are <u>not</u> included in the intervention program. In any case, the selection of treatment objectives must be based on experimental examinations of the multiple functions of childrens' discrete social behaviors. These functional analyses are especially necessary given our recent awareness that desirable outcomes cannot be achieved by merely making target childrens' social repertoire "look like" those of typical children.

Finally, one of the most limiting aspects of peer-mediated interventions has been the consistent lack of generalization and maintenance over time. An abundance of prior studies has demonstrated that generalization across toprograhies, settings, and over time is not a spontaneous or automatic outcome of peer-mediated interventions for childrens' social skills. In essence, research pursuing a programmatic approach to generalization and maintenance is badly needed at this time.

SECTION VI

DESCRIPTION OF THE RESEARCH STUDIES

A total of six research studies have been conducted over the past four years. Each of these is described below. Copies of studies 2, 3, and 4 can be found in Appendix A.

Study 1. The effects of immediate and delayed reinforcement on the cross-setting generalization of childrens' social interactions. This study was conducted within two classrooms of a integrated preschool program in the Pittsburgh, PA. area. The study involved three preschoolers who ranged from 3 - 4 years of age and all of the typical youngsters enrolled in their classrooms. All three target children were selected for participation by their teachers and exhibited difficulties in both social and communication skills.

Children participated in two daily play activities in groups of three, including one target child and two typical youngsters. Children participated first in one of 8 different dramatic play activities which alternated on a daily basis. Immediately afterwards, each group participated in one of 8 manipulative play activities, which also alternated daily. This second activity served as a generalization condition throughout the study. All play activities selected in this and all subsequent studies have been field tested extensively by our research group over the past 10 years. Children engaged in each play activity for a total of 6 min.

Following an initial baseline phase and social skills

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training, children participated in an alternating reinforcement condition. Each target child and his/her peers earned individual rewards for exchanging a criterion number of social overtures during the dramatic play activity. The schedule of reinforcement delivery was alternated on each day, however. On immediate reinforcement days, the reward was provided immediately after the dramatic play activity. Following this reward, children participated in the manipulative play setting, but did not receive any rewards for their performance. On alternate days, however, reinforcement was withheld until after the generalization activity, but was still contingent upon performance in the earlier dramatic play setting.

Results indicated that the alternating reinforcement schedule increased childrens' social exchanges in both the training and nontraining settings. Interestingly, all three target children demonstrated equal levels of generalized interaction during both the early and late reinforcement conditions. More specifically, all three target children and their peers consistently exhibited the targeted social behaviors in the nontraining activity regardless of whether reinforcement occurred on an early or late schedule. Childrens' interactions decreased in both settings during a subsequent baseline phase and generalized improvements did not occur during a second alternating reinforcement condition. Social interactions were increased in the manipulative play activity during a final phase by imposing a variety of experimental manipulations in that setting (i.e., reversing the order of play

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activities, etc.). This study has not yet been submitted for journal publication.

Study 2. Promoting social and supportive interactions between preschoolers: An analysis of group-oriented contingencies. The first purpose of this study was to compare the effects of individual and group-oriented reinforcement on childrens' supportive interactions in their playgroups (e.g., one peer prompts another peer to share with the target child, prompts the target child to initiate a play organizer suggestion to another peer, etc.). A second purpose was to examine the effects of both procedures on target childrens' percentage of social interaction with their typical peers during daily play activities in a training and generalization setting.

Results can be summarized as follows: (1) neither the individual nor group-oriented reinforcement contingency produced consistently high levels of supportive behaviors; (2) both reinforcement contingencies increased target childrens' interactions in the training and nontraining settings, although the generalized increases were transient in nature; and (3) after children were specifically taught to direct supportive overtures to their playmates, their social and supportive interactions were maintained with a group-oriented contingency for target child-peer social exchanges only. Furthermore, target childrens' interactions also increased in the nontraining setting during this final phase of the experiment. This study has been published in the Journal of Early Intervention.

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Study 3.   Using a group-oriented contingency to increase
social interactions between children with autism and their peers:
A preliminary analysis of corollary supportive behaviors.   The
effects of a group-oriented contingency on the social and
supportive interactions of three preschoolers with autism and their
socially competent peers was examined.   Children participated in
daily manipulative play activities in groups of three, including
one target child and two peers.

A group-oriented reinforcement contingency increased all three
target childrens' interactions with peers (e.g., share, assistance,
and play organizers), but produced few or no corollary supportive
exchanges within the playgroups (one socially competent youngster
tells another to "Ask target child to share the logo toys with
us").   After a reversal to baseline where social interactions
decreased to low levels, children were taught to direct supportive
comments to other members of their playgroup. Following this brief
training, the interdependent group contingency was reinstated to
reinforce the share, assistance and play organizer exchanges
between the target children and peers. In addition to interacting
with the target children more frequently, socially competent peers
also utilized supportive prompts to facilitate social exchanges
between the remaining group members.   Childrens' social and
supportive behaviors decreased and increased once again during
subsequent baseline and group contingency phases. This study has
been accepted for publication in Behavior Modification.

Study 4. The overtures of preschool social skill intervention

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agents: Differential rates, forms, and functions. The purpose of this study was to examine the differential topographies and functions of social behaviors directed by normally developing preschoolers to their playmates with autism. Social interaction data from intervention phases of Study 3 above were analyzed in three different ways. First, we examined the frequency of four different behaviors commonly included in social interaction training and/or assessment procedures (i.e., play organizers, share offers/requests, assistance offers/requests, and general statements). Second, the effects of each peer behavior on the immediate responses of three different target children with autism were examined. Finally, we examined the impact of each initiation that led to a positive response on the duration of subsequent target child-peer interactions.

Results indicated that the four peer social behaviors had differential topographical and functional properties. Shares and play organizers occurred most frequently and generated the highest proportion of positive responses from all three children with autism. Conversely, assistance offers/requests occurred less often and received a lower percentage of positive responses. However, assistance overtures consistently led to the longest social interactions. This study has been accepted ᶠor publication in Behavior Modification.

Study 5. Peer-mediated interventions for childrens' social interactions: An analysis of performance variability.

Peer-mediated procedures have become increasingly popular over

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the past 10 years. While these interventions have increased the quality and quantity of childrens' interactions, they have also been associated with a high degree of day-to-day variability across individual children and play activities.

The purpose of this study was to examine the sources for this variability in childrens' interactions. We examined the individual impact of three different variables that are commonly regarded to have a significant impact of chidlrens' interactions. A first variable was type of play activity. A total of nine play activities, including three rated as highly interactive, moderately interactive, and low interactive by teachers, were alternated on a daily basis. A second variable was teachers' predictions of target childrens' "sociability" (on a 1 - 5 Likert Scale) immediately prior to each activity. Finally, we examined the impact of peers various social overtures on target childrens' immediate responses, duration of interaction, and overall percentage of social behavior during an intervention session. A total of three different target children with autism and their typical peers participated in an ABAB reversal design that was comprised of a baseline and intervention phase.

Results indicated that activity type and teacher predictions of target child sociability did not correlate positively with the target childrens' amount of social interaction during either the baseline or intervention phases. Conversely, the specific types of peers' overtures had the most direct relationship to day-to-day interaction rates. Like the results of Study 4, we found that

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specific peer overtures such as play organizer suggestions, share offers/requests, assistance offers/requests, and general statements had differential effects on target childrens' immediate responses, length of ensuing interaction, and overall quantity of social behavior. This study has not yet been submitted for journal publication.

Study 6. Programming for generalization of peer-mediated interventions: The analysis of childrens' social interactions. The purpose of this study was to program for the transfer of childrens' newly taught social behaviors to novel play settings. Three children with autism and 12 typical youngsters enrolled in an integrated preschool participated.

Children participated in two daily play activities in groups of three, including one target child and two typical peers. Following an initial baseline phase, all children received formal social skills training. Immediately after training, teachers implemented a reinforcement contingency during one activity, where target children and peers received individual rewards for exchanging a criterion number of social exchanges. Following this session, each group participated in a second generalization activity. An ABAB design examined the impact of peer-mediated interventions in the training setting.

Results indicated that the intervention package consisting of peer overtures and individual reinforcement increased childrens' exchanges in the training setting. Little or no generalized behavior change occurred in the second nontraining setting,

however. Like the results of Studies 4 and 5, we found that various types of peer overtures had differential effects on target childrens' immediate responding and length of ensuing interaction. Given these results, a refined intervention consisting on **only one form of peer behavior** was implemented within each target child's nontraining play activity. For example, observational records from the training setting indicated that one target child responded positively to peers' play organizers, but less favorably to share and assistance offers. Furthermore, peers' play organizer initiations also led to social exchanges that were significantly longer than those started with shares or assistance. Given these results, the teacher instructed these children to exchange high rates of play organizers in the nontraining setting. An ABAB design indicated that this strategy was effective in programming for the transfer of childrens' social exchanges. This study has not yet been submitted for journal publication.

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SECTION VII

Description Of Methodological or Logistical Problems

There were no significant methodological or logistical problems encountered over the project period. All of our research activities were in accordance with the original grant objectives.

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SECTION VIII

The specific results of each study are described in Section VI of this report. Copies of the three studies that have been accepted for publication are provided in Appendix A.

Section IX

Project Impact

Three types of records are reported to indicate the overall impact of this project on the field of early childhood special education. These include service products and dissemination activities. Both are described below.

A. Service Products.

a. Observational protocols for assessing preschool childrens' social and supportive interactions. Two observational codes have been developed and field-tested over the course of this project. Once instrument entitled the **"Child Intervention Code"** examines the reciprocal social exchanges between an observed child with disabilities and his/her typical peers during various classroom play activities (e.g., sociodramatic, manipulative, and gross motor play). This 19 category code includes a wide range of skills and strategies that have been derived from social interaction research conducted by our own group and many other researchers over the past 10 years. This code has been the primary instrument for evaluating the effectiveness of peer-mediated intervention on the social interactions of children with disabilities and their peers. A total of eight different individuals have learned to use this code during the four year grant period.

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A second instrument measures the <u>supportive</u> social behaviors that children exchange during daily intervention activities. More specifically, we have taught children to use a variety of supportive reminders and suggestions in order to facilitate one anothers' positive social interactions. For example, one socially competent youngster might remind the other peer to "Remember to help <u>(the target child)</u>." Similarly, a socially competent peer might ask the target child to "Please take the block that <u>(other peer)</u> is offering you." This code, entitled the Child Support Code has been used in Studies 2 and 3 as a primary instrument for evaluating the supportive peer-group networks that are generated with group-oriented contingency procedures. Seven different individuals have learned to use this coding instrument.

Both observational codes have been field-tested extensively for reliability and validity during the duration of this project. Using the standard formula for calculating occurrence reliability, interobserver agreement has consistently been 85% or higher for both codes. The treatment validity of both instruments has been provided by demonstrating that various peer-mediated training and intervention procedures result in an increased number of social and supportive interactions. **Both of these products pertain to Service Objectives 1 and 2 on page 6.**

b. <u>A modified procedure for teaching children a wide range of effective social interaction skills and strategies.</u> As a result of our intervention efforts, we have developed a validated procedure for teaching social and supportive skills to preschool-aged

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children. Two characteristics distinguish this procedure from the majority of prior social skill training techniques. First, the teacher conducts skill training with an entire class of preschoolers, including those youngsters with developmental disabilities. Second, all children learn a wide variety of different skills and strategies for engaging their classmates in play. Five basic social skills include share offers/requests, assistance offers/requests, play organizer suggestions, compliments, and affection. Children also learn three different strategies for using each skill. They learn to initiate or start interactions with the skill, to respond positively to the skill, and to persist in their use of initiation and response strategies. This is an extension of prior procedures that have taught typical children to use only one strategy for engaging their peers with disabilities in play.

We have also developed and tested a manual for training teachers to conduct teaching sessions for social and supportive skills. This "How to" manual describes procedures for arranging play activities, identifying target children, selecting skill objectives, conducting training sessions, and maintaining childrens' newly taught social and supportive interactions. A total of 16 preschool teachers have used this manual during the course of this project. **This product pertains to Service Objective four on page 6.**

c. A list of social behaviors that lead to target childrens' acceptance and inclusion into integrated play groups. As indicated

on page 8, many prior studies have attempted to improve childrens' discrete social skills prior to a full understanding of what competent social behavior was in the first place. One primary focus of this project has been to identify a range of skills typically targeted for social skills intervention and to examine their various functions on target childrens' social behaviors.

Studies 4, 5, and 6 examined the specific functions of play organizer, assistance, share, and general statement overtures on target childrens' social behaviors. Collectively, these three studies have produced four consistent and significant results. First, the various forms of peer initiations (including shares, assistance, play organizer suggestions, and general statements) produce differential effects on the <u>quality of target child responses</u> as well as the <u>duration of ensuing target child-peer interactions</u>. More specifically, we have consistently found that some initiations lead to a greater proportion of positive responses from target children, or longer interactions with the target child, than do others.

Second, these two functions are sometimes incompatible. For example, results of Study 4 indicated that all three target children received a high number of shares and play organizers from their peers during daily play activities, and received very few assistance or general statement bids. Interestingly, each child also exhibited the highest proportion of positive responses to shares and play organizers, while assistance and general statement overtures were ignored much of the time. However, peer assistance

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initiations that were responded to positively by the target children led to interactions that were <u>significantly longer</u> than interactions begun with shares or play organizers. This illustrates a case of two desirable behavioral functions (i.e., quality of target childrens' immediate social response and length of ensuing interaction) which are incompatible, demanding their own, idiosyncratic programming.

Third, identification of the "most effective" social behaviors (in terms of immediate response and length of ensuing interaction) varies considerably across individual children. Our data indicate that some target children respond most positively to share offers, while others exhibit the highest proportion of positive responses to play organizer suggestions, general statements, etc. Our functional analyses of interaction length yields similar results. Peer play organizer initiations lead to the longest interactions for some target children, share offers for others, and assistance offers for still others. In summary, while our functional analyses can lead to a hierarchy of "most effective" social behaviors, this hierarchy is highly idiosyncratic across individual children.

Finally, despite differences across individual children, our research indicates that topography of peer social behaviors is the <u>single</u> variable that adequately predicts target childrens' interactions. Conversely, the variables of activity type and teacher predictions immediately prior to a session do not predict childrens' quality or quantity of social behavior. These findings indicate that specific hierarchies of the "most effective" social

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behaviors can be developed for individual children

In summary, Studies 4 - 6 indicate that various peer behaviors are associated with different dimensions of target childrens' social competence.   The structure of our primary observation instrument, The Child Intervention Code, lends itself to functional analyses that will identify the "most effective behaviors" for target childrens' acceptance and inclusion into integrated play activities (**See Service Objective three on page 6**).   In contrast, Study 6 found that variables such as play activities and materials have little or no impact on childrens' social interactions **(see Service Objective five on page 6)**.

d.   <u>A group-oriented contingency procedure for maintaining childrens' newly taught interaction skills and strategies.</u> Group-oriented contingencies have become popular within educational settings over the past decade.   The primary goal of Studies 2 and 3 were to identify the conditions where "peer group support" could be reliably produced to promote and maintain childrens' independent interactions.   These studies demonstrated that group-oriented contingencies generate consistent levels of support <u>only</u> after children receive direct training for these behaviors.   In fact, children who received supportive training repeatedly and enthusiastically reminded their classmates to play with one another, even though teacher or experimental contingencies were never provided directly for this behavior.   <u>This is a vast improvement over procedures where childrens' interactions are heavily dependent on teacher directions and approval</u>.   In short,

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once children have learned to support or facilitate one anothers'
behaviors, then group-oriented contingencies serve as an effective
methodology for generating and maintaining high levels of positive
and interdependent interactions. **This product pertain to serve
Objectives six and seven on page 6.**

2. Dissemination Activities. Table 1 on the following page lists
the different dissemination activities completed during Years 01 -
04 of this project.

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Table 1

Dissemination Activities Completed During Years 01 - 04

Activity	Primary Audience	Totals
Research Based Manuscripts and Other Journal Articles and Book Chapters	Researchers and practitioners in Special Education, Psychology, Education, Psychiatry, Project Directors From OSERS	7 Total Accepted; 3 to be submitted
Presentations at Professional Conferences	Same As Above	12
Presentations at Local and State Workshops	Teachers and parents of preschoolers with disabilities, School Psychologists, Directors of Early Childhood Programs	10
Classroom Instructional Materials	Teachers and parents of preschoolers with disabilities; OSERS programs; SIGs; other FIRs; State Inservice Directors, Institutions of higher education with early childhood or special education programs.	700 people receiving materials

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APPENDIX A

COPIES OF STUDIES

2, 3 and 4.

Promoting Positive and Supportive Interactions Between Preschoolers: An Analysis of Group-Oriented Contingencies

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LISA DeCESARE
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This study examined the effects of several procedures on the social and supportive interactions of two pre-schoolers with handicaps and their socially competent peers. An alternating individual and group-oriented reinforcement contingency produced equal increases in the target children's interactions with peers. However, neither procedure generated consistent levels of supportive peer behaviors. Following a baseline phase where social and supportive interactions decreased to lower levels, two socially competent children were taught to deliver high levels of supportive prompts to their peers during a dramatic play activity (e.g., "Ask [target child] to come and join our picnic"). Results indicated that peers complied with these statements by increasing the frequency of social behaviors directed to the target children. A final interdependent group contingency condition maintained both social and supportive interactions at high levels. These results are discussed with regard to the efficacy of group-oriented contingencies.

Acquiring positive interaction skills is a primary developmental task during early childhood years (Strain, Guralnick, & Walker, 1986). These skills enable children to form positive relations and friendships with their peers (Asher & Taylor, 1981). Other important skills acquired during peer interactions include language and vocabulary (Guralnick, 1981) and a host of other social overtures (Hartup, 1983). Conversely, the absence of positive interaction skills predicts peer rejection and ridicule (Strain, Kerr, & Ragland, 1981), school underachievement (Foster & Ritchey, 1979), juvenile delinquency (Roff, Sells, & Golden, 1972), and adjustment and

mental health problems during the adult years (Roff, 1961).

During the past 10 years, an effective technology has emerged for improving the social interaction skills of young children (Barton, 1986). One set of procedures uses classroom peers as intervention agents. For example, Strain, Shores, and Timm (1977) taught preschoolers to direct social initiations to their withdrawn classmates. Similarly, Paine et al. (1982) used a group-oriented contingency to promote social interaction during daily recess periods. Finally, Kohler and Fowler (1985) implemented a group contingency to maintain positive social exchanges between

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a first grade child and her peers. The target child and peers earned points that were exchangeable for class rewards by making share offers and play invitations.

Peer-assisted interventions provide a variety of potential benefits to educational practitioners and researchers. Some evidence indicates that these procedures are as effective as teacher-implemented methods (i.e., Fowler, Dougherty, Kirby, & Kohler, 1986). Furthermore, when peer-assisted interventions are supplemented with group-oriented contingencies, a variety of supportive or facilitative behaviors may occur from peers who participate in the reinforcement contingency. In an extensive literature review, Greenwood and Hops (1981) noted that group contingencies frequently generate corollary or untrained peer prompts and encouragement (Alexander, Corbitt, & Smigel, 1976; Wilson & Williams, 1973), approval (Frankosky & Sulzer-Azaroff, 1978), and even tutoring (Axelrod & Paluska, 1975) for target children's treatment gains. Unfortunately, most of these studies were based upon anecdotal reports, rather than formal observations of supportive peer behaviors (Kohler, 1986). Furthermore, studies conducted with preschool children have yet to document these corollary effects.

Very few researchers have examined the function of corollary peer behaviors generated with group contingencies. One exception is a study by Van Houten and Van Houten (1977). While using a group contingency with a class of special education students, they found that several children provided evaluative comments for the reading performance of their peers. Suspecting that these comments were functional, Van Houten and Van Houten taught several youngsters to provide and withhold their statements in an alternating fashion. Results indicated that peer comments generated higher reading rates.

The Van Houten and Van Houten (1977) results may have important implications for the efficacy of group-oriented contingencies. Facilitative natural or untrained peer behaviors may well ensure that target children's treatment gains transfer to novel response classes, settings, or over time (Baer & Wolf, 1970). However, supportive peer behaviors must first be documented with formal observations and then experimentally analyzed to determine their effect on target children's and peer responses.

This investigation sought to expand the existing literature in three ways. A first purpose was to examine the impact of individual and group-oriented contingencies on the social interactions of handicapped and non-handicapped preschoolers. A second purpose was to identify any supportive and corollary (untrained) peer behaviors generated by these two procedures. Finally, we examined the impact of formal training on the supportive comments exhibited by two socially competent children during a final group contingency condition.

METHODS

Subjects and Setting

An entire class of two autistic and seven normally developing preschoolers participated in this study. All nine children were enrolled in a half-day integrated preschool for autistic and normally developing children.

Ken was a 4-year-old autistic boy who had been enrolled in the program for 2 years prior to this study. He demonstrated a variety of problematic social behaviors, including ignoring or responding inappropriately to peers' play overtures. Classroom observations indicated that Ken also lacked age-appropriate play skills and was rarely ap-

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proached by other children during play activities.

James, a 4-year-old autistic boy, was a second primary subject of this study. Observations indicated that James frequently demanded materials and rarely responded positively to other children's play requests or offers. Unlike Ken, James exhibited many age-appropriate play skills prior to the study.

For both Ken and James, three confirmatory diagnoses of autism were available from three independent child psychiatrists who used DSM-III criteria. That is, each child was observed by the psychiatrists to engage in significantly delayed and deviant forms of communication and social interaction skills, preoccupation with objects, and repetitive behaviors. For each child, all of these characteristics were present prior to 30 months of age. Finally, Ken scored above the 50th percentile in all categories of the *McCarthy Scales of Children's Abilities* (excluding the motor category), while James scored below the 20th percentile on all but the perceptual category of this developmental test.

Seven nonhandicapped children enrolled at the school served as participating peers. These children ranged from 3 to 4 years of age at the beginning of the study. Peers 1 and 2 (both 4 years old) participated in all phases of this investigation. Due to changing enrollment over the summer months, Peers 3 through 7 participated in only portions of the study. Further information pertaining to the involvement of the peers is provided later.

Experimental observations and interventions took place in two different settings. Training and intervention sessions occurred during five different dramatic play activities, which were rotated daily. Generalization sessions were conducted in eight manipulative play activities, which were also rotated each day. Generalization sessions occurred approximately 5 minutes after the intervention sessions.

Two preschool teachers arranged and conducted the intervention and generalization activities each day. These individuals had 2 to 4 years of prior experience teaching in integrated preschool programs.

Experimental Measures
Two observational codes were used to record the social interactions of target children and peers in the intervention (dramatic play) and generalization (manipulative play) activities.

Child Intervention Code   A 6-second, partial interval, time-sampling system was used to code peer behaviors directed to the target children and behaviors the target children directed to peers. In addition to recording its type (i.e., initiation, response, or concurrent), the observers indicated whether the target child or peer exhibited each behavior. The various categories are described below.

A. *Child Initiations.*   These behaviors started an interaction and were not preceded by another child's behavior during the previous 6-second interval. Seven types of child initiations were scored, including:

* *Play organizer:* Verbalizations wherein a child specifies an activity, suggests a play idea, or directs another child to engage in an activity-related play behavior.
* *Share:* Verbal offer or request for an object from another child.
* *Assistance:* Verbal offer or request for help. This type of initiation was virtually nonexistent during the initial baseline 1 phase.
* *Compliment:* Verbal statement indicating affection, attraction, or praise.
* *Affection:* Patting, hugging, or holding hands with another child.
* *Negatives:* All verbal or physical actions that were uncomplimentary, rejecting, or

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physically harmful in nature. Examples include name calling, hitting, or destroying another child's block construction.

- *General:* All verbal or social initiations not scored in the other categories.

Observers scored a maximum of one initiation per observational interval. Two precedence rules existed for intervals during which two or more initiations occurred. First, negatives took priority over all other types of initiations. Second, shares, play organizers, assists, compliments, and affection took precedence over general initiations.

B. *Child Responses.* These behaviors were timely and direct responses to another child's initiation (i.e., they occurred within two observational intervals after the initiation). Three different responses were scored:

- *Yes:* All positive or compliant responses. Examples included accepting another child's play item (share offer) or complying with a play suggestion.
- *No:* Scored whenever a child did not respond to another child's initiation within 12 seconds. Examples included ignoring or refusing to comply with another child's initiation.
- *Negatives:* All verbal or physical actions that were uncomplimentary, rejecting, or physically harmful in nature.

C. *Child Concurrents.* These social actions followed and extended a previous response, but did not constitute a new initiation (i.e., 6 seconds did not elapse without a social behavior from a child). In addition to the seven discrete categories listed under the initation category, child concurrents included nonverbal actions that followed a previous initiation and response and were socially cooperative or associative in nature. For example, all intervals of mutual block construction

that followed a peer's initiation, "Let's build a schoolhouse" and a target child's response, "Ok" were scored as a "Continue" category of concurrent play.

Two types of teacher behavior were scored with the Child Intervention Code. *Prompts* were coded whenever the teacher suggested, directed, or asked the target children or peers to exchange any initiation, response, or concurrent behaviors. *Praise* included statements of approval for engaging in initiation, response, or concurrent exchanges.

Peer Support Code A 6-second, partial interval, time-sampling system was used to score interactions between two peers who participated in play sessions with the target child. Once again, the observers coded the name of the peer performing each supportive behavior. The following categories were scored:

A. *Peer Initiations.* Three types of peer behaviors were scored in this category, including:

- *Peer Prompts:* Scored whenever one peer asked, suggested, or instructed another peer to direct an initiation, response, or concurrent behavior to the target child (see Child Intervention Code). Examples included directions to share with the target child or requests to "Ask [target child] to play with us." Two criteria for scoring a prompt were (1) the statement was directed to another peer and (2) the statement pertained to a specific action that should be directed to the target child and would be scored with the child intervention code.
- *Peer Approval:* All verbalizations where one peer expressed praise, admiration, or affection to another peer for interacting with the target child.
- *Peer Negatives:* Any uncomplimentary, rejecting, or threatening statement/action

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from one peer to another peer. Unlike prompts and approval, negative peer initiations did not have to pertain to interactions with the target child.

B. Peer Responses. Three types of responses were scored:

- Yes Responses: Scored when peers responded positively to another peer's prompt, approval, or negative initiation within two observational intervals (12 seconds). Examples included complying with a request to share with the target child, saying "thank you" to peer approval, and saying "Please stop that" after being pushed by a peer.
- No Responses: All cases where a peer did not respond positively (or comply with) another peer's initiation within 12 seconds. Both ignoring and actual refusals ("No, I won't ask him to play") were scored.
- Negative Responses: All verbal or physical actions that were uncomplimentary, rejecting, or physically harmful in nature.

Teacher prompts and praise were also scored with the peer support code. These teacher directions/requests or approval were directed to one or both peers and pertained to engagement in any of the supportive peer initiation or response categories.

Reliability was assessed by having two observers simultaneously but independently score with the same observational code. Reliability was conducted on at least 20% of the intervention and generalization sessions with both target children. Occurrence reliability scores were calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100.

Occurrence reliability scores for the Child Intervention Code averaged 90%, 85%, and 86% for child initiations, responses, and concurrent behaviors respectively (range of 67%

to 100% across individual behaviors). A primary dependent measure of this study was the percentage of intervals during which Ken and James engaged in positive social interaction with their peers. This measure encompassed all positive target child initiations, responses, and concurrent behaviors (including continues). Reliability scores for Ken and James' total percentage of positive interaction averaged 95% and 90% across all experimental settings and phases. Agreement about the occurrence of teacher prompts and approval averaged 89% and 95% for Ken and James (range of 36% to 100%). The low points in the reliability ranges represent occasions on which very few behaviors were scored.

Occurrence reliability scores for the Peer Support Code averaged 83% and 80% for supportive initiations and responses, respectively. Total reliability averaged 78% and 79% for Ken and James across all experimental settings and phases (range of 56% to 100% across individual behaviors). Interobserver agreement scores about the occurrence of teacher prompts and approval for supportive behaviors averaged 93% and 86% for Ken and James (range of 65% to 100%). The low points in the reliability ranges represent occasions on which very few behaviors were scored.

A measure of validity was taken between child behaviors on the two separate codes. First, all Yes responses (to a peer prompt initiation) scored on the Peer Support Code were identified. Next, the accompanying data sheet for the Child Intervention Code was examined to determine whether an inititation or concurrent behavior (i.e., share, play organizer, assistance, affection, compliment, and general) was directed toward the target child (by the peer who had received the prompt initiation on the Peer Support Code) within the next observational interval (6 seconds after the Yes response was scored on the peer

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code). A total of 308 Yes responses were scored on the Peer Support Code. Of these responses, 262 (85%) were followed within one interval by a peer behavior directed to the target child on the Child Intervention Code. This indicates that 85% of the peer prompt initiations that were complied with led to behaviors that had been scored with the Child Intervention Code.

Experimental Design and Procedures

The two target children and their peers participated in the daily intervention and generalization sessions in rotating groups of three (including one target child and two participating peers). Six minutes of observational data were collected for Ken, James, and their respective peers for each observational session.

The composition of play triads was alternated on each day during the first four conditions to ensure that Peers 1 through 5 participated with each other and with both target children. Group composition remained constant in the final two experimental conditions, when Peers 1 and 6 participated with Ken and Peers 2 and 7 were placed in a group with James.

A combined reversal and alternating treatment design was used to examine the six experimental conditions described below.

Baseline 1 The two target children and their peers participated in the dramatic play (intervention) and manipulative play (generalization) activities on a daily basis. The teacher spent 2 to 3 minutes introducing the activities by describing the various themes, roles, and appropriate use of play materials. Following this introduction, the teacher did not interact with the children except to resolve conflicts over play materials or roles.

Classwide Social Skills Training The teachers implemented a programmed social skills

training package developed by Odom, Kohler, and Strain (1987) in the dramatic play setting with both target children and Peers 1 through 5. Children participated in daily 15-minute training sessions and learned the following three skills: (1) play organizers, (2) share offers and requests, and (3) assistance offers and requests. Children learned three different strategies for using these skills. First, each skill was used to *initiate* or *continue* play interactions with another child. For example, peers might extend a share offer to a target child who was playing alone. Second, children learned to *respond positively* to these social overtures. Using the above example, a target youngster might respond to a peer's share offer by accepting a particular play item. Finally, children learned to *be persistent* in their use of initiation and response strategies. Social initiations that were ignored or refused were followed by more elaborative overtures.

Social skills training occurred for 15 days and entailed three distinct stages for each skill. Teachers introduced and modelled the skills for the children during Stage 1, which generally extended for one to two sessions. During Stage 2, children rehearsed and role played the social skills with the teacher and with one another. The teacher provided ongoing instructions, models, assistance, and feedback (correction and praise) to individual children at this time. Stage 2 generally lasted 2 to 3 days for each skill. During Stage 3, the children practiced the skills with one another independently. Two criteria were set for terminating this final stage: (1) the target children and Peers 1 through 5 exchanged at least six skills (i.e., share, play organizer, or assitance) within a 6-minute play period; and (2) Peers 1 through 5 performed at least 50% of their skills independent of teacher directions or specific prompts.

The two target children were observed with the Child Intervention Code during the final

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three training days of Stage 3 to ensure that their peers met both of the criteria. Formal observational data were not collected during Stages 1 and 2 due to the teacher's more frequent and active involvement in these training sessions (e.g., frequent models and role playing, instructions, assistance, immediate feedback).

Alternating Treatment The two target children and their peers resumed participation in the daily intervention and generalization sessions. An individual and interdependent group-oriented contingency were alternated on each day. Members of each play group (one target child and two peers) earned happy faces (posted on a large chart) for exchanging the previously trained skills with one another. The alternating reinforcement conditions are described below.

Individual Contingency. The teacher spent several minutes introducing the activity and contingency to the children. The teacher pointed to a poster illustrating a single elephant and noted "Today is individual day. Each person will receive a prize if they get their own six Happy Faces." After quizzing the children to ensure their understanding of this contingency, the teacher reviewed the various skills and strategies that could earn Happy Faces and told the children that they could help their friends earn Happy Faces if they wished. Finally, the teacher awarded Happy Faces to the target children and Peers 1 through 5 for exchanging play organizers, share offers/requests, and assistance offers/requests with one another. All children with six or more Happy Faces at the end of the 6-minute session received an inexpensive reward (balloon, sticker, coloring sheet, etc.). Teachers identified a pool of 8 to 10 rewards commonly used in the classroom and permitted the children to choose from two to

three items daily. Peers received a maximum of two teacher prompts per session while the target children received a maximum of three teacher reminders. Teachers did not provide prompts, Happy Faces, or rewards during generalization activities.

Interdependent Group Contingency. The teacher described this contingency by pointing to a chart showing a group of three elephants and stating "Today is group day. To get a prize, every square on the Happy Face Chart must be filled when the timer rings. That means that nobody gets a prize unless they earn all of their own Happy Faces and both of their friends earn all of their Happy Faces too." The teacher ensured the children's understanding of this contingency by filling in various portions of the chart and then asking individual children whether they would receive their prizes today. After reviewing the various social interaction strategies, the teacher told the children that they could help their friends earn Happy Faces if they wished.

Following the introduction, the target children and their peers received Happy Faces for exchanging target skills. However, each group member chose one reward (from a pool of two to three items) after the session only if *all* three children (the target child and both peers) had earned at least six Happy Faces. If one or more individuals did not meet this criterion, none of the children were permitted to select a reward. Teachers continued to provide a maximum of three and two prompts to target children and peers respectively during the dramatic play activity. As before, no teacher intervention was permitted in the generalization activity. The design of this contingency was identical to those previously associated with the occurrence of supportive peer comments (Greenwood & Hops, 1981).

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Interdependent Group Contingency The interdependent group contingency described above was implemented on *each day* during the dramatic play activity.

Baseline 2 In order to establish a base rate of behavior for the subsequent supportive training phase, the conditions operating in Baseline 1 were reinstated.

Supportive Training for Peers 1 and 2 Peers 1 and 2 were taught to remind their participating peers (Peers 6 and 7) to interact with the target children during the dramatic play activities. Rather than interacting with the target child, Peers 1 and 2 were instructed to make sure that their peers continually interacted with and directed discrete social behaviors towards Ken and James (i.e., shares, play suggestions, etc.).

Training was conducted in the dramatic play setting by the first author and one research assistant. Training occurred for 15 minutes on 3 separate days and entailed adult instructions and rehearsal, adult and child role play, and child rehearsal with adult feedback. Because Peers 1 and 2 had exhibited a low rate of supportive prompts during the previous group contingency phase, training focused mostly on using a higher rate of reminders. Training continued until both children could independently direct 8 to 10 prompts to the adult trainer (who role-played a participating peer) within a 6-minute period. Peers 1 and 2 did not participate in the intervention and generalization sessions with Ken and James during this phase.

Peer Support Peers 1 and 2 resumed participation in the daily intervention and generalization sessions. Peer 1 played with Ken and Peer 6, while Peer 2's play group included James and Peer 7. Because Peers 6 and 7 were new to the preschool program, neither child had been involved in any prior experimental or social skills training phases.

A classroom teacher met with Peers 1 and 2 before each intervention session to review the supportive strategies (e.g., "Remember to watch Peer 6/7 and remind him to share with, play with, or talk to the target child"). Following this review, the teacher called the target child and participating peer over to the area and the intervention session began.

The teachers monitored Peers 1 and 2 closely throughout the session and occasionally reminded them to ask/tell their friend to interact with the target child. Teachers provided a maximum of two prompts to Peers 1 and 2 per session. Baseline conditions were reinstated for the target children and Peers 6 and 7. That is, the teacher did not prompt these children to interact with one another, did not provide approval or Happy Faces, and did not give a postsession reward. The teacher did permit Peers 1 and 2 to select an inexpensive reward (privately) after the session if they directed at least six prompts to Peers 6 and 7. Finally, no teacher intervention occurred in the generalization sessions.

Interdependent Group Contingency For replication purposes, the final study phase involved a reinstatement of the prior group contingency condition.

RESULTS

Three primary results are reported. The effects of the various experimental conditions on the target children's total social interactions with their peers will be presented first. This measure entailed all intervals during which Ken or James directed a positive initiation, response, or concurrent (including continue) behavior towards his peers. Next, the number of supportive peer initiations occurring during each experimental condition will

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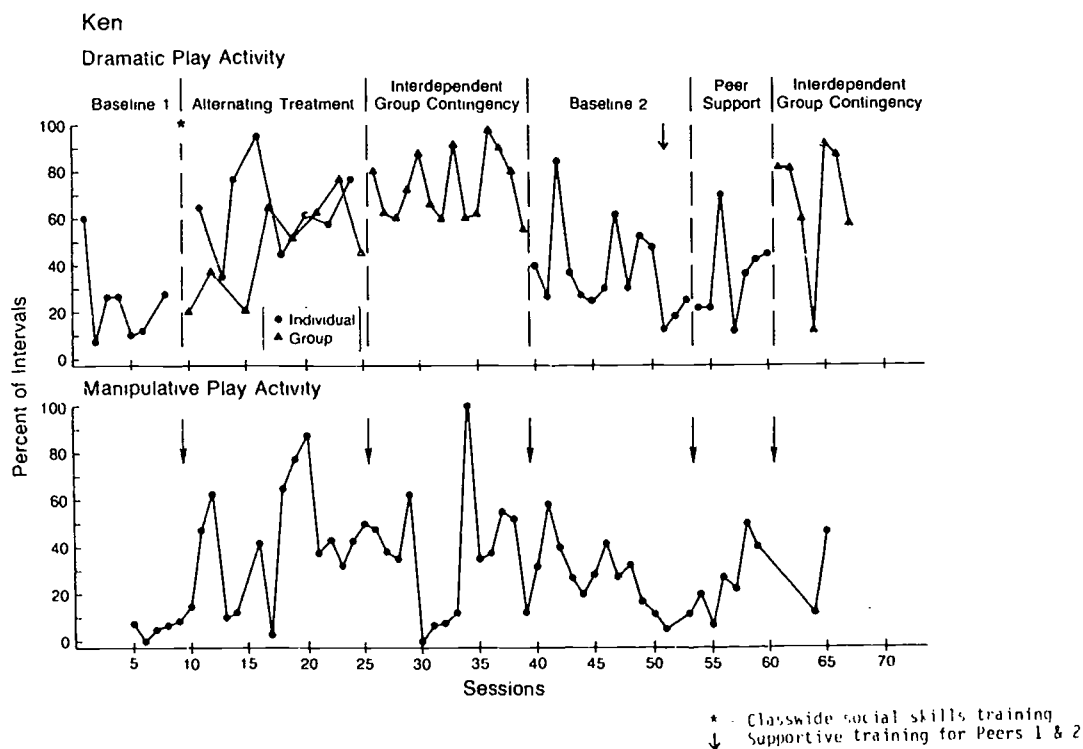be reported. Finally, data indicating the function of the supportive peer initiations will be presented.

Target Child–Peer Social Interaction

Figures 1 and 2 illustrate the percentage of intervals during which James and Ken engaged in positive social interactions (including positive initiations, responses, and concurrent behaviors) with their peers in the intervention and generalization activities. Ken and his peers interacted during an average of 23% of the intervals during baseline while James interacted with his peers 50% of

the time. Social interaction rates for both target children were much lower in the generalization setting.

The alternation of individual and group-oriented reinforcement contingencies increased both boys' interactions with peers. While James' interaction trend increased only slightly, Ken's behaviors increased to 56%, which was a significant improvement from his 23% baseline level. With the exception of Ken at first, neither child showed differences across the individual and group contingency procedures. Interaction percentages were quite variable for both boys during this

FIGURE 1

The Daily Percentage of Social Interaction Directed by Ken to his Peers During the Dramatic and Manipulative Play Activities Across All Experimental Sessions and Conditions

Ken

Dramatic Play Activity

Manipulative Play Activity

* — Classwide social skills training
↓ — Supportive training for Peers 1 & 2

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The Daily Percentage of Social Interaction Directed by James to his Peers During the
Dramatic and Manipulative Play Activities Across All Experimental Sessions
and Conditions

James

* = Classwide social skills training
↓ = Supportive training for Peers 1 & 2.
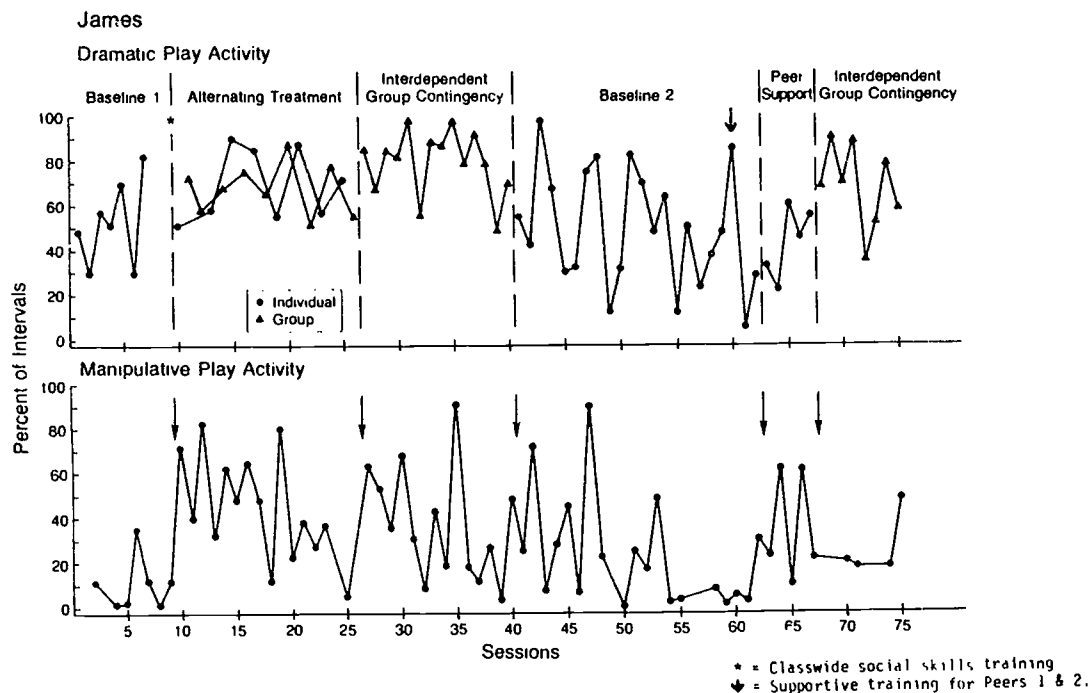
phase. Teachers delivered an average of two prompts to the target children and their peers (range of one to three).

The target children also interacted slightly more often in the generalization activity during the alternating treatments phase. James' social behaviors showed an initial increase, but then declined during sessions 20 through 25.

Daily implementation of the interdependent contingency maintained James and Ken's interactions at high levels during the dramatic play activity. Social behavior trends were highly variable during both the dramatic and the generalization activities. Teacher prompts averaged two to peers and targets throughout this phase.

The Baseline 2 condition decreased the target children's interaction with peers. James interacted during an average of 49% of the intervals, while Ken's average dropped to 37%. Similar decreases occurred in the generalization setting. Once again, high levels of variability occurred during both activities.

Implementation of the Peer Support phase had little impact on the target children's social interactions. Ken's and James' behaviors occurred at levels very similar to their Baseline 2 rates.

A second and final application of the Interdependent Group Contingency condition restored social interactions to their previous high levels. As in the previous intervention

phases, teachers delivered an average of two prompts to the peers and target children. Social interaction trends remained stable in the generalization setting.

Occurrence of Supportive Peer Initiations

The average number (per phase) of supportive peer initiations exhibited by Peers 1, 2, 6, and 7 in dramatic play is depicted in Table 1. Because approval and negative peer initiations were never observed, the data illustrate prompts from one peer to another for interaction with the target child.

Table 1 shows that supportive peer prompts were virtually nonexistent during the initial Baseline 1 phase. The alternating treatment condition led to an average of 1.0 and .60 prompts (summed across the two alternating conditions) in James' and Ken's play groups respectively. This low rate of less than one prompt per day continued with daily implementation of the interdependent group contingency, with .43 and .65 prompts occurring per day in James' and Ken's groups respectively. Finally, peer prompts decreased to near-zero levels during the Baseline 2 condition.

Implementation of the peer support phase following supportive training increased the number of prompts observed in both play groups. Observations indicated that Peers 1 and 2 exhibited all of the supportive prompts in their play groups. Peer 1 directed a mean of 15 prompts per session to Peer 6 (Ken's group), while Peer 2 directed Peer 7 to interact with James an average of 12 times per session. Finally, supportive prompts decreased to lower and more stable levels during the final group contingency phase, with Peers 1 and 2 providing an average of 9 and 3 statements, respectively.

Function of Supportive Peer Prompts

The data suggest three related, yet different functions of supportive peer prompts over the final four experimental phases: Interdependent Group Contingency, Baseline 2, Peer Support, and Interdependent Group Contingency. Each of these functions are described below.

1. *Peer 6's and 7's interactions with the target children.* Peers 6 and 7 directed low levels of social behaviors to Ken and James during their initial Baseline 2 phase of participation (2% and 6% for Peer 6 and Peer 7, respectively). It is important to note that neither child had received social skills training or participated in any of the previous interven-

TABLE 1
Range and Average Number of Supportive Prompts Made in Ken's and James' Play Groups Across All Experimental Conditions

| | Ken | | James | |
| | Phase Average | Range | Phase Average | Range |
Phase				
Baseline 1	.10	0– 1	0	0
Alternating Treatment				
Individual Contingency	.45	0– 3	1.17	0– 6
Interdependent Contingency	.90	0– 6	.75	0– 4
Interdependent Group Contingency	.65	0– 5	.43	0– 5
Baseline 2	.20	0– 1	.10	0– 2
Peer Support	15	6–25	12	0–18
Interdependent Group Contingency	9	0–14	3	0–10

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tion conditions. When they received frequent prompts from Peers 1 and 2 during the Peer Support phase, however, Peers 6's and 7's average percentage of social behaviors to Ken and James increased to 21% and 23%. Although these levels decreased to 15% and 10% during the final Interdependent Group Contingency phase, they still represent increases over the Baseline 2 percentages.

2. *Peer 1 and 2's interactions with the target children*. Peers 1 and 2 directed social behaviors to Ken and James during an average of 21% and 15% of the intervals, respectively, during the first Interdependent Group Contingency phase. Both children's behaviors decreased during Baseline 2 (11% for Peer 1 and 13% for Peer 2). Peer 1 and 2's percentage of social behaviors to the target children decreased *even more* during the Peer Support phase, when they were instructed to direct prompts to Peers 6 and 7 (8% and 7% for Peer 1 and 2, respectively). Finally, both peers directed more social behaviors to Ken and James during the final Interdependent Group Contingency Phase (22% for Peer 1 and 15% for Peer 2).

3. *Ken and James' percentage of social interaction with peers*. The mean percentage of intervals where Ken and James engaged in positive interaction with peers has been detailed previously (Figures 1 and 2). To review here briefly, both boys' mean interaction levels were 79% during the first Interdependent Group Contingency phase. These levels decreased to 37% and 49% for Ken and James, respectively, during Baseline 2 and maintained low trends during the Peer Support phase. Finally, Ken and James resumed high interaction levels during the final phase.

DISCUSSION

The results of this study show that (a) both individual and group-oriented contingencies had an equivalent effect on target children's social interaction with peers; (b) socially competent preschoolers exhibited few supportive prompts without direct training under two group-oriented contingency conditions; and (c) two socially competent children demonstrated high levels of supportive prompts during a final group contingency phase, after they had been taught to use these statements.

These findings hold numerous implications for classroom practice. One interesting finding was the highly variable levels of social interaction generated by the individual and group contingency interventions. Because the frequency of teacher prompts remained constant across all intervention sessions and phases, this variability is probably attributable to the different play activities. Unfortunately, the brief experimental conditions in this study did not permit an adequate analysis of the different dramatic and manipulative activities. Future studies should examine this issue more thoroughly.

It appears that group and individual reinforcement contingencies can have an equivalent impact on preschool children's social interactions. Children exchanged a wide variety of social overtures under both conditions, including play organizer suggestions, shares offers/requests, and assistance. Furthermore, most peers used the initiation, response, and persistence strategies taught in the Social Skills Training Procedure (Odom et al., 1987). Although this study did not examine the differential impact of the social skills training and group contingency intervention, the overall package seems to be an effective tool for classroom teachers.

Prior studies comparing group and individual reinforcement contingencies have reported mixed results. For example, Gresham and Gresham (1982) evaluated the effects of individual and group-oriented procedures on the disruptive responses of 12 EMR children.

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An ABCDABCD design demonstrated that the group procedures produced superior results. In a different study, Speltz, Shimamura, and McReynolds (1982) compared the effects of individual and group contingencies on the academic and social behaviors of 12 LD students. Some students demonstrated their best performance with the group procedure while others responded in an equivalent fashion across both conditions.

Prior studies have indicated that peers consistently exhibit corollary and supportive behaviors during group-oriented reinforcement contingencies (Greenwood & Hops, 1981). In our study, an alternating treatments phase was initially implemented to determine whether preschoolers would exhibit differential levels of support under individual and interdependent group-oriented contingency interventions. Interestingly, neither condition generated consistent levels of supportive comments. The interdependent group contingency was then implemented with the same results of few or no supportive behaviors. Given these findings, two socially competent children were specifically taught to direct supportive prompts to their peers. Following three training sessions, both children directed a high number of reminders to Peers 6 and 7 during the Peer Support Phase. An interdependent group contingency was again implemented to determine whether Peers 1 and 2 would use supportive comments without direct prompting or reinforcement from the teacher. Both peers exhibited consistent levels of supportive comments during this final condition. These results suggest that the supportive impact often associated with group-oriented contingencies should not always be inferred with preschool children. Classroom teachers wanting children to interact in socially supportive ways might need to provide specific training to facilitate these behaviors.

The supportive peer comments in this study had little facilitative impact on target children's social interaction levels. Following the initial group-oriented contingency condition, two socially competent children were taught to deliver high levels of supportive prompts to their nontarget and untrained classmates. Results showed a desirable and predictable outcome, with Peers 1 and 2 providing frequent reminders to Peers 6 and 7, who complied with these supportive prompts by directing an increased number of social behaviors towards Ken and James. However, the social overtures of Peers 6 and 7 did not increase the target children's level of social interactions. The *frequency* of peer social bids may be responsible for these results. In the initial individual and group contingency phases, two different peers directed six to eight social overtures each toward the target children. During the peer support phase, however, only Peers 6 and 7 interacted directly with Ken and James. Thus, the *number* of social overtures received by the target children during the peer support phase was only one half of that achieved in the previous intervention phases. Future studies might alleviate this problem by ensuring that two to three different children receive prompts to direct social behaviors towards their target classmates.

In summary, this investigation extends the existing research literature in several ways. First, it examined the impact of individual and group-oriented reinforcement contingencies on the social interactions of handicapped and nonhandicapped preschool children. Second, this study examined the effects of these two procedures on peer group support for target children's treatment gains. Research exploring these issues in more detail may well result in a more effective technology for remediating the social skill deficits of handicapped children.

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A Study of Employee Stability and Turnover in Home-Based Early Intervention

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Unusually high turnover rates in early intervention programs will contribute significantly to the documented shortage of qualified personnel needed for the successful implementation of PL 99-457, forcing policy makers to consider options for maximizing the retention of personnel presently in the field. This study was conducted to provide an initial indication of the extent of turnover among early childhood interventionists working in a statewide network of home-based early intervention programs. Results indicated that the mean length of service of staff was increasing (2.5 years in 1985; 3.5 years in 1988) whereas the mean length of service of related therapists and specialists employed as consultants was decreasing (2.9 years, 1985; 2.2 years, 1988). The findings also revealed that 49% of staff and 38% of consultants remained employed over a 2.7 year period, while 68% of directors of programs remained during the same period. The results of the study are compared to turnover rates and length of service for various related settings described in the literature, and implications for further research are discussed.

A key factor influencing the successful implementation of Public Law 99-457 is the availability of a sufficient number of qualified personnel to provide early intervention. Unfortunately, shortages of early childhood special educators and related therapists have been documented in nearly all 50 states and are predicted to continue for the next several years (McLaughlin. Smith-Davis, & Burke, 1986; Meisels, Harbin, Modigliani, & Olson, 1988). An issue that compounds the increased demand for qualified personnel is employee turnover. While personnel turnover may have possible positive consequences, such as displacement of poor performers, infusion of new ideas, skills and knowledge, and stimulation of changes in policy and practice (Mobley, 1982), the negative consequences are often more significant. Unusually high rates of attrition will intensify the shortage of personnel, accelerate the need for training and recruiting, and complicate policy decisions regarding service delivery in early intervention programs.

Employee turnover has additional effects on organizations. It is a vital concern for most

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Using a group-oriented contingency to increase social
interactions between children with autism and their peers: A
preliminary analysis of corollary supportive behaviors

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Running Head: Corollary Behaviors

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Abstract

The effects of a group-oriented contingeny on the social and supportive interactions of three preschoolers with autism and their socially competent peers were examined. Children participated in daily manipulative play activities in groups of three (including one target child and two peers). A group reinforcement contingency increased all three target children's social interactions with peers (e.g., share, assistance, and play organizers) but produced few or no corollary supportive exchanges within the playgroups (e.g., one socially competent youngster tells another to "Ask target child to share the lego toys with us"). After a reversal to baseline where social interactions decreased to low levels, children were taught to direct supportive comments to other members of their playgroups. Following this brief training, the interdependent group contingency was reinstated to reinforce the share, assistance and play organizer exchanges between the target children and peers. In addition to interacting with the target children, socially competent youngsters also utilized supportive prompts to facilitate the social exchanges between their remaining group members. Children's social and supportive interactions decreased and increased again during subsequent baseline and group contingency phases. These results are discussed with regard to the efficacy of group-oriented contingencies and the function of supportive peer behaviors.

Using a group-oriented contingency to increase social
interactions between children with autism and their peers: A
preliminary analysis of corollary supportive behaviors

Public Law 99-457 has specified a need to identify and provide
effective intervention services for children birth to 5 years old
with disabilities (Smith, 1988). This public policy has immediate
implications for early child researchers and practitioners, who
must develop and implement effective interventions for young
children displaying a wide range of diverse developmental
disabilities and needs (Guralnick & Bennett, 1987).

One developmental area that has received considerable
attention over the past decade is children's social interaction
skills (Strayhorn & Strain, 1986). Many of the interventions for
this skill domain utilize typical peers in some formal or informal
capacity. For example, Twardosz, Nordquist, Simon, and Botkin
(1983) taught typical youngsters to direct affectionate behaviors
(e.g., tickling, hugging, etc.) to a peer with autism during daily
group activities. Strain, Shores, and Timm (1977) taught typical
preschoolers to direct a wide variety of social initiations (i.e.,
"Come and play with us") towards their withdrawn classmates.
Finally, LeFebvre and Strain (1989) utilized a group-oriented
reinforcement contingency to increase childrens' positive social
exchanges. Preschoolers with autism and their socially competent
peers earned rewards for their entire class by exchanging positive
social behaviors during daily play sessions.

Group-oriented reinforcement contingencies have become increasingly popular within school settings over the past several decades (Greenwood & Hops, 1981). There are several reasons for this surge in popularity. First, group-oriented procedures enable teachers to more efficiently instruct and manage the behaviors of a large number of students (Kazdin & Geesey, 1977; Grieger, Kauffman, & Grieger, 1976). The use of group, rather than individual behavioral criteria and consequences represents considerable savings in teacher time and effort.

Another benefit of group contingencies is the emergence of corollary or untrained supportive behaviors. Researchers have reported that children participating in these procedures exhibit prompts and encouragement (Alexander, Corbitt, & Smigel, 1976; Wilson & Williams, 1973), approval (Greenwood, Hops, Delquadri, & Guild, 1974), assistance (Switzer, Deal, & Bailey, 1977), and even tutoring (Axelrod & Paluska, 1975) to influence one another's performance. In an extensive review of this literature, Greenwood and Hops (1981) concluded that corollary support is a consistent and reliable outcome of group-oriented contingencies.

Several recent studies indicate that corollary supportive behaviors are not a reliable product of group contingencies, however. For example, Kohler and Greenwood (1990) implemented a peer tutoring procedure containing a group contingency in a 3rd/4th grade class. Only 3 of 19 students consistently exhibited supportive behaviors during daily tutoring sessions. Following a brief training period, most remaining students increased and maintained their supportive behaviors over a final three week

maintenance condition. Similarly, Kohler, Strain, Maretsky and DeCesare (1990) compared the effects of an individual versus group contingency on the social and supportive exchanges between three preschoolers with autism and their peers. Although both procedures increased social interactions, typical children used few supportive comments in the group contingency condition until they received direct teaching for this repertoire.

Only a few studies have examined the function of peers' supportive behaviors that are generated with group-oriented contingencies. In one such investigation, Van Houten and Van Houten (1977) implemented an interdependent group contingency to improve the reading skills of special education students. After finding that several children provided evaluative comments for the performance of their peers, the authors taught these youngsters to provide and withhold their comments in an alternating fashion. Results indicated that peer comments generated higher reading rates. Similarly, Kohler and Greenwood (1990) found that three 3rd graders exhibited corollary prompts, approval, and assistance during a peer tutoring procedure containing a group contingency. By instructing the girls to add and withhold these behaviors from their tutoring repertoire on alternating days, they found that peer support generated higher levels of academic responding and achievement from four different tutees. Both Van Houten and Van Houten (1977) and Kohler and Greenwood (1990) examined the function of supportive comments on the academic performance of elementary school students. Similar analyses have not been conducted with preschool aged children. Furthermore, prior studies have not

examined the impact of supportive behaviors on the quality of social interactions between children with severe disabilities and their socially competent peers.

This study sought to replicate and extend the existing literature in four ways. The first purpose was to re-examine the effects of a group contingency on the social interactions of three preschoolers with autism and their peers (only a few such studies having been conducted previously). A second objective was to identify any corollary supportive peer behaviors exhibited during this intervention. Given the absence of corollary support, a third goal was to teach peers this repertoire and then to examine the maintenance of supportive behaviors in subsequent group contingency interventions. Finally, a preliminary analyses of the topography and function of childrens' supportive comments was conducted.

<div align="center">Methods</div>

Subjects and Settings

Three preschoolers with autism and six of their typical classmates participated in this study. All nine children were enrolled in two classrooms within a half day integrated preschool for children with autism and typical youngsters. Informed consent was obtained from the parents of all participating children.

George was a 4-year old boy with autism who had been enrolled in the program for one year prior to this study. Observations indicated that George engaged in occasional interactions with peers, but usually made demands and responded negatively to other chidlren's offers and requests. George exhibited age appropriate play skills prior to the study.

Bert was a 4-year old boy with autism who had been enrolled in the program for 7 months before the study. Bert exhibited stereotypic behavior and echolalic speech during unstructured classroom periods. Unlike George, Bert rarely interacted with peers and responded in bizarre and inappropriate ways to other children's social overtures.

Ralph was a 4-year old boy with autism who had been enrolled for 13 months prior to this study. Although he exhibited some verbal skills, Ralph made oppositional or negative responses to most adult and peer social overtures. Typical children generally avoided Ralph during classroom play activities.

For George, Bert, and Ralph, three confirmatory diagnoses of autism were obtained from three independent child psychiatrists who used DSM-III criteria. Each child was observed by the psychiatrists to engage in significantly delayed and deviant communication and social interaction, preoccupation with objects, and repetitive behaviors. For each child, these characteristics were present prior to 30 months of age. George and Bert scored at or below the 25th percentile on the cogntive, motor, and memory categories of the McCarthy Scales of Children's Abilities. Ralph scored below the 15th percentile on each category of this test.

Six typical children ranging from 3 years, 4 months to 5 years, 2 months served as participating peers. Four children were in George and Bert's class, while the remaining two were in Ralph's class. Despite classroom placement, all six peers participated in sessions with each target child throughout the study.

All experimental observations and interventions took place during six manipulative play activities, which were alternated on a daily basis. Three preschool teachers arranged and conducted the activities on each day. These individuals had three to five years of experience teaching in integrated preschool programs.

Children participated in daily intervention sessions in groups of three, including one target child and two peers. The composition of play triads changed each day so that all six peers participated with each other and with all three target children. Six minutes of observational data were collected for each session.

Experimental Measures

Two observational codes developed by Kohler et al. (1990), The Child Intervention Code and The Child Supportive Code, were used to record the social interactions of target children and peers during daily play activities. Observers used both codes simultaneously (i.e., within the same interval sampling system).

Child Intervention Code. A 6-second, partial interval, time sampling system was used to code social behaviors directed by peers to target children and behaviors that target children directed to peers. The categories of social behavior are described below.

A. Child Initiations: These behaviors started an interaction and were not preceded by a social overture during the previous 6-second interval. Seven initiations were scored, including:

Play organizer: Verbally requests or directs another child to engage in activity-related play.

Share: Verbally or nonverbally offers/requests an object.

Assistance: Verbally offers or requests help.

Compliment: Verbally states attraction, liking or praise.

Affection: Hugging, or holding hands with another child.

Negatives: Name calling, hitting, or destroying another child's block construction.

Generals: All verbal initiations not coded in an above category.

Observers scored a maximum of one initiation per interval. Two precedence rules existed for intervals wherein two or more initiations occurred. First, negatives took priority over all other initiations. Second, shares, play organizers, assists, compliments, and affection took precedence over general statements.

B. Immediate Child Responses: These behaviors were timely and direct responses to another child's initiation (i.e., they occurred within 2 intervals after the initiation). Responses included:

Yes: Positive or compliant response including accepting a toy or complying with a play suggestion.

No: The recipient of an initiation did not respond positively within 12 seconds, including ignoring or refusing to comply.

Negatives: Statements or physical actions that were uncomplimentary, rejecting, or physically harmful.

C. Child Concurrents: These behaviors followed and extended a previous response, but did not constitute a new initiation (i.e., 6 seconds did not elapse without a social behavior from another child). In addition to the seven behaviors listed as initiations, child concurrents encompassed a "Continue" category, which included all follow-up play that was cooperative and/or associative in

nature. For example, all intervals of mutual block building that followed an initiation, "Let's build a house" and response, "Ok" were scored as a "Continue" category of concurrent play.

Two teacher behaviors were scored with the Child Intervention Code. Prompts were coded whenever a teacher suggested, directed, or asked children to exchange initiation, response, or concurrent behaviors. Praise included statements of approval for these behaviors.

Child Supportive Code. A 6-second, partial interval time sampling system was used to code childrens' supportive interactions. Due to a turnover in observer staff, this code was used during only 50% of sessions in the first three experimental phases, but was used daily thereafter. The following categories were scored:

A. Peer Supportive Initiations: Two types of initiations were scored, including:

> Peer Prompts: These were scored when a typical child asked or directed another youngster to interact with the third member of their play triad. Examples included directing a peer to share with the target child or asking the target child to request help from the other peer. Peer prompts had to pertain to a specific action that, if complied with, would be coded as an initiation, response, or concurrent behavior with the Child Intervention Code.

> Peer Negatives: Negatives were scored whenever one peer directed an uncomplimentary, rejecting, or threatening statement/action to another child. Unlike prompts, peer

negatives did not have to pertain to social interaction between the remaining two group members.

B. Peer Supportive Responses: Three responses were scored:

Yes Responses: Responding postively to a peer prompt or negative initiation within two observational intervals. Examples included complying with a request to share with the third group member or saying "Please stop that" after being pushed by a peer.

No Responses: Failing to respond positively with a peer's prompt initiation within 12 seconds. Examples included ignoring and actual refusals.

Negative Responses: Verbal or physical actions that were uncomplimentary, rejecting, or physically harmful.

Teacher prompts also were scored with the Child Supportive Code. These instructions directed children to exhibit any one of the supportive initiations or responses.

Observer Training

Three observational staff learned to use the two codes in 15 consecutive four hour sessions (60 hours total). Observer training encompassed three separate activities including: (1) discussion and memorization of code definitions and scoring procedures; (2) practice observations to directly compare and discuss one another's scoring on an interval-by-interval basis; and (3) simultaneous and independent observations to establish interrater agreement. This final stage of training occurred until interrater agreement on the overall codes averaged 75% or better for three consecutive days. Practice and independent observations with the Child Intervention

Code were conducted in the two preschool classrooms. Observers

viewed videotapes from the Kohler et al. (1990) study to practice

and establish pre-baseline reliability on the Child Supportive

Code, since children did not exhibit supportive behaviors in the

classrooms prior to this study.

Interrater Agreement Procedures

Interrater agreement was assessed by having two observers

simultaneously, but independently score an experimental session

with the same observational code. This assessment occurred on at

least 20% of the sessions with all three target children. Percent

occurrence agreement was calculated by dividing the total number of

agreements by the total number of agreements plus disagreements and

multiplying by 100.

Percent occurrence agreement for the Child Intervention Code

averaged 89%, 77%, and 77% for initiations, responses, and

concurrent behaviors, respectively (range of 69% to 96% across

individual behaviors). A primary dependent measure was the percent

of intervals wherein George, Bert, and Ralph engaged in positive

interaction with peers. This encompassed all positive target child

initiations, responses, and concurrents (including continues).

Mean agreement scores for target childrens' percentage of positive

interactions averaged 76% (range of 74% - 77%) across all

experimental settings and phases. Agreement about the occurrence

of teacher prompts and praise averaged 79% - 85% across the three

target children (range of 76% to 100%).

Percent occurrence agreement for the Child Supportive Code

averaged 98% and 90% for supportive initiations and responses.

Interrater agreement could not be calculated on teacher prompts since these behaviors never occurred in this study.

A measure of validity was taken between child behaviors on the two separate codes. Fifty percent of the sessions containing one or more supportive interactions were examined. First, all YES Responses (to a peer prompt initiation) scored on the Child Support Code were identified. Next, the accompanying data sheet for the Child Intervention Code was examined to determine whether an initiation or concurrent behavior was exhibited (by the child who had received and responded positively to the peer prompt on the Child Supportive Code) within the next observational interval. A total of 112 YES responses were scored on the Child Support Code. 100 of these responses (89%) were followed within one interval by an initiation or concurrent behavior on the Child Intervention Code. Thus, 89% of the peer prompts that were complied with led to behaviors that were directly coded on the Child Intervention Code.

Experimental Design and Training Procedures

A withdrawal of treatment design was used to examine the two experimental conditions and training procedures described below.

Baseline 1. Target children and their peers participated in play sessions on each day. The teacher briefly introduced the activity by describing the various materials and themes. Following this introduction, the teacher did not interact with the children except to resolve conflicts over play materials or roles.

Classwide Social Skills Training. Immediately after Baseline 1, teachers implemented a programmed social skill training package developed by Odom, Kohler, and Strain (1987) with all three target

children and their peers. This procedure is described below.

Children participated in daily 15 minute training sessions to learn the following skills: (1) play organizer suggestions; (2) share offers and requests; and (3) assistance offers and requests. Three strategies were taught for each skill. First, skills were used to initiate or extend play interactions. For example, peers might extend a share offer to a target child playing alone. Second, children learned to respond positively by accepting play items being offered or agreeing to a play suggestion. Finally, children learned to be persistent in their use of initiation and response strategies. Social initiations that were ignored or refused were followed by more elaborate overtures.

Training occurred for 15 days and entailed three stages for each skill. Teachers introduced and modelled skills during Stage 1, which lasted one to two sessions. During Stage 2 (two - three days) children rehearsed the skill with the teacher and with one another, while the teacher provided instructions, models, and assistance. Children practiced the skills with one another independently during the third stage. Training was terminated when two criteria were met: (a) target children and peers exchanged at least four skills each within a 6 minute period; and (b) three of six peers performed 50% of their skills independent of teacher prompts. Children were observed with the Child Intervention Code during Stage 3 to ensure that they met both of the above criteria.

Group Contingency 1. After introducing the activity, the teacher pointed to a poster with each child's name and said "Today is group day. To get a prize, every square on the Happy Face Chart must be

filled when the timer rings. That means that nobody will get a
prize unless they earn all of their own Happy Faces and both
friends earn all their Happy Faces too." The teacher then filled
in various portions of the chart and asked individual children
whether they would receive a prize today. After reviewing the
three interaction skills and strategies, the teacher told children
that they could help their friends earn happy faces if they wished.

Following this introduction, the target children and their
peers received 6 happy faces each for exchanging share, play
organizer, and assistance skills. George and all six peers earned
happy faces by directing skills to their appropriate playmates.
Conversely, one-half of Bert and Ralph's happy faces were
contingent upon responding positively to peers' overtures. Each
group member chose one reward (from a pool of three items) after
the session only if all three children had earned their six happy
faces. Teachers could provide unlimited prompts to facilitate
children's social exchanges throughout the session.

Baseline 2. The Baseline 1 conditions were reinstated.

Classwide Supportive Skills Training. Immediately after
Baseline 2, the target children and peers learned to remind one
another to exchange share, play organizer, and assistance behaviors
(e.g., "'target child', ask 'other peer' to give us a block").
Training occurred for 15 minutes on three consecutive days. Since
several peers had exhibited low rates of supportive prompts during
the Group Contingency 1 phase, training focused primarily on
incorporating these reminders into the ongoing play situation or
context. Training continued until three of six peers could

independently exhibit two to four prompts within a 6-min period.

Group Contingency 2. The identical conditions described in the previous group contingency phase were reinstated. After reviewing the target skills, teachers told children that they could help their friends earn happy faces if they wished. No further instructions or consequences were provided for children's supportive exchanges. Group reinforcement was contingent on all three children earning six happy faces by exhibiting the share, play organizer, and assistance skills.

Baseline 3. The earlier baseline conditions were reinstated.

Group Contingency 3. The intervention conditions described previously were reinstated during this final experimental phase.

Results

Four primary results are reported. First, the mean number of teacher prompts per phase will be reported as an independent variable of this intervention. Second, the effects of each experimental condition on target children's social interactions with peers will be shown. Third, the mean number of supportive prompts per session is presented for each experimental condition. Finally, several analyses of children's supportive exchanges are reported.

Teacher Prompts For Social Interactions

The mean number of teacher prompts per session to each target child and his peers is presented in Table 1. Prompts are reported for behaviors scored with the Child Intervention Code only, since teachers never prompted for supportive behaviors in this study.

Table 1 depicts three primary results. First, teachers did not instruct children to interact during the baseline phases (exception of Baseline 2 for Ralph). Second, Bert consistently received more prompts than his peers. Finally, teachers reduced their prompts to all three play groups during the latter two intervention phases.

Target Child-Peer Social Interactions

The upper panels of Figures 1 - 3 illustrate the daily percent of observational intervals of positive social interaction between the target children and their peers. This measure entailed all intervals wherein George, Bert, and Ralph directed a positive initiation, response, or concurrent (including continue) to peers.

Insert Figures 1 - 3 about here

George and his peers interacted during an average of 12% of the intervals during Baseline 1 while Bert and Ralph interacted 1% and 12% of the time respectively. Bert displayed the lowest and most stable social behavior levels while George and Ralph showed considerable variability in their daily interactions.

Introduction of the group contingency immediately following classwide social skills training increased all three boys' exchanges with their peers. George and Bert showed gradual accelerating trends, interacting during an overall mean of 60% and 53% percent of the intervals, respectively. Both boys also demonstrated variability in their daily interactions. Ralph's social behaviors did not show the same accelerating trend, but did

range from 12% to 60% of the intervals (mean of 38%).

All three boys engaged in low and stable levels of social interactions during the Baseline 2 phase. The second group contingency increased social behaviors once again, with George, Bert, and Ralph interacting during an average of 77%, 57%, and 39% percent of the intervals, respectively. In contrast to the prior intervention phase, the boys' behavioral patterns showed little acceleration and greater stability during this second phase.

The third application of the baseline and intervention conditions generally replicated the earlier results. All three boys exhibited little interaction during Baseline 3 (excluding Session 42 for Ralph), and increased their social behaviors during the final group contingency phase. Interestingly, George engaged in less peer interaction during this final phase than in the prior two group contingency conditions.

Number Of Peer Supportive Prompts

The bottom panels of Figures 1 - 3 depict the daily number of peer supportive prompts occuring within George, Bert, and Ralph's playgroups. As the figures indicate, peers rarely exhibited supportive initiations during the first 3 phases.

Following Baseline 2, children learned to incorporate supportive prompts into their play interactions. During the subsequent Group Contingency 2 phase, peer prompts increased immediately, averaging 7.1, 5.1, and 2.6 per session in George, Bert, and Ralph's groups, respectively.

Peer prompts decreased to zero levels during Baseline 3, but increased again during the final intervention phase, averaging 7.6,

7.5, and 3.5 per session in George, Bert, and Ralph's groups, respectively (see Figures 1 - 3). With the exception of a single session for Ralph, supportive prompts occurred on a daily basis for all three groups.

Additional Analyses of Peers' Supportive Prompts

Two additional analyses are conducted of the peers' supportive prompts. Both analyses are described below.

Frequency, Direction, and Responses To Supportive Prompts. Table 2 describes the peer prompts that occurred during the Group Contingency 2 and 3 phases. The first column illustrates the total number of prompts observed within each group. Peers used a total of 125, 91, and 49 prompts, respectively, within George, Bert, and Ralph's play groups. The second column indicates the direction of these behaviors. Peers distributed 43% of their supportive prompts to the target children, while typical children received 57% of these reminders.

The final column in Table 2 indicates the percentage of peer prompts that were responded to positively by their recipients. The three target children and their peers reponded positively to 71% - 96% (mean of 86%) of the prompts they received without specific teacher directions to do so.

Corroborative Properties of Supportive Prompts. Two preliminary analyses were conducted of the function of peers' supportive prompts occurring during the Group Contingency 2 and 3 phases. To conduct these analyses, all target child-peer positive social interactions that were coded with the Child Intervention Code were examined. These primary social interactions were separated into

two categories: (a) interactions that were preceded by or included a supportive peer prompt and positive response (coded with the Child Supportive Code); and (b) target child-peer interactions that occurred independent of any supportive behaviors.

The primary interactions containing and lacking supportive prompts were then analyzed in two different ways. First, we compared the average estimated duration of both types of target child-peer interactions. Interaction durations are estimated, based upon the 6-second partial interval system used in this study. That is, if a target child positive initiation, response, or concurrent behavior occurred at any time during a 6-second interval, then that entire interval was coded as social in nature.

As Table 3 shows, the average estimated length of interactions lacking supportive behaviors was 13.6, 13.3, and 12.4 seconds (2 - 3 intervals) for George, Bert, and Ralph. In contrast, primary interactions containing supportive behaviors averaged 20.7 seconds (range of 19.6 - 22.6 across the three boys).

A second analysis pertains to the percentages of primary interactions that were initiated by the target children versus their socially competent peers. As Table 3 shows, George, Bert, and Ralph initiated 25%, 26%, and 15% of the interactions occuring independent of supportive behaviors during the latter two intervention phases. Conversely, target children initiated 38% - 40% of the interactions containing supportive behaviors during these same two conditions.

Discussion

The results of this study show that: a) a comprehensive

intervention increased the social interactions between three children with autism and their typical peers; b) socially competent preschoolers exchanged supportive prompts under group contingency conditions only after they received training for these behaviors; and c) target child-peer social interactions that contained supportive prompts were longer and more reciprocal in nature.

These results have important implications for the social interactions and relations between children with severe disabilities and their peers. Typical childrens' utilization of the three social skills (e.g., share, play organizer, and assistance) and strategies (e.g., initiation/extend, respond, and persist) led to an increased number of interactions with all three target children. The supportive skills repertoire further enhanced the overall quality of these interactions.

Prior researchers have reported that dependent and interdependent group contingencies often generate corollary peer group support for children's performance (Greenwood & Hops, 1981). However, this and several other studies suggest that the supportive peer network generated with group reinforcement contingencies is not as consistent or widespread as initially believed (Kohler & Greenwood, 1990; Kohler et al, 1990). Collectively, these studies indicate that: a) most young children participating in group contingencies do not direct supportive behaviors to their peers without specific training for this repertoire; and b) once taught to use supportive behaviors, most children increase and continue to use these responses without adult encouragement to do so in subsequent group contingency conditions.

This study replicates the Kohler et al. (1990) investigation by showing that a package consisting of social skills training, teacher prompting, and group-oriented reinforcement can increase the interactions between typical preschoolers and their classmates with autism. The current study extends the earlier investigation, however, by examining the _function_ of supportive exchanges on the length and reciprocity of target child-peer interactions.

A primary rationale for examining supportive interactions is to develop a technology for maintaining childrens' treatment gains through natural communities of peer reinforcement (Kohler & Greenwood, 1986). Preliminary analysis suggested that supportive exchanges had two facilitative effects on target child-peer social interactions. First, supportive prompts and responses were consistently associated with longer or more extended interaction episodes. Must play groups consisted of two typical children who demonstrated some variability in their social competence. Analysis indicated that three specific peers exhibited a vast majority of the supportive initiations within their playgroups. Interestingly, these youngsters were also among the older children enrolled in the preschool. The target child and peer recipients nearly always responded positively to supportive prompts by directing a share, assistance, or play organizer overture to the third member of their group. Perhaps the more competent peer's prompts resulted in social initiations and concurrents (from their recipients) that were more sophisticated or elaborate in nature than the overtures that less competent children made independent of teacher or peer prompts.

All three target children were also more likely to initiate interactions that contained one or more episode of peer support. Peers directed 43% of their supportive prompts to the target children during the Group Contingency 2 and 3 phases. Peer prompts that were <u>directed to and complied with</u> by target children <u>necessarily</u> led to target child initiations or concurrents to a typical peer. In essense, a socially comptent child's choice of <u>who</u> needed a supportive prompt (and a subsequent happy face) at any given moment directly affected the direction of a subsequent target child-peer exchange.

Anecdotal observations suggested that the supportive behaviors were easy, natural, and enjoyable to exchange. Two socially competent children within the same play group often took turns directing supportive prompts to one another and to the target child. On these days, 50%-75% of the group's happy faces were the direct result of supportive exchanges. On several occasions observers reported that George instructed his socially competent peers to exchange share or assistance skills. In no case did children exhibit negative behaviors during their supportive interactions. In fact, children sometimes cheered as the teacher awarded a happy face to an individual who complied with a supportive prompt and reported that they enjoyed helping their group earn rewards.

The relationship of teacher prompts to children's supportive interactions also merits consideration. George, Ralph, and their peers received an overall average of only 2.9 prompts per six minute session. This number is considerably lower than the levels

of teacher prompts frequently necessary to maintain high quality
social exchanges between preschool aged children (Hendrickson et
al. 1982; Strain, Shores & Timm, 1977). Children's supportive
exchanges also occurred independent of teacher directions or
praise. It appears that peer support may replace teacher prompts
as functional antecedents for target child-peer interactions. In
essence, the supportive network may have increased the ease,
naturalness, and independence of childrens' interactions with one
another. Positive social exchanges that are natural, independent,
and reciprocal are viable goals for the community integration of
persons with disabilities.

Several issues merit further examination at this time. There
is an immediate need to more thoroughly examine the conditions
under which children engage in supportive interactions. Many prior
group contingency studies resporting corollary supportive behaviors
have been conducted with adolescent or adult populations (i.e.,
Alexander, Corbitt, & Smigel, 1976; Frankosky & Sulzer Azaroff,
1978; McCarthy, Griffin, Apolloni, & Shores, 1977). Researchers
should examine the supportive behaviors generated by group
contingencies with a wide variety of different age groups and
populations.

In order to have practical value, childrens' supportive
networks should be widespread in nature (e.g., consist of numerous
behaviors that are exhibited regularly by several different
children). Yet. very few studies have examined the number of
supportive behaviors occurring on a day-to-day basis or the number
of different group members exhibiting and receiving support. The

Corollary Behaviors

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results of this study suggests that brief training followed by a group-oriented reinforcement contingency is a viable method for creating a supportive network that is both widespread and effective. Future research might examine the generalization and maintenance of childrens' supportive exchanges across settings and over extended time periods.

Finally, researchers should continue to experimentally analyze the function of peer supportive behaviors on a host of different outcomes, including the quality and maintenance of target children's treatment gains. The few studies that have conducted these analyses have found promising and exciting results (i.e., Kohler & Greenwood, 1990; Van Houten & Van Houten, 1977). A programmatic line of studies that examines the conditions and function of supportive interactions may lead to the successful integration of persons with disabilities into a wide range of diverse community activities.

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Table 1

Mean Number of Teacher Social Interaction Prompts

a

For Each Experimental Phase

	Play Group 1		Play Group 2		Play Group 3	
Condition	George	Peers	Bert	Peers	Ralph	Peers
Baseline 1	0	0	0	0	0	0
Group 1	4	3.5	12	3	5.5	7.5
Baseline 2	0	0	0	0	.25	.12
Group 2	.75	1.2	9	2.5	6.1	1.8
Baseline 3	0	0	0	0	0	0
Group 3	2.5	1.6	5.2	.12	2.5	1.3

a = The teacher delivered two and one prompts to Ralph and his peers during a single session of the baseline 2 condition.

Table 2

Description of the Supportive Peer Prompts Occuring During

All Sessions Of The Group Contingency 2 and 3 Conditions

	Total Number Of Prompts	% Delivered To The		% of Positive Responses By	
		Target Child	Peer	Target Child	Peer
Play Group 1 (George)	125	43%	57%	93%	92%
Play Group 2 (Bert)	91	40%	60%	96%	86%
Play Group 3 (Ralph)	49	49%	51%	71%	96%

Table 3

Corroborative Properties of Supportive Peer Prompts

On Target Child-Peer Interactions

	Primary Interactions Lacking Peer Supportive Prompts		Primary Interactions Containing Peer Supportive Prompts	
	Mean Length	Target Child As Initiator	Mean Length	Target Child As Initiator
Play Group 1 (George)	13.6 sec	25% of Interactions	19.6 sec	40% of Interactions
Play Group 2 (Bert)	13.3 sec	26% of Interactions	20.0 sec	38% of Interactions
Play Group 3 (Ralph)	12.4 sec	15% of Interactions	22.6 sec	40% of Interactions

Figure Captions

Figure 1:   The percentage of intervals wherein George engaged in
            positive social interaction (upper panel) and the number
            of supportive peer prompts occurring within George's play
            group (lower panel) across all experimental sessions and
   conditions.

Figure 2:   The percentage of intervals wherein Bert engaged in
            positive social interaction (upper panel) and the number
            of supportive peer prompts occurring within Bert's play
            group (lower panel) across all experimental sessions and
            conditions.

Figure 3:   The percentage of intervals wherein Ralph engaged in
            positive social interaction (upper panel) and the number
            of supportive peer prompts occurring within Ralph's play
            group (lower panel) across all experimental sessions and
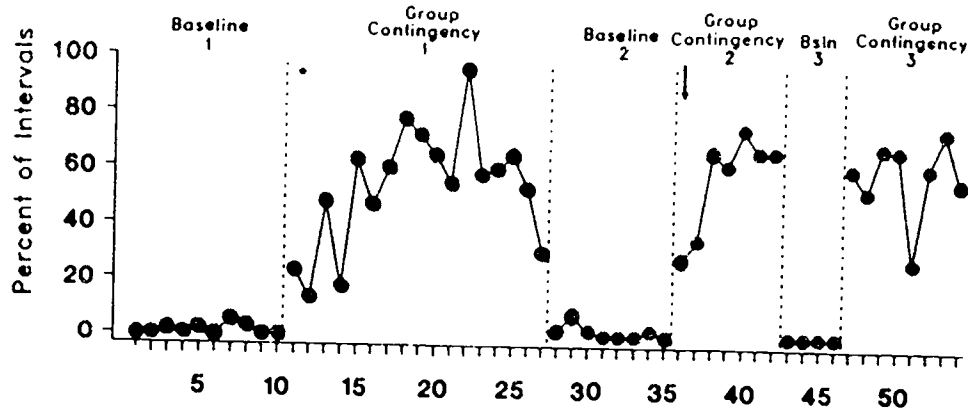   conditions.

George
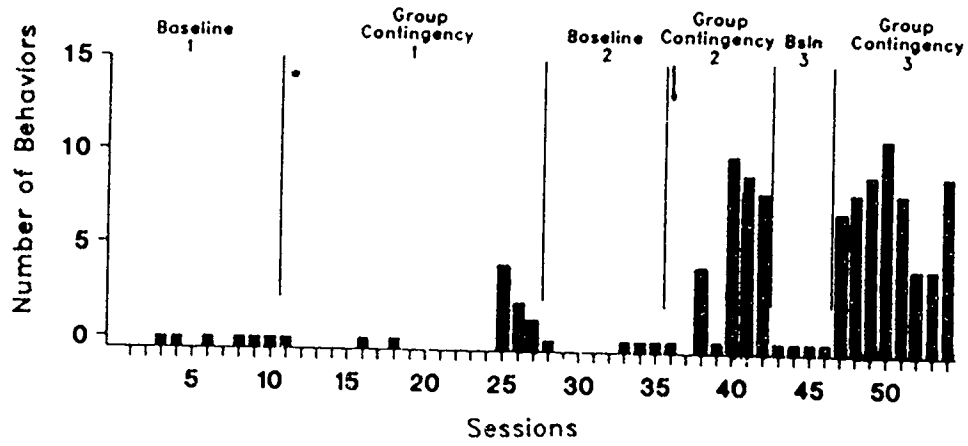### Total Social Interactions
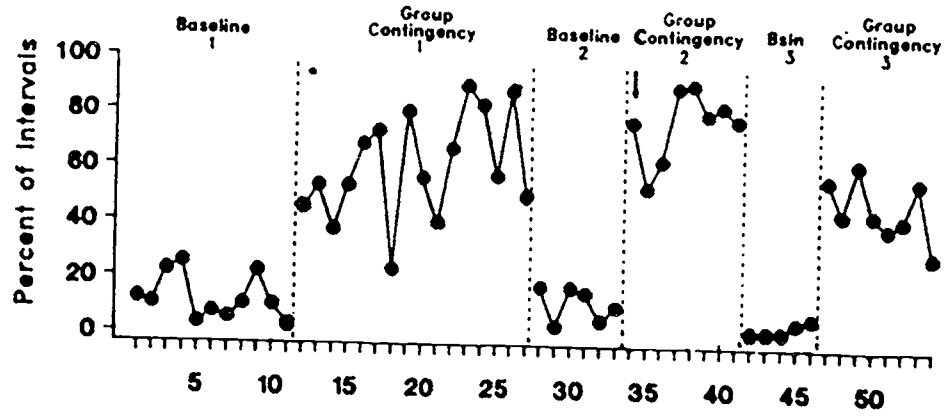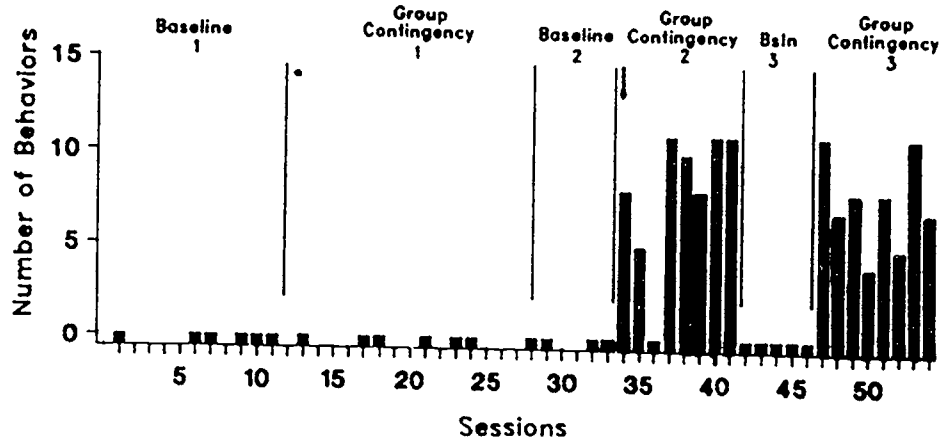
Supportive Peer Prompts

Sessions

● Classwide Social Skills Training

▎ Classwide Supportive Skills Training

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Bert

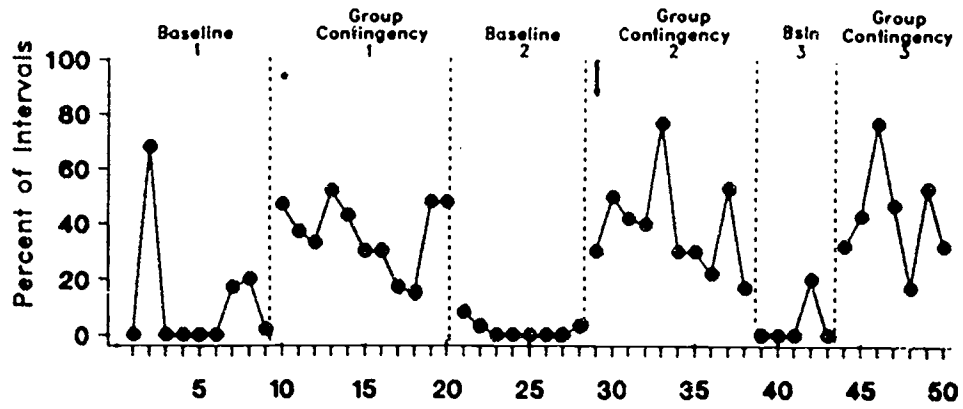Total Social interactions

Supportive Peer Prompts
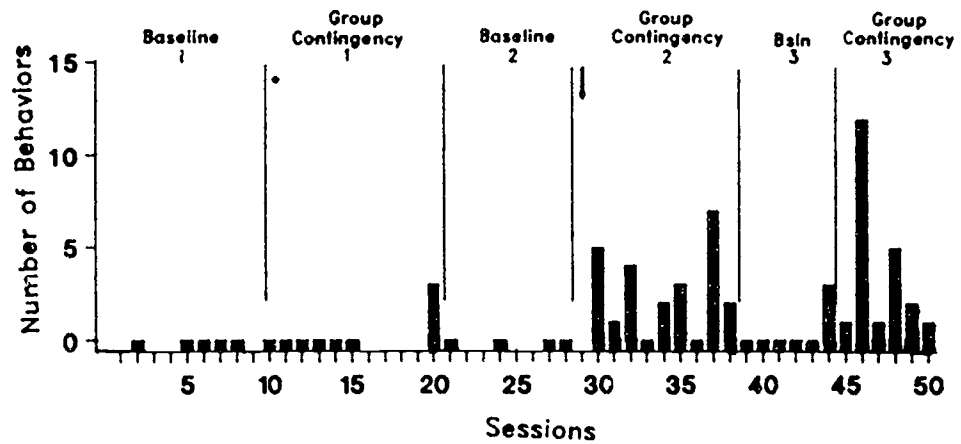

Sessions

• Classwide Social Skills Training

| Classwide Supportive Skills Training

Ralph

Total Social Interactions

Supportive Peer Prompts

Sessions

• Classwide Social Skills Training
I Classwide Supportive Skills Training

The Overtures of Preschool Social Skill Intervention Agents:

Differential Rates, Forms, and Functions.

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Running Head: Peer Social Overtures

Authors' Notes

Abstract

The purpose of this study was to examine the differential topographies and functions of social behaviors directed by normally developing preschoolers to their playmates with autism. Social interaction data from intervention phases of the Kohler, Strain, Hoyson, DeCesare, Donina and Rapp (in press) study were analyzed in three different ways. First, we examined the frequency of four different behaviors commonly included in social interaction training and/or assessment procedures (i.e., play organizer suggestions, share offers/requests, assistance offers/requests, and general statements). Second, the effects of each peer behavior on the immediate response of three different children with autism was examined. Finally, the impact of each behavior that led to a positive response on the duration of the subsequent target child-peer social interactions was examined. Results indicated that the four social behaviors had differential topographical and functional properties. Shares and play organizers occurred most frequently and generated the highest proportion of positive responses from all three children with autism. Conversely, assistance offers/requests occurred less often and received a lower percentage of positive responses. However, assistance behaviors consistently led to the longest social interactions. These results are discussed with regards to their implications for future social skills training and research.

The Overtures of Preschool Social Skill Intervention Agents:

Differential Rates, Forms and Functions.

One of the most significant unmet challenges in the area of social skills intervention for children with disabilities is determining what specific skills to teach (Strain, Guralnick, & Walker, 1986; Strain & Kohler, 1988). The problem is one of reducing an infinite universe of behavioral episodes and sequences into the most robust, functional, and parsimonious set of behaviors for social skills instruction.

A vast majority of previous attempts to identify a functional and teachable set of social behaviors have focused, almost exclusively, upon the immediate temporal consequences of children's overtures (e.g., Strain, 1984; 1985; Tremblay, Strain, Hendrickson, & Shores, 1981). For example, Tremblay et al., (1981) conducted naturalistic observations of typical preschoolers in order to examine the functions of 14 different child initiations. In addition to scoring the frequency of each behavior, these researchers recorded the type of social responses that occurred within three seconds. Tremblay et al., (1981) found that social overtures such as play organizers, shares, assistance, and affection lead to a higher proportion of immediate positive responses than questions, general statements, or imitative behaviors. These clear and consistent behavioral patterns were documented during "naturalistic observations," or conditions in which no specific instruction or training was provided to the children being observed.

A question of significant importance is how social behavior patterns and functions occurring under "naturalistic" contexts compare with those emerging under conditions of active social skill instruction or intervention. Specifically, it is necessary to know whether children's social behavior topographies are the same, and more importantly, whether these topographies function in a similar manner under of naturalistic observation <u>and</u> active intervention. Furthermore, it is becoming increasingly obvious that the assessment of social behavior function should encompass more than the quality of recipients' immediate responses.

Several studies have suggested that reciprocity and duration are key ingredients to high quality social exchanges. For example, Kohler, Strain, Maretsky, and DeCesare (1990) recently examined the social exchanges between three preschoolers with autism and their peers. After learning to direct play organizer, share, and assistance behaviors to classmates with autism, typical youngsters were taught to offer supportive suggestions to members of their play groups (e.g., "Remember to help <u>target child</u> build a train" or "Ask <u>target child</u> to share the lego toys with us"). Results indicated that target child-peer interactions started with peer supportive prompts were more reciprocal in nature (e.g., children with autism contributed a higher proportion of behaviors to the interaction) than interactions not so started. Other researchers such as Guralnick (1986) and Hendrickson, Strain, Shores, and Tremblay (1982) have noted that duration is also an essential ingredient of high quality social interactions. For example,

Walker, Greenwood, Hops, and Todd (1979) experimentally demonstrated that teaching children to exhibit both social initiations (STARTS) and responses (CONTINUES) led to longer social exchanges than training either component alone. With these few notable exceptions, however, very few studies have examined the relationship between specific behavioral topographies and reciprocal or prolonged social interaction episodes.

This study expands the literature in two important ways. First, it identifies the behavioral topographies exhibited by preschool intervention agents under conditions of active social skills instruction and reinforcement. Specifically, data collected during three group contingency intervention conditions in the Kohler, Strain, Hoyson, Donina, DeCesare, and Rapp (in press) study were analyzed to examine the frequencies of four different peer social initiations, as well as the immediate target child responses associated with each peer behavior (i.e., play organizer, share, assistance, and general statement). Second, in light of the emerging role of duration as a critical index of high quality interaction episodes, we studied the relationship between the occurrence of four peer overtures and the duration of target child-peer subsequent social interactions.

<div align="center">Methods</div>

Subjects and Settings

Three preschoolers with autism and six of their normally developing classmates participated in this study. All nine children were enrolled in two classrooms within a half day

integrated preschool for normally developing youngsters and those with autism.

George was a four-year-old boy with autism who had been enrolled in the program for one year prior to this study. Observations indicated that George engaged in occasional interactions with peers, but usually made demands and responded negatively to other children's offers and requests. George exhibited age appropriate toy use skills prior to the study.

Bert was a four-year-old boy with autism who had been enrolled in the program for 7 months. Bert exhibited stereotypic behaviors and echolalic speech during unstructured class activities. Unlike George, Bert rarely interacted with peers and responded in bizarre or inappropriate ways to other children's overtures.

Ralph was a four-year-old boy with autism who had been enrolled in the program for 13 months prior to this study. Although he exhibited some verbal skills, Ralph made oppositional or negative responses to most adult and peer social overtures. Given his occasional aggressive behaviors, typical children generally avoided Ralph during classroom play activities.

For George, Bert, and Ralph, confirmatory diagnoses of autism were available from three independent child psychiatrists who used DSM-III criteria. Each child was observed by the psychiatrists to display delayed and/or deviant communication and/or social interaction skills, preoccupation with objects, and repetitive behaviors. For each child, all of these characteristics were present prior to 30 months of age. George and Bert scored at or

below the 25th percentile on the cognitive, motor, and memory categories of the McCarthy Scales of Children's Abilities. Ralph scored below the 15th percentile on all three categories of this developmental test.

Six typical children enrolled at the center served as participating peers. These children ranged from 3 years, 4 months to 5 years, 2 months. All six children had been at the center for at least four months prior to this study. Four children were in the same classroom as George and Bert, while the remaining two children were in Ralph's classroom. Despite their classroom placement, all six peers participated in experimental sessions with each target child throughout the course of the study.

All experimental observations and interventions took place during six manipulative play activities, which were alternated on a daily basis. Three preschool teachers arranged and conducted the activities on each day. These individuals had three to five years of experience teaching in integrated preschool programs.

Experimental Measures

The Child Intervention Code was used to record the social behaviors exchanged by the three target children and their peers (Kohler et al., 1990). This code entails a six-second, partial interval time sampling system. In addition to recording its type (i.e., initiation, response, or concurrent), observers indicated whether the target child or peer exhibited each behavior. The specific code categories are described below.

A. Child Initiations. These behaviors started an interaction

and were not preceded by another child's behavior during the previous six-second interval. Seven initiations were scored, including:

Play organizer: Verbalizations wherein a child specifies an activity, suggests a play idea, or directs another child to engage in an activity-related play behavior.

Share: Verbally or nonverbally offers or requests an object from another child.

Assistance: Verbally offers or requests assistance from another child.

Compliment: Verbal statement indicating affection, attraction, liking, or praise.

Affection: Patting, hugging, or holding hands with another child.

Negatives: All verbal or physical actions that were uncomplimentary, rejecting, or physically harmful in nature. Examples included name calling, hitting, or destroying another child's block construction.

General: All verbal initiations not scored in the above categories.

Observers scored a maximum of one initiation per observational interval. Two precedence rules existed for intervals wherein two or more initiations occurred. First, negatives took priority over all other types of initiations. Second, shares, play organizers, assists, compliments, and affection took precedence over generals.

B. Child Responses. These behaviors were timely and direct

responses to another child's initiation (i.e., they occurred within two observational intervals after the initiation). Three different responses were scored.

> Yes: All positive or compliant responses were scored as "Yes's." Examples included accepting another child's play item (share offer) or complying with a play suggestion.
>
> No: These were scored whenever a child did not respond positively to another child's initiation within 12 seconds. Examples included ignoring or refusing to comply with another child's initiation.
>
> Negatives: All verbal or physical actions that were uncomplimentary, rejecting, or physically harmful in nature were scored as negative responses.

C. Child Concurrents. These social actions followed and extended a previous response, but did not constitute a new initiation (i.e., six seconds did not elapse without a social behavior from a child). In addition to the seven discrete behaviors listed under the initiation category, child concurrents included nonverbal actions that were socially cooperative or associative in nature. These nonverbal actions represented follow-up or extended play and were coded as "Continues." For example, all intervals of mutual block construction that followed a peer's initiation, i.e., "Let's build a school" and a target child's response, "Ok" were scored as a "Continue" category of concurrent play. In essence the Continue Code represented all forms of

associative play that followed and extended a preceding initiation and positive response.

Two types of teacher behavior were scored with the Child Intervention Code. Prompts were coded whenever the teacher suggested, directed, or asked the target children and/or peers to exchange any initiation, response, or concurrent behaviors. Praise included statements of approval for exchanging these behaviors.

Reliability was assessed by having two observers simultaneously, but independently, score with the child intervention code. Occurrence reliability scores were calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. For the purpose of this study, reliability was calculated for at least 20% of each target child's intervention sessions. Interobserver agreement was calculated on only the specific behaviors reported in this study, including four peer initiations (play organizer, share, assist, and generals), four target child responses (yes, no, ignore and negative), and four peer concurrent behaviors (same as initiations and including continues). Finally, occurrence reliability was calculated on teacher prompts to the three target children and their peers.

Reliability on peer initiations averaged 91% (range of 80% - 100%) across the target children and intervention conditions. Similarly, agreement on target children's responses averaged 85% (range of 67% - 94%). The mean for peers' concurrent behaviors was 80% (range of 66% - 90%) across children and intervention

conditions. Finally, interobserver agreement on teacher prompts to the target children and peers averaged 80% (range of 40% - 100% across phases). The low point in this range represents a phase with very few teacher prompts.

Experimental Design and Procedures

The three target children and their peers participated in the daily intervention sessions in rotating groups of three which included one target child and two participating peers. Six minutes of observational data were collected for George, Bert, Ralph, and their respective peers for each intervention session. The composition of play triads was alternated on each day so that all six peers participated with each other and with all three target children.

Although a reversal ABABAB design was utilized in the original Kohler et al., (in press) study, data analyses for this report entail target child-peer interactions during applications of a group-oriented contingency procedure only. This intervention condition, as well as an initial classwide social skills training procedure are described below.

Classwide Social Skills Training. Following an initial baseline phase, the teachers implemented a programmed social skills training package developed by Odom, Kohler, and Strain (1987) in the manipulative play setting with all three target children and their peers. This training procedure was also utilized by Kohler et al., (1990) and is described below.

Children participated in daily training sessions of 15 minutes

duration and learned the following three skills: (1) play
organizer suggestions; (2) share offers and requests; and (3)
assistance offers and requests. Three different strategies were
taught for using each skill. First, skills were used to initiate
or extend play interactions with another child. For example, peers
might extend a share offer to a target child who was playing alone.
Second, children learned to respond positively to these social
overtures. Using the above example, a target youngster might
accept the play item being offered. Finally, children learned to
be persistent in their use of initiation and response strategies.
Social initiations that were ignored or refused were followed by
different or more elaborate overtures.

Social skills training occurred for 15 days and entailed three
distinct stages for teaching each skill. Teachers introduced and
modelled the skills for children during Stage 1, which lasted one
to two sessions. During Stage 2 (two-three days) children
rehearsed the skill with the teacher and with one another. The
teacher provided ongoing instructions, models, and feedback
(correction and praise) to individual children at this time.
During Stage 3 the children practiced the skills with one another
independently. Two criteria were set for terminating this final
stage: (1) the target children and peers exchanged at least four
skills each within a six minute play period; (2) three of the six
peers performed at least 50% of their skills independent of
specific teacher directions or prompts.

The three target children were observed with the Child

Intervention Code during the final three training days of Stage 3 to ensure that their peers met both of the above criteria. Formal observational data were not collected during Stages 1 and 2 due to the teacher's more active and frequent involvement in these training sessions (e.g., frequent models, role playing or rehearsal, instructions, feedback).

Interdependent Group Contingency. Each target child participated in three different applications of this condition, which were interspersed between three baseline phases. A detailed description of this intervention condition follows.

The teacher spent several minutes introducing the activity and group reinforcement contingency to the children. The teacher pointed to a poster and said "Today is group day. To get a prize, every square on the Happy Face Chart must be filled when the timer rings. That means that nobody will get a prize unless they earn all of their own Happy Faces and both of their friends earn all of their Happy Faces too." The teacher facilitated children's understanding of this contingency by filling in various portions of the chart and then asking individual children whether they would receive their prize today. After reviewing the various social interaction skills/strategies, the teacher told the children that they could help their friends earn happy faces if they wished. Following this introduction, the target children and their peers had the opportunity to receive six happy faces each from the teacher for exchanging the share, play organizer, and assistance skills. Happy faces to George and all six participating peers were

contingent upon <u>directing</u> skills to the appropriate members of their play groups. These children could earn happy faces for directing <u>any combination</u> of shares, play suggestions, and assists to their playmates. For clinical reasons, Bert and Ralph also were required to earn six happy faces, but three of these were contingent upon responding positively to peer social overtures. Each group member chose one reward (from a pool of two to three items) after the session only if <u>all</u> three children (the target children and both peers) had earned six happy faces. Teachers were free to provide unlimited prompts to facilitate children's exchanges of share, play organizer, and assistance skills throughout the session.

<div align="center">Results</div>

As a precedent to the primary results, the data set for each target child is described below. After this description, four primary results are reported. First, the mean number of teacher prompts delivered to the three children with autism and their peers is presented. Second, the frequency of peers' four different initiation and concurrent behaviors is illustrated. Third, the effects of each peer initiation on target children's immediate responding is shown. Finally, data depicting the effects of the various peer initiations/concurrents on the duration of children's positive interactions is presented.

<u>Description of the data set for George, Bert, and Ralph</u>

Two criteria were used to determine the data sets for this archival study. First, <u>all</u> Group Contingency 2 and 3 sessions from

Kohler et al., (in press) were included in each child's data set. Second, all Group Contingency 1 sessions that included one or more occurrences of a peer play organizer, share, assist, and general concurrent behavior (totalling at least four concurrents of different types) were included in each target child's data set. George's data set included 21 total intervention sessions (including five sessions from the Group Contingency 1 phase). Conversely, only one Group Contingency 1 session was added to Bert and Ralph's set, totalling 16 and 18 sessions for these two children, respectively. The more stringent criterion for including sessions from the Contingency 1 condition was necessitated because few episodes of the behaviors of interest occurred in this phase.

Frequency of teacher prompts to target children and peers

As indicated earlier, teachers were free to provide an unlimited number of prompts to facilitate children's positive exchanges during the play sessions. George and his peers received an average of 2.5 and 1.9 (total range of 0-10) prompts across the 21 intervention sessions. Teachers delivered a mean of 7.7 and 1.6 prompts to Bert and his peers, respectively (total range of 0-13). Finally, Ralph received an average of 5.2 teacher directions while his peers received 2.1 average prompts (total range of 0-13) across the three intervention phases.

Frequency of peers' social initiations and concurrents

Table 1 summarizes the mean number of play organizer, share, assistance, and general behaviors delivered by peers to each target child per 6-minute intervention session. Peer data are reported

for both initiations and concurrents and represent the combined efforts of two typical children within a play group.

Table 1 shows that peers delivered an average of 20.3, 15.9, and 14.9 total behaviors to George, Bert, and Ralph per 6-minute intervention session. Initiations consistently occurred more frequently for the play organizer, share, and assistance skills, while general initiations and concurrents occurred at lower levels. Peers exhibited an average of 6.8 play organizer and share overtures (including both initiations and concurrents), while assists and generals averaged only 1.6 per session.

Effects of peer initiations on target children's responses.

Table 2 illustrates the percentage of target children's "yes" responses to each of the four peer initiations (coded within two observational intervals after the initiation). Shares generated the highest percentage of "yes" responses, averaging 86% across the three target children and intervention phases. Similarly, target children responded positively to 73% of peers' play organizer suggestions (range of 68%-95%). Assistance and general initiations, however, led to a lower percentage of affirmative responses from both George and Ralph (Bert's data set included only one general initiation). Overall, George and Bert responded positively to 83% and 79% of peer initiations respectively, while Ralph's percentage of "yes" responses averaged only 61% (range of 43% to 68%).

Effects of each peer behavior on the length of the ensuing interaction

Table 3 depicts the estimated average duration (in seconds) of positive interactions that followed each of the four peer initiations. These duration estimates are based upon the six-second interval recording system used in this study. Furthermore, duration estimates were conducted for only those peer initiations that were followed by an immediate "yes" response from the target children.

Table 3 shows that the four initiations were associated with differing interaction lengths. Play organizers and shares led to interactions that averaged 16.7 and 15.7 seconds respectively (range of 14.4 to 18.8 across the three play groups). Positive interactions resulting from assistance initiations and "yes" responses were consistently longer, averaging 29.9, 29.4 and 60.7 seconds across the groups. Finally, general initiations were associated with the shortest interactions, averaging only 9.0 seconds (range of 6.0 to 12.0 seconds).

Unlike initiations, peers' concurrent behaviors occurred during an ongoing positive interaction. Therefore, a second analysis was conducted to examine the effects of the four concurrents on the duration of children's ensuring or subsequent social interactions. This analysis consisted of three steps. First, the length of each positive interaction containing one or more concurrent behaviors was calculated (i.e., precise number of intervals). Then, the number of interaction intervals that followed each concurrent behavior (including the interval where that behavior occurred) was counted. Finally, the number of

ensuing interaction intervals was divided by the number of total
interaction intervals to produce a percentage score. For example,
an interaction lasting 10 intervals (60 seconds) might contain
three separate concurrent behaviors. A share might occur in the
third interval, which means that 80% of the total interaction
intervals followed that behavior. An assistance overture might
occur during interval number 5, which means that 60% of the
intervals followed that behavior. Finally, a second share
concurrent occurring in the 9th interval would result in 20% of the
interaction intervals following that behavior.

Table 4 depicts the overall percentage of positive interaction
intervals that followed the peer play organizer, share, assistance,
and general concurrents. Play organizers and shares consistently
occurred near the middle of ongoing interactions, averaging 48% to
54% (means of 56% and 50%) across the three play groups.
Conversely, generals were followed by only 39%, 39%, and 19% of
interaction intervals for George, Bert, and Ralph's groups
respectively (average of 29%). Finally, assistance concurrents
were followed by 81% of the interaction intervals in Ralph's group,
and 58% and 61% of subsequent interaction intervals for George and
Bert respective (overall average of 65%).

Discussion

The results of this archival study show that: a) after
receiving comprehensive social skills training and intervention,
six normally developing preschoolers directed differential rates of
play organizer, share, assistance, and general behaviors to their

classmates with autism; b) the four peer behaviors were differentially successful at generating immediate positive responses from three children with autism; and c) the various peer behaviors were associated with differential lengths of subsequent interactions.

These results have several implications for the social interactions and relations of typical preschoolers and their peers with severe handicaps. First, socially competent intervention agents will incorporate different behavioral topographies into their interactions with handicapped peers. Although they received training and reinforcement for three primary skills, the peers in this study exhibited a high proportion of play organizers and shares during daily play sessions. These findings replicate prior studies showing that young children exhibit divergent social interaction overtures and patterns when interacting with peers with differing developmental levels and social status (e.g., Ervin-Tripp, 1977; Guralnick & Paul-Brown, 1977, 1980, 1984).

Peers' various social topographies had differential functions on the immediate and extended social behaviors of the children with autism. Play organizer and share initiations, which occurred most often, were consistently associated with the highest proportion of positive responses. Conversely, assistance offers/requests, which were a less frequent part of peers' repertoires, were associated with a lower percentage of positive responses. Yet assistance initiations and concurrents both led to the longest social exchanges. These behavioral patters and findings were highly

consistent across all 3 play groups.

Teachers assumed an important role in the intervention by providing specific prompts to facilitate children's social exchanges. Examination of these data, however, suggest that teacher prompts were not responsible for producing the differential types of peer initiations, target child responses, or peer concurrents (e.g., prolonged interactions). In fact, the six typical children received less than two average prompts per session (combined total for two peers participating in the play group) across all intervention sessions and conditions, while George received only 2.5 prompts. Although Bert and Ralph received an overall mean of 6.5 prompts, only about one-half of these were for positive responses (the remainder were for initiations and concurrents, which are not reported in this study). Finally, prompts to Bert and Ralph were not specific to any type of preceding peer initiation, but were dispersed equally among the play organizer, share, and assistance behaviors.

Immediate positive responses and long subsequent interactions are both desirable outcomes of typical children's overtures to youngsters with social skill deficits. These two functions were conflicting or incompatible in this study, however. Play organizers and shares led to a high proportion of immediate positive responses, but short subsequent interactions. Conversely, assistance offers and requests occurred less often and were frequently ignored or refused by their recipients. When complied with, however, assistance behaviors led to the longest and most

elaborate social exchanges.

Perhaps the play organizers and shares occurred most often and were most successful in the short term because they required only a single social action from their recipient (e.g., taking/giving a play material or complying with a simple play suggestion). On a pragmatic level, assistance offers might require a greater number of more elaborate type of social action (e.g., complying with a request to "Help me build a train" requires more effort than responding to a simple share offer or play suggestion). These explanations are only speculative, however. Follow-up research is necessary to examine and clarify the differential functions of children's play organizer, share, and assistance behaviors.

This archival study replicates and extends the existing literature in several important ways. In an earlier investigation, Tremblay et al., (1981) reported that shares and play organizers occurred two to three times more frequently than assistance behaviors, which is very similar to the rates observed in this study. Interestingly, these researchers also reported that shares and play organizers generated the highest proportion of immediate positive responses, followed by assistance and general statements, respectively. Therefore, it appears that the types and immediate functions of children's social overtures are very similar under naturalistic and intervention conditions.

The results of this study also replicate and extend prior research examining the differential functions of children's social behaviors. Kohler and Fowler (1985) taught three young girls to

direct various types of play invitations (including shares) to their peers during daily play activities. The peer recipients of these overtures also directed an increased number of play invitations back to all three girls, and both target children's and peer invitations were maintained over time. Conversely, a second targeted behavior, social amenities, was not reciprocated by peers, and subsequently decreased to very low levels during reversal and maintenance phases. In an earlier study, Warren, Rogers-Warren, and Baer (1976) found preschool children's rate of share offers were associated with different types of immediate responses. More specifically, a rate of two to three share offers every 5 minutes generated the highest proportion of positive responses. Additional offers were generally refused. Thus, it appears that children's types and rates of social overtures can have a variety of different functions for their recipients. Future research should examine these relationships further.

The fact that children's various social overtures can have different and conflicting functions creates a dilemma for individuals wanting to provide the most robust, functional, and parsimonious social skills instruction for preschool children. In particular, the issue of what specific behaviors to teach depends upon one's view of which divergent behavioral functions are desired, and in what order. The results of this study suggest that both immediate positive responses and prolonged interaction episodes are attainable outcomes. Indeed, an optimal intervention could promote both outcomes in the following ma..ner. First,

teachers might utilize prompts and differential praise to promote a greater number of assistance initiations from socially competent peers. Similarly, children with social delays might be directed to respond positively to a higher proportion of peer assistance overtures. Finally, teachers might facilitate longer and more elaborate social exchanges by instructing peers to direct a higher proportion of concurrent behaviors (in contrast to initiations) towards their playmates. Efforts of this nature may well result in the most robust, functional, and parsimonious social skills intervention for young children with and without developmental disabilities.

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Table 1

Average Number of Peer Initiations and Concurrents Delivered

To Each Target Child Per Intervention Session

	George's Group			Bert's Group			Ralph's Group		
Behavior	Init	Conc	Total	Init	Conc	Total	Init	Conc	Total
Play Organizer	4.0	2.0	6.0	3.1	1.9	5.0	4.9	1.7	6.6
Shares	5.3	4.5	9.3	5.5	2.8	8.3	4.1	1.5	5.6
Assists	2.9	.67	3.5	2.0	.23	2.2	.89	.17	1.1
Generals	.38	.66	1.0	.05	.35	.40	1.2	.45	1.6
Total	12.5	7.8	20.3	10.6	5.3	15.9	11.1	3.8	14.9

Table 2

Percentage of Target Children's Positive (Yes) Responses

To Each Type of Peer Initiation

Type of Initiation	Percentage of Positive Responses			
	George	Bert	Ralph	Average per behavior
Play Organizers	84	76	62	73
Shares	95	90	68	86
Assists	66	53	50	59
Generals	50	100	43	47
Average per child	83	79	61	75

Table 3

Overall Length Of Social Interaction Following Each

Peer Initiation And Positive Target Child Response

	Overall Length of Interaction in Seconds			
Type of Initiation	George	Bert	Ralph	Average per behavior
Play Organizers	17.1	18.8	14.4	16.7
Shares	15.5	14.9	17.4	15.7
Assists	29.9	29.4	60.7	33.4
Generals	6.0	12.0	10.2	9.0
Average per child	18.5	18.0	18.3	18.3

Table 4

Overall Percentage Of Positive Interaction Intervals

Following Each Peer Concurrent Behavior

	Overall Percentage of Subsequent Interaction Intervals			
Type of Concurrent	George	Bert	Ralph	Average per behavior
Play Organizers	51	52	61	56
Shares	48	54	50	50
Assists	58	61	81	65
Generals	39	39	19	29
Average per child	50	53	54	52