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CONTEXT-BASED FUNCTIONAL ASSESSMENT AND INTERVENTION
FOR PRESCHOOL AGE CHILDREN WITH
PROBLEM BEHAVIORS IN CHILDCARE

by
Kwang-Sun Cho Blair

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A Dissertation Submitted to the Faculty of the
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1996
As members of the Final Examination Committee, we certify that we have read the dissertation prepared by Kwang-Sun Cho Blair entitled Context-Based Functional Assessment and Intervention for Preschool Age Children with Problem Behaviors in Childcare and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

John Umbreit, Ph.D. 11/14/96
Candace S. Bos, Ph.D. 11/14/96
Aldine von Isser, Ph.D. 11/14/96
Jeannine M. McCarthy, Ph.D. 11/14/96

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copy of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

Dissertation Director
John Umbreit, Ph.D. 12/2/96
Candace S. Bos, Ph.D.
STATEMENT BY AUTHOR

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SIGNED: [Signature]
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DEDICATION

To the dedicated staff at the childcare center and
to the special children they serve
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ABSTRACT

A context-based functional assessment was conducted to identify variables that influenced the problem behaviors of four preschool age children in a childcare center, and the effects of intervention programs which were developed based on the assessment results were evaluated. Generality to non-targeted situations and children was also investigated. In addition, treatment acceptability was assessed to determine the acceptability of the intervention procedures. Structured interviews and observations were employed to develop hypotheses about relevant variables.

The hypotheses were tested using a combination of reversal and multielement designs. Antecedent variables (preference, task length, availability of centers, and social skills) and a consequent variable (attention) were manipulated to determine their effects on problem and appropriate behaviors during preacademic and table activities. Preference was a common variable that influenced the problem behaviors of all of the participating children. For one child, however a complex interaction among variables (preference, social skills, and attention) was demonstrated.

A combination of multiple-baseline and multielement designs was used during the intervention phase to evaluate the intervention effects across children and teachers and to compare the two stages of intervention. The assessment-based interventions reduced the problem behaviors of the children and the negative interactions of teachers, and increased positive teacher interaction. In addition, generality was demonstrated to non-targeted activities and children. The results also demonstrated that the intervention procedures could successfully be applied by multiple teachers with multiple children. Finally, the acceptability of the intervention procedures was high across teachers and children.
CHAPTER 1
INTRODUCTION

Young children with problem behaviors usually lack the skills needed to interact with caregivers and peers. This skill deficit leads to a persistence of their problem behavior (Dunlap & Fox, 1996). As a result, they have limited opportunity to develop positive relationships with others, which is critical for their development. Considerable evidence indicates that early intervention can produce significant improvements in skill development (Dunlap, Johnson, & Robbins, 1990; Rogers & DiLalla, 1991), and that greater improvements may be expected if intervention is begun when a child is very young (Fenske, Zalenski, Krantz, & McClannahan, 1985). Unfortunately, staff in educational programs for children with serious emotional or behavioral disorders often lack both academic remediation skills and the ability to fully address the behavioral and emotional needs of children (Knitzer, Steinberg, Fleisch, 1990). Because controlling inappropriate behavior has been a major interest, the importance of fostering and building positive social behaviors and skills in the children is usually ignored in developing intervention programs for young children with problem behaviors (Tiedemann & Johnston, 1992). Many times, interventions implemented to eliminate problem behaviors are inefficient and may actually make the problem worse. The social motivation of the problem behaviors, which could lead to appropriate intervention, are never addressed adequately (Reichle, 1996).

Research in developing intervention programs for problem behavior has emphasized the use of functional assessment in determining the functions or factors that cause and maintain problem behaviors. Since the research of Iwata, Dorsey, Slifer, Bauman, and Richman (1982), extensive reports on functional assessment-based intervention have demonstrated significant treatment effects on reducing various problem
behaviors. Experimental analysis designed to determine if a target behavior is maintained by positive or negative reinforcement has been widely used in the process of developing intervention programs (Cooper, Wacker, Millard, Derby, Cruikshank, & Roger, 1993; Day, Horner, & O'Neill, 1994; Mace & Lalli, 1992; Vollmer, Iwata, Zarcone, Smith, & Mazeleski, 1993).

Children's problem behaviors occur within a context of the environment, and the context may exert considerable influence on the behavior. Although reinforcers may be determinants of problem behavior, it is important to recognize that their functions are determined by the context in which they occur (Dunlap & Kern, 1993). For example, studies have found that a number of problem behaviors of young children occur in the context of competitive activities or games (Bay-Hinitz, Peterson, & Quilitch, 1994). Ignoring the context of the early childhood educational setting, which may set the occasion for problem behaviors, the researcher who is interested in variables which reinforce problem behavior may seek to demonstrate the possible function of the behavior under a positive reinforcer, such as attention or tangibles. The context — the game — often is not considered. The limitation with an approach that focuses only on consequences, such as this, pertains to the way that an intervention strategy is developed. If a problem behavior is believed to be maintained by positive reinforcement in the form of attention or tangibles, intervention may include extinction of the reinforcer or teaching the child the communication skills necessary to gain access to the reinforcer (Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990; Carr & Durand, 1985). From an antecedent and context-based point of view, the intervention would be directed at teacher involvement in organizing play and games, modifying the play situations, and developing activities that promote cooperative and positive interaction among children. The development of experimental analysis procedures designed to identify relevant variables in the context of the natural
environment (Dunlap, Kern-Dunlap, Clarke, & Robbing, 1991) offers great improvements in the field of behavioral functional assessment and theory. Since intervention development targets needed changes in the child's entire environment, the effects of intervention can be powerful.

Early identification and treatment of developmental delays in young children is a major policy factor associated with the increased need for early childhood programs (Noonan & McCormick, 1993). Unfortunately, many professionals who serve preschoolers have limited expertise and confidence in implementing strategies to positively address repertoires of problem behavior in young children (Reichle et al., 1996). It has also been found that interventions that reduce child behavior problems in one setting may not generalize to other settings (Horn, Lalongo, Popovich, & Paradotto, 1987). A primary setting in which early identification of behavioral disorders may occur is in community early childhood programs such as child care centers. The fact that even public school teachers are not adequately trained to serve children with problem behaviors leads to a great concern about the children served in those community programs, because they are likely to be underserved.

Significance of the Study

Families with young children who exhibit behavioral disorders constitute the largest group of referrals to regional intervention programs across the United States (Timm, 1993). Behavior problems are also reported to be the number one reason given by teachers for referring young children to special education programs (Carta et al., 1994). Teachers are found to be generally positive about the progress of children with special needs, but they express difficulties in dealing with children who demonstrate behavior problems and are skeptical about the possibility of improvement by these children (Palfrey, Singer,
Walker, & Butler, 1987). It has been reported that 14%-20% of typically developing and at-risk children exhibit behavioral and emotional difficulties (Brandenberg, Friedman, & Silver, 1990). Although it is considered to be important to provide educational services to children with and without disabilities in inclusive environments, children with problem behaviors are often not included in inclusive child care and public school programs (Giangreco & Putnam, 1992). In fact, service providers, in particular, childcare providers, have the legal right to refuse to serve such children in their programs because service delivery in those settings is not mandated. Furthermore, they often believe that such children would be better served by professionals who have the expertise to address their needs. When considering that special education services for young children are usually not full-day services and that most of the children are served in childcare settings for the rest of the day, service delivery to the childcare staff seems to be critical.

The emerging issue with center-based child care is that the quality of care provided to millions of children through these facilities is far from adequate in many places (Spodek & Saracho, 1992; Thorman, 1989). More than 25% of the children with special needs are served in these centers (Spodek & Saracho, 1992). Therefore, the most critical priority in developing positive approaches toward the management of problem behavior is improving the quality and availability of preservice and in-service training for parents and educators (Reichle, 1996).

**Statement of Purpose**

The purpose of this study was to extend antecedent and context-based functional assessment and intervention procedures to preschool age children with problem behaviors in the natural setting of the childcare center. The research focused on identifying variables that cause and maintain the problem behaviors of the children in the childcare center,
investigating intervention effects on behavior change of children and teachers, and

generality effects to other situations and peers. The long term goal of this study was to
provide information which can serve as a catalyst for changing the childcare environment in
ways that promoted learning based on child-centered activities and developmental
characteristics of the individual children.

Research Questions

The following questions were addressed:

R.1. To what extent do contextual functional assessment-based interventions
produce positive behavior changes among the participating children?

R.2. What is the relationship between the intervention program and teacher
behavior change?

R.3. Do the interventions have generality to non-targeted situations and peers?

R.4. To what extent are the intervention procedures considered by the teachers to
be beneficial and effective?

Definition of Terms

Functional Assessment

A process of determining the relationship between environmental events and the
occurrence of problem behavior; a process of gaining an understanding of behavior using
interviews, rating scales, observations, and experimental analysis; the full range of
strategies used to identify the antecedents and consequences that control problem behavior.

Functional Analysis

One approach to functional assessment. Procedures that involve direct and
systematic manipulations of hypothesized variables under experimental conditions with systematic observation of behavior. The manipulations are conducted using a reversal, withdrawal, alternating treatments, or multielement experimental single-subject design.

**Hypothesis Development**

The first step of functional assessment. This involves the collection of information in order to develop hypotheses about functional relationships between environment and behavior; information gathering and formulation of hypothesis statements to predict with a high degree of certainty the conditions under which the behavior will occur. Variables that govern the occurrence and nonoccurrence of the problem behavior are hypothesized.

**Hypothesis Testing**

The second step of functional assessment. This is referred to as functional analysis or experimental analysis. It is used when there is a reason to firmly establish the validity of the hypotheses or when it is important to obtain further information through experimentation. It can be beneficial for developing an intervention procedure that will produce the desired results during intervention.

**Consequent-Based Functional Assessment**

Identifying the functional relationship between the behavior and consequent events, i.e., operant contingencies of reinforcement, that maintain problem behavior. The motivation or purpose of the behavior are stated as hypotheses e.g., “Kim has temper tantrums to obtain toys during free play.” The operant motivations are either to get something (positive reinforcement) or to escape or avoid something (negative reinforcement)
Context-Based Functional Assessment

Identifying the contextual associations between environmental events and the presence or absence of the problem behavior. This approach emphasizes the value of understanding antecedent and contextual stimuli that are associated with behavior. The variables that occur or are present prior to the problem behavior are identified and stated as hypotheses, e.g., "Kim is likely to have a temper tantrum when she is engaged in academic tasks."
CHAPTER 2
REVIEW OF THE LITERATURE

In this chapter, four major challenges that must be tackled in order to develop functional assessment and intervention procedures for preschool age children with problem behaviors are reviewed. The theoretical orientation of the research focuses on antecedent and contextual variables that are functionally related to child behavior (Dunlap & Kern, 1993) and extends functional analysis procedures to the natural setting of childcare.

Antecedent and Context-Based Assessment

The purpose of functional assessment is to derive clear hypotheses about the relationship between the environment and behavior (Repp, Felce, & Barton, 1988). The assessment procedures include techniques that help to identify these relationships. The techniques that have been developed for functional assessment are interview-based rating scales (Durand & Crimmins, 1988), interview questionnaires (Dunlap, Kern, dePerczel, Clarke, Wilson, Childs, White, Falk, 1993; O'Neill, Horner, Albin, Storey, & Sprague, 1990), direct observation (Bijou, Peterson, Ault, 1968; Mace & Lalli, 1991; O'Neill, Dunlap, & Horner, 1991; Touchette, MacDonald, & Langer, 1985), and experimental analysis (Dunlap & Kern, 1993; Iwata, Vollmer, & Zarcone, 1990; Repp et al., 1988).

Functional assessments that identify functional relationships between environment and behavior can be separated into two general approaches: (1) the identification of reinforcement contingencies including positive and negative reinforcement, and (2) the identification of controlling contextual and antecedent stimuli (Dunlap & Kern, 1993). Most of the studies in functional assessment have used the first approach in which the function or purpose of the behavior is stated in terms of contingencies of reinforcement in

Iwata et al. (1982) presented the first comprehensive functional analysis methodology for identifying operant contingencies of self-injurious behavior. Their analysis showed that, when the functions of behavior were matched with treatment, reinforcement-based interventions were found to be as effective as punishment, and the positive behavioral interventions that reduced the need for punishment became a powerful intervention procedure. Cooper et al. (1990) and Northup, Wacker, Sasso, Steege, Gigrand, Cook, & DeRaad (1991) constructed a two-phase functional assessment procedure. Evaluating the effects of task demands on task performance and the effects of positive and negative reinforcement on aggressive behavior, the initial assessment involved rapidly changing conditions and focused on changes in behavior across distinct conditions during the first phase. Once variables that maintained problem behavior were identified, a contingency reversal (second phase) was conducted. During this phase, conditions identified during the initial assessment were presented again along with instruction on appropriate behavior to use in these situations. For example, if a participant engaged in self-injury to gain attention, requesting attention would be taught and reinforced, and attention would be withheld for self-injury during the contingency reversal sessions. Increases in attention requests and decreases in self-injury during the contingency reversal sessions would further support the choice of an assessment-based intervention. This two-phase analysis is conducted within a multielement design, with sessions limited to five to ten minutes.

The central goal of functional assessment has been to identify reinforcers that presumably maintain a target behavior. It is useful to understand the consequences, i.e., the operant contingencies, that are maintaining a problem behavior if we are to build
effective interventions. At the same time, it has been pointed out that in many situations, the consequences for problem behaviors are not very consistent or clear, and it can be very difficult to formulate statements about operant functions. In contrast, it may be more feasible to identify relevant antecedent variables (Dunlap & Kern, 1993). Furthermore, a comprehensive intervention plan often requires a more detailed understanding of the specific antecedent stimuli that control a problem behavior (Durand, 1990). We are limited in developing interventions if we only have information on consequent functions.

The second approach to functional assessment addresses controlling contextual and antecedent stimuli in developing hypotheses that focus on the contextual associations between environmental circumstances and the presence or absence of a target behavior (Dunlap & Kern, 1993). Dunlap, Kern-Dunlap, Clarke, and Robbins (1991) and Dunlap et al., (1993) conducted extensive functional assessment to identify classroom events that maintained the problem behaviors of various children. In these studies, they manipulated antecedent classroom events, using a reversal or alternating treatment design, to test hypotheses in the context of regularly-occurring classroom activities. The reason that research which is designed to make clear inferences about the operant functions of the antecedent variables has not received much attention may be that it has difficulties manipulating the contextual and antecedent stimulus. Although previous researchers often used interviews and observations to identify possible functional relationships between antecedent variables and behavior, they usually treated these as preliminary steps in functional assessment in order to increase its internal validity. Furthermore, relevant antecedent variables, once identified, were usually held constant to facilitate the precise identification of consequent operant functions. Therefore, only a few antecedent variables have been carefully studied in the literature.

So far, educational research on classroom variables in functional analysis which
are associated with child problem behaviors has focused on the role of instructional
variables. A number of researchers have found that preferred activities and provisions for
opportunities to make choices are factors that can improve task performance and decrease
the problem behaviors of children with developmental disabilities or with behavioral
disorders (Clarke, Dunlap, Foster-Johnson, Childs, Wilson, White, & Vera, 1995; Cooper
et al., 1992; Dyer, Dunlap, & Winterling, 1990; Foster-Johnson, Ferro, & Dunlap, 1994;
Umbreit & Blair, 1996). In a research study of children with moderate intellectual
disabilities, Foster-Johnson et al. (1994) evaluated the effects of preference for curricular
activities on student behavior using a reversal design. In this study, preferred activities
were associated with reduced levels of problem behavior and increased levels of desirable
behaviors.

Task difficulty, task length, and the manner in which instructions to complete a
task are delivered have also been related to problem behavior in the school setting (Cooper
et al., 1992; Kern, Childs, Dunlap, Clarke, & Falk, 1994; Singer, Singer, & Horner,
conducted research, using a reversal design, with a child with emotional and behavioral
challenges to identify classroom variables that were associated with his problem behavior.
A functional assessment identified task difficulty and task length as variables that were
functionally related to his problem behavior. During intervention, task length was reduced
by providing several brief tasks, the content of the lesson was modified to reduce the
amount of drill and practice, and alternatives to handwriting were provided. These
modifications dramatically reduced his problem behavior.

As described above, intervention procedures sometimes incorporate a child's
interests into the curriculum, or modify the difficulty level of a task to reduce the
occurrence of undesirable behavior. These antecedent modifications can result in
significant behavioral improvement during instructional activities.

Besides the classroom variables described above, there are numerous other factors that influence children's behavior in educational settings. Researchers have found that teacher-directed group activities (Cooper & Harding, 1993), placing children in low-achieving classrooms (Slavin, 1988; Werthamer-Larsson, Kellam, & Wheeler, 1991), the physical arrangement of the classroom and scheduling of instruction (Nordquist, Twardosz, & McEvoy, 1991), and excessively structured classroom environments (Pellegrini & Horvat, 1995) can be related to high rates of problem behavior. Even though the effects of these contextual variables have not been tested through functional assessment using experimental methodologies, all of these classroom variables need to be considered in assessing and developing effective intervention programs for the children with problem behaviors. In the past, most children with severe behavior problems were served in segregated settings and had little contact with peers without disabilities. Thus, researchers in functional assessment need to identify specific variables that support appropriate behaviors in inclusive settings.

One of the important factors that is critical in developing interventions for young children with behavior problems in school and childcare settings is peer relations. A substantial body of research has demonstrated critical relationships among children's social skill deficits, their peer relationships, and aggressive behavior (Kazdin, 1985, 1987). Children with problem behaviors often elicit maladaptive social responses from other children (Whalen & Henker, 1985) and have concomitant difficulties relating to peers (Cantrell & Prinz, 1985). Consequently, maladaptive behaviors are likely to lead to poor peer relations and social rejection (Carlson, Lahey, Frame, Walker, & Hyung, 1987; DeHass, 1986; Landau & Milich, 1988). Likewise, rejected children have been found to engage in high rates of aggressive and disruptive behavior (Dodge, 1983; Dubow &
Cappas, 1988; Frentz, Gresham, & Elliott, 1991). This bi-directional, reciprocal nature of social behavior has not been investigated with respect to the area of functional assessment. There is a need to investigate social skills and peer variables in demonstrating a functional relationship between behaviors of concern and environmental variables to understand a child's behavior and develop an effective intervention. Interventions for young children with aggression should be designed to promote prosocial coping in the early childhood settings and peer-group contexts to improve the quality of interactions with teachers and peers. Interventions should focus on teaching children how to interact with each other in socially acceptable ways. A great deal of literature documents reductions in the aggressive behaviors of young children by teaching social skills (Maston, Fee, Coe, & Smith, 1991; Prinz, Blechman, & Dumas, 1994). Improving social skills has increased the positive attention received from parents, teachers, and peers. Besides teaching parents and teachers behavior management skills, research emphasized the importance of parents and teachers' skills in teaching and promoting specific social skills.

Interventions based on antecedent manipulations are considered to be relatively simple to implement (Cooper & Harding, 1993; Dunlap & Kern, 1993). However, if we consider all the contextual and antecedent variables that can produce problem behavior at home and in various educational settings, developing intervention procedures can be difficult because manipulating environmental variables to improve a child's behavior requires a multidimensional approach. Regardless of how difficult it is to assess behavior and develop interventions based on antecedent and contextual variables, treatment effects can be expected to be powerful.
Functional Analysis in Natural Settings

The purpose of conducting an experimental functional analysis during the functional assessment procedure is to find treatment variables that will bring behavioral change during intervention. One reason an educator or interventionist might wish to test hypotheses prior to intervention is to confirm the hypotheses in their analysis. By doing this, they can have greater confidence that the manipulated variables will produce the desired results during intervention. Experiments using analog procedures, that assess activities in contexts which differ from the person's everyday environment (e.g., in a clinical setting versus a classroom), consist of manipulating consequent environmental events to provide information regarding their functional relationships with the target behavior. Although the objective of functional analysis is to find the function of behavior, we would not be able to find the relationship if we did not specify the context in which the behavior occurs. The question is whether analog procedures reflect natural occurring conditions (Mace & Shea, 1990). Analog analyses can produce at least two types of errors: a false negative error and a false positive error (Halle & Spradlin, 1993). Iwata et al. (1990) suggested that this limitation of analog analysis can be overcome by observing directly in the natural environment to aid in the selection of the analog situation. However, Lalli and Goh (1993) demonstrated that they were not able to observe similar frequencies of the target behaviors in their carefully designed analog analysis. In their research, the conditions closely paralleled those observed during a descriptive analysis by using the same situations, specific topographies of subsequent events, and the frequency in which a parent responded to a child's problem behaviors when an interventionist delivered the consequences.

To date, the researchers have tried to overcome this limitation by using teachers as therapists in school settings and having them conduct the analyses (e.g., Northup et al., 1991; Wacker et al., 1995), or by also using parents as therapists in clinical settings (Lalli
& Goh, 1993; Wacker et al., 1995). The question is whether it is possible to include all potential antecedent and consequent events which might influence behavior when there are numerous variables selected for evaluation (Cooper & Harding, 1993). Analog conditions allow an approximation of controlling variables but typically identify only classes of reinforcers that may serve to maintain the problem behavior. Another consideration is whether it is feasible to conduct the functional analysis in natural settings in a highly controlled manner. The experimental analysis portion of functional assessment is usually conducted within reversal designs or a combination of reversal and multielement-baseline designs of single-subject experimental methodology. The variables identified through interviews and observations are directly manipulated to verify the hypothesized relationships. The manipulations require exposing the participant to a series of experimental conditions in which the environmental stimuli are presented to determine the functions of antecedents and consequences. The major problem with this type of analysis in natural settings is that manipulation of each variable may involve changing the entire social ecology of the natural environment (Halle & Spradlin, 1993). The procedures can be troublesome for teachers and parents.

Several researchers have demonstrated successful experimental analyses in natural classroom settings (Dunlap et al., 1993; 1994; Kern et al., 1994; Umbreit, 1995; Umbreit & Blair, 1996). In this research, all of the assessment procedures were developed and conducted within the context of the students’ ongoing educational programs. They were successful in identifying antecedent and consequent classroom variables that were functionally related to problem behavior in natural conditions. This research suggests that it is possible to conduct experimental analyses in natural settings, and that interventions designed by teachers using the assessment results are effective. Their contribution to the field is the extension of functional assessment in natural settings. However, functional
procedures for inclusive school and home settings are still in their infancy.

So far, only limited research has demonstrated the effectiveness of functional assessment-based interventions in inclusive education settings. Therefore, effective experimental analysis procedures and the variables which occasion and maintain problem behaviors in unstructured regular education and inclusive childcare settings are unclear. Moreover, there is an importance factor that must be considered when using a functional assessment approach to developing interventions for children in regular classroom settings. Specifically, researchers must consider whether teachers can apply comprehensive assessment and intervention procedures. They must also understand how the teachers approach classroom intervention. For a teacher who is responsible for managing a complex classroom ecology, cost in time and personnel is a critical consideration (Fantuzzo & Atkins, 1994). Practically, the teacher's focus is classroom based, not individual-child based. Because of their limited resources, they are interested in implementing interventions along a continuum for the entire class. It is not feasible to apply an intervention procedure for one child when it causes the teacher to provide less care to the other 20 or 30 children. Developing classroom-wide interventions that require minimal external resources seem to be critical when applying functional assessment-based interventions in classroom settings. If it is fundamental to identify specific stimulus features that control a problem behavior in natural settings when developing effective interventions, it is also essential to consider how the teachers, not the interventionist, can develop intervention procedures. This is particularly important because functional assessment should not be viewed as a one-time event, but rather as a continual, ongoing assessment process that enables the teacher to understand changes in the behavior of children (Horner, 1994).
Multiple Functions of Behavior

Multiple functions of problem behavior have recently received some theoretical and empirical attention in the functional assessment literature. Evidence has shown that different contingencies of reinforcement can maintain the same problem behavior (Day, Horner, & O'Neill, 1994; Durand & Carr, 1992; Harding & Kennedy, 1990; Smith, Iwata, Vollmer & Zarcone, 1993). In a study of the problem behaviors of individuals with intellectual disabilities (Day, Horner, & O'Neill, 1994), target behaviors were found to be maintained both by positive reinforcers (access to tangible objects) and by negative reinforcers (escape from difficult tasks).

Consequent variables may also interact with antecedent variables (Horner, 1994). Umbreit & Blair (1996) showed that the problem behaviors of one student were affected both by a consequent variable (attention) and antecedent variables (preference and choice). This research also demonstrated an interaction among these variables. Specifically, choice was a distinct antecedent variable that interacted with preference and the availability of frequent attention. The fact that the problem behavior can be a function of multiple antecedent and consequent variables presents a challenging task from the standpoint of both assessment and intervention. If intervention is aimed at only one of the functions, there will be selective treatment effects (Durand & Carr, 1992).

It is necessary to develop a functional analysis procedure to identify the multiple functions of problem behavior. The assessment may need to occur across the range of stimulus conditions in which the problem behavior has been observed (Carr & Carlson, 1993), or to evaluate functions using multiple assessment conditions in a single experimental session. Yet, including a wide range of conditions is a challenging task. Although some information is available concerning antecedent variables, there is little research that investigates the effects of combinations of variables.
Multisystems-Based Intervention for Young Children

Strong relationships have been found between early antisocial behavior and subsequent long-term social maladjustment, including adolescent aggression, and adult criminality (Chamberlain & Patterson, 1984; Eron, 1980; Loeber, 1985; Patterson, 1982). Because young children who exhibit persistent patterns of problem behavior are clearly at risk, there is strong justification for the development of effective early intervention strategies. However, regardless of which approach is used, there is a growing awareness that home-based and school-based interventions may not provide young children with all the support they need (Duchnowski, 1994; Halpern, 1990; Powell, 1988). In the past decade, significant advances have been made in the area of functional assessment. Even so, intervention research is at an early stage in providing the range of services needed by parents and educators of children with problem behaviors. A current limitation of functional assessment-based intervention is that the interventions usually target only one setting. Researchers have reported on the efforts of either the clinic/consultant-home or school collaboration, but not both at once (Fiore, Becker, & Nero, 1993). Nevertheless, these studies suggest the potential of similar home-school or community collaborations. Intervention programs need to foster a close working relationship between families, peers, school, and community because children with emotional or behavioral disorders exist within a broader social context.

Where parent education programs have proved effective in assisting children's development, specific parent-child and child development activities have been included in the program design in their home, parent-child center, or childcare (Beller, 1979; Dickie & Gerber, 1980; Lazar & Darlington, 1982). Parent-professional collaboration has been found to be a major variable in successful intervention (Dunst, Trivette, Starnes, Hamby, & Gorden, 1993). Dunst et al. (1993) suggest that programs that provide families with
support, resources, and training for dealing with the complex difficulties of children with problem behavior can greatly strengthen family functioning. Koegel, Koegel, & Schreibman (1991) demonstrated a reduction in problem behavior and improved generalization and maintenance of treatment gains when a parent education program was provided. Involving parents in home interventions within the context of their daily routine can result in a powerful intervention effect. Unlike professionals who see a child relatively infrequently, parents have more access to a child in natural environments and can be active participants in implementing intervention.

Therefore, the critical issues in developing interventions for young children through functional assessment appear to be (a) how to incorporate family, peer, school, and community domains through child-focused approaches, and (b) how to incorporate multiple social and setting domains through multisystems-based or ecological assessment approaches. When integrated services are arranged so that intervention supports an individual throughout the life span, it becomes possible to provide comprehensive, supportive, and effective intervention to children with problem behavior.

Summary

Extensive reports on functional assessment-based intervention have demonstrated significant treatment effects in reducing various problem behaviors of children. The development of methodology to investigate reinforcement functions of problem behaviors has been an emphasis in the functional assessment literature. Because of significant findings concerning the relationship between the context and problem behaviors, recent research in the field has focused on identifying antecedent variables that occasion problem behaviors and on developing context-based interventions. Although a number of researchers have been interested in developing context-based assessment procedures,
difficulties in manipulating the context and antecedent of the behavior have resulted in limited identification of variables. Moreover, the investigation of multiple functions of behavior, i.e., interactions among variables, is still in its infancy. One limitation of current functional assessment research is that it has not focused on developing comprehensive multisystems-based intervention programs. The potential benefits of collaboration among different community settings and parents would warrant its full service to children with special needs.
CHAPTER 3

METHODOLOGY

This study was accomplished through two phases. The first phase focused on assessment of the target behaviors using interviews, observations, hypothesis development, and hypothesis testing within naturally occurring activities. The second phase of the study examined the effectiveness of functional assessment-based interventions that were applied by the teachers.

Settings

This study was conducted in two classrooms for preschool children, ages four and five, in a nonprofit childcare center which was located in a residential area for low income families. The childcare center serves about 140 children, ages one to five, in seven classrooms. Most of the children are from minority families with low income and who receive public assistance. Each of the classrooms participating in this research is licensed for 20 children, most of whom are present each day. About half of the children come to childcare at 6:00 a.m., and most of the children stay until 4:00 or 5:00 p.m. Children who arrive early have free play time with younger children ages 2 and 3 until 8:20 a.m. when breakfast is served. The center is staffed during that period with two to four aides, dependent upon the number of children. The classroom teachers are with the children from 8:30 a.m. to 5:30 p.m. During this period, a partition separates the two classrooms. Breakfast is served to the children in the classrooms with the partition open. Lunch is served in a gymnasium adjacent to the classrooms. One aide is assigned to help the teachers in both classrooms with preparing materials for class projects. Several aides are assigned to the center and move from room to room with a different aide being assigned during the various time periods each day.
Classroom A

Classroom A served eight girls and 12 boys. The classroom had typical early childhood educational materials, but the materials were not arranged in separate areas for different activities, except for a kitchen and dress-up area. Three tables, with enough chairs for every child, were arranged throughout the room. The room had a counter and a sink, storage cubbies on one side of the room, and two shelves for blocks and manipulative activities. Most of the materials were old; some were broken or damaged; and some had missing parts. Because the children did not put puzzles or other manipulative materials back where they belonged, the materials were usually stacked together without being fixed or rearranged. The daily routine during the morning consisted of breakfast, circle time, preacademic class, table activity, snack time, another circle time, choice time, and outdoor free play. The purpose of the first morning circle time was to take attendance and explain the schedule for the day. The preacademic class was designed for learning to recognize letters, the calendar, numbers, colors, and shapes. All of the children sat at the tables and participated in this session. During the table activity time, which lasted 30 to 40 minutes, one project was introduced to the children. The next circle time activity included whole group activities such as identifying words, counting, and story-reading. After the second circle time, the children were allowed to choose a free activity among the blocks and manipulative materials such as puzzles, legos, or beads. The morning ended with outdoor play. This was followed by lunch and a two-hour nap in the classroom. Another snack time, outdoor play, a choice time, and story time were provided in the afternoon.

Classroom B

Classroom B served seven girls and 11 boys. The physical arrangement of Classroom B was almost identical to that of Classroom A, as were the kinds of early childhood materials which were available. Classroom B had a large storage closet and a
window facing the kitchen, which was designed for serving breakfast and snacks. Classroom B did not have a play kitchen or dress-up area, but had a sand table instead. This classroom had more play materials and less furniture than Classroom A. There were two shelves, one for blocks and one for manipulative materials and books. Story books in the shelf were old, and most were torn up. The daily routine for Classroom B during the morning was the same as for Classroom A, except that there was no preacademic instructional class in the morning. Instead, the classroom teacher included the preacademic skills during one of the circle times. During table activity time, two art projects were introduced when no manipulative activities were prepared. Three manipulative activities were usually introduced during this table activity, and when the activities were over, the children were allowed to choose a free activity. The routine and activities in the afternoon were the same as those of Classroom A. Because most of the children were picked-up by their parents after nap time, around three or four o'clock in the afternoon, the remaining children from both classrooms were combined and participated together in activities such as story time and free play.

Participants

Two children from each classroom, for a total of four children, and the two classroom teachers served as the primary participants in this study. The teachers had been serving the children for seven months prior to the start of the study. Each teacher identified two children from her classroom about whom they were the most concerned because of problem behaviors. In addition, the teachers identified an additional child (peer) in each class who also exhibited aggressions and other problem behaviors such as off-task and noncompliance. Peers were observed for the purpose of demonstrating generality to non-targeted children. The four primary participants were assessed for their current developmental levels and behavioral characteristics while the research was being
conducted. Assessments were conducted using a Battelle Developmental Inventory (BDI) Screening Test (Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 1984) that provided information about personal-social, adaptive, motor, communication, cognitive development, and the Behavior Assessment System for Children (BASC) (Reynolds & Kamphaus, 1992). The BASC provides normative data on certain dimensions, including externalizing problems (hyperactivity and aggression), internalizing problems (anxiety and depression), school problems (attention), and atypicality. All four children were second or third generation Mexican-American children who spoke English. Both teachers were also second or third generation Mexican-American. Both were bilingual but were more comfortable with English than Spanish. The participating children's developmental and behavior characteristics are summarized in Table 1.

**Children**

**Carlos.** Carlos was a five-year old boy who had been in the program since he was three. He reportedly was diagnosed as having Attention Deficit Disorder (ADD) when he was three, but had never taken any medication. His parents had been concerned about any possible side effects of medication. On the BDI, Carlos exhibited a significant delay in the personal-social domain (2.0 standard deviation below the mean, 2th percentile) and average to low average skills in other developmental domains. On the BASC, Carlos was not considered to have clinically significant results, but his overall level of problem behavior (BSI) was relatively high, demonstrating problem behavior in the 91st percentile. His teacher considered him to be one of the difficult children in the class because of frequent off-task behavior during activities and noncompliant behavior when given directions. He initiated interaction with peers very well and participated in most of the activities. However, he usually bothered peers next to him during group and individual activities. During transitional periods, he often became disruptive. When redirected, he
Table 1. Characteristics of Participants on the Bettelle Developmental Inventory and Behavior Assessment System for Children

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Carlos</th>
<th>Maria</th>
<th>Alfonso</th>
<th>Jose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chronological Age (months)</strong></td>
<td>63</td>
<td>61</td>
<td>61</td>
<td>60</td>
</tr>
<tr>
<td><strong>BDI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal-Social</td>
<td>32 (44-46)</td>
<td>31 (42-43)</td>
<td>30 (40-41)</td>
<td>29 (39)</td>
</tr>
<tr>
<td>Adaptive</td>
<td>31 (51-52)</td>
<td>31 (51-52)</td>
<td>31 (51-52)</td>
<td>31 (51-52)</td>
</tr>
<tr>
<td>Motor</td>
<td>34 (61-63)</td>
<td>37 (68-72)</td>
<td>38 (73-77)</td>
<td>27 (44-45)</td>
</tr>
<tr>
<td>Communication</td>
<td>26 (49-50)</td>
<td>22 (43-44)</td>
<td>22 (43-44)</td>
<td>24 (45-46)</td>
</tr>
<tr>
<td>Cognitive</td>
<td>28 (59-63)</td>
<td>29 (64-68)</td>
<td>26 (51-52)</td>
<td>30 (69-72)</td>
</tr>
<tr>
<td>Total Score</td>
<td>151 (53)</td>
<td>150 (52)</td>
<td>147 (51)</td>
<td>140 (48)</td>
</tr>
<tr>
<td><strong>BASC (TRS-P)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Externalizing Problems</td>
<td>60 (82)</td>
<td>67 (93)</td>
<td>52 (60)</td>
<td>75 (99)</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td>60 (84)</td>
<td>56 (72)</td>
<td>46 (39)</td>
<td>69 (96)</td>
</tr>
<tr>
<td>School Problems</td>
<td>61 (86)</td>
<td>61 (84)</td>
<td>59 (80)</td>
<td>80 (99)</td>
</tr>
<tr>
<td>Atypicality</td>
<td>66 (91)</td>
<td>60 (89)</td>
<td>58 (84)</td>
<td>80 (98)</td>
</tr>
<tr>
<td>Behavioral Symptoms Index (BSI)</td>
<td>64 (91)</td>
<td>64 (91)</td>
<td>55 (70)</td>
<td>92 (99)</td>
</tr>
</tbody>
</table>

Note. *Battelle Developmental Inventory Screening Test
| Scores 1.5 SD below the mean (7%ile) | Scores 2.0 SD below the mean (2%ile) |
| Behavior Assessment System for Children (Teacher Rating Scales for Preschool Children): | |
| Externalizing Problems (Mean Score = 51.2, SD = 8.7), Internalizing Problems (Mean Score = 49.3, SD = 8.1), School Problem (Mean Score = 49.3, SD = 7.3), Atypicality (Mean Score = 48.9, SD = 8.0), Behavioral Symptoms Index (Mean Score = 49.6, SD = 8.2) |
often complied, but only for a few minutes. Because the teacher believed his problem behavior was caused by his attention problem, it was usually ignored.

**Maria.** Maria was a four-year, 11-month-old girl who was very small for her age. She had attended the center for two-and-a-half years. The staff reported she had been aggressive and noncompliant since she began the program. She hit and pinched her peers when she did not get her way and also upset her peers often by teasing them. Because of her self-injurious behavior when time-out was used, her teacher tried not to use the procedure when problem behavior occurred. A language delay was observed about a year before the research started and she was assessed for a possible speech or language disorder. Even though she was not placed in a preschool special education program, the results of BDI showed that her communication skills, in particular her expressive language skills were severely delayed. She also exhibited severe delay in the personal-social domain, but demonstrated average development in both the motor and cognitive domains while her overall BDI score fell significantly below the expected level for her age group (1.5 standard deviations below the mean). On the BASC, Maria demonstrated significant results on externalizing problems with a score at the 93 percentile, which is equivalent to about 1.5 standard deviations above the mean. In particular, aggression was observed to be clinically significant. Her overall level of problem behavior (BSI) was also relatively high, demonstrating problem behavior in the 91st percentile.

**Alfonso.** Alfonso was a four-year, 9-month-old boy who had been enrolled in the center for one year. He was from a family with many brothers and sisters. His parents were described by the teacher as irresponsible and without parenting skills. He often came to the center early in the morning hungry and dirty. He exhibited severe delay on the Battelle in the personal-social, communication, and cognitive domains. Therefore, his overall score fell significantly below the mean for his age group. He was described as noncompliant and disruptive. His test results on the BASC showed no significant
findings. However, he seldom participated in group and center activities and rarely interacted with peers. While he was off-task, he played by himself under the sand table in the corner of the classroom. He refused to followed directions when he was redirected, and was often in time-out. His teacher tried to ignore his behaviors unless he was disruptive or aggressive toward his peers and staff members. His off-task behavior was reported to be problematic because the teacher was concerned that other children were modeling him. His teachers also were concerned because Alfonso sometimes stole from his peers.

Jose. Jose was a four-year, nine-month-old boy of small height and low weight. He had attended the center for two years. The staff reported he was often aggressive, noncompliant, and off-task. He was described as being smart, which was confirmed by the test results in the cognitive domain of the BDI. His cognitive developmental level was above average. However, Jose demonstrated moderate-to-severe delay in most of the other areas. In particular, his personal-social domain was 2.0 standard deviations below the mean and his motor domain was 1.5 standard deviations below the mean. His overall BDI score revealed that he was at-risk in his development. On the BASC, Jose demonstrated clinically significant findings on all dimensions. His level of problem behavior was significantly high and his overall BSI was significant (99th percentile), being more than two standard deviations above the mean. Jose also was described as a loner who often played alone. He did not interact with peers and did not let them take his play materials nor share his art project materials. He often cried when he was upset. He liked to hide under the table when he was off-task. Almost every other day, he was taken to the administrative office because of his persistent aggressions and noncompliant behavior. Jose was from a small family, having one brother. His parents also were concerned about his aggressive behavior toward his brother at home.
Peers. Two boys, one from each of the two classrooms, whose ages were 4-years, 7-months and 5-years, served as peers. They had been in the program seven and nine months, respectively. The two children were also described as "difficult" because of frequent off-task and disruptive behavior. They were identified by the teachers as not being cognitively delayed, but were considered to lack social skills.

Teachers

Teacher A. Teacher A was in her late 20's and had been working for the program for about a year. She had taken some college courses in education and had taught in an elementary school as an assistant before she moved to this city. She developed lesson plans with Teacher B. The manner in which she delivered instructions to the children was more suitable for older children. She spent every morning teaching letters, numbers, shapes, and colors using direct instruction. She placed emphasis on making projects and was busy preparing project materials during the morning. She often displayed finished projects on the classroom walls. She had more children with problem behaviors than Teacher B and had difficulties handling them when they did not follow directions. When problem behaviors occurred, she often raised her voice, gave reprimands, or used time-out. She rarely attended to the children's positive behaviors.

Teacher B. Teacher B was also in her late 20's and had been working for the program for about eight years. She was one of the senior teachers and was considered to be one of the best in the childcare center. She had a high school education, but seemed to have knowledge about child development. She tried to incorporate play-based activities during table time but did not vary the play materials, almost always using the same materials every day. She hardly opened the sand table for the children because the classroom became messy whenever they played at the table. She directly taught children preread skills but did this only two days per week. She demonstrated better control
over the children, using a firm voice when giving redirection or a reprimand. She did not raise her voice, but seldom attended to appropriate positive behavior.

**Dependent Measures**

The dependent measures in this study included both the child and teacher behaviors. Four basic categories of behavior were measured: (a) appropriate behavior, (b) problem behavior, (c) positive teacher interaction, and (d) negative teacher interaction. The definitions are as follows:

**Appropriate Behavior**

Appropriate behavior included **on-task** behavior such as engaging in the activity and paying attention to the teacher when instructions were given, **compliance** behavior such as following directions, and **appropriate social** behavior such as interacting with peers appropriately.

**Problem Behavior**

Problem behavior included **off-task** behavior, scored when the child did not engage in activities or left the activity without permission, **noncompliance** behavior, scored when the child did not follow directions, **disruptive** behavior, scored when the child screamed, yelled, jumped and ran in the classroom, or threw objects on the floor, and **aggressive** behavior, scored when the child interacted inappropriately with peers and staff by hitting, kicking, biting, scratching, pulling, grabbing, or throwing objects. All attempt to engage in these actions also were scored as problem behaviors.

**Positive Teacher Interaction**

Positive teacher interaction was scored when the teacher attended to the children by
giving complements, smiling, saying affectionate words, giving physical affection, prompting children to engage in activities, or assisting children with assignments.

**Negative Teacher Interaction**

Negative teacher interaction was recorded when the teacher attended to inappropriate behavior with reprimands, time outs, or raised her voice.

**Phase 1: Context-Based Functional Assessment**

The context-based assessment procedure used in this phase was developed by Dunlap and Kern (1993) and has been used in various studies. The procedures involved interviews, observations, hypothesis development, and hypothesis testing. Data from interviews and direct observations were combined to develop hypotheses about the conditions under which better behavior should be expected. Hypothesis testing is a process of confirming or denying the predictive validity of the interview and observation results regarding the behavior of each target child. Hypotheses are tested experimentally. This procedure has been shown to lead to the development of effective interventions for problem behaviors in classroom settings (Umbreit & Blair, 1996).

**Interviews**

The main purpose of the interviews was to identify the situations or conditions under which problem behavior was likely and unlikely to occur. A questionnaire (Appendix A), which included 22 items developed by Dunlap et al. (1993), was used during the interviews. Various factors such as skill deficits, medication, physical condition, and discomfort that may be associated with the problem behaviors were considered in the interview questionnaire. Most of all, the interview questionnaire focused on identifying instructional or classroom variables related to the problem behaviors of
concern. The characteristics of the classroom environment, including teacher and child behavior, activities, and the time of day, were assessed. The interview was conducted with the program director and the classroom teachers during two hours on a single day during nap time. An informal interview also was conducted with two classroom aides on the following morning.

Observations
An A-B-C observation method developed by Bijou et al. (1968) and designed to identify the antecedents and consequents of the target behavior were used during observation periods (Appendix B). The A-B-C data were collected during the most problematic situations identified by the teachers during 10- to 20-minute observations on six consecutive days. Three observations were conducted for each child. Teacher A identified that her large group instruction activity during the morning (with the purpose of teaching letters, numbers, colors, and shapes) was the most problematic situation for both of her children. Teacher B identified her individual-based table activity as the most problematic. Because the Classroom A activity lasted less than 15 minutes, the children in this classroom were observed first. During these observation sessions, a mean of eight episodes of problem behavior occurred for each child.

Hypothesis Development
Based on the interviews and observations, hypotheses concerning the target behaviors were developed for each child. The results of the interviews and observations were used to develop the hypotheses. The process of hypothesis development and the hypotheses for each child are described.

Carlos. Because of Carlos’s history of being diagnosed as ADD, the teaching staff indicated during the interview that his off-task behavior was caused by his short attention
span. His noncompliance when given direction was also reported to be due to his short attention problem. Carlos was described as a child who was healthy and had some prosocial skills, and his physical condition and peer relationships were not identified as factors associated with his problem behavior.

The A-B-C data showed an interesting relationship between Carlos’s problem behavior and instruction during preacademic activities in the morning. Carlos did not pay attention to instruction on letters and colors, but was generally on-task during the shape and number lessons. In particular, he was interested in learning numbers in Spanish. During free play and center activities, he was observed to be on-task for the entire 20-minute observation session when he found something interesting to work on. Carlos preferred to play with games and building blocks with his peers rather than alone. He was observed to enjoy working on painting more than making art projects. It appeared that he would be able to engage in activities for long periods if his interests were incorporated into his preacademic activities. Therefore, the variable of task length, which was related to his short attention and which was identified through the interview, and the variable of preferred activity led to the development of the hypotheses concerning Carlos’s behavior. It was hypothesized that 1) Carlos would engage in a high rate of appropriate behavior when activities incorporated his preference or interests, and 2) that his appropriate behavior would increase when he was assigned a short task.

Maria. In Maria’s case, the interview with the teaching staff did not provide clear information about her problem behaviors. Her lack of communication and social skills were identified as possibly related to her aggressions. However, these variables were not related to her off-task and disruptive behavior during preacademic activities because they did not require peer interaction. One of the staff members, the other classroom teacher who had known Maria for a longer period than Maria’s classroom teacher, mentioned that an attention variable might have maintained her problem behavior. Maria reportedly enjoyed
sitting next to her teacher during circle time, but became upset if she did not get a turn.

During the observations, Maria's teacher sometimes responded to her problem behavior by reprimanding or giving her a chance to take a turn. Thus, the positive reinforcer, attention, was considered in part as a function for her problem behavior. However, during other times, in particular during center activities, she was observed to engage in on-task behavior for the entire period. She finished all of her projects regardless of what was assigned, and did not require the teacher's supervision or help. Even when she was given manipulative activities, she engaged in the individual activities 100% of the session. Once in a while she conversed with her peers, but most of the time she was busy working on her activities alone. It appeared that Maria preferred individual rather than group activities. Thus, it was hypothesized that 1) Maria would engage in a high rate of appropriate behavior when preferred activities were provided during group preacademic activities, and 2) Maria would engage in appropriate behavior when attention was provided.

**Alfonso.** During the interview, Alfonso's teacher reported that his problem behavior occurred most often during table activities. She indicated that he rarely engaged in aggression or noncompliant behavior if he was allowed to play with toys or manipulative materials. His off-task behavior also occurred during circle time, but was not considered to be problematic because the activity did not last for a long time. Because his aggression or noncompliant behavior occurred whenever he was forced to engage in an activity, ignoring his behavior had been considered to be the most effective approach to use. Deprivation of food at home was identified during the interview with the director, but it was not considered a factor that triggered his problem behavior since he was fed breakfast at the center when he arrived.

Observational data revealed that, as described by the staff, Alfonso's problem behavior rarely occurred during free play sessions when he was allowed to choose any play material he wanted. However, his off-task behavior — lying under the table or wandering
around the classroom — was observed during this period after he went through the bookcases where the blocks and manipulative materials were kept and found nothing of interest. His on-task behavior with one material or item did not last more than six or seven minutes. Alfonso also was off-task when some art projects were introduced. For example, he engaged in painting and cutting, but did not engage in coloring with crayons, gluing, and pasting. When he used glue, having glue on his finger seemed to bother him, and he would wash it off which resulted in playing in the sink during the rest of the project time. It appeared that access to preferred activities or introducing fun activities would reduce his problem behavior. Providing more than one activity during the project or table activity time was also considered likely to increase his on-task behavior, which would compensate for his short interest in the material. Therefore, it was hypothesized that Alfonso: 1) was more likely to engage in appropriate behavior when preferred activities were provided, and 2) that his on-task behavior would increase when several activities based on his interests were introduced during the center-based activities.

Jose. In Jose’s case, all of the staff members agreed that he seldom engaged in problem behavior during group story time. He attended to the activity, answering the teacher’s questions. However, like Alfonso, he was described as having difficulty during table activity time when art projects or manipulative materials were presented. His teacher also reported that his social skills deficit was one of the main causes of his aggression during the activity time or free play. Aggressions occurred in situations in which Jose wanted to take play material from his peers or when his peers tried to take them from him. He was reported to always try to get his way.

During observations, it was observed that the variable of preferred activities played an important role in triggering his problem behavior, confirming the interview results. Even though his teacher stated that he seldom engaged in project activities, his on-task behavior occurred at a high rate when he was instructed to use scissors to cut pictures out
of magazines and paste them on a piece of paper. During this art project and other manipulative or free play time, however, Jose engaged in aggression whenever his peers were around him trying to share the materials. One important factor associated with his problem behavior was found to be attention during observations. During group story time, he wanted the teacher's assistant to be with him, wanting to sit on her lap or next to her. Off-task behavior was observed when she was not available during this period. Off-task behavior also increased during table activity time when he did not get help from the teaching staff. He often asked his teachers if they could help him or if they would sit next to him. The variables of attention, preferred activity, and social skills became the bases of the hypotheses for Jose's problem behavior. It was hypothesized that 1) Jose would engage in a high rate of appropriate behavior when preferred activities were provided, 2) Jose's appropriate behavior would increase when attention was provided, and 3) Jose's appropriate behavior would increase when appropriate social behavior between he and his peers was prompted and reinforced.

**Hypothesis Testing**

The experimental procedures for hypothesis testing were developed jointly by the teaching staff and the author. The most important consideration during the process was to determine how the teachers could conduct the experiment in the natural context of the classroom. Because the activities involved in the experiment were group-based, and the teachers were to interact with all children, conditions for testing the hypotheses were designed so that all of the children would participate.

The variable of preferred activities, which was included in the hypotheses for every participant child, was the first target area for functional analysis. A preference assessment was first conducted using procedures based on work by Dyer (1987, 1989). Activities that were initiated independently by each child or when first prompted, and which were
continued for several minutes without supervision or help were identified by the teacher as preferred activities. Teacher A identified her traditional preacademic activity, a teacher-directed activity, as non-preferred for both her children. The activities were assessed using a three-point scoring system with higher scores indicating higher preference. One point was given if the child began the activity independently or when first prompted; another point was given if the child engaged in the activity continuously for five minutes; a third point was scored if the child continued the activity for another five minutes. Each activity was tested in the context of naturally occurring ongoing situations. The mean scores of the children for each of the preferred activities was 3.0. The mean scores for the non-preferred activities was 0.2. The preferred activities and experimental conditions for each child are described. Table 2 presents the experimental conditions for each child during the assessment.

Carlos. Playing games and building blocks with his peers, some puzzles, and painting were identified as preferred activities for Carlos. His non-preferred activities were learning letters and colors during preacademic activities. The variables of preferred activities and task length were tested within the following four conditions: 1) preferred activities with long task; 2) preferred activities with short task; 3) non-preferred activities with long task; and 4) non-preferred activities with short task. Each condition was tested three times. To test hypotheses regarding preferred activities, the preacademic class was modified so that Carlos’s preference or interest in games with his peers was incorporated into the activity. Instead of pointing at letters, shapes, and colors on the wall and asking the children to recognize and discriminate them, bingo games with letters, shapes, or colors were introduced. During the condition of preferred activities with long task, Carlos participated in one of the game activities for 15 minutes. He was given the same activity, but for only five minutes, during the short task sessions. During the next two conditions, Carlos was given non-preferred activities during the preacademic class. There were no
Table 2. Functional Analysis Conditions for Each Child

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Carlos</th>
<th>Maria</th>
<th>Alfonso</th>
<th>Jose</th>
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<tbody>
<tr>
<td><strong>Preferred Activities</strong></td>
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<tr>
<td>Condition 1</td>
<td>Long Task</td>
<td>Attention</td>
<td>Project</td>
<td>Attention and Non-Social</td>
</tr>
<tr>
<td>Condition 2</td>
<td>Short Task</td>
<td>No Attention</td>
<td>Centers</td>
<td>Attention and Social</td>
</tr>
<tr>
<td>Condition 3</td>
<td>Long Task</td>
<td>Attention</td>
<td>Project</td>
<td>No Attention and Non-Social</td>
</tr>
<tr>
<td>Condition 4</td>
<td>Short Task</td>
<td>No Attention</td>
<td>Centers</td>
<td>Attention and Non-Social</td>
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<tr>
<td>Condition 5</td>
<td>Long Task</td>
<td>Attention</td>
<td>Project</td>
<td>Attention and Social</td>
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<td>Condition 6</td>
<td>Short Task</td>
<td>No Attention</td>
<td>Centers</td>
<td>No Attention and Non-Social</td>
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<tr>
<td><strong>Non-Preferred Activities</strong></td>
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<td>Condition 1</td>
<td>Long Task</td>
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</table>
modifications to the preacademic class except that task length alternated between short (five minutes) and long (15 minutes). Hypotheses regarding preferred activities and task length were tested on the first week, and the hypotheses regarding non-preferred activities and task length were tested on the following week.

**Maria.** Working on manipulative activities and arts and crafts projects were identified as preferred activities for Maria. Non-preferred activities were participating in preacademic group class and circle time. The four experimental conditions developed for Maria were 1) preferred activities with attention; 2) preferred activities with no attention; 3) non-preferred activities with attention; and 4) non-preferred activities with no attention. Each condition was repeated three times.

The preacademic group activity was used to test the hypotheses. The activity was modified to incorporate Maria's preference for individual manipulative and arts and crafts activities into the preacademic activity. Puzzles with letters were prepared on one of the tables for the purpose of teaching letter recognition; various sorting and counting objects were prepared on another table to teach number and color recognition and counting; and an art project with different shapes of different colors was prepared to teach shapes and colors.

Maria was engaged in her preferred activities for a 15-minute session during the first experimental condition - preferred activities with attention - while teacher attention was provided in the form of helping, talking, and giving positive complements on her on-task and other appropriate behaviors. Attention was provided approximately every 30 seconds. During the second condition, Maria was introduced to the preferred activities without attention, her teacher and peers did not interact with her. During the third and fourth conditions, non-preferred activities -- the preacademic class without modification -- were provided with and without attention, respectively, in the same manner as described above during the first two conditions. The first week was devoted to testing the hypotheses
regarding preferred activities with and without attention, and the second week was devoted to testing the hypotheses regarding non-preferred activities with and without attention.

**Alfonso.** The teacher identified the following activities, which could be incorporated into the table activity during the experimental assessment, as preferred activities for Alfonso: 1) manipulative activities that had not been available to Alfonso for a long period of time such as pattern blocks, magnetic boards with shapes, and puzzles; 2) arts and crafts work using paint, scissors, or sprinkles; and 3) working at the sand table. The non-preferred activities were wooden blocks, some puzzles, coloring, and art projects using glue.

To test the hypotheses, four experimental conditions were developed. During the first condition — preferred activities with one project — Alfonso was presented with one art project using his favorite materials, or one manipulative activity. During the second condition — preferred activities with centers — a variety of preferred activities were arranged in a center format. Instead of preparing one project for everybody, the project table was set up and other manipulative materials were arranged on other tables. The sand table was open, and Alfonso was allowed to choose any activity at any time. During the third and fourth conditions — non-preferred activities with one project and non-preferred activities with centers — non-preferred activities were tested using the same format as described for conditions one and two above. Each condition was tested three times. One day was devoted to testing hypotheses regarding preferred activities and a second day was devoted to testing non-preferred activities for a total of two days to test the four conditions. Each session lasted 10 to 15 minutes.

**Jose.** Preferred activities identified for Jose were playing with legos and wooden blocks, craft work with beads, painting, cutting pictures out as art work, and counting with animal toys. The non-preferred activities identified were manipulative activities such as puzzles, working on art projects, and coloring. For the three hypotheses for his problem
behaviors, the following six experimental conditions were developed: 1) preferred activities with attention and social skills instruction, prompting, and reinforcement (praise); 2) preferred activities with attention but no social skill instruction, prompting, and reinforcement; 3) preferred activities with no attention but no social skills instruction, prompting, and reinforcement; 4) non-preferred activities with attention and social skills instruction, prompting, and reinforcement; 5) non-preferred activities with attention but no social skills instruction, prompting, and reinforcement; and 6) non-preferred activities with no attention but no social skills instruction, prompting, and reinforcement. Each condition was tested twice.

During the first condition — preferred activities with attention and social skills, instruction, prompting, and reinforcement — several preferred activities were presented on the tables and floors. The teacher instructed the children to engage in positive social behavior just before they engaged in the activities. In particular, they were told to share, request, wait, and use words. Jose was directed to engage in one of his preferred activities with three or four other children. He and his peers were again reminded at the beginning of the activity how to interact positively with each other. The teacher gave him attention in the form of helping him and giving positive comments on his on-task behavior approximately once every 20 seconds, and encouraged the children to share and to engage in other positive social behavior. The teacher gave compliments for positive interactions. During the second condition — preferred activities with attention but no social skills instruction, prompting, and reinforcement — preferred activities were arranged and attention was given to Jose as described before, but instruction on social behavior was not provided, and the children were not praised for demonstrating positive social behavior. During the third condition, preferred activities were arranged, but the teacher controlled the attention and social variables. She did not interact with Jose nor his peers, and did not provide instruction on social behavior. The procedures for the fourth, fifth, and sixth conditions
were the same as the first, second, and third, respectively, except that they involved non-preferred activities. Two conditions were tested each day for a total of three days of hypothesis testing. Each session lasted 10 to 15 minutes.

Data Collection and Interobserver Agreements

An alternating treatment design was used to test the hypotheses for each child. Since the routine of Classroom A allowed only one observation session per child, alternating conditions using the design required two consecutive weeks per child. Each condition was tested three times, except those for Jose, which were tested twice. Two weeks were devoted to testing the hypotheses for the four children. Both appropriate and problem behaviors were recorded during the hypotheses testing. Data were collected using a six-second, partial interval method (Appendix C). Both live observations and videotaping were used to record the sessions. Two observers sat unobtrusively in the back of the classroom and conducted observations during live classroom periods for the purpose of obtaining interobserver agreement. The observers avoided eye contact and social interactions with the children. Videotaped sessions were simultaneously reviewed by both observers. The observers maintained a distance from each other so that their recordings would be independent. The observers practiced recording in pairs until interobserver agreement in the classroom reached 85% or higher for two consecutive days. During this period the observers recorded naturally occurring situations in which the conditions of the activity were identical to the analysis conditions. The observers conducted interobserver agreement checks on 90% of the observations. Point-by-point comparisons for occurrence and nonoccurrence of each behavior were made and calculations were computed using the following formula: agreements divided by agreements plus disagreements multiplied by 100 (Kazdin, 1982). The overall agreement for experimental conditions was 87%, with a range of 86 to 100%.
Results

The results of the functional analyses for the four participating children are presented in Figures 1 through 5. Levels of problem behavior are presented in the graphs on the left; levels of appropriate behavior are presented on the right. The graphs on the top of the page show the results for the testing of the common hypothesis for every child, preferred activity.

Carlos. Figure 1 shows the results for Carlos. In the first, third, and fifth sessions, a long task was delivered. During the second, fourth, and sixth sessions, a short task was presented. The results confirm the hypothesis on preferred activity, but not on task length. Carlos engaged in appropriate behavior for most of the intervals during preferred activity conditions (i.e., when his preference in games with his peers was incorporated into his non-preferred preacademic class). In contrast, a high rate of problem behavior occurred during non-preferred conditions. Appropriate behavior occurred during an average of 99% (range = 98-100%) of the intervals across all preferred activities sessions, and problem behavior occurred during an average of 73% (range = 67-83%) of the intervals across all non-preferred activity sessions. For both the preferred and non-preferred activities, the levels of Carlos’s problem and appropriate behaviors were very similar regardless of whether he was assigned a long or short task. For example, Carlos engaged in problem behavior an average of 74% (range = 69-83%) of the intervals during the long task condition and engaged in problem behavior an average of 72% (range = 67-78%) of the intervals during the short task. Thus, the data strongly supported Hypothesis 1 in that Carlos engaged in a high rate of appropriate behavior when preferred activities were provided. However, task length (Hypothesis 2) did not affect his behavior -- problem behavior did not decrease during the short task conditions.

Maria. Figure 2 shows the results for Maria. In the first, third, and fifth sessions, attention was provided; no attention was provided during the second, fourth, and sixth
Figure 1. Percentage of intervals of problem and appropriate behaviors across assessment conditions for Carlos.
sessions. As with Carlos, Maria exhibited almost no problem behavior during preferred activity conditions (i.e., when manipulative and art activities were incorporated into the preacademic class). Again, as with Carlos, problem behavior occurred for Maria during most of the intervals in the non-preferred conditions. Appropriate behavior occurred during an average of 99% (range = 97-100%) across all preferred activities sessions, and problem behavior occurred during an average of 75% (range = 62-82%) across all non-preferred activity sessions. The levels of Maria's problem and appropriate behaviors were very similar during preferred activities regardless of whether attention was or was not provided. There were some slight differences in her behavior during non-preferred activity conditions when attention was provided. However, it was not considered significant. Thus, the data strongly supported Hypothesis 1 but not Hypothesis 2. Maria engaged in a high rate of appropriate behavior when preferred activities were provided: her appropriate behavior did not increase when attention was provided.

Alfonso. Figure 3 shows the results for Alfonso. The data strongly supported Hypothesis 1 regarding preferred activities. The levels of appropriate behavior during preferred activities (an average of 92%) were much higher than those during non-preferred activities (an average of 9%). In contrast, the levels of problem behavior were much higher during non-preferred activities. The data provided slight support for Hypothesis 2 regarding centers. When one project was provided in the first, third, and fifth sessions, more problem behavior occurred than in the sessions with centers. During preferred activities, problem behavior occurred during an average of 9.3% (range = 7-9%) in conditions with a single project compared to an average of 0% in conditions with centers in which a variety of activities were provided and the children were allowed to choose their activities. Likewise, during non-preferred activities, more problem behavior occurred in sessions with a single project than in sessions with centers. Problem behavior occurred during an average of 97% (range = 95-100%) in conditions with a single project of non-
Figure 2. Percentage of intervals of problem and appropriate behaviors across assessment conditions for Maria
preferred activities while it occurred during an average of 77% (range = 72-78%) in conditions with centers of non-preferred activities.

_Jose._ Figure 4 shows the results for Jose. As with the other children, the data confirmed Hypothesis 1 regarding preferred activity. The levels of appropriate behavior during preferred activities were (an average of 82%, range = 67-100%) much higher than those during non-preferred activities (an average of 33%, range = 37-62%). In comparison, the levels of problem behavior were much higher during non-preferred activities (an average of 63%) than during preferred activities (an average of 16%).

The data also supported Hypothesis 2 regarding attention. When attention was provided, more appropriate behavior occurred than in sessions without attention. During preferred activities, appropriate behavior occurred during an average of 80% of the intervals in the attention conditions, but at an average of only 68% in conditions without attention. Likewise, during non-preferred activities in sessions with attention, more appropriate behavior occurred than in sessions without attention. Appropriate behavior occurred during an average of 40% of the intervals in conditions with attention compared to 0% during conditions without attention.

The data also supported Hypothesis 3 regarding social skills. When social skill prompting and reinforcement was included in the attention conditions (sessions two and four), appropriate behavior increased over sessions with no social skills prompting and reinforcement. During preferred activities, appropriate social behavior occurred during an average of 98% of the intervals in the attention conditions compared to an average of 78% in attention conditions without social skills prompting and reinforcement. Likewise, during non-preferred activities in attention conditions with social skills prompting and reinforcement, more appropriate behavior occurred than in conditions without social skills prompting or reinforcement. Appropriate behavior occurred during an average of 56% of the intervals in the attention conditions with social skills prompting and reinforcement.
Figure 3. Percentage of intervals of problem and appropriate behaviors across assessment conditions for Alfonso.
Figure 4. Percentage of intervals of problem and appropriate behaviors across assessment conditions for Jose.
compared to an average of 40% of the intervals without social skills prompting or reinforcement.

Phase 2: Intervention

The second phase involved developing and implementing assessment-based (Phase 1) intervention programs for the children and examining the effects of these interventions. The educational programs and teacher behaviors that were associated with low rates of problem behavior and high rates of appropriate behavior were modified and incorporated, respectively, during this phase.

Procedure

The staff had little formal training and often attended to (reinforced) problem behavior. For this reason, the author decided that some inservice staff development was needed to increase the chances that the staff would properly implement the intervention procedures. A staff development program was provided for a period of one and a half month after the assessments and before the interventions were implemented. The staff development program was designed to improve the quality of the program for all children by providing additional necessary knowledge to the staff rather than focusing on intervention procedure for each participating child. Therefore, when the in-service staff development program was provided to the participating teachers, the entire teaching staff of the childcare center was invited. The content of the staff development program was based on the results of the assessments during Phase 1. The staff development program was provided at the center and at a preschool by the author and three professionals in early childhood education and early childhood special education. The teaching staff also attended a local childcare conference on activity development for young children. In addition, they visited other early childhood educational settings to obtain information for developing an
effective educational environment. Because of the limited financial situation at the center, various fund raising activities were developed by the author and the teaching staff to provide training and educational materials for the teachers and children.

**Staff Development**

Staff development activities focused on 1) positive methods for managing child behavior; 2) child development and developmentally appropriate activities; and 3) instructional activity centers and room arrangement, developing cost-effective educational materials, and teaching appropriate social skills. Five two-hour sessions were presented in the evenings and included lectures, discussions, reading materials, and instructor modeling (Appendix F).

A session on positive approaches to managing child behavior focused on developing a reinforcement-rich environment, i.e., how to teach desirable behavior by actively and contingently reinforcing it. Increasing appropriate behavior by providing age-appropriate activities that make lessons more interesting and enhance the children's ability to initiate positive interaction with others was discussed. Emphasis was given to "catching children being good" as often as possible. The training also emphasized interacting positively with children as often as possible and learning how to ignore inappropriate behavior rather than reinforcing it by giving attention. Most of all, the session emphasized methods for preventing behavior problem by controlling relevant antecedents.

Information about child development and developmentally appropriate activities in five areas -- adaptive, cognitive, communication, physical, and social-emotional -- was presented in another session. The importance of child active initiation of learning was discussed. Emphasis was given to how children learn through blocks, games, puzzles, books, music, cooking, and play, and how the teachers could guide a child's growth and learning through those activities.
Sessions on instruction focused on ways to develop activity centers, room arrangements, how to develop cost-effective educational materials, and how to prompt and reinforce appropriate social interaction among the children. Materials needed for each center and methods for arranging the centers in ways that appeal to children and provide safe and effective learning environments were discussed. Suggestions concerning the use of props in each center were also discussed. The importance of rotating toys and other materials was a focus of discussion during the session. Resources for finding free educational materials were shared. To provide hands-on experience, the teachers were given time to make an art project or musical instrument from materials obtained in the community, such as recycled food containers. Methods for increasing parental involvement in preparing educational and play materials were also discussed.

A social skills curriculum using puppets to stimulate and discuss social problem solving developed by Vaughn, Levine, and Ridley (1990) was introduced. The curriculum is designed to teach interpersonal problem solving techniques to children between the ages of three and six years and to give them a positive self-concept. The program has been used with typical young children, young children with aggression, elementary school children with learning disabilities and social difficulties, and older children with moderate mental retardation. During the session, teachers selected and rehearsed one of the lessons and were evaluated for their presentation. They practiced techniques for presenting a puppet show, varying the volume and tone of their voice, using facial expressions, and keeping the puppets moving as they talked and performed the actions.

Intervention

The intervention phase consisted of two stages. During Stage 1, instructional programs were modified to incorporate the children's interests and preferences to meet their needs because preference was functionally related to the problem behaviors of each of the
participating children. The purpose was to reduce problem behaviors and enhance learning. Intervention was designed to benefit all of the children in the classroom. The teachers developed five or six activity centers using tables and floor space. Furniture was rearranged and new bookcases were brought in to separate the centers. Newly prepared art, play, and manipulative materials, blocks, and books were arranged in each center to attract the children. Children were allowed to choose and move to any center during the activity periods. Rules for each center, such as sharing, requesting, number of children allowed, waiting, and no-hitting, were established and taught to the children. Each area of development was stressed equally while the children engaged in the various activities. Rather than monitoring the children, the teachers interacted with them.

The interventions targeted preacademic activities in Classroom A and table activities in Classroom B. However, both classrooms used the same center format to achieve individual goals and objectives. In particular, Teacher A discontinued her preacademic class and taught the academic skills during the center activities. The teachers also incorporated the use of preference in other activities throughout the day. For example, group circle time was shortened from 15 to 10 minutes and changed to incorporate games, music, and movement so that it would enhance the children's engagement. Outdoor play time was increased from 30 minutes to one hour during the morning and modified to focus on play activities that facilitated physical growth and learning.

To increase the appropriate behavior of the children, especially Jose, inappropriate behavior was ignored as much as possible. Instead, the teaching staff attended to appropriate behavior. The children were praised for their positive behaviors. The teacher's assistant helped Jose most of the time during arts and crafts projects so that he could receive frequent attention. In addition, Jose was taught how to request help whenever he needed it, and his appropriate behavior was reinforced by verbal praise and by allowing him to spend individual time with the teacher by being a helper.
During Stage 2, starting on Day 24, the teachers implemented social skills training on a daily basis for a period of two weeks. After breakfast when the children were waiting with their teacher for class time to begin, a 15-minute circle time session for all children in the two classrooms was presented to provide social skills training. Teachers took turns providing the 15-minute lesson to have more practice time with puppets. The puppets were used to teach the children to express feelings, ask, share, invite, wait, take turns, get assistance from others, and trade. Skills in using appropriate refusals and the reciprocal behavior of handling refusals were included as well. Understanding problem situations and their consequences and understanding peers' feelings also were emphasized.

Strategies for teaching social skills were introduced through the use of puppet modeling, prompting, and reinforcing social behavior. Through this activity, the children were reminded how to interact positively with peers before the center activities began. The skills that were taught during social skills training sessions were praised by the teachers throughout the day. In addition, a two-foot rule was implemented for the teaching staff. Specifically, they were instructed to approach the children if they needed to talk to them. Yelling or raising their voice during activities or any other period was not acceptable.

Design and Measurement

The intervention effects were evaluated by using a combination of multiple baseline and multielement designs to delineate the differences in behavior change across children and within the two stages of intervention. The children in Classroom A were targeted first. Baseline data were collected on Carlos during the first five days, and on Maria during the first seven days. During baseline, the teacher continued to use the previous preacademic activities. Beginning on Day 6, the intervention was implemented for Carlos, providing puzzles and games on a table to teach preacademic skills. Beginning on Day 8, when the intervention was implemented for Maria, the teacher discontinued her previous activities
and implemented the new intervention program for the entire class by setting up centers. The intervention was implemented in Classroom B for Alfonso on Day 10 and for Jose on Day 11. Because a variety of activities that trigger the interests of both Alfonso and Jose were provided during the first day of intervention, Jose was not allowed to move around to the different centers, but was restricted to working on only one art project during the baseline period. On the second day of intervention, Day 11, Jose was allowed to work on any activity he wanted. The second stage of intervention, which included social skill training and reinforcement, began on Day 24 and used a multielement design. The same procedure continued for the rest of the data collection period.

Two probe procedures were used to assess the generality of the intervention to other situations and other children. For Carlos and Maria in Classroom A, a table activity time was targeted for the probe procedure; for Alfonso and Jose in Classroom B, a group circle time was targeted. Generality to other children was assessed by collecting data on one additional child from each classroom participating in the probe procedures during baseline and intervention. Two or three data points were obtained during baseline and five data points were obtained during intervention. Generality to other situations was assessed by collecting probe data during non-targeted activities. Once again, two to three data points were collected during baseline, and three to five data points were collected during intervention. Data on teacher behavior also were obtained to compare differences in their behavior during baseline and intervention. Both positive and negative teacher interaction behaviors were recorded.

**Data Collection and Interobserver Agreement**

Intervention data were collected for a total of 39 school days. One 15-minute observation period was conducted each day with each child. During intervention, Alfonso (Classroom B) transferred to another childcare center because it was much closer to his
home. Thus, data for Alfonso were collected for only 26 days. During the 15-minute data collection periods, the author recorded the occurrence of the target responses for the participating children and teachers. However, the teaching staff recorded data during the generality probes with peers during both baseline and intervention.

Interobserver agreement was calculated using the same procedure described in Phase 1. Disagreements were those intervals in which the second observer scored the interval in a manner differing from that of the first observer. Percentage agreement was calculated. Forty percent of the observation sessions were videotaped for the purpose of determining interobserver agreements. The mean percentage agreement for problem behavior during baseline, intervention, and generality probes was 92%, ranging from 90% to 100%. The mean percentage agreement for positive teacher interaction during baseline and intervention was 88%, ranging from 84% to 97%. The mean percentage agreement for negative teacher interaction was 90%, ranging from 86% to 100%.

To evaluate the staff's implementation of the intervention program, procedural reliability data were collected for 20 percent of the intervention sessions. To assess adherence to the intervention protocol, two observers independently assessed the teachers while they implemented the intervention. Three checklists, two for implementing the intervention procedures and one for implementing social skills training, were used.

The first checklist (Appendix D.1) included items on whether the teacher varied activity materials for the centers, whether the teacher rotated the materials or added new materials each day, and whether the teacher provided preferred activities. The second checklist (Appendix D.2) included items on whether the teacher reminded the children of rules for social interaction before the activity started, whether the teacher praised appropriate behavior during the activity sessions, and whether the teacher provided other forms of contingent positive attention to children during the session. The third checklist (Appendix D.3) included 12 items on whether the teacher (a) had all the materials ready, (b)
presented the puppet shows using appropriate body movement, facial expressions, different voices, questions, and props, (c) knew the content, (d) made positive comments while maintaining physical closeness and eliciting elaboration, and (e) shared personal experiences with the children.

Overall, the procedural reliability reached 93% across both teachers. For Teacher A, the reliability reached 95% while implementing the first stage of intervention which included modifying activities and providing activities in centers based on the preferences and interests of the children. During the second stage of intervention when social skills were encouraged and attention was provided, the reliability reached 92%.

The procedural reliability during implementation of social skill training reached 88%. For Teacher B, the reliability reached 98% during the first stage of intervention and 95% during the second stage of intervention. During the social skill training, it reached 90%. The overall reliability of 93% demonstrates that the intervention procedures were specified well enough that other teachers could implement them with a high degree of accuracy.

**Treatment Acceptability**

The Treatment Acceptability Rating Form-Revised (TARF-R) (Reimers & Wacker, 1988) was used to determine the relative acceptability of the pre- and post-assessment interventions. This instrument includes 17 items (Appendix E), with multiple items addressing each of the following areas: reasonableness, effectiveness, side effects, disruptiveness/time required, cost, and willingness. Each item is rated on a seven-point Likert-type scale. Scores for items concerning reasonableness, effectiveness, and willingness range from not at all (1) to very much (7). High scores on these items indicate higher levels of reasonableness, effectiveness, and willingness for treatment procedures. Scores for items that rate side effects range from none (1) to many (7), with higher scores
indicative of greater levels of side effects for a given intervention. Disruptive/time and cost scores range from not at all (1) to very much (7). High score on these items indicate greater levels of disruptive effect and higher cost for given intervention procedures. Cumulative scores could range from 17 to 119. The TARF-R was completed for each participating child by each of the classroom teachers. To assess the program before and after the intervention, they completed the form twice. The first time, during the baseline stage, was directed at the program in effect at that time. The second time, after the intervention phase, was directed at the intervention.
CHAPTER 4
RESULTS

This chapter presents the results for the implementation of interventions and treatment acceptability. Results for each Research Question are reported. Data on the participating children's problem behaviors during baseline, intervention, and generality sessions are presented in Figure 5; data on teacher and peer behaviors during baseline and intervention sessions are presented in Figure 6.

**Question 1**

Question One addressed the effects of contextual functional assessment-based intervention on individual children.

**Carlos**

As shown in Figure 5, Carlos engaged in problem behavior during 70-90% of the intervals during baseline conditions. When intervention was implemented starting on Day 6, his problem behavior occurred rarely, 0-12% of the intervals. The same pattern maintained during Stage 2 intervention. Almost no differences were observed between Stage 1 and Stage 2 intervention. During generality sessions during baseline, Carlos demonstrated problem behavior during 60-72% of the intervals. His problem behavior, however, was completely eliminated during the generality sessions during intervention.

**Maria**

Maria's problem behavior also was reduced dramatically during intervention. She engaged in problem behavior during 0-8% of the intervals during intervention, compared to 62-78% of the intervals during baseline.
Figure 5. Percent of problem behavior during baseline, intervention, and generality sessions for each child
During Stage 2 of the intervention, no problem behavior was observed. In contrast, no problem behavior occurred during intervention except on Day 8 when she engaged in problem behavior during only 5% of the intervals. In generality sessions during baseline, problem behavior occurred during 38-58% of the intervals.

Alfonso

During baseline, Alfonso engaged in problem behavior during 82-100% of the intervals. However, dramatic behavior change was observed during intervention, as Alfonso never engaged in problem behavior during either Stage. During generality sessions in baseline, Alfonso engaged in problem behavior during 80-90% of the intervals. In contrast, no problem behavior occurred during the generality sessions in intervention with the exception of Day 11 when problem behavior occurred during 5% of the intervals.

Jose

As shown in Figure 5, Jose engaged in problem behavior during 80-100% of the intervals during baseline. When intervention was implemented starting on Day 11, his problem behavior was reduced to 0-22% of the intervals during the first stage of intervention. When the second stage of intervention was implemented, providing attention and prompting and reinforcing social skills, his problem occurred during only 0-10% of the intervals. In generality sessions during baseline, Jose demonstrated problem behavior during 60-70% of the intervals. However, his problem behavior was reduced and occurred rarely in generality sessions during intervention (demonstrating 0-5% of the intervals during the first stage and 0% of the intervals during the second stage).

Together, these data clearly demonstrate that the context-based functional
assessment and intervention resulted in eliminating problem behaviors of target children at the childcare center. Furthermore, the effect occurred immediately and lasted throughout the rest of the intervention period.

**Question 2**

Question two addressed the intervention effects on teacher behavior. The results of the analysis are presented in Figure 6.

**Teacher A**

As shown in Figure 6, Teacher A demonstrated negative interaction with children during 28-35% of the intervals during baseline conditions, and positive interaction during only 13-17% of the intervals. When intervention was implemented, negative interactions reduced to 0-8% of the intervals during the first stage of intervention and 0-3% of the intervals during the second stage of intervention. Simultaneously, positive interactions occurred during 72-90% of the intervals during the first stage and 87-95% during the second stage of intervention.

**Teacher B**

Teacher B engaged in negative interactions with children during 10-18% of the intervals during baseline conditions, and positive interaction during 6-15% of the intervals. When intervention was implemented, negative interactions reduced to 0-2% of the intervals. In contrast, positive interactions with children occurred during 91-100% of the intervals during the first stage and 97-100% during the second stage.

The data clearly demonstrate positive changes in teacher behavior. Before intervention was implemented, neither teacher interacted positively with the children very often. They seldom provided positive attention to the children. Instead, they were more
Figure 6. Negative and positive teacher interactions during baseline and intervention, and problem behavior of non-targeted peers during generality sessions.
prone to attend to negative behaviors. Following the staff development sessions and the implementation of the intervention, significant behavioral changes occurred in both teachers.

**Question 3**

Question three addressed the generality of the intervention. Generality was tested across situations and children not directly included during assessment or intervention. The behavior of the target children during the generality probe sessions in non-targeted activities paralleled that seen during baseline and intervention. In generality sessions conducted during baseline, problem behaviors recurred during 40-90% of the intervals across the four children. In generality sessions during intervention, problem behaviors were virtually eliminated.

Generality also recurred to non-targeted children. The selected peer in Classroom A demonstrated problem behavior during 74-82% of the intervals during baseline; problem behavior dramatically reduced during intervention, occurring during only 0-2% of the intervals. The selected peer in Classroom B also engaged in high rates of problem behavior during baseline (52-65% of the intervals). As with the peer in Classroom A, his problem behavior was virtually eliminated during intervention, occurring during only 0-4% of the intervals.

Results on the non-targeted situations and peers demonstrate the generality of the assessment-based intervention. Positive behavior changes by the targeted children occurred in other activities during the day. In addition, implementation of the intervention also had positive effects on the behavior of other children who were not targeted during assessment and intervention.
Question four addressed the acceptability of the intervention to the teaching staff. Treatment acceptability ratings on the TARF-R for the intervention procedures in effect during baseline (i.e., time out and redirection) were 19 and 30 for Teacher A for an average of 27 (out of 119) or 1.4 per item, and 18 and 25 for Teacher B for an average of 24 or 1.2 per item. The overall average acceptability was 26. Acceptability ratings for the contextual functional assessment-based intervention were 100 and 110 for Teacher A for a mean of 108 or 6.4 per item, and 102 and 116 for Teacher B for a mean of 110 or 6.6 per item. The overall acceptability averaged 109. The results demonstrate that the assessment-based intervention received very high acceptability ratings from the teaching staff. In contrast, the procedures they had previously used received very low acceptability ratings.
CHAPTER 5
DISCUSSION

This research is one of the few investigations of the problem behavior of children in inclusive childcare settings using a context-based functional assessment approach. The study identified relevant antecedent and consequent variables, employed a functional analysis methodology, and demonstrated the effects of assessment-based intervention across children and teachers in the natural context of an inclusive childcare center. The study also demonstrated generality to other typical activities in the childcare center and to children who were not targeted during assessment or intervention. It demonstrated dramatic improvements in child and teacher behaviors and high treatment acceptability.

This chapter includes a summary of the research, discusses findings of the study in relation to the existing literature, discusses limitations of the study, and suggests implications for future research.

Summary of the Research

The purpose of this study was to extend antecedent and context-based functional assessment and intervention procedures for preschool age children with problem behaviors to the natural setting of an inclusive childcare center. Two phases were included: assessment and intervention. Besides identifying variables that maintained problem behaviors, the research investigated intervention effects on the behavior of the participating children and teachers, and generality to other situations and peers.

Four children and two teachers participated in this study. Two peers of the children participated during the generality probe sessions. Assessment data were collected for a period of two weeks, and intervention data were collected once per day for 39 school days, except for one child whose intervention data were collected for 26 days. Procedural
reliability data were obtained across the stages of intervention to verify that the teachers properly implemented the intervention procedures and determined the teachers were able to implement the intervention. Treatment acceptability data were obtained to determine the acceptability of the interventions by the two classroom teachers who implemented the interventions.

An alternating treatment design was used during Phase 1 to identify the variables that were functionally related to the children's problem behaviors. Multiple hypotheses were tested by including more than one condition in one experimental session. During intervention (Phase 2), the design combined a multiple-baseline design across children and teachers with a multielement design. The intervention phase included three sub stages: baseline, stage 1, and stage 2. Five two-hour training sessions were provided to the teachers prior to the development and implementation of the intervention.

The results of the context-based functional assessment indicated that the problem behaviors of target children were influenced by either not considering the children's preferences, not providing access to a variety of activities, not providing adequate attention, or failing to instruct, prompt or reinforce social skills. For three of the children, access to preferred activities was the most relevant variable. For one of the children, interaction between preference, attention, and social skills was the most relevant variable. The assessment-based intervention greatly reduced problem behavior by children and negative teacher interaction, and increased positive teacher interaction. The results demonstrated generality to non-targeted situations and peers. Both procedural reliability and treatment acceptability were high, demonstrating that the intervention procedure could be applied by multiple teachers and that the benefits of the intervention were considered to be large.
Significance and Relationship to the Literature

Regardless of the participating children, preference for activities was an important variable. The children demonstrated high rates of problem behavior when non-preferred activities were provided and high rates of appropriate behavior during preferred activities. One of the children (Jose) engaged in more appropriate behavior when attention, a positive reinforcer, was provided during preferred activities. Furthermore, his appropriate behavior increased further when social skills were demonstrated to him and his peers. In other words, some children's problem behavior is influenced by multiple variables.

Another important finding was that functional assessment-based intervention could be applied very successfully to manage the problem behaviors of young children at risk for behavior disorders in an inclusive childcare center. An assessment-related staff development program was developed, and the childcare center teachers were able to develop intervention procedures based on the results of the assessment, modify the program, and improve the entire environment. The intervention effects were powerful in changing the behavior of both the children and the teachers.

The findings of this study are significant for several reasons. First, this study extends the literature on context-based functional assessment, in particular, on the effects of the antecedent variable "preferred activities" on problem behavior. Consistent with the results of other research (Clarke et al., 1995; Foster-Johnson et., 1994; Kern et al., 1994; Umbreit & Blair, 1996), it was found that preference or interest in activities is a very important variable to consider when developing interventions for young children who demonstrate problem behaviors. Researchers have demonstrated that choice can have significant effects on the occurrence or nonoccurrence of problem behavior (Dunlap et al., 1994; Dyer et al., 1990). Even when choice has been given during non-preferred activities, problem behavior has been reduced (Vaughn, 1994; Umbreit & Blair, 1996). In this study, the antecedent variable of "availability of centers" may be similar to that of
"choice" which has been investigated in the other studies. Children were allowed to explore any interesting center during activities when the effects of preference were assessed. Since the availability of various activity centers may approximate the variable of choice, it is difficult to clearly distinguish "preference" of various stimulus activities from choice in this study.

Several researchers have demonstrated a relationship between task length and problem behavior (Dunlap et al., 1991; Kern et al., 1994) in which problem behavior was reduced by reducing the task length. In the present study, task length did not affect the occurrence of problem behavior. One possible explanation for the difference between the results of previous research and this study should be considered. In some children, as in this research, modifying an activity based on the child's preferences and interests may be more important than reducing the activity length. Although task demands are reduced to increase on-task behavior, incorporating preference by modifying instructional activities and providing a variety of interesting activities may facilitate learning and increase appropriate behavior in ways that make it unnecessary to reduce task length. As emphasized in the research of Foster-Johnson et al. (1994) and Umbreit and Blair (in press), the preferred activities in this present study were valuable because they were identified and modified in the context of the instructional objectives. The preferred activities were appropriate for the context and compatible with program goals. This study also extends the use of preferred activities to typical routines and activities as they occur throughout the day. Embedding elements of preferred activities within existing non-preferred activities was successful as shown in studies of school-age children with behavior disorders (Clarke et al., 1995) and a preschool-age child with problem behaviors in childcare (Umbreit and Blair, in press).

This study also extends the literature on the multiple functions of problem behavior. Previous research (Umbreit & Blair, 1996) demonstrated that preference and choice
(antecedent variables) interacted with attention (consequent variable). One of the children in this present research (Jose) showed that his problem behavior was reduced more when attention was provided during the preferred activities. Preference was also found to interact with another antecedent variable (social skills) in the child, demonstrating less problem behavior during preferred activity conditions when social skills were simultaneously demonstrated. A complex interaction among the three variables was demonstrated as well. Thus, during the second stage of the intervention phase when social skills training was provided and demonstration of social skills were prompted and reinforced, Jose's problem behavior was reduced more than during the first stage of intervention when preferred activities and attention were provided without social skills training.

This study is the first to demonstrate generality to non-targeted activities and peers using the functional assessment methodology. This finding is important, particularly for applied settings, because it demonstrates important benefits that extend well beyond formal, brief experimental sessions. The fact that the teachers were able to incorporate the intervention procedures in many activities throughout the day demonstrates the flexibility of assessment-based intervention and its potential to have a far reaching, positive impact on both teacher behavior and programming. The fact that other children's behavior was positively affected by the intervention points to the benefits that appropriate programming can have for all children, including those who are not targeted for assessment or intervention.

Finally, the results of treatment acceptability revealed that the intervention procedures were highly valued by the staff, and the effects of the intervention were viewed as powerful. This demonstrates that contextual functional assessment-based intervention is feasible for implementation by childcare teachers with a limited educational background. It has been reported that there is a positive relationship between treatment acceptability and compliance (Reimers, Wacker, Cooper, & DeRaad, 1992). Reimers et al. (1992) found
that parents who reported the treatments to be more acceptable continued the intervention procedure in their follow-up research. The high treatment acceptance rate was related to long-term maintenance of compliance over time. Thus, it seems likely that the teachers in the present study would continue their contextual functional assessment-based intervention procedures to provide a quality program to their new children and to prevent future problem behaviors.

**Limitations of the Study**

Some limitations of this study should be noted. First, no follow-up data were collected due to the late implementation of the interventions toward the end of the school year. Children from the center, including the participants, transferred to kindergarten classes at public schools because they had advanced a grade and were ready for public education. Hence, no conclusions can be drawn regarding the maintenance of behavior change. In addition, the participating children were relatively homogeneous in terms of family SES and ethnic background. This may limit extension of the findings to other populations. An additional limitation of this study is that the factors that mediate the effects of the classroom variables on child behavior were not assessed. It is well established that when parents are involved in intervention, the effect of treatment may be more significant. In this study, interviews with the parents were not included nor were home observations. Thus, the effects of home factors on the children's behaviors were not investigated. A more complete intervention program would include the parents during assessment and intervention.

Finally, even though staff development appeared an important aspect in developing and implementing the interventions, the effects of the staff development were not empirically investigated. It is not clear whether intervention procedures without staff development can solely account for the behavioral changes observed among the children. It appears that the staff development variable may play a significant role in teacher behavior
change, which could have played an important role in improving the quality of the program and child behavior. The possible effects of the staff development on the results of treatment acceptability also need to be considered in interpreting the treatment acceptability reports. The teachers may have based their rating of the treatment not only on the intervention procedure itself, but also on the staff development program provided before the intervention.

Implications for Education and Future Research

A number of implications can be derived from this research. First, multiple variables, in particular, antecedent variables that can affect problem behavior should be investigated further. To identify antecedent and context-related variables, their interactions, and their relationship to the problem behaviors of children, research in inclusive settings should be undertaken.

Second, the findings of this study suggest the importance of an assessment-based intervention approach when developing curriculum-based interventions for children with problem behaviors. Using preferred activities that are appropriate for the context and compatible with program goals and embedding preferences into existing non-preferred activities should be considered. The use of preferred activities to improve behavior must be accompanied by a consideration of the relevance and appropriateness of the activities.

Third, a multisystems-based service delivery model needs to be considered in the future to develop more comprehensive interventions and provide a full range of services to children with special needs. Although this study concluded when the children transferred to public school education, the intervention could have been more complete had the service to the children been continued in the public schools. Besides homes, after school program settings also need intervention services for children with problem behaviors.

Third, staff development is another area for future research. Follow-up and
technical assistance appear to be necessary. The long-term goal of this research was to
improve the quality of childcare centers. To achieve this goal, on-going staff development
program should be provided to the staff. Follow-on evaluation of the program in the future
will provide valuable information in developing more effective interventions for children in
the community settings.
APPENDIX A

INTERVIEW QUESTIONNAIRE

PRELIMINARY FUNCTIONAL ASSESSMENT QUESTIONNAIRE
Instructions to PBS staff: The following interview should be conducted with the student's teacher. Prior to the interview, ask the teacher whether or not the Classroom Aide should participate. If yes, indicate both respondents' names. In addition, in instances whether divergent information is provided, note the sources attributed to specific information.

Student: ____________________________ Subjects #: _______________________
Age: __________ Sex: M F
Interviewer: __________________________ Date: __________________________
Respondent(s): _______________________

1. List and describe behavior(s) of concern.
   a. c.
   b. d.

2. Prioritize these behaviors (which is the most important?):
   a. c.
   b. d.

3. What procedures have you followed when the behaviors first occurred?
   a. c.
   b. d.

4. What do you think causes (or motivates) the behavior?
   a. c.
   b. d.

5. When do these behaviors occur?
   a. c.
   b. d.
6. How often do these behaviors occur?
   a. 
   b. 
   c. 
   d. 

7. How long has this/these behavior(s) been occurring?
   a. 
   b. 
   c. 
   d. 

8. Is there any circumstance under which the behavior does not occur?
   a. 
   b. 
   c. 
   d. 

9. Is there any circumstance under which the behavior always occurs?
   a. 
   b. 
   c. 
   d. 

10. Does the behavior occur more often during certain times of the day?
    a. 
    b. 
    c. 
    d. 

11. Does the behavior occur in response to the number of people in the immediate environment?
    a. 
    b. 
    c. 
    d. 

12. Does the behavior occur only with certain people?
    a. 
    b. 
    c. 
    d. 

13. Does the behavior occur only during certain subjects?
    a. 
    b. 
    c. 
    d. 

14. Could the behavior be related to any skills deficit?
    a. 
    b. 
    c. 
    d.
15. What are identified reinforcers for this student?
   a. c. 
   b. d. 

16. Is the student taking any medications that might affect his/her behavior?
   a. c. 
   b. d. 

17. Could the student's behavior be signaling some deprivation condition (e.g. thirst, hunger, lack of rest, etc.)?
   a. c. 
   b. d. 

18. Could the behavior be the result of any discomfort (e.g. headaches, stomachaches, blurred vision, ear infection, etc.)?
   a. c. 
   b. d. 

19. Could the behavior be caused by allergies (e.g., food, materials in certain environments, etc.)?
   a. c. 
   b. d. 

20. Do any other behaviors occur along with this behavior?
   a. c. 
   b. d. 

21. Are there any observable events that signal the behavior of concern is about to occur?
   a. c. 
   b. d. 

22. What are the consequences of the behavior?
   a. c. 
   b. d.
APPENDIX B

OBSERVATION FORM

BEHAVIOR ANALYSIS
## BEHAVIOR ANALYSIS

<table>
<thead>
<tr>
<th>Time</th>
<th>Antecedents</th>
<th>Behavior</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Description of what is happening in relation to student. What student was doing immediately before the problem behavior</td>
<td>Description of the behavior</td>
<td>What happens as a result of behavior (any response, or intervention to the student's behavior)</td>
</tr>
</tbody>
</table>
APPENDIX C

INTERVAL RECORDING DATA COLLECTION FORM
# Interval Recording Data Collection Form

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Observer's Name</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Code: + problem behavior; - appropriate behavior)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Start Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MIN</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
</table>

| MIN | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|-----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|


APPENDIX D

PROCEDURAL CHECKLIST

D.1. INTERVENTION PROCEDURE 1
D.2. INTERVENTION PROCEDURE 2
D.3. SOCIAL SKILLS TRAINING
Procedural Checklist (1)

INTERVENTION PROCEDURE 1

Teacher: _______________  Classroom: _______________  Date: _______________
Observer: _______________

1. *Teacher varies activity materials for each center*. Several activity materials are available in each center for the number of children involved.

2. *Teacher prepares new sets of materials for each center or added new props or materials*. The teacher tries to interest children by having different materials each day.

3. *Teacher provides activities or materials based on child's preference*. Has some activities and materials in centers to interest the target child.
Procedural Checklist (2)

INTERVENTION PROCEDURE 2

Teacher: ____________  Classroom: ____________  Date: ____________
Observer: ____________

1. Teacher reminds the children of rules for social interaction before the activity starts. Talks with the children about sharing, requesting, waiting, and saying no instead of hitting peers.

2. Teacher praises appropriate behavior during activity sessions. Makes many positive comments and attends to positive interaction among children to encourage social skills.

3. Teacher provides other forms of contingent attention to the children. Helps the children, provides physical contacts, or has children be helpers.
**SOCIAL SKILLS TRAINING**

Teacher: ______________  Classroom: ______________  Date: ______________

Observer: ______________

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. The teacher has all materials ready (puppets, props, manual).</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Teacher varies the arm, head, and body movements of the puppets.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keep the puppets moving as they talk and perform the actions that represent the content of the lesson.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Teacher varies the volume and tone of her voice.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As the emotions of the puppet change, so should the inflection of her voice. The voice of each character is distinct.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4. The teacher uses facial expressions.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5. Use props whenever possible to enhance the story.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6. Teacher knows the content and purpose of the lesson.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7. Teacher maintains physical closeness.</strong> The teacher, the children, and the puppets are in contact throughout the lesson.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8. Teacher makes many positive comments during the lessons</strong> to provide support for and encouragement of the children's efforts and ideas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>9. Teacher reflects the child's message</strong> by repeating the message content</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>10. Teacher elicits elaboration</strong> by reflecting the child's message and adding a neutral comment to encourage additional expression of thoughts and feelings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>11. Teacher uses question</strong> to obtain information from children.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12. Teacher shares personal experiences with the children</strong> to encourage them to share experiences and feelings about similar events.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E
TREATMENT ACCEPTABILITY RATING FORM - REVISED
(TARF-R)
### TREATMENT ACCEPTABILITY RATING FORM - REVISED (TARF-R)

1. How acceptable do you find the treatment to be regarding your concerns about this child?

<table>
<thead>
<tr>
<th>Not at all acceptable</th>
<th>Neutral</th>
<th>Very acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. How willing are you to carry out this treatment?

<table>
<thead>
<tr>
<th>Not at all willing</th>
<th>Neutral</th>
<th>Very willing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Given this child's behavioral problems, how reasonable do you find the treatment to be?

<table>
<thead>
<tr>
<th>Not at all reasonable</th>
<th>Neutral</th>
<th>Very reasonable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. How costly will it be to carry out this treatment?

<table>
<thead>
<tr>
<th>Not at all costly</th>
<th>Neutral</th>
<th>Very costly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. To what extent do you think there might be disadvantages in following this treatment?

<table>
<thead>
<tr>
<th>None are costly likely</th>
<th>Neutral</th>
<th>Many are likely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. How likely is this treatment to make permanent improvements in this child's behavior?

<table>
<thead>
<tr>
<th>Unlikely</th>
<th>Neutral</th>
<th>Very likely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. How much time will be needed each day for you to carry out this treatment?

<table>
<thead>
<tr>
<th>Little time will be needed</th>
<th>Neutral</th>
<th>Much time will be needed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. How confident are you that the treatment will be effective?

<table>
<thead>
<tr>
<th>Not at all confident</th>
<th>Neutral</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. How disruptive will it be to carry out this treatment?

Not at all disruptive  Neutral  Very disruptive

10. How effective is this treatment likely to be for this child?

Not at all effective  Neutral  Very effective

11. How affordable is this treatment for you?

Not at all affordable  Neutral  Very affordable

12. How much do you like the procedures used in the proposed treatment?

Do not like them at all  Neutral  Like them very much

13. How willing will other staff members be to help carry out this treatment?

Not at all willing  Neutral  Very willing

14. To what extent are undesirable side-effects likely to result from this treatment?

No side-effects are likely  Neutral

15. How much discomfort is your child likely to experience during the course of this treatment?

No discomfort at all  Neutral  very much discomfort

16. How willing would you be to change your routines to carry out this treatment?

Not at all willing  Neutral  very willing

17. How well will carrying out this treatment fit into the existing routine?

Not at all well  Neutral  very well
APPENDIX F

STAFF DEVELOPMENT

F.1. OUTLINE OF STAFF DEVELOPMENT

1) Session 1: Positive Methods for Managing Child Behavior
2) Session 2: Child Development and Developmentally Appropriate Activities
3) Session 3: Activity Centers and Room Arrangement
4) Session 4: Cost-Effective Educational Materials and Lesson Plan
5) Session 5: Teaching Social Skills to Children

F.2. SAMPLES OF THE STAFF DEVELOPMENT MATERIALS
Outline of Staff Development

**Session 1: Positive Methods for Managing Child Behavior**

<table>
<thead>
<tr>
<th>PURPOSE:</th>
<th>To help staff learn how to develop a reinforcement-rich environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARTICIPANTS:</td>
<td>Teaching staff and other staff members</td>
</tr>
<tr>
<td>LOCATION:</td>
<td>A classrooms at the childcare center</td>
</tr>
<tr>
<td>TIME:</td>
<td>2 hours</td>
</tr>
<tr>
<td>OBJECTIVES:</td>
<td></td>
</tr>
<tr>
<td>• Behavioral characteristics of children with problem behaviors</td>
<td></td>
</tr>
<tr>
<td>• How to teach children appropriate behavior through reinforcement</td>
<td></td>
</tr>
<tr>
<td>• How to increase appropriate behavior by providing age-appropriate activities</td>
<td></td>
</tr>
<tr>
<td>• Ignoring inappropriate behavior</td>
<td></td>
</tr>
<tr>
<td>• Controlling relevant antecedents</td>
<td></td>
</tr>
<tr>
<td>• How to give instructions to children</td>
<td></td>
</tr>
<tr>
<td>ACTIVITIES:</td>
<td>Lecture, discussion, sharing experiences, group activities, and demonstrations</td>
</tr>
<tr>
<td>MATERIALS:</td>
<td>Hand-outs, books, and videotapes</td>
</tr>
</tbody>
</table>
### Session 2: Child Development and Developmentally Appropriate Activities

<table>
<thead>
<tr>
<th>PURPOSE:</th>
<th>To help staff learn developmental characteristics of preschoolers and how the children learn</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARTICIPANTS:</td>
<td>Teaching staff and other staff members</td>
</tr>
<tr>
<td>LOCATION:</td>
<td>A classrooms at the childcare center</td>
</tr>
<tr>
<td>TIME:</td>
<td>2 hours</td>
</tr>
<tr>
<td>OBJECTIVES:</td>
<td></td>
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<tr>
<td>• Development of adaptive, cognitive, communication, physical, and social areas in young children</td>
<td></td>
</tr>
<tr>
<td>• Child directed and teacher directed activities</td>
<td></td>
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<tr>
<td>• How children learn through blocks, games, puzzles, books, music, and play</td>
<td></td>
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<tr>
<td>• The roles of the teacher</td>
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<tr>
<td>ACTIVITIES:</td>
<td>Lecture, discussion, sharing experiences, and group activities</td>
</tr>
<tr>
<td>MATERIALS:</td>
<td>Hand-outs, books, and videotapes</td>
</tr>
</tbody>
</table>
Session 3: Activity Centers and Room Arrangement

PURPOSE: To teach staff how to develop activity centers and arrange materials and furniture

PARTICIPANTS: Teaching staff and other staff members

LOCATION: Another preschool setting

TIME: 2 hours

OBJECTIVES:
• Indoor activity centers and materials to be prepared
• Outdoor activities
• Arranging centers

ACTIVITIES: Lecture, discussion, sharing experiences, group activities, and demonstration

MATERIALS: Hand-outs, books, pictures, and videotapes
Session 4: Cost-Effective Educational Materials and Lesson Plan

<table>
<thead>
<tr>
<th>PURPOSE:</th>
<th>To help staff learn how to make materials using community resources and how to develop effective lesson plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARTICIPANTS:</td>
<td>Teaching staff and other staff members</td>
</tr>
<tr>
<td>LOCATION:</td>
<td>A preschool in the community</td>
</tr>
<tr>
<td>TIME:</td>
<td>2 hours</td>
</tr>
</tbody>
</table>
| OBJECTIVES: | • Importance of rotating toys and other materials and associated costs  
• Resources available in the community to find free materials and their uses  
• Increasing parental involvement in preparing materials  
• What children can learn and make through those materials |
| ACTIVITIES: | Lecture, discussion, examples of children's projects, group activities, and demonstration |
| MATERIALS: | Hand-outs, projects done by children, pictures, examples of materials made by teachers, and project materials for participants |
Session 5: Teaching Social Skills to Children

PURPOSE: To help staff learn how to teach pro-social skills to children using puppets

PARTICIPANTS: Teaching staff and other staff members

LOCATION: A classrooms at the childcare center

TIME: 2 hours

OBJECTIVES:
- Importance of teaching social skills to children
- How to increase social skills
- Introducing a social skills program
- Techniques to implement the program

ACTIVITIES: Lecture, discussion, modeling, and group presentation

MATERIALS: Hand-outs, books, and puppets
Sample

BEHAVIOR MANAGEMENT

1. Behavior is purposeful.

2. Behavior occurs in a sequence: Prompt - Behavior - Consequence. The sequence is very simple, but behavior forms into chains and identifying the prompt that sets off a chain can be complex. Dealing with misbehavior before it happens should be your goal. It is easier to "get in front of" behavior than to run around behind it.

3. Behavior occurs in an environment. Sometimes behavior is specific to one environment only. Why? Toilet training is an example.

4. Behavior is not what the child is thinking or feeling. It is what you can see. Stick to understanding what you see. Become a good observer.

SOME RULES FOR GETTING CHILDREN TO BEHAVE IN DAY CARE ARE:

A. Make sure the children understand what is expected of them at all times.

B. State your expectations in positive terms.

C. Catch the children being good and tell them why you are pleased.

D. Make your environment, your activities, and yourself so much fun that children will want to be included. Do not allow them to have attention or special materials when they chose to wander.

E. PRAISE, PRAISE, PRAISE. The rule of thumb is that you should praise children four times for every correction you say to them. You could easily chart this while you teach. All you need is a paper with two columns. Make a mark on one side every time you praise and make a mark on the other side for every correction, criticism, or negative statement. When you have a child in your class who can be disruptive, there is tendency to "hold your breath" and hope the peace lasts when the child is playing nicely. You don't want to be intrusive to ongoing play, but it is important that children receive praise when they are doing what you want them to do. The praise must state specifically why you are pleased. "Good boy" is not an effective praise. Say, for example, I like the way share your toys with your friends.
F. Make your daily routine consistent.

G. Watch your transition times, when you move from one activity to another. Transition should be as smooth and brief as possible. Although teachers are often busy setting up and cleaning up during transition times, if you have children who become too active or disruptive during transition from one activity to another, the teacher should not be busy with materials during transitions. As much as possible, the children should be doing the clean-up and set up for activities.

RECOMMENDATIONS FOR GIVING INSTRUCTIONS TO STUDENTS

1. Maintain eye contact with the student during verbal instruction.

2. Make directions clear and concise. Be consistent with daily instructions.


4. Make sure the student comprehends before beginning the task.

5. Repeat in a calm, positive manner, if needed.

6. Help the child feel comfortable with seeking assistance.
Developmental Characteristics of Preschool Age Children (4-5 years)

- Walks and runs well, maintaining balance when quickly changing direction and speed; somersaults; begins to skip or hop; seeks many challenges on playground equipment.

- Dresses completely (zips and buttons, ties shoe strings, combs hair).

- Serves themselves at the table; uses fork, spoon and sometimes knife; almost always cares for their own toilet needs; washes face and hands without help.

- Plays games with other children and can agree to rules; likes to sing, dance and act; shows more independence (may go to visit neighbor by themselves).

- Begins to explain their behavior rather than lose control; obeys rules if they know them in advance.

- Prefers to play in a group of 2-3 children.

- They have more understanding of time such as "yesterday," 'next summer,' and "when you go to school." They can recall facts and tell what is missing from a set of familiar objects.

- Tells longer stories; uses full sentences; says name and address. Asks what words mean; asks lots of why, what, how where, and when questions.

- Laughs at silly mistakes in pictures; can carry out a series of three commands (find the book, move the truck, then close the door). Can tell whether or not two words rhyme. Understands that a single word can mean different things (e.g. this is "cool" meaning "chilled to touch" and this is "cool" meaning "neat or good").

- Matches and names colors; matches and names circle/square/triangle; can give or take the correct amount of 1 to 5 items; asks about letters, numbers and words.

- Scribbles and attempts to make own name or letters. Is interested in what letters, numbers, and words say.

- Says numbers 1 through 10.
What Teachers and Parents Need to Do

• Help the child enjoy playing with other children at parks and playgrounds. This will be a safe place for all the climbing and swinging they will want.

• Set up a routine for the child to care for themselves and their home by giving them simple chores. Let the child pick out their clothing for the day.

• Show interest and praise them for attempts to be independent and make choices, even if she buttons unevenly or their colors don't match at first.

• Help them to learn how to get along with others by showing them in the way that you deal with them.

• Help the child anticipate what comes next, and what to expect. Tell her a few minutes beforehand that she will need to wash hands; put the toys away when the timer goes off; or it's bedtime when the clock says_____. These will help them to have a sense of anticipation and responsibility when expected to follow a request.

• Talk about events and activities; talk about things as being first, next or last. Express your thoughts and feelings, allowing time to listen to them. Show a sense of humor and enjoyment while talking with them. Answer their questions.

• Point out and name colors as she sees and uses colored objects - help them match colors, have a 'yellow hunt' or match socks, towels or blocks. Play simple card games like 'Old Maid,' "Go Fish" and lotto cards. They will be listening to directions, following rules, counting, matching and concentrating.

• Read the letters and words they see regularly and asks about - on food labels, street signs, in books and when she sees her own name.

• Encourage their interest in paper and crayon activities. Show them how their name looks when printed; praise their attempts to copy their name and write it from memory.

• Have fun with numbers and counting. Count out spoons for the treat, read numbers on people's houses or license plates when you are out walking. Draw what the clock will look like when it's time to eat or go to bed. Play 'give or take' an amount from 1 to 5.
What We Need to Watch for

• If we notice a child has difficulty climbing stairs, catching a large ball, pedaling a tricycle, or using swings or slides, refer them for an evaluation.

• If a child usually avoids interactions with others, prefers to play alone, or has difficulty learning and following routine, refer for observation or preschool screening.

• They should hear and be understood by others (neighbor, grandparent, sitter). If anyone questions their hearing, have it checked by your local clinic or professionals, i.e., speech pathologist, nurse, or pediatrician

• This is a time to make sure the child has opportunities to develop school readiness behaviors such as sharing toys, taking turns, following simple directions and listening when others are talking.
GAMES (LEARNING & CIRCLE)

RULES OF GAMES

Games offer an excellent vehicle for learning while having fun.

With games a child can:

1) Increase his vocabulary,
2) Identify objects, pictures, and materials,
3) Learn to discriminate and classify,
4) Learn to follow directions,
5) Learn cause and effect,
6) Gain experience and social skills with other children and adults,
7) Learn to take turns,
8) Develop his senses.

USES OF GAMES

Games without props can be used at anytime and are especially useful to assist in the transition from one activity to another.

1) While children are ASSEMBLING for a story group, singing time, or a juice period.
2) While children are WAITING for something to cook, to be prepared, etc.
3) While children are slowly DISPERSING to go home and are leaving at different times.
4) While a child or children are WAITING for others; to finish lunch, to finish their nap, to go outside or to another room (If staff number is limited so that the children are unable to 'float' from one place to another as is possible in larger schools with a larger number of teachers available).
5) While RIDING to and from nursery school or the day care center in a carpool or on a bus with other children.
6) While children are DRESSING, either removing or putting on outdoor clothes.
7) While DIVERTING silly or unacceptable types of conversation or behavior to other channels.
8) Adaptations may be used when PREPARING for a specific activity, such as an introduction of a new idea in art activities, science, or following a story.
9) During GROUP TIME as a tool to teach a concept or learning.

Games with props can be planned for the whole group as in group time or with a small group or with an individual child during a free choice time.
1) Preschoolers learn best in small groups (eliminates long waiting, and offers more person to person opportunities).

2) Relays and "winner" games are not recommended at this age level. A child should be encouraged to compete only against his own past performance. He needs many opportunities to succeed and to feel good about himself. Too many failures can defeat this purpose.

3) Introduce only one or two concepts at a time.

4) Remember as a guide a preschoolers attention span is about one minute more than his age for any concentrated effort. By varying the pace and activity you may keep them in an organized group for longer periods.

5) Keep games simple, making sure instructions are clear. Too many verbal instructions are confusing. Try the "watch this" method, demonstrating as much as possible for children to mimic.

6) Watch for restlessness. Stop when interest wanes.

7) Insure each 'child's opportunity to participate and succeed (if not alternate each game, at least each child in one game during group time.)

8) Rather than insist a child participate in a game, appeal through a special interest or past experience to encourage him to want or ask to play. NOTE: Some young children may appear never to "enjoy" a group participating game but will learn the song or game by observing and will frequently use it at home by himself or demonstrate to family. Sometimes unwillingness to "follow rules" are indications the game has gone too long or is too structured. Perhaps those who wish to continue could do so and other might be given an alternative activity.
**Small Motor Center**
(Manipulative)

Purpose: In the small motor center children develop small muscles, eye-hand coordination, attention span, improve social skills, and increase build concepts about size, shape, color, and pattern.

Materials: puzzles, puzzle rack
beads
sewing cards
lacing activities
pegboard
Etch-a-Sketch
dressing toys
stacking toys
locks and keys
nuts and bolts
take-apart toys
scissors
hole punch
clay
play dough
pattern cards
blocks
snap toys
paper and pencils
Sand/Water Center

Purpose: Sand and water experiences give children sensory pleasure while developing math concepts, small motor skills, social skills, and language.

Materials: sand or water table (you can use your classroom sink, plastic tubs, or a wading pool)
- toy dishes, spoons, pots, pails
- plastic containers
- measuring cups
- sponges
- soap bubbles
- sifter, strainer
- plastic boats and toys
- smocks
- towel
- piece of hose
- plastic cars and trucks

Math Center

Purpose: Through the math center children learn counting, grouping, communication, comparisons, patterns, time, money, measurement, addition, subtraction, geometric shapes, small motor skill, problem-solving, and social skills.

Materials: toy clock
- pennies
- play money
- rulers
- balance scale
- flannel board
- objects to count (shells, rocks, buttons, etc.)
- paper, pencils
- toys, attribute blocks
- geometric shapes, geometric board
- tactile numerals
- puzzles, chalkboard
- computer
- measuring cups and spoons
- dominoes
- counting cube
Music Center

Purpose: Through music children can improve auditory discrimination and auditory memory, verbal expression, motor skills, creativity, can learn about beat, rhythm, tempo, melody, and can derive personal enjoyment.

Materials: musical instruments
- homemade instruments
- record player
- records
- keyboard
- autoharp
- tone bells
- xylophone
- tape recorder
- piano
- musical toys
- music box
- radio
- listening station

Library Center

Purpose: In the library area children can improve oral language listening skills, reading readiness skills, and can learn new concepts and develop a love of books.

Materials: books (all sizes, shapes, subjects)
- book rack
- comfortable seating (pillows, bean bag chair, small rocking chairs, etc.)
- homemade books
- magazines
- flannel board and figures
- puppets
- sensory books
- picture books
- dictionary
- pictures and posters
- listening station
Science Center

Purpose: Through the science center children are able to experiment, solve problems, make decisions, develop concepts about science and nature, improve language, interact socially, as well as develop sensory skills and math concepts.

Materials: magnifying glass
    magnets
    plants
    prisms
    animal and cages
    aquarium
    balance scale
    experiments
    exhibits (nature collections of rock, shell, insects, butterflies, etc.)
    science book magazines
    pictures
    thermometer
    color paddles
    feely box
    terrarium
    seeds, nuts, flowers
    bird nests, feathers
    sensory activities

Large Motor Center

Purpose: Through the large motor center children develop coordination, strength, large muscles, physical fitness, social skills, and can release feelings and frustrations.

Materials: balls, balloons
    balance beam
    bean bags
    climbing equipment
    hula hoops
    tumbling mats
    play gym
    slide, riding toys
    record player
    parachute
    jump rope
Social Skills Training Program

**Session 1**

**Alternative Thinking: Share**

**Purpose**
To introduce the concept of share as a method of solving a problem with another child.

**Criterion**
The children will use share as a method of solving a problem with peers.

**Materials**

<table>
<thead>
<tr>
<th>Lesson:</th>
<th>Criterion Activity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bunny puppet</td>
<td>Box of crayons</td>
</tr>
<tr>
<td>Monkey puppet</td>
<td>Small edibles such as raisins</td>
</tr>
<tr>
<td>Several small toys such as cars</td>
<td></td>
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<tr>
<td>or small animals</td>
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**Procedure I**

**Bonnie Bunny Shares the Cars**

1. The bunny puppet is playing with several small cars.
2. The monkey puppet comes along and demands that the bunny give him all the cars.
3. The bunny puppet refuses to give away her toys.
4. The monkey cries to you that the bunny will not give him all the cars.
5. Suggest that the monkey ask the bunny to share the toys instead of demanding them.
6. The bunny puppet shares the toys with the monkey after he asks her to share.

**Procedure II**

**Bonnie Bunny Shares the Cars**

1. Bonnie Bunny is playing with some small cars.
   
   Bonnie: I am so happy that I came to school early today.
   
   *I am the first one to get the box of little cars.*
   
   *Usually someone else is playing with them.*
   
   *I think I will play with these little cars all morning.*

2. Monkey Joe comes along and sees Bonnie playing with the cars.
   
   Joe: Oh, no. I ran right over here to play with the cars, and you are playing with them. I wan them. You give them to me right now!

   Bonnie: No, I am sorry, Monkey Joe. I won’t give them
to you. I started playing with them first. I am not finished playing with them.

3. Monkey Joe comes to the teacher, crying.

Joe: Teacher, Bonnie Bunny will not give me the little cars. I told her I wanted them, and she would not give them to me. I wanted to play with those little cars all morning.

Teacher: Monkey, Joe, remember the other day when you wanted some gum from Dippy Dog? How did you get it?

Joe: I asked him for it and said please.

Teacher: Perhaps Bonnie will give you the cars if you ask please.

4. Monkey Joe tries again with Bonnie Bunny.

Joe: Bonnie, I want those cars. Can I have them, please?

Bonnie: No, Monkey Joe, I am not finished playing with them yet.

Joe: (crying) Oh, I asked please, and I didn’t get them. You are supposed to give them to me if I ask please.

Bonnie: Well, maybe we could share them.

Joe: What is share? Does that mean I get to have the cars?

Bonnie: Share is a good idea sometimes. It means we can play together. It means that you play with some of the cars, and I play with some of the cars. That way we can both play with the cars.

Joe: Wow! That sounds great. I think I’ll try that idea.

Bonnie Bunny, will you share the cars with me?

Bonnie: Sure, Monkey Joe. It’s more fun playing with a friend, anyway, and now we can both play with the cars all morning.
5. Reinforce the idea of share with the children.

What new idea did Monkey Joe learn today? (share) That's right, sometimes you can share things with your friends. Now Monkey Joe has a new idea for getting what he wants. He can ask please, or he can ask to share.

Criterion Activity

1. Hold up a box of crayons.
   Let's make believe that I have this whole box of crayons, and you don't have any crayons. You want some of my crayons. Do you think I will share the box with you? Let's see if you can ask me to share the crayons with you.

2. Agree to share if the child asks you to share. Help the child say:
   Will you share the crayons with me?

3. Give the crayons to the child.
   Now, I'll ask you to share with me. Will you share your crayons with me?

4. If the child agrees, say thank you. If the child refuses, accept that answer, commenting that:
   Sometimes asking to share works, and sometimes it doesn't.

5. If there is time, repeat the above activity with some small edible such as raisins. First you have the child have them, and you ask the child to share. Again, if the child does not know how, give the child the words:
   Say, “Will you share the raisins with me?”
REFERENCES


Sasso, G., Reimers, T., Cooper, L., Wacker, D., Berg, W., Steege, M., Kelly, L.,


