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MEASURING CHANGES IN SPONTANEOUS PLAY BEHAVIOR IN
PRESCHOOLERS WITH AUTISM ASSOCIATED WITH A
RECEPTIVE LANGUAGE INTERVENTION

by

Jori Reijonen

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Philosophy
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
August 1996

MEASURING CHANGES IN SPONTANEOUS PLAY BEHAVIOR IN PRESCHOOLERS WITH AUTISM ASSOCIATED WITH A RECEPTIVE LANGUAGE INTERVENTION

Jori Reijonen, Ph.D.

Western Michigan University, 1996

Children diagnosed with Autistic Disorder have well documented deficits in the development of pretend play. When it occurs, spontaneous pretend play differs from play seen in other children in frequency, duration, and quality. The present study examined the effects of teaching preschoolers with Autism to follow one-part directions to play during discrete trial receptive language training sessions on spontaneous play skills.

Receptive language tasks were designed to teach simple pretend play skills (e.g., "Feed the doll with a spoon"). Spontaneous play was continuously sampled during free play sessions in the clinic and in the child's home before these receptive tasks were introduced and while they were taught. Subjects were boys between two-and-a-half and five years of age. Each had been diagnosed with Autistic Disorder by an independent evaluator and all were enrolled in a treatment program that employed discrete trial therapy methods. The receptive language task was introduced in a multiple baseline across subjects design. Duration measures of pretend play were taken from videotaped samples of free play sessions.

Participants varied in terms of the rate at which they acquired the play skills during receptive language tasks. All children learned to respond consistently to at least one play direction. The results of the intervention on spontaneous play varied across subjects as well. One subject generalized several functional play activities to free-play sessions in both generalization settings, three subjects showed no clear intervention ef-

fects, and one showed a decrease in appropriate play following the intervention. Possible reasons for the variability across subjects and suggestions for improving methods of teaching pretend play are discussed.

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ACKNOWLEDGMENTS

Many people provided encouragement and support during the dissertation process and deserve acknowledgment. First of all, I would like to thank the members of my committee, who provided invaluable input. Dr. Patricia Meinhold, my advisor, deserves special thanks for providing assistance throughout this project.

Next, I would like to thank the many undergraduate assistants who helped with this research. Two assistants in particular, Rebecca Zegarius and Sarah Phanuf, contributed many hours and great enthusiasm to this project.

Third, I wish to thank the participating children and their parents. This project would not have been possible without their involvement.

Finally, I am grateful to my family for their unconditional love and faith in my abilities. My husband, Michael, deserves special recognition for providing daily encouragement and support throughout my graduate training.

Jori Reijonen

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INTRODUCTION AND LITERATURE REVIEW

Autistic children show behavioral deficits in many areas. In order to meet DSM-IV criteria for a diagnosis of autistic disorder, a child must show deficits in social interaction, communication, imaginative activity, and the range of activities in which they engage (American Psychiatric Association, 1994).

Despite the fact that clinical signs of autism appear as early as 18 months, most autistic children do not receive a definitive diagnosis until their fourth year (Stone, Lemanek, Fishel, Fernandez, & Altmeyer, 1990; Stone & Rosenbaum, 1988). The absence of pretend play skills may be an especially important diagnostic marker because, in normal children, these skills generally well developed prior to the age that autism is usually diagnosed (Stone, et al., 1990).

Early diagnosis of autism is important, because early participation in intervention programs can in significant improvements in at least a subset of children with autism (Birnbauer & Leach, 1993; Lovaas, 1987, 1993; McClannahan & Krantz, 1994; McEachin, Smith & Lovaas, 1993). These improvements have been long-lasting, and have allowed some of the children in intensive early intervention programs to be mainstreamed into special education or normal classrooms (Lovaas, 1987; McClannahan & Krantz, 1994; McEachin, Smith, Lovaas, 1993).

Play skills may be an important target for early intervention because of their importance in development of the communication, adaptive, and social skills that will facilitate later development (Restall & Magill-Evans, 1993). For example, Strain (1975) found that toy play skills were an important factor in determining the social acceptance of severely handicapped preschool children by their normal peers.

Play Development in Normal Children

During normal development, play impacts several areas of development, including physical, intellectual, linguistic, social, and emotional development (Athey, 1984). The development of pretend play with objects in normal children proceeds from simple pretend play in younger children (for example, pretending to eat from a toy plate) to more complex forms in older children (for example, pretending a doll is feeding herself) (Belsky & Most, 1981; McCune-Nicholich, 1977; Rosenblatt, 1977; Ungerer, Zelazo, Kearsley, & Most, 1981). The amount of time spent in pretend play and the length of single episodes of pretend play increases with age during the preschool years (Haight & Miller, 1993).

Children under one year of age spend most of their time in manipulative and investigative play, exploring the properties of an object (Belsky & Most, 1981; Fenson, Kagan, Kearsley, & Zelazo, 1976; Rosenblatt, 1977). They usually play with only one object at a time, and switch objects frequently (Rosenblatt, 1977). When they play with two toys, it is most often to strike objects against each other, although by 9 months many children will combine two objects in a more functional and fashion (i.e., placing a toy cup on a saucer) (Belsky & Most, 1981; Fenson et al., 1976).

During the first half of the second year of life play develops rapidly. By about twelve months of age, children spend a longer time playing with the same toy (Rosenblatt, 1977). By thirteen months, they will often play with more than one toy at a time and their combinations of toys are often functional (Belsky & Most, 1981). Children also become interested in toys that illustrate the cause and effect of their actions, such as wind-up toys (Fenson, et al., 1976). By 14 months, many children will direct their functional play acts toward themselves, for example pretending to drink from a toy cup (Fenson & Ramsey, 1980; Watson & Fisher, 1977).

Play continues to develop during the second half of the second year. By 19 months of age, most children begin directing their play acts towards dolls (i.e., pretending to give the doll a drink) (Fenson, 1984; Fenson & Ramsey, 1980; Rosenblatt, 1977; Watson & Fisher, 1977). Simple sequences of acts in which the child directs the same act toward two different objects (i.e., pretending to drink from one cup and then another) are also seen in most normal children at this age (Fenson, 1984; Fenson & Ramsey, 1980).

Most children begin to show true symbolic play between 20 months and two years of age (Doherty & Rosenfeld, 1984; Leslie, 1987; Murphy, Callias, & Carr, 1985; Rosenblatt, 1977). Symbolic play is characterized by the use of an object in a non-conventional manner (for example, pretending that a block is a car). At about this time, children begin to pretend that their dolls are alive and able to act (i.e., that the doll can take a drink by itself) (Fenson & Ramsey, 1980; Watson & Fischer, 1977). Children of this age also begin to use multicomponent sequences in their play (i.e., first pretending to take a drink from a cup, then eating from a plate) (Fenson & Ramsey, 1980; McCune-Nicholich, 1977).

The ability to play symbolically continues develop during the preschool years. Children under three years of age usually need an object that is similar in form to the object they are pretending to use. By three years of age, children are able to use a non-similar object to pretend (Elder & Pederson, 1978; Ungerer, Zelazo, Kearsley, & O'Leary, 1981). By about three-and-a-half, children are able to pretend to use a non-present object (Elder & Pederson, 1978). Older preschool children show higher levels of pretend play than younger children (McGhee, Etheridge, & Benz, 1984). As children near kindergarten, they spend more time in complex fantasy games involving "make-believe" situations with other children (Field, DeStefano, & Koewler, 1982).

Play and Intellectual Development

The development of play in normal infants and young children is correlated with other areas of development. For example, researchers have found that early attention to objects is correlated with later cognitive status (Belsky, Goode, & Most, 1980; Kopp & Vaughn, 1982). Measures of object manipulation in four month old infants (Ruddy & Bornstein, 1982), and free play in children between 4 years 5 months and 6 years 5 months (Clune, Paoella, & Foley, 1979) correlated with general IQ measures. Similarly, Bates and her colleagues measured the play of infants using several measures, including free play, play with their mothers, and parent report. Play behaviors were found to be significantly related to other cognitive measures (Bates, Benigni, Bretherton, Camoaini, & Volterra, 1979). Other researchers have found a relationship between the availability of toy materials and cognitive development (Bradley, 1986; Bradley & Caldwell, 1984).

Because of the correlation between cognitive and play development, it has been suggested that measures of play might be useful indicators of general cognitive development (Belsky & Most, 1981; Fewell & Rich, 1987; Martin, 1986; Morgan-Bevan, 1994; Westby, 1980). A review of the research regarding the development of pretend play in children with mental impairments reveals that while these children show delays, their play development is consistent with their development of cognitive skills (Beeghly, Weiss-Perry, & Cicchetti, 1990; Cicchetti, Beeghly, & Weiss-Perry, 1994; Cunningham, Glenn, Wilkinson, & Sloper, 1985; Hill, & McCune-Nicholich, 1981; Hulme & Lunzer, 1966; Jeffree, & McConkey; Krakow & Kopp, 1983; Li, 1981, 1985; Motti, Cicchetti, & Sroufe, 1983).

Symbolic play is thought to be linked to language skills, as both are related to the ability to use symbols and representational thought (Corrigan, 1982; McCune, 1986;

McCune-Nicholich, 1981; Udwin & Yule, 1983; Ungerer & Sigman, 1984; Vygotsky, 1966). Research supports the existence of a relationship between pretend play and language development (Lovell, Hoyle, & Siddall, 1968; Ruddy & Bornstein, 1982; Shore, 1986; Shore, O'Connell, & Bates, 1984; Udwin, & Yule, 1983; Ungerer & Sigman, 1984). For example, Ruddy & Bornstein (1982) found that the frequency of object manipulation in 4 month old infants was correlated with vocabulary size at 12 months. Ungerer and Sigman (1984) found that functional play with dolls and other people was related to language measurements at 13.5 months and 9 months later. Udwin and Yule (1983) found a relationship between imaginative play and language expression and comprehension. Complexity of language and play correlates in toddlers (Shore, 1986; Shore, O'Connell, & Bates, 1984) and preschoolers (Lovell, Hoyle, & Siddal, 1968). Children with a language comprehension of less than 20 months do not exhibit symbolic play (Wing & Gould, 1979).

Athey (1984) discussed the contributions that play is thought to make to the development of infants, children, and adolescents. From this point of view, play functions to help in the development of physical, intellectual, and language skills, as well as having an important role in emotional and social development. For example, a child pretending to have a tea party with her dolls is using language and practicing a social role.

Pretend Play and Language Skills in Autistic Children

As might be expected from studies of normal play development, play skills relate to language skills in autistic children. For example, Wing (1978) found in a study of autistic and mentally impaired children that none of the children with a language comprehension age of 20 months showed any symbolic play. Ungerer & Sigman (1981, 1984, 1987) found that autistic children with higher language skills showed significantly more

functional and symbolic play than autistic children with lower language skills. Similarly, Riguet, Taylor, Benaroya, & Klein (1981) found that symbolic play was positively correlated with receptive language skill. Whyte & Owens (1989) found in a study of the relationship between play and language that functional play skills were strongly correlated with language comprehension and expressive language.

Pretend Play Deficit in Autistic Children

A number of studies have shown that autistic children have a deficit in pretend play behavior in comparison to other groups of handicapped and normal children. However, most of these studies contain methodological weaknesses such as flaws in group matching procedures. Due to the importance of language skills in the development of symbolic play in normal (Lovell, Hoyle, & Siddall, 1968; Ruddy & Bornstein, 1982; Shore, 1986; Shore, O'Connel, & Bates, 1984; Udwin, & Yule, 1983; Ungerer & Sigman, 1984) and autistic children (Riguet, et al., 1981; Ungerer & Sigman, 1981, 1984, 1987; Whyte & Owens, 1989; Wing, 1978), matching groups of children on the basis of language skills is important. While most of these studies compare autistic children to other children, in some studies groups are unmatched (Wing, 1978; Wing, Gould, Yeates, & Brierley, 1977). In other studies groups are matched by chronological age (Demeyer, Mann, Tilton, & Lowe, 1967; Stone, et al, 1990; Tilton & Ottinger, 1964) or general mental age (Mundy, Sigman, Ungerer, & Sherman, 1986; Power & Radcliffe, 1989; Restall & Magill-Evans, 1993; Sigman & Ungerer, 1984). A number of recent studies compared groups matched on language skills (Baron-Cohen, 1987; Gould, 1986; Lewis & Boucher, 1988; Riguet et al., 1981).

Comparison of groups that are not matched on language skills must be interpreted with caution. Differences in pretend play abilities are probably related to factors

that are not exclusive to autism (i.e., developmental age). Children who have mental abilities of less than twenty months would not be expected to demonstrate symbolic play (Doherty & Rosenfeld, 1984; Leslie, 1987; Murphy, Callias, & Carr, 1985; Wing, 1978). Because symbolic play is strongly linked to language abilities (Fein, 1978; Sinclair, 1970; Ungerer & Sigman, 1981, 1984, 1987; Vygotsky, 1967; Whyte & Owens, 1989; Wing, 1978), studies using groups matched on language ability provide the clearest indication of autistic children's deficit in pretend play. While other studies provide interesting descriptive information, they should be interpreted with caution.

Interpretation of this literature is also difficult because terms describing play are not used consistently. For purposes of this review, these terms will be used in the following manner: functional play refers to the use of an object in a conventional manner; symbolic play refers to the use of an object to substitute for another, pretending that a non-available object is present, or the use of a doll as if it were capable of action; finally, pretend play is an umbrella term which refers to functional and symbolic play.

A number of studies compared unmatched groups of children. Wing, Gould, Yeates, and Brierley (1977) reported the results of a descriptive study of the symbolic play in severely mentally impaired children between the ages of five and fourteen years. The majority of the children who showed no symbolic play or only stereotyped symbolic play (characterized by repetition of a very narrow range of play acts) had autistic features or the full autistic syndrome. No child with the full autistic syndrome showed true symbolic play.

A similar pattern of results was seen in a subsequent study by Wing (1978). She compared the behaviors of children with severe mental impairment with those of children showing autistic and/or psychotic behaviors. All of the mentally impaired children with mental age of over 20 months showed some symbolic play, but only 1 of 31 with

autistic features showed true symbolic play.

Several studies used groups of children matched by chronological age. An early study of toy play compared groups of autistic, mentally impaired, and normal children. Twenty minute free play sessions were observed. Autistic children showed more oral play (i.e, sucking on a toy) and repetitive play than other children. They also demonstrated fewer play acts and used combinations of objects less frequently than the other groups (Tilton & Ottinger, 1964). Demeyer, Mann, Tilton, & Loew (1967) extended the above study by comparing the results of a maternal questionnaire to the results of the play observations. Autistic children demonstrated significantly less toy play of most types, including dramatic play and doll play.

Stone, et al. (1990) compared the play of groups of autistic, mentally impaired, hearing impaired, language impaired, and normal children. All of the children were between the ages of three and six. Autistic children spent less time than other children interacting with the toys in a functional manner. This difference in functional play was largely due to a lack of doll-directed functional play in the autistic children. No difference in symbolic play, however, was found between the groups, a finding which might be attributed to the fact that many of the non-autistic children did not demonstrate symbolic play, either.

A number of studies in which groups were matched for general mental age provide stronger evidence of a deficit in pretend play in autistic children. However, because autistic children show stronger performances on nonverbal than verbal tests (Ozonoff, Pennington, & Rogers, 1990), general mental age matching procedures may actually put autistic children at a disadvantage because play skills are more strongly related to language skills than performance skills (Jarrold, Boucher, & Smith, 1993).

In pilot research, Ungerer & Sigman (1981) tested 16 autistic children in free

and structured play situations. The play of these children was found to be different from that of the normal children described in other studies. The children distributed their play time spending an equal amount of time in manipulative, relational, and functional play (rather than spending most of their time in functional play). Symbolic play was rare. Spontaneous play was infrequent, and there was very little doll play observed. This study was then extended to include mentally impaired children matched on chronological and mental age and normal children matched on mental age (Sigman & Ungerer, 1984). They found that the autistic children showed deficits in functional play, especially doll-directed, and in symbolic play in comparison to other children. They concluded that autistic children have a deficit in symbolic skills that goes beyond their deficits in language comprehension.

Mundy, Sigman, Ungerer, and Sherman (1986) recorded the total number of functional and symbolic play acts in separate free play and structured play sessions. This study included autistic, mentally impaired, and normal children matched on general mental age. The autistic children showed significantly fewer functional and symbolic play acts in the structured play setting than the other children.

Power and Radcliffe (1989) compared the functional play of 247 developmentally disabled children with performance on developmental tests. Groups were not formally matched on general mental age, but the analysis controlled for general mental age. Children with autism scored significantly lower on functional play than children with other types of delays.

Studies in which groups were matched by language abilities provide the strongest support for the existence of a pretend play deficit in autistic children. Riguet et al. (1981) compared autistic preschool aged children with normal children and children with Down's syndrome. Groups were matched on mental age using the Peabody Picture

Vocabulary Test. Play in both unstructured and structured play sessions was assessed. During structured play sessions, symbolic play acts were modeled. Results showed that the autistic children did not show as much symbolic play as children in other groups in either unstructured or structured play, although symbolic play was more frequent during the structured sessions.

Wetherby and Prutting (1984) compared the social and communicative abilities of four autistic and four normal children paired on the basis of language ability. They found that the quality of symbolic play was lower in the autistic children than in the normal children, but did not report detailed findings.

Another study compared socially-impaired children (showing the triad of social and communication impairments typical of autism as discussed in Wing & Gould, 1979) with social children who were impaired in language development. A play test was used to compare play test age (measuring functional play) with spontaneous play. While the social children showed a similar level during each, the socially-impaired children showed less spontaneous pretend play than their play ages would predict (Gould, 1986).

Baron-Cohen (1987) compared the free-play of autistic children with a matched group of children with Down's syndrome and normal controls. A significantly greater number of autistic children than either control group failed to show any symbolic play.

Lewis and Boucher (1988) compared the play of groups of autistic, moderately learning disabled, and normal children who had been matched on language abilities during spontaneous, instructed, and elicited play conditions. The autistic children spent less time playing functionally during the spontaneous play condition than other groups. This difference was not found in the other play conditions, and there were no reported differences between groups in symbolic play. However, this may have been due to the fact that none of the groups engaged in much symbolic play.

In general, review of the literature in this area provides support for the deficit in functional and symbolic play in autistic children despite difficulties in methodology. In a review article of this area, Wulff (1985) concludes that the play of autistic children lacks fantasy and symbolic play, and is qualitatively different from the play of other children. In another review article (Jarrold, Boucher, & Smith 1993), it is concluded that there is good evidence to support the presence of deficits in functional and symbolic spontaneous play. Roeyers and van Berckelaer-Onnes (1994) similarly conclude that both the quality and quantity of spontaneous symbolic play in children with autism is impaired.

Functional doll-directed acts were found in several studies to be a deficit in the functional play of children with autistic disorder (Demeyer, Mann, Tilton, & Loew, 1967; Stone et al., 1990; Ungerer & Sigman, 1981; Sigman & Ungerer, 1984). Stone et al. (1990) found that this was the category of functional play that accounted for the deficit between the autistic and other groups. Sigman & Ungerer (1984) noted that functional doll play was associated with elementary language skills in both the autistic and mentally impaired children, whereas self-directed functional play was not. Doll-directed functional play is the latest type of functional play to develop in normal children, and is not seen until about 19 months of age (Fenson & Ramsey, 1980; Rosenblatt, 1977; Watson & Fisher, 1977). Thus, doll-directed functional play may be a bridge between functional and symbolic play skills.

Pretend Play and Differential Diagnosis

Early researchers discussed the possibility of using measures of pretend play for differential diagnosis of autism and other developmental disorders (Loomis, Hilgemann, & Meyer, 1957; Schachter, Loomis, & Meyer, 1962). However, at this time, there is only limited support for using play as a diagnostic tool.

A number of studies illustrate the potential for using differences in pretend play to differentiate between groups of impaired children (Atlas, 1990; Doherty & Rosenfeld, 1984; Mundy, Ungerer, & Sherman, 1986; Stone, et al., 1990). For example, Doherty and Rosenfeld (1984) looked at the results of a parent interview/questionnaire and observational data from play sessions for fifteen severely language delayed children. They concluded that symbolic play was impaired or absent in the children who met the DSM-III criteria for Autistic Disorder, while the children who engaged in symbolic play fell into other diagnostic categories.

In a study comparing the play of children with autism and children with childhood schizophrenia, Atlas (1990) found that the presence of symbolic play was a powerful discriminant variable, and predicted the diagnostic group of the children. Autistic children generally showed no symbolic play, whereas schizophrenic children showed some forms of symbolic play.

Mundy, Sigman, Ungerer and Sherman (1986) found in a discriminant analysis that object play was a powerful variable in differentiating groups autistic, mentally impaired, and non-handicapped children, but was not as powerful as other variables, such as the presence or absence of non-vocal communication such as pointing.

Another study (Stone, et al., 1990) showed that a combination of appropriate play, functional play (especially doll-directed functional play), and imitation measures could discriminate autistic children from children with similar symptomatology (i.e. language impaired children). Imitation and functional play could discriminate mentally impaired children from autistic children. Imitation, however, was the most important factor. Use of symbolic play as a discriminant factor was weakened by the fact that a number of normal and mentally impaired children did not demonstrate symbolic play either. Notably, these researchers only observed play during one eight minute session. These

researchers concluded that play skills could be helpful in the differential diagnosis of young children, and that functional play assessment (that is, an assessment of the earliest forms of pretend play) was more important than an assessment of symbolic play skills in preschool aged children.

Recently, DiLavore, Lord, and Rutter (1995) reported on a more structured diagnostic tool, the Pre-Linguistic Autism Diagnostic Observation Schedule (PL-ADOS). During administration of the PL-ADOS, the examiner presented a series of structured play and social activities, which provided behavioral observation scores on a variety of relevant behaviors. Trained observers reliably scored the behaviors that occurred. The PL-ADOS discriminated between non-verbal autistic children and other developmentally disordered children using an algorithm based upon DSM-IV and ICD-10 criteria.

Screening measures might also be useful in differential diagnosis (Baron-Cohen, Allen, & Gillberg 1993; Lord, Storoschuk, Rutter, & Pickles, 1993; Stone & Lemanek, 1990). For example, Lord, et al. (1993) found that a caregiver interview (Autism Diagnostic Interview - Revised) was useful in the differential diagnosis of autistic and mentally handicapped preschool children. One of the areas that differentiated the two groups was play, including imaginative and social play.

Stone and Lemanek (1990) compared the results of a parent report measure given to parents of autistic and mentally retarded children ranging in age from 3 to 6. Differences in imaginative play distinguished between autistic children and others at a similar developmental level.

Baron-Cohen, Allen, and Gillberg (1993) studied the use of a brief screening instrument to detect autistic behaviors in 18 month old children. Fifty randomly selected children and 41 children at high risk for developing autism (based on having a sibling with autism) were screened. Four of the high risk children were identified as

failing in two or more key types of behavior. At follow-up, the 87 children who had passed the screen were developing normally. The four children who had failed had each received a diagnosis as autistic by 30 months. One of the key psychological predictors at 18 months was lack of symbolic play. Other predictive factors included deficits in protodeclarative pointing, social play, social play, and joint-attention behavior.

In summary, the above studies indicate that a lack of pretend play behaviors is one of several important early diagnostic indicators. in the literature include: imitation (Lord, et al., 1993; Stone & Lemanek, 1990; Stone, et al., 1990); non-vocal indicating behaviors such as pointing (Baron-Cohen, Allen, & Gillberg, 1993; Lord, et. al., 1993; Mundy, et al. 1986); appropriate play (Stone, et al., 1990); joint attention (Baron-Cohen, Allen, Gillberg, 1993); social overtures and restricted behaviors and interests (Lord, et. al., 1993) and social interest and social play (Baron-Cohen, Allen, & Gillberg, 1993; Stone & Lemanek, 1990). A combination of deficits in these areas, including pretend play, may be useful in the early diagnosis of autism, although further research is needed to determine which are most important. This research also suggests that a deficit in pretend play is a common characteristic of children with autism, and therefore a target for intervention.

Theoretical Explanations of Autistic Disorder

A number of theories have been suggested to explain the many deficit areas, including pretend play, observed in children with autistic disorder. Most of these theories attempt to explain the many deficits areas seen in children with autism as being caused by a single, primary deficit.

Several cognitive theories have been suggested. For example, deficits in the ability to formulate (Ricks & Wing, 1975) or manipulate symbols (Hammes & Langdell,

1981, Ricks & Wing, 1975), in the ability to generate internal representation (Boucher & Lewis, 1989; Lewis & Boucher, 1991, and in central executive abilities (Russell, Mauther, Sharp, & Tidswell 1991) have been suggested. Rutter, Bartak, and Newman (1971) suggested that language deficits were the primary cause of autism.

Other researchers have proposed an inability to develop a theory of mind (Baron-Cohen, 1987, 1989b, 1990a; Baron-Cohen, Leslie, & Frith, 1985; Harris, 1989a; Leslie, 1987) or a specific developmental delay in acquiring this skill (Baron-Cohen, 1989a). Other researchers have argued that the underlying impairment in autism is social (Fein, Pennington, Markowitz, Braverman, and Waterhouse, 1986; Hobson, 1989a, 1989b, 1990, 1991; Rogers & Pennington 1991; Ungerer, 1989). Motivational deficits have also been suggested as a primary deficit (Harris, 1989b; Lord, 1985; Koegel & Mentis, 1985). Mundy & Sigman (1989a, 1989b; Sigman & Mundy, 1987) propose a model that suggests that the interaction between cognitive and affective deficits leads to the symptoms of autism. Jarrold, Boucher, and Smith (1993) provide a detailed discussion of these theories and the support for and arguments against each.

From a behavioral perspective, Lovaas and Smith (1989) argue that autism is best described as comprised of behavioral deficits. These deficits are not related to a primary deficit, but instead are separate developmental delays. Because children with autism can learn when put into a special environment, the deficits can be viewed as a mismatch between autistic children's nervous system and the environment.

Intervention for Play Behaviors

Despite the fact that a deficit in the pretend play of children with autistic disorder has been shown in research, there is little published research regarding direct intervention on pretend play skills in this population. Recently, however, several articles

have described the results of such intervention (Lifter, Sulzer-Azaroff, Anderson, & Cowdery, 1993; Stahmer, 1995; van Berckelaer-Onnes, 1994).

Lifter et al. (1993) used a shaping and prompting procedure to teach three pre-school aged children with autistic-like behaviors pretend play skills. Using a sequential treatments design, they compared the efficacy of teaching play skills determined to be age-appropriate for these children (doll as agent activities) against teaching developmental-age appropriate play skills (child as agent activities). Generally, the age-appropriate activities were not acquired by the children, while the developmental-age appropriate play activities were acquired by the children and were generalized to other toys and to play outside of the teaching sessions.

Another researcher briefly describes the results of an eleven week program designed to teach pretend play skills to twenty-four autistic children between the ages of three and seven. It was hypothesized that: (a) in comparison to normal children, autistic children do not gain adequate play experience through the manipulation of toys during the first two years of life; (b) because of this, the functional play which is acquired is mechanical and not part of meaningful sequences; and (c) the play experiences of autistic children are so limited that they cannot lead to symbolic play. To correct this, the teaching program began by providing play experiences first in manipulative play, and then moving through relational, functional, and imaginative play. In each phase, the trainer first observed what the child did with the toys provided, and then modelled other play. The researcher reports that of the sixteen children who participated in this program, four of the children showed symbolic play in training sessions and outside of the sessions at the end of training. The other children showed improvements in their play skills, with all sixteen showing improvements in functional play. These results are difficult to interpret, however, because very little detail was provided. For example, subject

demographics and scoring procedures were not given. The results section did not show the data, but discusses the conclusions that were reached (van Berckelaer-Onnes, 1994).

Stahmer (1995) used Pivotal Response Training (PRT) to teach symbolic play skills to seven children with autistic disorder. During this training, the experimenter presented preferred toys to the child. If the child did not respond, the experimenter modeled appropriate play activities, varying between functional and symbolic play. If the child still did not respond, the experimenter would model the play activity again. A shaping procedure was used so that as the child's symbolic play abilities increased, more complex play acts were required in order to receive reinforcement. Reinforcement consisted of the opportunity to play with toys and praise. It was found that using this procedure, each of the children learned symbolic play skills and increased in the complexity of their play. Language training alone, using PRT, did not increase symbolic play skills. The experimenter also found that language and interaction skills improved with this training.

Although few studies have targeted teaching pretend play skills to autistic children, many other studies have implications for such intervention. For example, researchers have effectively intervened on the play skills of children with mental impairment (i.e., Haring, 1985; Kim, Lombardino, Rothman, & Vinson, 1989; Kohl, Beckman, & Swenson-Pierce, 1984; McConkey & Jeffree, 1980; Moran & Whitman, 1985; Romanczyk, Diament, Goren, Trunell, & Harris, 1975). Haring (1985) assessed generalization of appropriate functional play skills taught to four mentally impaired children. He found that training using a modeling procedure was effective in teaching functional play skills, and that these skills did generalize to more abstract toys. Another group of researchers, however, found that an intervention using behavioral techniques was not successful in increasing independent constructive play in twenty profoundly mentally im-

paired children (Murphy, Callias, & Carr, 1985). Articles by Wehman (1975), Li (1981) and Malone and Langone (1994) provide literature reviews of this area of research.

A number of researchers have found that making toys or preferred materials accessible (Favell, McGimsey, & Shell, 1982; Vollmer, Marcus, & LeBlanc, 1994) or teaching appropriate toy play (Ballard & Medland, 1986; Coleman, Whitman, & Johnson, 1975; Eason, White, & Newsom, 1982; Epstein, Doke, Sajwaj, Sorrell, & Rimmer, 1974; Flavell, 1973; Scott, Glynn, & Ballard, 1988) was effective in helping to decrease self-stimulatory behavior in developmentally disabled individuals. Other researchers have found that toys can be used to provide appropriate substitutes for self-stimulatory hand-mouthing (Goh, Iwata, Shore, De-Leon, Lerman, Ulrich, & Smith, 1995). There is also some indication that teaching appropriate play behavior may also be useful in reducing self-injurious behavior (Ballard & Medland, 1986; Scott, Glynn, & Ballard, 1988).

Intervention on other behavior may lead to increases in appropriate play in autistic children. For example, Koegel, Firestone, Kramme, & Dunlap (1974) showed in a study of two autistic children with self-stimulatory behaviors that suppressing self-stimulatory behavior increased the level of appropriate play demonstrated by these children. Another study found that decreasing self-stimulatory behaviors using differential reinforcement techniques led to increased independent toy play in a six-year-old developmentally disabled girl (Fellener, La-roche, & Sulzer-Azaroff, 1984). Other researchers showed that teaching self-management skills could increase appropriate toy play in unsupervised settings in three autistic children (Stahmer & Schreibman, 1992).

A number of studies have shown that intervention can be effective in increasing social play skills in autistic children (i.e., Belchic & Harris, 1994; Coe, Matson, Craigie & Gossen, 1991; Coe, Matson, Fee, Manikam, & Linarello, 1990; Haring & Lovinger,

1989; Schleien, Rynders, Mustonen, & Fox, 1990; Schleien, Heyne, & Berken, 1988; Wolfberg & Schuler, 1993). Wolfberg and Schuler (1993), in a study targeting peer play, found that involvement in an integrated play group not only increased social play, but also functional play in two of three participants. Intervention on social play has also been shown to be effective with mentally impaired children (Strain 1975, 1976).

In several studies, socio-dramatic play has been targeted in disadvantaged children (i.e., Dansky, 1980; Li, 1985; Saltz & Dixon, 1977; Shmukler & Naveh, 1985). Socio-dramatic play is a more sophisticated type of symbolic play involving groups of children playing at "make-believe." Intervention has been shown to be effective in increasing this type of play in disadvantaged children (Christie, 1985; Dansky, 1980; Li, 1985; Saltz, Dixon, & Johnson, 1977; Shmuckler & Naveh, 1985; Smilansky, 1990).

A number of studies have shown that the level of pretend play increases in highly structured play conditions over levels observed during spontaneous free play (Gould, 1986; Ungerer & Sigman, 1981; Lewis & Boucher, 1988; McCune-Nicholich & Fenson, 1984; Mundy, et al., 1986; Riguet et al, 1981; Whyte & Owens, 1989). In normal children, modeling procedures elicit higher levels of play than seen in free-play (Belsky, Garduque, & Hrncir, 1984; Bretherton, O'Connell, Shore, & Bates, 1984; Fenson, 1984; Jeffree & McConkey, 1976). This may indicate that an intervention using highly structured teaching methods (such as the trial-based procedure mentioned below) could be effective in teaching play skills.

It has also been shown that like other behavior, play can be affected by operant contingencies (i.e., Azrin & Lindsley, 1956; Goetz & Baer, 1973; Hart, Reynolds, Baer, Brawley, & Harris, 1968; Whitman, Mercurio, & Caponigri, 1970). Reinforcement contingencies have been shown to be effective in increasing the diversity of play with blocks (Goetz & Baer, 1973), social play (Whitman, Mercurio, & Caponigri, 1970) and

cooperative play (Azrin & Lindsley, 1956). Children with profound mental impairments were found to spend more time playing with toys that had been altered so that they emitted sensory stimuli (vibration, light, or sound) when manipulated (Murphy, Carr, & Callias, 1986).

In summary, pretend play skills are thought to be important to the development of normal children. These skills have been found to be deficit in autistic children, but there are few reported studies of intervention techniques in this area. Structured trial-based teaching methods have been found to be effective in developing other skills in autistic children (Lovaas, 1987; 1993) and seem likely to be effective in teaching pretend play skills.

This study was designed as an initial investigation of the effects of trial-based teaching methods on the development of pretend play skills in autistic children. The focus was on the generalization of pretend play skills to more natural free-play settings. The intervention was administered as part of an intensive early intervention summer program that targeted attentional skills, motor and verbal imitation, expressive and receptive language, and self-help skills. Appropriate functional play activities were embedded into teaching trials during receptive language sessions. Receptive language trials generally use directives to prompt arbitrary behaviors (e.g., "Touch your nose"). These types of receptive language tasks were used during the baseline phase of this study. During the intervention phase, one part directives were included that prompted behaviors that would be functional during play activities (e.g., "Feed the doll with the spoon") using a standard set of toys. Samples of free play behaviors at the school and the children's homes were used to determine whether or not these teaching methods could be used to teach generalizable play skills.

METHODS

Subjects participating in this research were recruited from the Summer Autism Program '94.

Site and General Program Description

During the summer of 1994, a nine week program provided behavioral therapy services to six children. The program was open to children between the ages of two and five years old who had been previously diagnosed with Autistic Disorder. Enrolled children attended the program three days per week for three hours per day. The program was located at 1822 East Main Street in Kalamazoo Michigan.

Standardized assessments were administered one week before the program began and again during the final week of the program. Adaptive functioning was assessed using the Vineland Scales of Social Maturity (Vineland) with parents acting as informants. The first administration of the Vineland was performed by program staff (graduate students enrolled in a clinical psychology program) and the second by the program director or staff. Global cognitive and language functioning was estimated by administering the Mental Scales from the Bayley Scales of Infant Development, Second Edition (Bayley). The program director performed the first administration of the Bayley. The second was performed by the program director or staff.

Therapy procedures were based on the operant therapy methods developed by Lovaas (1977, 1987). One-on-one behavioral therapy sessions using trial-based teaching methods were used to teach attentional, expressive and receptive lan-

guage, and self-help skills. For a description of trial-based teaching methods, see Koegel, Russo, Rincover, and Schreibman (1982) and Lovaas (1987). Therapy goals were determined jointly by the program director (a fully-licensed psychologist) and the parents of participating children during an initial home visit.

Subjects also participated in two ten-minute play sessions each day. During one of these sessions, the children were prompted by a tutor to engage in a variety of toy play activities, including manipulative and pretend play. A formal treatment protocol was not used. Instead, the tutor was instructed to prompt a range of play skills and to encourage appropriate independent play. During the other play session, subjects were observed in a free-operant play period with a minimum of adult interaction. Due to scheduling restrictions, one subject was observed alone, while the others were observed in groups of two.

Weekly home visits sampled structured and unstructured activities at each child's home. During each visit, responses to current teaching goals were sampled with the parent acting as therapist. A free-operant play session like the one conducted at the clinic was observed as part of this weekly observation.

Procedures for documenting each child's progress were in place throughout the course of the summer program. Videotaped samples were taken of trial-based teaching sessions, structured and free-operant play sessions at the clinic, and home visits. During trial-based teaching sessions, an ongoing written record of level of prompting required and children's responses was kept.

Subjects

All of the children attending the summer program had been diagnosed with Autistic Disorder by independent agencies. The diagnosis was confirmed by the

director of the clinic. The children were all male, and ranged in age between 2.5 and 5 years of age at the beginning of the program. Three of the children were between 2.5 and 3 years of age, and two were between 4 and 5 years of age. Each of these children came from middle income families.

Subjects were referred to this research project by the program director when they met criteria based on data collected during trial-based teaching sessions and free-operant play sessions. Criteria for inclusion in this study included demonstration of the ability to reliably respond to the names of five labeled objects (i.e., by pointing to the named object) or five one-part directives. Reliable responding was defined as appropriate responding to eighty percent of teaching trials during two consecutive teaching trials. Eligible children also showed a deficit in age-appropriate pretend play skills during free-operant play sessions and the development of these skills had been identified as a treatment goal.

The parents of six out of six eligible children gave informed consent for their children to participate. [See Appendix A for the Informed Consent Form used according to Human Subjects Institutional Review Board (HSIRB) policies. See Appendix B for a copy of HSIRB approval.] Five of the children completed the research protocol. One child left the summer program while still in the baseline phase of the treatment protocol.

Ages and test scores for the five children who participated in the receptive language intervention on pretend play skills are given in Table 1. Examples of treatment goals at the beginning and end of the summer program for receptive and expressive language and play are given in Table 2.

Table 1

Subject Ages and Standardized Testing Scores One Week Before and
During the Final Week of the Summer Program

Subjects	Age*	Test	Before	Final Week
1	4-7	Vineland:**		
		Communication	65 (53)	82 (56)
		Daily Living Skills	83 (58)	91 (58)
		Socialization	50 (53)	53 (53)
		Bayley:***		
		Raw Score	127	137
		Index Score	22 months	25 months
2	4-5	Vineland:		
		Communication	28 (46)	34 (47)
		Daily Living Skills	45 (50)	49 (49)
		Socialization	32 (50)	33 (50)
		Bayley:		
		Raw Score	80	92
		Index Score	10 months	13 months
3	2-9	Vineland:		
		Communication	26 (56)	33 (58)
		Daily Living Skills	41 (64)	46 (64)
		Socialization	49 (63)	50 (62)
		Bayley:		
		Raw Score	88	94
		Index Score	12 months	14 months

* Age given in years and months at beginning of the program

** Scores for Vineland Scales of Social Maturity given as raw scores with standard scores in parentheses. Standard scores; Mean = 100, SD = 15

*** Bayley Scales of Infant Development (Second Edition) - Mental Scale scores. Index scores indicate the age in months at which the raw score obtained by the subject would earn a scaled score of 100.

Table 1--Continued

Subjects	Age*	Test	Before	Final Week
4	2-6	Vineland:		
		Communication	23 (55)	28 (56)
		Daily Living Skills	46 (67)	47 (67)
		Socialization	47 (63)	48 (62)
		Bayley:		
		Raw Score	96	113
5	3-0	Index Score	14 months	18 months
		Vineland:**		
		Communication	20 (55)	28 (56)
		Daily Living Skills	46 (62)	47 (62)
		Socialization	37 (54)	38 (54)
		Bayley:***		
		Raw Score	82	90
		Index Score	11 months	13 months

* Age given in years and months at beginning of the program

** Scores for Vineland Scales of Social Maturity given as raw scores with standard scores in parentheses. Standard scores; Mean = 100, SD = 15

*** Bayley Scales of Infant Development (Second Edition) - Mental Scale scores. Index scores indicate the age in months at which the raw score obtained by the subject would earn a scaled score of 100.

Procedures

Baseline

During the baseline condition, children participated in a free-operant play session at the clinic three times per week. Play sessions at the clinic took place in an approximately three-meter by three-meter space and lasted for ten minutes. A tutor ensured that the subjects stayed within the play area but did not encourage play. The tutor interrupted any potentially dangerous behavior. If the child en-

Table 2

Sample Treatment Goals for Subjects at the Beginning and End of the Summer Program

Subject	Time	Receptive Language Goals	Expressive Language Goals	Play Goals
1	Beginning	Point to a single named object. Point to named objects in pictures.	Imitate single syllable words. Verbally label objects.	Increase manipulative and functional play.
	End	Point to named object in an array of pictures. Follow one part instructions.	Imitate two syllable sounds. Verbally indicate action in a picture.	Increase variety of functional and symbolic play activities.
2	Beginning	Point to a single named object.	Imitate single syllable sounds (i.e., "ah," "oo").	Increase manipulative play.
	End	Point to named object in an array. Discriminate between several one part instructions.	Imitate a wider variety of single syllables.	Increase manipulative and functional toy play. Decrease stereotyped play with toys.
3	Beginning	Follow instructions to "Look at me" and to imitate modeled actions.	Vocal imitation of single syllable sounds.	Increase manipulative and functional play. Decrease stereotyped play with toys.
	End	Point to named object in an array. Follow one part	Verbally label several objects in response to "What's this?"	Increase manipulative and functional toy play.

Table 2--Continued

Subject	Time	Receptive Language Goals	Expressive Language Goals	Play Goals
4	Beginning	Follow instructions to "Look at me" and to imitate modeled actions.	Pre-language skills such as imitating modeled actions	Increase manipulative and functional play with toys.
	End	Discriminate between several one part instructions.	Imitate single syllable sounds.	Increase manipulative and functional play with toys.
5	Beginning	Follow instruction "Look at me" and "Sit in the chair."	Pre-linguistic skills such as imitating actions.	Decrease stereotyped play with toys. Increase manipulative and functional play with toys.
	End	Follow one part instructions presented singly.	Imitate single syllable sounds.	Decrease stereotyped play with toys. Increase manipulative and functional play with toys.

gaged in self-stimulation that involved toy contact (i.e., repeatedly spinning the wheels of the car), the behavior was not interrupted. Self-stimulation that did not involve interaction with toys (e.g., hand-flapping) was interrupted by the tutor. The play space contained only a standard set of toys consisting of a doll with removable clothing, cup, toy telephone, spoon, and toy car. The same procedures were employed during free-operant play sessions which occurred during weekly home visits. The toys provided to the subjects during these sessions contained the same types of items, but the toys were not identical to those presented in the clinic. For example, toys cars included in free-operant play sessions at the clinic and in the home differed in color and size. Videotaped samples of free-operant play sessions were taken two times per week at the clinic and one time per week at the children's homes.

During the baseline condition, ongoing therapy targeted an array of skills using trial-based teaching methods as previously described. During these therapy sessions, tutors recorded the child's performance on each trial, indicating the degree of prompting required, if any, and the accuracy of the child's response. These data were used by the program director to determine when each child was eligible to be included in this study.

Intervention

The intervention consisted of teaching subjects to follow a series of one-part directives during trial-based teaching sessions. These instructions required subjects to engage in simple play responses. Standard instructions used included: (a) feed the doll with the spoon, (b) give the doll a drink with the cup, (c) talk on the telephone, (d) give the doll a ride on the car, (e) you take a drink from the cup,

(f) give the doll a hug, and (g) push the car. The instructions selected were associated with simple play activities that could be performed with the set of standard toys presented during free-operant play session. For example, one directive required that the child "feed the doll with the spoon." If the child did not respond to the verbal prompt, the appropriate response was modeled by the tutor. Physical prompting was used to guide the child through the appropriate response if the child did not respond appropriately after modeling.

An instruction was considered acquired when the subject appropriately responded to the verbal instruction without a prompt on 80% of trials across two consecutive trial-based teaching sessions. New instructions were introduced sequentially, while continuing to periodically present those instructions that had already been learned in order to maintain performance of those skills. The amount of time spent in the receptive language intervention using play instructions pretend play varied, but typically children spent ten to thirty percent of their total therapy time in this intervention.

Children continued to participate in the overall therapy program. As previously described, videotaped samples of free-operant play sessions continued to be taken. Tutors also continued to record data after each teaching trial.

Dependent Measures

Duration measures of free-operant play behaviors were taken from videotaped samples of free-operant play sessions in the clinic and home settings across baseline and intervention conditions (i.e., the total number of seconds the child engaged in each of the several response categories was recorded). Duration measures of the following types of play were recorded: manipulative; stereotyped manipulat-

Table 3

Operational Definitions for Scored Behaviors With Examples

Behavior	Definition	Examples of Behavior
Manipulative Play	Nondiscriminative object use	Mouthing, fingering, banging, waving, or throwing toy
Stereotyped Play	Manipulative play that is repetitive	Mouthing toy; twirling toy repetitively; banging toy repetitively
Relational Play	Combining objects in a nonconventional manner	Banging two toys together; stacking objects nonfunctionally
Functional Play	Use of one or more objects in a conventional manner	Conventional use of toy(s) that is directed towards the child, a doll, another person, or an object
Symbolic Play	Use of one or more objects that is not constrained by the physical and functional properties of the available objects	Substituting one object for another; treating a doll as if were capable of independent action; pretending to use toys without physical representation in the environment

ive; relational; functional; and symbolic play (see Table 3). Operational definitions for these responses were adapted from Ungerer and Sigman (1981). Time spent out of camera range (e.g., the child moved into a corner with a poor camera angle) was also calculated and used to adjust total observation times to reflect time "on camera" only.

Interobserver Agreement

Undergraduate assistants scored the videotaped samples. Before formal scoring of the tapes began, scorers learned the scoring criteria for the behaviors described in Table 3. Scorers reached ninety percent interobserver agreement scoring practice tapes (i.e., a variety of videotaped samples of autistic and non-autistic children engaging in play activities) before they began formal scoring.

Interobserver agreement was obtained for each target behavior for an average of twenty-six percent of sampled free-operant play sessions across scoring categories, including clinic and home sessions. Selection of sessions to be scored for interobserver agreement was random. Scorers were not aware of which sessions would be assessed for interobserver agreement.

Agreement was figured by a simple ratio in which the smaller of two duration scores was divided by the larger to obtain a percentage. Interobserver agreement on a particular response (e.g., functional play) was calculated for each selected session, and then averaged across sessions. Average agreement ranged from 84% to 96% across response categories [manipulative play = 93%, (range 68%-100%); stereotyped manipulative play = 88%, (range 0%-100%); relational play = 84%, (range 0%-100%); functional play = 84%, (range 21%-100%); symbolic play = 96%, (range 56% - 100%); and off camera = 89%, (range 53% - 100%)]. In every case in which interobserver agreement was 0% and in many cases where agreement was very low, the rate of behavior was very low (i.e., one scorer marked the behavior as having not occurred at all during the session, and the other as having occurred for only a few seconds).

Research Design

A multiple-baseline-across-subjects design was used (Barlow & Herson, 1984), that is, the intervention was introduced systematically across subjects. A series of baseline observations of each subject was followed by the introduction of the intervention. The length of the baseline varied naturally across subjects. For example, the intervention was introduced during the second week for Subject 1 and during the seventh week for Subject 5. Each subject was exposed to the experimental intervention as soon as the program director determined that the subject had met the receptive language criteria described earlier.

RESULTS

Acquisition of One Part Directives Targeting Functional Play During Teaching Trials

Each of the children enrolled in the program met the criteria for participating in this study as described previously. Subjects 1, 2, and 5 acquired at least one one part directive targeting functional play. Table 6 summarizes the one part directives taught to each subject, whether or not the acquisition criterion was met for that one part directive, and the number of teaching trials required to meet the criterion. Subjects met between 0 and 4 directives. The number of trials that it took for the acquisition criteria to be met for acquired one part directives ranged from 20 to 145.

Subject 4 did not meet the criterion for acquisition of a one part directive during the intervention period (see Table 4). Subject 4 was presented with two directives during the same teaching session from the beginning of the intervention. Over the course of the intervention, this subject was presented with four different one part directives. This protocol change was made because this subject had previously demonstrated improved performance on discrimination tasks when more than one instruction was taught within a session. A total of 216 trials of the one part directives were presented, with correct responses varying from 0% to 57% across teaching sessions.

Subject 3 did not meet criterion for acquisition of the first one part directive. He was introduced to only 1 one part directive during the intervention period. The one part directive was presented 244 times, with correct responding ranging from 0% to 80% across teaching sessions.

Table 4
Play Directives Used and Acquisition Data

Subject	Play Directive Used	Acquisition Criteria Met?	If Yes, Number of Trials Until Met Criteria
1	Feed the doll with the spoon	Yes	20
	Give the doll a drink with the cup	Yes	20
	Talk on the telephone	Yes	20
	Give the doll a ride on the car	Yes	51
	You take a drink from the cup	No	
2	Give the doll a drink from the cup	Yes	40
	Feed the doll with the spoon	Yes	80
	Give the doll a ride on the car	Yes	145
	Give the doll a hug	No	
3	Give the doll a hug	No	
4	Talk on the phone	No	
	Push the car	No	
	Give the doll a drink with the cup	No	
	Give the doll a hug	No	
5	Give the doll a drink with the cup	Yes	79

Free-Operant Play Observations

Measures of play behavior collected during free-operant play sessions in the clinic and in the home were initially examined separately. Visual analysis revealed

that rates of play were very similar across both settings and showed similar trends when trends occurred. Data collected during free-operant play sessions in both settings were combined for purposes of further analysis.

The categories of manipulative and relational play were combined for purposes of graphing and tabular summaries. Both of these forms of play involved non-pretend, non-representational uses of toys and differ only in the number of toys used at a single time. In addition, rates of relational play were very low across all subjects. The term 'manipulative play' will be used to refer to this collapsed category.

Changes in Play Following the Intervention

Changes in Rates of Manipulative, Functional, and Symbolic Play

Rates of play are summarized in Table 5. This table shows the average rate of manipulative, functional, and symbolic play for each subject before and after the intervention.

Table 5

Average Percentage of Time Spent in Manipulative, Functional, and Symbolic Play
Before and After Intervention Across Subjects

Subject	Manipulative		Functional		Symbolic	
	Before	After	Before	After	Before	After
1	14	46	0	5	1	16
2	65	91	0	0	0	0
3	75	42	5	1	0	0
4	37	29	33	27	2	0
5	83	93	1	0	0	0

Figure 1 presents the rates of manipulative, functional, and symbolic play for Subject 1 across sessions. The rates are shown as a percentage of the observable session time for each free-operant play session. The 'A' represents the session during which this subject met criterion for acquisition of the first one part directive: The 'B' indicates acquisition of the third one part directive. Rates of play behavior varied from session to session both before and after the intervention. Increases in manipulative, functional, and symbolic play occurred immediately following the intervention. Manipulative play increased the greatest amount, with rates rising from 14% prior to the intervention to 46% after the intervention (see Table 5). Smaller increases occurred in functional and symbolic play (0% to 5%, and 1% to 16%, respectively). Overall, the average time engaged in play went from 15% before the intervention to 67% after the intervention. Subject 1 showed a marked increase in the use of the toy telephone (see Figure 2 and Table 6) during the intervention period. This increase occurred immediately after the acquisition criterion for the one part directive "Talk on the telephone" was met.

Rates of manipulative, functional, and symbolic play for Subject 2 are presented in Figure 3. The 'A' represents the session during which this subject met criterion for acquisition of the first one part directive: The 'B' indicates acquisition of the third one part directive. After low rates of any type of play during the first two free-operant play sessions, Subject 2 spent much of the sessions playing with the toys. His toy use involved manipulative play only: No functional or symbolic play was observed during any session. The average amount of time spent in manipulative play increased from 61% before the intervention to 91% after the intervention (see Table 5). No systematic changes in toy use following the intervention were noted (see Table 6).

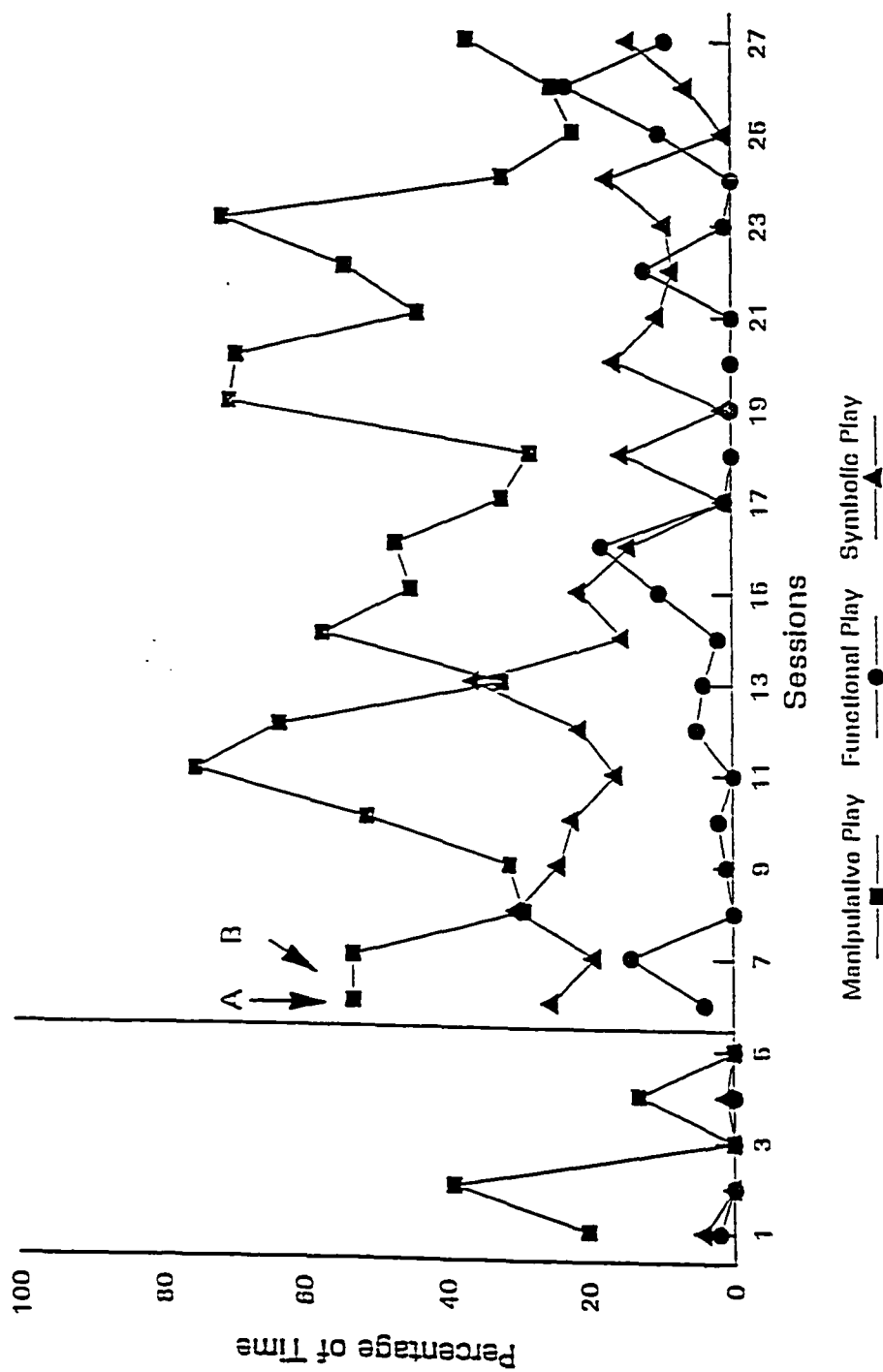


Figure 1. Subject 1 Manipulative, Functional, and Symbolic Play.

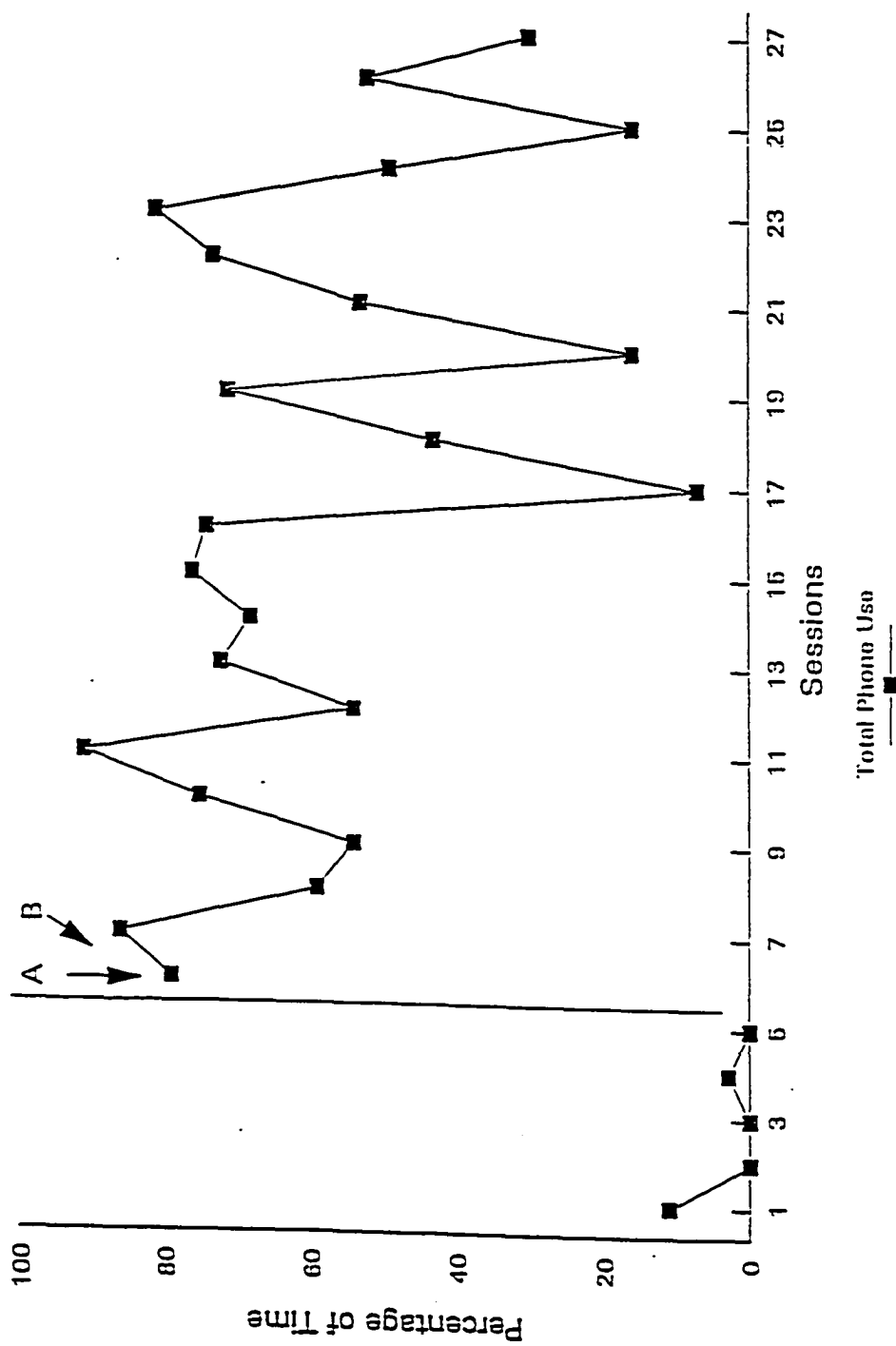


Figure 2. Subject 1 Play with the Toy Telephone.

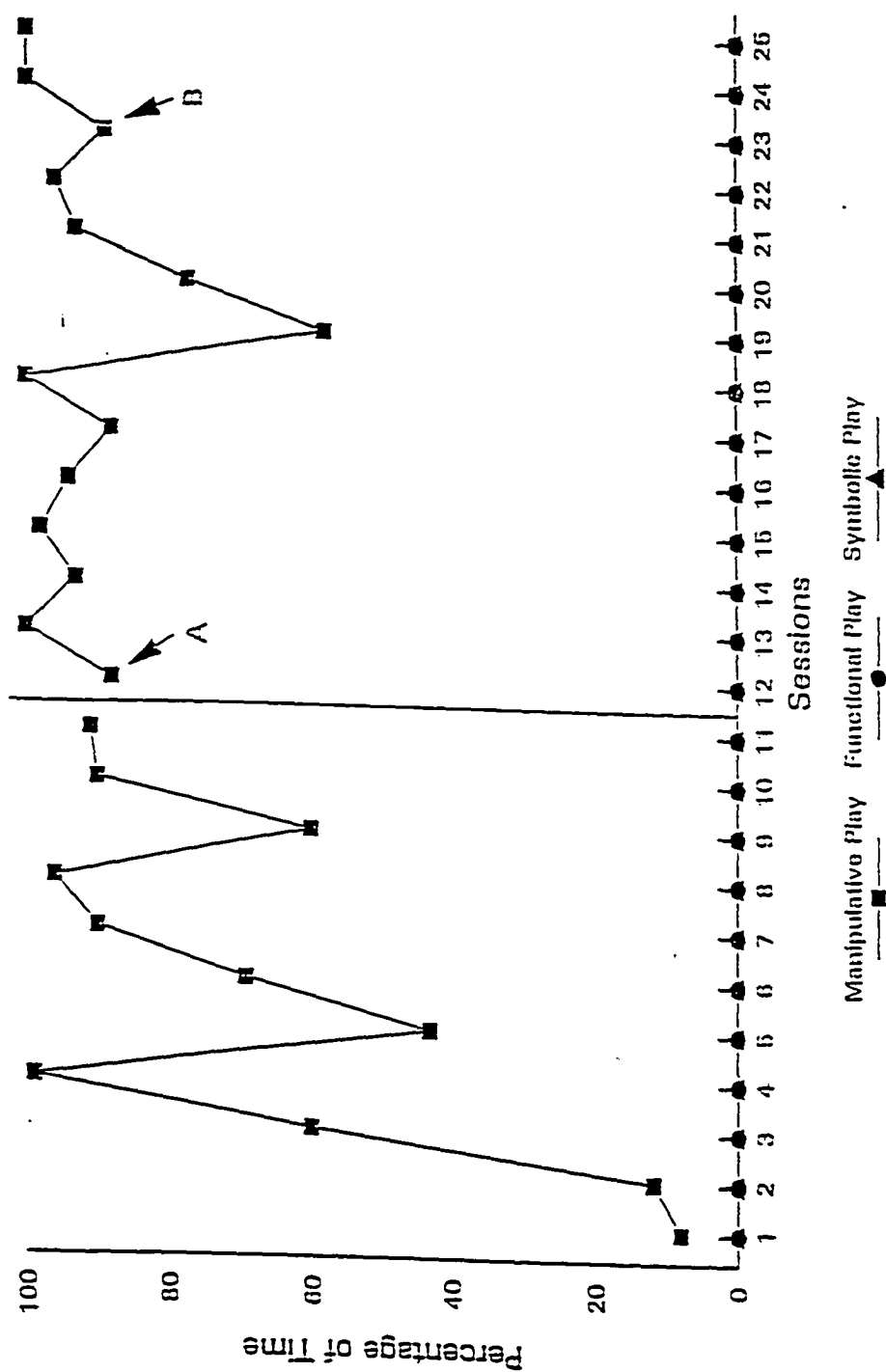


Figure 3. Subject 2 Manipulative, Functional, and Symbolic Play.

Table 6
Average Time Spent Using Toys Before and After the Intervention
for Toys Used During One Part Directives

Subject	Toys Used During Intervention	Average Use Before Intervention	Average Use After Intervention
1	Doll	0	5
	Spoon	7	0
	Cup	6	0
	Telephone	3	58
	Car	11	18
2	Doll	0	0
	Cup	0	2
	Spoon	3	16
	Car	49	25
3	Doll	34	18
4	Phone	12	10
	Car	35	30
	Doll	0	2
	Cup	2	5
5	Doll	1	1
	Cup	6	9

Subject 3 engaged in very little functional or symbolic play across free-operant play sessions (see Figure 4). During baseline sessions, this subject showed a high rate of manipulative play, averaging 75% of the observed session time (see Table 5).

Manipulative play decreased after intervention to an average of 42%. This decrease occurred three play sessions after introduction of the intervention. Manipulative play was not replaced by another play category. During the last two sessions,

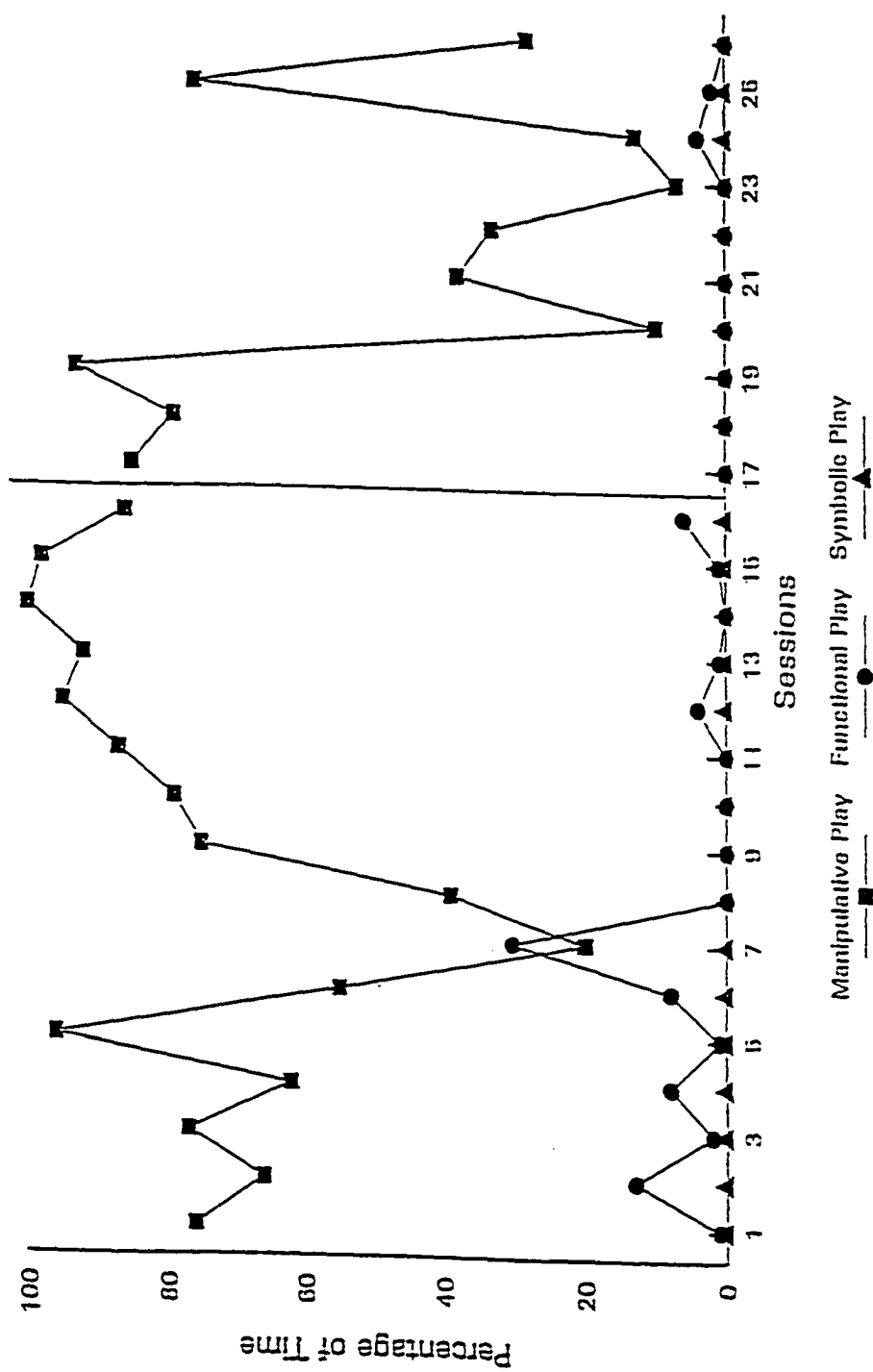


Figure 4. Subject 3 Manipulative, Functional, and Symbolic Play.

manipulative play rose to rates similar to those observed prior to the intervention. Changes in toy use related to the intervention were not observed for this subject (see Table 6).

Subject 4 spent much of the session time playing with the toys across all free-operant play sessions (see Figure 5). Manipulative and functional play predominated. These types of play varied inversely. When high rates of functional play were observed, low rates of manipulative play were observed, and vice versa. Very little symbolic play was observed during any session. The overall percentage of time spent interacting with the toys was relatively stable, especially across the first thirteen sessions. A small decrease in play occurred after the intervention, with manipulative play decreasing from 37% to 29% and average functional play decreasing from 33% to 27% (see Table 5). Use of specific toys did not change as a result of the intervention (see Table 6).

Subject 5 spent most of the free-operant play session time engaged in manipulative play, averaging 93% of observed time across all sessions [see Figure 6 (the arrow indicates the time when the first one-part directive was acquired) and Table 5]. Very low rates of functional play were observed across all sessions, and this subject did not engage in symbolic play during any of the sessions. Systematic changes in the use of specific toys were not observed following the intervention (see Table 6).

Rates of Stereotyped and Nonstereotyped Play

Examination of videotapes during scoring manipulative, functional, and stereotyped play led to the observation that for some subjects stereotyped play with the toys might have contributed to a lack of appropriate toy contact. Stereotyped

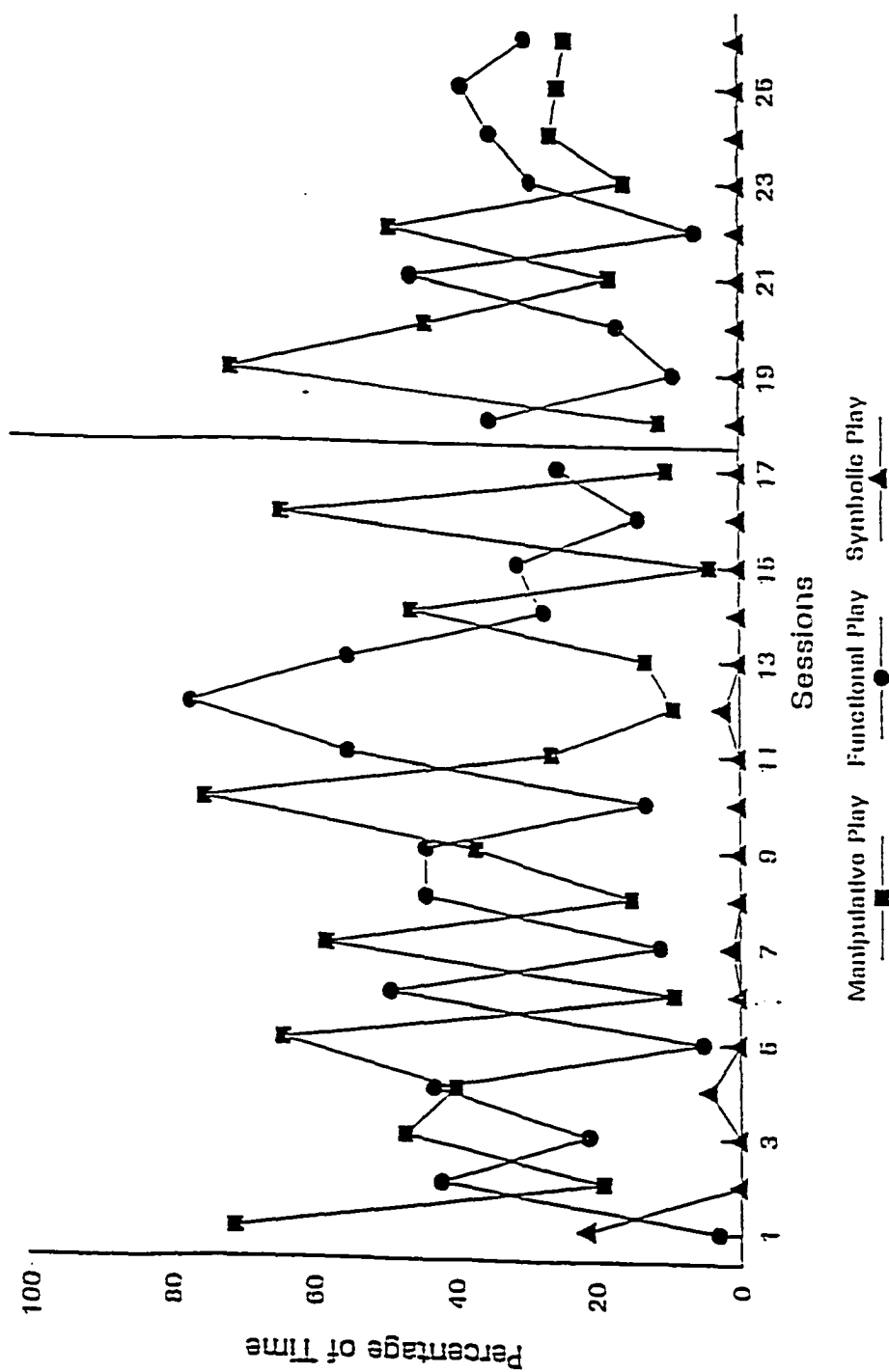


Figure 5. Subject 4 Manipulative, Functional, and Symbolic Play.

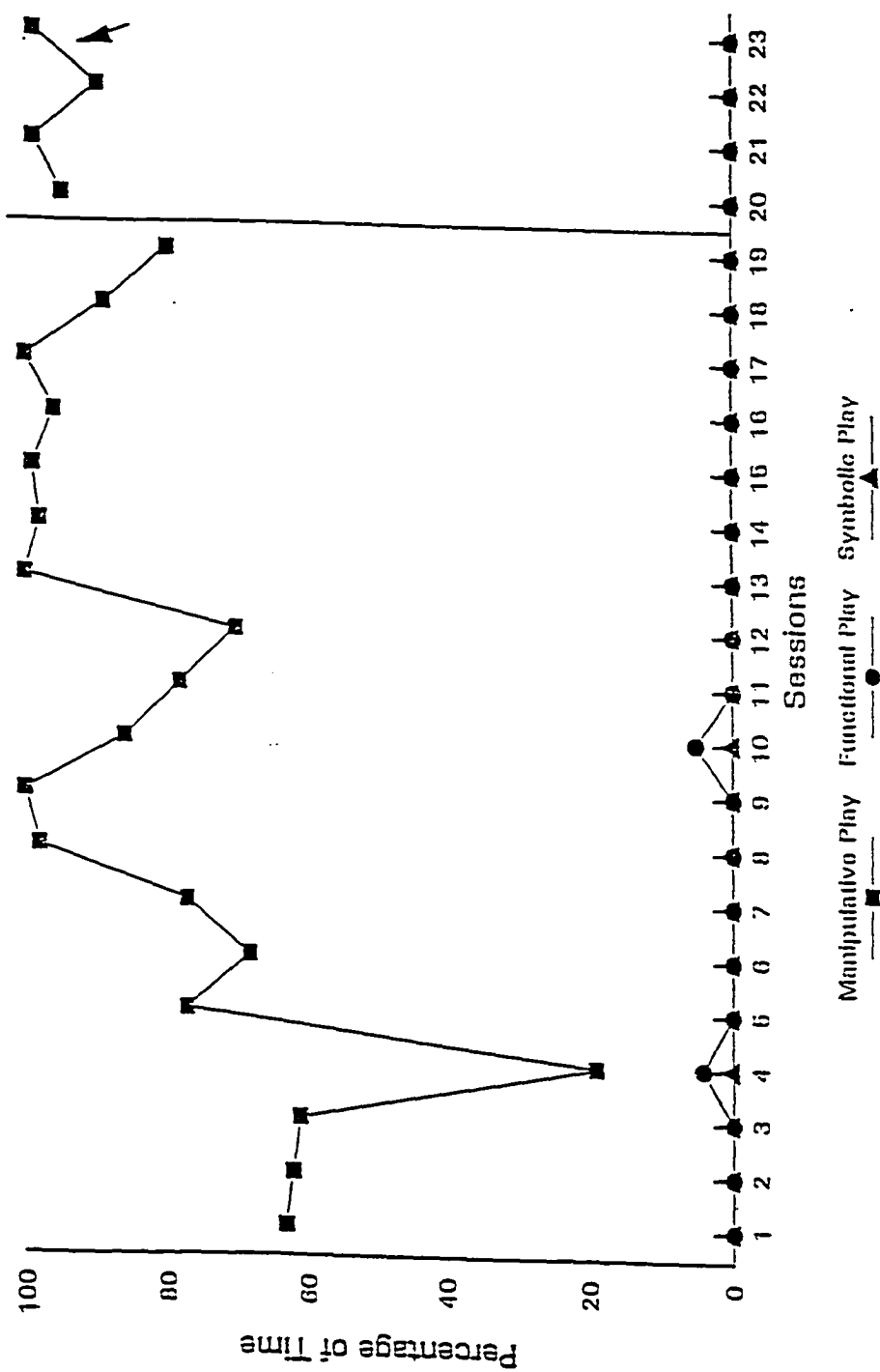


Figure 6. Subject 5 Manipulative, Functional, and Symbolic Play.

toy contact was defined as using the toys in a repetitive manner. The videotapes were then scored to determine rates of stereotyped play.

Rates of stereotyped and nonstereotyped play across free-operant play sessions for Subject 1 are shown in Figure 7 ('A' represents the session during which this subject met criterion for acquisition of the first one part directive and 'B' indicates acquisition of the third one part directive). Rates are presented as the percentage of observable time this subject spent in nonstereotyped (nonstereotyped manipulative, functional, and symbolic) and stereotyped play. Stereotyped play increased from 0% before the intervention to 16% of session time after the intervention (see Table 7). Nonstereotyped play increased from an average of 7% to 60%.

Table 7

Average Percentage of Time Spent in Stereotyped and Nonstereotyped Play Before and After the Intervention

Subject	Stereotyped Play		Nonstereotyped Play	
	Before	After	Before	After
1	0	16	7	60
2	11	28	55	60
3	3	2	77	41
4	4	1	71	54
5	41	40	41	52

As seen in Figure 8, Subject 2 gradually increased stereotyped play across sessions, especially during the later sessions. ('A' represents the session during which this subject met criterion for acquisition of the first one part directive and 'B'

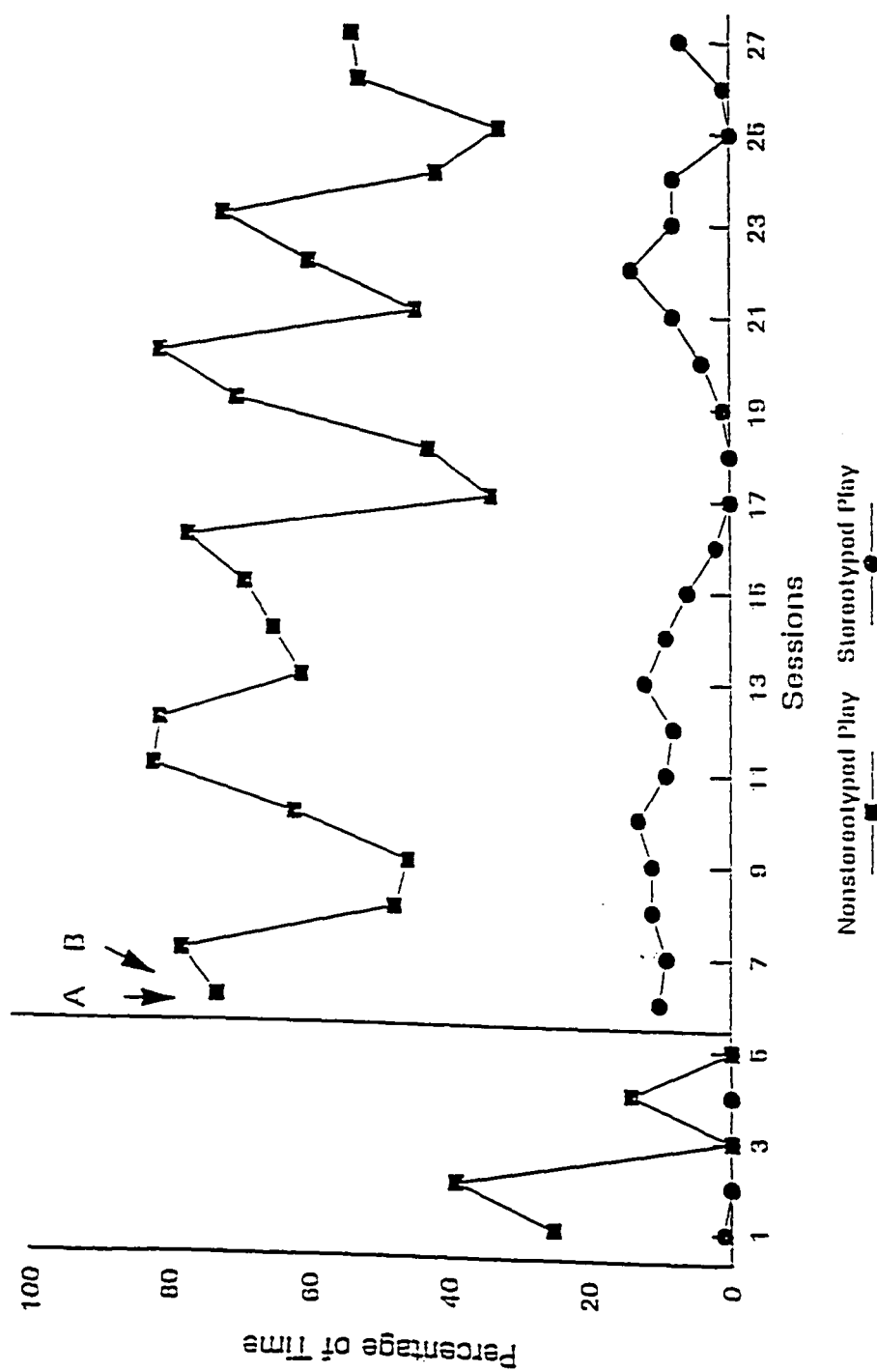


Figure 7. Subject 1 Stereotyped as Compared to Nonstereotyped Play.

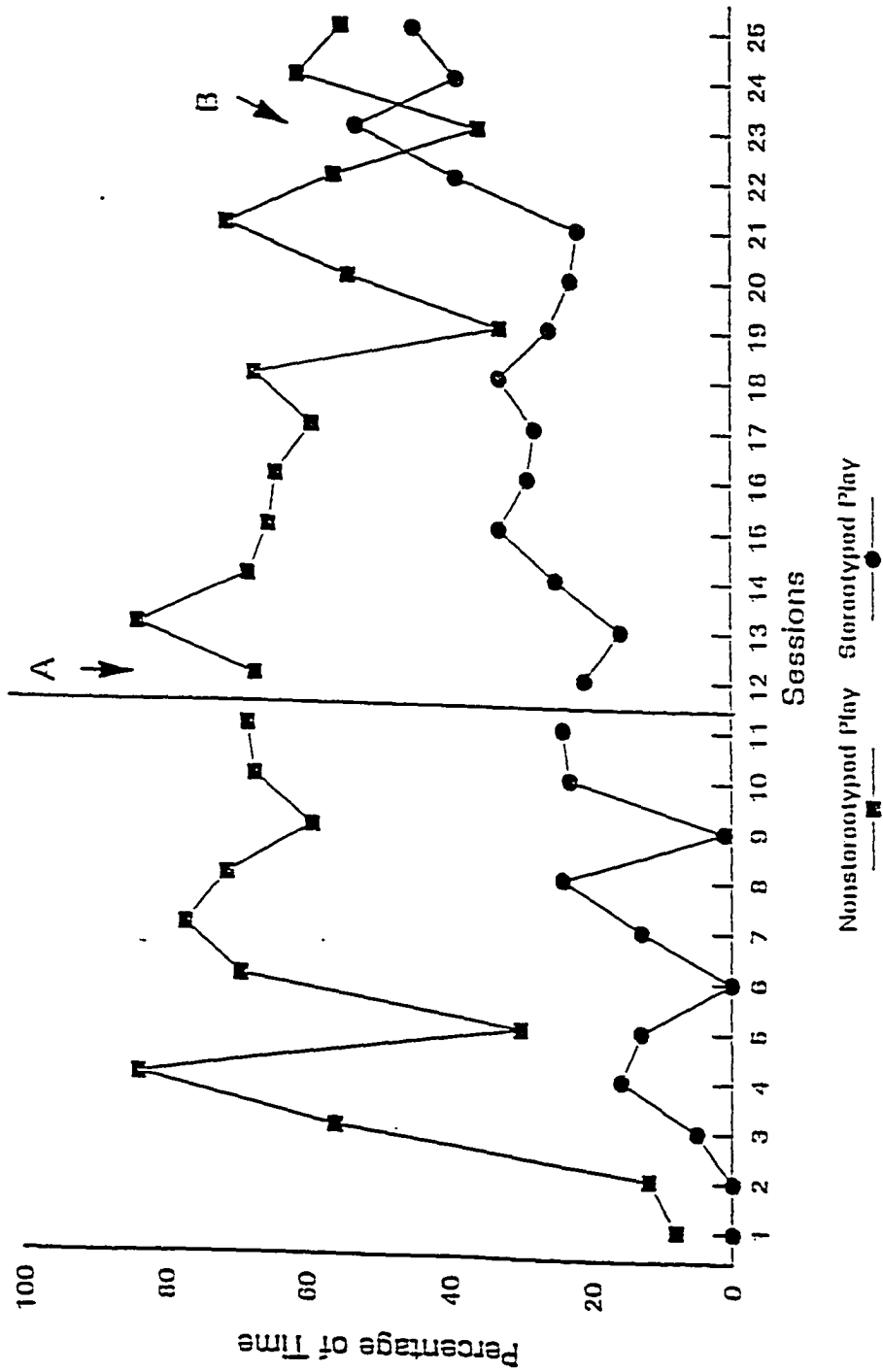


Figure 8. Subject 2 Stereotyped as Compared to Nonstereotyped Play.

indicates acquisition of the third one part directive.) Rates of stereotyped play increased from 11% before the intervention to 28% after the intervention (see Table 7). Nonstereotyped play increased a smaller amount (55% to 60%).

Subject 3 engaged in very little stereotyped play during any free-operant play session (see Figure 9 and Table 7), averaging 3% of free-operant play session time before the intervention. After the intervention, stereotyped play was observed during an average of 2% of session time. The average amount of nonstereotyped play decreased from 77% to 41% of session time.

Stereotyped play was low across all sessions for Subject 4 (see Figure 10), varying between 0% and 20%. The average rate of stereotyped play was stable before and after the intervention, averaging 4% and 1%, respectively (see Table 7). Nonstereotyped play decreased from an average of 71% prior to the intervention to 54% after the intervention.

Across all sessions, Subject 5 spent about equal amounts of session time engaged in stereotyped and nonstereotyped play (see Figure 11, the arrow represents acquisition of the first one part directive). Average rates of stereotyped play remained constant before and after the intervention, at 41% and 40%, respectively (see Table 7). After the intervention, nonstereotyped play increased from an average of 40% to 52% of free-operant play session time. Both stereotyped and nonstereotyped play increased slowly, but steadily, across the sessions.

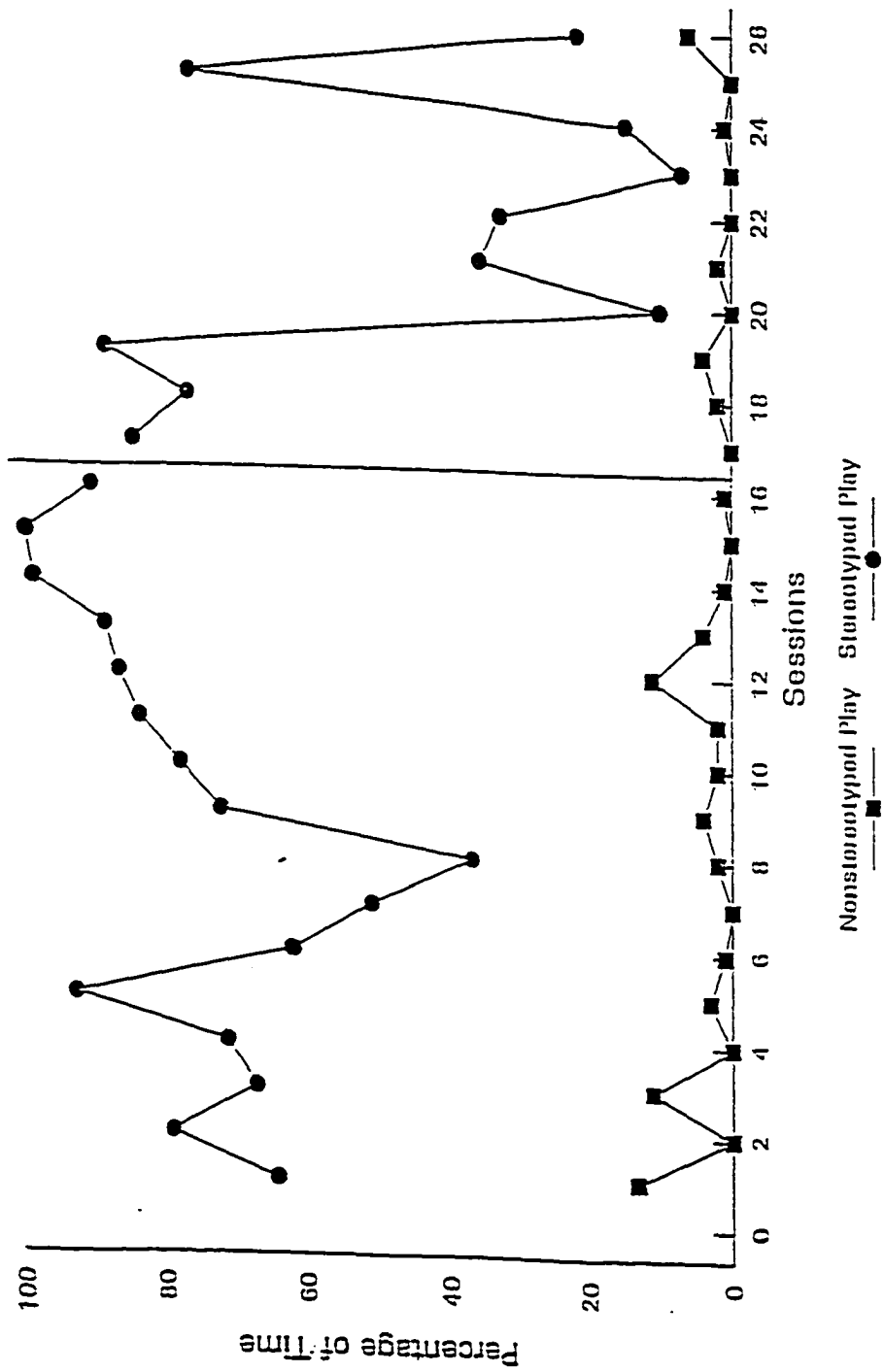


Figure 9. Subject 3 Stereotyped as Compared to Nonstereotyped Play.

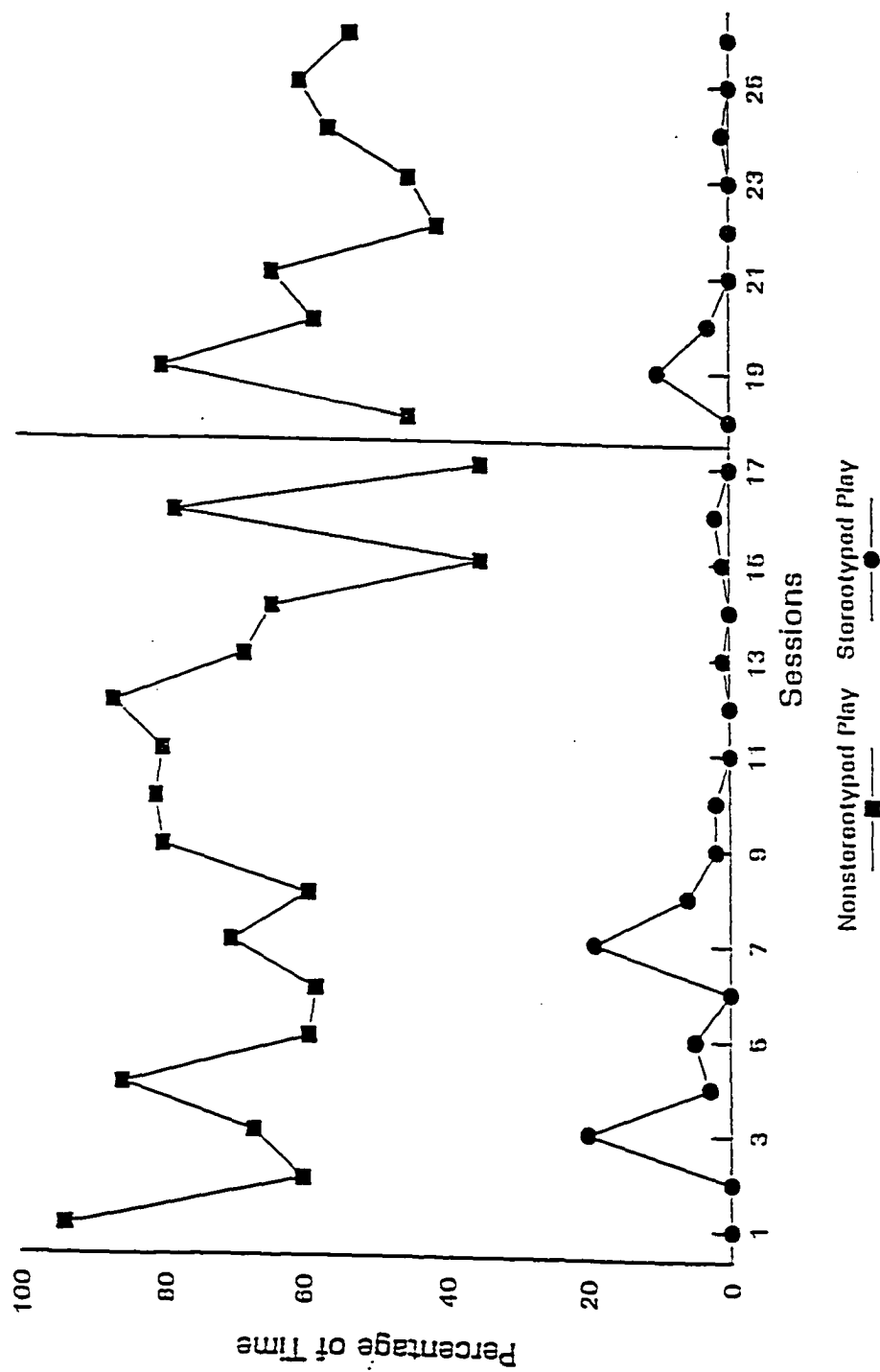


Figure 10. Subject 4 Stereotyped as Compared to Nonstereotyped Play.

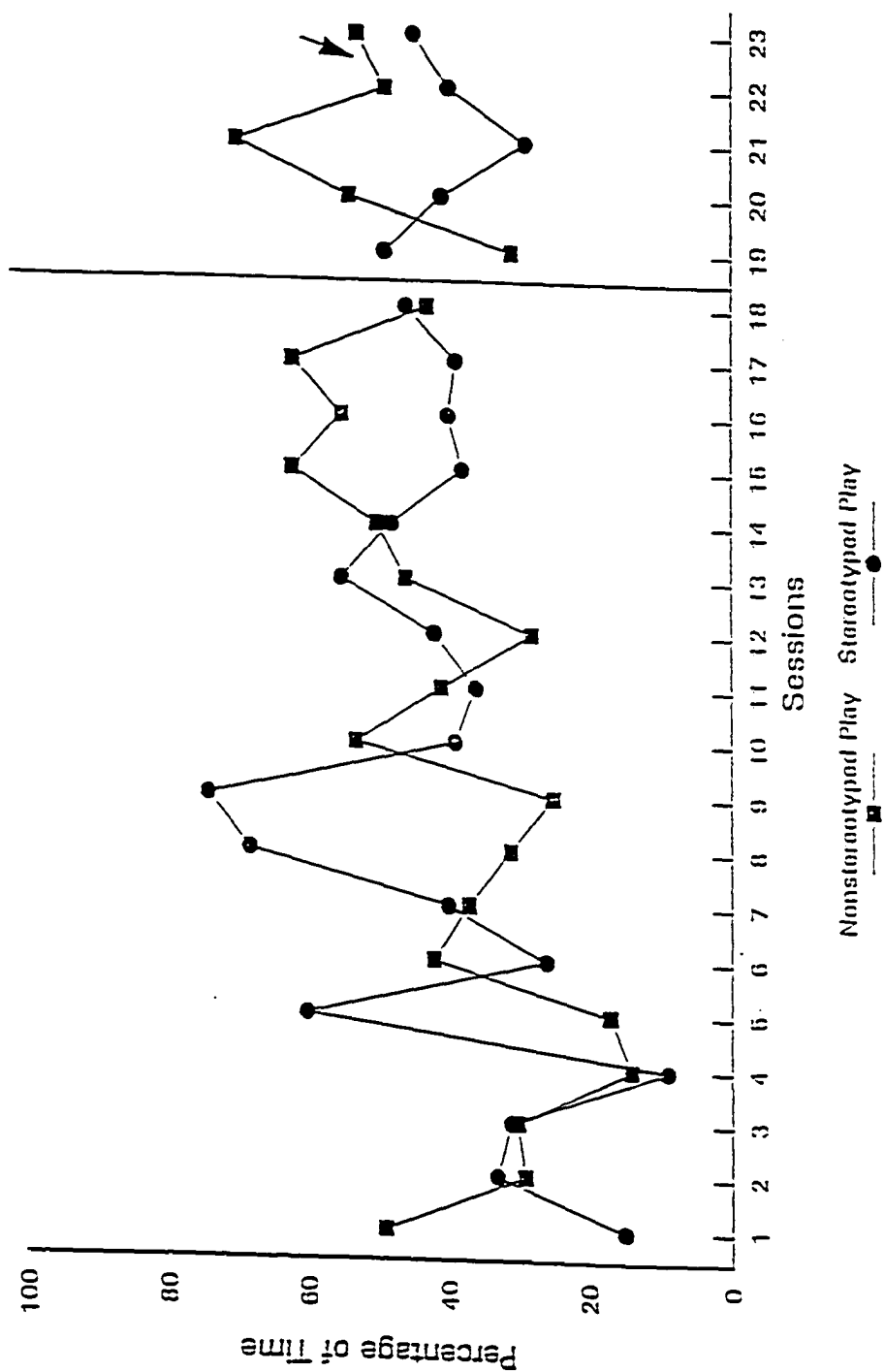


Figure 11. Subject 5 Stereotyped as Compared to Nonstereotyped Play.

DISCUSSION

A review of the literature revealed that children diagnosed with Autistic Disorder have deficits in the development of pretend play skills. These skills are considered important because of the relationship between the development of pretend play and language. Despite the importance of these skills, few studies had directly targeted these skills during intervention, and none had looked at teaching pretend play skills during trial based teaching. This research was designed as an initial investigation into the usefulness of integrating functional play behaviors into receptive language trial based teaching sessions.

The five subjects who participated in this research showed varying results. Subject 1 showed increased pretend play skills that appeared to be attributable to the intervention. Two of the subjects appeared to demonstrate decreased rates of appropriate play but for different reasons. Subject 2 engaged in steadily increasing rates of stereotyped play across sessions. Subject 3 decreased his interaction with the toys during the intervention phase. The decreases in appropriate play do not appear clearly attributable to the intervention for either subject. Finally, Subjects 4 and 5 did not demonstrate clear changes in play behavior during the intervention phase.

Due to the time-limited nature of the summer program and large differences between individual subjects, the independent variable was not manipulated as planned. Perhaps due to widely varying levels of development upon entering the summer program, subjects varied greatly in the amount of time it took each to reach the criteria for entering the study. Amount of exposure to the independent

variable differed across subjects. While Subject 1 was introduced to the one part directives during the second week of the program, Subject 5 began the intervention during the seventh week of the program.

Only three of the five subjects reached criteria for acquisition of at least one of the one part directive during the intervention (see Table 6 on page 41). Subject 1 met criterion for beginning the intervention first, and met criteria for acquisition of four one part directives. He was the only subject to show increases in play skills during the intervention period. Subject 2 met the acquisition criterion for three one part directives. Despite exposure to and acquisition of several of the one part directives, this subject increased in rates of stereotyped play but did not show improvements in more appropriate forms of play. Subject 5, who met the criterion for one of the one part directives, did so with only one free-operant play session left before the end of the summer program. He may not have had adequate time to begin to use more sophisticated play skills during spontaneous play.

Subjects 3 and 4 did not meet the acquisition criterion for any of the directives and would not be expected to show any clear intervention effects. Subject 3 decreased his interaction with the toys during the intervention phase three sessions after the intervention began. During the last session, play rose to pre-intervention levels. These changes in rates of play are difficult to interpret without further data. It remains unclear as to whether observed decreases in play should be attributed to the intervention or to some other factor such as becoming bored with the standard set of toys. Subject 4 decreased the amount of time he spent playing with the toys after the intervention. This decrease, however, does not appear to be large enough to be clinically significant. Neither of these subjects showed clinically relevant changes in play behavior that could be clearly attributed to the intervention.

To summarize, two of the subjects did not reach the criterion for acquisition of a single one part directive, and one of the subjects met the criterion at the end of the study. Because of this, the independent variable was not manipulated as had been planned, limiting the conclusions that can be reached.

The scoring procedures used for this research were found to be difficult even though they were adapted from a previously used scoring system (Ungerer and Sigman, 1981). Although overall rates interobserver agreement were in the acceptable range (from 84% to 96% across scoring categories), percent agreement between observers was sometimes low for single sessions. This was especially the case for functional and symbolic play. These behaviors occurred infrequently and, when they did occur, often fluctuated between the two behaviors. The use of an interval scoring procedure might have improved interobserver agreement.

The dependent measure used in this research (rates of spontaneous pretend play during free-operant play sessions) was conservative. The procedures used during this research required that the children generalize responses learned during trial based teaching sessions to free-operant play sessions in a different setting. No specific teaching took place in this setting. Generalization of behaviors to another setting is especially difficult for autistic children (Rincover & Koegel, 1975; Rosenblatt, Bloom, & Koegel, 1995). In this case, subjects also had to generalize across stimuli types, from behavior evoked by verbal stimuli (the one part directive) to behavior evoked by visual and tactile stimuli (the toys). Further, subjects were allowed to engage in free-operant responses other than appropriate play during these sessions. Strong behavioral repertoires (for example, stereotyped behavior with the toys) may have competed with less the less developed repertoires of appropriate play.

Individual differences between subjects may have contributed to the variation in results. For two of the subjects, stereotyped behavior with toys during free-operant play sessions appeared to interfere with more appropriate play skills. Subjects 2 and 5 each spent considerable amounts of time during the play sessions using the toys in a stereotyped fashion (see Table 9 on page 51 and Figures 8 on page 55 and 11 on page 58). Although each acquired at least one of the one part directives during the trial based teaching sessions, neither demonstrated increased pretend play skills during spontaneous play.

Previous research has demonstrated that suppressing self-stimulatory behavior led to increases in the appropriate toy play of two autistic children (Koegel, Firestone, Kramme, & Dunlap, 1974). While other researchers have found that teaching appropriate play decreased self-stimulatory behavior in people with developmental disabilities (Ballard & Medland, 1986; Coleman, Whitman, & Johnson, 1975; Eason, White, & Newsom, 1982; Epstein, Doke, Sajwaj, Sorrell, & Rimmer, 1974; Flavell, 1973; Scott, Glynn, & Ballard, 1988), this was not the case for these Subjects 2 and 5. Rather, these subjects appeared to learn that self-stimulatory behavior involving toys would not be interrupted during free-operant play sessions. (Other self-stimulatory behavior during play sessions and all self-stimulatory behavior during other times was interrupted while the children were at the clinic). The high rates of self-stimulatory play appeared to interfere with the development of other types of more appropriate play.

The play behavior displayed by the subjects who participated in this research was consistent with the literature on the development of pretend play in children diagnosed with Autistic Disorder. For example, Subject 1 was the only subject to earn an index score of greater than 20 months on the Bayley during developmental

testing (see Table 1 on pages 31-32). The Communication Subscale on the Vineland also indicated that this subject had higher communication skills than the other subjects. Developmental testing of the other subjects demonstrated abilities on the Bayley that ranged from index scores of 10 to 14 months at the beginning of the program, and 13 to 18 months at the end of the program. According to the developmental literature on pretend play, children would not be expected to show symbolic play until they reached a language comprehension age of 20 months (Doherty & Rosenfeld, 1984; Leslie, 1987; Murphy, Callias, & Carr, 1985; Wing 1978).

As noted previously, only Subject 1 engaged in clinically relevant amounts of symbolic play during the free-operant play sessions. After intervention, Subject 1 demonstrated pretend play skills that were closer to his developmental age. Despite improvements in play skills, post hoc analysis showed that his symbolic play skills did not show the variety and flexibility that a non-autistic child would be expected to show. Most of his symbolic play involved talking into the toy telephone. Anecdotal reports from his parents indicate, however, that after leaving the summer program, he continued to show increasing pretend play skills with a increasing variety of toys.

Subject 4 was the only subject to regularly engage in functional play activities before the intervention phase. A post hoc analysis of his play, however, showed that his functional play both before and after the intervention was limited to pushing the toy car back and forth. He did not demonstrate the variety and flexibility seen in the play of non-autistic children.

Implications for Future Research

Overall, the results of this study do not lend strong support for the use of this intervention to build pretend play skills. Despite the lack of clear intervention effects, these results have implications for future research.

This intervention may be useful as a way of introducing appropriate play activities into trial-based teaching sessions. The directives usually used during receptive language teaching trials request behavior that has little usefulness as a functional or adaptive response (other than teaching receptive language skills). Examples of common directives include: "Touch your nose"; "Stick out your tongue"; and "Clap your hands".

The one part directives introduced during the intervention were easily incorporated into receptive language teaching trials and prompted behaviors that had potential to become functional responses to play materials. Further, examination of individual subject characteristics might indicate appropriate play skills to target during receptive language teaching trials.

During this research, the particular one part directives taught were not tailored to the individual child. They were selected from a standard set of directives, most of which required doll-directed functional play. This is consistent with the behavioral literature, which indicates that it is often possible to teach particular target skills using behavioral techniques without consideration of developmental level. Recent research, however, reported that autistic children may learn pretend play activities that are matched to their developmental age more readily than those matched to chronological age (Lifter, Sulzer-Azaroff, Anderson, & Cowdery, 1993). This may indicate that the subjects with a developmental age of less than 19

months may have more easily acquired directives targeting self-directed functional play behaviors.

In the course of this research, two subjects with developmental ages of less than 19 months did acquire one part directives targeting doll-directed behavior during teaching sessions. However, they did not generalize these behaviors to the free-operant play setting. Subject 1, who had a developmental age of greater than 19 months, acquired these responses during teaching sessions and generalized play behaviors to spontaneous play. Matching one part directives to developmental level might have led to greater generalization to free-operant play, but this remains speculative until further research is completed.

For children who engage in high levels of stereotyped play, it might be necessary to interrupt stereotyped play during play sessions in order to observe increases in appropriate play. For two of the subjects who participated in this study, stereotyped behavior predominated when such behavior was not interrupted by a tutor. Interrupting stereotyped play may have allowed more appropriate play activities to emerge. Research into the effects of response competition during free-operant play upon the development of appropriate play is needed. Other researchers have found that when intervention decreased self-stimulatory behavior, appropriate play behavior increased. (Fellner, Laroche, & Sulzer-Azaroff, 1984; Koegel, Firestone, Kramme, & Dunlap, 1974).

Procedures for increasing generalization may increase the likelihood that these skills will generalize to free operant play (Stokes & Baer, 1977; Stokes & Osnes, 1989). Pretend play training should take place in a variety of settings, including settings in which play is expected to occur (i.e., home and school play rooms). Teachers should be varied and should include people with whom the child

will interact during play times (i.e., parents and classroom teachers). Training should include a wide variety of toys.

Training effects might also be strengthened through using techniques to make the toys used more during training attractive to the children. Baseline observations might be useful in indicating toys which the child appears to prefer. The use of stimulus preference techniques (Fisher, Piazza, Bowman, Hagopian, Owens, & Slevin, 1992; Pace, Ivancic, Edwards, Iwata, & Page, 1985) could then be used to empirically validate the selection of toys that would be preferred by each child, and therefore would be more likely to provide automatic reinforcement for appropriate play behavior.

It might also prove useful to teach similar pretend play responses using a variety of procedures. For example, during receptive language teaching sessions, the tutor would use one part directives to prompt the child to hug the doll. During structured teaching play, the tutor would use Pivotal Response Training techniques (Stahmer, 1995) to teach the same response. This would be expected to increase generalization, because appropriate play responses would become controlled by a variety of stimuli, including verbal, visual, and tactile stimuli.

Summary

In summary, strong conclusions cannot be reached as to the effectiveness of the intervention on pretend play skills used during this research. Due to time limitations and individual differences in developmental abilities across subjects, the independent variable was not fully manipulated. Despite methodological limitations in this particular study, this intervention appears to be worthy of further study. It is based upon well-developed procedures for teaching autistic children (Lovaas,

1987; 1993). Further, it proved to be easily integrated into receptive language teaching trials. Improvements in pretend play skills that appeared to be attributable to the intervention occurred for one of the subjects. Individual differences between subjects are suggestive of procedures that might lead to stronger intervention effects. Future research looking at matching the intervention to subject characteristics and improving generalization to free-operant play will be necessary to determine the usefulness of this intervention in increasing pretend play behaviors in children diagnosed with Autistic Disorder.

Appendix A
Informed Consent Form

Informed Consent Form

Western Michigan University, Department of Psychology

Measuring Improvements in Pretend Play Behavior
as the result of Short-term Intensive Behavior Therapy
for Preschool Children with Autism

Principal Investigator: Jori Reijonen, M.A.

Advisor: Patricia Mainhold, Ph.D.

I understand that dissertation research is being conducted at the Summer Behavior Therapy Program 94 by Jori Reijonen. The nature of this research is to determine the effects that a simple intervention during receptive language training session will have on pretend play behaviors of autistic children during free play.

This intervention is part of the regular therapy programming for each child. The effect of the intervention will be assessed by collecting measures from videotapes taken during free play sessions at the program and at home. These videotapes are being taken to assess the progress of children enrolled in this program. No additional videotapes are being added to the videotapes being taken for purposes of this dissertation project.

I understand that the following information will be summarized in the dissertation: individual response data collected during treatment sessions; results of the before and after standard tests given to my child; and measures of behavior changes in pretend play collected from videotapes.

Whether or not I agree to allow my child's data to be reported as part of Jori Reijonen's dissertation research will not affect the programming or assessments that my child will receive in the Summer Program. I may withdraw my consent to allow my child's data to be used as research data for this project at any time, even after the therapy program has ended.

I understand that the only risks anticipated from participating in this research would be related to protecting my child's and my family's right to confidentiality in the reporting of data. All clinical records with any identifying information, such as my child's name and address, will be kept in a locked file in Dr. Mainhold's home office in order to keep records confidential. The data used in the dissertation report (summary data) will have no names or other identifying information on them and will only have a code number on it. A separate list of the children's names and code numbers will be kept with other sensitive information in the locked file. After all of the summaries are collected, the list of names will be destroyed. The videotapes of my child's progress will be kept in his file as a permanent record of his progress.

If I have any questions or concerns about this research study, I may contact Jori Reijonen at 344-3733 or Dr. Meinhold at 387-4497. I may also contact the chair of the Human Subjects Institutional Review Board or the Vice President for Research with any concerns that I have.

My signature below indicates that I give my permission for the clinical data concerning _____ (my child's name) to be collected for Jori Reijonen's dissertation project. Data may also be reported at professional meetings or published in research reports.

Parent's signature

Date

Appendix B

Human Subjects Institutional Review Board Approval

Human Subjects Institutional Review Board

Kalamazoo, Michigan 49002-3299
616 337-2293

WESTERN MICHIGAN UNIVERSITY

Date: June 21, 1994

To: Jori Reijonen

From: Kevin Hollenbeck, Chair

Re: HSIRB Project Number 94-06-01

This letter will serve as confirmation that your research project entitled "Measuring improvement in pretend play behavior as the result of short-term intensive behavior therapy for preschool children with autism" has been approved under the exempt category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

You must seek reapproval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: Jun 21, 1995

xc Meinhold, Psych.

Human Subjects Institutional Review Board

Kalamazoo, Michigan 49002-3299
616 387-3293

 WESTERN MICHIGAN UNIVERSITY

Date: October 20, 1994

To: Joni Reijnen

From: Richard Wright, Interim Chair *f. for R. Wright*

Re: HSIRB Project Number 94-06-01

This letter will confirm that the revisions you requested in your memo dated (October 3, 1994) to your research project entitled "Measuring improvements in pretend play behavior as the result of short-term intensive behavior therapy for preschool children with autism" has been approved by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the revisions as described in your memo.

Please note that you must seek specific approval for any further changes in this design. You must also seek reapproval if the project extends beyond the reexamination date. In addition if there are any unanticipated adverse or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: Oct. 20, 1995

xc Meinhold, PSY

BIBLIOGRAPHY

- American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (Fourth Ed., revised). Washington DC: APA.
- Athey, I., (1984). Contributions of play to development. In T. D. Yawkey & A. D. Pellegrini (Eds.), Child's play: Developmental and applied. Hillsdale, N.J.: Erlbaum.
- Atlas, J. A., (1990). Play in assessment and intervention in the childhood psychoses. Child Psychiatry and Human Development, 21, 119-133.
- Azrin, N. H., & Lindsley, O. R., (1956). The reinforcement of cooperation between children. Journal of Abnormal and Social Psychology, 2, 100-102.
- Bailey, D. B., & McWilliam, R. A., (1990). Normalizing early intervention. Topics in Early Childhood Special Education, 10, 33-47.
- Ballard, K. D., & Medland, J. L., (1986). Collateral effects from teaching attention, imitation and toy interaction behaviors to a developmentally handicapped child. Child & Family Behavior Therapy, 7, 47-60.
- Barlow, D. H., & Hersen, M., (1984). Single Case Experimental Designs: Experimental Strategies for Studying Behavior Change. Second Edition. New York: Pergamon.
- Baron-Cohen, S. (1987). Autism and symbolic play. British Journal of Developmental Psychology, 5, 139-148.
- Baron-Cohen, S. (1989a). The autistic child's theory of mind: A case of specific developmental delay. Journal of Child Psychology and Psychiatry, 30, 285-297.
- Baron-Cohen, S. (1989b). Joint attention deficits in autism: Towards a cognitive analysis. Development and Psychopathology, 1, 185-189.
- Baron-Cohen, S., (1990a). Autism: A specific cognitive disorder of 'mind-blindness'. International Review of Psychiatry, 2, 81-90.
- Baron-Cohen, S., (1990b). Instructed and elicited play in autism: A reply to Lewis & Boucher. British Journal of Developmental Psychology, 8, 207.

- Baron-Cohen, S., Allen, J., & Gillberg, C. (1993). Can autism be detected at 18 months? The needle, the haystack, and the CHAT. In M. E. Hertzog & E. A. Farber (Eds.), Annual progress in child psychiatry and child development. New York: Brunner Mazel.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a 'theory of mind'? Cognition, 21, 37-47.
- Bates, E., Benigni, L., Bretherton, I., Camoiaioni, L., & Volterra, V., (1979). Cognition and communication from nine to thirteen months: Correlational findings. In E. Bates, The Emergence of Symbols (pp. 69-151) New York: Academic Press.
- Beeghly, M., Weiss-Perry, B., & Cicchetti, D., (1990). Beyond sensorimotor functioning: Early communicative and play development of children with Down syndrome. In D. Cicchetti & M. Beeghly (Eds.), Children with Down Syndrome: A Developmental Perspective (pp. 329-368). New York: Cambridge University Press.
- Belchic, J. K., & Harris, S. L., (1994). The use of multiple peer exemplars to enhance the generalization of play skills to the siblings of children with autism. Child and Family Behavior Therapy, 16, 1-25.
- Belsky, J., Garduque, L., & Hrnacir, E., (1984). Assessing performance, competence, and executive capacity in infant play: Relations to home environment and security of attachment. Developmental Psychology, 20, 406-417.
- Belsky, J., Goode, M. K., & Most, R. K., (1980) Maternal stimulation and infant exploratory competence: Cross-sectional, correlational, and experimental analyses. Child Development, 51, 1163-1178.
- Belsky, J., & Most, R. K., (1981). From exploration to play: A cross-sectional study of infant free play behavior. Developmental Psychology, 17, 630-639.
- Berlyne, D. E., (1969). Laughter, humor, and play. In G. Lindzey, & E. Aronson (Eds.), The Handbook of Social Psychology, Second Edition, pp. 795-852. Reading, MA: Addison-Wesley Publishing Co..
- Birnbrauer, J. S., & Leach, D. J., (1993). The Murdoch Early Intervention Program after 2 years. Behaviour Change, 10, 63-74.
- Blum, E. J., Fields, B. C., Scharfman, H., & Silber, D., (1994). Development of symbolic play in deaf children aged 1 to 3. In A. Slade & D. P. Wolf (Eds.) Children at Play: Clinical and Developmental Approaches to Meaning and Representation, pp. 238-260. New York: Oxford University Press.

- Boucher, J. (1977). Alternation and sequencing behaviour and response to novelty in autistic children. Journal of Child Psychology and Psychiatry, 18, 67-72.
- Boucher, J. (1988). Word-fluency in high functioning autistic children. Journal of Autism and Developmental Disorders, 18, 637-646.
- Boucher, J., & Lewis, V. (1989). Memory impairments and communication in relatively able autistic children. Journal of Child Psychology and Psychiatry, 30, 99-122.
- Boucher, J., & Lewis, V. (1990). Guessing or creating? A reply to Baron-Cohen. British Journal of Developmental Psychology, 8, 205-206.
- Boucher, J., & Warrington, E. K. (1976). Memory deficits in early infantile autism: Some similarities to the amnesic syndrome. British Journal of Psychology, 67, 73-87.
- Bradley, R. H., (1986). Play materials and intellectual development. In A. W. Gottfried, & C. C. Brown (Eds.) Play Interactions: The Contribution of Play Materials and Parental Involvement to Children's Development, pp. 227-251. Lexington, MA: Lexington Books.
- Bradley, R. H., & Caldwell, B. M., (1984). The relation of infants' home environments to achievement test performance in first grade: A follow-up study. Child Development, 55, 803-809.
- Bretherton, I., O'Connell, B., Shore, C., & Bates, E., (1984). The effect of contextual variation on symbolic play development from 20 to 28 months. In I. Bretherton (Ed.), Symbolic Play: The development of Social Understanding, pp. 271-298. Orlando: Academic Press, Inc..
- Christie, J. F., (1985). Training of symbolic play. Early Child Development and Care, 19, 43-52.
- Cicchetti, D., Beeghly, M., & Weiss-Perry, B., (1994). Symbolic development in children with Down syndrome and in children with autism: An organizational, developmental psychopathology perspective. In A. Slade & D. P. Wolf (Eds.) Children at Play: Clinical and Developmental Approaches to Meaning and Representation, pp. 206-239. New York: Oxford University Press.
- Clune, C., Paoletta, J. M., & Foley, J. M. (1979). Free-play behavior of atypical children: An approach to assessment. Journal of Autism and Developmental Disorders, 9, 61-72.

- Coe, D. A., Matson, J. L., Craigie, C. J., & Gossen, M. A., (1991). Play skills of autistic children: Assessment and instruction. Child & Family Behavior Therapy, 13, 13-40.
- Coe, D. A., Matson, J., Fee, V., Manikam, R., & Linarello, C., (1990). Training non-verbal and verbal play skills to mentally retarded and autistic children. Journal of Autism and Developmental Disorders, 20, 177-187.
- Cohen, D., (1993). The Development of Play, Second Edition. London: Routledge.
- Coleman, R. S., Whitman, T. L., & Johnson, M. R., (1979). Suppression of self-stimulatory behavior of a profoundly retarded boy across staff and settings: An assessment of situational generalization. Behavior Therapy, 10, 266-180.
- Corrigan, R., (1982). The control of animate and inanimate components in pretend play and language. Child Development, 53, 1343-1353.
- Cunningham, C. C., Glen, S. M., Wilkinson, P. & Sloper, P. (1985). Mental ability, symbolic play and receptive and expressive language in young children with Down's Syndrome. Journal of Child Psychology and Psychiatry, 26, 255-265.
- Dansky, J. L., (1979). Cognitive consequences of sociodramatic play and exploration training for economically disadvantaged preschoolers. Journal of Child Psychology and Psychiatry, 20, 47-58.
- DeMyer, M. K., Mann, N. A., Tilton, J. R., & Loew, L. H. (1967). Toy-play behavior and use of body by autistic and normal children as reported by mothers. Psychological Reports, 21, 973-981.
- DiLavore, P. C., Lord, C., & Rutter, M., (1995). The Pre-Linguistic Autism Diagnostic Observation Schedule. Journal of Autism and Developmental Disorders, 25, 355-379.
- Doherty, M. B., & Rosenfeld, A. A., (1984). Play assessment in the differential diagnosis of autism and other causes of severe language disorder. Developmental and Behavioral Pediatrics, 5, 26-29.
- Eason, L. J., White, M. J., & Newsom, C., (1982). Generalized reduction of self-stimulatory behavior: An effect of teaching appropriate play to autistic children. Analysis and Intervention in Developmental Disabilities, 2, 157-169.
- Elder, J. L., & Pederson, D. R. (1978). Preschool children's use of objects in symbolic play. Child Development, 49, 500-504.

- Epstein, L. H., Doke, L. A., Sajwaj, T. E., Sorrell, S., & Rimmer, B., (1974). Generality and side effects of overcorrection. Journal of Applied Behavior Analysis, 7, 385-390.
- Favell, J. E., McGimsey, J. F., & Schell, R. M., (1982). Treatment of self-injury by providing alternate sensory activities. Analysis and Intervention in Developmental Disabilities, 2, 83-104.
- Fein, D., Pennington, B., Markowitz, P., Braverman, M., & Waterhouse, L. (1986). Toward a neuropsychological model of infantile autism: Are the social deficits primary? Journal of the American Academy of Child Psychiatry, 25, 198-212.
- Fein, G. G. (1975). A transformational analysis of pretending. Developmental Psychology, 11, 291-296.
- Fein, G. G. (1981). Pretend play in childhood: An integrative review. Child Development, 52, 1095-1118.
- Fellner, D. J., Laroche, M., and Sulzer-Azaroff, B., (1984). The effects of adding interruption to differential reinforcement on targeted and novel self-stimulatory behaviors. Journal of Behavioral Therapy and Experimental Psychiatry, 15, 315-321.
- Fenson, L., (1984). Developmental trends for action and speech in pretend play. In I. Bretherton (Ed.), Symbolic Play: The development of Social Understanding, pp. 249-270. Orlando: Academic Press, Inc..
- Fenson, L., (1986). The developmental progression of play. In A. W. Gottfried, & C. C. Brown (Eds.) Play Interactions: The Contribution of Play Materials and Parental Involvement to Children's Development, pp. 53-65. Lexington, MA: Lexington Books.
- Fenson, L., Kagan, J., Kearsley, R. & Zelazo, P. (1976). The developmental progression of manipulative play in the first two years. Child Development, 47, 232-236.
- Fenson, L., & Ramsay, D. S. (1980). Decentration and integration of the child's play in the second year. Child Development, 51, 171-178.
- Fewell, R. R., & Kaminski, R., (1988). Play skills development and instruction for young children with handicaps. In S. L. Odom & M. B. Karnes (Eds.), Early Intervention for Infants and Children with Handicaps, pp. 145-158.

- Fewell, R. R., & Rich, J. S., (1987). Play assessment as a procedure for examining cognitive, communication, and social skills in multihandicapped children. Journal of Psychoeducational Assessment, 2, 107-118.
- Field, T., De Stefano, L., & Koewler, J. H., (1982). Fantasy play of toddlers and preschoolers. Developmental Psychology, 18, 503-508.
- Fisher, W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Owens, J. C., & Slevin, I., (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. Journal of Applied Behavior Analysis, 25, 491-498.
- Flavell, J. E., (1973). Reduction of stereotypies by reinforcement of toy play. Mental Retardation, 11, 21-23.
- Fraiberg, S., & Adelson, E. (1977). Self-representation in language and play. In S. Fraiberg (Ed.), Insights from the blind, pp 248-270. New York: Basic Books, Inc..
- Freyberg, J. T., (1973). Increasing the imaginative play of urban disadvantaged kindergarten children through systematic training. In J. L. Singer (Ed.), The Child's World of Make Believe: Experimental Studies of Imaginative Play, pp. 129-154. New York: Academic Press.
- Garvey, C., (1990). Play. Cambridge, MA: Harvard University Press.
- Goetz, E. M., & Baer, D. M., (1973). Social control of form diversity and the emergence of new forms in children's blockbuilding. Journal of Applied Behavior Analysis, 6, 209-217.
- Goh, H. L., Iwata, B. A., Shore, B. A., DeLeon, I. G., Lerman, D. C., Ulrich, S. M., Smith, R. G., (1995). An analysis of the reinforcing properties of hand mouthing. Journal of Applied Behavior Analysis, 28, 269-283.
- Golomb, C. & Cornelius, C. B. (1977). Symbolic play and its cognitive significance. Developmental Psychology, 13, 246-252.
- Gottfried, A. E., (1986). Intrinsic motivational aspects of play experiences and materials. In A.W. Gottfried, & C. C. Brown (Eds.) Play Interactions: The Contribution of Play Materials and Parental Involvement to Children's Development, pp. 81-99. Lexington, MA: Lexington Books.
- Gould, J. (1986). The Lowe & Costello symbolic play test in socially impaired children. Journal of Autism and Developmental Disorders, 16, 199-213.

- Haight, W. L., & Miller, P. J., (1993). Pretending at Home: Early Development in a Sociocultural context. Albany, New York: State University of New York Press.
- Hammes, J. G. W., & Langdell, T., (1981). Precursors of symbol formation and childhood autism. Journal of Autism and Developmental Disorders, 11, 331-346.
- Haring, T. G. (1985). Teaching between-class generalization of toy play behavior to handicapped children. Journal of Applied Behavior Analysis, 18, 127-139.
- Haring, T. G., & Lovinger, L. (1989). Promoting social interaction through teaching generalized play initiation responses to preschool children with autism. Journal of the Association for Persons with Severe Handicaps, 14, 58-67.
- Harris, P. L., (1989a). Chapter 9: Autism. In P.L. Harris Children and Emotion: The Development of Psychological Understanding, pp. 193-215. Oxford: Blackwell.
- Harris, P. L. (1989b). The autistic child's impaired conception of mental states. Development and Psychopathology, 1, 191-195.
- Hart, B. M., Reynolds, N. J., Baer, D. M., Brawley, E. R., & Harris, F. R., (1968). Effect of contingent and non-contingent social reinforcement on the cooperative play of a preschool child. Journal of Applied Behavior Analysis, 1, 73-76.
- Hill, P. M., & McCune-Nicolich, L., (1981). Pretend play and patterns of cognition in Down's syndrome children. Child Development, 52, 611-617.
- Hobson, R. P. (1989a). Beyond cognition: A theory of autism. In G. Dawson (Ed.), Autism: Nature, diagnosis, and treatment. New York: Guilford.
- Hobson, R. P. (1989b). On sharing experiences. Development and Psychopathology, 1, 197-203.
- Hobson, R. P., (1991). What is autism? Psychiatric Clinics of North America, 14, 1-17.
- Hobson, R. P., Ouston, J., & Lee, A. (1989). Naming emotion in faces and voices: Abilities and disabilities in autism and mental retardation. British Journal of Developmental Psychology, 7, 237-250.
- Hulme, I., & Lunzer, E. A., (1966). Play, language and reasoning in subnormal children. Journal of Child Psychology and Psychiatry, 7, 107-123.
- Huttenlocher, J., & Higgins, E. T., (1978). Issues in the study of symbolic development. In W. A. Collins (Ed.), Minnesota Symposia on Child Psychology Volume 11, pp. 98-140.

- Ichinose, C. K., & Clark, H. B., (1990). A review of ecological factors that influence the play and activity engagement of handicapped children. Child and Family Behavior Therapy, 12, 49-76.
- Jackowitz, E. R., & Watson, M. W. (1980). Development of object transformations in early pretend play. Developmental Psychology, 16, 543-549.
- Jarrold, C., Boucher, J. & Smith, P. (1993). Symbolic play in autism: A review. Journal of Autism and Developmental Disorders, 23, 281-307.
- Jeffree, D. M., & McConkey, R., (1976). An observation scheme for recording children's imaginative doll play. Journal of Child Psychology and Psychiatry, 17, 189-197.
- Jennings, K. D., Connors, R. E., Stegman, C. E., Sankaranarayan, P., & Mendelsohn, S., (1985). Mastery motivation in young preschoolers: Effect of a physical handicap and implications for educational programming. Journal of the Division for Early Childhood, 8, 162-169.
- Kim, Y. T., Lombardino, L. J., Rothman, H., & Vinson, B., (1989). Effects of symbolic play intervention with children who have mental retardation. Mental Retardation, 27, 159-165.
- Koegel, R. L., Firestone, P. B., Kramme, K. W., & Dunlap, G. (1974). Increasing spontaneous play by suppressing self-stimulation in autistic children. Journal of Applied Behavior Analysis, 7, 521-528.
- Koegel, R. L., & Mentis, M. (1985). Motivation in childhood autism: Can they or won't they? Journal of Child Psychology and Psychiatry, 26, 185-191.
- Kohl, F. L., Beckman, P. J., & Swenson-Pierce, A., (1984). The effects of directed play on functional toy use and interactions of handicapped preschoolers. Journal of the Division for Early Childhood, 8, 114-118.
- Kopp, C. B., & Vaughn, B. E., (1982). Sustained attention during exploratory manipulation as a predictor of cognitive competence in preterm infants. Child Development, 53, 174-182.
- Krakow, J. B., & Kopp, C. B., (1983). The effects of developmental delay on sustained attention in young children. Child Development, 54, 1143-1155.
- Leslie, A. M. (1987). Pretence and representation: The origins of 'theory of mind'. Psychological Review, 94, 412-426.

- Leslie, A. M., & Happe, F. (1989). Autism and ostensive communication: The relevance of metarepresentation. Development and Psychopathology, 1, 205-212.
- Lewis, V., & Boucher, J. (1988). Spontaneous, instructed and elicited play in relatively able autistic children. British Journal of Developmental Psychology, 6, 325-339.
- Lewis, V., & Boucher, J. (1991). Skill, content and generative strategies in autistic children's drawings. British Journal of Developmental Psychology, 9, 393-416.
- Li, A. K. F., (1981). Play and the mentally retarded child. Mental Retardation, 19, 121-126.
- Li, A. F. K., (1985a). Correlates and effects of training in make-believe play in pre-school children. Alberta Journal of Educational Research, 31, 70-79.
- Li, A. F. K., (1985b). Toward more elaborate pretend play. Mental Retardation, 23, 131-136.
- Lifter, K., Sulzer-Azaroff, B., Anderson, S. R., & Cowdery, G. E., (1993). Teaching play activities to preschool children with disabilities: The importance of developmental considerations. Journal of Early Intervention, 17, 139-159.
- Loomis, E. A., Hilgeman, L. M., & Meyer, L. R. (1957). Play patterns as nonverbal indices of ego functions: A preliminary report. American Journal of Orthopsychiatry, 27, 691-700.
- Lord, C., (1985). Autism and the comprehension of language. In E. Schopler & G. B. Mesibov (Eds.), Communication Problems in Autism, pp. 257-281. Plenum Press: New York.
- Lord, C., Storoschuk, S., Rutter, M., & Pickles, A., (1993). Using the ADI-R to diagnose autism in preschool children. Infant Mental Health Journal, 14, 234-252.
- Lovaas, O. I., (1978). Parents as therapists. In M. Rutter & E. Schopler (Eds.) Autism: A Reappraisal of Concepts and Treatment, pp. 369-378. Plenum Press: New York.
- Lovaas, O. I., (1987a). Behavioral treatment and normal educational and intellectual functioning in young autistic children. Journal of Consulting and Clinical Psychology, 55, 3-9.
- Lovaas, O. I., (1987b). The Autistic Child: Language Development Through Behavior Modification. New York: Irvington.

- Lovaas, O. I., (1993). The development of a treatment-research project for developmentally disabled and autistic children. Journal of Applied Behavior Analysis, 26, 617-630.
- Lovaas, O. I., & Smith, T., (1989). A comprehensive behavioral theory of autistic children: Paradigm for research and treatment. Journal of Behavior Therapy and Experimental Psychiatry, 20, 17-29.
- Lovell, K., Hoyle, H. W., & Siddall, M. Q., (1968). A study of some aspects of the play and language of young children with delayed speech. Journal of Child Psychology and Psychiatry, 9, 41-50.
- Lowe, M. (1975). Trends in the development of representational play in infants from one to three years-an observational study. Journal of Child Psychology and Psychiatry, 16, 33-47.
- Main, M., (1983). Exploration, play, and cognitive functioning related to infant-mother attachment. Infant Behavior and Development, 6, 167-174.
- Malone, D. M., & Langone, J., (1994). Object-related play skills of youths with mental retardation: A review of single-subject design research. Remedial and Special Education, 15, 177-188.
- Marino, B. L., (1988). Assessments of infant play: Applications to research and practice. Issues in Comprehensive Pediatric Nursing, 11, 227-240.
- Martin, R. P., (1986). Assessment of the social and emotional functioning of preschool children. School Psychology Review, 15, 216-232.
- McClannahan, L. E., & Krantz, P. J., (1994). The Princeton Child Development Institute. In S. L. Harris & J. S. Handleman (Eds.), Preschool Education for Children with Autism, pp 54-73. Austin, TX: Pro-Ed.
- McConkey, R., & Jeffree, D., (1980). Developing play. British Journal of Special Education, 7, 21-23.
- McCune, L., (1986). Play-language relationships: Implications for a theory of symbolic development. In A. W. Gottfried, & C. C. Brown (Eds.) Play Interactions: The Contribution of Play Materials and Parental Involvement to Children's Development, pp. 67-79. Lexington, MA: Lexington Books.
- McCune-Nicolich, L. (1977). Beyond sensorimotor intelligence: Assessment of symbolic maturity through analysis of pretend play. Merrill-Palmer Quarterly, 23, 89-99.

- McCune-Nicolich, L. (1981). Toward symbolic functioning: Structure of early pretend games and potential parallels with language. Child Development, *52*, 785-797.
- McCune-Nicolich, L., & Fenson, L., (1984). Methodological issues in studying early pretend play. In T. D. Yawkey & A. D. Pellegrini, (Eds.), Child's Play: Developmental and Applied, pp. 81-104. Hillsdale, N.J.: Lawrence Erlbaum.
- McEachin, J. J., Smith, T., & Lovaas, O. I., (1993). Long-term outcome for children with autism who received early intensive behavioral treatment. American Journal on Mental Retardation, *97*, 359-372.
- McGhee, P. E., Ethridge, L., & Benz, N. A. (1984). Effect of level of toy structure on preschool children's pretend play. Journal of Genetic Psychology, *144*, 209-217.
- Merighi, J., Edison, M., & Zigler, E. (1990). The role of motivational factors in the functioning of mentally retarded individuals. In R. M. Hodapp, J. A. Burack, & E. Zigler (Eds.), Issues in the developmental approach to mental retardation, pp. 114-134. Cambridge: Cambridge University Press.
- Mogford, D. R., & Whitman, T. L., (1985). The multiple effects of a play-oriented parent training program for mothers of developmentally delayed children. Analysis and Intervention in Developmental Disabilities, *5*, 73-96.
- Morgan-Bevan, K. P., (1994). Play assessment for play-based intervention: A first step with young children with communication difficulties. In J. Hellendoorn, R. van der Kooij, & B. Sutton-Smith (Eds.), Play and Intervention, pp. 157-172. Albany, NY: State University of New York Press.
- Motti, F., Cicchetti, D., & Sroufe, L. A., (1983). From infant affect expression to symbolic play: The coherence of development in Down syndrome children. Child Development, *54*, 1168-1175.
- Mundy, P., & Sigman, M. (1989a). Second thoughts on the nature of autism. Development and Psychopathology, *1*, 213-217.
- Mundy, P., & Sigman, M. (1989b). The theoretical implications of joint-attention deficits in autism. Development and Psychopathology, *1*, 173-183.
- Mundy, P., Sigman, M., Ungerer, J., & Sherman, T. (1986). Defining the social deficits of autism: The contribution of non-verbal communication measures. Journal of Child Psychology and Psychiatry, *27*, 657-669.

- Mundy, P., Sigman, M., Ungerer, J., & Sherman, T. (1987). Nonverbal communication and play correlates of language development in autistic children. Journal of Autism and Developmental Disorders, 17, 349-364.
- Murphy, G., Callias, M., & Carr, J. (1985). Increasing simple toy play in profoundly mentally handicapped children. I. Training to play. Journal of Autism and Developmental Disorders, 15, 375-388.
- Ozonoff, S., Pennington, B. F., & Rogers, S. J. (1990). Are there emotion perception deficits in young autistic children? Journal of Child Psychology and Psychiatry, 31, 343-361.
- Ozonoff, S., Pennington, B. F., & Rogers, S. J. (1991). Executive function deficits in high-functioning autistic individuals: Relationship to theory of mind. Journal of Child Psychology and Psychiatry, 32, 1081-1105.
- Pace, G. M., Ivancic, M. T., Edwards, G. L., Iwata, B. A., & Page, T. J., (1985). Assessment of stimulus preference and reinforcer value with profoundly re-tarded individuals. Journal of Applied Behavior Analysis, 18, 249-255.
- Piaget, J., (1962). Play, Dreams, and Imitation in Childhood. New York: The Norton Library.
- Piaget, J., & Inhelder, B., (1969). The Psychology of the Child. New York: Basic Books, Inc..
- Power, T. J., & Radcliffe, J. (1989). The relationship of play behavior to cognitive ability in developmentally disabled preschoolers. Journal of Autism and Developmental Disorders, 19, 97-107.
- Prior, M., & Hoffmann, W. (1990). Brief report: Neuropsychological testing of autistic children through an exploration with frontal lobe tests. Journal of Autism and Developmental Disorders, 20, 581-590.
- Restall, G., & Magill-Evans, J., (1993). Play and preschool children with autism. American Journal of Occupational Therapy, 48, 113-120.
- Ricks, D. M. & Wing, L. (1975). Language, communication, and the use of symbols in normal and autistic children. Journal of Autism and Developmental Disorders, 5, 219-222.
- Riguet, C. B., Taylor, N. D., Benaroya, S., & Klein, L. S. (1981). Symbolic play in autistic, Down's and normal children of equivalent mental age. Journal of Autism and Developmental Disorders, 11, 439-448.

- Rincover, A., & Koegel, R. L., (1975). Setting generality and stimulus control in autistic children. Journal of Applied Behavioral Analysis, 8, 235-246.
- Roeyers, H., & van Berckelaer-Onnes, I. A., (1994). Play in autistic children. Communication & Cognition, 27, 349-360.
- Rogers, S. J., (1991). A psychotherapeutic approach for young children with pervasive developmental disorders. Comprehensive Mental Health Care, 1, 91-108.
- Rogers, S. J., Herbison, J. M., Lewis, H. C., Pantone, J., & Reis, K., (1986). An approach for enhancing the symbolic, communicative, and interpersonal functioning of young children with autism or severe emotional handicaps. Journal of the Division for Early Childhood, 10, 135-148.
- Rogers, S. J., & Lewis H. (1989). An effective day treatment model for young children with pervasive developmental disorders. Journal of American Academy of Child and Adolescent Psychiatry, 28, 207-214.
- Rogers, S. J., & Pennington, B. F. (1991). A theoretical approach to the deficits in infantile autism. Development and Psychopathology, 3, 137-162.
- Rosenblatt, D. (1977). Developmental trends in infant play. In B. Tizard & D. Harvey (Eds.), Biology of play, pp. 33-44. London: Heinemann.
- Rosenblatt, J., Bloom, P., & Koegel, R. L., (1995). Overselective responding: Description, implications, and intervention. In R. L. Koegel & L. K. Koegel (Eds.), Teaching Children with Autism: Strategies for Initiating Positive Interactions and Improving Learning Opportunities, pp. 33-42. Baltimore, MD: Brooks Publishing.
- Ruddy, M. G., & Bornstein, M. H., (1982). Cognitive correlates of infant attention and maternal stimulation over the first year of life. Child Development, 53, 183-188.
- Russell, J., Mauthner, N., Sharpe, S., & Tidswell, T. (1991). The 'windows task' as a measure of strategic deception in preschoolers and autistic subjects. British Journal of Developmental Psychology, 9, 331-349.
- Rutter, M. (1983). Cognitive deficits in the pathogenesis of autism. Journal of Child Psychology and Psychiatry, 24, 513-531.
- Rutter, M., Bartak, L., & Newman, S., (1971). Autism - A central disorder of cognition and language? In M. Rutter (Ed.), Infantile Autism: Concepts, Characteristics and Treatment, pp. 148-171. London, England:Churchill Livingstone.

- Saltz, E., Dixon, D., & Johnson, J., (1977). Training disadvantaged preschoolers on various fantasy activities: Effects on cognitive functioning and impulse control. Child Development, 48, 367-380.
- Schachter, F. F., Meyer, L. R., & Loomis, E. A. (1962). Childhood schizophrenia and mental retardation: Differential diagnosis before and after one year of psychotherapy. American Journal of Orthopsychiatry, 32, 584-595.
- Schafer, W. M., (1979). Expressive symbolism in spontaneous play before two years of age. New Directions for Child Development, 3, 17-27.
- Schleien, S. J., Heyne, L. A., & Berken, S. B., (1988). Integrating physical education to teach appropriate play skills to learners with autism: A pilot study. Adapted Physical Activity Quarterly, 5, 182-192.
- Schleien, S. J., Rynders, J. E., Mustonen, T., & Fox, A., (1990). Effects of social play activities on the play behavior of children with autism. Journal of Leisure Research, 22, 317-128.
- Scott, S., Glynn, T., & Ballard, K., (1988). Reducing self-injury in a boy with intellectual disability using visual screening, toy play training and contingent social interaction. Behaviour Change, 5, 117-127.
- Shmukler, D., & Naveh, I., (1985). Structured vs. unstructured play training with economically disadvantaged preschoolers. Imagination, Cognition, and Personality, 4, 293-304.
- Shore, C., O'Connell, B., & Bates, E., (1984). First sentences in language and symbolic play. Developmental Psychology, 20, 872-880.
- Shore, C., (1986). Combinatorial play, conceptual development, and early multiword speech. Developmental Psychology, 22, 184-190.
- Siegel, L. S., (1981). Infant tests as predictors of cognitive and language development at two years. Child Development, 52, 545-557.
- Sigman, M., & Mundy, P., (1987). Symbolic in young autistic children. In D. Cicchetti & M. Beeghly (Eds.), Symbolic Development in Atypical Children, pp. 31-46. San Francisco: Jossey-Bass Inc..
- Sigman, M., & Ungerer, J. A. (1984). Cognitive and language skills in autistic, mentally retarded, and normal children. Developmental psychology, 20, 293-302.
- Singer, J. L., (1973). The Child's World of Make-Believe. New York: Academic Press.

- Smilansky, S., (1990). Sociodramatic play: Its relevance to behavior and achievement in school. In E. Klugman & S. Smilanski (Eds.), Children's Play and Learning: Perspectives and Policy Implications, pp 18-42. New York: Teachers College Press.
- Smith, P. K., Takhvar, M., Gore, N., & Vollstedt, R., (1985). Play in young children: Problems of definition, categorization and measurement. Early Child Development and Care, 19, 25-41.
- Smith, P. K., & Vollstedt, R., (1985). On defining play: An empirical study of the relationship between play and various play criteria. Child Development, 56, 1042-1050.
- Smoluch, F., (1992). The relevance of Vygotsky's theory of creative imagination for contemporary research on play. Creativity Research Journal, 5, 69-76.
- Stahmer, A. C., (1995). Teaching symbolic play skills to children with autism using Pivotal Response Training. Journal of Autism and Developmental Disorders, 25, 123-141.
- Stahmer, A. C., & Schreibman, L., (1992). Teaching children with autism appropriate play in unsupervised environments using a self-management treatment package. Journal of Applied Behavior Analysis, 25, 447-459.
- Stokes, T. F., & Baer, D. M., (1977). An implicit technology of generalization. Journal of Applied Behavior Analysis, 10, 349-367.
- Stone, W. L., & Lemanek, K. L. (1990). Parental report of social behaviors in autistic preschoolers. Journal of Autism and Developmental Disorders, 20, 513-522.
- Stone, W. L., Lemanek, K. L., Fishel, P. T., Fernandez, M. C., & Altemeier, W. A. (1990). Play and imitation skills in the diagnosis of autism in young children. Pediatrics, 86, 267-272.
- Stone, W. L., & Rosenbaum, J. L., (1988). A comparison of teacher and parent views of autism. Journal of Autism and Developmental Disorders, 18, 403-414.
- Strain, P., (1975). Increasing social play of severely retarded preschoolers with socio-dramatic activities. Mental Retardation, 13, 7-9.
- Strain, P., (1976). The effects of sociodramatic activities on social interaction among behaviorally disordered preschool children. Journal of Special Education, 10, 71-75.

- Strain, P., (1985). Social and nonsocial determinants of acceptability in handicapped preschool children. Topics in Early Childhood Special Education, 4, 47-58.
- Strain, P. S., & Cooke, T. P. (1976). An observational investigation of two elementary-age autistic children during free play. Psychology in the Schools, 13, 82-91.
- Strain, P. S., & Odom, S. L., (1986). Peer social initiations: Effective intervention for social skills development of exceptional children. Exceptional Children, 52, 543-551.
- Tilton, J. R., & Ottinger, D. R. (1964). Comparison of the toy play behavior of autistic, retarded, and normal children. Psychological Reports, 15, 967-976.
- Udwin, O., (1983). Imaginative play training as an intervention method with institutionalized preschool children. British Journal of Educational Psychology, 53, 32-39.
- Udwin, O., & Yule, W., (1983). Imaginative play in language disordered children. British Journal of Disorders of Communication, 18, 197-205.
- Ungerer, J. A., (1989). The early development of autistic children: Implications for defining primary deficits. In G. Dawson (Ed.), Autism: Nature, Diagnosis, and Treatment, pp. 75-91. Guilford: New York.
- Ungerer, J. A., & Sigman, M., (1981). Symbolic play and language comprehension in autistic children. Journal of the American Academy of Child Psychiatry, 20, 318-337.
- Ungerer, J. A., & Sigman, M., (1984). The relation of play and sensorimotor behavior to language in the second year. Child Development, 55, 1448-1455.
- Ungerer, J. A., Zelazo, P. R., Kearsley, R. B., & O'Leary, K., (1981). Developmental changes in the representation of objects in symbolic play from 18 to 34 months of age. Child Development, 52, 186-195.
- van Berckelaer-Onnes, I. A., (1994). Play training for autistic children. In J. Hellen-doorn, R. van der Kooij, & B. Sutton-Smith (Eds.), Play and Intervention, pp. 173-182. Albany, NY: State University of New York Press.
- Vollmer, T. R., Marcus, B. A., & LeBlanc, L., (1994). Treatment of self-injury and hand mouthing following inconclusive functional analyses. Journal of Applied Behavior Analysis, 27, 331-344.

- Vygotsky, L. S. (1966). Play and its role in the mental development of the child. Soviet Psychology, 5, 6-18.
- Watson, M. W., & Fischer, K. W. (1977). A developmental sequence of agent use in late infancy. Child Development, 48, 828-836.
- Wehman, P., (1975). Establishing play behaviors in mentally retarded youth. Rehabilitation Literature, 36, 238-246.
- Weiner, B. J., Ottinger, D. R., & Tilton, J. R. (1969). Comparison of the toy-play behavior of autistic, retarded, and normal children: A reanalysis. Psychological Reports, 25, 223-227.
- Westby, C. E., (1980). Assessment of cognitive and language abilities through play. Language, Speech, and Hearing Services in Schools, 11, 154-168.
- Wetherby, A. M., & Prutting, C. A. (1984). Profiles of communicative and cognitive-social abilities in autistic children. Journal of Speech and Hearing Research, 27, 364-377.
- Whitman, T. L., Mercurio, J. R., & Caponigri, V., (1970). Development of social responses in two severely retarded children. Journal of Applied Behavior Analysis, 3, 133-138.
- Whyte, J., & Owens, A. (1989). Language and symbolic play: Some findings from a study of autistic children. Irish Journal of Psychology, 10, 317-332.
- Wing, L. (1978). Social, behavioral, and cognitive characteristics: An epidemiological approach. In M. Rutter & E. Schopler (Eds.), Autism, a Reappraisal of Concepts and Treatment, pp 27-45. New York: Plenum Press.
- Wing, L., & Gould, J. (1979). Severe impairments of social interaction and associated abnormalities in children: Epidemiology and classification. Journal of Autism and Developmental Disorders, 9, 11-29.
- Wing, L., Gould, J., Yeates, S. R., & Brierley, L. M. (1977). Symbolic play in severely mentally retarded and in autistic children. Journal of Child Psychology and Psychiatry, 18, 167-178.
- Wolfberg, P. J., & Schuler, A. L. (1993). Integrated play groups: A model for promoting the social and cognitive dimensions of play in children with autism. Journal of Autism and Developmental Disorders, 23, 467-489.

Wulff, S. B. (1985). The symbolic and object play of children with autism: A review.
Journal of Autism and Developmental Disorders, 15, 139-148.