TOY PREFERENCES OF AUTISTIC CHILDREN

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By

CARA MARIE HAMMOND, B. S.

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CHAPTER I

INTRODUCTION TO THE STUDY

The primary problem confronting researchers is that authors cannot agree on the definition, cause or treatment of autistic children. There are approximately 100,000 children in the United States diagnosed as autistic.[1] Statistics show that autism occurs in five per 10,000 births, with boys being affected about four times as often as girls.[2] These figures may prompt one to conclude that autism is rare, but actually more children are classified as autistic than as blind and it is nearly as common as deafness.[3] When people refer to autism, they are typically describing children

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[1]Margaret Dewey, "Recreation and Play for Autistic Children," in Physical Education, Recreation, and Related Programs for Autistic and Emotionally Disturbed Children, compiled by Liane Summerfield (Washington, D. C.: American Alliance for Health, Physical Education, Recreation, and Dance, 1976), p. 17.

[2]National Institutes of Health, Office of Scientific and Health Reports, Fact Sheet: Autism, NIH Publication No. 79-1877.

[3]Martin A. Kozloff, Reaching the Autistic Child: A Parent Training Program, 3d ed., (Champaign, Illinois: Research Press, 1978), p. 1.

who display a majority of the following symptoms:

1. Lack of appropriate speech;
2. Lack of appropriate social behavior;
3. Apparent, but unconfirmed sensory deficit;
4. Lack of appropriate play;
5. Inappropriate and out of context emotional behavior;
6. High rates of stereotyped, repetitive behaviors;
7. Isolated areas of high level functioning in the context of otherwise low level intellectual functioning.[1]

As children they present no associated physical deformities, that is, the deviance is behavioral.[2]

Play is behavior which is intrinsically motivated. Through play, children build the skills necessary to interact with peers and objects in the environment.[3] The lack of appropriate use of toys is one of the striking behavioral characteristics of autistic children.[4]

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[1]Benard Rimland, "Inside the Mind of the Autistic Savant," Psychology Today 12 (December 1978):68-80.

[2]Glen Dunlap, Robert L. Koegel, and Andrew L. Engel, "Autistic Children in School," Exceptional Children 45 (April 1979):552-558.

[3]Gene A. Hayes, "Recreation and the Mentally Retarded," Recreation and Special Populations, 2d ed., ed. Thomas A. Stein and H. Douglass Sessoms (Boston: Holbrook Press, Inc., 1977), p. 73.

[4]Raymond G. Romanczyk, Charles Diament, Elizabeth R. Goren, Gary Trunell, and Sandra L. Harris, "Increasing Isolate and Social Play in Severely Disturbed Children: Intervention and Post-intervention Effectiveness," Journal of Autism and Childhood Schizophrenia 5 (March 1975):57-70.

Many autistic children display little or no appropriate play, both isolate and social play. Instead of playing with toys appropriately, autistic children frequently engage in self-stimulatory behaviors.[1] This inability to play further impairs the social development of autistic children. In addition to social impairment, children lacking appropriate play skills may have inappropriate patterns of behavior reinforced.[2]

Tilton and Ottinger stated that the lack of communicative speech and interpersonal relationships associated with autism tend to rule out the use of standard psychological testing for diagnostic and research purposes.[3] It appeared that the observation of toy play was an appropriate and practical method

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[1]Robert L. Koegel, Paula B. Firestone, Kenneth W. Kramme, and Glen Dunlap, "Increasing Spontaneous Play by Suppressing Self-Stimulation in Autistic Children," Journal of Applied Behavior Analysis 7 (Winter 1974):521-528.

[2]Maureen Black, B. J. Freeman, and Joanne Montgomery, "Systematic Observation of Play Behavior in Autistic Children," Journal of Autism and Childhood Schizophrenia 5 (December 1975):363-371.

[3]James R. Tilton and Donald R. Ottinger, "Comparison of the Toy Play Behavior of Autistic, Retarded, and Normal Children," Psychological Reports 15 (October 1964):967-975.

of studying autistic children as findings were not dependent on verbal communication or the children's attentiveness to an adult. In turn, if play is a viable method for therapeutic intervention, it becomes critical to identify the type and characteristics of toys that evoke play, and the conditions most effective in stimulating social play.[1]

Lovaas stated that major problems remain concerning the situationality and reversibility of most treatment gains.[2] Much is yet to be known about teaching autistic children to play, creating ideal peers for autistic children, and programming social interaction among peers.

A review of the literature revealed that the majority of research in play behavior has not been conducted by recreators. It was not until the 1960's that therapeutic recreation services shifted to

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[1]Cindy Ferrara and Suzanne D. Hill, "The Responsiveness of Autistic Children to the Predictability of Social and Non-Social Toys," Journal of Autism and Developmental Disorders 10 (March 1980):51-57.

[2]O. Ivar Lovaas, "Contrasting Illness and Behavioral Models for the Treatment of Autistic Children: An Historical Perspective," Journal of Autism and Developmental Disorders 9 (December 1979):315-323.

include non-institutionalized persons with special needs.[1] In turn, therapeutic recreation, a relatively new field of service, must substantiate principles and concepts not only through experience but through research.[2] This includes determining the effects of recreation and play on the physiological and psychological well-being and behavior of individuals.[3] Thus, recreators, providing direct therapeutic recreation services, must develop a body of knowledge and contribute to the existing research concerning the toy play behavior of autistic children.

Statement of the Problem

In response to the above findings, this investigation was an attempt to observe autistic children in a free play setting. The problem was to investigate toy preferences of ten autistic children,

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[1]Claudine Sherrill, Adapted Physical Education and Recreation: A Multidisciplinary Approach, (Dubuque, Iowa: Wm. C. Brown Company Publishers, 1976), p. 25.

[2]H. Douglass Sessoms, Harold D. Myer, and Charles K. Brightbill, Leisure Services: The Organized Recreation and Park System, 5th ed., (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1975), p. 336

[3]Ibid.

ages six through fifteen, enrolled in the Lynne Developmental Center during the fall of 1980, in Richardson, Texas. Toy preferences were measured after the children had completed a minimum of six weeks in the operant conditioning toy stimulation program at the center.

A conclusion was drawn concerning whether significant differences existed between the conditioned toy preferences and free play preferences of the children. In addition, a conclusion was drawn according to reactive and non-reactive toy preferences of the children.

Limitations of the Study

The following limitations were imposed on the study: (1) the number of autistic children available at the Lynne Developmental Center to participate in the study; (2) the effectiveness of the conditioning period on toy preferences; (3) the degree to which the subjects were representative of the population from which they were drawn; (4) the cooperation of the administrators and teachers at the Lynne Developmental Center; and (5) the validity and reliability of the observations during a three-day observation period.

Definitions and Explanations of Terms

For the purpose of clarification, the following definitions and explanations of terms have been established for use throughout the present study:

Autism. Autism refers to:

> A tendency to morbid self-absorption and anthropophobia,; infantile (autism), severe emotional disturbance of childhood characterized by inability to form meaningful interpersonal relationships.[1]

Lynne Developmental Center. The Lynne Developmental Center, located in Richardson, Texas, is a Texas Education Agency approved private school providing year round services to children who have been diagnosed as autistic by a licensed Psychologist.

Toy Stimulation Program. Children enrolled in the Lynne Developmental Center participate in a toy stimulation program in which toy preferences are conditioned. Staff members observe self-stimulating behaviors, then present the children with a toy which best duplicates the self-stimulating behaviors. These procedures are repeated until the children exhibit appropriate play skills and have a toy repertoire

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[1] Stedman's Medical Dictionary, 23d ed., s.v. "autism."

of five or six toys.

Operant Conditioning. Operant conditioning is

> A form of conditioning in which reinforcement is contingent upon the occurrence of the response . . . (operant conditioning) involves the repeated emission of the same response . . . In operant conditioning the same response conditioned is the operant which is any of a class of behaviors that are equally effective in achieving reinforcement.[1]

Reactive Toys. Reactive toys will be defined as those toys with moveable or audible components.

Non-Reactive Toys. Non-reactive toys will be defined as those toys which do not meet the criteria established for reactive toys.

Hypotheses of the Study

The following hypotheses were examined at the .05 level of significance:

1. There is no significant difference on toy preferences of autistic children in a free play setting after operant conditioning.

2. There is no significant difference between reactive and non-reactive toy preferences of the autistic children.

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[1]Dictionary of Behavioral Science, 1973 ed., s.v. "Operant conditioning."

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter includes a review of literature related to the present study which aided the investigator in the development and understanding of this research. A survey of the literature revealed that this study does not duplicate any research available at the present time. The chapter is divided into three sections with literature reviewed under the following center headings: Research in General Treatment of Autistic Children; Research in Recreation and Play of Autistic Children; and Research in Recreation and Play of Non-Autistic Children.

Research in General Treatment of Autistic Children

The following section is presented as a collection of illustrative articles concerning research in the treatment of autistic children. It is not intended to serve as an inclusive review of literature in the field of autism.

Kanner was the first person to use the term, "autism." In so doing, he described children whose

conditions differed markedly and uniquely from anything previously reported.[1] He obtained histories from the parents of eleven children (eight boys and three girls). The subjects were selected from the Henry Phipps Psychiatric Clinic, the Harriet Lane Home for Invalid Children, the Johns Hopkins Hospital, and the Child Study Center of Maryland. Several of the subjects had, in fact, been viewed as feebleminded or schizophrenic. There were individual differences in the degree of their disturbances, the manifestation of specific features, the family constellations, and the step-by-step development in the course of years. Kanner defined certain common characteristics which formed a new and unique syndrome known as autism.

Kanner's characteristics were: (1) the inability to relate themselves in the ordinary way to people and situations from the beginning of life; (2) autistic aloneness--failing to regard anything from the outside; (3) a failure to assume, at any time, an anticipatory posture before being picked up; (4) failure to use speech as a means of communication;

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[1]Leo Kanner, "Autistic Disturbances of Affective Contact," The Nervous Child 2 (April 1943):217-250.

(5) an excellent rote memory; (6) delayed echolalia; (7) literalness; (8) repetition of personal pronouns just as heard; (9) rejection of intrusions (food, loud noises and moving objects); (10) masturbatory orgastic gratifications; and (11) good relations to objects/poor relations with people. Kanner found profound aloneness and desire for sameness to dominate all behavior of these children. He also suggested that all of the children were endowed with good cognitive potentials, essentially normal physical conditions, and were members of highly intelligent families. Kanner believed that there was a great deal of obsessiveness in the family backgrounds, as there were very few really warmhearted fathers and mothers.[1] In addition, parents, grandparents, and collaterals were strongly preoccupied with abstractions of a scientific, literary, or artistic nature, and demonstrated limited genuine interest in people. Kanner questioned the extent to which these conditions contributed to the problems of the children. He emphasized that much more research was needed to establish concrete criteria regarding emotional reactivity.

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[1]Ibid., Kanner, p. 250.

Sorosky et al. systematically and quantitatively recorded the pattern of spontaneous motor and perceptual behaviors of six autistic children and one child with Down's Syndrome at the University of California at Los Angeles Medical School.[1] Each subject was observed, for approximately six hours through a one-way mirror, in a playroom containing only a mattress and a few toys. One autistic child was observed on ten different occasions. Using the Esterline Angus twenty-pen event recorder, twenty behaviors unique to the individual child's behavior repertoire were recorded according to onset, duration, and termination of the behavior.[2] A three-way analysis of variance was computed to determine observer reliability. No significant differences were found between observers on most of the behavioral items. Observer unreliability for the category of "visual input" (time

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[1]Arthur D. Sorosky, Edward M. Ornitz, Morton B. Brown, and Edward R. Ritvo, "Systematic Observations of Autistic Behavior," Archives of General Psychiatry 18 (April 1968):439-449.

[2]O. Ivar Lovaas, Gilbert Freitag, Vivian J. Gold, and Irene C. Kassorla, "Recording Apparatus and Procedure for Observation of Behaviors of Children in Free Play Setting," Journal of Experimental Child Psychology 2 (June 1965):108-120.

subject was looking at hands while flapping or oscillating) was extremely low. This category, therefore, was not used in the study.

For analysis purposes, motor behaviors were divided into three groups: (1) Hand Behaviors, M_1; (2) Total Body Behaviors, M_2; and (3) Rhythmic Behaviors, M_3. Each of the subjects displayed a unique repertoire of behaviors. Subject 5 (observed ten times) exhibited variations in the amount of behavior per day, but the relative values for the different groups remained constant: $M_1 < M_3 < M_2$. Concerning patterns of behaviors, no evidence revealed that behaviors assumed any cyclic or periodic pattern. Throughout the eight-month observation period for Subject 5, behaviors remained constant except when affected by the following unusual conditions: (1) a febrile illness; (2) a period of excessive crying; (3) an allergic pruritus; and (4) top spinning.

Sorosky et al. examined the findings in relation to four hypotheses. First, the finding that insignificant behavior changes were made when the child was placed in a setting of social and partial sensory isolation was inconsistent with the idea that

fluctuations are secondary to events at home, to the relationship with the therapist, or to other stressful or meaningful situations. Secondly, it appeared that a complex environment was not necessary to sustain high levels of stereotyped activities. Sorosky et al. also postulated that self-stimulatory behaviors provided the children with various types of sensory stimulation: visual, auditory, tactile, kinesthetic, and gustatory. Finally, it was hypothesized that children with autism sustained excitatory states as a result of a Central Nervous System (CNS) imbalance created by increased excitation or decreased inhibition.

Ornitz et al. provided additional data on the influence of environmental changes on the intensity of autistic disturbances of motility.[1] Subjects were studied under three experimental conditions: (1) introduction of a spinning object; (2) human intervention; and (3) visual input restriction. The observation room, recording techniques, behaviors recorded, and analysis procedures were replications of the Sorosky et al. study.[2]

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[1]Edward M. Ornitz, Morton B. Brown, Arthur D. Sorosky, Edward R. Ritvo, and Lorraine Dietrich, "Environmental Modification of Autistic Behavior," Archives of General Psychiatry 22 (June 1970):560-565.

[2]Sorosky et al., "Systematic Observations."

Six autistic children, ages three to nine years, served as subjects for this study. Differences between every two conditions for each behavior were tested by two-sample t tests.

All subjects were exposed to the top; and behaviors were recorded while the top was spinning, immobile, and hidden from view. All six of the subjects responded significantly more of the time when the object was spinning. None of the subjects showed a significant increase in autistic behavior when the top was spinning, while two subjects showed a significant decrease in autistic behavior during this time.

Four of the subjects were used in the human-intervention experiment. An adult remained in the room and responsive to the child, in the room but aloof from the child, or absent from the room for four- or five-minute intervals. Two subjects went to the door more often when the adult was absent and exhibited significantly more autistic behavior when the adult was in the room. Another subject displayed no interest in following the adult out of the room and there was significanly less autistic behavior while the adult was in the room. The final subject showed no significant

change in the amount of autistic behavior.

Two subjects participated in the visual-input restriction experiment to determine if hand flapping and oscillating behavior provided visual input to the autistic child. Each subject was observed for five seventy- or ninety-minute sessions under conditions of absolute darkness. One subject significantly reduced both hand flapping and oscillating during the dark periods, modifying these behaviors so that he touched his body with each movement (tactile input). The other subject exhibited no significant change in hand flapping; tending to brush his fingers against his body during both light and dark periods.

Ornitz et al. determined that motility disturbances were not significantly influenced by the presentation of spinning objects, and the reaction to human-intervention was highly variable. No conclusions were drawn from the visual-input experiment considering the variables and the number of children involved. Ornitz et al. concluded that autistic motility disturbances were relatively independent of environmental influence, and that these disturbances provided some sensory feedback.

Russo and Koegel investigated the feasibility of mainstreaming an autistic five year old girl into a public-school classroom in Santa Barbara, California, using behavioral techniques.[1] The subject, her therapist, an observer, a teacher, a teacher's aide and twenty to thirty normal children were present in each classroom throughout the twenty-five-week duration of the study. The children attended school five days per week from 9:00 A.M. to 2:30 P.M.

A multiple baseline approach was utilized to assess the effects of treatment by the therapist on the following target behaviors: (1) social behavior; (2) self-stimulation; and (3) verbal response to command. Observations were made during three four-minute time samples, with nine-minute intervals for recording. Measurements were taken two times per week throughout all conditions.

Experiment 1 began with a baseline period during which the therapist and the child were seated in the rear of the classroom but did not interact with any

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[1]Dennis C. Russo and Robert L. Koegel, "A Method for Integrating an Autistic Child into a Normal Public-school Classroom," Journal of Applied Behavior Analysis 10 (Winter 1977):579-590.

class members. The second phase consisted of targeted behavior treatment utilizing a token economy by the therapist. During the latter phases of the study, the therapist trained the classroom teacher and concurrently began to reduce the density of token reinforcement (fading). Finally the child was moved to the front of the class, and treatment was given by the trained kindergarten teacher without the therapist's assistance. Observer reliability for all three target behaviors was above 80 per cent. The data revealed changes in classroom behavior on all three measures.

The child was passed to the first grade, but after the summer vacation her behavior was unmanageable and additional treatment was requested. Target behaviors, design of investigation, and recording and observation procedures in the follow-up experiment were identical to those used the previous year. Retreatment by the therapist was sufficient to restore improved levels of behaviors, both social behavior and self-stimulation.

Russo and Koegel concluded that improvement in classroom performance of the three behaviors treated was adequate enough to ensure continuation in school.

Furthermore, they suggested that school teachers can easily learn to teach at least some autistic children in regular classrooms.

Carr et al. attempted to teach four nonverbal autistic boys, ages ten through fifteen, sign labels for five common foods.[1] The subjects were residents of a local children's psychiatric hospital in Stony Brook, New York. Training sessions of one hour per day were conducted three to four days per week. The training procedure was carried out in three steps: (1) prompting, (2) fading, and (3) stimulus rotation. During Step 3, a new sign was presented after the child could correctly sign and discriminate among each of the five objects in a testing situation. Test sessions were conducted at six points throughout the study to reinforce signs and ensure object discrimination.

The mean interobserver reliability in both test and training sessions was .99. A second method utilized in assessing the reliability was hospital staff correctly identifying the subjects' signs. The

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[1]Edward G. Carr, Jody A. Binkoff, Eileen Kologinsky, and Michael Eddy, "Acquisition of Sign Language by Autistic Children. I: Expressive Labelling," Journal of Applied Behavior Analysis 11 (Winter 1978):489-501.

interobserver reliability across four pairs of personnel ranged from .86 to .88.

In addition to testing sessions, Carr et al. attempted to assess stimulus controls by presenting: (1) visual cues in which the therapist held up the objects; (2) visual cues in which the therapist solely vocalized the name of the objects; and (3) lipreading in which the therapist mouthed the name of the objects. Three of the children's signing was controlled by the visual cue independent of the auditory cues related to the same object.

Carr et al. concluded that a combination of prompting, fading, and stimulus rotation constituted a viable intervention program. They proposed that further attempts in training autistic children should not be limited to a highly controlled atmosphere, but rather used concurrently in a variety of situations. The authors believed that sign-language training presented a treatment intervention for a population previously viewed as having no potential for developing a system of communication.

Research in Recreation and Play of Autistic Children

Tilton and Ottinger conducted a study to describe

objectively selected aspects of the toy play behavior of autistic, retarded, and normal children and to determine whether toy play behavior would discriminate among the groups.[1] Two aspects of toy play behavior were investigated: (1) the proportion of total toy play activity devoted to various defined toy manipulations and combinations and (2) the number of different specific toy uses which a child exhibited in his play. Preliminary observations of 100 children from several populations were made to determine the specific uses children might employ with a particular group of toys. This study revealed 321 specific manipulations and combination toy uses, which were classified in ten general categories: (1) combinational uses of toys; (2) separation of parts of toys; (3) manipulations of moveable parts of toys; (4) personalized uses of toys; (5) pushing or pulling; (6) throwing toys; (7) pounding with toys; (8) oral contacts; (9) repetitive manual manipulations; and (10) undefined uses of toys.

Forty-three children from the Indianapolis area were selected to participate in the study. The

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[1]James R. Tilton and Donald R. Ottinger, "Comparison of the Toy Play Behavior of Autistic, Retarded, and Normal Children," Psychological Reports 15 (October 1964):967-975.

experimental group consisted of thirteen subjects, ages three to six, diagnosed as autistic. These subjects were either non-verbal or echolalic, resisted changes in routine, engaged in some type of ritualistic behavior, and were not toilet trained. None of the subjects was testable on standard psychological tests. Twelve mentally retarded children, ages three to six who did not exceed an intelligence quotient score of 55, were selected from the day nursery school program at the Noble School for Retarded Children in Indianapolis or residential Muscatatuck State School. This group did not include any children with serious visual impairments or neurological problems which might interfere with grasping toys or moving about the room. The normal group contained eighteen subjects, ages three to five years, enrolled in a day nursery program serving a highly heterogeneous social-economic population.

A twenty-minute observation period was divided into sixty fifteen-second intervals with five-second segments employed between the fifteen-second intervals (for recording purposes). Records of toy play behavior were verbally dictated and later transcribed to checks for data processing. The observer reliability for

defined uses was 88 per cent and 73 per cent for undefined toy uses. Observer agreement for the specific acts comprising the subjects' toy play repertoires was 89 per cent.

To stabilize the variance, the data were subjected to the Freeman-Tukey arc sine transformation and analyzed in group categories through a repeated measure analysis of variance design. Simple t tests were performed on each category to determine if significant differences existed among the groups. Tilton and Ottinger selected only two categories to be measured in the analysis of variance design: (1) specific combinations and (2) all other specific uses. Combinational uses of toys showed significant differences among all three groups with both the normal and the retarded children surpassing the autistic children, and the normal children exceeding the retarded children in over-all combinational uses of toys. The autistic subjects spent more time in repetitive manipulations and oral contacts than did either the normal or retarded subjects. Normal subjects engaged in a higher proportion of pushing and pulling activities, whereas the retarded children engaged in a higher proportion of pounding activities.

When considering the total play repertoires, both normal and retarded children surpassed the autistic children. No significant difference was found between the normal and retarded children.

Tilton and Ottinger concluded that this study provides detailed descriptive information on the toy play behavior of subjects which is valuable for general clinical purposes. They proposed that if these children do have a unique difficulty or deficit in perceiving relationships (combinational uses), then this might account for their failure to develop social learning and the general lack of organization in their behavior.

DeMyer et al. compared the toy behavior of autistic and normal children by means of data obtained through a maternal interview.[1] The findings from these interviews were compared with those collected by a questionnaire devised by the authors and with those obtained by Tilton and Ottinger in their observations of toy play.[2] Thirty-three autistic children, ages two

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[1]Marian K. DeMyer, Nancy A. Mann, James R. Tilton, and Lois H. Loew, "Toy-Play Behavior and Use of Body by Autistic and Normal Children as Reported by Mothers," Psychological Reports 21 (December 1967):973-981.

[2]Tilton and Ottinger, "Comparison of Toy Play."

through seven years, comprised the sample for the study. Fourteen of these subjects had participated also in the Tilton and Ottinger study. The normal group consisted of thirty-three children who were carefully matched with the autistic children on several variables: (1) age; (2) ordinal position in family; (3) socio-economic status; (4) sex; (5) race; and (6) religion. Participation was voluntary, but DeMyer et al. stipulated that the children should never have been recommended for psychiatric or psychological treatment and must be judged normal by their family physician and teacher.

The toy play interview, conducted with the mother, was a subjective questionnaire in which the mother answered "yes, he exhibits certain behaviors" or "no, he does not". Items described various behaviors in nine categories, and nineteen questions pertained to perseverative nonconstructive play and use of body. A total of ten quantitative comparisons were then made of maternally reported and visually observed toy play behaviors of the fourteen autistic children which participated in both studies.

To determine the distinguishing toy or body use behaviors between normal and autistic children, each

item on the questionnaire was analyzed by an exact probability test on 2 x 2 contingency tables. The percentage of agreement on the interview study and questionnaire study ranged from 29 per cent to 100 per cent. DeMyer et al. found that mothers of autistic children reported lesser amounts of mature or complex toy play than did mothers of normal children. In addition, they found that mothers of autistic children reported greater amounts of perseverative or non-constructive play than did mothers of normal children. This was also in agreement with Tilton and Ottinger's findings for autistic children. Autistic children differed significantly from normal children on items categorized by dramatic role play, use of small wheel toys, and use of large wheel toys. Most often the autistic children engaged in inappropriate throwing and pounding behaviors, whereas, the normal children reacted more age-appropriately. Tilton and Ottinger's findings concerning manipulation and combination toy uses were supported by mothers' reports of perseverative play in the home.

Seventy-two per cent agreement between the maternal questionnaire and the laboratory observations

made by Tilton and Ottinger substantiated the use of the questionnaire. A high percentage of agreement was found in block play, toy combination, doll play (clothing), pounding, dramatic play (props), and dismantling. Four categories that were of low percentage agreement were push/pull toys, throwing, dramatic play (dress-up), and doll play (holding).

DeMyer et al. concluded that significant differences existed between the toy play behavior of autistic and normal children. In addition, the agreement percentages between the questionnaire and observations suggested that the two methods were equally useful in assessing toy play behavior. DeMyer et al. did suggest, however, that questionnaire refinement might come from more observationsl studies, enlargement or restriction in some categories, and revision of the questionnaire to yield a more precise developmental scale.

Boer described a method developed to obtain a complete enumeration of behavior items in a unit of time.[1] He also illustrated the advantages of this

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[1]Arland P. Boer, "Application of a Simple Recording System to the Analysis of Free-Play Behavior in Autistic Children," Journal of Applied Behavior Analysis 1 (Winter 1968):335-340.

approach in the analysis of the autistic syndrome. Four children, three males and one female, ages four to five years, were observed in a free play setting during the second hour of a two-hour therapy period held three times per week. All subjects were patients in the Southeastern Mental Health Center, Sioux Falls, South Dakota, and had been diagnosed as either autistic or autistic-symbiotic. Children were observed over a five-week period through a one-way mirror for five-minute intervals. The following behavior categories were defined: (1) adult-directed behavior; (2) child-directed behavior; (3) self-directed behavior; (4) inanimate object manipulation; (5) rapid energy expenditure; (6) visual survey; (7) locomotion; and (8) resting.

The apparatus utilized during the observations was a simple stenograph operated by a secretary with no previous training in behavioral research or scientific methodology. After a brief training program, the observer/investigator agreement exceeded 90 per cent.

Boer found that adult-initiated behavior constituted 10.07 per cent of the children's free-play repertoire. Almost 83 per cent of the children's

spontaneous play was directed toward an inanimate object, with manipulation of objects being the most frequent behavior for each subject.

Boer concluded that for facilities with access to a secretary and stenograph machine, a program of direct observation of the subject's total behavioral repertoire can be easily established. In addition, through this approach to observation, conceptualizations of autism (such as manipulative behaviors) can be generalized or hopefully improved on the behavior variability.

Maurer reported the success of Peek-A-Boo in establishing eye-to-eye recognition of a six-year-old autistic male, Jay.[1] Jay attended a California settlement house play school for atypical children. He had no eye-to-eye contact with anyone, including peers, teachers, and family members. Jay sometimes shouted syllables, but conveyed no meaning to on-lookers. The game of peek-a-boo was initiated by accident, but provided the foundation for reaching into Jay's world.

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[1]Adah Maurer, "Peek-A-Boo: An Entry into the World of the Autistic Child," Journal of Special Education 3 (Summer 1969):309-312.

While removing coats one morning, the teacher threw her scarf over Jay's face and greeted him with a "peek-a-boo" upon removal of the scarf. This was Jay's first experience with looking at someone. The game continued and Jay invented variations of his own over a period of time. As a result of this game, there was an increase in verbal contacts with both peers and teachers, an increase in the ability to greet another human in a normal fashion, and a decrease in the problems associated with going to sleep at night. Maurer concluded that loneliness and emotional withdrawal can be positively affected by a simple interchange of peek-a-boo.

Hingtgen and Churchill conducted a study to identify perceptual limitations and their effect on the behavioral repertoire of non-verbal autistic children.[1] Four non-verbal autistic boys, ranging in age from four to five years, were selected as subjects for the experiment. All were inpatients at the LaRue Carter Hospital, Indianapolis, for at least six weeks

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[1]Joseph N. Hingtgen and Don W. Churchill, "Identification of Perceptual Limitations in Mute Autistic Children: Identification by the Use of Behavior Modification," Archives of General Psychiatry 21 (July 1969):63-71.

prior to entering intensive training.

The intensive imitative training consisted of five to six hours of daily training sessions over a period of three to five weeks. Each subject received food, water, and social contact from six adults who used the reinforcers to shape imitative behaviors such as: (1) use of body; (2) use of objects; and (3) vocalizations. Once the imitative behaviors reached the appropriate level for each child, subsequent sessions (totalling one to two hours per day) focused on language development.

Hingtgen and Churchill concluded that intensive training with elevated motivational levels was effective in increasing the "cooperative set" in autistic children and in substantially expanding their behavioral repertoires. In addition, they suggested that the failure to master low-level tasks, in spite of intensive training and elevated motivational levels, was a result of perceptual disturbances.[1]

Weiner, Ottinger and Tilton presented a re-analysis of the previously reported Tilton and Ottinger

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[1]No description of high-level and low-level tasks was given in the article.

study, which compared the toy play behavior of autistic, retarded, and normal children.[1] A multiple discriminant function analysis was applied to the Tilton-Ottinger data in order to gain more information about the individual subjects and to combine all ten variables and their intercorrelations into a single analysis. In addition to treating the data in a single analysis, subjects were classified according to which group they were most similar. Information gained through the discriminant function analysis on individuals showed the proportion of subjects who were statistically classified the same as in their original psychiatric diagnosis: (1) .96 of the normal children; (2) .83 of the autistic children; and (3) .89 of the retarded children. Several originally diagnosed autistic children were statistically classified as normal or retarded, but no normal or retarded children were reclassified as autistic.

Weiner et al. found that the mean vectors were significantly different at the .001 level of significance

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[1]Barbara J. Weiner, Donald R. Ottinger, and James R. Tilton, "Comparison of the Toy-Play Behavior of Autistic, Retarded, and Normal Children: A Reanalysis," Psychological Reports 25 (August 1969):223-227.

for all possible pairs of groups and for the comparisons of all three groups. When comparing the three groups to determine the discriminant variables, they found these categories contributed significantly: (1) combinations; (2) undefined; (3) throws; (4) pounds; and (5) manipulating parts. In discriminating normal from autistic children, combinations, personalized, and pushes/pulls were the most important variables. Discriminant variables differentiating normal from retarded children were combinations, manipulating parts, pounds, personalized, and pushes/pulls. In differentiating retarded from autistic children, the most important variables were combinations, undefined, throws, and personalized. The fact that combinations appeared in all four discriminant functions supported Tilton and Ottinger's original finding. Manipulations and oral uses, which were significantly different in the original study, did not show up in the four discriminant function analyses.

Weiner et al. concluded that the real importance of the reanalysis was not to provide data on significant differences in the mean vectors, but rather to suggest that significant classifications of individuals may

be more accurate and faster than the current diagnosis procedures. Multiple discriminant function analysis might also indicate whether the child's toy-play behavior was becoming less similar to that of the original statistical classification.

Richer and Nicoll constructed a playroom to create an environment designed to change the behavior of autistic children.[1] The playroom was constructed at Smith Hospital, England, with the target behaviors being an increase of social approaches and interactions and a decrease in frustration and arousal. The subjects were ten children, age four to eleven, in residence at Smith Hospital. Six children were classified as autistic, two might have been called autistic, and two children were not autistic, but severely disturbed. These subjects spent most of the day in the playroom and the staff had been instructed to allow the children total freedom while in the room. Structures in the new playroom were robust, safe, and most were fixed down.

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[1]John M. Richer and Stephen Nicoll, "A Playroom for Autistic Children, and Its Companion Therapy Project: A Synthesis of Ideas from Ethology, Psychology, Nursing and Design," The British Journal of Mental Subnormality 17 (December 1971):132-143.

A time sampling study of four categories of behaviors was instigated a few weeks in the old playroom, before conversion, and a few weeks in the new playroom, after conversion. The four categories of behaviors were: (1) stereotyped activities and postures; (2) social approaches to another child or adult; (3) interaction with another person; and (4) object manipulations. Each child was observed for ten consecutive fifteen-second intervals, noting whether or not the behavior occurred at least once during the interval. The average frequency of each behavior category was computed; comparing the old playroom score to the new score by using a Wilcoxin sign rank test. The results revealed: (1) stereotyped behaviors were less frequent in the new playroom ($p < .025$); (2) interactions were more frequent in the new playroom ($p < .025$); and (3) approaches and object manipulations showed no significant change. The results also revealed differences between the six autistic children and other groups in the following ways: (1) stereotyped behaviors were more frequent in the autistic group ($p < .01$); and (2) interactions were less frequent in the autistic group ($p < .333$).

Mahlberg instigated a music therapy program with Jack, a seven year old autistic boy, in residential treatment on the children's unit of Larned State Hospital, Kansas.[1] The treatment was designed to: (1) increase his attention span; (2) interrupt and reduce his autistic behaviors; and (3) teach him nonverbal communication techniques. Clapping, both with music and without, was the first technique used to increase his attention span. During the next few sessions, a tamborine was introduced and Jack learned to rhythmically tap-out words and phrases of various songs. Action songs, such as "Where is Thumbkin?" and "Put Your Finger in the Air," were used to lengthen Jack's attention span and teach body image. These activities also served as a method to interrupt and reduce Jack's autistic behavior. Marching and dancing were other activities which demanded that Jack respond to the structured reality of music. Tempos were varied to ensure that Jack was responding to the music and not merely performing a repetitive behavior. During a segment of each session, Jack was allowed to listen to

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[1]Mavis Mahlberg, "Music Therapy in the Treatment of an Autistic Child," Journal of Music Therapy 10 (Winter 1973):189-193.

records he selected.

Mahlberg stated that all three treatment goals were met during the music therapy sessions. In addition, Jack seemed to become more aware of the therapist as a person as the sessions progressed. Mahlberg noted that although the sessions produced positive attributes, only through research and therapy can the full results be determined.

Wintre and Webster conducted a study to determine the advisability of using a traditionally normal social behavior scale with children displaying severe deficits in social adjustment.[1] The subjects were six males, ages six to ten years, attending a five-week summer day camp for six hours per day. All subjects had problems in social adjustment and had been diagnosed as elective mute, brain damaged, hyperactive, childhood schizophrenic, autistic, and childhood psychotic.

After a rather lengthy survey of scales and instruments, Wintre and Webster opted for a scale

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[1]Maxine Gallander Wintre and C. D. Webster, "A Brief Report on Using a Traditional Social Behavior Scale with Disturbed Children," Journal of Applied Behavior Analysis 7 (Summer 1974):345-348.

developed in 1932 by Parten.[1] This scale consisted of six categories of social participation: (1) unoccupied behavior; (2) solitary independent play; (3) onlooking; (4) parallel activity; (5) associative; and (6) co-operative play. Wintre and Webster added a seventh category, adult-directed behavior.

Observers sat on the fringe of the play area and recorded behaviors during a thirty-five-minute free play period each week day morning in a classroom over a five-week period. The pre-determined order of observations varied from day to day, but remained constant from week to week. Behaviors were coded for thirty seconds in ten-second intervals, noting the behaviors which occurred the majority of the time during the ten-second interval. The observers had no previous experience with this method of observations, but spent about an hour before the initial recording session studying Parten's definitions and examples. The observer reliability was 85.9 per cent and did not vary appreciably during the five-week period. An analysis of variance, computed on each category, yielded a

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[1]M. B. Parten, "Social Participation Among Preschool Children," Journal of Abnormal and Social Psychology 27 (Summer 1932):243-269.

statistically significant difference in only one category over the five weeks: associative play ($F = 6.40$, $df = 20,4$; $p < .05$).

Wintre and Webster concluded that the Parten scale, although designed for a normal population, can be used effectively in a free-play situation to rate behaviors of children with severe problems in social adjustment. They proposed that too much time is devoted to developing new instruments, where the end result closely resembles a basic scale that has already been devised.

Koegel et al. conducted a study through the University of California, Santa Barbara, to analyze the relationship of self-stimulation to spontaneous appropriate toy play in an eight-year old autistic boy and a six-year old autistic girl.[1] Both subjects engaged in high levels of self-stimulatory behavior with low baseline frequencies of appropriate play with toys. Each child was placed in a room in front of a table with three toys set on the table. Before the observations began,

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[1]Robert L. Koegel, Paula B. Firestone, Kenneth W. Kramme, and Glen Dunlap, "Increasing Spontaneous Play by Suppressing Self-Stimulation in Autistic Children," Journal of Applied Behavior Analysis 7 (Winter 1974):521-528.

therapists (not connected with this study) conducted fifteen-minute to one-hour per day pre-training sessions to ensure that the appropriate play responses were included in the child's behavioral repertoire.

Experimental sessions for each child lasted five-minutes, with two to six sessions conducted per day, four to five days a week. Two experimenters sat on either side of the child with one or two observers seated across the room recording data during the session. Each child was rated according to: (1) self-stimulatory behavior; (2) appropriate play; (3) occurrence of punishment; and (4) simultaneous occurrences of punishment and play. Behaviors were recorded during the first three seconds of the ten-second time intervals. Reliability was 80 per cent, calculated by using the number of agreements for all occurrence and non-occurrence behaviors.

The research design consisted of a baseline period, self-stimulation suppression sessions, and another baseline period. During these baseline sessions, the per cent occurrence of self-stimulatory behavior was 100 and 99.9 (mean) for each subject respectively. After the onset of the self-stimulation suppression

sessions, self-stimulation decreased and appropriate play rose for both children. Self-stimulation, for the first child, decreased to a rate of 10 per cent and appropriate play increased to above 65 per cent. The second child's self-stimulatory behaviors decreased to 13 per cent while appropriate play increased to 85 per cent. Upon the discontinuation of self-stimulation suppression, the per cent of self-stimulation and appropriate play returned to the pre-suppression levels.

Koegel et al. indicated that autistic children must have their self-stimulatory behaviors suppressed before appropriate play behaviors can be increased. They proposed that further studies apply this finding in a more naturalistic setting and develop ways of maintaining play more permanently.

Romanczyk et al. conducted a study to determine the effectiveness of intervention on increasing isolate and social play in severely disturbed children.[1] Four

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[1]Raymond G. Romanczyk, Charles Diament, Elizabeth R. Goren, Gary Trunell, and Sandra L. Harris, "Increasing Isolate and Social Play in Severely Disturbed Children: Intervention and Post-intervention Effectiveness," Journal of Autism and Childhood Schizophrenia 5 (March 1975):57-70.

subjects, ages five to seven, were selected from the younger class of the Child Behavior Research and Learning Center, and out-patient facility at Rutgers University. These children's pshyciatric diagnosis included infantile autism, neurological impairment, and childhood schizophrenia.

During daily half-hour sessions, the subjects were placed in a cordoned-off area of a room while observers positioned themselves outside the boundaries. Romanczyk et al. utilized a time-sampling observational code to rate behaviors according to twelve categories: (1) laugh, (2) cry, (3) vocalization alone, (4) vocalization to others, (5) isolate play, (6) social play, (7) offer toy, (8) take toy, (9) touch, (10) aggression, (11) motion, and (12) idle. Children were observed in random order twice in each session for a two and a half minute interval. Observations were made according to occurrence and non-occurrence on a twenty-second observe and ten-second record basis. Data were analyzed as to the percentage of intervals in which the behavior occurred rather than as the number of occurrences. The mean reliability for all observers was 84.4 per cent.

The study consisted of four phases: (1) baseline 1 was free play with no instructions or interventions; (2) isolate play was contingent on the occurrence of the desired behavior with social and food reinforcement; (3) social play was reinforced and isolate play ignored; and (4) baseline 2, identical to baseline 1, was a test of resistence to extinction. Social play which had a low baseline 1 rate, increased to 87.5 per cent when reinforcement and passive shaping were instituted. The rate of isolate play increased and decreased proportionately opposite to that of social play. During the second baseline period, isolate play remained identical to the baseline 1 rate. Although social play sharply decreased during baseline 2, it stabilized at 27.3 per cent, nearly two and a half times the rate in baseline 1.

Romanczyk et al. concluded that change in behaviors was due to the intervention process. The results of this study demonstrated the feasibility of modifying isolate and social play of severely disturbed children in a group setting.

Study 2, conducted by Romanczyk et al. was to assess the effects of gradually withdrawing the passive

shaping procedure in an effort to increase the resistance of social play extinction.[1] Four subjects, ages seven to twelve, were selected from the older class of the Child Behavioral and Learning Center. These subjects, similar to the children in Study 1, were severely impaired in social functioning.

Romanczyk et al. procedurally conducted Study 2 the same as the first study, except that the social play phase was followed by a period of fading the passive shaping procedure before extinction commenced. The mean reliability for all observers was 86.2 per cent. The first three phases produced the same results in Study 2 as were found in Study 1. The period of fading passive shaping proved to be effective as the social play rate of decrease was much slower than in Study 1. Conversely, the rate of increase in isolate play did not increase so dramatically as in Study 1. During baseline 2, social play remained substantially above the rate observed in baseline 1.

Romanczyk et al. concluded that the isolate and social play of severely disturbed children can be modified in an approach that does not require a

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[1]Ibid., Romanczyk et al.

one-to-one intervention program. The researchers noted, however, that the need still remained for the development of more sophisticated and sensitive observational codes.

Black, Freeman and Montgomery conducted a study to examine how play behavior in autistic children was affected by placing them in different environments.[1] Four environments were selected for this study: (1) a stark empty room environment; (2) a theraplay unit equipped with vinyl-covered forms of various shapes and colors; (3) a playroom equipped with a multitude of age-appropriate toys; (4) an outside deck comprised of a large open space with gross motor objects present. Five male children, previously diagnosed as autistic, were drawn from the inpatient population at the Neuropsychiatric Institute, University of California, Los Angeles. The subjects ranged chronologically from four to six years with a mental age range of two to three years. The intelligence quotient scores ranged from 31 to 84.

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[1]Maureen Black, B. J. Freeman, and Joanne Montgomery, "Systematic Observation of Play Behavior in Autistic Children," Journal of Autism and Childhood Schizophrenia 5 (December 1975):363-371.

The procedure involved observing the subjects in all four environments for three-minute intervals on three separate occasions. The children were rated on Jones Socialization Scale.[1] This study concentrated on two major categories of the test: Moves toward peers and moves toward materials. Each child was observed for a three-minute interval; then the observer spent two minutes coding the behavior on a scale from 0-3 (0 means behavior was not present--3 means behavior was continuous). Interobserver reliability was established by observing and rating the behavior of non-participants for a one-week period. After the week of observation the reliability was .90. The interobserver reliability during the study was .73. Black et al. postulated that this decrease in reliability was a result of difficulty in distinguishing perseverance and negative use of objects.

The primary variables which emerged from the study were space, model, and objects. The confined spaces facilitated more peer interaction than did the outdoor space. In the stark environment, subjects

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[1]M. Jones, Personal communication, 1974; Obtained from article by Black, Freeman and Montgomery.

touched, manipulated clothes, and exhibited aggressive behavior. There was little communication, with activity primarily solitary and repetitive. Ignoring objects, desirable behaviors, and communication and play were highest in the theraplay unit. In the playroom, behaviors were object-directed with low levels of physical contact.

Black et al. concluded that (1) for some children there was virtually no difference in unstructured play behavior; (2) children frequently related to objects rather than peers; (3) object play was frequently in the manipulatory stage; (4) autistic children frequently engaged in solitary repetitive behavior; and (5) in a confined space designed to facilitate movement, autistic children modeled and imitated and were involved in gross motor play together. The confined play area with minimal objects present seemed to facilitate the development of imitation and purposeful play alternatives.

Mosher developed a perceptual motor program for autistic children.[1] This program was designed to increase perceptual motor skills, visual-perceptual skills,

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[1]Richard Mosher, "Perceptual-Motor Training and the Autistic Child," Journal of Leisurability 2 (July 1975):29-35.

socialization skills, and attention spans. This article was not a report of research, but rather a description of a successful program. This program, developed through the University of Ottowa, was aimed at providing the same cognitive, motor and recreational stimulation as normal children receive in a summer experience. The autistic children in the area received a five-hour per day, five days per week, summer experience. Eight stations were established, with the station to be attended by each child determined by level of functioning. The eight stations included: (1) Sequential Skills I (creeping, crawling, walking, jumping); (2) Sequential Skills II (catching, throwing, striking); (3) Body Image Development; (4) Fine Motor Skills--Manual Dexterity; (5) Vestibular Stimulation; (6) Swimming; (7) Cognitive Skills; and (8) Arts and Crafts. Mosher, in his program, attempted to utilize principles and techniques found in research and to apply them toward a perceptual-motor program for autistic children.

Dewey surveyed the recreational interests of autistic children through 200 questionnaires completed by parents and professionals in the field: schools,

hospitals, and treatment facilities.[1] She discovered that these children pursue many seemingly compulsive activities, such as tearing paper, taking things apart, driving nails, sharpening pencils, and digging holes, with such enjoyment that she suggested that these activities must surely be considered recreation to them. According to Dewey, some of the recreation activities that autistic children enjoyed were:

1. Collections--popular with many autistic children, this included rock, lint, string, sticks, straws, and pieces of fabric;
2. Music--listening was especially popular, followed by singing;
3. Travel--despite the fact that resistance to change is a marked characteristic of autistic children, many loved to travel both far from home and with their parents on local errands;
4. Arts and Crafts--pasting, clay, coloring, and drawing were enjoyed;
5. Trampoline--this was the most popular apparatus activity listed;
6. Swimming--this was also listed as a favorite sport by many; and
7. Bicycle Riding--a favorite of some.[2]

Dewey concluded that although autistic children

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[1]Dewey, "Recreation and Play for Autistic Children," p. 17.

[2]Ibid., p. 17.

sometimes exhibited bizarre behaviors and inappropriate toy play, they cannot be judged according to what is considered less than traditional recreation activities.

Wells et al. conducted a study through the University of Georgia, to examine the effects and side effects of over-correction by successively suppressing each of several stereotyped behaviors in the repertoire of two male autistic children.[1] The subjects were non-institutionalized ten-year old fraternal twins, John and Tim, who had been labelled severely emotionally disturbed in association with brain damage and severely mentally retarded in association with autism. Both subjects attended a school for the developmentally handicapped, although in different classes, and had been observed to engage in excessive amounts of self-stimulatory behavior. The experiment was conducted in a small playroom equipped with a small table, two childsize chairs and various toys located on both the table and floor.

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[1]Karen C. Wells, Rex Forehand, Kevin Hickey, and Kenneth D. Green, "Effects of a Procedure Deprived from the Overcorrection Principle on Manipulated and Non-Manipulated Behaviors," Journal of Applied Behavior Analysis 10 (Winter 1977):679-687.

The children were observed together, through a one-way mirror, during a thirty-minute free play session, four days per week for twelve weeks. The time-sample observations of occurrence and nonoccurrence behaviors were recorded in alternating ten-second intervals: ten-second observation and ten-second recording. The recorded target behaviors were: (1) inappropriate object manipulation; (2) mouthing; (3) inappropriate hand movements; and (4) other inappropriate behaviors. Observer reliability was 85 per cent.

Target behaviors were observed and recorded during three experimental conditions: (1) baseline; (2) over-correction; and (3) reinforcement. No responses were made on the occurrence of a behavior during the baseline period. The period of positive overcorrection was utilized to engage the subjects in appropriate toy-play. Whenever inappropriate behavior occurred, the experimenter manually guided the subject through 2.5 minutes of appropriate play interaction. If during the next 2.5-minute interval, the child independently engaged in appropriate play, the manual guidance was faded out. Conversely, if inappropriate play reoccurred, the experimenter shadowed the behavior

or reinstigated manual guidance for the remainder of the 2.5-minute period. During the last nine days of the experiment, social and edible reinforcers were presented to each child for appropriate play responses. John received reinforcers after thirty seconds of continuous play, whereas Tim received the reinforcers after five seconds of continuous play.

Both subjects exhibited abrupt reduction from the baseline rate in the targeted inappropriate behaviors when overcorrection was introduced. In addition, one of the subjects displayed a marked increase from the baseline rate for appropriate toy-play during overcorrection.

Wells et al. indicated that overcorrection reduced the stereotyped behavior exhibited by the two autistic children including: (1) inappropriate manipulation; (2) mouthing behavior; (3) inappropriate hand movements; and (4) other inappropriate behaviors. The results also indicated that overcorrection may be effective in teaching and motivating appropriate forms of behaviors.

Cole investigated the empirical and basic assumption of dance therapy that the therapeutic process

is dependent upon movement communication between client and therapist.[1] The subject was a nonverbal, seven-year old autistic boy enrolled at the Center for Behavioral Studies, North Texas State University, Denton, Texas. Sessions were documented on videotapes during an eight-week period. During the analysis of the videotapes, gross, observable body movements were recorded in verb form according to: (1) the physical contact between the child and therapist; (2) contact between the child and objects; and (3) the child's self-contacts. Physical contact between the child and therapist was subdivided into client initiated and therapist initiated.

Cole found that trends of data supported a growing trust relationship between the subject and therapist during the eight weeks. The results indicated: (1) an increase in closeness; (2) an increase in time spent in contact; (3) an increase in child-initiated contact; and (4) an increase in frequencies of contact. Contrary to typical autistic behaviors, the subject began to like being carried and playing a game which

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[1]Ivy Lee Cole, "Dance Therapy with a Nonverbal, Autistic Child: A Documentation Process," (Ph.D. Dissertation, Texas Woman's University, 1979).

involved cuddling.

Data on the child's contact with objects showed a growing ability to play, explore, and control. Cole found the hyperactive child becoming purposefully active as he gained control over himself and his environment. In this sense, the child's excessive need for sameness decreased as the subject/therapist relationship grew.

Data on the child's self-contact/autistic gestures demonstrated a growing ability to express and communicate. Analysis of the data indicated that: (1) thumb sucking was associated with the need for love; (2) head hitting served as a movement cue to elicit the desired behavior from the therapist; and (3) head banging expressed frustration. Cole stated that as the child gained control over himself, his self-stimulating gestures became purposeful.

Cole concluded that movement patterns manifested in the client-centered approach to dance therapy are specific indicators of the therapeutic process. She also stated that all purposes set forth in the study had been achieved through the dance therapy sessions.

Ferrara and Hill explored the responsiveness

of autistic children to the predictability of social and nonsocial toys.[1] Ten autistic children, ranging in age from three to twelve years, were selected from special programs for autistic children in public school or hospital settings. In addition, ten normal children, ages three years two months to three years ten months, were recruited from local preschools or volunteered by their parents to serve as a comparison group.[2] Based on previous laboratory research, the researchers determined that the autistic children were able to solve perceptual problems at a three years six months level.

Two pairs of social and nonsocial toys were presented to the children in a toy box theatre on three consecutive days. The complexity of the objects was determined by the number of features present and flexibility. Each toy was presented twice for thirty

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[1]Cindy Ferrara and Suzanne D. Hill, "Responsiveness of Autistic Children to the Predictability of Social and Nonsocial Toys," Journal of Autism and Developmental Disorders 10 (March 1980):51-57.

[2]All subjects attended Southeastern State Hospital, Louisiana State University Therapeutic Nursery School, Bienville Public School, the Little Prince Play School, or the ABC Day Care Center.

seconds under predictable or unpredictable conditions. The predictable condition consisted of a light illumination six seconds before immediate presentation of the toy. During the unpredictable condition the light was illuminated but there was a one to fifteen second delay before toy presentation. Day 1 was used to familiarize the subjects with the situation. On Day 2, half of the children viewed the toys under predictable conditions. The conditions were reversed on Day 3. Utilizing a videotape, the subjects were scored according to manipulating and looking behaviors.

On both conditions the normal children looked at and manipulated the toys significantly more than the autistic children ($p < .05$). The autistic children, however, significantly reacted to the predictable condition in both looking and manipulating. In contrast, the normal children seemed to be relatively little affected (sic) by predictability. A significant difference was also found in responsiveness to toy characteristics ($p < .05$). The normal children looked at and manipulated the more complex toys more of the time. The autistic children manipulated the less complex toys more, while remaining relatively unresponsive to

complexity in relation to looking time. The autistic children both manipulated and looked at the social toys significantly more than at the nonsocial toys when both were of low complexity ($p < .05$).

Ferrara and Hill concluded that autistic children were able to form expectancies from environmental events. They stated that although autistic children learn to respond appropriately under the control of their teachers, these responses seldom function independently. They proposed that a more appropriate starting place for therapeutic intervention would be to focus on the development of social play. Therapy should begin with social objects of low intensity in a predictable and repetitive sequence of activities. Complexity should gradually be increased in intensity, as well as, the introduction of language and cognitive tasks matching the complexity.

Research and Recreation and Play of Non-Autistic Children

Wahler investigated the possibility that peer group variables may control the social behavior of children in a free play setting.[1] The subjects were

[1]Robert G. Wahler, "Child-Child Interactions in Free Field Settings: Some Experimental Analyses," Journal of Experimental Child Psychology 5 (June 1967):278-293.

five children, ages five to six years, who were enrolled in the University of Tennessee Nursery School. The children were observed and recorded through the use of an Esterline-Angus twenty-pen event recorder and two operating panels.[1] Each child was observed in a designated environment, and the behavior was classified by pressing the appropriate button.

The first three subjects were observed independently with two randomly selected peers in a restricted environment (large playroom) and instructed to play in one section of the room until the experimenter returned. The other two subjects were observed in the natural nursery school environment with approximately twelve peers and three or four teachers. The subjects were observed for fifteen-minute intervals three days per week at the same time of day.

The first segment of the experiment was the behavior classification sessions in which the subjects were observed in the designated environment until the observers believed that they had obtained a stable picture of the subjects' most frequent occurring responses and their usual contingencies. Next, to establish

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[1]Lovaas et al., "Recording Apparatus."

observer reliability, the observers (monitored by Wahler) were instructed to record each behavior in ten-second intervals. If a disagreement occurred, Wahler stopped the process for time to discuss the problem. This procedure was continued until the agreement percentage for all classes reached 90 per cent or better. At this point the baseline periods were begun, varying in length and number for the five subjects. For the first three subjects, the baseline period lasted five minutes followed by two five-minute experimental-manipulation sessions. The other two subjects required several fifteen-minute sessions of baseline observations.

Following the baseline period, a behavior that had an exceptionally high or low frequency in comparison to the other classes of behaviors exhibited by the child was selected for experimental manipulation. During the experimental period, peers were instructed to ignore the high-rate behavior or interact only when a low-rate behavior was emitted. A behavior class was selected for experimental analysis for each subject which included: (1) doll play; (2) aggressive behavior; (3) cooperative behavior; (4) speech; and (5) passive behavior for the five subjects respectively.

Wahler concluded that through the experimenter's instructions, the peer groups were able to predictably alter the strength of these response classes by manipulating their social attention contingencies. While other studies have demonstrated adult control of child behavior, this was the first study to provide experimental evidence that peer groups may serve a similar function.

Hart et al. conducted a study to compare the separate roles of frequent reinforcement and contingent reinforcement in developing the cooperative play of a preschool child.[1] The subject, Martha, was five years four months of age and attended preschool at the University of Kansas. The group enrolled in the university preschool consisted of fifteen normal children who attended school five afternoons a week for approximately 2.5 hours each day. Martha's contact with other children, though frequent, tended to be brief and non-cooperative. Her anti-social behavior made her

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[1]Betty M. Hart, Nancy J. Reynolds, Donald M. Baer, Eleanor R. Brawley, and Florence R. Harris, "Effect of Contingent and Non-Contingent Social Reinforcement on the Cooperative Play of a Preschool Child," Journal of Applied Behavior Analysis 1 (Spring 1968):73-76.

aversive to other children, with a similar effect on teachers.

Martha's behavior was objectively recorded daily in ten-second intervals over a forty-one-day period by an observer. During the first ten days of the study, Martha's teachers responded to her intermittently, with no particular contingency, to establish the baseline. Martha, for the next seven days, received greatly increased and carefully controlled contingent social reinforcement from teachers. This reinforcement was presented according to intervals of time, with no regard to the behaviors that might be occurring at that time. Over the next twelve-day interval, decreased reinforcement was presented contingent on cooperative play or on behaviors conducive to cooperative play. After an evidenced behavior change, non-contingent reinforcement was reinstigated for a four-day period. Finally, during the last eight-day period, reinforcement contingent on cooperative play was resumed. There was a decreased reinforcement for cooperative play and an increase in reinforcement for other desirable behaviors during the last four days of this period. The purpose of this was to develop a more typical schedule of reinforcement for

Martha and to determine if cooperative play would be maintained. Observer reliability was checked on five separate days using the categories of proximity, cooperative play, and teacher reinforcement. A 92 per cent or better agreement was computed in each of the categories on five days.

The percentage of cooperative play during the baseline period was approximately 5 per cent of the day, which did not change during the first phase of non-contingent reinforcement. The percentage of cooperative play dramatically increased to almost 40 per cent per day during the contingent reinforcement and dropped to its baseline level when continuous non-contingent reinforcement was resumed. When reinforcement was again made contingent on cooperative play Martha's high rate of behavior was immediately regained at approximately 25 per cent per day. The percentage of proximity per day, likewise, fluctuated from a baseline of 50 per cent to a final of 90 per cent.

Hart et al. concluded that only when reinforcement was made contingent upon the behavior (cooperative play) did any reliable change rate occur. This indicates that teacher attention, whether continuous or intermittent,

does not affect behavior change unless the attention is contingent on some behavior. It is conceivable that a much smaller amount of reinforcement could drastically create a behavior change so long as it is contingent with the behavior.

Buell et al. designed a study to provide objective data concerning the variety and amount of behavior change that might result in a preschool setting during the course of a behavior modification program using social reinforcement aimed at a selected problem behavior.[1] The subject, Polly, was a three-year-old enrolled in a preschool program with eleven other children. In addition to Polly's lack of motor and social repertoires, she had a deficit in English language skills (parents were not native speakers of English). Her teachers noted that she showed no cooperative play and rarely exhibited any social interaction with her peers.

A behavior modification program was planned to develop Polly's use of outdoor play equipment. It was

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[1]Joan Buell, Patricia Stoddard, Florence R. Harris, and Donald M. Baer, "Collateral Social Development Accompanying Reinforcement of Outdoor Play in a Preschool Child," Journal of Applied Behavior Analysis 1 (Summer 1968):167-173.

hoped that if use of the equipment could be increased and maintained, exposure to a steady variety of peer interactions would contribute to the development of motor and social repertoires. In order to establish a baseline, Polly was observed constantly throughout each outdoor session at ten-second intervals. The categories of response included: (1) child-oriented social behaviors; (2) teacher-oriented social behaviors; and (3) equipment use. The rate in any category was computed as the percentage of ten-second intervals that any behavior was exhibited. These rates comprised the basic data of the study.

The observer reliability was established and monitored frequently (three out of every five days) by having a pair of observers rate Polly's behaviors and compare their records at the end of the day. The percent agreement was never less than 85 per cent and usually exceeded 90 per cent for each behavior category.

The experimental design consisted of a: (1) baseline period with random non-contingent attention; (2) reinforcement period with priming; (3) reinforcement period without priming; and (4) two probes with non-contingent reinforcement. Utilizing the priming

techniques, the teacher bodily lifted Polly onto a piece of play equipment and held her there for a minimum of thirty seconds. In addition to the continuous reinforcement offered for all forms of play on equipment, whether primed or not, and teacher continued to give random, intermittent reinforcement for Polly's other behaviors. One observation made by the teachers and confirmed by the observers was that Polly never used a piece of play equipment during the primary period which had not already been primed. The period of reinforcement without priming lasted twenty-seven days with two interruptions for probing of non-contingent reinforcement. Polly's use of the play equipment increased from a baseline rate of 2 per cent to nearly 70 per cent by the end of the study.

Concerning collateral social development, some behaviors showed no change, some increased and one decreased. Teacher-oriented behaviors, especially touching and verbalizing and on child-oriented behavior, parallel play, remained constant. Behaviors that increased were primarily child-oriented: (1) touching children; (2) verbalizing to peers; and (3) cooperative play. One behavior that decreased following the

reinforcement of equipment use was baby behavior.

Buell et al. concluded that teacher-supplied social reinforcement can have a definite role in developing a selected response in a preschool child. In addition, they proposed that by improving the child's motor skill the result would be increased social contact with other children. Finally, Buell et al. were encouraged to note the possibilities that emotional disturbances, autism, or regression might be decreased as effectively as Polly's baby-like repertoire.

Clark, Wyon and Richards described environmental factors in a nursery school, especially what children do and who they do it with and the way in which these may be influenced by the children's age, sex, and birth position.[1] The subjects were twenty-two girls and eighteen boys, ages three to four years, in two classes of a local Authority Nursery School in Cambridge, Massachusetts. All children attended the morning session only, and were observed during the autumn and spring terms during the morning free-play

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[1]Anne H. Clark, Sally M. Wyon, and M. P. M. Richards, "Free-Play in Nursery School Children," Journal of Child Psychology and Psychiatry and Allied Disciplines 10 (November 1969):205-216.

sessions. The teachers rarely redirected activity, as the children were free to occupy themselves as they chose.

The autumn term was utilized for extensive preliminary visiting in which to determine the methods of observation. Each observer, with a list of the children in alphabetical order, observed the children in ten-second intervals (signalled by an interval-timer in the experimenter's ear). The observers designated thirty or so categories which could describe the children's behaviors. These categories included: (1) non-specific activity; (2) blocks; (3) table paint; (4) sand; (5) plasticine and clay; (6) puzzles; (7) balcony; (8) painting; (9) house; (10) toilet and sink; (11) milk; (12) on push toy; (13) get out/put away toys; (14) sawing and hammering; (15) music; (16) apron on/off; (17) cars and trains; (18) balls; and (19) machinery. Records were made continuously during an hour session.

The inter-observer reliability was checked by means of a synchronized interval times, which ensured the observation of the same child each time. Agreement on such categories as "blocks" or "sand" was 93.5 per cent, whereas, the agreement on non-specific tasks

("wandering," "talking to," etc.) was much lower.

During the spring term each class was observed by an experimenter sitting in a constant position in the classroom. Records were obtained through fifteen sessions with one class and seventeen sessions with the other. Over a five-week period each child was observed a minimum of six hours and ten minutes. Clark et al. noted, however, that during the observation period the children rarely went outside due to inclement weather. Patterns of play might be slightly different in the summer months.

Significant differences at the .05 level between the groups were found using the Mann Whitney U and correlations with the Spearman Rank correlation coefficient. Boys were found to prefer activities of gross motor skills, while girls spent more time in activities which involved sitting at a table and fine motor manipulation. Age was found to correlate significantly in only three activities: (1) on blocks with older children having higher scores ($r_s = +0.464$, $p < .01$); (2) on puzzles with younger children having higher scores ($r_s = -0.376$, $p < .02$); and (3) on music with younger children having higher scores ($r_s = -0.385$,

$p < .02$). The only significant difference found among first borns was on "non-specific" activity ($p = 0.006$).

In regard to sociability, Clark et al. found that boys preferred to play with other male peers (significant at .05 level). One class of girls showed no preference and the other class of girls played with girls more than boys. Older children scored higher in sociability scores ($r_s = +0.521$, $p < .001$) and tended to play in larger groups ($r_s = +0.488$, $p < .01$). First borns were found to spend significantly more time alone than latter borns ($p = 0.03$).

Clark et al. concluded that what children do in nursery school was clearly related to their sex, age, and birth order. They argued that these factors must be taken into account in the analysis of social behavior.

Linford et al. conducted a study to describe the free play patterns of Down's Syndrome and normal children.[1] The subjects were eleven Down's Syndrome children, ranging in chronological ages from four

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[1]Anthony G. Linford, Claudine Y. Jeanrenaud, Kathryn K. Karlson, and Peter A. Witt, " A Computerized Analysis of Characteristics of Down's Syndrome and Normal Children's Free Play Patterns," Journal of Leisure Research 3 (Winter 1971):44-52.

through eight with an estimated mean mental age of 3.5 years. These subjects, were available through participation in another study being conducted at the University of Illinois with the Adler Zone Center. Date collected from this group was compared to the combined results of four groups of normal preschoolers (n = 32), ages three to five years.

Each group was taken to a playroom on alternate weekdays throughout the study and allowed to play freely in the room. All groups were allowed three fifteen-minute exposure sessions followed by ten filmed and recorded sessions. A ceiling-mounted camera attached to a remote control allowed one frame of the playroom to be shot every ten seconds during the fifteen minute session. The shot of the playroom, equipped with various apparatus, allowed the position of every child on every frame for every session to be recorded and punched into a computer (IBM 7094). The following information was obtained on every subject: (1) mean number of yards moved per frame x sessions; (2) average velocity in yards per frame when moving; (3) percentage of frames in movement; (4) time spent actually on the apparatus; and (5) time spent on the individual pieces

of apparatus. From this information group means were calculated.

Linford et al. found that normal subjects exhibited much greater movement than did the Down's Syndrome group. In addition, they revealed that normal children spent longer periods of time on the apparatus than the Down's Syndrome group. The rank difference correlation (rho) was exactly zero between the two groups' preferences for different pieces of apparatus.

The highest preferences were for a set of three moveable boxes and open tube for the normal and Down's Syndrome group respectively. The lowest interest for the normal children was in the closed tubes and for the Down's Syndrome children was in the wooden rocker.

Linford et al. postulated that if the expenditure of a certain amount of energy was required in a free setting, a longer period of time would be necessary for Down's Syndrome than for normal children. The greater use of free play space by Down's Syndrome children may indicate a desire for a less complex environment, but subjective evaluation of the apparatus choices did not provide substantial support for this hypothesis. Another tentative hypothesis was to determine the reason

for the amount of time Down's Syndrome children spend in free space. Linford et al. concluded replication of of the study with other groups of exceptional children was indicated to investigate the patterns of social interactions.

Thompson and Wade compared the content of play of hyperactive and normal children in response to environments of varying stimulation to test the Linford and Jeanrenaud four-stage theory of play.[1] They hypothesized that familiarity with the play environment, a low level of social stimulation (play group size), and a low level of physical environmental complexity (apparatus configuration) would positively influence the fantasy play exhibited by the subjects. In addition, behavioral differences, due to the variations of threshold stimulation levels and cognitive skill levels, would result in less fantasy play for hyperactive children. The subjects were eight white males, ages

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[1]Ann Rittenhouse Thompson and M. G. Wade, "Real Play and Fantasy Play as Modified by Social and Environmental Complexity in Normal and Hyperactive Children," Therapeutic Recreation Journal 8 (Fourth Quarter 1974):160-167; and Anthony G. Linford and Claudine Y. Jeanrenaud, "Report: A Behavioral Model for a Four-Stage Play Theory," Contemporary Psychology of Sport, ed. Kenyon, (Chicago: The Athletic Institute, 1968):447-450.

eight to ten years, from the third grade of the Urbana, Illinois, schools. Four of the subjects were normal and the remaining four had been diagnosed as hyperactive. None of the subjects were receiving medication during the study. Subjects played alone (monad) or in tetrads with peers whose activities were not monitored. During the experiment, the apparatus in the playroom was arranged two ways: one with minimum play apparatus (locomplex), and one with a large amount of apparatus (hicomplex). The subjects and peers (two normal, two hyperactive) were brought to the playroom four days per week for two fifteen-minute sessions per day and instructed to do whatever they wanted while in the playroom. The observers rated the behaviors every four seconds and recorded whether the play behaviors were real, fantasy, or between episodes. A one-way viewing system was used so that the subjects were not aware of the observations.

Data from the following four dependent variables (DV) were analyzed: (1) DV_1--frequency of fantasy play; (2) DV_2--mean duration of fantasy play episodes; (3) DV_3--frequency of real play; and (4) DV_4--mean duration of real play episodes. DV_1 and DV_3 comprised

the total number of data points (225) observed in the fifteen-minute session. Each variable increased and decreased proportionally. Each dependent variable was rated every four seconds and multiplied by four for an estimated real time elapsed for a particular score. The observer reliability was found to be .96. The analysis revealed a slightly higher frequency of real play and a much larger episode length for the low complexity configuration. The only variable showing a significant differece in the analysis of variance was the mean episode length of real play: (1) group-size main effect ($F = 4.94$, with 1,49 df, $p < .05$); (2) group-size interaction ($F = 5.04$, with 1,49 df, $p < .05$); and (3) effect of children ($F = 3.44$, with 6,49 df, $p < .01$). There was an increase in fantasy play across the four days of testing, but the differences were not significant. The significant group-size effect revealed that normal children did not engage in fantasy play.

Thompson and Wade did note, however, that this high level of real play among the normal subjects was due to a failure to detect fantasy play. Keogh, in an earlier study, had predicted that hyperactive subjects would not reach stage four of the Linford and

Jeanrenaud model.[1] Conversely, Thompson and Wade suggested that hyperactive children showed higher levels of fantasy play than did normal subjects.

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[1]Barbara K. Keogh, "Hyperactivity and Learning Disorders: Review and Speculation," Exceptional Children 38 (October 1971):101-110.

CHAPTER III

PROCEDURES FOR THE STUDY

The procedures followed in the development of this study are described in this chapter under the following headings: Preliminary Procedures, Selection of the Subjects, Selection and Development of the Instrument, Collection of the Data, Organization and Treatment of the Data, and Preparation of the Final Report.

Preliminary Procedures

The investigator developed a tentative outline after surveying and studying information from all available documentary sources. This outline was presented to the Thesis Committee members and revised according to their suggestions.

A series of meetings were held with the Executive Director of the Lynne Developmental Center in Richardson, Texas, to secure research clearance and to determine the details for implementation of the planned project. The Executive Director, authorized to give consent for the subjects to participate in the research study,

signed the necessary forms as the subjects were not capable of consenting due to their limited mental functioning.

The required forms for approval of the study were submitted to the Human Research Committee of Texas Woman's University. Upon completion of the procedures, the revised outline of the approved study was filed in the form of a Prospectus in the Office of the Provost of the Graduate School.

Selection of the Subjects

The sampling design was that of convenience sampling with children selected from the Self-Help, Language Development, and Social/Emotional (Play) classes at the Lynne Developmental Center. The criteria for the selection of the subjects were: (1) the participation in the toy stimulation program a minimum of six weeks; and (2) the absence of any additional impairments which might interfere with the subjects' performance during the observations. Table 1 indicates the number of children enrolled in the center and the number selected as subjects.

TABLE 1

DESCRIPTION OF THE NUMBER OF AUTISTIC CHILDREN AT THE LYNNE DEVELOPMENTAL CENTER

Class	Total Enrollment	Participants
Class 1	3	3
Class 2	4	4
Class 3	4	3
Class 4	3	0
Total	14	10

Children from Class 4 (Compliance Class) did not participate in the study as they failed to meet the first criterion established for this study. Another child was not selected as a subject due to a profound hearing impairment and his unresponsiveness to instructions. Thus, a total of ten subjects, nine males and one female, were selected to participate in the study. The autistic children ranged in age from six through fifteen, with a mean age of 11.06 years.

Selection and Development of the Instrument

A meeting was held with the Consultant for

Statistical Research, Texas Woman's University, Denton Campus, to determine the instrument that would be required to record data during the observation periods. After obtaining suggestions from the committee members, and studying various recording devices, a simple checklist format was selected.

As a result of the meetings and surveys concerning the development of the instrument, it was determined that the information necessary in conducting the study included: (1) personal data; (2) conditioned toy; (3) selected conditioned toy (yes/no); (4) toy selected; and (5) classification of the selected toy (reactive/non-reactive). The age, sex and length of enrollment in the center for each subject comprised the personal data. It was determined that a center staff member could provide data concerning the conditioned toy preference for each of the subjects. The recording form provided space for the investigator to check yes or no on whether the subject selected the conditioned toy during the observations. In addition, the selected toy was recorded. Each toy had been previously classified by the investigator as reactive or non-reactive.

Table 2 describes the toy classifications. Toys comprising the reactive category had moveable or audible components, whereas, the non-reactive toy did not meet this criterion.

TABLE 2

DESCRIPTION OF TOYS: REACTIVE AND NON-REACTIVE

Reactive Toys	Non-Reactive Toys
Basketball Game	Baseball
Kaleidoscope	Basketball
Medical Kit	Bristle Clocks
Movie Viewer	Clay
Pass the Nut	Doll
Roly Poly Chime Game	Interlocking Pieces
Sorting Box	Lego Blocks
The Bee Says	Puzzle
Wind-up Train Engine	Shapees
Tumble Tower	Stacking Letter Blocks
Two Tune TV	Tower-ifics

This particular observation format provided the highest measure of reliability and validity as subjects

either selected their conditioned toy or they selected a toy other than their conditioned toy. In the same manner, toys either met the criterion established for the reactive classification or they were considered non-reactive. A copy of the observation form appears in Appendix B.

Collection of the Data

A time schedule was developed so that observations were made during October, 1980, at the same time on three consecutive mornings to minimize extraneous variables which might affect toy preferences. Observations were made by the investigator as three classes rotated on a twenty-minute schedule through the Social/Emotional (Play) classroom which is approximately twelve by fifteen feet. The carpeted room contained a table, toys, and two sofas.

Five aspects pertaining to toy preferences of autistic children were recorded, including: personal data, conditioned toy, selected conditioned toy (yes/no), toy selected, and classification of selected toy (reactive/non-reactive). The Executive Director of the Lynne Developmental Center provided personal information on each subject including: (1) name,

(2) age, (3) sex, and (4) length of enrollment at the center. The classroom teacher, in turn, provided data concerning the conditioned toy preference for each subject and the self-stimulatory behavior which they attempted to duplicate in the program.

Data were recorded by the investigator who sat in the corner of the room and did not interact with any of the subjects during the observation periods. Subjects, observed in groups of three or four, entered the classroom and sat on the sofa prior to the onset of the observations. The classroom teacher, in turn, instructed each child to select a toy of his or her choice from the table set-up in the room and she did not intervene in the free play unless a potentially harmful behavior was exhibited. During the observations, the investigator recorded: (1) whether the conditioned toy was selected (Yes/No); (2) what toy was selected; and (3) what classification was the selected toy (Reactive/Non-reactive). The results of the subjects' toy preferences are presented in Chapter IV and in Appendix C.

Organization and Treatment of the Data

After the observations were recorded, the

investigator organized the data into tables for the appendix. The data concerning age, selection of the conditioned toy, and selection of a reactive or non-reactive toy were read into the DEC System-Twenty computer following the procedures outlined by Dr. Dave Marshall, Consultant for Statistical Research, at Texas Woman's University, Denton Campus.

The computer was used to determine frequencies on two variables: (1) yes/no, selection of conditioned toy; and (2) reactive/non-reactive, selection of toy. In addition, total three-day frequencies were computed for each variable.

Point biserial correlations were computed using the computer to show the relationships between age and the other variables: (1) Yes/No Day 1; (2) Reactive/Non-reactive Day 1; (3) Yes/No Day 2; (4) Reactive/Non-reactive Day 2; (5) Yes/No Day 3; (6) Reactive/Non-reactive Day 3; (7) Total Yes/No; and (8) Total Reactive/Non-reactive. The formula used to compute the point biserial correlations was:[1]

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[1]James L. Bruning and B. L. Kintz, Computational Handbook of Statistics, 2d ed., (Glenview, Illinois: Scott, Foresman and Company, 1977), p. 182.

$$r_{pb} = \frac{\bar{Y}_1 - \bar{Y}_0}{S_y} \sqrt{\frac{N_1 N_0}{N(N-1)}}$$

Pearson Product-Moment correlations were used to show the relationships between the eight dichotomous variables concerning the selection of the toys. The following formula was used by the computer:[1]

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{(N\Sigma X^2 - (\Sigma X)^2)(N\Sigma Y^2 - (\Sigma Y)^2)}}$$

A chi square was used to determine if there were significant differences between the selection of toys, either Yes/No or Reactive/Non-reactive, on each day independently and for the total three-day observation period. The formula utilized by the computer was:[2]

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[1]N. M. Downie and R. W. Heath, Basic Statistical Method, 4th ed., (New York: Harper & Row, Publishers, 1974), p. 92.

[2]Ibid., p. 332.

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

The findings are presented in Chapter IV through the use of tables. Additional tables of raw data are included in the appendix.

Preparation of the Final Report

The writing of the final report entailed submitting the chapters to the committee members and making corrections in accordance with their suggestions. Each chapter was revised, the research summarized, and the findings presented and interpreted. Recommendations for further studies were made. An appendix and a bibliography were developed.

CHAPTER IV

PRESENTATION OF THE FINDINGS

The problem of this study was to investigate toy preferences of ten autistic children, ages six through fifteen, enrolled in the Lynne Developmental Center during the fall of 1980, in Richardson, Texas. Subjects in the study had participated in the toy stimulation program at the center a minimum of six weeks. Toy preferences were observed on two items: (1) they selected their conditioned toy, (Yes/No); and (2) they selected a toy of one classification, (Reactive/Non-reactive). The findings of the study will be presented under the following headings: (1) Description of the Subjects, (2) Description of the Subjects during the Observations, and (3) Testing the Hypotheses.

Description of the Subjects

The ten subjects were enrolled in school-age classes at the Lynne Developmental Center in Richardson, Texas, during October, 1980. Table 3 describes the subjects selected from three of the four school-age classes: (1) Self-Help, (2) Language Development, and

(3) Social/Emotional (Play) classrooms.

TABLE 3

DESCRIPTION OF SUBJECTS BY CLASS, AGE, SEX AND LENGTH OF PARTICIPATION IN THE TOY STIMULATION PROGRAM

Subject		Age Years	Sex	Participation in Program
Class 1	1	9.4	M	6 months
	2	11.3	M	1 year 3 months
	3	14.3	M	11 months
Class 2	4	15.4	M	2 years 11 months
	5	10.9	M	4 years 0 months
	6	6.9	M	2 years 0 months
	7	11.9	M	5 months
Class 3	8	8.9	F	3 months
	9	9.0	M	6 months
	10	12.5	M	1 year 3 months

The subjects were comprised of nine males and one female. Subjects' participation in the toy stimulation program ranged from three months to four years. The toy stimulation program consisted of center staff members observing self-stimulatory behaviors then presenting the

children with toys which best duplicated these behaviors. The procedures were repeated until the children had toy repertoires of five or six toys. The subjects had progressed to a point in the program in which they exhibited appropriate play skills during most of the classes.

Table 4 describes the age of the group with respect to the range, mean, standard deviation, and standard error of the mean. The age of the subjects ranged from 6.9 years to 15.4 years with a mean age of 11.06 years. The standard deviation of 2.6 and the standard error of the mean of 0.83 were appropriate for the sample size.

TABLE 4

DESCRIPTION OF SUBJECTS' AGES IN YEARS

Group	Range	Mean	S.D.	SE_m
Autistic (N=10)	8.5 (6.9-15.4)	11.06	2.6	0.83

Description of the Subjects During the Observations

The subjects were observed on three consecutive

mornings in October, 1980, as each class rotated on a twenty-minute schedule. The classroom teacher provided the name of the conditioned toy for each subject prior to the onset of the observations. During the observations, the classroom teacher instructed each subject to select a toy of his choice from a table in the room. The investigator recorded a Yes/No on whether the subject selected the conditioned toy. In addition, each toy that was selected was classified as reactive or non-reactive.

Pearson Product-Moment and point biserial correlations between variables studied in this investigation are presented in table 5. The point biserial correlation was indicated when a continuous variable, age, was correlated with the dichotomous variables, toy preferences. There was a significant negative correlation at the .05 level between age and the selection of the conditioned toy on Day 2 (-0.63), Day 3 (-0.56), and Total Days (-0.60). This indicates that the older subjects selected a toy other than their conditioned toy. Conversely, the younger subjects exhibited a tendency to select their conditioned toy. These findings may be the result of the older subjects'

TABLE 5

MATRIX OF CORRELATIONS BETWEEN VARIABLES: Y/N DAY 1, R/N DAY 1, Y/N DAY 2, R/N DAY 2, Y/N DAY 3, R/N DAY 3, TOTAL Y/N, AND TOTAL R/N[1]

	Age	Y/N Day 1	R/N Day 1	Y/N Day 2	R/N Day 2	Y/N Day 3	R/N Day	Total Y/N	Total R/N
Age	----	-0.33	0.10	-0.63*	-0.04	-0.56*	-0.15	-0.60*	-0.03
Y/N Day 1		----	-0.41	0.38	-0.22	0.67*	-0.22	0.81*	-0.37
R/N Day 1			----	0.10	0.09	-0.27	0.53	-0.22	0.72*
Y/N Day 2				----	-0.22	0.67*	-0.22	0.81*	-0.14
R/N Day 2					----	-0.51	0.52	-0.36	0.69*
Y/N Day 3						----	-0.51	0.90*	-0.56*
R/N Day 3							----	-0.36	0.89*
Total Y/N								----	-0.40
Total R/N									----

*Significant at the .05 level

[1]Y/N represents the yes or no selection of conditioned toys; R/N represents the reactive or non-reactive classification of selected toys.

feeling of independence when in a free play setting, whereas, the younger subjects were still impressionable and did not deviate significantly from the program.

The Pearson Product-Moment correlations in table 5 indicate that there is a high correlation between a subject's preference concerning conditioned response toys on Day 1 and the Day 3 selection and the Total selection. A high correlation of .90 indicates that the toy selection on Day 3 relates directly to the total conditioned toy preferences. That is, the toy selection on Day 3 reflects the choice of toys on all three days. The total reactive/non-reactive toy preferences shows a relatively high correlation with the reactive/non-reactive selections on all three days (0.69, 0.72, 0.89). This indicates a trend for most subjects to select one classification of toys during the observations. The inverse correlation of -0.56 between the Total Reactive/Non-reactive toy selections and the conditioned selection on Day 3 may be the result of most conditioned toys being non-reactive. Conversely, most of the subjects selected a reactive toy on Day 3.

Table 6 reveals the frequencies on the Yes/No toy selection in a free play setting during each of the

observation periods. On Day 1 and Day 2, 80 per cent of the subjects selected toys other than their conditioned toy preferences. On Day 3, 90 per cent of the subjects chose a toy that was not conditioned. The tabled chi square value for significance at the .05 level with 1 degree of freedom is 3.8. Only on Day 3 was there a significant tendency to select a toy different from the conditioned toy preferences.

TABLE 6

DESCRIPTION OF SUBJECTS' SELECTION ON CONDITIONED TOY PREFERENCES

Day	Selected Conditioned Toy				χ^2
	N	Yes %	N	No %	
Day 1	2	20	8	80	3.6
Day 2	2	20	8	80	3.6
Day 3	1	10	9	90	6.4*

*Significant at the .05 level

χ^2 with 1 df (.05) = 3.8

The high percentage of subjects who did not select their conditioned toys may prompt the conclusion that the toy stimulation program is unsuccessful. These findings, however, do not account for the fact that most

of the subjects had entered the program with no measurable play skills, and as a result of the toy stimulation program, the subjects exhibited appropriate play skills during the observations.

A description of the total three-day responses to selecting the conditioned toy appears in table 7. The table indicates that: (1) 20 per cent of the subjects selected their conditioned toy on one day; and (2) 10 per cent of the subjects selected their conditioned toy on all three days. The remaining 70 per cent of the subjects did not select their condition toy at any time during the three-day observation period.

The investigator hypothesized that there was no significant difference on toy preferences of autistic children in a free play setting after operant conditioning. The tabled value for chi square with 2 degrees of freedom is 5.99. Therefore, the total chi square value of 6.2 for the difference between selecting and not selecting the conditioned toy is significant at the .05 level of significance. It appears that although the subjects exhibited play skills, there is a tendency for them to select a toy other then their conditioned response. These findings indicate, however, success of a

major goal of the toy stimulation program in that the subjects are increasing their toy repertoires.

TABLE 7

DESCRIPTION OF SUBJECTS' SELECTION ON CONDITIONED TOY PREFERENCES OVER THE OBSERVATION PERIOD

Number Selections	N	%	2
1 day	2	20	----
2 days	0	0	----
3 days	1	10	----
Total Correct Selection	3	30	----
Total Never Selected	7	70	----
Total	10	100	6.2*

Table 8 describes the frequencies in selecting a toy classified as reactive or non-reactive during each observation period. On Day 1, 40 per cent of the subjects selected a reactive toy, whereas, 60 per cent chose a non-reactive toy. Conversely, on Days 2 and 3, 70 per cent of the subjects selected a reactive toy

and 30 per cent chose a non-reactive toy.

TABLE 8

DESCRIPTION OF SUBJECTS' SELECTION OF REACTIVE AND NON-REACTIVE TOYS

Day	N	Reactive %	N	Non-reactive %	χ^2
Day 1	4	40	6	60	0.4
Day 2	7	70	3	30	1.6
Day 3	7	70	3	30	1.6

χ^2 with 1 df (.05) = 3.8

The tabled chi square value for significance at the .05 level with 1 degree of freedom is 3.8. It was noted that the chi square values did not exceed this tabled value and, therefore, are not significant at the .05 level of significance concerning the selection of reactive or non-reactive toys. The subjects did not appear to prefer a reactive toy over a non-reactive toy, and visa versa.

Table 9 reveals the total three-day responses to selecting either a reactive or non-reactive toy. This indicates that: (1) 20 per cent of the subjects selected a non-reactive toy all three days; (2) 10

per cent of the subjects selected a reactive toy one day; (3) 40 per cent of the subjects selected a reactive toy on two days; and (4) 30 per cent of the subjects selected a reactive toy on all three days.

TABLE 9

DESCRIPTION OF SUBJECTS' SELECTION OF REACTIVE OR NON-REACTIVE TOYS OVER THE OBSERVATION PERIOD

Selection	N	%	# Selections	χ^2
Non-reactive	2	20	3	----
Reactive	1	10	1	----
Reactive	4	40	2	----
Reactive	3	30	3	----
Total	10	100	---	2.0

χ^2 with 3 df (.05) = 7.8

The total chi square value was 2.0, whereas, the tabled chi square value with three degrees of freedom is 7.8. This indicates that there is no significant difference between reactive and non-reactive toy preferences of the autistic children. It appears that there is an even chance that subjects will prefer a

reactive toy over a non-reactive toy. This finding indicates that the reactivity or non-reactivity of toys has little effect on toy selections when considering therapeutic intervention with autistic children.

Testing the Hypotheses

Utilizing a chi square and frequency percentage concerning the selection of conditioned toys, the investigator found that there is a significant difference at the .05 level on toy preferences of autistic children in a free play setting after operant conditioning. Thus, the null hypothesis was rejected. There was not, however, a significant difference at the .05 level between the selection of a reactive or non-reactive toy over the three-day observation period. And therefore, the null hypothesis was accepted.

CHAPTER V

SUMMARY, CONCLUSION, AND RECOMMENDATIONS FOR FURTHER STUDIES

Summary

This study was undertaken to investigate the toy preferences of autistic children after operant conditioning in toy play. The subjects were ten autistic children, ages six through fifteen, enrolled in the Lynne Developmental Center in Richardson, Texas, during October of 1980. All subjects had completed a minimum of six weeks in the operant conditioning toy stimulation program at the center. It was hypothesized that a significant difference existed between the conditioned toy preferences and the free play toy preferences of the children. In addition, a second hypothesis was examined pertaining to reactive and non-reactive toy preferences of the children.

Related literature was presented in Chapter II under the headings: Research in General Treatment of Autistic Children; Research in Recreation and Play of Autistic Children; and Research in Recreation and

Play of Non-Autistic Children. The review of literature aided the investigator in the development and understanding of this research. This study did not duplicate any research found in the literature.

With the exception of Kanner's classic article in 1943 on autism, studies concerning the general treatment of autistic children were limited to literature published between 1968 and 1978. The study conducted by Carr et al., which presented sign language as a treatment intervention, provided valuable insight into the development of the present study as subjects at the Lynne Developmental Center utilized sign language to communicate.

Several studies were found to describe the toy play behaviors of autistic children. The aspects of play that were studied and the procedures that were utilized varied among the studies due to the scarcity and fragmented research concerning play and autistic children. Some of the aspects of play and autistic children that were reviewed included: (1) observing behaviors; (2) creating a playroom; (3) instigating a music therapy program; (4) utilizing a social behavior scale; (5) suppressing self-stimulation; (6) investigating

environmental effects; (7) defining a dance therapy process; and (8) investigating social and non-social toy preferences.

Most of these studies utilized the observation procedure for obtaining data concerning the play behavior of autistic children. Three studies found in the literature used an experimental approach. Only two studies were found to develop a program pertaining to toy play behavior of autistic children.

Literature reviewed in research and play behaviors of non-autistic children was limited to those studies found between 1967 and 1974. It was noted that most of these researchers utilized the observation method to obtain data in toy play behavior. Topics reviewed in this section included: (1) investigating peer group variables; (2) describing environmental factors; and (3) comparing content of play.

The preliminary procedures followed in the development of this study were presented in Chapter III. It was determined that ten autistic children enrolled at the Lynne Developmental Center would be observed on three consecutive mornings in October, 1980, as three

classes rotated through the Social/Emotional (Play) classroom. The teacher instructed the subjects to select a toy from a table set-up in the room. Data recorded by the investigator included: (1) name; (2) age; (3) sex; (4) length of enrollment; (5) conditioned toy preferences; (6) selection of conditioned toy (yes/no); (7) toy selected; and (8) classification of selected toy (reactive/non-reactive).

The DEC System-Twenty computer was used to determine the frequencies on two variables: (1) yes/no on the selection of the conditioned toy, and (2) reactive/non-reactive on the classification of the selected toy. Frequencies were computed for each day and for the total observation period.

Point biserial correlations were computed to show the relationships between age and the dichotomous variables (selection of toys). The Pearson Product-Moment correlations were used to show the relationships between the eight dichotomous variables concerning the selection of toys, either yes/no or reactive/non-reactive. The resulting findings were organized into tables in Chapter IV.

The findings of the study were presented in

Chapter IV. The ages of the ten autistic children ranged form 6.9 years to 15.4 years, with a mean age of 11.06 years. Pearson Product-Moment correlations revealed that there was a tendency for a high correlation between the toy selection on Day 3 and the selection on the other days and on total days. The point biserial correlation indicated that the older subjects selected a toy other than their conditioned toy with the negative correlations of -0.63, -0.56, and -0.60 for Day 2, Day 3, and Total Days respectively. Utilizing the chi square statistical technique on both variables, the only significant differences at the .05 level were found on Day 3 ($\chi^2 = 6.4$) and on the Total Days ($\chi^2 = 6.2$) concerning the selection of the conditioned toy.

The findings of the study led the investigator to reject the following hypothesis:

1. There is no significant difference at the .05 level between toy preferences of autistic children in a free play setting after operant conditioning.

The findings, however, led the investigator to accept the following hypothesis:

2. There is no significant difference at the

.05 level between the selection of reactive or non-reactive toys.

Conclusion

The autistic subjects demonstrated a tendency to select toys other than those which had been conditioned in the toy stimulation program. The program was successful in the fact that subjects selected toys, exhibited appropriate play skills most of the time, and appeared to increase their toy repertoires. Many of the children had enrolled in the Lynne Developmental Center with no measurable play skills. The subjects did not, however, show a preference for selecting reactive over non-reactive toys during the observation period. These findings indicate that the reactivity or non-reactivity of toys have minimal effect on toy selection when considering therapeutic intervention with autistic children.

Recommendations for Further Studies

Following are recommendations for further studies involving the use of autistic subjects:

1. Replication of this study using a larger sample size.

2. Reanalysis of data concerning reactive and non-reactive toy preferences of autistic children.

3. Comparison of reactive and non-reactive toy preferences of several populations.

4. Determination of the types and characteristics of toys that evoke play, and the conditions most effective in stimulating play.

5. Development and testing of a toy play program for autistic children.

6. Investigate toy color in relationship to reactive and non-reactive toy preferences.

APPENDIX A

CORRESPONDENCE AND CONSENT FORMS

Lynne Developmental Center, Inc.

319 LASALLE DRIVE, BOX 57 • RICHARDSON, TEXAS 75080 • (214) 690-1223

October 13, 1980

To: Human Subjects Review Committee

As Executive Director of the Lynne Developmental Center, Peter Graves is authorized to give the subject's consent to participate in a research study pertaining to Toy Preferences of Autistic Children; the results of which will serve to enhance each student's individual habilitation plan.

The subjects are not capable of giving their consent due to limited mental functioning.

Sincerely

Peter Graves

Peter Graves
Executive Director

Sworn and Subscribed to me this day 13th of October 1980

Notary Public, Dallas County

Consent Form
TEXAS WOMAN'S UNIVERSITY
HUMAN RESEARCH REVIEW COMMITTEE

(Form A -- Written presentation to subject)

Consent to Act as a Subject for Research and Investigation:

The following information is to be read to or read by the subject. One copy of this form, signed and witnessed, must be given to each subject. A second copy must be retained by the investigator for filing with the Chairman of the Human Subjects Review Committee. A third copy may be made for the investigator's files.

1. I hereby authorize Cara M. Hammond
(Name of person (s) who will perform procedure (s) or investigation (s)

to perform the following procedure (s) or investigation (s): (Describe in detail)

Autistic Subjects (10) will be observed on three consecutive mornings, October 7-9, 1980, during the scheduled free play class at Lynne Developmental Center. The classroom teacher will instruct the subjects to select a toy of their choice.

Data will be recorded by the investigator in a check-list format. Data will include: (1) name; (2) age; (3) sex; (4) pre-conditioned toy preference; (5) toy preference in a free play setting; and (6) toy classification (reactive vs. non-reactive).

A conclusion will be drawn concerning toy preferences and toy classifications in a free play setting.

2. The procedure or investigation listed in Paragraph 1 has been explained to me by Cara M. Hammond.
(Name)

3. (a) I understand that the procedures or investigations described in Paragraph 1 involve the following possible risks or discomforts: (Describe in detail)

Subjects' identity and background will be known only to the investigator. No risk will be involved other than that of all regular classes at the center.

No interaction will occur between the subjects and the investigator, other than the investigator's presence in the room.

(Form A - Continuation)

3. (b) I understand that the procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others:

The procedure will aid in determining: (1) the effectiveness of pre-conditioning toy preferences and (2) the preferences pertaining to toy classification (reactive vs. non-reactive). Findings will aid in the development of appropriate play skills of autistic children.

3. (c) I understand that - No medical service or compensation is provided to subjects by the university as a result of injury from participation in research.

4. An offer to answer all of my questions regarding the study has been made. If alternative procedures are more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

_____ _____
Subject's Signature Date

(If the subject is a minor, or otherwise unable to sign, complete the following):

Subject is a minor (age ____), or is unable to sign because:

Signatures (one required)

_____ _____
Father Date

_____ _____
Mother Date

_____ _____
Guardian Date

_____ _____
Witness (one required) Date

APPENDIX B

TOY PREFERENCES RECORDING FORM

LYHNE DEVELOPMENTAL CENTER DATE_____

TOY PREFERENCES RECORDING FORM

SUBJECT	AGE	SEX	CONDITIONED TOY	SELECT CONDITIONED TOY		TOY SELECTED	CLASSIFICATION	
				YES	NO		REACTIVE	NON-REACTIVE

APPENDIX C

RAW DATA FOR OBSERVATIONS

LYNNE DEVELOPMENTAL CENTER DATE OCTOBER 13, 1980

TOY PREFERENCES RECORDING FORM

SUBJECT	AGE (YRS.)	SEX	CONDITIONED TOY	SELECT CONDITIONED TOY		TOY SELECTED	CLASSIFICATION	
				YES	NO		REACTIVE	NON-REACTIVE
1	9.4	M	LEGO BLOCKS		X	INTER-LOCKING BLOCKS		X
2	11.3	M	BRISTLE BLOCKS		X	TUMBLE TOWER	X	
3	14.3	M	TOWER-IFICS		X	TUMBLE TOWER	X	
4	15.4	M	BASKETBALL		X	SHAPEES		X
5	10.9	M	MOVIE VIEWER		X	BEE SAYS	X	
6	6.9	M	BALL	X		BALL		X
7	11.9	M	LEGO BLOCKS	X		LEGO BLOCKS		X
8	8.9	F	BELL CHOIR		X	DOLL		X
9	9.0	M	MUSIC BOX		X	BEE SAYS	X	
10	12.5	M	TOWER-IFICS		X	BRISTLE BLOCKS		X

LYNNE DEVELOPMENTAL CENTER DATE OCTOBER 14, 1980

TOY PREFERENCES RECORDING FORM

SUBJECT	AGE (YRS.)	SEX	CONDITIONED TOY	SELECT CONDITIONED TOY		TOY SELECTED	CLASSIFICATION	
				YES	NO		REACTIVE	NON-REACTIVE
1	9.4	M	LEGO BLOCKS		X	TUMBLE TOWER	X	
2	11.3	M	BRISTLE BLOCKS		X	PUZZLE		X
3	14.3	M	TOWER-IFICS		X	SORTING BOX	X	
4	15.4	M	BASKETBALL		X	STACKING LETTER BLOCKS		X
5	10.9	M	MOVIE VIEWER		X	BEE SAYS	X	
6	6.9	M	BALL	X		BALL		X
7	11.9	M	LEGO BLOCKS		X	MUSICAL BALL	X	
8	8.9	F	BELL CHOIR		X	RECORD PLAYER	X	
9	9.0	M	MUSIC BOX	X		MUSIC BALL	X	
10	12.5	M	TOWER-IFICS		X	BEE SAYS	X	

LYNNE DEVELOPMENTAL CENTER DATE OCTOBER 15, 1980

TOY PREFERENCES RECORDING FORM

SUBJECT	AGE (YRS.)	SEX	CONDITIONED TOY	SELECT CONDITIONED TOY		TOY SELECTED	CLASSIFICATION	
				YES	NO		REACTIVE	NON-REACTIVE
1	9.4	M	LEGO BLOCKS		X	TUMBLE TOWER	X	
2	11.3	M	BRISTLE BLOCKS		X	SORTING BOX	X	
3	14.3	M	TOWER-IFICS		X	TUMBLE TOWER	X	
4	15.4	M	BASKETBALL		X	LEGO BLOCKS		X
5	10.9	M	MOVIE VIEWER		X	BEE SAYS	X	
6	6.9	M	BALL	X		BALL		X
7	11.9	M	LEGO BLOCKS		X	MUSICAL BALL	X	
8	8.9	F	BELL CHOIR		X	RECORD PLAYER	X	
9	9.0	M	MUSIC BOX		X	TRAIN	X	
10	12.5	M	TOWER-IFICS		X	BRISTLE BLOCKS		X

APPENDIX D

INVESTIGATOR'S OBSERVATIONS NOTES AND COMMENTS

Notes During Observations

Subject 1. Appears to be a compulsive "color person." His fascination with colors may directly effect toy selection. He makes designs with colors, especially with interlocking blocks, lego blocks, and bristle blocks.

Subject 2. Seemed to be very interested in the tumble tower. First observation period, he sat entire time with this toy. When observed with the puzzle, he put it together and took apart the same way every time.

Subject 3. When selecting or putting away the toys, he seemed to require continuous reinforcement that his actions were approved. He resists change.

Subject 4. Enjoys tapping toys with his fingers or tapping pieces of toys together.

Subject 5. Went immediately to Bee Says during all three observation periods. It was reported by his teacher that he responds to visual stimulation. He watched and felt the spinning part of the Bee Says during observations. He also enjoys the movie viewer.

Subject 6. Selects a ball during all free play periods.

Subject 7. Becomes very engrossed in auditory stimulation. He enjoys the musical ball, but he exhibited a tendency to drop it from the arms of the sofa or from the table (bang objects).

Subject 8. She remained virtually unresponsive during the observations. She did, however, respond to auditory stimulation through the use of the record player during two of the three days.

Subject 9. Responds to auditory stimulation, especially through the use of the Bee Says and the musical ball.

Subject 10. Selects toys but quickly moved toward tearing the edge of the carpet.

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