Experimental analysis of the interactional behavior of severely disturbed children.

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EXPERIMENTAL ANALYSIS OF THE INTERACTIONAL
BEHAVIOR OF SEVERELY DISTURBED CHILDREN

A Dissertation Presented
By
John E. Denny

Submitted to the Graduate School of the
University of Massachusetts in
partial fulfillment of the requirements for the degree of

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EXPERIMENTAL ANALYSIS OF THE INTERACTIONAL
BEHAVIOR OF SEVERELY DISTURBED CHILDREN

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August 1970
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This dissertation is dedicated to my wife, Winnie, for her loving encouragement and understanding throughout many years of graduate work.
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INTRODUCTION

The diagnostic classification system of the American Psychiatric Association (1965) provides for the differentiation of mental disorders based upon etiological factors. Specific syndromes within disorders are identified by behavioral descriptions. The only syndrome directly applicable to severely disturbed children is listed as "schizophrenic reaction, childhood type." This term refers to schizophrenic behavior occurring before puberty. A warning is given that the clinical picture may differ from schizophrenic reactions occurring during other age periods because of the immaturity and plasticity of the patient at the time of onset of the reaction. Final statements indicate that all psychotic reactions in children manifesting primarily autism should be classified under this heading and that special symptomatology may be added to the diagnosis as manifestations.

The American Psychiatric Association (1966) has recognized many of the problems involved in the present nosological system. They have designated "The Group for the Advancement of Psychiatry" as a working body to investigate the need for a more adequate and useful classification system dealing with disorders of mental and emotional nature in children and adolescents. In the new proposed nosological system the all inclusive schizophrenic category was discarded at the youngest age levels in favor of more specific classifications. Under the heading "Psychoses of Infancy and Early Childhood" were listed: (1) early infantile autism, (2) interactional psychotic disorder, and (3) other psychosis of infancy.
and early childhood. Schizophrenic reactions were included only under "Psychoses of Later Childhood". This action represents a complete change from grouping all psychotic children under the heading of "schizophrenic reaction" with no provision for early infantile autism to the establishment of "early infantile autism" with no schizophrenic category at the youngest levels. The confusion between these two categories seems apparent.

Disadvantages of the Present Nosological System

Sundberg and Tyler (1962) have enumerated many disadvantages of the present psychiatric classification system. They emphasize that although the supposition is made that the major disorders are caused by different etiological factors, the specific etiology of each disorder is not made clear. The system identifies certain supposedly correlated clusters of symptoms or syndromes which very few people actually fit. Also, an attempt is made at the description of disorders, but these are not specified in any concrete operational way.

Ullman and Krasner (1966) relate the present classification system to the concept of a "medical model" or the supposition that the individual's behavior is considered peculiar, abnormal, or diseased because of some underlying cause. This leads to the categorization of people in terms of presumed underlying illnesses. These illnesses, however, are developed on a descriptive basis without the validation of either a clearly defined disease or a definite pattern of behavior. Thus, it is usually rare for a person to display all the aspects of a particular
syndrome and no other maladjustive behaviors. In most cases a limited and variable number of symptoms are considered sufficient to justify the designation of a particular form of mental illness, and those maladaptive behaviors that are present but not considered within the specific syndrome are ignored or rationalized. Once the diagnosis has been arrived at there is a presumption that all people so classified share basic common traits in terms of underlying illness, treatment of choice, and prognosis.

A prime example of the difficulties involved in utilizing the APA classification system is shown in an attempt to diagnose severely disturbed children. Under the present system all children must be classified as either organically impaired or schizophrenic. Specific behavioral descriptions are useless due to these general "wastebasket" categories. Thus, all psychotic children are apt to be lumped together under the same general classification. Other systems offer slightly more variation (Arieti, 1959; Wolman, 1965) however, the problem remains due to the etiological basis for classification.

New diagnostic categories have only added to the already growing confusion. This was demonstrated by the introduction in 1943 of Kanner's (1965) syndrome of "infantile autism." Although many attempts have been made to delineate the autistic syndrome via detailed behavioral descriptions (Bettleheim, 1967; DesLauriers, 1969; Rimland, 1964; Wing, 1966) it has still not been clearly defined and accepted as distinct from childhood schizophrenia. The difficulties involved in distinguishing between
childhood schizophrenia and early childhood autism relate to the problem of attempting to assign very young children to diagnostic categories at an age when both physical and emotional growth proceed rapidly and changes are perhaps best noted in retrospect. However, with respect for the pitfalls involved in making any specific diagnosis, there does seem to be some historical and behavioral basis for a distinction between the two syndromes.

The definition of the syndrome of early infantile autism as established by Kanner (1965) distinguished two primary features: (1) extreme self-isolation and (2) obsessive insistence on the preservation of sameness. Other important behavioral features were: failure to use language for the purpose of communication (if at all) and a fascination for objects which were handled with skill in fine motor movements. Rimland (1964) incorporated most of Kanner's diagnostic factors and enumerated several more. He emphasized early infantile behavior where some autistic infants were reported to have been apathetic and unresponsive in the first few months, while others were given to implacable crying. The first awareness of any problem is often the observation that the child fails to make the usual anticipatory movements prior to being picked up, or adjustments of the body when being held. Headbanging and prolonged rocking are also noted.

Childhood schizophrenia, on the other hand, is defined more in terms of a maturational lag at the embryonic level that influences all areas of personality functioning (Bender, 1953) or by a loss of affective contact
with reality coincident with or determined by the appearance of autistic thinking (Despert, 1968). The symptoms are widely varied and may include such factors as motor excitement, restlessness, stupor, muscular rigidity, rituals and compulsions, an inability to differentiate between fantasy and reality, speech and language deviations, auditory and visual hallucinations, delusions, etc.

While many of the same behavioral elements may be evidenced in both syndromes, the severity of self-isolation, communicative impairment, and the lack of affective perception of the autistic individual far surpasses that of the schizophrenic. In fact, Bender emphasizes that contrary to exception, schizophrenic children may not appear withdrawn in their human relations; and that their contact is pathologically invasive for a period of time.

A historical review also aids in making the distinction more clear. The onset of autism can frequently be traced to the first few months of life, while childhood schizophrenia usually follows a period of normal development. Therefore, most authorities make the distinction between the two syndromes while recognizing many common features. DesLauriers (1969) states that early infantile autistic behavior cannot be considered a psychosis due to the historical factors. In a psychosis, the disturbed behavior appears consequent and reactive to environmental conditions and circumstances which affect the child in such a manner that he turns away from the environment, his development arrested and his communication seriously impaired. What had been normal for two to three years becomes, in these cases, oddly abnormal and regressive. In the early
infantile autistic child the development from the beginning is stymied, and it is only through far-fetched reasoning that one could claim that the very early developmental arrest is consequent to the infant's "sensing." in the early hours after birth, that his mother wished him dead, thereby causing him to turn away from her. Thus, DesLauriers feels that it would seem much closer to the observed and reported history of the autistic infant's behavior to clearly distinguish this syndrome from those childhood disturbances which are reactive to environmental stress and are forms of psychotic behavior.

Compounding the diagnostic problems are the parental perceptual distortions of the actual development of the child. These may become so great as to invalidate either a favorable or unfavorable picture of the child's earlier development. Thus, the considerable difference cited in the literature on etiology may be considered as arising partly out of problems in interpretation of developmental histories that were invalid from the start.

Despert (1968) summarizes the diagnostic problems and offers some concrete suggestions.

1. With the exception of degenerative and epileptic psychoses, there exists in the literature a tendency to group together psychoses of infancy and early childhood, which may represent different illness processes, or to differentiate between them in accordance with concepts which are difficult to apply clinically.

2. Autistic defenses are generally characteristic of these psychoses. But this does not justify a failure to differentiate between types which can be distinguished clinically. Such differentiation would appear advisable until knowledge concerning etiology increases.

3. It is suggested that the diagnosis of 'autistic psychosis' be applied only to cases meeting Kanner's criteria of early infantile autism.
4. The diagnosis of 'schizophrenic illness' should be applied to cases with onset after age one and with a picture characterized principally by loss of affective contact with reality and autistic thinking.

5. Psychoses in children with retarded motor development, or in whom intellectual performance, although atypical for any age level, is below normal functioning in all areas, would best be classified for the present in a separate group as psychoses in mentally defective children.

6. With the exception of rarely occurring affective psychoses in this age group, and with the exception of organic and epileptic psychoses, most psychoses of infancy and early childhood will meet the criteria of one of these types.

7. The degree of impairment of communication present in these psychoses constitutes a significant prognostic factor.

Very few attempts have been made to improve the diagnostic quandry. The present psychiatric classification system seems so firmly entrenched that many authorities have advocated ignoring it entirely (Ullman & Krasner, 1966; Eysenck, 1960; Szasz, 1961). The trend has been towards an evaluation of the patient's behavior per se, without implicating any underlying causes. In this respect, the etiological question may remain moot if necessary, for the behavior itself can be treated without complication. With the increasing emphasis being placed upon behavior, it becomes possible to gain more objectivity, and the former subjective and invalid diagnostic techniques need not be used. Instead, it will become increasingly important to improve and develop means of examining behavior both quantitatively and qualitatively.

Research with Severely Disturbed Children

While a trend towards objective behavioral diagnosis has been developing in recent years, most research studies have emphasized
treatment rather than behavioral factors. Although treatment studies must start with subjects from prediagnosed clinical categories, the possibility that treatment effects occur or fail to occur due to inadequate diagnoses is usually ignored.

An example of this type of research is shown in a study by Freedman, Ebin, and Wilson (1962). The treatment consisted of large dosages of LSD administered to twelve children ranging in age from 5-11. These children all attended a day school for schizophrenic children. The lack of concern for obtaining a homogeneous population is shown by the description of the subjects; "all of the children were of the 'autistic type' and all were mute or nearly so." The fact that these children were enrolled in a school for schizophrenic children demonstrates the lack of distinction and confusion between the schizophrenic and autistic categories. The results were as all inclusive as the subjects. Somatic effects that were noted were facial flush, dilation of pupils, some catatonic, some ataxia, complete loss of appetite, increased body awareness and a desire for physical contact. The psychic effects included rapid mood swings from elation to depression, anxiety or flattening of affect, auditory and visual hallucinations, decreased alertness in a few, increased remoteness, decreased eye contact in several and increased contact in a few. The hoped for change from muteness to speech did not occur. Needless to say, the authors did not explain how the auditory and visual hallucinations were assessed in mute autistic children.

Other treatment studies (Lovaas, Schaeffer, & Simmons, 1965; Simmons, Leiken, Lovaas, Schaeffer, & Perloff, 1966) have involved so few
subjects that a behavioral description was given of each subject rather than stating any specific diagnostic criterion for inclusion in the research.

In a treatment study by Rabb and Hewett (1967) children diagnosed as autistic, atypical, schizophrenic, minimally neurologically impaired and severe primary behavior disorders were all administered token reinforcers in an operant conditioning paradigm. The conclusion was made that "a major finding of this study is that a severely disturbed group of four to six children functioning at the two-to-five-year level in social and communication skills, can be profitably involved in a learning situation with one teacher." Such all inclusive methods and results seem to add little to an understanding of any particular diagnostic group.

The most fruitful and potentially helpful investigations dealing with severely disturbed children seem to be those that attempt to extend the behavioral knowledge of specific types of children. Such studies focus upon the experimental analysis of behavior by means that can be objectively applied. The importance of this type of research was pointed out in a study by Ferster and DeMyer (1962). They emphasized the importance of establishing behavioral baselines. They stated that it is not known to what extent the behavioral deficits observed in autistic children represent a basic constitutional or physiological deficit. However, the possibility of recording "lawful" activity in a situation where behavior of autistic children can be objectively recorded may open the way to techniques for evaluating the extent of focal physiological defi-
cits, or whether in fact infantile autism represents a uniform condition. Behavioral baselines could thus serve to evaluate the child's repertoire in terms of the performance ordinarily considered in intelligence tests, to test the effect of drugs, and to test the integrity of the central nervous system.

In an experiment focusing upon one aspect of behavior Tilton and Ottinger (1964) compared the toy play responses of autistic, retarded, and normal children. The diagnostic groups were carefully delineated in this study with children classified as childhood schizophrenic, autistic type or autistic with symbiotic features, following a minimum of four weeks evaluation at the Indiana University Medical Center. Autistic, mentally retarded, and normal children were observed individually during 20-minute play sessions in which they were allowed complete freedom in the selection and use of toys. The observation period was divided into 60 segments and observers recorded which of a number of defined categories of toy uses occurred during each segment. This technique also provided a measure of the number of distinctly different acts comprising the subject's toy play repertoire. The method of analyzing behavior in this study was objectified by classifying 321 previously observed toy uses into 9 general categories which could be recorded quickly during the time sample. Also, the efficiency of the study was improved by making sound recordings of dictated reports of toy behavior. These were later transcribed to check lists for data processing. The results indicated that both normal and retarded children exceeded the autistic children in the proportion of over-all play devoted to combinational-use of toys. The
play of the autistic group included higher proportions of both oral and repetitive uses of toys than that of the other groups. The distinctly different acts within the toy play repertoires of the autistic children were limited as compared to the other groups.

In an investigation demonstrating unique methodology, EEG abnormalities were studied for various clinical groups (White, DeMyer & DeMyer, 1964). In order to diagnose and classify the children under 7 categories: interaction with adults, peer relationships, use of toys and play behavior, verbal behavior, school and intellectual performance, special symptoms, and projective tests. After careful consideration of these behaviors and clinical records, the children were classified into 5 groups: autistic or symbiotic schizophrenics, chronic undifferentiated schizophrenics, non-psychotic behavior disorders, neurotics, and normal controls. Detailed behavioral criteria were also listed for each group. One error here seemed to be grouping autistic children with symbiotic schizophrenics. Due to the fact that only two symbiotic children were in this group the results would seem most applicable to autistic subjects. A "double blind" technique was incorporated into the study by obtaining final clinical diagnoses without knowledge of the EEG readings as determined for this study, and with EEG's placed in random order and read without any knowledge of the clinical diagnosis. The results indicated no EEG abnormalities in the psychiatrically normal group. Except for the neurotics, the EEG abnormalities were qualitatively and quantitatively similar in the psychiatric patients. A total of 51% of the psychiatri-
cally disturbed children demonstrated abnormal EEG's. The question remains however, as to how the implied cerebral dysfunction in the psychiatrically abnormal children may relate to aberrant behavior.

In a rather poorly controlled experiment, Jahoda and Goldfarb (1957) utilized standard observation techniques for the psychological evaluation of nonspeaking children. Three "hard to reach" children who had in the past received a variety of diagnostic titles were employed as subjects. An observer sitting in the room with the subject attempted to record the child's movements, facial expressions, and vocalizations, while simultaneously marking the time with a stopwatch. These methods undoubtedly led to the conclusion by the investigators that observation periods of over 30 minutes duration led to fatigue of the observer and diminished accuracy of recording. The material gathered in the 30 minute observations was analyzed and scored with regard to the following variables:

(1) motility, (2) behavior directed to self, (3) behavior directed to inanimate objects, (4) behavior directed to a human, (5) goal persistence, (6) mode of communication, (7) affective expression, and (8) perception. Every one of these variables was appraised for its frequency and modality for each 5 minute period during the 30 minutes. It was concluded from the differentiating patterns of behavior, that although all three children had at one time been diagnosed as schizophrenic, that they were now quite different. The behavior patterns agreed with the final diagnoses for the respective children of; cerebral pathology with mental deficiency, cerebral pathology with epilepsy, and childhood schizophrenia.
Steisel, Weiland, Denny, Smith, and Chaiken (1960) established a simple standardized experimental situation in which the interaction of nonverbal psychotic children and an attending adult would be measured objectively. The experimental procedure was divided into three phases: (1) interaction solicited by the experimenter; (2) interaction rejected by the adult; and (3) interaction attempts by the child awaited. During the session two trained observers scored the child's behavior on seven five-point scales which described the degree and, to some extent, the type of interaction demonstrated by the child. The psychotic children interacted to a lesser degree than the control children. The methods of this study represented an extensive attempt to employ objectivity. However, neither psychotic subjects nor control subjects were specifically identified. It was therefore impossible to determine what type of psychotic children were included in the research. Also, one might expect interactional differences to be great when only psychotic and normal children are compared.

In another study of the diagnostic type Hutt and Ounsted (1966) developed a technique for investigating the significance of gaze aversion with autistic infants. The children were observed in a room where model faces were mounted on stands three feet high; the facial configurations were of a happy, sad, and blank human face, monkey face, and dog face. The stands were placed around the periphery of an otherwise empty room at approximately equal distance from each other; the positions of the models were varied for each child. The children were introduced into the room individually, by an observer who remained in the room and made plots
of the child's movements about the room on a scale plan. The room had a checkerboard floor covering, each square having a reference number. A second observer tape-recorded a commentary of the child's behavior from behind a one-way mirror. The child was taken from the room at the end of ten minutes. Eight autistic children and six non-autistic children of the same age group were studied. The results included a record of the mean number of encounters per child with the different faces as well as with the other environmental fixtures in the room. The non-autistic group showed least interest in the blank faces, all the other faces encountered more or less equally often. The autistic children encountered the happy face least frequently; the blank and animal faces more frequently; and the environmental stimuli (light switches, taps, windows) most often. Also, the autistic children did not always visually inspect the faces. This was less true of their encounters with the other environmental stimuli. The same patterns of responsiveness were found in studying the amount of time spent investigating the various models and fixtures. The autistic children spent relatively less time with the faces as a whole and more time with the fixtures. The proportion of time spent on the fixtures as opposed to the faces was significantly different between the two groups. Although the methods involved in this study were unique, they lacked objectivity. An observer manually marking a child's movements could not be exact if the child moved very rapidly. A tape recorded commentary without any prearranged rating system must have proven cumbersome and inefficient. Also, a comparison of autistic and normal children seems prearranged to demonstrate gross behavioral differences.
In a report to the Eastern Psychological Association, Rothstein (1967) described an ongoing project designed to investigate the stimulational and interactional patterns of autistic children and their parents. After extensive evaluation, groups of autistic, brain-damaged, and normal nursery school children were observed in interaction sessions with their parents. The parents were instructed to engage in seven activities or tasks with the child. The activities were used to stress different levels of ego functioning. The seven tasks included: reading a story to the child; singing a song with the child on one's lap; playing blocks with the child; feeding the child lunch; having the child color an outline form; shooting darts at a target; and putting a puzzle together. It was assumed that although the autistic children would be unable to perform all these tasks adequately, that the observations of the mothers and fathers reactions to their child's inabilities would be significant. In order to analyze the interactions two observers who were unaware of the specific purposes of the project took running notes of the sessions from behind a one-way mirror. Afterwards they rated the behaviors and interactions on a number of rating scales. They also recorded their own impressions of the parents and child. Statistically significant differences were found between the interactional behaviors of the family triads of the three groups. Of greatest interest were findings indicating that parents with psychotic children show a deficiency in the interactional exchange between themselves and their child. The repertoire of interaction patterns in these families was significantly more limited than in families either with a brain-damaged child or families with a
normal child. Differences between the brain-damaged and normal groups tended to be non-significant. Employing another abnormal group greatly enhanced the importance of results in this study, especially since both autistic children and brain-damaged children have many similar behavioral traits. Thus, one might suspect that parents of both types would react similarly to the aberrant behavior.

Lovass et. al. (1965) described recording apparatus and procedure for the observation of behaviors of autistic children in free play settings. The apparatus consisted of a panel of 12 button-switches connected to an Esterline-Angus pen recorder. Various behaviors of the child and the attending adult were defined. Each behavior corresponded with a designated button on the panel or pen on the recorder. The apparatus kept a running account of both frequency and duration of each behavior. A series of studies was performed on the reliability of the observations comparing behaviors of normal and autistic children. Not only were the behavior categories found to be highly reliable when used simultaneously by different observers but specific differences were shown between the behaviors of autistic and normal children. Compared with normals, the autistic patient before treatment demonstrated behavior more like that of very young children, one-half and one year old, in more often engaging in what is often considered "nonsocial" behaviors. A change towards less self-destructiveness and more social behavior was noted after 7 months of treatment. The procedure was shown to be successful for analyzing interrelated behaviors of the child, as well as for studying covarying relationships between the child's behaviors and those of an attending adult.
The procedure followed in this study represents the most objective and efficient means for compiling behavioral data of any research cited thus far. The methods seem to be adaptable to other forms of interaction with little variation. The major criticism of this investigation is the comparison of only extreme groups at opposite ends of the adjusted-maladjusted continuum. Perhaps a more stringent test of this technique as a diagnostic tool would have been to attempt to differentiate between closely aligned disturbed groups.

In reviewing the results of the cited research, several factors become evident: (1) many treatment studies lack adequate criterion for inclusion of subjects in diagnostic categories, thereby invalidating results; (2) many diagnostic studies frequently compare only extreme groups, e.g. autistic and normal children, therefore results are apt to be overestimated; and (3) many diagnostic studies employ inefficient subjective methods for recording and analyzing behavioral data.

Research Needs

Empirical investigations and literature dealing with severely disturbed children both indicate common needs. The most apparent factor seems to be the lack of adequate diagnostic techniques and criteria for comparing children who lack communicative speech and have severe problems in the area of inter-personal relationships. With the limitations of standard diagnostic techniques, alternative methods must be devised for evaluating these children, assessing changes in behavior, and obtaining measures of behavioral differences which may exist between various pop-
ulations. There can be no basis for distinction between such overlapping and ambiguous syndromes as "early infantile autism" and "childhood schizophrenia" unless clearly established behavioral traits can be reliably identified with specific groups of children. Also, as indicated by Ferster and DeMyer (1962), there is an important need to establish some type of behavioral baseline in conjunction with a specific diagnosis. Thus, if the behavior of severely disturbed children can be objectively recorded, techniques may be developed for evaluating the extent of physiological and psychological deficits with respect to some norm or standard for each diagnostic group. Since the etiological basis for treatment and classification has proven confusing and impractical, this movement towards behavioral analysis seems warranted.

Purpose of the Present Research

The purpose of the present investigation are: (1) to develop an objective technique for the examination of the interactional behavior of severely disturbed children, and (2) to attempt to differentiate groups of children of autistic, schizophrenic, mentally retarded, and normal classifications by analysis of behavioral data collected from the experimental technique.
METHOD

Subjects

The subjects were 40 children enrolled in educational or educational-treatment programs at the following Massachusetts' agencies: Worcester Youth Guidance Center, Worcester; The James Jackson Putnam Children's Center, Boston; The League School, Newton; and the University of Massachusetts Nursery School, Amherst. Ten Ss were selected for each of the following groups: (1) children classified "autistic" by an attending psychologist; (2) children classified "schizophrenic" by an attending psychologist; (3) children classified as "educable retarded" by a special class instructor; and (4) children classified as "normal" by nursery school instructors. A classification procedure patterned after that of White, DeMyer and DeMyer (1964) was provided all attending psychologists to aid in classifying psychotic children for the study.

All Ss were between the ages of 3 and 9. All of the older Ss had been enrolled in some form of treatment program for several years. All Ss were living in their own homes at the time of the study. Subjects were judged to be from middle to lower middle socio-economic groups. The chronological age and sex of Ss in each group were as follows:

1. Autistic, 5 male, 5 female, mean age 6.6.
2. Schizophrenic, 9 male, 1 female, mean age 7.3.
3. Educable Retarded, 7 male, 3 female, mean age 5.4.
**Apparatus**

Sony video equipment was used to record and replay all interactions on video tape.

The apparatus for quantifying the observed behaviors consisted of three units: an Esterline-Angus twenty-pen event recorder and two nine button operating panels. Each button was mounted on a microswitch so that when depressed it activated a corresponding pen on the Esterline recorder. The buttons were arranged on a 7 in. x 12 in. panel, in the configuration of the fingertips of an outstretched hand. Each button could be pressed independently of any of the others and with the amount of force similar to that required for an electric typewriter key.

**Behavioral Categories**

Lovass, et al. (1965) defined and descriptively labeled nine behaviors which could be used in an analysis of covarying relationships between an autistic child's behaviors and those of an attending adult. Since these were developed to be easily used and highly reliable when applied by different observers, they were employed in the present research with only slight variation. The behaviors were defined as follows:

1. **Verbal I**—nonrepetitive, intelligible verbal behavior used in a communicative or expressive way.

2. **Verbal II**—repetitious verbal behavior (any nonmeaningful response repeated within five seconds or nonintelligible verbalizations, gibberish, etc.).

3. **Attending**—visually attending to the adult's face.

4. **Physical Contact**—initiation and maintenance of physical contact by use of the hands, with another person (hand-holding, touching, and handling the adult).
5. Social Nonverbal--socially acceptable nonverbal activity which requires cues given by the adult for its initiation or completion (child following the adult's request, imitating behavior of adult, or activity initiated by the child and requiring involvement of adult).

6. Atavisms--behaviors in which the child is destructive towards himself or others (throwing objects, screaming, head-banging).

7. Self-Stimulation--stimulation by use of hands only without the use of physical objects (scratching or fondling oneself or repetitive, stereotyped bodily movements such as flapping the hands or arms).

8. Physical Object Play--suspending, manipulating, or displacing an object with the use of the hands only.

9. Participant Requests--any verbal request given by adult participants that could be considered an appropriate cue for social response on the part of the child.

Procedure

Ss were observed with a familiar and unfamiliar female adult serving as participants. All observations were obtained in rooms with sound equipment and one-way mirrors from which all sections of the room could be seen or in similar settings when observation rooms were not available. The floor of each room was divided into four quadrants of equal size with masking tape. Each room was entirely empty with the exception of two chairs for the participants.

Before the session, the interactional procedure was explained to the two adult participants. They were instructed not to hold the child against his will, to offer only verbal encouragement, and to continuously call to the child until he came to them. After being admitted to the observation room, the adults took chairs placed in diagonally opposed quadrants. Seating arrangements were randomly varied for each subject.
Four interactions were presented during each session, each for a period of five minutes. The first interaction was designed as a "warm-up" period, with both adults instructed to react spontaneously to the child and to each other. At a signal from the examiner (knock on observation window or screen) the following randomized interactions were presented: both participants sitting quietly with no attempt to interact with the S in any way; familiar female participant attempting to call the S to sit on her lap, unfamiliar quiet; and the unfamiliar female participant attempting to call the S to sit on her lap, familiar quiet.

Video-tapes were made of the four interactions from the observation room. Two undergraduate students who had each received four hours of training later viewed the tapes to record the data with Esterline-Angus equipment. The recordings were made in a completely "blind" fashion, with the raters having no knowledge of the children's diagnostic category. One rater recorded behavioral data by utilizing nine buttons from one panel from the equipment while the second rater utilized four buttons of a second panel to record the amount of time the S spent in each quadrant. This procedure provided a means for recording more than one behavior simultaneously. The raters exchanged roles when reliability measures were taken.

One subject from each diagnostic group was selected at random during the 8 week video-tape viewing period as a reliability measure. At the end of the viewing period 4 different subjects, one from each diagnostic group, were again rated for reliability. Only behavioral ratings were replicated since these were found to be the most difficult.
RESULTS

Reliability

Reliability coefficients for the two raters as shown in the first part of Table 1 (insert Table 1 here) were calculated using the Spearman Rank-Order Method for each diagnostic category. The coefficient for each category represents ratings for a single subject, selected at random from the total population. These were calculated for all 8 behavioral categories in total. The proximity coefficients represent rank-order ratings for all 4 quadrants. These coefficients were consistently high, with only small differences among the various diagnostic groups.

The second part of Table 1 shows Pearson Product-Moment reliability coefficients for the two raters calculated for each behavioral category. Data from the same four Ss was utilized in these measures. The coefficients for Attending, Physical Contact, and Social Nonverbal behavior were somewhat lower than the rest, indicating that these traits may have been more difficult to rate consistently. However, even these coefficients for the remaining categories were extremely high.
Table 1
Reliability Coefficients for Behavioral Raters

<table>
<thead>
<tr>
<th></th>
<th>Autistic</th>
<th>Schizophrenic</th>
<th>Retarded</th>
<th>Normal</th>
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</thead>
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<tr>
<td><strong>Spearman Rank-Order Coefficients for Diagnostic Categories</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratings made during 8 week viewing period</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioral</td>
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<td>.93</td>
<td>.89</td>
<td>.86</td>
</tr>
<tr>
<td>Proximity</td>
<td>.96</td>
<td>.92</td>
<td>.96</td>
<td>.93</td>
</tr>
<tr>
<td>Ratings made at the end of the 8 week viewing period</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioral</td>
<td>.97</td>
<td>.99</td>
<td>.99</td>
<td>.99</td>
</tr>
</tbody>
</table>

**Pearson Product-Moment Coefficients for Behavioral Categories**

<table>
<thead>
<tr>
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<th>Verbal II</th>
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<td>Contact</td>
<td>.75</td>
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<tr>
<td>Social Nonverbal</td>
<td>.81</td>
<td>Atavisms</td>
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<td></td>
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<tr>
<td>Self Physical Stimulation</td>
<td>1.00</td>
<td>Object Play</td>
<td>1.00</td>
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</tbody>
</table>
Data Analysis

A single analysis of variance was performed on each of the first 8 behavioral variables and the 4 proximity variables. Separate analyses were performed on each variable in order to simplify and distinguish nosological effects. These consisted of 4 (diagnostic categories) x 4 (social interactions) analyses of variance with repeated measures on the last factor. The raw data consisted of the total time in seconds that the S engaged in each of the 8 behaviors and the total time of his location within each of the 4 quadrants of the observation room.

Two additional one way analyses of variance were performed on behavioral variable 9, Participant Requests. The raw data for these analyses consisted of the frequency of familiar and unfamiliar adult participant calls or requests to the S. Independent variables consisted of the 4 diagnostic categories.

The decision to use duration instead of frequency as a measure of behavior in the first 8 analyses of variance was based on the observation that some Ss rapidly changed behaviors while others spent long periods of time engaged in a specific behavior. Frequency measures would therefore be greatly misleading and duration was chosen as a much more accurate parameter of behavior. However, for variable 9, Participant Requests, frequency was felt to be the most revealing parameter since adult requests were usually very short and quite frequent.
Analyses of Behavioral Variables

Verbal I

Figure 1 demonstrates similar amounts of Verbal I (nonrepetitive intelligible verbal behavior used in a communicative or expressive way) for both normal and schizophrenic groups throughout the four interactions (insert Fig. 1 here). Mentally retarded Ss showed much more of this behavior during the B-Both Quiet and C-Familiar Call, Unfamiliar Quiet interactions than all other Ss. Autistic Ss demonstrated only negligible amounts of this behavior at all times.

A summary of the analysis of variance for Verbal I found in Table 2a of Appendix C, indicates significant effects due to Diagnosis $F (3, 108) = 7.98, p < .001$, and the interaction of Diagnosis x Social Interaction $F (9, 108) = 2.69, p < .01$.

Duncan's Multiple Range Test (Table 2b of Appendix C) (Edwards, 1964) indicates that the significant Diagnosis effect was due to the difference between the autistic group and all three remaining groups ($p < .01$). This test (Table 2c of Appendix C) also indicated that the significant Diagnosis x Social Interaction was due to an increase in Verbal I behavior by mentally retarded Ss, with a corresponding decrease by normal and schizophrenic Ss from the A-Both Call to the B-Both Quiet periods ($p < .01$).

Verbal II

Figure 2 shows that negligible amounts of Verbal II (repetitious verbal behavior, any non-meaningful response repeated within five seconds or non-intelligible verbalizations, gibberish etc.) were measured for the schizophrenic, mentally retarded, and normal groups throughout all inter-
Fig. 1. The number of seconds of Verbal I behavior as a function of the type of interaction with diagnosis as the parameter.
actions (insert Fig. 2 here). Schizophrenics demonstrated a slight increase in this type of behavior during the B-Both Quiet interaction. Autistic Ss demonstrated much greater amounts of this behavior at all times, with slight increases during the A-Both Call and D-Unfamiliar Calls, Familiar Quiet interactions.

A summary of the analysis of variance for Verbal II is shown in Table 3a of Appendix C. This indicates significant effects due to Diagnosis $F_{(3, 108)} = 6.37, p < .005$.

Duncan's Multiple Range Test (Table 3b of Appendix C) indicates that the significant Diagnosis effect was due to the difference between the autistic group and the three remaining groups ($p < .01$).

**Attending**

As shown in Fig. 3, normal Ss displayed the most Attending (visually attending to the adult's face) (insert Fig. 3 here). Mentally retarded Ss displayed slightly less amounts of this behavior, but much more than the other two groups. Both groups responded most during the C-Familiar Calls, Unfamiliar Quiet interaction. Schizophrenics demonstrated less Attending than normals or the mentally retarded but more that autistic Ss, with the exception of the B-Both Quiet interaction during which they fell below the level of the autistic group. Autistic Ss demonstrated negligible amounts of this behavior except during the B-Both Quiet period when they slightly exceeded the schizophrenics.

The analysis of variance for Attending as shown in Table 4a of Appendix C, indicated significant effects due to Diagnosis $F_{(3, 108)} = 4.54$, $p < .01$. 
Fig. 2. The number of seconds of Verbal II behavior, as a function of the type of interaction with diagnosis as the parameter.
Fig. 3. The number of seconds of Attending behavior as a function of the type of interaction with diagnosis as the parameter.
Duncan's Multiple Range Test (Table 4b of Appendix C) indicates that the Diagnosis effect was due to a significant difference in Attending between the autistic and normal Ss (p<.01).

**Physical Contact**

Figure 4 shows similar curves for all groups for Physical Contact (initiation and maintenance of physical contact by use of the hands, with another person, hand-holding, touching, and handling the adult) (insert Fig. 4 here). Schizophrenic Ss demonstrated somewhat more of this behavior than other Ss except during the B-Both Quiet period when they were the lowest. All groups responded with increased amounts of Physical Contact during the C-Familiar Calls, Unfamiliar Quiet interaction.

The analysis of variance for the Physical Contact variable (Table 5a of Appendix C) indicates significant effects due to the type of Social Interaction $F (3, 108) = 3.27, p<.025$.

Duncan's Multiple Range Test (Table 5b of Appendix C) revealed that the significant Social Interaction effect was due to greater amounts of Physical Contact for all diagnostic groups during the C-Familiar Calls, Unfamiliar Quiet interaction compared to lesser amounts during the A-Both Call and B-Both Quiet periods (p<.05) and greater amounts of this behavior for all groups during the D-Unfamiliar Calls, Familiar Quiet interaction as compared to the B-Both Quiet interaction (p<.05).

**Social Nonverbal**

Generally similar curves for all diagnostic groups were obtained for Social Nonverbal behavior (socially acceptable nonverbal activity
Fig. 4. The number of seconds of Physical Contact behavior as a function of the type of interaction with diagnosis as the parameter.
which requires cues given by the adult for its initiation or completion, child following the adult or activity initiated by the child and requiring involvement of adult) as shown in Fig. 5 (insert Fig. 5 here).

In general, all groups showed less of this behavior during the B-Both Quiet interaction and the most during the C-Familiar Calls, Unfamiliar Quiet and D-Unfamiliar Calls, Familiar Quiet interactions than any other group. The remaining groups correspond rather closely with less response to these interactions.

The analysis of variance for Social Nonverbal behavior (Table 6a of Appendix C) indicated significant effects due to the type of Social Interaction \( F(3, 108) = 8.91, p < .001 \).

Duncan's Multiple Range Test (Table 6b of Appendix C) indicates that the significant Social Interaction effect was due to the great increase in Social Nonverbal behavior by all groups during the C-Familiar Calls, Unfamiliar Quiet interaction as compared to lesser amounts by most groups during the B-Both Quiet and A-Both Call interactions. It was also due to large amounts of this behavior from all groups during the D-Unfamiliar Calls, Familiar Quiet interaction, as compared to the B-Both Quiet period \( p < .01 \).

Atavisms

Figure 6 indicates that only negligible amounts of Atavisms (behaviors in which the child is destructive towards himself or others, throwing objects, screaming, head-banging) were demonstrated at any time for any group (insert Fig. 6 here). The largest amount of this behavior was demonstrated by the schizophrenic group during the B-Both Quiet
Fig. 5. The number of seconds of Social Nonverbal behavior as a function of the type of interaction with diagnosis as the parameter.
interaction.

The analysis of variance for Atavisms (Table 7a of Appendix C) indicates no significant Diagnosis or Social Interaction effects.

**Self-Stimulation**

Figure 7 shows generally similar curves for all diagnostic groups as a function of the Social Interactions for Self-Stimulation (stimulation by use of hands only without the use of physical objects, scratching or fondling oneself or repetitive, stereotyped bodily movements such as flapping the hands or arms) (insert Fig. 6 here). Self-Stimulation increased in all groups during the B-Both Quiet interaction. The autistic group demonstrated an increase in this type of behavior during the D-Unfamiliar Calls, Familiar Quiet interaction while all three remaining groups showed much less of this behavior. The autistic group also demonstrated the most Self-Stimulation in general, the schizophrenic group the least.

The analysis of variance for Self-Stimulation (Table 8a of Appendix C) indicates no significant Diagnosis or Social Interaction effects.

**Physical Object Play**

Figure 8 shows extreme variation among all diagnostic groups over all interactions for Physical Object Play (suspending, manipulating, or displacing an object with the use of the hands only) (insert Fig. 8 here). The autistic Ss displayed much greater amounts of this behavior than the other groups, with the highest measurements during the B-Both Quiet periods. The schizophrenic group was the next highest, with the largest measurements during the B-Both Quiet and D-Unfamiliar Calls, Familiar Quiet periods. The mentally retarded and normal groups were respective-
Fig. 6. The number of seconds of Atavism behavior as a function of the type of interaction with diagnosis as the parameter.
Fig. 7. The number of seconds of Self-Stimulation behavior as a function of the type of interaction with diagnosis as the parameter.
ly much lower, with greater amounts of this behavior during the B-Both Quiet period. In general, the least amount of Physical Object Play for all groups was measured during the initial A-Both Call interaction.

The analysis of variance for Physical Object Play (Table 9a of Appendix C) indicates a significant Diagnosis effect $F(3, 108) = 3.67$, $p < .05$.

Duncan's Multiple Range Test (Table 9b of Appendix C) indicates that the significant Diagnosis effect was due to the difference in the amount of Physical Object Play between the autistic and normal Ss ($p < .05$) and between autistic and mentally retarded Ss ($p < .05$). No difference was found between autistic and schizophrenic Ss on this variable.

**Participant Requests**

The analyses of variance for the familiar and unfamiliar adult participants (Table 10a of Appendix C) indicates no significant differences with respect to the required number of calls to the various diagnostic groups. A comparison of data also showed very little difference between the total frequency of calls for familiar and unfamiliar participants.

**Summary of Behavioral Findings**

Verbal I-significant effects due to Diagnosis and the interaction of Diagnosis x Social Interaction.

Verbal II-significant effects due to Diagnosis.

Attending-significant effects due to Diagnosis.

Physical Contact-significant effects due to Social Interaction.

Social Nonverbal-significant effects due to Social Interaction.

Atavisms-no significant effects.
Fig. 8. The number of seconds of Physical Object Play behavior as a function of the type of interaction with diagnosis as the parameter.
Self-Stimulation-no significant effects.

Physical Object Play-significant effects due to Diagnosis.

Participant Requests-no significant effects.

Analyses of Proximity Variables

Familiar Adult Quadrant

Figure 9 shows similar curves for the schizophrenic, mentally retarded, and normal groups with respect to the number of seconds spent within the familiar adult's quadrant. The autistic Ss spent much less time in this quadrant during the A-Both Call, B-Both Quiet, and C-Familiar Calls, Unfamiliar Quiet interactions than any other group. All groups responded similarly to the interactions, spending the most time within the familiar adult quadrant during the period when that person called, the least amounts of time were spent within this quadrant during the B-Both Quiet and D-Unfamiliar Calls, Familiar Quiet periods (insert Fig. 9 here).

The analysis of variance of the Familiar Adult Quadrant (Table 11a of Appendix D) indicated a significant main effect for the type of Social Interaction $F(3, 108) = 5.54, p < .005$, regardless of Diagnosis.

Duncan's Multiple Range Test (Table 11b of Appendix D) indicates that the significant Social Interaction effect was due to much greater amounts of time spent within the Familiar Adult Quadrant during the C-Familiar Calls, Unfamiliar Quiet period as compared to much less time within this quadrant during the B-Both Quiet and D-Unfamiliar Calls, Familiar Quiet periods ($p < .01$).
Fig. 9. The number of seconds within the Familiar Adult Quadrant as a function of the type of interaction with diagnosis as the parameter.
Unfamiliar Adult Quadrant

Figure 10 shows extremely similar curves for all groups with respect to the amount of time spent within the Unfamiliar Adult Quadrant with the exception of the autistic group (insert Fig. 10 here). Autistic Ss spent much more time within this quadrant during the A-Both Call and B-Both Quiet periods than other Ss. All groups in general spent the most time within the Unfamiliar Adult Quadrant in response to the D-Unfamiliar Calls, Familiar Quiet interaction. The least amounts of time were spent within this quadrant during the A-Both Call and C-Familiar Calls, Unfamiliar Quiet periods. There was also a trend for all Ss to enter the Unfamiliar Adult Quadrant during the B-Both Quiet period.

The analysis of variance for the Unfamiliar Adult Quadrant (Table 12a of Appendix D) indicated significant effects due to the type of Social Interaction $F(3, 108) = 7.76, p < .001$.

Duncan's Multiple Range Test (Table 12b of Appendix D) indicates that the significant Social Interaction effect was due to much greater amounts of time spent within the Unfamiliar Adult Quadrant by all groups during the D-Unfamiliar Calls, Familiar Quiet interaction as compared to the amount to time spent within this quadrant during all other interactions ($p < .01$).

Empty Quadrants

Since both Empty Quadrants were approximately equivalent, the data for the two quadrants was collapsed into a single graph. The four diagnostic groups show only negligible variation in terms of the amount of time spent within Empty Quadrants. The autistic group, in general, spent the most time within the Empty Quadrants, the schizophrenic group the
Fig. 10. The number of seconds within the Unfamiliar Adult Quadrant as a function of the type of interaction with diagnosis as the parameter.
Fig. 11. The number of seconds within the Empty Quadrant as a function of the type of interaction with diagnosis as the parameter.
least, with the normal and mentally retarded varying between these two extremes. There were no definite reactions in terms of the Social Interactions with respect to the Empty Quadrants (insert Fig. 11 here).

The analyses of variance for the Empty Quadrants (Table 13a of Appendix D) indicates no significant Diagnosis or Social Interaction effects.

**Summary of Proximity Findings**

- **Familiar Adult Quadrant**-significant effects due to Social Interaction.
- **Unfamiliar Adult Quadrant**-significant effects due to Social Interaction.
- **Empty Quadrants**-no significant effects.
DISCUSSION

In order to assess the relative effectiveness of the present investigations in terms of the proposed goals two questions must be examined: (1) Did the experimental technique provide an objective and efficient means for examining the behavior of severely disturbed children? and (2) Was it possible to clearly differentiate groups of children of autistic, schizophrenic, mentally retarded, and normal classifications by analysis of the experimental data?

When the 14 behavioral and proximity variables were examined, only 4 of the behavioral measures revealed significant differences among diagnostic groups. These measures were: Verbal I, Verbal II, Attending, and Physical Object Play. Subjects as autistic demonstrated significantly less amounts of Verbal I (nonrepetitive, intelligible verbal behavior used in a communicative or expressive way) than those classified as schizophrenic, mentally retarded, and normal. Subjects classified as autistic demonstrated significantly more Verbal II (repetitious verbal behavior, any nonmeaningful response repeated within five seconds or nonintelligible verbalizations, gibberishm etc.) than those classified as schizophrenic, mentally retarded, and normal. In Attending (visually attending to the adult's face) Ss classified as autistic showed significantly less amount of this behavior than Ss classified as normal. Ss classified as autistic demonstrated significantly more Physical Object Play (suspending, manipulating, or displacing an object with the use of the hands only) than Ss classified as mentally retarded and normal.

The only variables that significantly differentiated Ss classified as autistic from those classified as schizophrenic were Verbal I and Verbal II.
On these variables autistic Ss varied extremely from all other groups, including schizophrenics. The lack of communicative speech has been recognized as a major diagnostic feature of autism (Kanner, 1965; Wing, 1966, Rimland, 1964) and in the present research appears to be the only behavioral trait that clearly distinguishes these two similar nosological groups. Although Ss classified as autistic and normal were significantly different in terms of Attending and Physical Object Play, autistic Ss were not significantly different from schizophrenics on these variables.

In terms of the proximity variables, all of the nosological groups responded similarly, showing a tendency to move to the proximity of the adult who offered the social invitation. This was demonstrated by the significant Social Interaction effects. Subjects from all nosological categories spent the most time within the Familiar Adult Quadrant when only the familiar person made the social invitation, and the most time within the Unfamiliar Adult Quadrant when only the unfamiliar person offered a social invitation.

In view of these results, the most outstanding factor in terms of what might have been expected from children from these nosological categories is the lack of primary autistic behavioral traits as defined by Kanner (1965) in those children classified as autistic by clinicians closely associated with the therapeutic training programs. A primary feature of Kanner's syndrome not demonstrated by the autistic children of this study was extreme self-isolation. Some of the secondary features however, such as the failure to use language for the purpose of communication and fascination for objects, were shown.
One factor to be considered here, is the influence of the programs in which the children were enrolled. Most of the older autistic and schizophrenic Ss had been attending some form of treatment or training program for several years. Lovaas (1965) found that social behavior for autistic children was directly related to the amount of time spent in treatment. Thus, the children employed in this study may have maintained quite different behavioral patterns before treatment. The fact that all of the severely disturbed children included in the study were living in their own homes could also have greatly influenced social behavior.

The age of the children in the four diagnostic categories should be considered as a possible influential factor in this study. An analysis of variance for chronological age (Table 14a of Appendix E) revealed significant differences in mean age among the four groups. Duncan's Multiple Range Test (Table 14b of Appendix E) indicated that the mean age for the normal group was significantly lower than those for the other three groups. The mean age for the mentally retarded group was significantly lower than those for the schizophrenic and autistic groups. The schizophrenic and autistic groups were not significantly different in mean age. The age factor might therefore be expected to have reduced variation since the immature behavior of the younger normal and mentally retarded Ss might have been similar to that of the more disturbed Ss due to less advanced sociability. Unfortunately, it was not possible to obtain age equivalent Ss in all four categories. The age factor may therefore had added to the conservatism of the investigation in terms of reducing behavioral differences.
The results should also be examined in terms of the experimental situation. The technique proved to be extremely powerful in terms of gaining the social participation of Ss. This was true even for the more severely disturbed children. The limited size of the experimental rooms and the aura of difference about a bare room might be considered as factors that would influence both behavioral and proximity variables. Also, the behavior and attitude of the adult participants, continuous calling of Ss, etc., would seem important. The fact that all Ss responded to the unfamiliar participant may have been partially due to the 20 minute exposure to this person with a familiar person. In a study by Ainsworth & Bell (1970) the "stranger" entered the experimental room and the familiar participant (child's mother) left. This type of situation would seem much more stringent in terms of a child's relationship to an unfamiliar person than one in which both familiar and unfamiliar individuals were continually present.

The results of this investigation demonstrated that behavioral expectations for children classified in specific psychiatric categories were not consistent with their actual behaviors. Children classified as autistic and schizophrenic did not show many of the classical behavioral traits associated with these syndromes. Contrary to expectation, they were nearly as socially responsive as those Ss classified as mentally retarded and normal. These findings indicate a need for studying and treating behavior per se, not nosological syndromes. The labeling and consideration of individuals within a specific nosological framework leads to the search for specific behaviors that fit the framework. If this is the type of activity
that takes place to satisfy classification demands, the system would clearly seem to reward finding maladaptive behaviors since only maladaptive symptoms are included in currently used behavioral descriptions (American Psychiatric Association, 1965). A clinician searching for a specific type of behavior must certainly respond positively to any suggestion of that behavior, either adaptive or maladaptive in an individual. Thus, the nosological approach in itself could be detrimental to the care and understanding of individuals requiring psychiatric or psychological attention. It does not seem implausible that maladaptive behaviors not initially associated with an individual may become conveyed and instigated by an over zealous clinician determined to make an "accurate" diagnosis. Also, behaviors that might be adaptive or otherwise important may be excluded and not reinforced if they do not coincide with the requirements for a specific syndrome. Ullman & Krasner (1966) indicated that most individuals are placed in categories for which very few of their behavioral traits fit and that those traits that do not meet the specifications are usually ignored.

The nosological system also does not allow for changes in behavior. Therefore, when behavioral change takes place the only alternative is to re-diagnose. This usually means placing the individual in an entirely different category. This factor may apply to many of the Ss included in the present investigation who changed with treatment. A lack of appropriate alternative categories may cause them to be left in severely disturbed inappropriate classifications. Behavioral change is usually a very gradual process, thus a system that cannot provide a continuous scale
fails to offer accurate classifications. Since change is one of the most important aspects of treatment and assessment, it would seem important to allow for this in the diagnostic description of an individual.

A distinction between what we now have in the present nosological system and what is needed thus becomes clear. Only the classifications or pigeonholing of behavior in terms of symptoms is presently possible. What seems needed is a system based upon actual measurement of behavior with quantitative diagnostic descriptions. The presumption that symptoms or behaviors are important only in relation to an underlying disease process now seems totally unreasonable, especially when so many real behaviors are observed that do not support the expectations for an underlying disease process.

The technique utilized in the present investigation provided a means for studying 8 important behaviors without nosological bias due to a completely blind rating system. These behaviors were found to occupy the following percentages of time for each group during the observation period: autistic 21%, schizophrenic 22%, mentally retarded 31%, and normal 25%. A t-test of these values indicated that they were not significantly different. What the Ss were doing during the remainder of the time was usually not observable. Since the 8 categories were relatively exhaustive, it may be assumed that the Ss were not engaged in any other overt behaviors during the remainder of the time.

The facility of the experimental technique as a diagnostic tool was demonstrated by the ease and reliability with which two psychologically naive undergraduate students examined the behavior of children from widely...
divergent and similar nosological groups. The major difficulties with the method involved the mechanical and technical operation of equipment, resulting at times in poor audio and video quality. These factors were due largely to inadequate facilities for video-taping at the various locations where the pictures were taken. Even under adverse viewing conditions, raters were still able to measure behavioral qualities of severely disturbed children reliably and without the subjectivity of most psycho-diagnostic techniques.

Some of the difficulties have been explored that are encountered by attempting to arbitrarily assign individuals to nosological groups in order to study behavior in relation to a classical syndrome. The experimental technique utilized in this study offers an opportunity to avoid this frustrating and often futile diagnostic task. Since the behaviors for each group of children in the present study were measured by identical methods, it becomes possible to make direct comparisons. A means is provided for establishing a baseline and behavioral range along which the quantitative aspects of specific behaviors may be examined. Also, an individual's behavior may be compared to a group or other individual's to evaluate his position in relation to others as suggested by Ferster and DeMyer (1962). A means is thus provided for assessing the degree of behavioral deviation among the four diagnostic groups of this study. This method could provide a more objective measure if Ss were individually compared, without assignment to nosological categories. However, since one of the major goals of the present study was to investigate the relationship of children assigned to various nosological categories, the comparison will be made in terms of
the established groups.

By exploring the cell means of the 4 statistically significant behavioral variables for the Diagnosis effect, it becomes possible to more explicitly compare the nosological groups both quantitatively and qualitatively. The Diagnosis cell means for Verbal I, Verbal II, Attending, and Physical Object Play were thus examined. The quantitative range for each behavior was represented by the autistic group at one extreme and the normal group at the other with the exception of Verbal I, where mentally retarded and normal groups were interchanged at the upper end of the range. The quantitative aspects of these behaviors may thus be viewed as a continuum of adaptive or maladaptive functioning with respect to the quality of the specific behavior. In all cases, the autistic group falls at the maladaptive extreme, with the normal group usually at the adaptive end of the continuum. The schizophrenic group falls between these two extremes; on Verbal I and Verbal II closer to the adaptive end of the range, on Attending and Physical Object Play closer to the maladaptive end of the range. The similarity of the autistic and schizophrenic groups thus varied, however, their respective positions on the continuum remained constant, with the autistic representing the most extreme behavior at all times in comparison to the less severe fluctuation of the schizophrenic group. The mentally retarded group remained closest to the normal group on all four behaviors.

By examining the behavior of groups or individuals in the manner presented in this study, it becomes possible to avoid the nosological problem of attempting to match individuals with a predetermined set of
symptoms. Behaviors can be measured and individuals compared to others in an objective quantitative manner. Labeling therefore, does not become imperative nor does it serve as a source of misleading information. Norms and standard deviations may be calculated for different types of behavior and for various populations. Such a system would seem to facilitate both diagnosis and treatment.

In view of the results of the investigation, there are several implications for future studies. The first of these might be to compare the results of the present work to those obtained with children in autistic and schizophrenic classifications who are institutionalized and thus more limited in their social and therapeutic contacts. It would also prove interesting to attempt to obtain a carefully screened diagnostic group to analyze behaviorally in order to determine what behaviors may not fit or are directly opposed to the classification specifications. Etiological implications could be studied by employing the parents of children in the social interactions as compared to therapists or strangers. The technique itself allows for infinite variations in the type of interactional situation that may be designed or the tasks that may be utilized.
SUMMARY

A technique was developed to objectively measure the interactional behavior of severely disturbed children. An attempt was made to differentiate groups of children of autistic, schizophrenic, mentally retarded, and normal classifications by analysis of behavioral data. Ten children were included in each diagnostic group. Video tapes were made of each child in a series of four social interactional situations with a familiar and unfamiliar female adult. The tapes then viewed by two undergraduate students in a completely "blind" fashion. An esterline-Angus multiple pen event recorder was used to measure all subject behavior. One student made continuous recordings of eight different subject behaviors while the other simultaneously recorded the subject's location in the observation room.

Analyses of Variance were performed on each of the behavioral and location variables. The results indicated significant differences among the diagnostic groups on four of the behavioral variables. These variables were defined as:

1. Verbal I-nonrepetitive, intelligible verbal behavior used in a communicative or expressive way.

2. Verbal II-repetitious verbal behavior (any nonmeaningful response repeated within five seconds or nonintelligible verbalizations, gibberish, etc.)

3. Attending-visually attending to the adult's face.

4. Physical Object Play-suspending, manipulating, or displacing an object with the use of the hands only.

On Verbal I and Verbal II, Ss classified as autistic were significantly different from all other Ss, demonstrating less Verbal I and more Verbal II. Autistic Ss demonstrated significantly less amounts of Attending
than normal Ss. Also, autistic Ss showed significantly greater amounts of Physical Object Play than mentally retarded and normal Ss.

The quantitative aspects of these behaviors were viewed as a continuum of adaptive or maladaptive functioning with respect to the quality of the specific behavior. In all cases, the autistic group fell at the maladaptive extreme with the normal group usually at the adaptive end of the continuum. The schizophrenic group fell between these two extremes, with Verbal I and Verbal II closer to the adaptive extreme and Attending and Physical Object Play behaviors closer to the maladaptive end of the continuum. The mentally retarded and normal groups both remained nearest the adaptive end of the continuum on all four significant behaviors.

The usefulness of the experimental technique was described in terms of providing a means for establishing a baseline and behavioral range which quantitative aspects of behavior can be measured. Individual or group behavior may thus be compared in a direct objective manner.
REFERENCES


Appendix A

Instructions to Participants
INSTRUCTIONS

You will be seated in an empty observation room for a 20 minute period for the purpose of video-taping four 5 minute social interactions with a young child. Please take seats as instructed as soon as you enter the room. Do not leave your seats at any time during the session. A chart on the wall of the room will signify the interactional order and the procedure to follow. The four interactions will include: adjustment period, both adults reacting spontaneously to the child and to each other, familiar adult attempting to call child to sit on her lap, unfamiliar adult quiet, unfamiliar adult attempting to call child to sit on her lap, familiar adult quiet, and both adults sitting quietly with no attempt to interact with the child in any way except to answer questions. Be sure that the interactions are followed in the order listed on the wall chart. The adjustment interaction will begin as soon as you enter the room and are seated. During this period feel free to talk with the other adult participant or with the child. At the first signal (knock on the one-way glass) immediately begin interaction number 2. At each following signal switch immediately to the next listed interaction. If the child is on your lap put him down immediately if the interaction changes.

It is very important that you use only verbal encouragement when it is your turn to call the child to sit on your lap. Be sure to continuously encourage the child to sit on your lap. Be sure to continuously encourage the child at approximately 10 second intervals to come to you and to sit on your lap as long as he resists. If he comes to you, you may put out your arms to pick him up, but do not lift him to your lap if he does not
initiate the move. As long as he is willingly sitting on your lap you
may hold him and talk with him but do not attempt to hold him against
his will.

Please do not talk with the child during the "both quiet" period
unless he directly asks you a question.

Please leave all pocketbooks, large jewelry or accessories, etc.
outside the observation room.
Appendix B

Classification Procedure for Autistic and Scizophrenic Subjects
CLASSIFICATION PROCEDURE

Directions

(1) Read the two paragraphs denoting the criteria for classifying children as "autistic" and "schizophrenic".

(2) Consider the behavior of the child under each of the 7 categories and assess each as either (A) autistic, (S) schizophrenic, or (N) neither.

(3) Classify the child with respect to the largest total for the 7 categories. If information is not available for some categories base your decision on those that remain. In the event of a tie make an arbitrary choice.

Autistic Criteria

The predominant characteristics of this category as defined by Kanner are: (1) an extreme detachment from human contact, (2) an obsessive desire for the maintenance of sameness, (3) a fascination with objects which are handled with skill in fine motor movements, and (4) failure to use language for the purpose of communication. The autistic child's withdrawal is usually noticeable in the first year of life. The child does not meet the eyes of others, fails to imitate the actions of his parents or other children, and rejects physical contacts. Most of the day he engages in self-generated activities. If the child approaches an adult, it is to use the adult as a tool. If the adult frustrates the child or fails to set the stage for the child's customary routines, the child may become enraged or anxious, or the child may not react obviously but retreat to manipulation of an inanimate object or his own body. Generally peers are ignored.
Another important feature in the autistic child's behavior with adults is his extreme negativism. The withdrawal itself can be considered an extreme form of negativism. With toys, the autistic child is singularly uncreative. He uses only a few toys or objects. His toy play is highly idiosyncratic, although sometimes skillful. He seldom combines two toys or objects. He will not play with an examiner, accept a role suggested to him by an examiner, or play in an imaginative manner. While the child may use some words, again in an idiosyncratic manner, he does not use words for interpersonal communication. Oftentimes the child is mute.

**Schizophrenic Criteria**

These children have some conversational ability and more normal eye-to-eye contact than the autistic. While the emotional reaction to an examiner is often inappropriate, the child generally shows some conformance to social amenities and responds positively to some requests. In other words, his negativism is less intense than the autistic child's. Thus the child will perform to some extent on psychological tests, although he does so erratically. He has some conversational speech, but idiosyncratic distortions, varying widely from child to child, are always present, such as tangentiality, pronoun reversal, abnormalities of voice pitch, echolalia, extreme preoccupations, and sometimes delusions and hallucinations.
Categories

1. Interaction with adults.
2. Peer relationships.
3. Use of toys and play behavior.
4. Verbal behavior.
5. School and intellectual performance.
6. Special symptoms.
7. Projective tests.
Appendix C

Analyses of Variance Tables for Behavioral Variables

with Duncan Multiple Range Tests
### Table 2a

Analysis of Variance for Verbal I

<table>
<thead>
<tr>
<th>Source</th>
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<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
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<td>.001</td>
</tr>
<tr>
<td>I (Social Interaction)</td>
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<td>.22</td>
<td></td>
</tr>
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<td>.01</td>
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### Table 2b

Duncan's Multiple Range Test for (D)

Diagnosis Effect for Verbal I ($p < .01$)

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<th>Means</th>
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<th>(3)</th>
<th>(4)</th>
<th>(5) Signifcant Ranges</th>
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<td></td>
<td>(A)</td>
<td>(S)</td>
<td>(N)</td>
<td>(R)</td>
<td>Shortest Ranges</td>
</tr>
<tr>
<td></td>
<td>.22</td>
<td>68.38</td>
<td>75.54</td>
<td>89.07</td>
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</tr>
<tr>
<td>A</td>
<td>68.16**</td>
<td>75.32**</td>
<td>88.85**</td>
<td>R₂ = 54.65</td>
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</tr>
<tr>
<td>S</td>
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<td>13.53</td>
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<td>R</td>
<td>89.07</td>
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</tr>
</tbody>
</table>

** Significant at .01 level.

Note.-A-autistic, S-schizophrenic, N-normal, R-retarded.

Note.-Any two treatment means not underscored by the same line are significantly different.

Note.-Any two treatment means underscored by the same line are not significantly different.
Table 2c

Duncan's Multiple Range Test (p<.01) for

(DI) Diagnosis x Social Interaction Effect for Verbal I

<table>
<thead>
<tr>
<th>Means</th>
<th>(1) NB</th>
<th>(2) SB</th>
<th>(3) SC</th>
<th>(4) RA</th>
<th>(5) RD</th>
<th>(6) NC</th>
<th>(7) SA</th>
<th>(8) SD</th>
<th>(9) NA</th>
<th>(10) ND</th>
<th>(11) RC</th>
<th>(12) RB</th>
<th>(13) Shortest Significant Ranges</th>
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</thead>
<tbody>
<tr>
<td>NB</td>
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<td>9.1</td>
<td>14.0</td>
<td>26.6</td>
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<td>36.5</td>
<td>42.9</td>
<td>49.1</td>
<td>70.9**</td>
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<td>SB</td>
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<td>3.6</td>
<td>8.5</td>
<td>21.1</td>
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<td>27.4</td>
<td>31.0</td>
<td>37.4</td>
<td>43.6</td>
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<td>18.0</td>
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<td>27.4</td>
<td>33.8</td>
<td>40.0</td>
<td>56.9**</td>
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<td>RA</td>
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<td>6.3</td>
<td>9.9</td>
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<td>22.5</td>
<td>44.3</td>
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<td>5.8</td>
<td>9.4</td>
<td>15.8</td>
<td>22.0</td>
<td>43.8</td>
<td>R_7 = 50.67</td>
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<tr>
<td>SA</td>
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<td>6.0</td>
<td>12.4</td>
<td>18.6</td>
<td>40.4</td>
<td>R_8 = 51.20</td>
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<tr>
<td>SD</td>
<td>81.8</td>
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<td>10.0</td>
<td>16.2</td>
<td>38.0</td>
<td>R_9 = 51.64</td>
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<td></td>
<td></td>
<td></td>
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<td>12.6</td>
<td>34.4</td>
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<td>21.8</td>
<td>R_11 = 52.37</td>
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<td></td>
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<td>R_12 = 52.68</td>
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</tr>
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<td>RB</td>
<td>119.8</td>
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Table 3a

Analysis of Variance for Verbal II

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<td>82.17</td>
<td>.38</td>
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<td>117.97</td>
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<td>215.58</td>
<td>6.37</td>
<td>.005</td>
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Table 3b

Duncan's Multiple Range Test for (D) Diagnosis Effect for Verbal II (p<.01)

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<th>(5) Shortest Significant Ranges</th>
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<tr>
<td></td>
<td>N</td>
<td>R</td>
<td>S</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td>0.10</td>
<td>1.66</td>
<td>27.38**</td>
<td><strong>R_2 = 20.69</strong></td>
</tr>
<tr>
<td>N</td>
<td>0.00</td>
<td>.10</td>
<td>1.66</td>
<td>27.38**</td>
<td><strong>R_3 = 21.58</strong></td>
</tr>
<tr>
<td>R</td>
<td>0.10</td>
<td>1.56</td>
<td></td>
<td>25.72**</td>
<td><strong>R_4 = 22.17</strong></td>
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<tr>
<td>S</td>
<td>1.66</td>
<td></td>
<td>25.72**</td>
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<tr>
<td>A</td>
<td>27.38</td>
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N R S A
### Table 4a

**Analysis of Variance for Attending**

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<td>I</td>
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### Table 4b

**Duncan's Multiple Range Test for (d)**

**Diagnosis Effect for Attending (p<.01)**

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<tr>
<th>Means</th>
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<th>(3) R</th>
<th>(4) N</th>
<th>(5) Shortest Significant Ranges</th>
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<td>11.72</td>
<td>28.32</td>
<td>38.15</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
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</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

| A | 3.58  | 8.14  | 24.74 | 34.57** | R₂ = 28.62 |
| S | 11.72 | 16.60 | 22.85 |         | R₃ = 29.85 |
| R | 28.32 |       | 9.83  |         | R₄ = 30.68 |
| N | 38.15 |       |       |         |           |

<table>
<thead>
<tr>
<th>A</th>
<th>S</th>
<th>R</th>
<th>N</th>
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</thead>
</table>
Table 5a

Analysis of Variance for Physical Contact

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<td>5331.51</td>
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Table 5b

Duncan's Multiple Range Test for (I)

Social Interaction Effect for Physical Contact (p<.05)

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<th>Mean</th>
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<th>(5)</th>
<th>Shortest Significant Ranges</th>
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<tr>
<td></td>
<td>B</td>
<td>43.70</td>
<td>2.73</td>
<td>27.10*</td>
<td>31.16*</td>
<td>R₂ = 25.27</td>
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<tr>
<td></td>
<td>A</td>
<td>46.43</td>
<td>24.37</td>
<td>28.43*</td>
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<td>R₃ = 26.61</td>
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<td>D</td>
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<td>4.06</td>
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<tr>
<td></td>
<td>C</td>
<td>74.80</td>
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</table>

* Significant at .05 level.

Note.- B-Both Quiet, A-Both Call, D-Unfamiliar Calls, Familiar Quiet, C-Familiar Calls, Unfamiliar Quiet.
Table 6a

Analysis of Variance for Social Nonverbal

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Table 6b

Duncan's Multiple Range Test for (I) Social Interaction Effect for Social Nonverbal (p<.01)

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<th>(3)</th>
<th>(4)</th>
<th>(5) Shortest Significant Ranges</th>
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<td>77.77**</td>
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<td>R₃ = 45.30</td>
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<td>26.19</td>
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<td>R₄ = 46.56</td>
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<tr>
<td>C</td>
<td>114.85</td>
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</table>

B A D C
Table 7a

Analysis of Variance for Atavism

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<td>1.38</td>
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</tr>
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<td>.29</td>
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<td>DI</td>
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<td>5.46</td>
<td>.71</td>
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Table 8a

Analysis of Variance for Self-Stimulation

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<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
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<tbody>
<tr>
<td>D</td>
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<td>2885.41</td>
<td>.68</td>
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<tr>
<td>I</td>
<td>3</td>
<td>1349.79</td>
<td>1.80</td>
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</tr>
<tr>
<td>DI</td>
<td>9</td>
<td>886.64</td>
<td>1.18</td>
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</tr>
<tr>
<td>SI/D</td>
<td>108</td>
<td>752.20</td>
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Table 9a
Analysis of Variance for Physical Object Play

<table>
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<tr>
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<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
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<td>53822.88</td>
<td>3.67</td>
<td>.05</td>
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<td>1.86</td>
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<td>924.69</td>
<td>.53</td>
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<td>SI/D</td>
<td>108</td>
<td>1752.12</td>
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Table 9b
Duncan's Multiple Range Test for (D)
Diagnosis Effect for Physical Object Play (p < .05)

<table>
<thead>
<tr>
<th>Means</th>
<th>(1) N</th>
<th>(2) R</th>
<th>(3) S</th>
<th>(4) A</th>
<th>(5) Shortest Significant Ranges</th>
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<tbody>
<tr>
<td>N</td>
<td>7.54</td>
<td>24.54</td>
<td>53.42</td>
<td>91.33</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>24.54</td>
<td>45.88</td>
<td>66.79*</td>
<td></td>
<td>R2 = 55.37</td>
</tr>
<tr>
<td>S</td>
<td>53.42</td>
<td>37.91</td>
<td></td>
<td></td>
<td>R3 = 58.24</td>
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<tr>
<td>A</td>
<td>91.33</td>
<td>83.79*</td>
<td></td>
<td></td>
<td>R4 = 59.97</td>
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Table 10a
Analysis of Variance for Participant Requests

<table>
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<th>P</th>
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<tbody>
<tr>
<td><strong>Familiar Adult</strong></td>
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<td></td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>101.97</td>
<td>1.31</td>
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</tr>
<tr>
<td>S(D)</td>
<td>36</td>
<td>77.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unfamiliar Adult</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>63.57</td>
<td>.95</td>
<td></td>
</tr>
<tr>
<td>S(D)</td>
<td>36</td>
<td>66.73</td>
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Appendix D

Analyses of Variance Tables for Proximity Variables

with Duncan Multiple Range Tests
Table 11a

Analysis of Variance for the Familiar Adult Quadrant

<table>
<thead>
<tr>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>D</td>
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<td>16845.00</td>
<td>.43</td>
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<tr>
<td>I</td>
<td>3</td>
<td>41995.02</td>
<td>5.54</td>
<td>.005</td>
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<tr>
<td>DI</td>
<td>9</td>
<td>2448.90</td>
<td>.32</td>
<td></td>
</tr>
<tr>
<td>SI/D</td>
<td>108</td>
<td>7580.83</td>
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Table 11b

Duncan's Multiple Range Test for (I) Social Interaction Effect for the Familiar Adult Quadrant (p .01)

<table>
<thead>
<tr>
<th>Means</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5) Significant Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>102.56</td>
<td>118.31</td>
<td>140.09</td>
<td>177.35</td>
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</tr>
<tr>
<td></td>
<td>15.75</td>
<td>37.53</td>
<td>74.79**</td>
<td>R₂ = 51.84</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>118.31</td>
<td></td>
<td>21.78</td>
<td>59.04**</td>
<td>R₃ = 54.04</td>
</tr>
<tr>
<td>A</td>
<td>140.09</td>
<td></td>
<td></td>
<td>37.26</td>
<td>R₄ = 55.55</td>
</tr>
<tr>
<td>C</td>
<td>177.35</td>
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</table>
Table 12a

Analysis of Variance for the Unfamiliar Adult Quadrant

<table>
<thead>
<tr>
<th>Source</th>
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<th>P</th>
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</thead>
<tbody>
<tr>
<td>D</td>
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<td>8833.16</td>
<td>.68</td>
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<tr>
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<td>3</td>
<td>38082.56</td>
<td>7.76</td>
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<td>DI</td>
<td>9</td>
<td>1870.22</td>
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<tr>
<td>SI/D</td>
<td>108</td>
<td>4906.72</td>
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Table 12b

Duncan's Multiple Range Test for (I)

Social Interaction Effect for the Unfamiliar Adult Quadrant (p<.01)

<table>
<thead>
<tr>
<th>Means</th>
<th>(1) C</th>
<th>(2) A</th>
<th>(3) B</th>
<th>(4) D</th>
<th>(5) Significant Ranges</th>
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<tbody>
<tr>
<td>C</td>
<td>30.70</td>
<td>45.34</td>
<td>60.72</td>
<td>102.22</td>
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</tr>
<tr>
<td>A</td>
<td>45.34</td>
<td>15.38</td>
<td>71.52**</td>
<td>R2 = 41.68</td>
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<td>B</td>
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<td>47.50**</td>
<td>R3 = 43.46</td>
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<tr>
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<td>102.22</td>
<td>56.88**</td>
<td>R4 = 44.66</td>
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C A B D
Table 13a

Analysis of Variance for the Empty Quadrants

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<tr>
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<td>1483.36</td>
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<tr>
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Appendix E

Analysis of Variance Table for Chronological Age of Subjects with Duncan Multiple Range Test
### Table 14a
Analysis of Variance for Chronological Age of Subjects

<table>
<thead>
<tr>
<th>Source</th>
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<th>P</th>
</tr>
</thead>
<tbody>
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<td>D</td>
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### Table 14b
Duncan's Multiple Range Test for (D)
Diagnosis Effect for Chronological Age (P<.01)

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<tr>
<th>Means</th>
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<th>(3)</th>
<th>(4)</th>
<th>(5) Significant Ranges</th>
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<tbody>
<tr>
<td></td>
<td>N</td>
<td>R</td>
<td>A</td>
<td>S</td>
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<td>2.70*</td>
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</table>

<table>
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<th></th>
<th>N</th>
<th>R</th>
<th>A</th>
<th>S</th>
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</thead>
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<td>R₂ = .77</td>
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<tr>
<td>R₃ = .81</td>
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<tr>
<td>R₄ = .83</td>
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