THE RELATIONSHIP BETWEEN MATERNAL BEHAVIORS AND A CHILD'S CURIOSITY AND PLAY BEHAVIOR

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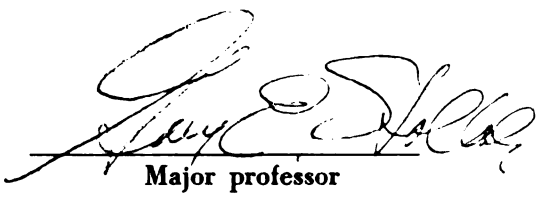

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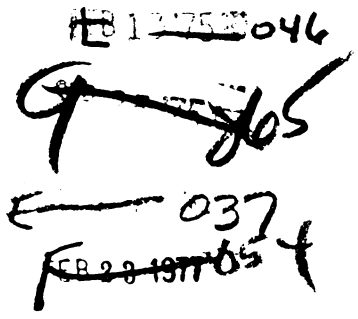

ABSTRACT

THE RELATIONSHIP BETWEEN MATERNAL BEHAVIORS AND A CHILD'S CURIOSITY AND PLAY BEHAVIOR

by Robert M. Saxe

Most of the recent literature on curiosity has focused on determining the stimulus characteristics eliciting exploration, manipulation, and seeking information. Studies relating parent-child variables, and experiences, such as anxiety, have for the most part tended to rely on paper-pencil tests.

The presented study, in contrast, defined parent and child behaviors in observational terms, and focused on relating maternal behavior and a boy's curiosity in a playroom situation.

Four groups of first grade boys who differed in curiosity, aggressiveness, and neurotic behavior (anxiety and social withdrawal), based on teachers' ratings, were selected to participate in a free play situation study. The mother-son interaction was observed by raters who were trained to code both mother and son on pre-selected behavior categories.

In general the results indicate the categories could be reliably measured by trained raters, though some interactional behaviors, such as non-cooperativeness, proved to be less stable than the other behavior categories. Also child behaviors between the first and second ten minutes were quite variable and unstable, so that further research is in order to obtain more reliable estimates of variables such as a child's novel curiosity.

The results of the study, nevertheless, indicate that investigation of objects (attentive observation and manipulation) was positively intercorrelated with curiosity toward novel stimuli, the number of different kinds of objects explored, and such verbal manifestations of curiosity, as seeking and offering information. Exploration of novel stimuli and exploration of a greater variety of objects was not, however, correlated with seeking and offering information.

Although emotional indices, such as anxiety, expression of negative feeling, and aggressiveness by the child were not correlated either positively or negatively with the curiosity measures, solitary play by the child was negatively correlated with investigation of familiar objects and seeking information. In this study solitary play was the only behavior exhibited by the child which competed and interfered with the expression of curiosity. Other child behaviors such as aggression, anxiety, and

join participation were not frequent or intense enough to inhibit the expression of curiosity.

Regarding the influence of parental behaviors on a child's curiosity and play, parental punitive behaviors were not found to be negatively correlated with the child's expressions of curiosity. Punitive behaviors, such as restriction, aggression, and negative feeling were too infrequently displayed by the mothers. Low intervention by the parent, in terms of a reluctance to seek participation, give help and direction, and reflect behavior, was associated with greater solitary play by the child. The parental behaviors which were most highly positively correlated with the child's curiosity were (1) the mother's curiosity behavior and (2) the mother's expression of positive feeling. The child's curiosity toward novel stimuli was highly positively correlated with the novel curiosity expressed by his mother ($r = .72$). The child's attentive observation, manipulation, and seeking information was positively correlated with the mother's expression of positive feeling.

In contrast, parental non-attention was negatively correlated with a number of child curiosity measures including attentive observation, manipulation, seeking and offering information.

The differences between the groups of boys, based on the teacher's ratings, were in the predicted

direction with the High Curious-High Prosocial group exhibiting the most manipulation and positive feeling, the high neurotic group expressing the most anxiety, and the High Agressive group displaying the most aggression. The differences in child behavior between the groups were not large enough, however, to be statistically significant.

A number of significant differences in behavior between the groups of mothers were found. The greatest differences were between the mothers of the High Curious-High Prosocial boys and the mothers of the High Aggressive boys. Mothers of High Curious-High Prosocial boys expressed significantly more positive feeling and were less restrictive and less non-attentive than mothers of High Aggressive boys.

The results were interpreted within a social learning theory model, which emphasized the influence of such social reinforcers as positive feeling and attentiveness and the effect of imitation on curiosity. The effect of the child's curiosity and play on the parent's behavior was also discussed.

Approved: _____

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Date: _____

THE RELATIONSHIP BETWEEN MATERNAL BEHAVIORS AND A CHILD'S CURIOSITY AND PLAY BEHAVIOR

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DEDICATION

I should like to dedicate this thesis to my wife, Jacquie, and daughter, Matty, whose love and joy helped make the last five years most exciting and rewarding. I would also like to thank both our parents for their consistent interest, understanding, and support, in our development and enjoyment.

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I would first like to acknowledge myself, for without my persistence, tolerance for frustration, and ingenuity, the study would not have been completed.

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Acknowledgement is not due to the Lansing and East Lansing School Boards who, in the year of our Lord, 1968, refused to allow the study to be undertaken in their school districts. Their undue apprehension, lack of interest and non-cooperation directed toward this project, as well as other research projects conducted within the

Psychology Department deserves mention, and hopefully change.

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INTRODUCTION

Although there has been much theoretical speculation about the nature of curiosity since James (1890) to Maslow (1954), only recently has curiosity been experimentally studied (Harlow, 1950; Harlow, Harlow, and Meyer, 1950; Butler, 1953, 1957; Welker, 1956; Berlyne, 1960). The results of these experimental studies with both animals and humans indicate that "novel" stimuli evoke exploratory behavior.

In several experiments, for example, Berlyne noted which stimulus a subject looked at first. In human infants aged three to nine months it was the figure with the greater amount of contour which captured the infant's gaze, (Berlyne, 1958). Frantz (1958) reported similar findings for human infants and infant chimpanzees using a checkerboard pattern as compared to simpler patterns. With human adults, Berlyne (1958) found more complex or incongruous pictures were fixated longer than were congruous or less complex pictures. In this experiment the pair of figures was only briefly exposed (10 seconds) but a longer time (two minutes, Berlyne, 1958) did not alter the results. These experiments are representative of the finding that

subjects orient themselves to stimuli in accordance with such stimulus properties as novelty, incongruity, and complexity.

The majority of the research has focused on defining the specific stimulus properties subsumed under the concept novelty. Little research, however, has been directed toward elucidating the effect of other variables, such as an individual's life experiences on exploratory behavior. Harlow's studies on the "Nature of Love" stand out as an exception. He showed that monkeys raised on soft cloth mothers, when presented a novel fearful stimulus, emitted fewer indices of emotional behavior, and more exploratory behavior than monkeys raised on wire mothers. He concluded that contact comfort provided a means of relaxation, which enabled fear to be reduced, so that monkeys would freely explore their environment.

Definition of Curiosity and Novel Stimuli

The stimulus properties which have been subsumed under the concept, novelty, include: (1) stimulus incongruity, i.e., a combination of familiar and unfamiliar elements, such as a camel with a lion's head (Hebb, 1946, 1949; Berlyne, 1957), (2) stimulus complexity--the absence of redundancy and the presence of variety and diversity in stimulus pattern (Berlyne, 1957, 1958), and (3) the surprising aspect of a stimulus, i.e., whether a figure differs

markedly from several other figures.

Curiosity has been operationally defined and inferred from instrumental actions which increase the organism's contact with environmental stimuli. Curiosity may be inferred from the degree to which a child reacts positively to new, strange, and incongruous elements in the environment by: (1) approaching them, (2) manipulating them, (3) exhibiting a need to know about himself and his environment by questioning, or (4) scanning his surroundings, seeking new experiences (Maw and Maw, 1961).

Curiosity and Parent-Child Interaction Variables

In an exhaustive review of the literature very few studies were found where the primary purpose was to relate children's curiosity to parent-child interaction variables. A few studies were found, however, in which curiosity was a small part of a larger study. The results of studies done by Baldwin (1948) and Baldwin, Kalhorn, and Breese (1949) indicated that parents who were strict and undemocratic in their methods of control were likely to have children who were among other things restricted in curiosity, originality, creativity, and imagination.

In the Baldwin (1948) study each of 67 preschool four year old children were observed for a month in a nursery school environment,, during which the child was rated on a battery of child behavior variables. Con-

currently he was visited in his home every 6 months by an independent investigator, who rated the impact of the home environment upon the child using a battery of Parent Behavior Ratings. Factor analysis of the child behavior ratings revealed a general factor which might be called activeness, or maturity, or good nursery school behavior. Factor analysis of the parental behaviors revealed two closely related factors; namely democracy and control. Democracy was characterized by a high level of verbal contact between parent and child, appearing as consultation regarding policy decisions, explanations for family rules, and verbal explanations in response to the child's curiosity. The second factor, control, emphasized the existance of restrictions clearly conveyed to the child, although not necessarily arrived at democratically. A characteristic often accompanying control was lack of friction over disciplinary decisions. The lack of disagreement appeared to be a function of: (1) prohibitions against talking back, (2) easy conformity by the child, or (3) determination of policy by mutual agreement. Most democratic homes were found to be not uncontrolled. Democracy in the home tended to have two sorts of effects upon the child's behavior. It tended to accentuate and raise significantly the activity level of the child and produce aggressive, fearless and planful, leadership behavior in the nursery school. Democratic homes, however, also tended, though the

differences did not reach statistical significance, to facilitate curiosity, non-conformity, and disobedience. Control produced the opposite childhood behaviors. When control and lack of democracy occurred together, they produced a quiet, well behaved, non-resistant child, who was socially unaggressive, and restricted in his curiosity and originality. Despite these interesting findings numerous methodological criticisms can be offered which put into question the findings Baldwin reported. For one, so many variables were tested without utilizing appropriate analysis of variance techniques so that the probability of obtaining significant differences was greatly enhanced. Second, levels of significance were not reported. Third, there was possibility that a halo effect existed, since it is quite conceivable that when the rater observed curiosity in the home, he tended, to assume the home was more democratic and rate it appropriately. Finally, the vague way the behavior ratings were reported reduced the possibility of the study being replicated.

Despite these criticisms the general results were supported by Watson (1957) who found that sixth grade children from permissive homes (based on questionnaires) showed a higher level of spontaneity, originality, and creativity than children from restrictive homes. On the other hand Baldwin, Kalhorn, and Breese (1945) reported that indulgence (babying and protecting) fosters inactive,

unaggressive behavior, lacking in originality and inferior in social status. Arsenian (1943) reported that three year old children who were left alone to play in a strange playroom expressed more indices of insecurity (crying and agitated non-adaptive movements) than other children whose mothers were present. When the mother was present the children played more frequently and demonstrated less insecurity. McReynolds, Archer, and Pietila (1961), Penny (1965), and Zucherman, Kolin, Price, and Zoob (1964) also reported studies showing that low anxiety (as measured by the Children's Manifest Anxiety Scale) was inversely related to curiosity (as measured by a Sensation Seeking Scale and a Reactivity Curiosity Scale). Medinnus and Love (1965), however, failed to confirm the negative relationship between insecurity and curiosity. In the Medinnus and Love study, 25 four year old children were administered three tests of curiosity. Two teachers were also asked to rate independently the children on security, using six behavioral-rating scales developed by Prichard and Ojemann (1941). The children were also rated on global insecurity and curiosity (based on the definition proposed by Maw and Maw, 1961). The first test of curiosity was very similar to the one used by McReynolds, Acker, and Pietila. Twelve relatively common toys and objects, such as a magnet, ball, and car, were placed in a curtained box, from which S drew the toys. E scored S's manipulations on

a score sheet, listing all possible manipulations for each toy. A stopwatch was used to measure the time spent with each toy. S's task was to stick his hand in the box, touch the toy, and try to guess what it was.

After making a guess the child was allowed to take the toy out of the box and play with it. During the play period manipulations, time spent manipulating, and questions asked were recorded.

The second curiosity test involved the child chosing to play with a known toy which he could see or an unknown toy hidden from his view.

The third curiosity test consisted of reading to S nine two choice situations in which the problem essentially was whether to explore or not to explore.

The results indicated first, that the curiosity measures were not significantly intercorrelated. Only one of six possible intercorrelations was significant; and that significant correlation was between the time scores and the manipulation scores. The results were interpreted to mean that curiosity is not a unitary characteristic and that future research should aim at identifying various aspects of curiosity rather than attempting to relate a single measure of curiosity to other variables.

In testing the hypothesis of a positive correlation between curiosity and security Pearson product-moment correlations were computed. Twenty-seven of the 36

correlations were in the predicted direction, but none of the coefficients reached the .05 level of significance. In interpreting the results it is important to note that: (1) the small sample size used reduced the probability of obtaining significant correlations, (2) the population from which the sample was drawn may not have varied sufficiently, and (3) the experimental situation may have in some way reduced the insecurity felt by the Ss, especially since the tasks were quite structured, and may not have elicited uncertainty and anxiety. Furthermore, the objects were quite familiar, rather than possessing novel properties.

Although there has been a paucity of research focusing on observing exploratory behavior and curiosity in children in naturalistic free play situations, there has been reported numerous studies on the exploratory behavior of animals.

Exploratory Behavior of Animals

Numerous investigators have tried to determine whether exploratory behavior is influenced by hunger, thirst, and sexual deprivation. Dasiell in 1925 reported that hungry animals explored less frequently than satiated animals. Bolles (1967) in reviewing a number of replications of the Dashiell and Montgomery studies, concluded the findings were contradictory. He inferred that exploration may be overwhelmingly under the control of the novelty of

the stimulus conditions under which it occurs.

Though drives such as hunger and thirst may not be important determinants of exploration, Montgomery and Monhman (1955), Hays (1960), and Baron (1964) demonstrated that exploration in animals is inhibited by fear. Another class of variables studied in relation to exploratory behavior and curiosity is the effect of stimulus deprivation. Again the results are somewhat contradictory. Montgomery (1953) found a confinement of eight days had no effect on exploration; and studies by Charlesworth and Thompson (1957), Montgomery and Zimbardo (1957), and Ehrlich (1954) supported Montgomery's earlier findings. Butler (1953) however reported visual deprivation was effective in increasing visual exploratory behavior. Fowler (1963) reduced some dissonance by pointing out that the length of confinement and associated boredom may be an important variable in determining whether deprivation increases or decreases curiosity and exploratory behavior.

Theories Relating to Curiosity

In isolating other determinants of curiosity and exploratory behavior in humans, apart from the impersonal characteristics of stimulus objects, two classes of parental behavior can be identified: namely, what a parent does *before* and *after* a child has emitted a curiosity or exploratory response. From an operant learning theory point of

view any event which acts as a reinforcer, and follows such a response, ought to increase its rate and frequency. The presentation of such secondary reinforcers as attentive observation (Allen, Hart, Buell, Harres, and Wolf, 1964; Harris, Wolf, and Baer, 1966) praise, expression of affection or positive feeling ought to facilitate such behavior. If verbal curiosity and exploratory behavior are not reinforced, then such behavior should diminish, and the child will only infrequently explore the environment and ask questions to seek additional information. If, on the other hand, curiosity functions independently of external reinforcement then the child's curiosity will be more a function of the available novel stimuli, a view which more closely corresponds to Berlyne's theory (1950). Berlyne hypothesizes that curiosity is related to the amount of information gained when an object is explored. He hypothesizes that the relationship is non-monotonic, and stimuli which contain both familiar and novel elements will elicit the greatest curiosity. Berlyne's explanation of curiosity, however, does not emphasize the possible influence of such variables as punishment, fear, and learning to be curious by observing and imitating one's parents (Bandura and Walters, 1963).

If parents punish a child after he acts in a curious manner, the child may react in a number of alternative ways. He may respond with heightened anxiety, fear, hostility, withdrawal (Dollard and Miller, 1950), or with

protests and demands for an explanation. The child may also respond to punitive parental behavior by turning to examine other objects. The important point is that punishment or actively preventing the child from expressing curiosity may be conceptualized as a frustrating experience which temporarily interrupts a careful examination of the environment. If punitiveness toward manifestations of curiosity toward both "dangerous" and "safe" stimuli characterize the parent-child interaction, the child may develop the habit of not carefully attending to the environment in a persistent manner. His behavior may then be characterized by either (1) short attention span and hyperactivity, or (2) withdrawal from the parent into isolated play and indirect hostility.

A short attention span with hyperactivity may be conceived as one way of responding to an approach-avoidance conflict. Environmental stimuli elicit approach and investigation responses, while punitive behaviors by the parent elicit avoidance responses. The child approaches one stimuli then withdraws, avoiding punishment, and tentatively approaches another object. To an observer he appears hyperactive.

A second way of responding when parents consistently punish exploratory behavior is to withdraw into solitary play. The child approaches familiar objects, but instead of investigating and seeking information, he plays

alone, avoiding interaction with his parents. He avoids making a new response which might elicit parental punitiveness. As the child continues to play with the same objects, the parent becomes bored, and non-attentive.

Utilizing the concept of "imitation" (Bandura and Walters, 1963), it can be hypothesized that the child may learn to be curious by observing and imitating the curiosity behavior of his parents. If the parents express limited curiosity, curiosity may only infrequently appear in the child's total repertoire of behavior, especially as the child grows older, to be replaced by other competing behaviors. In contrast, if the child observes his parents manipulating objects and hears them frequently ask questions and seek information, the child may imitate these parental behaviors. Parents who express limited curiosity and, in addition, infrequently reinforce curiosity behavior in their children, may, instead, reinforce other behavior, such as goal directed competitive play, school behavior, or quite non-explorative solitary play.

The second class of parental behavior which may relate to curiosity behavior may be identified as what the parent does before a curiosity response is expressed by the child. From a classical conditioning paradigm the parent's behavior may serve as a conditioned stimulus for eliciting further exploration or curiosity. Parental behaviors which may elicit curiosity, may include, for example, directing

behavior such as pointing to an object and saying, "Look at that," or asking questions which encourage the child to more carefully examine an object. These directive cues may have established their "eliciting" properties by being associated with active exploration when the child was an infant or toddler. Other parental behavior may inhibit curiosity. If the child, upon entering the play room, perceives the room as strange, and is uncertain about what is expected of him, he may respond with anxiety (Arsenian, 1943) which may be defined operationally as acts unrelated to the task at hand, such as rubbing, stuttering, crying, picking one's nails, looking back and forth, etc. The child has not expressed curiosity, but how the parent responds to the child's anxiety may determine the kind and frequency of curiosity. Numerous studies on the effects of anxiety on learning have shown that high anxiety may facilitate the learning of simple tasks, where there is little competition between presenting stimuli and one dominant response already in the repertoire of the individual is defined as correct (Taylor and Spence, 1952). Where the learning task is more complex and the subject is presented numerous stimuli demanding fine discriminations and where the response to be made requires differentiation, high anxiety has been found to interfere with learning (Lucas, 1952; Monague, 1953; Raymond, 1953; Steindish and Champion, 1960).

Extending the relationship between anxiety and learning to the expression of curiosity, it is possible that a high level of anxiety, which the parents may ignore or augment, may facilitate expression of curiosity of a simple kind, manifested by brief examination of numerous stimuli and numerous competing responses, so that the child appears highly distractable. When anxiety is low or when the parents interact in such a way so as to reduce high anxiety, curiosity is expressed and manifested by a more careful, persistent examination of the environment. It could be further hypothesized that the low anxious child will more frequently seek information from his parents and also more frequently form answers to his own questions.

In summary, from a social learning point of view, curiosity can be conceived as a class of behaviors involving exploration of the environment and seeking and offering information. As a class of behaviors curiosity may be influenced by social reinforcers such as parental attention and expression of positive feeling, which have been shown to influence other classes of behaviors. Exploration and curiosity are elicited or "released" by the presence of novel and familiar stimuli. At the same time events following exploration, either reinforce and increase the probability of exploration, decrease the rate of exploration, or temporarily suppress the rate of exploration. In addition, events occurring before or contiguous with

exploration serve as conditioned stimuli for exploration. Cues preceding exploration or in temporal proximity with curiosity, such as directions, questions, or another person exploring the environment, serve as stimuli to elicit exploration. The person expressing curiosity may also serve as a model for curiosity. The exploration of novel stimuli, however, may be conceived as a reinforcing behavior in itself (Premack, 1959). Being punitive or nonattentive, however, may temporarily suppress the rate of exploration, though its rate may increase in the absence of the punitive agent.

The basic question which, nevertheless, arises is, "Why is the exploration of novel stimuli a reinforcing experience? If novel stimuli are conceived as unconditioned stimuli, does this imply a drive for exploration? Rather than postulating a drive for exploration, a manipulation drive (Harlow and Meyer, 1950) or a need for stimulation, the reinforcement value of novel stimuli can be accounted by other explanations. First, it is hypothesized that by attending to novel stimuli, one avoids familiar stimuli, which through past experience have become associated with reactive and associative inhibition (Hull, 1941) or more generally negative feelings of boredom. A second explanation is that an organism tries to maintain a general adaptation level or activity level, and that a combination of familiar and novel elements in a stimulus (Berlyne, 1960)

arouses and maximizes exploration. The combination of familiar elements and surprising, incongruous, and complex elements arouses internal cognitive dissonance conflict (Fesinger, 1957) which is resolved by investigation and exploration. The important distinction is that the capacity for novel stimuli to elicit and reinforce behavior can be accounted by an anxiety reduction hypothesis and stimulus habituation hypothesis, without postulating an exploratory drive concept. The postulation of an exploratory drive would appear to be more related to research aimed at determining the effect of stimulus deprivation on exploratory behavior. As Fowler (1963) stated the relationship between stimulus deprivation and associated boredom and its effect on curiosity is more complex than the relationship between food deprivation, hunger, and eating. However, even confinement and stimulus deprivation may be conceived as a frustrating experience, which energizes a variety of behaviors, including exploration.

From the above discussion the following major hypotheses were formed:

Major Hypotheses

1. Measures of curiosity, such as attentive observation, manipulation of objects, variety of objects explored, curiosity directed toward novel stimuli, preference for novel stimuli, seeking of information, and offering information would be positively intercorrelated.

2. Child behavior categories such as high anxiety,

negative feelings and aggressiveness would be negatively correlated with curiosity measures.

3. High solitary play would be negatively correlated with curiosity measures.

4. Parental punitive behaviors, such as restriction, negative feeling, and aggression would be negatively correlated with the child's expression of curiosity. In contrast parental attentiveness and expression of positive feeling would be positively related to the child's expressions of curiosity.

5. Parental non-attention would be negatively correlated with expression of curiosity.

6. Parental curiosity toward novel stimuli would be positively correlated with the child's curiosity toward novel stimuli.

It was also hypothesized that children who were rated by their teachers as low-prosocial and low-curious would express in a play situation with their mothers present less curiosity than children rated high-prosocial and high-curious. Conjointly it was hypothesized that mothers of low prosocial-low curious children would interact differently with their children than mothers of children rated high-prosocial-high-curious.

The above hypotheses were based on the assumption that: (1) teachers' ratings would be sufficiently reliable and valid to allow group differences in parent and child behaviors to emerge in the play situation, and (2) that children, in part, develop social and intellectual behavioral skills through their interaction with their parents.

A more basic assumption which underlies the study

is that there is a relationship between children's play and intellectual and social behavior in school. Granted that the school class differs from a play situation in the demands it makes on a child, nevertheless it was hypothesized that parents who would allow their children to freely play and explore the environment without excess restriction, non-attention, anxiety, or negative feeling, would have children who could more effectively and creatively adjust and benefit from a school experience. The following minor hypotheses were formed:

7. Boys identified by their first grade teachers as highly curious and prosocial would express more curiosity and less anxiety, negative feeling and aggression in a laboratory playroom than boys identified as less curious, more neurotic, and more aggressive.

8. Mothers of highly curious-prosocial boys would more frequently reinforce the child with praise, affection and positive feeling than parents of low curious, neurotic, and aggressive boys.

9. Mothers of high curious-prosocial boys would express less non-attention and less punitive behavior than parents of low curious, neurotic, and aggressive boys.

METHOD

The subjects were forty first-grade boys selected from a sample of 105 boys from the Holt school system in Michigan.

Each of seven teachers was asked to select two boys who most aptly fit each of several behavioral categories. Each teacher was presented a behavioral check list containing nineteen categories. The check lists were adopted from those used by Maw and Maw (1961), Quay (1966), and Ross, Lacey, and Parton (1965). For the specific items used see Appendix A. From the teacher's ratings four groups were formed: namely, (1) a high curiosity-high prosocial group (HC-HP), (2) a low curiosity group (LC), (3) a high aggressive group (HA), and (4) a high neurotic group (HN).

The limited number of subjects available for study in the selected school system, and the fact that the teachers tended to rate high prosocial boys high on curiosity, and not rate neurotic and aggressive boys high on curiosity prevented the identification of other pertinent groups; such as: (1) a High Neurotic-High Curiosity group, (2) a High Aggressive-High Curiosity group, (3) a High

Aggressive-Low Curiosity group, and (4) a High Prosocial-Low Curiosity group.

The specific criteria and rules used in forming the four groups can be found in Appendix B. Briefly, high curiosity included such criteria as exploration, investigation, manipulation of objects, asking of questions, and expressing a need to know more about oneself and the environment. Low curiosity included items such as little or only short-lived enthusiasm about objects in environment, acceptance of information without question, and limited interest in learning about oneself and the environment. Prosocial behavior included criteria such as cooperativeness, considerateness, self-confidence, independence, and popularity. The aggressive group included, in addition to aggression, hyperactivity, uncooperativeness, and attention seeking "show-off" behavior. Neurotic behavior included items such as anxiety, depression, low self-confidence, confusion, and social withdrawal.

Of sixty-seven boys who fit into the four groups, forty parents agreed to participate in the study. The high curious-high prosocial and low curious groups included 11 subjects each, while high neurotic and high aggressive groups included 9 subjects each. Before observing the mother and son interact in the play room, each mother was asked to complete in an adjoining room a short questionnaire containing questions pertaining to family size, income,

vocation, education, and the ordinal position of the child. The child usually sat quietly watching his mother fill out the questionnaire.

Observational Situation

Each mother and her son were brought into a playroom (16' X 20') containing standard playroom toys, such as a punching bag, a sandbox, masks, toy furniture, dolls, guns, bowling pins, and puzzles. For a more complete list see Appendix C. Novel objects were also present and included: (1) incongruous pictures, (2) pictures on the walls, (3) a battery-operated ice-cream truck with faces painted on ice-cream cones, (4) a doll, half black and half white, (5) a candy "life saver" man, (6) a "I Hate You Teacher" doll, (7) a puzzle which allowed more than 3,000 possible combinations of facial features to form cartoon faces, and (8) a gerbil and running wheel in an aquarium. The novel objects were selected utilizing the definitions of novelty formulated by Berlyne (1960). All objects were placed in the same location for each session.

The instructions for the play period were as follows:

> We want to see how children play with these materials with their mothers present. You do not have to play with your child at all, if you don't want to, but you certainly may do so as much as you like. We so have one restriction. Your son can play with the animal in the cage or on his lap. But we would rather not have the animal on the floor or table. The session will last twenty minutes. Would you be

prepared to leave at _____. I'll leave you alone until then, but I'll be behind the one-way mirror observing.

The mother-child interaction and the child's curiosity and play behavior were observed through a one-way mirror by trained raters, one rater observing the child's behavior while a second rater observed the parent's behavior. Each rater recorded the observations into one channel of a stereo tape recorder. Another tape recorder counted off twenty-second intervals.

Child's Behavior

During each twenty-second interval a rating was made on each of the seventeen child behavioral variables, partially derived from a more comprehensive system first developed by Moustakas, Siegel, and Schalock (1956). During each twenty-second interval more than one category could be scored, but no category (except number of different objects) was scored more than once during the interval. For the twenty-minute session, the highest score that could be obtained was a score of sixty. The seventeen child behavioral categories included six measures of curiosity; namely: (1) close attentive observation, (2) manipulation of objects, (3) seeking of information, (4) offering information, (5) an absolute frequency count of the number of different kinds of objects manipulated, and (6) whether or not a novel stimulus was explored during the

interval. Other variables scored were (7) solitary play, (8) joint participation, (9) expression of positive feeling, (10) expression of negative feeling, (11) cooperation, (12) non-cooperation, (13) direction, (14) anxiety, (15) aggression, (16) seeking attention, help, and participation from parent, and (17) whispering. The raters were instructed to note whether anxiety and aggression were mild, moderate, or severe. The specific criteria for scoring the seventeen variables can be found in Appendix D. In addition, preference for novel objects was determined by asking each child to name five objects which he did not have at home with which he especially enjoyed playing.

Reliability of the Ratings of the Child Behavior

A group of eight raters were trained in both group and individual sessions. The raters observed a variety of parents and their children interact in the playroom. In addition the investigator role-played behaviors which were displayed infrequently by the children to insure the raters learned the categories. After twelve hours of training, product moment correlations on twenty-minute segments of play were computed. The investigator's ratings served as the standard by which each rater was compared. One rater, at a time, observed with the investigator a different set of mothers and sons in order to correlate the

relationship between the standard and the rater on the behavioral categories. For example, to determine the rater reliability correlation coefficient for positive feeling, the total positive feeling score obtained by rater A on subject Q was computed against the total positive feeling score obtained by the investigator on subject Q. Rater B's total positive feeling score on subject R was compared with the investigator's total positive feeling score on subject R. In this way mean scores and standard deviations were obtained for the eight raters as compared to the investigator's rating's on eight different Ss. Pearson product-moment correlations were computed with M=8 and d.f.=6.

The correlations between the raters and the standard were quite high, demonstrating that the behaviors could be reliably measured. The reliability coefficients can be found in Table 1.

Of the seventeen correlations, twelve Pearson product-moment correlations were greater than .83, significant at the $p < .01$ level of significance. The categories which appeared least reliable were direction ($r = .42$), non-cooperation ($r = .53$), and negative feeling ($r = .65$).

Reliability of the Ratings of the Adult Behavior

Another group of nine raters were trained in individual and group sessions to rate the mothers on seven-

TABLE 1.--Correlation coefficients between raters' and the investigator's observations for the child and adult behavior categories

Child Behaviors[1]	Correlation Coefficient	Adult Behaviors[2]	Correlation Coefficient
Attention observation	.76*	Non-attention	.99***
Manipulation	.80	Attentive observation-close	.99***
Number of different objects	.88***	Attentive observation-far	.98***
Novel curiosity	.97***	Seeks information	.99***
Seeks information	.99***	Reflection of behavior	.89***
Offers information	.84**	Solicited response	.68
Solitary play	.99***	Unsolicited response	.98***
Joint participation	.99***	Direction	.55
Seeking response from parent	.90**	Restriction	.96***
Direction	.42	Non-cooperation	.46
Cooperation	.91**	Novel curiosity	.98***
Non-cooperation	.53	Familiar curiosity	.97***
Positive feeling	.86***	Positive feeling	.98***
Negative feeling	.65	Negative feeling	.96***
Anxiety	.92**	Anxiety	.97**
Aggression	.83**		
Whispering	.86**	Whispering	.92**

[1] n = 8, d.f. = 6.

[2] n = 9, d.f. = 7.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

teen behavioral categories. The reliability coefficients for each behavioral category were determined in the same way as the child behavioral categories and can be found in Table 1. Thirteen of fifteen behavioral categories had Pearson product-moment correlation coefficients ranging between $r = .89$ and $r = .99$. Too many mothers had zero ratings on aggression so correlation coefficients were not computed for aggression. The three categories which appeared least reliable were direction, non-cooperation, and solicited response ($r = .55$, $r = .46$, and .58 respectively). In general the adult behavior categories were rated more reliably than the child categories, perhaps because the raters of the adult behaviors had received additional training and experience in another study, using similar categories.

RESULTS AND PRELIMINARY DISCUSSION

Stability of Adult and Child Behaviors within the Twenty-Minute Session

In order to assess the reliability of the behavioral categories, Pearson product-moment correlations were computed for the adult and child behavior categories between the first and second ten minutes of the play session. The data from Table 2 indicates the adult behaviors in general were reasonably stable. Of the seventeen variables, only non-cooperation, negative feeling, and aggression were not highly positively correlated between the first and second ten minutes. This suggests that the behavior observation ratings in the play room, were not taping stable and valid estimates of the child's non-cooperation, negative feeling, and aggression. The children were not consistently aggressive, negative, or non-cooperative, over the total situation, and tended to have instead periods of such behaviors.

The data from Table 2 indicates that the child behaviors were less stable and more variable between the first and second ten minutes than the adult behavior categories. Of the six observational curiosity measures,

four had Pearson product-moment correlations ranging between .43 and .67. The number of different kinds of objects explored and novel curiosity had Pearson product-moment correlations of .31 and .34, respectively. These lower correlations were expected and suggest investigation of different objects and exploration of novel stimuli may have diminished during the second ten minutes due to (1) possible habituation, and (2) the restricted number of new and different objects left to explore in the second ten minute period. The habituation of novel curiosity suggests that the novelty of the objects used elicited exploration of a short duration. The novel stimuli, with exploration and investigation lost their novelty.

Of the remaining child behaviors, seeking response from parents, expression of positive feeling, negative feeling, and anxiety appeared more reliable measures than interaction behaviors, such as joint participation, cooperation, or non-cooperation, and direction. The lower reliability for interaction behaviors was probably due to the following methodological difficulty. Since each rater had a great variety of behaviors to attend to they each focused on just the one person they were instructed to rate. However, in rating cooperation, it is necessary to observe the parent direct the child, and observe the child follow the direction. If the rater misses the parent's direction, cooperation would probably not be noted. In

TABLE 2.--Correlations for child and adult behaviors between first and second ten minutes

Child Behaviors	Correlations	Adult Behaviors	Correlations
Attention-Close	.64	Non-Attention	.71
Manipulation	.67	Attention-Close	.62
Different Objects	.31	Attention-Far	.62
Novel Curiosity	.34	Seeks Information	.63
Seeks Information	.43	Reflects Behavior	.66
Offers Information	.67	Solicited Response	.76
Solitary Play	.39	Unsolicited Response	.79
Joint Participation	.27	Direction	.61
Cooperation	.30	Restriction	.55
Non-Cooperation	.26	Non-Cooperation	.01
Seeks Response	.72	Novel Curiosity	.49
Direction	.28	Familiar Curiosity	.51
Positive Feeling	.56	Positive Feeling	.61
Negative Feeling	.52	Negative Feeling	.23
Anxiety	.44	Anxiety	.67
Aggression	.38	Aggression	.03
Whispering	.31	Whispering	.53

N = 40 Ss, Pearson product-moment correlations were reported.

future research, it therefore may be necessary to assign one rater to record a limited number of interaction behaviors.

In general, the low internal consistency of the child behavior categories indicates that without more reliable estimates of the child's behavior, correlations among the child behaviors and between the child and parent's behavior would tend to be unstable and low. Extending the time of the observation or introducing the child to another play situation with different novel and familiar objects might increase both the reliability of the behaviors and the degree to which child and parental behaviors are correlated.

Even though a number of child behaviors proved to be unstable estimates of the child's behavior, intercorrelations were computed, using the total scores on each behavior category for the entire 20 minute session.

The intercorrelation coefficients among the child and among the adult behavior categories, and the correlations between the child and parent behavior categories were computed using all subjects. The correlations for the curiosity measures are presented in Table 3. The means and standard deviations for all behavior measures are presented in Table 4.

TABLE 3.--Intercorrelations among child behavior categories[1]

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Attentive Observation (1)	.82**	.31*	.49**	.29	.39**	.30*	.57**	.12	.21	-.02	.16	.18	.25	.15	.26	.09	.02
Manipulation (2)		.40**	.37*	.31*	.42**	.42**	.43**	.02	.04	-.05	.23	.14	.15	.19	.25	.02	.00
Different Objects (3)			-.21	.03	.18	.12	-.21	.10	.18	.02	.21	.10	.17	.03	.23	.09	-.35*
Novel Curiosity (4)				.56**	.09	.12	-.15	-.04	.11	-.03	-.04	-.11	.06	.03	.06	.00	-.02
Preferred Novel Objects (5)					.05	-.03	-.15	-.13	.20	.00	.23	-.12	-.03	.09	.19	-.28	-.04
Seeks Information (6)						.27	-.37*	.24	.10	-.13	.17	.35*	.29	.36*	.23	.14	-.07
Offers Information (7)							.00	.05	.13	.00	.15	.38*	.29	.02	.07	-.11	.01
Solitary Play (8)								-.56**	-.28	-.07	-.05	-.17	-.19	-.14	-.22	-.07	-.19
Joint Participation (9)									.44**	.26	-.11	.19	.39*	-.06	.08	.08	.08
Cooperation (10)										.55**	-.06	.13	.25	-.03	-.05	-.13	-.04
Non-Cooperation (11)											-.11	.26	.00	-.08	.31*	.00	.07
Seeks Response (12)												.24	.38*	-.27	.43**	-.34*	.25
Direction (13)													.53**	.02	.03	-.12	-.08
Positive Feeling (14)														-.07	.23	.04	.01
Negative Feeling (15)															.05	.49**	-.29
Anxiety (16)																.02	-.04
Aggression (17)																	-.48
Whispering (18)																	

[1]This table contains Pearson product-moment correlations (d.f. = 38).

*p < .05.

**p < .01.

TABLE 4.--Means and standard deviations for adult and child behavior categories (maximum score = 60)

Child Behaviors	Means	S.D.	Adult Behaviors	Means	S.D.
Attention-Close	39.00	14.02	Non-Attention	13.95	9.60
Manipulation	30.50	14.03	Attention-Close	26.45	12.33
Different Objects	14.55	6.41	Attention-Far	20.03	13.66
Novel Curiosity	22.50	12.28	Seeks Information	7.38	5.55
Novel Preference	1.53	1.04	Reflects Behavior	3.03	3.88
Seeks Information	8.15	5.19	Solicited Response	9.18	6.76
Offers Information	22.78	9.93	Unsolicited Response	11.70	8.41
Solitary Play	29.68	13.35	Direction	6.33	5.69
Joint Participation	7.53	7.13	Restriction	2.13	2.74
Cooperation	4.35	4.00	Non-Cooperation	.78	1.34
Non-Cooperation	1.43	1.85	Novel Curiosity	17.80	10.44
Seeks Response	11.78	9.03	Familiar Curiosity	5.80	6.05
Direction	2.65	2.33	Positive Feeling	15.45	10.30
Positive Feeling	18.60	9.86	Negative Feeling	2.85	3.86
Negative Feeling	3.13	3.18	Anxiety	9.55	8.41
Anxiety	12.15	8.55	Agression	.23	.73
Aggression	6.55	5.80	Whispering	5.80	4.92
Whispering	4.03	3.67			

n = 40.

The Curiosity Measures

The data from Table 3 indicates that attentive observation and manipulation of objects was significantly correlated in a positive direction with the number of different objects explored, ($r = .31$ and $r = .40$, respectively), exploration of novel objects ($r = .49$ and $.37$, respectively), seeking information ($r - .39$ and $.42$, respectively). Exploring a greater variety of objects or focusing on the novel stimuli was not, however, associated with such increased verbal manifestations of curiosity as seeking and offering information.

The low stability of the child's novel curiosity may, in part, account for the low relationship between novel curiosity and seeking and offering information. One can not, therefore, conclude that exploration of novel stimuli either increases or decreases question asking.

Other Child Behaviors and Curiosity

The data from Table 3 indicates that solitary play was negatively correlated with such curiosity measures as attentive observation ($r = -.57$), manipulation ($r = -.43$), and seeking information ($r = -.37$). The negative relationship between solitary play and attentive observation, manipulation, and seeking information tentatively suggests the existence of an exploratory investigating behavior factor and a solitary play factor. The small sample ($N = 40$) did

not, however, allow a factor analysis of the child's behavior to clearly substantiate this inference. It is tentatively hypothesized that solitary play can be differentiated from exploration, and that the two distinct behaviors may be influenced by different variables. The negative relationship also implies that playing alone, using a toy in its prescribed fashion may compete with exploring the environment and more carefully investigating an object to gain new information.

The Effect of the Child's Emotionality on Exploration and Curiosity

Emotional indices, such as the child's positive and negative feeling, anxiety, and aggression were for the most part not significantly correlated with exploratory behavior or verbal curiosity. In general a high degree of investigation and curiosity toward novel stimuli was not associated consistently with either a high degree of positive or negative feeling expressed by the child. For example, some children explored frequently, and concommitantly expressed high positive feeling, whereas others explored frequently, expressing limited positive affect. Only negative feeling was moderately related to the seeking information ($r = .36$). The positive relationship between negative feeling and seeking information suggests that irritation, frustration associated with manipulating an

object, or boredom with a task may prompt the subject to seek information from the parent. However, since temporal sequences were not examined this speculation is offered with some caution.

The Effect of Parental Behavior and Curiosity

The data from Table 5 suggests that the exploration of and preference for novel stimuli by the child was highly positively related to the exploration of novel stimuli by the parent. From Table 4 it can be seen that children and mothers differed widely in the degree to which they attended to novel stimuli. The high correlation (of .72) between parent and child curiosity toward novel stimuli suggests exploration of novel stimuli may be influenced by parent-child variables. A number of alternative explanations can be offered to account for this high relationship between child and parent curiosity. First, child and parent may learn to imitate each other's curiosity, particularly in terms of the selection of stimuli to attend to. Second, attention and manipulation of novel stimuli by one person may elicit "following behavior" in another person. This interpretation defines the "novel stimulus" as including, in addition to the object being explored, the subject attending to it. The parent attends to the child exploring a novel stimulus. And third, the parent who attends to a novel stimulus as a child explores novel

TABLE 5.--Correlations between child and adult behavior categories[1]

Child Behaviors	Adult Behaviors																
	Non-Attentive	Attention Close	Attention Far	Seeks Information	Reflect Behavior	Solicited Response	Unsolicited Response	Direction	Restriction	Non-Cooperation	Novel Curiosity	Familiar Curiosity	Positive Feeling	Negative Feeling	Anxiety	Aggression	Whisper
Attentive Obs.	-.38*	.28	.19	.28	.03	.43**	.28	.30*	.14	.21	.13	-.39**	.36*	.15	.07	.08	.08
Manipulation	-.41**	.13	.23	.11	-.06	.28	.01	.12	.03	.15	.06	-.34*	.35*	.19	.06	-.04	.20
Different Obj.	-.20	-.16	.27	.01	.05	.33*	.02	.27	.13	.15	-.35*	-.13	.13	.03	.05	-.19	-.01
Novel Curiosity	-.16	-.22	-.09	.13	-.05	.02	.17	.16	.23	-.09	.72**	-.33*	.17	.03	.10	.19	.10
Preferred Nov. Obj.	-.13	.09	-.12	-.14	.00	.11	-.15	.19	.16	-.15	.39**	-.14	.01	.13	.16	.08	.33*
Seeks Information	-.37*	.06	.16	.19	.09	.23	-.18	.13	.12	.13	-.14	-.28	.21	-.24	.18	-.05	-.01
Offers Information	-.40**	.20	.04	.34*	.06	-.05	.03	.06	-.14	.15	.09	-.19	.41**	-.04	-.34*	-.07	.16
Solitary Play	.28	.17	-.11	-.22	-.36*	-.55**	-.37*	-.41**	-.18	.08	.01	.32*	-.05	-.14	.02	-.36*	-.04
Joint Participation	-.23	.16	-.08	.31*	.35*	.36*	.41**	.39**	.20	-.15	.12	-.13	.32*	-.07	-.21	.46**	-.30*
Cooperation	-.21	.19	-.05	.47**	.09	.03	.42**	.71**	.21	-.03	.20	-.06	.16	.26	-.17	.38*	-.22
Non-Cooperation	.06	.12	-.13	.21	-.15	-.21	.31*	.53**	.29	.06	.06	.30*	-.11	.23	-.16	.36*	.13
Seeks Response	.40**	-.26	.24	-.13	.11	.04	-.46**	-.15	.01	.13	-.26	-.14	.20	-.13	.01	-.28	-.16
Direction	-.34*	-.14	.18	.04	.17	-.04	-.17	-.16	.00	.34*	-.23	-.23	.29	-.06	-.23	-.10	.31*
Positive Feeling	-.54**	.06	.18	.06	.24	.14	-.17	.06	.22	.19	-.07	-.30*	.61**	-.16	-.32*	-.10	-.39**
Negative Feeling	-.06	-.03	.10	-.01	-.07	.10	-.10	.16	.26	-.03	-.25	-.21	-.20	.07	.32*	.14	.11
Anxiety	-.21	-.23	.43**	-.18	-.01	.04	-.20	-.01	.08	.12	-.14	-.27	.20	.05	.35*	.18	.05
Aggression	-.08	-.06	.09	.07	-.04	.13	.02	.22	.58**	.07	-.09	-.18	.05	.07	.16	.19	-.28
Whispering	-.18	.05	.03	.15	.03	.08	.17	-.13	-.30*	.01	.11	.09	.03	-.10	-.27	-.03	.33*

[1]Only this table contains Pearson product-moment correlations (d.f. = 38).

*p < .05.

**p < .01.

stimulus, also provides positive reinforcement, especially if attention is considered as a positive reinforcer.

The data from Table 5 did indicate that parental non-attention and focusing on familiar stimuli was negatively related to a number of curiosity measures, such as attentive observation ($r = -.38$; $r = -.39$), manipulation ($r = -.41$; $r = -.34$), seeking information ($r = -.37$; $r = -.28$), offering information ($r = -.40$; $r = -.19$). Non-attention was also negatively related to the child's expression of positive feeling ($r = -.54$). These relationships suggest that when a parent was distracted from her child, she tended to express less positive feeling, as she examined familiar stimuli. At the same time non-attention occurred more frequently when the child was expressing limited investigation and verbal curiosity.

In contrast being responsive to the child, by offering attention, help, participation upon request and expressing positive feeling was positively correlated with exploratory behavior and offering information. This suggests that parental interaction with the child may booster exploratory behavior. Another interpretation could be that exploratory behavior by the child may foster interaction by the parent.

Parental behaviors such as attentive observation, reflection of behavior, seeking information, offering unsolicited behavior, direction, restriction, and non-coopera-

tion, negative feeling, anxiety, and aggression were, for the most part, not correlated with the child's exploratory behavior or verbal curiosity. The absence of any negative relationships between the control techniques and exploration might have been due to their infrequent use by the mothers in the playroom. The means and standard deviations for the parental behavior can be found in Table 4.

When control techniques, however, were correlated with a number of other child behaviors, some interesting relationships were found. The data from Table 5 indicates that giving unsolicited help, participation, and direction, and expressing mild aggression was positively correlated with joint participation, cooperation, and non-cooperation. These same control techniques and reflecting behavior were negatively correlated with solitary play. Unsolicited help was positively correlated with joint participation ($r = .41$) indicating that giving help or participation often was associated with joint participation in an activity by the child with the parent. The parent however, initiated the interaction. Giving help by the parent was reciprocated by the child who then more frequently cooperated ($r = .42$). Unsolicited help was also negatively correlated with seeking a response by the child ($r = -.46$). With a high degree of help offered without being requested the child does not feel need or does not learn to frequently seek help or participation from the parent.

A high level of giving directions by the parent was likewise associated with joint participation. This indicates that in participating jointly with the child, the parent tended to give more directions (r = .39). In this study direction was correlated with both cooperation (r = .71) and non-cooperation (r = .53). This indicates that the boys did not cooperate with every request their parents made of them. Those parents who frequently gave directions had children who both frequently obeyed their parents and ignored them.

The same control techniques or intervention behaviors were negatively correlated with solitary play. The parent who did not intervene, by seeking participation, giving directions, or commenting on the child's activity, allowed solitary play to persist and interfere with the expression of other behaviors.

In summary, by playing alone, the child tended to avoid being directed by the parent and avoided conflicts associated with cooperation-non-cooperation, and participation with the possible expression of aggression.

Restriction by the parent was only related to aggression by the child. Since restriction was not correlated with the expression of high or low curiosity or other behaviors, the most reasonable interpretation is that aggressiveness by the child tended to elicit restriction by the parent. This hypothesis was supported by a qualitative

examination of the data. Aggression by the child tended to precede restriction by the parent.

Finally the correlations between the child and his parent's expression of feeling provide some evidence indicating the feelings expressed by a child are related to the feelings expressed by his parent. Positive feeling expressed by the child was especially highly correlated with positive feeling by the parent ($r = .62$).

Relationship between the Social-Economic Class Variables and Curiosity

The only socio-economic class variable which was significantly related to the behavior measures was the parent's level of education (less than High School, High School, greater than High School). Level of education was correlated in a positive direction with parent's seeking of information ($r = .47$, $p < .01$) and the child's offering of information ($r = .30$, $p < .05$). With more education there tended to be more "teacher-student" or question-answer interaction.

Teacher's Ratings and Behavior Observation Measures

In order to determine whether the teacher's ratings on curiosity and high and low prosocial behavior were related to the child and adult behavior measures in the playroom, analysis of variances and Newman-Keuls individual

comparisons were computed. Analysis of variances were also computed on the socio-economic variables to determine whether the groups differed in education, family size, income, and ordinal position of the child studied.

Those F-tests which approached ($p < .124$) or reached the .05 level of significance are presented in Table 6. There were no significant differences between the groups on parent's level of education, family size, or ordinal position. Differences between the groups on amount of income earned approached but did not reach the .05 level of significance.

Adult Behavior Categories

The data from Table 6 indicates the mothers differed in the amount of non-attention, restriction, and positive feeling they displayed in the playroom.

The largest differences were between the mothers of the high-curious-high prosocial boys and the mothers of high aggressive boys. Mothers of high curious-high pro-social boys were less non-attentive, less restrictive, and expressed more positive feeling than mothers of HA boys. Mothers of high curious-high prosocial boys also expressed more positive feeling than mothers of low curious boys. The mothers of high curious-high prosocial boys also tended to observe their child more frequently from a distance than the other groups of mothers. Mothers of low curious boys

were less restrictive than mothers of high aggressive and high neurotic boys. No significant differences were present between the mothers of high curious-high prosocial vs high neurotic boys and mothers of high aggressive vs high neurotic boys.

Child Behavior Categories

The data from Table 6 suggests the groups of boys tended to differ in the extent to which they manipulated objects, sought information, directed their mothers, displayed aggressive behavior, and expressed positive feeling and anxiety.

Even though the differences between groups were not large enough to be statistically significant, in general the differences were in the predicted direction. The HC-HP group had the highest mean manipulation, seeking information, direction and positive feeling scores. The HA group had the highest aggression score; and the HN group had the highest anxiety score.

Summary of Results as Related to Hypotheses

Hypothesis One:

Investigation of objects (attentive observation and manipulation) was positively intercorrelated with curiosity toward novel stimuli, number of objects explored, and verbal manifestations of curiosity (seeking and offer-

TABLE 6.--Differences between group means on the adult and child behavior categories[1]

Adult Behavior Categories	F-Test	P	HC-HP A	LC B	HA C	HN D	A-B	A-C	A-D	B-C	B-D	C-D
Non-Attention	2.90	.048	8.45	13.91	20.33	14.33		4.20*				
Restriction	3.64	.021	1.45	.82	4.33	2.33		3.65*		3.13*	3.18*	
Positive Feeling	2.96	.045	22.45	11.72	11.87	15.22	3.51*	3.53*				
Attention-far	2.46	.078	28.91	17.27	14.89	17.67						
Income	2.32	.091	2.64	1.91	2.33	2.56						
Child Behavior Categories												
Manipulation	2.06	.122	38.0	25.55	25.67	32.22						
Seeks Information	2.05	.124	10.0	6.0	6.44	10.22						
Positive Feeling	2.05	.124	23.45	19.64	13.33	16.67						
Aggression	2.52	.073	5.73	3.55	10.00	7.78						
Anxiety	2.52	.074	11.82	12.52	6.89	17.33						4.06*
Direction	2.64	.064	3.82	3.18	1.44	1.78						

[1]Only Newman-Keuls t's significant beyond the .05 level of confidence are reported.

$n_a = 11$, $n_b = 11$, $n_c = 9$, $n_d = 9$. $N = 40$.

*$p < .05$.

ing information). Some of the correlations between attention close and manipulation, for example, can be interpreted as unduly high since they were not completely independent. There was, however, no support for the hypothesis that novel stimuli elicit greater verbal expression of curiosity by first grade boys. Furthermore, the number of different kinds of objects explored did not correlate with novel curiosity or verbal manifestations of curiosity. The data, therefore, supports the notion that curiosity may be most usefully measured by: (1) investigation (attention observation and manipulation) of familiar objects, (2) exploration of novel objects, and, (3) verbal expression of curiosity by seeking and offering information.

Hypothesis Two:

High anxiety, expression of negative feeling, and aggressiveness by the child were not correlated with the curiosity measures.

Hypothesis Three:

Solitary play was, however, negatively correlated with a number of curiosity measures. Boys who more frequently played alone, less frequently investigated familiar objects, and less frequently sought information from their mothers.

Hypothesis Four:

Parental punitive behaviors were not correlated with the child's expression of curiosity. Expression of positive feeling by the mother, however, was positively correlated with investigation and seeking information. Parental positive feeling was not correlated with the number of different kinds of objects explored, curiosity toward novel stimuli, or offering of information. Attention-close and attention-far were not correlated with any of the curiosity measures.

Hypothesis Five:

Parental non-attention was negatively correlated with investigation and verbal manifestations of curiosity. Parental non-attention was not, however, negatively correlated with exploration of novel stimuli.

Hypothesis Six:

Curiosity toward novel stimuli by mother and son was highly positively correlated.

Hypothesis Seven:

Although the boys rated HC-HP by their teachers tended to more frequently investigate familiar stimuli, ask questions, and express more frequent positive feeling than the other groups of boys, the differences between the groups were not large enough to be statistically significant.

Hypothesis Eight:

Mothers of HC-HP boys expressed significantly more positive feeling than mothers of HA boys. Mothers of HC-HP boys also expressed significantly more positive feeling than mothers of LC boys.

Hypothesis Nine:

Mothers of HC-HP boys were less non-attentive and gave fewer restrictions than mothers of HA boys.

DISCUSSION

The results indicate that curiosity may be most usefully measured by: (1) attentive observation and manipulation of familiar stimuli, (2) exploration of novel stimuli, and (3) verbal manifestations of curiosity, such as seeking and offering information. In general, because the consistencies of the child behavior categories were low, especially for such categories as novel curiosity, consistent relationships between parent and child variables which applied to all the curiosity measures were not uncovered. Nevertheless, a number of significant relationships emerged which did lend support for the notion that curiosity is influenced or relates to interpersonal and social learning variables.

The pertinent variables which appeared positively correlated to a number of child curiosity measures were the amount of curiosity and positive feeling the parent expressed in the playroom. Although parental non-attention appeared consistently related to less frequent investigation and verbal curiosity, no support was present for the hypothesis that parental punitive behaviors and negative feelings either inhibited or facilitated the expression of

curiosity. Nevertheless, when the child did not interact with his parents, and became preoccupied with solitary play, he less frequently investigated familiar objects and verbally expressed curiosity. The child's positive feeling, negative feeling, or aggression did not, however, appear to either inhibit or facilitate exploratory behavior and verbal curiosity over the total session.

When the data was analyzed in terms of the groups the children were assigned to, based on teacher's ratings, the differences between the boys in curiosity, positive feeling, anxiety, and aggression were in the predicted direction, but differences were not large enough to be statistically significant. The mothers who appeared most different in their behavior were the mothers of the HC-HP boys and the mothers of the HA boys. The HE-HP mothers expressed much more positive feeling and were less non-attentive and less restrictive than the HA mothers.

In discussing the results, an emphasis will be placed on the effect the child's behavior has on the parent. It is felt, as Bell (1968) has concluded, that focusing exclusively on the effect a parent has on a child is too limited an approach to accommodate the data from studies of human and animal Ss.

Since the data collected is correlational, inferring cause-effect relationships is questionable, since variables were not systematically varied to experimentally

test their influence. The inferences presented are therefore offered with some caution and the hope that they will stimulate further experimental research.

The results indicate that curiosity toward novel stimuli by one person is influenced by the amount of curiosity directed toward novel stimuli by another person. From the data it was not possible to determine whether the parent influenced the child or the child influenced the parent. Three hypotheses could be clarified by future research. They are: (1) curiosity is developed through the process of imitation, by observing another express either high or low levels of curiosity (Bandura and Walters, 1963); (2) curiosity is enhanced merely by another person following and attending to explorative behavior; and (3) expression of positive feeling or the presentation of other reinforcers increases curiosity behavior. The present study, in terms of its design and analysis, does not clarify which hypothesis is most influential and applicable. Furthermore, it is quite conceivable that investigation and exploration by the child may elicit attentiveness, curiosity, and positive feeling in the parent, whereas solitary play and infrequent social interaction by the child may elicit non-attention and less frequent positive feeling by the parent. Qualitatively what was often observed in high curious children was the following pattern. A child would be exploring the playroom as his parent attended to him and

what he was doing. As she watched her child she expressed positive feeling, frequently smiling. She was pleased by his behavior. At times however, the boy would become excessively preoccupied with one stimulus and become involved in a solitary activity. The mother would then intervene, by directing the child's attention to another stimulus, or by herself beginning to explore a novel stimulus. The child then observing his mother explore a novel stimuli would join her; and then the mother would again attend to the child and his behavior, displaying renewed positive feeling.

No support was present to suggest punitive control techniques either inhibited or facilitated investigation, exploration of novel stimuli, or verbal curiosity. Punitive behavior by the parents was relatively infrequent. When restrictions were given, they appeared to be elicited by mild aggressive behavior by the child. The nature of the playroom, the presence of crayon drawings on the walls, the array of stimulus objects, and the fact that the parents and children knew they were being observed, all may have elicited a permissive and socially acceptable behavior "set" in the parents and children. The fact that non-attention nevertheless emerged as a significant variable suggests that: (1) non-attention is a behavior which is difficult to inhibit, especially if one concentrates on suppressing negative feelings and controlling behavior and

(2) consistent and "selective" attentiveness with positive feeling toward a child as he explores the environment may be important behavior for some parents to learn.

The lack of a relationship between aggression and anxiety and the curiosity measures may be due also to the fact that primarily mild anxiety and mild aggression were expressed in the playroom, rather than more disrupting intense anxiety or aggression. The mean number of intervals during which an aggressive act was displayed was, for example, 6.55, which indicates aggression did not pervade the play session.

Concerning child behaviors other than curiosity, the results indicate that parental intervention and responsiveness was related to low solitary play by the child. Solitary play was associated with fewer attempts by the parent to intervene and establish interaction between child and parent.

In general this exploratory study on curiosity relating maternal behavior and curiosity illuminated a number of variables which might be more systematically and experimentally studied.

The ideal strategy would be to select adults or students to role play various adult behaviors and determine their influence on child behaviors, such as novel curiosity, seeking information, solitary play, and positive feeling. Adult behaviors which might be systematically varied

include: (1) non-attention, (2) consistent attention-close and attention-far, (3) adult curiosity toward novel stimuli, (4) adult intervention behaviors, such as direction, solicited and unsolicited responsiveness, and (5) expression of positive and negative feeling. Adults might also be trained to selectively reinforce various curiosity behaviors.

To assess the influence of the child's behavior on the parent, children could likewise be trained through instruction to focus on one or two basic behaviors, such as: (1) high novel curiosity, (2) exclusive solitary play, or (3) high aggressiveness and high anxiety.

Before such an experimental study is undertaken the study of situational variables, such as the nature of the playroom, and the extent to which it elicits stable behavior patterns, is necessary to obtain reliable and valid behavioral measures and relationships. Situational variables which might be varied include (1) the number and type of objects present, (2) the time of the play observation session and (3) the degree to which the investigator provides structure by placing restrictions on the child and adult behaviors.

In terms of a theoretical discussion of the exploratory drive concept the study did not provide a systematic test for its presence, absence or heuristic value. Likewise, it excluded in its design the relationship

between covert, internal physiological processes and attempted to focus on manifest behavior. The study did provide support for the operant learning position, that social learning variables, such as reinforcers and imitation relate to the expression of curiosity. This is not to say, however, that activity level and the stimuli available are not important determiners of curiosity.

In extending this study beyond the data, to the school situation, home, and play therapy hour the following recommendations can be offered. In regard to school, if a teacher focuses exclusively on directing her children to be cooperative, and to work in solitary achievement activity, providing materials which lack novelty, she runs the risk of reducing the child's chance to investigate and enjoy activities which he finds unusual and surprising. If at the same time she finds teaching "dull" and does not, herself, express positive feeling, her students may, likewise, express less positive felling connected with the discovery and learning of information. If a teacher can identify children who express limited curiosity, on the other hand, she can focus, and reinforce small steps made by each child toward greater curiosity and interest in learning. Reinforcement of "questioning asking" may be a beginning step.

In a similar way parents can learn to reinforce with positive attention the exploration and inquisitiveness

their children display. In children, who are especially hyperactive, however, it may be necessary to reinforce and direct curiosity to a more limited number of stimuli. Non-attention, and allowing the child to persist in continuous solitary play may lead to less curiosity, exploration, and a reduced interest in seeking new information.

In reference to the therapy hour the parent-child interaction data presented, indicates that a play therapist may take advantage of a number of therapeutic behaviors, which previously he has inhibited or ignored. For one thing there was no evidence, what so ever, that it is important to consistently maintain a close (less than five feet) relationship in a play room with a child. Attention close was not correlated with any of the prosocial or curiosity measures. Second, the therapist can engage in joint participation and intervention behaviors when the child is playing alone, without fearing the child will become hopelessly dependent. Third, it would appear that in interacting with a child, one might, in addition to empathizing with the child, also shape behaviors, such as curiosity, by expressing and sharing genuine positive feeling when the child is enjoying his exploratory behavior and play. In summary by exclusively focusing on just relection of internal feelings and sharing one's understanding, the therapist may miss the opportunity to reinforce other learning and social skills.

SUMMARY

Most of the recent literature on curiosity has focused on determining the stimulus characteristics eliciting exploration, manipulation, and seeking information. Studies relating parent-child variables, and experiences, such as anxiety, have for the most part tended to rely on paper-pencil tests.

The presented study, in contrast, defined parent and child behaviors in observational terms, and focused on relating maternal behavior and a boy's curiosity in a playroom situation.

Four groups of first grade boys who differed in curiosity, aggressiveness, and neurotic behavior (anxiety and social withdrawal), based on teachers' ratings, were selected to participate in a free play situation study. The mother-son interaction was observed by raters who were trained to code both mother and son on pre-selected behavior categories.

In general the results indicate the categories could be reliably measured by trained raters, though some interactional behaviors, such as non-cooperativeness, proved to be less stable than the other behavior categories.

Also child behaviors between the first and second ten minutes were quite variable and unstable, so that further research is in order to obtain more reliable estimates of variables such as a child's novel curiosity.

The results of the study, nevertheless, indicate that investigation of objects (attentive observation and manipulation) was positively intercorrelated with curiosity toward novel stimuli, the number of different kinds of objects explored, and such verbal manifestations of curiosity, as seeking and offering information. Exploration of novel stimuli and exploration of a greater variety of objects was not, however, correlated with seeking and offering information.

Although emotional indices, such as anxiety, expression of negative feeling, and aggressiveness by the child were not correlated either positively or negatively with the curiosity measures, solitary play by the child was negatively correlated with investigation of familiar objects and seeking information. In this study solitary play was the only behavior exhibited by the child which competed and interfered with the expression of curiosity. Other child behaviors such as aggression, anxiety, and joint participation were not frequent or intense enough to inhibit the expression of curiosity.

Regarding the influence of parental behaviors on a child's curiosity and play, parental punitive behaviors

were not found to be negatively correlated with the child's expressions of curiosity. Punitive behaviors, such as restriction, aggression, and negative feeling were too infrequently displayed by the mothers. Low intervention by the parent, in terms of a reluctance to seek participation, give help and direction, and reflect behavior, was associated with greater solitary play by the child. The parental behaviors which were most highly positively correlated with the child's curiosity were (1) the mother's curiosity behavior and (2) the mother's expression of positive feeling. The child's curiosity toward novel stimuli was highly positively correlated with the novel curiosity expressed by his mother ($r = .72$). The child's attentive observation manipulation, and seeking information was positively correlated with the mother's expression of positive feeling.

In contrast, parental non-attention was negatively correlated with a number of child curiosity measures including attentive observation, manipulation, seeking and offering information.

The differences between the groups of boys, based on the teacher's ratings, were in the predicted direction with the High Curious-High Prosocial group exhibiting the most manipulation and positive feeling, the high neurotic group expressing the most anxiety, and the High Aggressive group displaying the most aggression. The

differences in child behavior between the groups were not large enough, however, to be statistically significant.

A number of significant differences in behavior between the groups of mothers were found. The greatest differences were between the mothers of the High Curious-High Prosocial boys and the mothers of the High Aggressive boys. Mothers of High Curious-High Prosocial boys expressed significantly more positive feeling and were less restrictive and less non-attentive than mothers of High Aggressive boys.

The results were interpreted within a social learning theory model, which emphasized the influence of such social reinforcers as positive feeling and attentiveness and the effect of imitation on curiosity. The effect of the child's curiosity and play on the parent's behavior was also discussed.

REFERENCES

1. Allen, K. E., Hart, B. M., Buell, J. S., Harris, F. R., and Wolf, M. M. Effects of social reinforcement on isolate behavior of a nursery school child. Child Development. 1964, 35, 511 - 518.

2. Arsenian, M. Young children in an insecure situation. J. Abnorm. Soc. Psychol., 1943, 38, 225 - 249.

3. Baldwin, A. L. Socialization and the parent-child relationship. Child Developm., 1948, 19, 127 - 136.

4. Baldwin, A. L., Kalhorn, Joan and Breese, Fay H. The appraisal of parent behavior. Psychol. Monogr., 1949, 63, (4, Whole No. 299).

5. Bandura, A. and Walters, R. H. Social Learning and Personality Development. New York: Holt, 1963.

6. Baron, A. Suppression of exploratory behavior by aversive stimulation. J. Comp. Physical Psychol., 1964, 57, 299 - 301.

7. Bell, R. Q. A reinterpretation of the direction of effects in studies of socialization. Psychol. Rev., 1968, 75, No. 2, 81 - 96.

8. Berlyne, D. E. Conflict, Arousal and Curiosity. New York: McGraw-Hill.

9. Berlyne, D. E. Conflict and information-theory variables as determinants of human perceptual curiosity. J. Exp. Psychol., 1957, 53, 399 - 404.

10. Berlyne, D. E. The influence of complexity and novelty in visual figures on orienting responses. J. Exp. Psychol., 1958, 55, 289 - 296.

11. Berlyne, D. E. and Frommer, F. D. Some determinants of the incidence and content of children's questions. Child Developm., 1966, 37, (1), 177 - 189.

12. Boles, Robert C. Theory of Motivation. New York: Harper and Row, 1967.

13. Butler, R. A. Discrimination learning by rhesus monkeys to visual exploration of motivation. J. Comp. Physiol. Psychol., 1953, 46, 95 - 98.

14. Butler, R. A. The effect of deprivation of visual incentives on visual exploration on motivation in monkeys. J. Comp. Phsyiol. Psychol., 1957, 50, 177 - 179. (b)

15. Charlesworth, W. R. and Thompson, W. R. (1957) Effect of lack of visual stimulus variation on exploratory behavior in the adult white rat. Psychol. Rep., 3, 509 - 512.

16. Dashiell, J. F. A quantitative demonstration of animal drive. J. Comp. Psychol., 1925, 5, 205, 208.

17. Dollard, T. and Miller, N. E. Personality and Psychotherapy. New York: McGraw-Hill, 1950.

18. Ehrlich, A. Effect of post experience on exploratory behavior in rats. Canad. J. Psychol., 1959, 13, 248 - 254.

19. Fowler, H. Exploratory motivation and animal handling: the effect on funway performance of start-box exposure time. J. Comp. Physiol. Psychol., 1963, 36, 866 - 871.

20. Freud, S. Collected Papers, Institute of Psychoanalysis and Hogarth Press, London, 1924, V. II.

21. Guerney, B. G. Jr., Burton, Jean, Silverberg, Dona, and Shapiro, Ellen. Use of adult responses to codify children's behavior in a play situation. Perceptual and Motor Skills. 1965, 20, 614 - 615.

22. Harlow, H. F. Learning and satiation of responses in intrinsically motivated complex puzzle performance by monkeys. J. Comp. Physiol. Psychol., 1950, 43, 289 - 294.

23. Harlow, H. F., Harlow, Margaret K. and Meyer, D. R. Learning motivated by a manipulation drive. J. Exp. Psychol., 1950, 40, 228 - 234. (a)

24. Harlow, H. F. The nature of love. Am. Psychol., 1958, 13, 673 - 685.

25. Harris, F. R., Wolf, M. M., Baer, D. M. Effects of Adult Social Reinforcement on Child Behavior. In The Causes of Behavior II, Rosenblith, J. F. and Allensmith, W. (eds). Allyn and Bacon, Boston, 1966, 99 - 107.

26. Hays, K. J. Exploration and fear. Psychol. Rep., 1960, 6, 91 - 93.

27. Hebb, D. O. On the nature of fear. Psychol. Rev., 1946, 53, 259 - 276.

28. Hebb, D. O. The organization of behavior. New York: Wiley, 1949.

29. James, W. The principles of psychology. New York: Holt, 1890.

30. Lucas, J. D. The interactive effects of anxiety, failure, and intra-serial duplication. Amer. J. Psychol., 1952, 65, 59 - 66.

31. Maddi, S. R. Exploratory behavior and variation-seeking in man. In D. W. Fiske and S. R. Maddi, Functions of varied experience. Homewood, Ill.: Dorsey Press, 1961, 253 - 277.

32. Maslow, A. H. Motivation and personality. New York: Harper, 1954.

33. Maw, W. H. and Maw, Ethyl W. Establishing criterion groups for evaluating measures of curiosity. J. Exp. Educ., 1961, 29, 299 - 306.

34. McReynolds, P., Archer, Mary and Pietila, Caryle. Relation of object curiosity to psychological adjustment in children. Child Developm., 1961, 32, 393 - 400.

35. Medinnus, G. and Love, J. M. The relation between curiosity and security in preschool children. J. Genet. Psychol., 1965, 107, 91 - 98.

36. Montague, E. K. The role of anxiety in serial learning. J. Exp. Psychol., 1953, 45, 91, 96.

37. Montgomery, K. C. Exploratory behavior as a function of "similarity" of the stimulus situation. J. Comp. Physiol. Psychol., 1953, 46, 129 - 133.

38. Montgomery, K. C. The effect of hunger and thirst drives upon exploratory behavior. J. Comp. Physiol. Psychol., 1953, 46, 315 - 319.

39. Montgomery, K. C. The role of exploratory drive in learning. J. Comp. Physiol. Psychol., 1954, 47, 60 - 64.

40. Montgomery, K. C. and Monkman, J. A. The relation between fear and exploratory behavior. J. Comp. Physiol. Psychol., 1955, 48, 225 - 228.

41. Montgomery, K. C., Zimbardo, P. G. Effect of sensory and behavioral deprivation upon exploratory behavior in the rat. Percept. Mot. Skills, 1957, 7, 223 - 229.

42. Moustakas, C. E., Sigel, I. E. and Schalock, H. D. An objective method for the measurement and analysis of child-adult interaction. Child Developm., 1956, 22, 2, 109 - 134.

43. Penny, R. K. Reaction curiosity and manifest anxiety in children. Child Developm., 1965, 36, 697 - 711.

44. Premack, D. Toward empirical behavior laws: Positive reinforcement. Psychol. Rev., 1959, 66, 219 - 233.

45. Quay, H. C., Morse, W. C., and Cutler, R. L. Personality patterns of pupils in special classes for the emotionally disturbed. Exceptional Children, 1966, 32 (5), 297 - 301.

46. Raymond, C. K. Anxiety and task as determiners of verbal performance. J. Exp. Psychol., 1953, 46, 120, 124.

47. Ross, A. O., Lacey, H. M., and Parton, D. A. The development of a behavior checklist for boys. Child Developm., 1965, 36, 1013 - 1027.

48. Siegel, A. Film-mediated fantasy aggression and strength of aggressive drive. Child Developm., 1956, 22, 365 - 387.

49. Spence, K. W. and Farber, I. E. The relation of anxiety to differential eyelid conditioning. J. Exp. Psychol., 1954, 47, 127 - 134.

50. Spence, K. W., Farber, I. E. and McFann, H. H. The relation of anxiety level to performance in competitional and non-competitional paired associates. J. Exp. Psychol., 1956, 52, 296 - 305.

51. Spence, K. W., Taylor, J. A., and Ketchel, R. Anxiety drive and degree of competition in paired associates learning. J. Exp. Psychol., 1956, 52, 306 - 310.

52. Standish, R. R. and Karwoski, T. F. Task difficulty and drive in verbal learning. J. Exp. Psychol., 1960, 59, 361 - 365.

53. Taylor, J. A. The relationships of anxiety to the conditioned eyeblink response. J. Exp. Psychol., 1951, 41, 81, 92.

54. Taylor, J. A. and Spence, K. W. The relationships of anxiety level to performance in serial learning. J. Exp. Psychol., 1952, 44, 61, 64.

55. Walters, J., Pearce, D., Dohms, Z. Affectional and aggressive behavior of preschool children. Child Developm., 1957, 28, 15 - 22.

56. Watson, G. Some personality differences in children related to strict or permissive parental discipline. J. Psychol., 1957, 44, 227 - 249.

57. Welker, W. I. Some determinants of play and exploration in chimpanzees. J. Comp. Physiol. Psychol., 1956, 49, 84 - 89. (a)

58. Welker, W. I. Variability of play and exploratory behavior in chimpanzees. J. Comp. Physiol., 1956, 49, 181, 185. (b)

59. Zuckerman, M., Kolin, E. A., Price, L., and Zoob, I. Development of a sensation seeking scale. J. Consult Psychol., 1964, 28, 477 - 482.

APPENDIX A

TEACHER RATING QUESTIONNAIRE

Instructions: Select two boys who most aptly fit each description and rank them first and second.

1. Explores and actively manipulates novel stimuli, expressing a strong need to know more about himself and the environment.

   (1)_____ (2)_____

2. Self-confident and sure of himself.

   (1)_____ (2)_____

3. Relatively at "ease" with himself.

   (1)_____ (2)_____

4. Hyperactive, is "always on the go", restless.

   (1)_____ (2)_____

5. Expresses little or only short lived enthusiasm about objects in his environment, usually accepting information without question or enthusiasm.

   (1)_____ (2)_____

6. Often anxious, or sad, or depressed.

   (1)_____ (2)_____

7. Spontaneously helpful, considerate, and cooperative.

(1)_____ (2)_____

8. Persistently concentrates, investigates, and examines objects in order to know more about them. Frequently asks questions, but is not a "pushy" or an "overly-curious" child.

(1)_____ (2)_____

9. Popular with his classmates and happy as most children.

(1)_____ (2)_____

10. Is quick to be helpful and considerate, but only when asked to be by his teacher, or others.

(1)_____ (2)_____

11. Appears to lack self-confidence and is often easily flustered and confused.

(1)_____ (2)_____

12. Appears more disruptive, aggressive, irritable, and uncooperative than other children.

(1)_____ (2)_____

13. A leader.

(1)_____ (2)_____

14. Works well by himself, but is generally a follower.

(1)_____ (2)_____

15. Quiet and relatively passive, expressing limited interest in learning more about himself and the environment-yet is not withdrawn or distant. Could be called quiet but good child.

(1)_____ (2)_____

16. Volunteers and works well by himself.

(1)_____ (2)_____

17. Very quiet and passive, expressing little interest in learning more about himself and the environment.

(1)_____ (2)_____

18. Socially withdrawn, shy and distant.

(1)_____ (2)_____

19. Exhibits attention seeking and "show-off" behavior.

(1)_____ (2)_____

APPENDIX B

RULES FOLLOWED IN FORMING HIGH CURIOSITY-HIGH PROSOCIAL, LOW CURIOSITY, HIGH AGGRESSIVE AND HIGH NEUROTIC GROUPS

I. High Curiosity-High Prosocial Groups (HC-HP)

A. Items

1. Explores and actively manipulates novel stimuli, expressing a strong need to know more about himself and the environment.

8. Persistently concentrates, investigates, and examines objects in order to know more about them. Frequently asks questions, but is not a "pushy" or an "overly-curious" child.

2. Self-confident and sure of himself.

7. Spontaneously helpful, considerate, and cooperative.

9. Popular with his classmates and happy as most children.

15. A leader.

18. Volunteers and works well by himself.

B. To belong to HC-HP groups S must be rated on either item 1 or 8, and on 1 or more of items 2, 7, 9, 15, and 18.

II. Low Curiosity Group (LC)

A. Items

5. Expresses little or only short lived enthusiasm about objects in his environment, usually accepting information without question or enthusiasm.

17. Quiet and relatively passive, expressing limited interest in learning more about himself and the environment--yet is not withdrawn or distant. Could be called a quiet but good child.

19. Very quiet and passive, expressing little interest in learning more about himself and the environment.

B. To belong to LC S must be rated on either items 5, 17, or 19 and not be rated on prosocial, or aggressive items.

III. High Aggressive Group (HA)

A. Items

4. Hyperactive, is "always on the go", restless.

14. Appears more disruptive, aggressive, irritable, and uncooperative than other children.

21. Exhibits attention seeking and "show-off" behavior.

B. To belong to HA S must not be rated on the curiosity behavior items but is rated on one or more of items 4, 14, 21.

IV. High Neurotic Group (HN)

A. Items

6. Often anxious, or sad, or depressed.

5. Expresses little or only short lived enthusiasm about objects in his environment, usually accepting information without question or enthusiasm.

13. Appears to lack self-confidence and is often easily flustered and confused.

19. Very quiet and passive, expressing little interest in learning more about himself and the environment.

20. Socially withdrawn, shy, and distant.

B. To belong to HN groups S is rated on one or more of items 6, 13, 20 and may be rated on items 5 and 19.

APPENDIX C

QUESTIONNAIRE

List of Toys in Playroom

1. Socker ball
2. Bowling pins and ball
3. Sand box
4. Dart gun
5. Space gun
6. Knife
7. Tinker Toys
8. Puppets
9. Toy shovel
10. Teddy bear
11. Raggedy Ann
12. Blocks
13. Checkers
14. Dolls
15. Football
16. Trucks
17. Toy stove, refrigerator
18. Toy telephone
19. Tanks
20. Buggy
21. Fire engine
22. Lincoln logs
23. Toy furniture
24. Toy toaster
25. Pin-ball game
26. Doctor's kit
27. Chalk and blackboard
28. Play bathtub
29. Punching bag
30. Wagon
31. Ping-pong table
*32. Battery-run truck
*33. Negro-white doll
*34. Donald Duck-Mickey Mouse puzzle
*35. Animal
*36. Life saver man
*37. Paintings
*38. Pictures in playroom

*Novel stimuli

Preference for novel stimuli: Of the toys you don't have at home, which ones did you like the best? Which ones were the most fun? Name five.

APPENDIX D

DEFINITIONS OF CHILD AND ADULT

BEHAVIOR CATEGORIES

1. Attentive observation:
   (a) The child or parent looks from a distance (greater than ten feet) at an object or person.

   (b) The child or parent looks closely at an object or person (less than five feet).

2. Holds and manipulates object:
   In differentiating manipulation from "play", it is important to observe whether the child is attempting to discover something new about the object, rather than just using it.

3. Seeks information:
   The child or parent asks a question about an object, the playroom, personal feelings, or experiences.

4. Offers information:
   The child makes a comment about the objects he is exploring.

5. Number of different objects manipulated:
   Each time the child manipulates a different object, the category is scored.

6. Solitary play:
   The child plays alone. He does not appear to be seeking additional information, but instead uses the toy; examples, pulling a toy, throwing a ball, playing with a puppet. Important note--some activities involve both curiosity and play. It is then necessary to score both categories. An example might be playing with a jig-saw puzzle.

7. Joint participation:
   Both parent and child play together. If the parent

watches the child, joint participation is not scored.

8. Expression of positive feeling:
   Satisfaction, joy, enthusiasm, pleasure, affection, or praise may be expressed verbally and non-verbally. Positive feeling is scored if the child or parent verbally states, "I like this," "I'm happy," "Boy, is this fun," "I wish I could play longer," "wowee," etc. It is also scored if the child laughs, smiles or expresses physical affection.

9. Expression of negative feeling:
   This is scored when the child or parent expresses annoyance, anger, fatigue, or dislike toward an object or person. It may be expressed verbally, by gesture, or facial expression.

10. Seeking response from parent:
    Seeking response is scored when the child asks the parent for help, assistance, or asks the parent to join him in play. It is not scored when the child seeks information about an object. If the child is looking for an object and asks the parent where it is located, it will be scored as seeking help.

11. Direction:
    Direction is scored when the child or parent suggests or directs another person's behavior. Direction is scored when it is expressed verbally or by using a gesture such as pointing.

12. Non-cooperation:
    Non-cooperation is scored when a question or request is ignored, help is rejected, or avoidance of another is expressed.

13. Cooperation:
    Cooperation is scored when the child complies to a parent's request. It is different from participation in that the child who cooperates is not involved in an activity with the parent. Example, the parent who says, "Why don't you play in the sand box?" The child replies, "O.K."

14. Anxiety:
    Anxiety is scored in three degrees.
    (a) Mild: motoric manifestations of fear, nervousness, anxiety, but feeling is not expressed intensely. Mild nervous gestures, may be present such as, picking nails, nose,

rubbing hands, sucking thumb, looking back and forth at clock, mirror, parent.

(b) Moderate: scored when it begins to interfere with activity. When mild anxiety is present, the child plays and appears unaware of nervousness. When moderate anxiety is present the child is clearly aware he is upset and verbalizes anxiety. He may walk back and forth, more intensely rub his hands, drop objects, and at times appear agitated, criticizing himself.

(c) Severe: scored when anxiety disrupts the child's behavior. The child is terrified, trembles, cries, hunches up in a corner, or wants to leave.

15. Aggression: See Appendix E.

16. Curiosity toward novel stimuli:
Novel stimuli is scored when curiosity is directed toward stimuli such as the pictures on the walls, the mechanical toy, the negro-white doll, the "I hate you teacher" doll, the "Life-saver" man, and the gerbil.

17. Curiosity toward familiar stimuli:
Curiosity familiar is scored when the parent attends to an object other than the novel stimuli.

18. Non-Attention:
Non-attention is scored when parent looks away from child and becomes involved in another task. It is important to note that non-attention and attentive observation can occur in the same interval.

19. Solicited response:
Solicited response is scored when the child asks for and receives information, help and participation.

20. Unsolicited response:
Unsolicited response is scored when the parent responds with information, help, or participation without the child seeking a response.

21. Restriction:
Restriction is scored when the parent prevents the child from partaking in an activity, by either

saying, "no", or physically restraining the child, threatening or appealing to sense of guilt.

22. Reflection of content behavior:
Reflection of behavior is scored when parent comments on behavior of child.

23. Whispering:
Whispering is scored when the rater can not hear the response and code it appropriately.

APPENDIX E

CRITERIA FOR CODING CHILDREN'S OVERT AGGRESSIVE BEHAVIOR

A. A rating of 0 will be given when the child shows no aggression, either verbal or physical.

B. A rating of 1 will be given for mild aggressive verbal or physical behavior, that is shooting darts at target or walls, bowling, playfully hitting the punching bag, or throwing any object, other than while playing catch with the therapist. Verbal aggression directed against either the therapist or some object or person in or out of the playroom should be given a one rating. Games like pinball or miniature baseball, in which the child strikes something but does not, in doing so, exert effort or show anger at the game itself (such as picking up the device and banging it on the counter) should be scored as 0.

C. A rating of 2 should be given for aggression in which the child is more physically involved. Rather than taking a haphazard swing at the punching bag, he will repeatedly strike it with force; rather than shooting

darts at a target, he will repeatedly shoot them at the therapist. A rating of 2 should also be given for attacks or attempted plots against the therapist.

In a two rating, the child will have his emotions concentrated upon the object of his aggression. He will pay little or no attention to either the therapist or any object in the room.

D. A three rating is given only for violent physical aggression in which the child is deliberately trying to destroy the object of his aggression. In contrast to the two rating, given when the emotions of the subject are concentrated but withheld, the three rating is given for acts in which there is a violent emotional outburst, that is, screaming, crying, and a loss of physical co-ordination.