MATERNAL PERCEPTUAL STYLE AND MOTHER-INFANT INTERACTION IN A PLAY SETTING

by

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ABSTRACT

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Fifty-two mother-infant pairs participated in a study exploring the relationship between mother's perceptual style and the interpersonal interaction between mother and infant during a play session. The mother's perceptions of an older child at play were used to assess the maternal positive and negative perceptual bias when evaluating childhood activities. Mothers responded by assigning positive, negative, and neutral behavioral characteristics to the child seen on the videotape stimulus by using a child behavior checklist. This checklist was previously developed and contained items reflective of childhood competence and behavior disorders.

Interpersonal interaction between mother and infant was videotaped during a play session held in a laboratory playroom. Verbal, nonverbal, and play behaviors were scored for periods of free and structured play episodes.

Cluster and factor analysis were performed on both mother and infant behaviors. The analysis of infant behavior isolated three categories of infant activity:

Attachment, Mutual-Play, and Solitary-Play. Over the course of the play session four different patterns of attachment were observed: Global-Attachment, Exploratory-Attachment, Exchange-Game-Attachment, and Negative/Ambivalent Attachment.

Infant play behaviors were indicative of competence activities. Competence was shown in either Solitary-Play or Mutual-Play. These factors of infant competence were generally independent of the factors showing infant attachment behavior.

Maternal perceptual style was positively related to mutual mother-infant interaction and infant play behavior. The attibutions assigned by the mother from the behavior checklist were predictive of infant competence but not infant attachment. Positive perceptual style was related to Mutual-Play, Exchange-Game, Sitting-On-Mother's-Lap, Solitary-Play, and Play-Time.

The behavior checklist was factored into six subscales: Bully, Angry, Impulsive, Competent, Intelligent, and Cooperative. Regression analyses of infant behavior on these subscales showed a strong relationship on infant behaviors indicative of the subscale factor. The Angry

and Impulsive subscales were related to infant behavior which expressed anger and impulsivity. The Bully subscale was not related to infant behavior. The negative subscales of Angry and Impulsive which were based upon items derived from childhood problem behaviors. Thus, these sixteen-month-old infants demonstrated similar clinical patterns and their mothers held perceptual biases consistent with these patterns.

Similarly, the regression analyses of infant behaviors on the positive subscales showed a strong relationship with infant competence. The subscales of Competent, Intelligent, and Cooperative were related to infant behaviors reflective of these factors. Thus, these infants demonsterated different patterns of competence behavior and their mothers held perceptual biases consistent with these patterns of behavior.

Dedicated to those friends who
have enriched my life and made this
dissertation possible

Jane Bradshaw Violin

Deena Agree Jazz Piano and Theory

Mary Simoni Classical Piano And Composition

Dr. Griffith Freed Humanist

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I wish to thank the members of my committee: Dr. Ellen Stromnun for her friendly encouragement; Dr. Donald Grummon for his clinical interest; and Dr. Larry Messe who proved to be a positive perceiver during one of my dark hours. My special thanks go to Dr. Gary Stollak whose belief in investigating parent-child relationships started me on this path. Finally, thanks to Dr. Hiram Fitzgerald who demonstrated high standards of academic and research excellence; he has been a good model to follow.

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Chapter 1

Introduction

A number of authors (Bell, 1974, 1971; Lewis & Lee-Painter, 1974) have drawn attention to the reciprocal nature of caregiver-infant interaction and communication. This interaction between mother and infant begins as early as the third month of life with mutual dyadic gazing (Robson, 1967) and smiling games (Wolff, 1963). Mother and infant use these behaviors to increase and prolong the time spent together. Many of these interactions take on a game-like nature. These mini-games most likely are a precursor to the more involved games which mother and infant play later during the first year (Stern, 1974).

Little is known about how mothers and infants play with one another during the first year of life. This study assumes that the manner in which a mother and infant touch, vocalize, and look at one another affects the development of their interpersonal relationship. In an attempt to measure the interaction between the mother and her infant, the present study attempts to examine these behaviors in a play setting.

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The General Scope of Mother-Infant Interaction

A number of personality theorists (Freud, 1969; Sullivan, 1953; Erikson, 1963) stress the importance of early mother-child interaction as a major formative factor in the personality development of the child. These theorists frequently center on the interpersonal exchange between mother and infant during the processes of socialization and caregiving (Yarrow, Rubenstein & Pedersen, 1975). Differences in maternal attitudes, personality characteristics, and social background are assumed to influence maternal behavior and emotional interaction during caregiving activities. Researchers, therefore, examined the relationship between maternal attitudes and practices in the areas of breast or bottle feeding, toilet training, weaning, discipline, and personality expression in their children (Caldwell, 1964a).

Caldwell's (1964a) review of this research area found little evidence to link maternal attitudes and practices to childhood behavior and personality. However, Caldwell (1964b), Yarrow and Goodwin (1965), and Moss (1965) suggested that this failure was due most likely to methodological problems associated with the earlier research. Most of this research was done as interviews with the mothers or retrospective self-reports by adults after the infancy period. The interview and self-report methods suffer from two complications--poor recall and the desire to give socially acceptable answers.

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Perhaps of greater importance is a third difficulty with self-observational methods. This difficulty is the extensive interactive nature of interpersonal communication. The more an observer or judge is an actor in an on-going activity, the more biased will be his statements about the interaction. Accuracy of judging interaction is in itself a special skill and perhaps a personality trait (Smith, 1974).

Maternal reports should suffer just by the sheer magnitude of interaction between mother and infant. For example, Clark-Stewart (1973) found that the twenty-month-old infant spends close to 80% of his waking hours in the same room with the mother. Of this time, mother and infant interacted directly about 30% of the time. White and Watts (1973) also noted that mothers interact with their year-old infants about one-third of the time.

In spite of the difficulties and lack of positive findings, a number of researchers (Yarrow et al., 1975; White & Watts, 1973; Connel & Brunner, 1974; Lewis & Rosenberg, 1974; Lewis & Goldberg, 1969) continued to stress the importance of early mother-infant interaction in the development of the infant's social and cognitive skills and behavior. Moss (1965) suggested that the research in this area should include an examination of maternal characteristics and direct observation of the mother and infant interaction.

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Thus, the present study examined maternal perceptual biases toward play activities of children and directly observed mother-infant activities in a standard laboratory setting. This introduction reviews interaction research involving the infant, play behavior of year-old infants, and the persistence of maternal attitudes as an explanatory concept for individual differences in infant behavior.

A Model for Studying the Infant's Interpersonal Interaction

Perhaps the most explicit theory on the role of specific behaviors and communication channels used by mothers and infants during the first two years of life can be found in Bowlby's (1969, 1973) theory on attachment and separation processes during infancy. Bowlby drew attention to the infant behaviors of crying, smiling, following, clinging, and sucking as interaction-maintaining behaviors. Robson (1967) added to Bowlby's list the behavior of eye-to-eye contact between mother and infant. This list of behaviors could certainly be expanded to include any behavior the mother and infant use to communicate with one another. For example, there are the other facial expressions of frowning, cry face, sobering, interest, and general body tensions of excitement and fatigue.

Bowlby focused on the active behaviors of the infant which bring the caregiver and infant into contact with one another. It can be argued that almost any communication channel can be used to build reciprocal attachment between

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mother and infant. Often, when things are too quiet from an infant's room, the mother will seek out and check on the infant. This suggests that a difference must be made in distinguishing the situational and goal factors of communication and the channels which mothers and infants use during interaction.

A review of literature on interpersonal interaction between the infant and caregiver suggests that at least six characteristics in interaction should be analyzed. Interaction may be studied by examining the type of the interaction, the dimensions of the communication, the specific behaviors used, and the participants involved in the interaction.

The types of interaction may be classified as exchanges which come from need reduction or caregiving to the infant (Bell & Ainsworth, 1972), situtions of affection and play (Sroufe & Wunsh, 1972), exploration (Rheingold & Eckerman, 1970), didactic exchange (White & Watts, 1973), and discipline-control (Stayton, Hogan, & Ainsworth, 1971). Interaction types then are characterized by situation and purpose of the exchange between the infant and the caregiver.

The dimensions of interaction describe the quantitative and qualitative stimulus aspects of the communication which may occur in any given type of exchange. Stimuli in an interaction may be classified by the contingent nature

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of responses (Etzel & Gewirtz, 1967), intensity or persistence (Bronson, 1974), positive affect (Wolff, 1963), negative affect (Lewis & Rosenblum, 1975), accuracy or effectiveness (Ainsworth & Bell, 1973), initiation of interactions (Bronson, 1974), termination of interaction (Lewis & Lee-Painter, 1974), and the distance over which communication is carried out either proximally (Cohen & Compos, 1974), or distally (Walters & Parke, 1965).

The specific content of an interaction episode comes as bids or bits of information exchange during the interaction. These are the specific behaviors associated with the interaction. These bids and bits of communication may come through a number of modalities and a variety of behaviors. The expression by one person may be given in one modality and received by the other person in another modality. For example, an infant's overall body tonus (kinesthetic-muscular channel) may be perceived by the mother by looking (visual channel) or by touching (tactile channel). Thus, in listing the specific content of a communication, both the sensory modalities and specific behaviors involved may be given. The modalities are tactile, auditory, visual, kinesthetic, and vestibular (Yarrow, et al., 1975). A sample of behaviors are eye-to-eye contact (Robson, 1967), vocalizations (Jones & Moss, 1971), touch (Lewis & Goldberg, 1969), locomotion (Rheingold & Eckerman, 1969), and rocking (Korner & Thoman, 1972).

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References on mother-infant interaction are scattered throughout the literature under a variety of topics (e.g., see Schaffer, 1971). No single study draws together all of the diverse elements of types, dimensions, or specific content available to the interpersonal interaction of mother and infant. This fact alone points to the diversity and the complexity of the communication system used by mother and infant.

Lewis and Lee-Painter (1974) offered an analysis of models and assumptions used by researchers in the area of caregiver-infant relationships. Most studies make the implicit assumption that infant behavioral differences are a result of infant temperament or child rearing practices of the caregiver and larger environment. But not all models of research approach the relationship accounting for the interactive nature of the data. Although not stated by Lewis and Lee-Painter, the question which the researcher wishes to answer should guide his decision about which research model he wishes to adopt.

The first model is the simple element model. Here the data collected centers on one member of the dyad. Data are usually in the form of frequencies emitted by either member of the dyad. One assumes that the frequencies of behaviors such as vocalizations, smiles, or time spent in activities are a result of the interaction which has occurred between caregiver and infant. An extension of

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the simple element model takes the form of measuring caregiver or environment characteristics at one time and later measuring infant behaviors at a second time. Even though presenting a more interactive appearance, this extension still lacks the establishment of linking the characteristics of the members' interaction at both time periods. For example, Ainsworth and Bell (1969) observed mother-infant interaction patterns of feeding at the infant's third month. They then measured the infant's attachment behavior at twelve months. A similar paradigm was followed by Robson, Pedersen, and Moss (1969) with mutual mother-infant eye-to-eye contact at three months of age and infant's behaviors of social approach and fear of strangers at twelve months.

A second type of model proposed by Lewis and Lee-Painter (1974) is the simple interaction model and its extension, the flow model. In the interaction model, both infant and caregiver behaviors are recorded and analyzed to see which member of the dyad initiates, responds to, and terminates interaction sequences. The flow model allows for unspecified interactions and unspecified responses. Data in these forms are analyzed by cross-panel correlations (Clark-Stewart, 1973), and cross-panel proportions (Stern, 1974).

Play Interaction

Surprisingly enough, few studies have been done on mother-infant interaction in play. Numerous studies have

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focused on the infant's exploratory activities in the presence of the mother, both at home and in the laboratory. The Sroufe and Waters study (1972) on the development of infant laughter was among the first to look at games which mothers play with their infants to make the infants laugh.

The lack of data on this point, however, has not kept play from being accorded a high status in infant development. Piaget (1953) held that much of what the infant learns within the first year is by the playful mechanism of "making interesting things last." Others, such as Murphy (1972) and Erikson (1972), viewed early mother-infant play to be crucial for healthy cognitive and personality development of the child. Mother-infant play is seen as the precursor to all of childhood play which is a major area for the development of competence (White, 1959; Bell, 1974; Singer, 1973).

There are no accurate figures on the total amount of play in which mothers and infants engage. Clark-Stewart (1973) found that in her sample of lower-class mothers, direct mother-infant play occurred about 4% of the total infant awake time at twelve months. Bell (1974), on the other hand, stressed the importance of the playful character of caregiving by the mother. Bell felt that mother and infant engage one another in mini-games during which both mother and infant share in shaping and reinforcing

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one another's playful behaviors. Play is seen as a mechanism for producing greater reciprocity and social intimacy between the mother and the infant. In a study of maternal stimulation and play during feeding, Brody and Axelrod (1971) found playful caregiving to be associated with social responsiveness in six-month-old infants.

In a broader context, Rubenstein (1967) assessed infants at six-and-a-half months and found high maternal attentiveness to be associated with higher levels of infant looking, manipulating, and vocalization during an observed play-exploratory period. In a more extensive analysis Yarrow et al. (1975) and Clark-Stewart (1973) found mother-infant play related to an infant cluster they called competence. Their competence clusters included high levels of motor manipulation of objects, exploratory behavior, and showing a high variety of schemes during free play.

Play may be a game involving only the participants, may involve engagement with toys, or may surround caregiving activities. The relationship of these play behaviors to other mother-infant activities is not clear. Yarrow et al. (1975) found a low correlation ($r = .21$) between a mother's engagement in play and her response to the infant's distress at six months. In older infants of twelve months, Clark-Stewart (1973) found a high correlation ($r = .58$) between these activities.

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Several explanations may account for these data. First, playfulness and distress interfere with one another. Secondly, playfulness and caregiving also appear to be separate domains of behavior (Brody & Axlerod, 1971). Lastly, as the infant matures, he is more likely to make responses which will elicit greater responsiveness from the mother in a larger number of interaction settings (Bell, 1974). The low correlation suggests that social play should be viewed as a separate system of interaction and not equated with attachment or caregiving (Rheingold, 1973).

Most studies on infant play center on the infant's responses to toys, strangers, and novel settings. A review of this literature was provided by McCall (1974), together with a series of experiments on the infant's responses to toys. The following conclusions from his research appear to be most relevant to the present study. First, play by the infant is an increasing function of the sound and plasticity potential of the play objects. Play increases as the number of communication channels stimulated increases. A similar finding is presented by Hutt (1971) for preschool children. Secondly, the more complex the toys are, the more complex is the child's play. Play is also directed at those toys which are appropriate for the schematic level shown by the child. As noted earlier, Yarrow et al. (1975) also found that the level of mother's

complexity of play interaction is mirrored by higher complexity in the infant's play. Toys appear to have similar influences. Lastly, during free play sessions, the infants tested by McCall frequently looked to the mother to share their play activity. Looking increased with age from 8-1/2 to 11-1/2 months. This point will be elaborated on shortly.

Often research on infant play does not focus on mother-infant interaction. Research is carried out under the theoretical and research base of attachment in which the mother is seen as a secure base to explore away from (Ainsworth, 1967) and her departure from the infant is seen as distressful (Rheingold, 1969). The mother is asked to act natural but not to overtly respond to the infant (e.g., the research conducted by McCall--1974). However, most studies do ask the mother to be present while the infant is playing. The findings from these studies have been summarized very concisely by McCall (1974).

> (a) Infants explore toys more when mother is present than when she is absent, and the availability of toys reduces the infant's fear when mother is away (Ainsworth & Wittig, 1969; Arsenian, 1943; Rheingold, 1969), but these effects are less obvious for children approaching their third birthday (Cox & Campbell, 1968; Gershaw & Schwartz, 1971).
>
> (b) Infants are more likely to voluntarily leave their mothers and fuss less if there are toys present than if there are none (Rheingold & Eckerman, 1969; Rheingold &

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Samuels, 1969), and this effect is stronger if the toys or the room possess relatively greater novelty for the infant.

(c) If the mother leaves the room, the presence of toys delays the infant's following her, and this is especially true if the toys are novel (Corter, Rheingold & Eckerman, 1972).

In studies in which the infant's responses to their mother have been recorded, infants frequently engaged in checking on the mother, showing, and sharing things with the mother. Bronson (1974) reported on the infant's relationship to the mother in a free play setting. Here the total bids for interaction in the setting of toys, peers, and mothers centered on mother-infant interaction. Infants looked to the mother in about 30% of their bids in a checking and sharing of play. Directly giving the mother toys occurred in 35% of the total bids. In a similar setting with mother, infant, and toys, Rheingold (1971) and Rheingold and Eckerman (1969), found that 12- and 18-month-old infants were very active in their exploration away from the mother and their play with toys. However, infants frequently maintained either a physical (proximal) or visual (distal) checking with the mother. Trips away from and back to the mother were frequent. Infants often pointed out and held up toys to their mothers in a showing gesture. When older and more mobile, they often brought toys back to the mother and shared them in play activities with her.

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In summary, these findings suggest that the infant's play is an integral part of the mother-infant bond. The variety and complexity of an infant's play appears to reflect a measure of competence in dealing with a novel environment and external objects. The infant's activities appear to be a reciprocal response to the play interaction offered by the mother to the infant. Bell (1974) suggested that both mother and infant condition one another to respond to signals provided within the dyad. The work of Bronson (1974), Rheingold (1971), and Yarrow et al. (1975) indicated that there are large individual differences on the continuum of reciprocal play interaction among mother-infant pairs.

The Persistence Of Maternal Attitudes As A Variable

Lewis and Rosenberg (1974) cited three factors as being important in the study of caregiver-infant exchange. The first is a precise account of the behaviors of the caregiver and the infant. Secondly, the personality characteristics of the pair should be related to the dyadic interaction. Lastly, the ideologies or strategies used by the caregiver and infant for interaction should be mapped out and studied.

Caregiver-infant communication often appears to be an idiosyncratic pattern of exchange but a stable exchange. Other investigators like Lewis and Rosenberg cited above, allude to the personality and attitudinal characteristics of the mother (Tulkin & Kagan, 1972), and the temperament

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of the infant (Kagan, 1974; McCall, 1974), as explanatory constructs helping to account for these patterns of interaction. Even though attitudes and personality differences are cited in the research, few studies have systematically related maternal attitudes to direct observations of mothers and infants in interaction with one another.

For example, Tulkin and Kagan (1972), in a study of social class differences and mother-infant interaction, found that lower-class mothers spoke less to their infants and faced them less in a face-to-face position than did middle-class mothers. In an interview with the mothers, Tulkin and Kagan report that the lower-class mothers felt talking to an infant did not make sense since young children could not understand what is said. Although no direct data are presented, they felt this attitudinal characteristic could help account for these social class differences.

In a more direct study of maternal and infant personality and behaviors, Stern, Caldwell, Hersher, Lipton, and Richmond (1969) used factor analysis to examine mother-infant interaction. Using interviews and observations during infant medical examinations, the study focused heavily on maternal characteristics. Even though observations of mother-infant interaction were collected, no specific data on mother or infant behaviors were presented (i.e., frequencies, means, or proportions of any given behavior). The factor analysis revealed that mothers

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could be set on a continuum ranging from child-centered mothering at one pole to mother-centered mothering at the other. Mothers who were child-centered were described as being aware of the infant's needs and signals, responding appropriately to these cues. Infants of these mothers appeared to be warm and interacted positively with their mothers. Those mothers described as mother-centered were not aware of the infant's needs and signals much of the time, appearing to be preoccupied with their own needs and wishes to the exclusion of the infant. Infants of these mothers were described as isolated and lacking in communication toward others, related poorly when approached by others, and displayed negative affect during examination.

Focusing on a the mother-infant feeding interaction, Ainsworth and Bell (1969) presented a very similar picture of mother-infant interaction to that described above. Ainsworth and Bell described nine different feeding patterns used by mothers with their three-month-old infants. Although a precise analysis of the mother's belief system was not made, Ainsworth and Bell frequently referred to these beliefs and attitudes on the part of the mother as an integral part of the interaction patters (e.g., "overfeeding to gratify the infant" versus "overfeeding to make the baby sleep"). Later, at twelve months, these same mothers and infants were observed in a laboratory session examining the infant's attachment to the mother (Ainsworth

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& Bell, 1969; Ainsworth, Bell & Stayton, 1971). Mother-infant interaction at twelve months was found to be related to patterns of feeding interaction at three months.

The patterns of interaction appeared to be highly related to ratings given to the mothers on dimensions of sensitivity-insensitivity, acceptance-rejection, cooperation-interference, and accessibility-ignoring. In defining these scales, the mother's behavior appeared to be an integral part of her cognitive stance and perceptions of the infant and her relationship with him or her. No easy separation of attitudes and behavior are present here. Mothers who maintained a reciprocal interaction with the infant also maintained a cognitive and perceptual set for the recognition of, and response to, infant behaviors and signals; while those mothers who did not interact with the infant shut out the infant's bids toward her and her own needs occupied her thinking and activity.

Tulkin and Cohler (1973) performed a more direct investigation of maternal attitudes and mother-infant interaction. They interviewed middle and working-class mothers on the issues of controlling the child, encouragement of reciprocal communication, and her comfort in perceiving the needs of the infant. Positive correlations were found between the mother's belief in reciprocal communication and face-to-face verbal interaction ($r = .51$) and face-to-face non-verbal interaction ($r = .39$). The mother's feeling that she could judge the infant's needs

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was correlated with an expression of affection by kissing the infant (r = .43) and with mother-infant play (r = .39). However, these correlations between attitude and behavior were only found in the middle-class sample and not in the working-class sample.

In conclusion, the studies reviewed on mother-infant interaction showed that the baby gives off numerous signals of communication to the mother. Mothers also attempt to engage infants in reciprocal interaction often as soon as the baby is able to maintain such a relationship. This interaction appears to be part of the mother's regard for the infant as a "person" and is important in the development of competence and attachment in the infant. Some mothers seem to maintain perceptual sets which allow them to respond to the infant's signals more than other mothers. Furthermore, mother-infant interaction appears to be influenced by the attitudes the mother holds about the kind of interaction she desires to have with her infant and her perceptions about the infant's capabilities for communicating.

Perception And Interpersonal Interaction

Much of the infant-caregiver interaction research has existed within a theoretical vacuum. One theory which incorporates the attitudes and perceptions of the participants into an interaction model is Heider's (1958) theory of interpersonal relations or attribution theory. (Also see Kelley, 1967; Jones & Davis, 1965.) Attribution

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theory was used to explain the motives and intentions of a person's behavior. The theory holds that when an actor performs an action, the observer will make a judgment about the intention of the action. The intention of the actor is either ascribed to some external environmental circumstance or to an internal motive or characteristic of the person who performed the behavior.

Three principles, which follow from Heider's theory, are important to a theory of mother-infant interaction. First, when the observer made an attribution about an actor's behavior, the behavior was evaluated for its positive and negative quality or affective relevance. Secondly, observers may hold different perceptions of a given actor's behavior. This means that the same behavior may be judged differently depending upon the perceptual set held by the observer. Lastly, the observer's own attitudes and behaviors toward the actor will influence the observer's interactions with the actor. This theoretical base fits the data presented by Tulkin and Cohler (1973). Mothers who attributed to the infant the ability to form a reciprocal relationship also showed a higher use of verbal and nonverbal communications in a face-to-face position with their infants.

Love and Kaswam (1974), using a model similar to Heider's perception-attribution theory outlined above, studied the interaction patterns of families with "troubled," as compared to "normal" children of elementary

school age. Their children designated as "troubled" were clinic-referred cases. The "normal" children and families were selected as a nonclinic control group.

Love and Kaswan found that the clinic and nonclinic parents differed from one another on two perceptual levels. The first is an historical perception or construct held by the parent of the child. The clinic referred parents reported a higher number of child behaviors and traits which were undesirable in their children than did the nonclinic referred parents. Using a very similar procedure, Ferguson, Partyka, and Lester (1974) also found that clinic-referred and well-adjusted children's parents could be differentiated by the number of negative behaviors attributed to their children. The clinic-referred parents attributed a set of "bad" behaviors and character traits to their children which nonreferred parents do not make. As Love and Kaswan pointed out, such attributions by clinic-referred parents may result from the deviant behaviors shown by their children. Of importance to the present study is the fact that parents form a construct about their child's behavior.

The second perceptual element differentiating referred from nonreferred families was the accuracy and validity of communication messages. Parents and their children performed a perceptual task in which they had to send messages to one another in order to identify ambiguous figures. Poorer scores were received on this task by

clinic-referred families. This poor performance was a result of the referred parent's acceptance of an uninformative communication by the child as being valid and helpful in the task. On the whole, the non-clinic-referred parents did not accept uninformative statements as valid and guided the child toward more informative statements. No differences in performance on this task were found when the parent was the sender of messages for recognition of the objects.

Love and Kaswan, in a further analysis rated videotapes of family interaction in the clinic. Tapes were scored for congruity and incongruity between effective tone and facial expression of communicator. Fifty-nine percent of the referred mothers gave discordant messages as compared to only ten percent given by the nonreferred mothers.

Parents of the referred children held negative constructs about their child's behavior. They accepted uninformative communications from their children as valid. Lastly, mothers of the referred children expressed a high proportion of messages which conflicted in affective tone and facial gesture.

Using a perception-information model for psychotherapy, Love and Kawsan showed parents videotapes of their family's interaction. The information feedback therapy led to alterations in the parents' perceptions of

themselves and altered parent-child interaction, yielding an improvement in the child's behavior.

Reif and Stollak (1973) also studied the influence of effective versus ineffective communication patterns in the context of play sessions between six-year-old children and college undergraduates. An experimental group was trained in the use of effective communication while a control group generally maintained high levels of ineffective communication during play sessions. Effective communication was defined as verbalizations by the undergraduate which expressed the actions and wishes of the child during play and an engagement in reciprocal fantasy play with the child. Ineffective communication took the form of generally ignoring or criticizing the child and an expression of the undergraduate's own wishes. Again, the communication appeared to be either child-centered or adult-centered.

The effective communication patterns by the undergraduates were related to higher levels of expression of personal thought and behavior in fantasy, statements of interpersonal awareness, and greater fantasy play by the child. Thus, in this play setting, accurate and reciprocal communication by the undergraduate was responded to by the child with an increase in communications about themselves and others in play and a high use of fantasy expression in play. These findings mirrored those found by Yarrow et al. (1975) and Clark-Stewart (1973), for

infants in which reciprocal interaction by the caregiver was responded to by a higher frequency of interpersonal behaviors and high levels of play.

The Present Study

The present study attempted to explore the relationship between a mother's perceptual style and the interpersonal interaction between mother and infant during a play session. The perceptual variable under consideration is the mother's evaluation of an older child who is playing with a graduate student. The perceptual style of the mother is assessed by the Behavior Checklist developed by Ferguson, Partyka, and Lester (1974). This list contains 32 positive and 32 negative statements which may be endorsed by the mother concerning the child seen in play. The Behavior Checklist is interpreted to indicate the extent to which the mother viewed the child at play with a positive or a negative perceptual bias, since the videotape of the child playing was made to contain approximately an equal number of positive and negative behaviors (Messe, Stollak, Larson, & Michaels, 1979).

The interpersonal interaction between the mother and the infant took place in a play session held in a laboratory at the university. The mother and infant were allowed to interact in a free play setting and were also asked to participate in a structured play tasks.

Hypothesis

The present study proposes the following hypothesis.

The perceptual style of the mother will be positively related to mother-infant mutual interaction during play. Thus, for example, mothers who have a predominately negative perceptual style should have less mother-infant interaction than mothers with a positive perceptual style. Specific experimental hypotheses are given with the three sections on data analysis.

Chapter 2

METHOD

Subjects

The subjects were fifty-two mothers and their fifteen-month-old infants. Local birth records were used to obtain the names and addresses of the mothers from communities near the university. Mothers were sent a letter asking them to participate in a study about mother-infant communication. (See Appendix A). They received $10.00 for their participation.

Sixty mothers responded and participated in the experiment. Of these, fifty-two mother-infant pairs were included in the present study. Eight mother-infant pairs were dropped from the study because of incomplete data, videotape failure, or atypical behavioral patterns.

Infants were accepted in the study if they were fifteen months of age at the time of the videotape session and if they appeared to be in good health. Twenty-six male and twenty-six female infants met these criteria. Infants were evenly divided in their ordinal position in the family. Twenty-five or 48.1% of the infants were only children. The remaining twenty-seven or 51.9 % had one or more older siblings. Table 1 presents background information on the mothers' and fathers' age and education.

Table 1

Demographic Information On Mothers
And Fathers

Variable	Mean	Std. Dev.	Min.	Max.	1st and 2nd Mode
Mother's Age	27.1	4.0	19.0	40.0	27.0 26.0
Mother's Educ. (Years)	13.8	2.2	9.0	20.0	12.0 16.0
Father's Age	29.1	5.3	19.0	52.0	28.0 29.0
Father's Educ. (Years)	15.1	2.5	10.0	20.0	16.0 18.0

Procedure

Mother's Session -- Perceptual Assessment

Mothers responding to the letter were telephoned and asked if they wished to continue participation. (See Appendix B.) An appointment was made for the first session. Mothers met in groups of four or five and were asked to complete a subject consent form, a personal history survey, and an infant temperament scale. (See Appendix C).

After completion of these questionnaires, mothers were asked to view the standard perceptual stimulus. Instructions similar to those used by Messe, et al. (1979) were read before the presentation of this videotape. (See Appendix D.) After viewing the videotape mothers were asked to complete the Child Behavior Checklist (CBC) Form B. (The CBC is described below.) When the CBCs were completed, an appointment was set for the mother and the infant to return for a half-hour play session. Mothers were shown the playroom and the videotape equipment, but they were not given any information as to the nature of the play session.

Before the mothers left, they were given a take-home packet containing the Sensitivity To Children's Projective Test (STC). Mothers were asked to write a series of stories about these pictures and to return with the stories at

their next appointment. Since only thirty-five mothers completed the stories, the STC was dropped from the study.

Play Session

The play session took place in a carpeted room of 2.4 meters by 4.9 meters. The room was equipped with a large one-way mirror for viewing and videotaping. A set of toys and a chair were placed about the room in a standard arrangement. Figure I is a diagram of this standard arrangement. A description of the play activities and the set of toys is given in the section on independent variables.

Debriefing

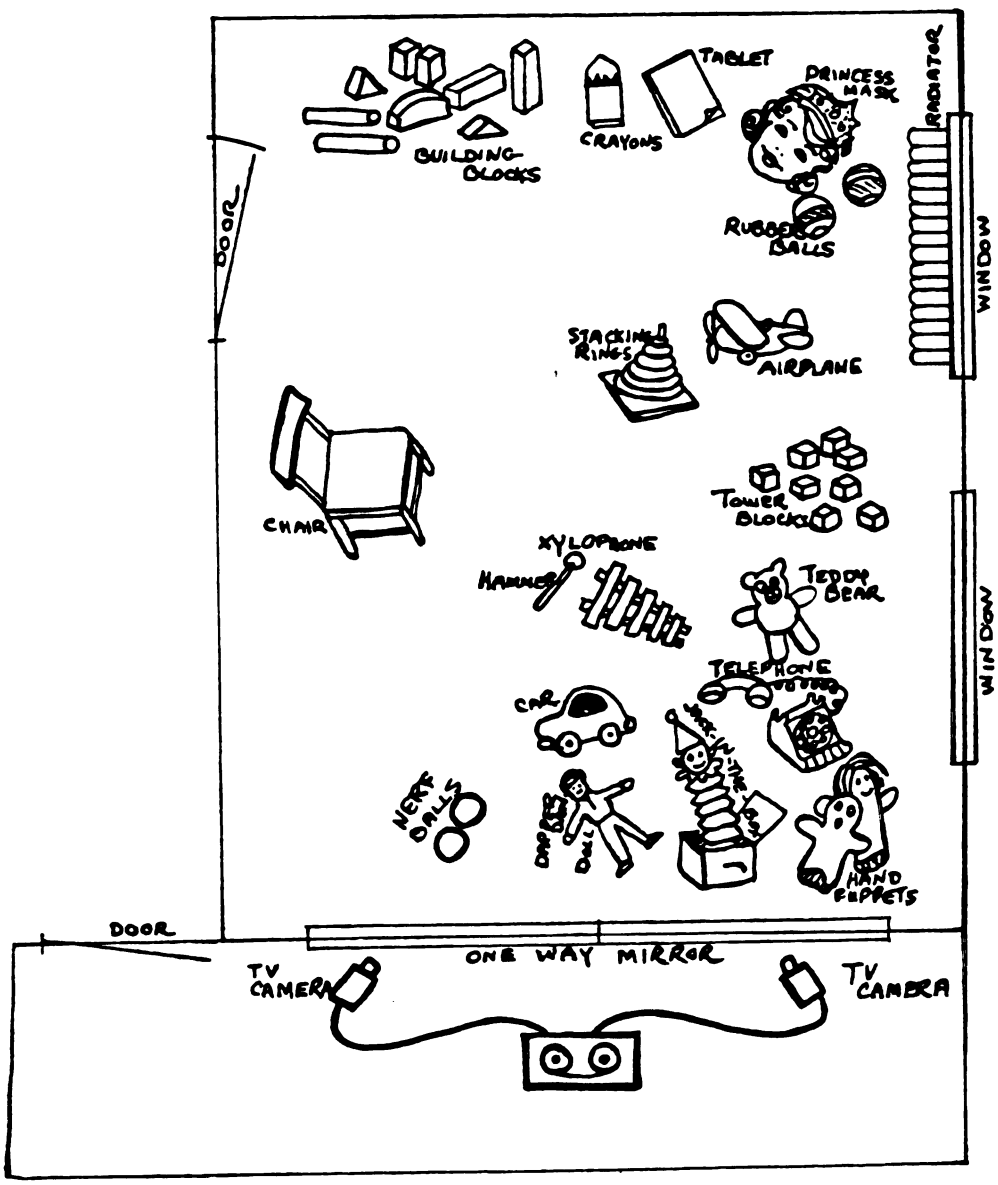
After the play session, mothers and infants were taken to the video studio and shown the videotape of their session. Mothers received an explanation of the research hypothesis and a description of the behaviors to be scored from the videotape. Any further questions were answered at this time.

Videotaping

A videotape with sound was made of the play session. Two cameras were placed at the one-way mirror of the playroom. One camera followed the infant while the other followed the mother. Split-screen recording allowed for reliable recording of both the mother's and infant's behaviors and their interaction.

Figure I

Diagram of Room Arrangement



Behavioral Scoring And Rater Training

Behavioral Scoring. Ten raters scored both the infants' and mothers' behaviors from the videotapes. The mothers' and the infants' behaviors were scored in separate rating sessions. One exception to this rule was the scoring of mother and infant offering and taking behaviors which were scored together in order to score the contingency between behaviors.

Behavioral scoring was done on a chart driven event recorder. As raters observed the behaviors assigned to them, they depressed a switch on a hand held panel which deflected a pen on the event recorder. In this manner the frequency and duration of the behaviors were recorded simultaneously. Duration of behaviors was measured to the nearest half second.

Two infant and mother behaviors were not scored by event recorder. These were variety-of-toys and variety-of-schemes. These behaviors were scored more reliably from a checklist of toys and schemes. If any schemes occurred which were not on the checklist, these were written next to the appropriate toy. The checklist of toys and schemes appears in Appendix E.

Rater Training. Ten raters were trained to observe mother and infant behaviors. Each rater was assigned two infant and two mother behaviors. Raters spent at least 30 hours in supervised pretraining before the collection of ratings. Rating did not begin until a rater reached a

reliabilty of .75 with an alternate rater. Reliability was checked throughout the rating process to ensure high reliability from beginning to end.

Independent Variables

The Standard Perceptual Stimulus. The standard perceptual stimulus was a twenty-minute videotape of an eight-year-old girl playing with an adult in a playroom. The purpose of this perceptual stimulus was to test the presence for positive or negative biases in the mother's attributions about the child in the standard perceptual stimulus. The girl in the videotape showed a wide range of prescribed positive and negative play behaviors, insuring a balanced presentation of behaviors.

The negative acts on the videotape included "pushing over and pounding a tower of blocks," "saying she hated the adult," "throwing things around the room," and "making 'fun' of the adult's play." Positive behaviors included such acts as "giving the adult a dart gun," "sharing a cookie," and saying she "enjoyed talking" and "being with the adult."

The girl in the videotape was not easily recognized as a girl or a boy. Approximately an equal number of mothers perceived her to be a girl or a boy. Before the videotape was shown, the experimenter read the instructions which

explained that the tape was a series of play sessions between the adult and the child. These instructions appear in Appendix F.

After completion of the videotape, mothers were asked to respond by checking behaviors on the CBC which they felt characterized the child in the videotape.

Play Periods. The play session was divided into eight three-minute periods. The first four of these periods was uninterruped free play between the mother and the infant. Mothers were given the following instructions before the free play periods began: (See Appendix F.)

> The first task is very simple. We are just interested in your playing together. During the next twelve minutes you may do whatever you want to do in the playroom. When the time is over, I will come back with the instructions for the next task. Do you have any questions?

After the free play periods, the next two periods contained stuctured play games involving both mother and infant participation. Mothers were asked to play the games commonly called "peek-a-boo" and "I'm going to get you." The instructions were as follows:

> The first game we would like you to play is "peek-a-boo." Over among the toys you will find the mask of a princess. We would like you to use this mask as part of the game. The second game we would like you to play is a game of "I'm going to get you." When I leave, you can begin the first game of "peek-a-boo." Then, after a few minutes, I'll come back to let you know when to start the second game. Do you have any questions?

When three minutes had elapsed, the experimenter returned and asked the mother to continue with the "I'm going to get you" game. If there were any questions about

these games, the experimenter gave a brief demonstration of them which occurred on several occasions.

The final two periods were composed of structured teaching games. The first task was to build a tower of six blocks. Mothers were instructed as follows:

> The first game is to build a tower of blocks to a height of six blocks. Over there (next to the radiator) is a set of blocks which you may use.

The last session consisted of putting a puzzle together. The puzzle was the form board from the Stanford-Binet Intellegence Test containing a circle, square, and triangle. The experimenter carried this puzzle into the room and said:

> Now we are ready for the other game. We would like you to put together this puzzle. Our puzzle is made up of a circle, triangle, and square. We would like you to teach ___(baby's name)___ to place them in the correct holes.

After three minutes, the experimenter came back and stated that the play session was over.

Play Periods And Variables Omitted. Two play periods were not scored. These were the "I'm going to get you" game and the puzzle task. The "I'm going to get you" game could not be scored reliably since it was difficult to keep the cameras on the mother and infant during this very active play.

The puzzle task was omitted since most infants sat with their mothers for the three-minute period working on the puzzle; so, there was little variability in the infant behavior during this task. Many mothers commented that

their infants were familiar with the puzzle task since they had similar puzzles with shapes and holes to play with at home.

The scoring of variety-of-toys and variety-of-schemes from the checklist was done without dividing the free play into three-minute segments. This error resulted in the loss of these data from the free play periods. Since these behaviors could not be assigned to a free play period, no data were available on these variables for free play. The stuctured play tasks were automatically divided into segments; thus, data were available for these periods.

The Playroom and Toys. The play session took place in a carpeted 2.4 meter by 4.9 meter playroom equipped with a large one-way mirror. The room contained a single living-room chair on which the mother or infant could sit. A set of toys was arranged about the room. Items in the playroom were placed in a prearranged order at the beginning of the play session. The playroom was consistent from one mother-infant pair to the next. (See Figure I.) The set of toys included: Two sets of blocks, three balls, a box of crayons, a paper tablet, a princess mask, an airplane, a set of plastic rings for stacking, a xylophone and hammer, a teddy bear, a Dapper Dan doll, a jack-in-the-box, and two soft animal hand puppets.

Dependent Variables

The Child Behavior Checklist (CBC).

The Child Behavior Checklist (CBC) consists of sixty-four descriptive statements of children's behaviors. (See Appendix G.) There were twenty-seven items expressing positive child behaviors such as neatness, concern for others, and pride in one's accomplishments. There were twenty-five items concerned with negative child behaviors such as bullying, selfishness, and disobeying adult directives. Twelve items on the CBC were filler statements. The checklist was used to obtain perceptions from the mother about the child she saw playing in the standard perceputal stimulus.

Mother's were given the following instructions:

> Below is a list of items describing many aspects of children's behavior -- things that children do sometimes -- ways that they act and feel. Of course, not all of these items apply to the child in the playroom that you first observed on the videotape, but quite a few of them do.
>
> First, read Item 1 carefully and then make up your mind about whether or not it describes the way he/she (the child) acted in the playroom. If so, mark an "X" in column one; if not put a "0" in the first column. Then go on to the second item and decide whether or not this behavior applies to the child's behavior, marking it the same way. Do this for all 64 items.

The checklist appears in Appendix G.

Infant Play and Interpersonal Behaviors.

Twenty different infant behaviors were scored from the videotaped play sessions. Seven variables examined the infant's play behavior: Solitary-play, mutual-play, object-involvement,

play-episodes, variety-of-toys, variety-of-schemes, and baby-imitates. There were three vocalization variables measuring positive, negative, and excited vocalizations.

Nonverbal communication and behaviors affecting mother-infant interaction were measured by ten infant behaviors: Looking-to-mother, looking-at-demonstration, offering, taking, taking-in-response, touching-positively, touching-negatively, turned-to-mother, proximity, and locomotion. The definitions of these behaviors appear in Appendix H. A list of these behaviors and the measures derived from them are presented in Table 2.

Mother Play And Interpersonal Behaviors. Twelve different mother behaviors were scored from the videotapes. Five behaviors dealt with the mother's play behaviors. These were game-play, demonstration-play, fantasy-play, variety-of-toys, and variety-of-schemes. Seven measures were taken of nonverbal communication of the mother toward the infant. These were offering, taking, taking-in-response, mother-imitate, touching-positively, touching-negatively and baby sitting-on-mother's-lap. These behaviors and the measures derived from them are presented in Table 3. The definitions of these behaviors appear in Appendix I.

Eleven verbal communication variables were proposed for study. These verbal communications were a concise scoring of each statement made by the mother as declarative, interrogative, or other linguistic categorization. Although the sound on the videotapes allowed for accurate

Table 2

Verbal And Nonverbal Infant Behaviors
Scored From The Play Session

Variables	Scoring: Frequency	Scoring: Duration
Play Behaviors		
look-to-mother	X	X
look-to-demonstration	X	X
object-involvement	X	X
solitary-play	X	X
mutual-play	X	X
baby-take	X	X
play-espisode	X	X
baby-imitate	X	
baby-offer	X	
takes-in-response	X	
variety-of-toys	X	
variety-of-schemes	X	
Interpersonal Behaviors		
baby-touch-positively	X	X
baby-touch-negatively	X	X
turn-to-mother	X	X
proximity	X	X
locomotion	X	X
positive-vocalization	X	
negative-vocalization	X	
excited-vocalization	X	

Table 3

Verbal and Nonverbal Mother Behaviors
Scored From The Play Session

Variables	Scoring: Frequency	Scoring: Duration
Play Behaviors		
game-play	X	X
demonstration-play	X	X
fantasy-play	X	X
variety-of-toys	X	
variety-of-schemes	X	
Interpersonal Behaviors		
mother-touches-positively	X	X
mother-touches-negatively	X	X
sits-on-mother's-lap	X	X
mother-imitate	X	
mother-take	X	
mother-offer	X	
takes-in-response	X	

evaluation of the general mother-infant interaction, the sound did not allow for scoring of each maternal statement. So, maternal verbal communications were dropped from the study.

Analyses Contained In The Present Report

The scope of the observations described above is extensive. Three separate analyses were required to summarize the complex behavioral and attitudinal relationships captured by these data. The first analysis evaluated infant and maternal behaviors during the play session. This analysis examined mother-infant attachment and play behaviors in free and structured play. The second analysis examined the relationship between mother and infant behaviors and the CBC. This analysis correlated mother and infant behaviors to the CBC difference scores (Messe et al., 1979). This was a test of the experimental hypothesis set forth in the Introduction. A third analysis examined the dimensions of the CBC scale and their relationship to mother and infant behaviors. The CBC was factor analyzed into six subscales. These subscales were placed in multiple regressions with the mother and infant behaviors.

RESULTS

ANALYSIS I: AN EXAMINATION OF MOTHER AND INFANT PLAY AND INTERPERSONAL BEHAVIORS IN A FREE PLAY AND STRUCTURED ENVIRONMENT

Strategy Used In Analysis I

Two hypotheses are proposed for the first analysis:

1. There should be clusters of behavior representing infant attachment and infant play behaviors.
2. There should be clusters representing maternal play strategies.

These hypotheses are tested using cluster analysis.

A review of the cluster analysis results will be presented below; but first the reliability and descriptive statistics on the infant measures are presented.

Reliability of Infant Play Behaviors

Reliability of behavioral measures had to reach .75 before scoring could begin. The reliabilities reported were those found after this criterion was reached. Reliabilities were obtained by computing the correlation between two raters' scores on the same infant's behavior. The reliabilities for the infant behaviors are presented in Table 4.

Three behavioral categories proposed in this study were dropped. The infant behaviors of "scanning the array of toys" and "visual inspection of a toy" could not be

Table 4

Reliabilities Of Ratings Of
Infant Interpersonal And Play Behaviors

Infant Behaviors	Reliabilities
look-to-the-mother (look-mother)	.95
looking-at-mother-demonstrate (look-demonstration)	.92
looking-at-the-array-of-toys	--
looking-at-a-toy (visual inspection)	--
looking-or-playing-with-objects (object involvement)	.89
solitary-play	.90
mutual-play	.90
positive-vocalization	.96
negative-vocalization	.83
excited-vocalization	.89
baby-offer-to-mother (baby-offer)	1.00
baby-take-from-mother (baby-take)	1.00
affection-expressed-to-a-toy	--
baby-touch-positively	.85
baby-touch-negatively	.79
turned-toward-mother	.94
proximity-to-mother (proximity)	.98
play-episodes	.89
locomotion	.91
variety-of-toys	.99
variety-of-schemes	.97

rated reliably. The other behavior of "affection displayed to a toy" occurred so rarely that it was considered uninformative and was eliminated.

Infant behavior showed high reliability. Reliabilities ranged from .79 to 1.00. These reliabilities were maintained throughout the rating process. Ratings of only one infant behavior fell short of the stated criterion of .75. This was "infant-imitate-mother" which had the lowest reliability. This may be due to the behavior's low occurrence. A few missed responses by the raters greatly diminished the reliability here. Given this, reliability was only slightly short of the stated criteria. The variable was included in the analysis.

Descriptive Statistics Of Infant Behavior

The basic descriptive statistics of the infant's behaviors are presented from Tables 5 through 11. The mean, standard deviation, minimum, maximum, and skewness are shown for each variable in each period. An examination of the means shows the wide variation in both frequency and duration between the types of infant behaviors. Generally, the most frequently occurring infant behavior was positive vocalization with a mean frequency response of 13 vocalizations per period. The least frequent infant behaviors were the infant-touching-behaviors with a mean level of response of .10 or less per period.

The fact that there was very little touching between mothers and their infants was quite a surprise. Within

Table 5

CONDESCRIPTIVE STATISTICS
INFANT BEHAVIORS
FIRST PLAY PERIOD

Infant Behavior	Mean	Deviation	Minimum	Maximum	Skewness
look-moth-freq	7.3	3.9	1.0	20.0	.7
look-moth-time	10.0	7.0	.5	43.0	2.0
look-dem-freq	6.4	2.7	1.0	13.0	.2
look-dem-time	28.9	18.4	2.5	81.5	.8
obj-inv-freq	.5	.8	0.0	4.0	2.1
obj-inv-time	1.5	3.4	0.0	18.5	3.3
positive-voc	13.2	9.1	1.0	44.0	1.2
negative-voc	.2	.9	0.0	7.0	6.6
excited-voc	1.3	3.8	0.0	20.0	4.9
sol-play-freq	7.9	3.5	1.0	17.0	.4
sol-play-time	83.7	30.8	22.5	167.5	.2
mut-play-freq	3.6	2.3	0.0	10.0	.8
mut-play-time	35.1	30.9	0.0	121.5	1.4
play-epis-freq	7.2	3.3	2.0	14.0	.2
play-epis-time	109.5	40.6	14.0	169.5	-.6
baby-imitate	1.3	1.4	0.0	6.0	1.1
loc-freq	6.7	5.0	0.0	17.0	.2
loc-time	21.4	26.5	0.0	153.5	3.0
turn-moth-freq	5.6	3.2	0.0	16.0	1.0
turn-moth-time	70.0	35.6	0.0	156.0	.0
prox-freq	3.3	1.4	1.0	8.0	.7
prox-time	89.5	42.0	13.5	177.5	.1
baby-offer	2.2	2.1	0.0	8.0	.8
baby-take	1.8	1.8	0.0	9.0	1.2
baby-take-resp	1.5	1.7	0.0	9.0	2.2

Table 6

CONDESCRIPTIVE STATISTICS
INFANT BEHAVIORS
SECOND PLAY PERIOD

Infant Behavior	Mean	Standard Deviation	Minimum	Maximum	Skewness
look-moth-freq	6.5	4.3	0.0	17.0	.5
look-moth-time	9.8	8.5	0.0	29.5	.8
look-dem-freq	6.5	3.3	1.0	14.0	.2
look-dem-time	31.5	21.8	.5	86.5	.9
obj-inv-freq	.6	1.4	0.0	9.0	4.2
obj-inv-time	2.0	6.3	0.0	40.5	4.8
positive-voc	13.7	8.3	0.0	37.0	.8
negative-voc	.3	1.1	0.0	5.0	3.1
excited-voc	1.3	2.0	0.0	11.0	2.5
sol-play-freq	6.6	2.6	1.0	16.0	.6
sol-play-time	85.1	39.2	5.0	154.5	-.1
mut-play-freq	3.2	2.8	0.0	8.0	.4
mut-play-time	51.0	42.4	0.0	170.0	.9
play-epis-freq	6.1	2.8	1.0	14.0	.6
play-epis-time	127.5	39.2	11.0	180.0	-1.1
baby-imitate	1.0	1.2	0.0	7.0	2.4
loc-freq	4.7	3.9	0.0	17.0	1.0
loc-time	14.8	21.8	0.0	141.5	4.2
turn-moth-freq	4.9	2.8	0.0	14.0	.8
turn-moth-time	83.4	42.4	0.0	178.5	.0
prox-freq	2.5	1.3	0.0	6.0	.4
prox-time	95.7	56.0	0.0	180.0	.0
baby-offer	2.4	2.3	0.0	8.0	.9
baby-take	2.2	1.7	0.0	8.0	1.4
baby-take-resp	1.9	1.6	0.0	8.0	1.7

Table 7

CONDESCRIPTIVE STATISTICS
INFANT BEHAVIORS
THIRD PLAY PERIOD

Infant Behavior	Mean	Standard Deviation	Minimum	Maximum	Skewness
look-moth-freq	6.9	3.3	0.0	18.0	.5
look-moth-time	11.3	6.9	0.0	31.5	.9
look-dem-freq	5.0	3.1	0.0	16.0	.9
look-dem-time	26.3	27.0	0.0	107.5	1.7
obj-inv-freq	.4	.8	0.0	3.0	1.7
obj-inv-time	1.4	2.8	0.0	11.5	2.1
positive-voc	13.3	8.2	0.0	36.0	.5
negative-voc	.5	1.9	0.0	13.0	5.9
excited-voc	1.6	2.7	0.0	18.0	4.5
sol-play-freq	7.1	3.0	2.0	17.0	.8
sol-play-time	84.8	39.6	12.5	148.0	-.3
mut-play-freq	3.4	1.9	0.0	9.0	.4
mut-play-time	48.1	40.2	0.0	154.5	.7
play-epis-freq	5.2	3.0	0.0	14.0	.5
play-epis-time	126.8	44.1	0.0	180.0	-1.3
baby-imitate	.9	1.0	0.0	3.0	.7
loc-freq	5.2	4.9	0.0	20.0	1.4
loc-time	17.8	26.6	0.0	171.0	4.1
turn-moth-freq	6.3	7.3	2.0	55.0	5.9
turn-moth-time	87.2	43.1	4.0	166.0	.1
prox-freq	2.6	1.7	1.0	9.0	1.3
prox-time	98.5	49.2	3.0	180.0	-.3
baby-offer	2.9	2.5	0.0	10.0	.8
baby-take	2.2	2.3	0.0	11.0	2.0
baby-take-resp	1.8	2.1	0.0	11.0	2.1

Table 8

CONDESCRIPTIVE STATISTICS
INFANT BEHAVIORS
FOURTH PLAY PERIOD

Infant Behavior	Mean	Standard Deviation	Min.	Max.	Skewness
look-moth-freq	7.2	4.9	0.0	21.0	.8
look-moth-time	11.4	9.4	0.0	35.5	.8
look-dem-freq	6.1	3.1	0.0	17.0	.6
look-dem-time	34.8	26.9	0.0	122.0	1.0
obj-inv-freq	.9	1.4	0.0	5.0	1.5
obj-inv-time	3.6	7.3	0.0	31.5	2.3
positive-voc	14.4	9.5	0.0	40.0	.7
negative-voc	.5	1.6	0.0	11.0	5.1
excited-voc	1.7	2.5	0.0	14.0	2.6
sol-play-freq	7.1	3.5	1.0	19.0	1.0
sol-play-time	80.5	37.2	4.5	161.5	.0
mut-play-freq	3.6	1.9	1.0	9.0	.6
mut-play-time	53.9	36.7	1.5	144.5	.3
play-epis-freq	4.7	2.5	0.0	10.0	.3
play-epis-time	117.4	46.1	0.0	180.0	-.7
baby-imitate	.8	1.2	0.0	4.0	1.2
loc-freq	5.2	5.0	0.0	18.0	.9
loc-time	16.3	24.5	0.0	163.0	4.3
turn-moth-freq	5.2	3.4	1.0	13.0	.6
turn-moth-time	84.7	45.6	8.5	180.0	.2
prox-freq	2.7	2.2	0.0	12.0	1.8
prox-time	96.1	55.3	0.0	180.0	-.3
baby-offer	2.6	2.5	0.0	9.0	.9
baby-take	2.3	1.9	0.0	7.0	.9
baby-take-resp	1.9	1.8	0.0	7.0	1.0
touch-pos-freq	.3	.6	0.0	2.0	1.7
touch-pos-time	.9	3.8	0.0	26.0	5.9
touch-neg-freq	.5	1.0	0.0	5.0	2.4
touch-neg-time	.3	.7	0.0	3.0	1.9
baby-sit-lap-freq	.1	.6	0.0	4.0	4.2
baby-sit-lap-time	2.2	7.9	0.0	34.0	3.4

Table 9

CONDESCRIPTIVE STATISTICS
INFANT BEHAVIORS
FIFTH PLAY PERIOD

Infant Behavior	Mean	Standard Deviation	Min.	Max.	Skewness
look-moth-freq	16.2	6.0	6.0	34.0	.7
look-moth-time	24.6	12.9	8.0	76.0	1.6
look-dem-freq	13.6	4.1	4.0	22.0	.0
look-dem-time	40.2	19.6	5.0	93.0	.8
obj-inv-freq	.9	1.6	0.0	7.0	2.0
obj-inv-time	3.3	6.2	0.0	27.5	2.2
positive-voc	12.1	7.9	0.0	31.0	.3
negative-voc	.7	2.0	0.0	13.0	4.7
excited-voc	3.9	4.5	0.0	16.0	1.2
sol-play-freq	6.3	3.2	0.0	14.0	.2
sol-play-time	47.7	30.0	0.0	118.5	.5
mut-play-freq	6.0	2.7	1.0	14.0	.8
mut-play-time	78.2	38.2	3.5	172.0	.0
play-epis-freq	5.8	2.9	1.0	14.0	.4
play-epis-time	90.6	40.1	6.5	166.0	-.2
baby-imitate	1.0	1.3	0.0	6.0	1.6
loc-freq	6.1	5.5	0.0	19.0	.6
loc-time	14.7	14.6	0.0	51.5	.8
turn-moth-freq	5.2	3.2	0.0	14.0	.7
turn-moth-time	110.8	43.4	0.0	179.5	-.4
prox-freq	3.2	2.5	0.0	11.0	.9
prox-time	99.5	49.5	0.0	180.0	-.1
baby-offer	2.0	2.0	0.0	8.0	1.2
baby-take	2.5	2.4	0.0	11.0	1.3
baby-take-resp	1.5	1.7	0.0	9.0	1.9
touch-pos-freq	.1	.4	0.0	2.0	2.2
touch-pos-time	.5	1.3	0.0	5.0	2.4
touch-neg-freq	.1	.5	0.0	2.0	2.9
touch-neg-time	.2	.9	0.0	4.0	3.3
baby-sit-lap-freq	.5	.9	0.0	5.0	2.3
baby-sit-lap-time	10.0	29.1	0.0	170.0	4.1

Table 10

CONDESCRIPTIVE STATISTICS
INFANT BEHAVIORS
SIXTH PLAY PERIOD

Infant Behavior	Mean	Standard Deviation	Min.	Max.	Skewness
look-moth-freq	5.4	3.9	0.0	22.0	1.5
look-moth-time	8.1	7.4	0.0	38.5	1.8
look-dem-freq	7.5	3.5	1.0	16.0	.0
look-dem-time	31.2	15.2	3.5	71.5	.6
obj-inv-freq	.7	1.3	0.0	7.0	2.7
obj-inv-time	2.2	5.0	0.0	29.5	3.6
positive-voc	13.9	8.0	1.0	30.0	.3
negative-voc	1.9	3.4	0.0	16.0	2.3
excited-voc	1.7	3.3	0.0	19.0	3.4
sol-play-freq	5.3	2.9	0.0	13.0	.4
sol-play-time	46.7	31.4	0.0	138.5	.8
mut-play-freq	3.8	2.5	0.0	15.0	1.7
mut-play-time	59.7	43.5	0.0	162.0	.4
play-epis-freq	5.0	2.8	1.0	13.0	.6
play-epis-time	106.3	37.1	22.0	164.0	-.1
baby-imitate	1.3	.9	0.0	3.0	.4
loc-freq	5.1	4.6	0.0	20.0	1.4
loc-time	16.8	17.9	0.0	94.0	1.9
turn-moth-freq	5.5	3.5	0.0	18.0	1.2
turn-moth-time	66.4	44.8	0.0	174.0	.4
prox-freq	2.5	1.6	0.0	8.0	1.5
prox-time	120.3	44.2	0.0	179.0	-.8
baby-offer	1.1	1.9	0.0	12.0	3.8
baby-take	2.3	2.5	0.0	11.0	1.4
baby-take-resp	2.1	2.4	0.0	11.0	1.5
touch-pos-freq	.1	.3	0.0	2.0	3.1
touch-pos-time	.2	1.1	0.0	7.0	4.9
baby-sit-lap-freq	.2	.5	0.0	2.0	1.7
baby-sit-lap-time	5.5	17.5	0.0	91.0	4.0

any given period, about 75 percent of the infants did not touch their mothers at all. Considering the significance attached to touching behavior, this was an unexpected result.

As can also be seen in examining any given infant behavior, there was a wide range of occurrence within a behavior. For example, in the first period of free play, positive vocalizations ranged from 1 to 44 and in the sixth period of play, tower building, time proximity ranged from 0 to 180 seconds. Most infant behaviors showed this tendency for a wide range producing a positively skewed distribution for most behaviors.

The variables of object-involvement, positive-touching, negative-touching, and sitting-on-the-mother's-lap occurred infrequently. A decision was necessary to determine if they should be included in further analysis. The frequency distributions of the touching behaviors are presented in Table 11. Touching behaviors were most frequent in periods four and five, while sitting-on-the-mother's-lap occurred most often in periods five and six. Thus, touching variables were placed in the analyses of the last three periods.

Object-involvement was also a low frequency response. The experimenter's impression was that although object-involvement was infrequent, it appeared to be related to specific mother-infant interactions. Therefore, object-involvement was kept in the analyses.

Table 11

FREQUENCY OF INFANT TOUCHING BEHAVIORS

Touching Variable	Frequency of Touching	Number of Subjects Within Periods Period I	Period II	Period III	Period IV	Period V	Period VI
touch-positive-freq	0	48	44	49	39	43	46
	1	2	5	2	9	8	5
	2	1	2	1	4	1	1
	3	1	1	--	--	--	--
touch-negative-freq	0	51	49	51	36	46	51
	1	1	3	1	10	3	1
	2	--	--	--	2	3	--
	3	--	--	--	2	--	--
	4	--	--	--	1	--	--
	5	--	--	--	1	--	--
baby-sit-lap-freq	0	47	47	48	47	35	39
	1	4	5	4	2	8	11
	2	1	--	--	2	8	2
	3	--	--	--	--	--	--
	4	--	--	--	1	--	--
	5	--	--	--	--	1	--

Table 12

Reliabilities Of Ratings Of

Maternal Interpersonal and Play Behaviors

Maternal Behavior	Reliability
demonstration-play	.83
game-play	.87
fantasy-play	.91
mother-imitate	.81
mother-offer	1.00
mother-take	1.00
mother-touch-positive	.89
mother-touch-negative	.72

Cluster Analysis Of Infant Behavior By Periods

In an attempt to locate and study those behaviors representative of play and attachment, the infant behaviors from each experimental period were submitted to a hierarchical cluster anlaysis. Thus, behaviors representing interpersonal or play behavior could be examined each period.

Before running the cluster analyses, however, a number of variables were transformed using a square root or log transformation. These transformations were carried out in order to minimize the positive skew found in these variables. The transformations converted the skewed distributions into a more normal distribution. This generated higher correlations for the cluster analysis (Rummel, 1970).

After these transformations, all variables were standardized to minimize the influence of extremes in duration between variables. For example, the average length of duration for a look-to-the-mother was .5 second, while average duration for an episode of proximity-to-the-mother was forty-five seconds. The larger scores in the latter would have resulted in weighting this variable in the analysis. The standardization procedure insured that equal weight was given to all the variables in the cluster analysis. This, then, enhanced the possibility of finding relationships between such diverse communication modes as looking-to-the-mother and proximity (Rummel, 1970).

Clustering was carried out on the correlation matrix of the behavioral variables for each experimental period. After clustering, the reliability at each level of the clusters was computed using Cronbach's alpha. These results are presented in the clustering diagrams shown in Figures II through VII. A summary of this analysis is presented below.

The clustering procedure grouped infant behavior into three major clustering groups of infant Attachment, Mutual-Play, and Solitary-Play. The cluster analysis was successful in identifying stable infant behavior patterns from period to period. The behaviors forming these clusters for each period are presented in Tables 12 to 14. Each of the three clusters will be discussed in its relationship to each period.

The Attachment Clusters. A cluster of behaviors indicative of attachment was present in every play period. In periods one and two of free play, the Attachment cluster was clearly defined. Here the infant moved away from and back to the mother [locomotion, turn-to-mother, and proximity-frequency], looked to the mother [look-mother-time and -frequency], and shared toys with the mother [baby-offer and baby-take-in-response]. This behavioral complex is similar to that observed by Ainsworth (1967) and written about by Bowlby (1969). They have defined this behavioral cluster as infant attachment

to the mother. The present study names this cluster Global-Attachment.

Beginning in the third period of free play, attachment behavior divided into three separate clusters of behavior. Attachment cluster I showed exploration of objects in the room [object-involvment-time and -frequency] and orienting behaviors directed toward the mother [locomotion-time and -frequency, proximity-frequency, and looking-to-mother-time and -frequency]. This type of attachment is referred to as Exploratory-Attachment (Ainsworth & Bell, 1970).

Attachment cluster II consisted of negative vocalization, imitation of the mother, and time spent turned toward the mother. In this cluster, there was orienting to the mother but with limited interpersonal interaction. There also was a negative element to this cluster (i.e., negative vocalization). Therefore, this cluster was labelled Negative-Attachment (Ainsworth & Bell, 1969).

Attachment cluster III focused upon mother and infant engaging toys in an exchange-game [baby-offer, baby-take, baby-take-response, and excited-vocalization]. These behaviors have been described by Rheingold (1973) as a form of separation in free play. Here these behaviors are interpreted as a form of attachment. This cluster was closely linked with the Global-Attachment behaviors in the first two periods. These behaviors also serve to promote

Figure II

CLUSTERS OF INFANT BEHAVIORS IN PERIOD I

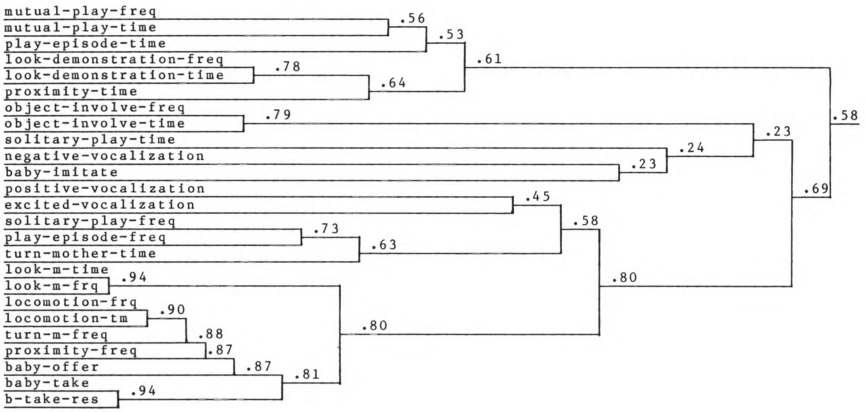


Figure III

CLUSTERS OF INFANT BEHAVIORS IN PERIOD II

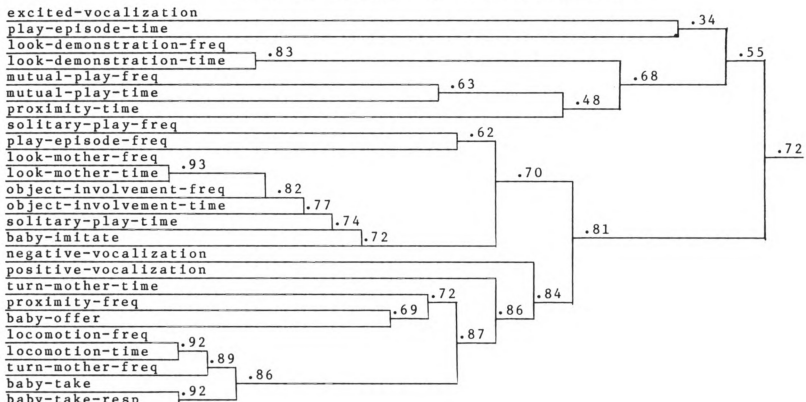


Figure IV

CLUSTERS OF INFANT BEHAVIORS IN PERIOD III

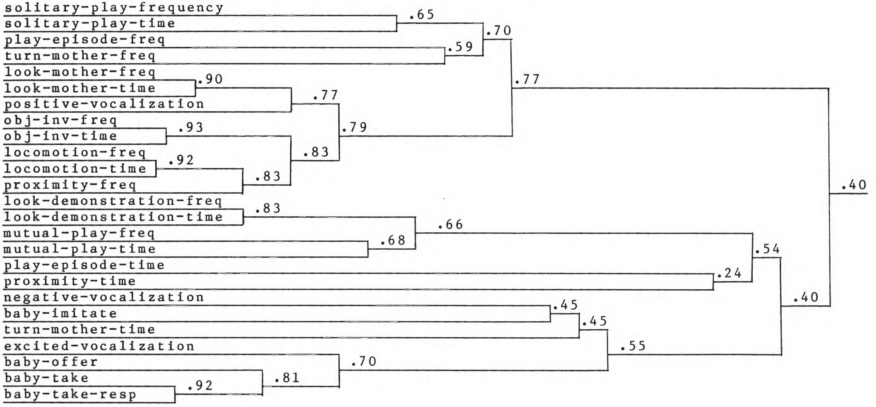


Figure V

CLUSTERS OF INFANT BEHAVIORS IN PERIOD IV

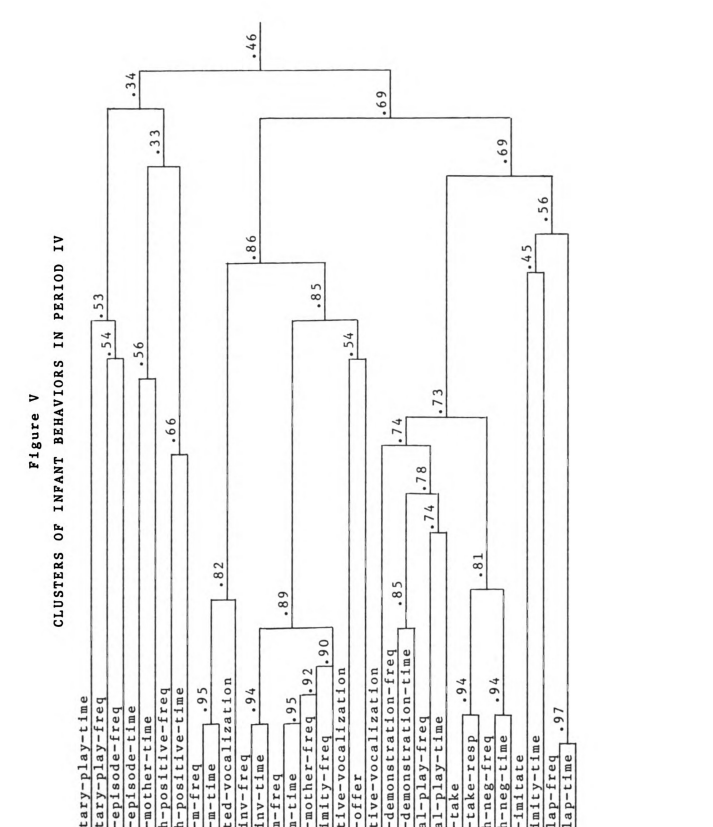


Figure VI

CLUSTERS OF INFANT BEHAVIORS IN PERIOD V

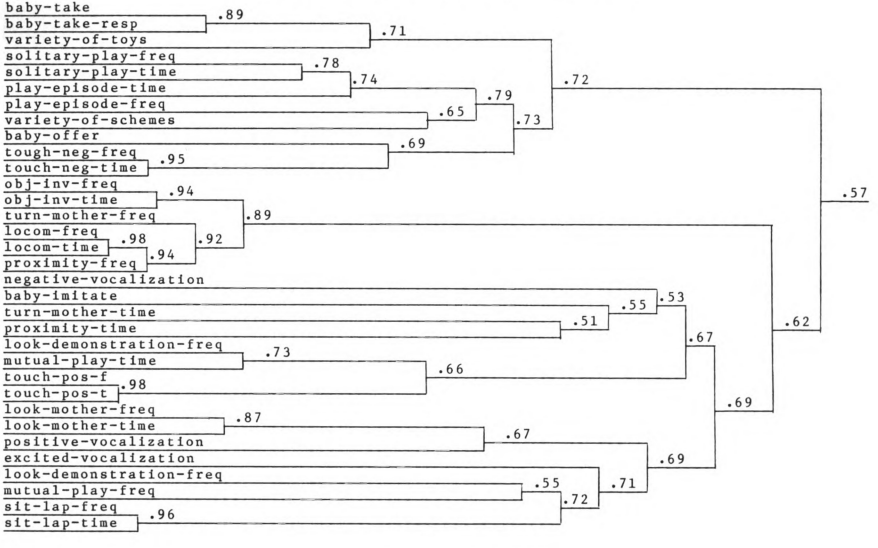


Figure VII

CLUSTERS OF INFANT BEHAVIORS IN PERIOD VI

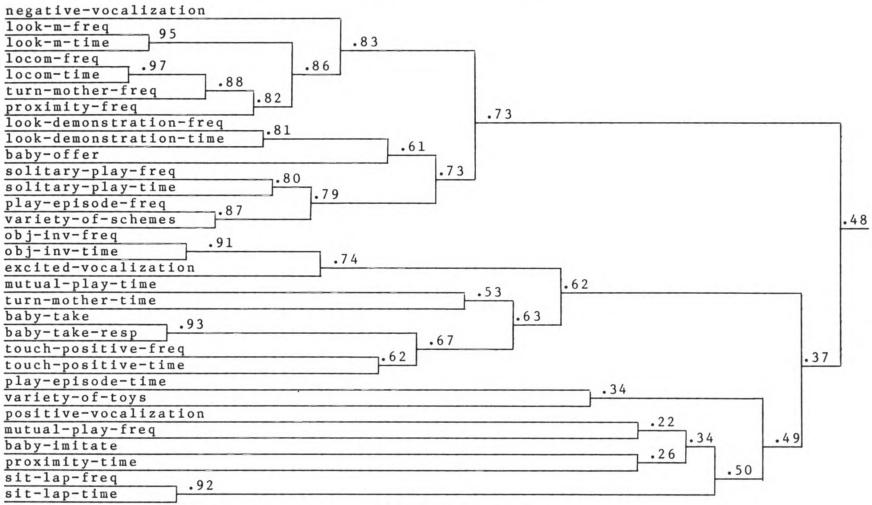


Table 12

Attachment Clusters in Periods I Through VI

PERIOD I

Cluster I
(Global-Attachment/.80)
look-mother-frequency
look-mother-time
locomotion-frequency
locomotion-time
turn-mother-frequency
proximity-frequency
baby-offer
baby-take
baby-take-response

PERIOD II

Cluster I
(Global-Attachment/.84)
negative-vocalization
positive-vocalization
turn-mother-time
proximity-frequency
baby-offer
locomotion-frequency
locomotion-time
turn-mother-frequency
baby-take
baby-take-response

PERIOD III

Cluster I
(Exploratory-Attachment/.83)
object-involvement-frequency
object-involvement-time
locomotion-frequency
locomotion-time
proximity-frequency

Cluster II
(Negative-Attachment/.45)
negative vocalization
baby-imitate
turn-mother-time

Cluster III
(Exchange-Game/.70)
excited-vocalization
baby-offer
baby-take
baby-take-response

PERIOD IV

Cluster I
(Exploratory-Attachment--secure/.92)
object-involvement-frequency
object-involvement-time
locomotion-frequency
locomotion-time
turn-mother-frequency
proximity-frequency
positive-vocalization
baby-offer

Cluster II
(Exchange-Game/.81)
baby-take
baby-take-response
touch-negative-frequency
touch-negative-time

Table 12 (continued)

Attachment Clusters in Periods I Through VI

PERIOD V	PERIOD VI
Cluster I	Cluster I
(Exploratory-Attachment/.92)	(Exploratory-Attachment)
turn-mother-frequency	negative-vocalization
locomotion-frequency	look-mother-frequency
locomotion-time	look-mother-time
proximity-frequency	locomotion-frequency
	locomotion-time
Cluster II	turn-mother-frequency
(Negative-Attachment/.53)	proximity-frequency
negative-vocalization	
baby-imitate	Cluster II
turn-mother-time	(Mutual Play Attachment I/.63)
proximity-time	mutual-play-time
	turn-mother-time
Cluster III	baby-take
(Exchange-Game/.71)	baby-take-response
baby-take	touch-positively-frequency
baby-take-response	touch-positively-time
baby-toys	

Table 13

Mutual-Play Clusters in Periods I Through VI

PERIOD I

Cluster I
(Mutual-Play/.61)
mutual-play-frequency
mutual-play-time
play-episode-time
look-demonstration-frequency
look-demonstration-time
proximity-time

PERIOD II

Cluster I
(Mutual-Play/.68)
look-demonstration-frequency
look-demonstration-time
mutual-play-frequency
mutual-play-time
proximity-time

PERIOD III

Cluster I
(Mutual-Play/.66)
look-demonstration-frequency
mutual-play-frequency
mutual-play-time

PERIOD IV

Cluster I
(Mutual-Play/.74)
negative-vocalization
look-demonstration-frequency
look-demonstration-time
mutual-play-frequency
mutual-play-time

PERIOD V

Cluster I
(Mutual-Play I/.66)(time)
look-demonstration-time
mutual-play-time
touch-positive-frequency
touch-positive-time

Cluster II
(Mutual-Play II/.71)
baby-sit-lap-time
excited-vocalization
look-demonstration-frequency
mutual-play-frequency
baby-sit-lap-frequency

PERIOD VI

Cluster I
(Mutual-Play I/.63)
(Exchange-Game)
(Attachment)
mutual-play-time
turn-mother-time
baby-take
baby-take-response
touch-positively-frequency
touch-positively-time

Cluster II
(Mutual-Play II/.50)
(frequency)
positive-vocalization
mutual-play-frequency
baby-imitate
proximity-time
baby-sit-lap-frequency
baby-sit-lap-time

Table 14

Solitary-Play Clusters in Periods I Through IV

PERIOD I

Cluster I
(Solitary-Play/.58)
positive-vocalization
excited-vocalization
solitary-play-frequency
play-episode-frequency
turn-mother-time

PERIOD II

Cluster I
(Solitary-Play/.70)
baby-imitate
solitary-play-frequency
play-episode-frequency
look-mother-frequency
look-mother-time
object-involvement-frequency
object-involvement-time
solitary-play-time

PERIOD IV

Cluster I
(Solitary-Play/.53)
solitary-play-time
solitary-play-frequency
play-episode-frequency

PERIOD V

Cluster I
(Solitary-Play/.79)
solitary-play-frequency
solitary-play-time
play-episode-time
play-episode-frequency
schemes-frequency

Behaviors Associated with Engaging the Mother in Alternative Play
baby-take
baby-take-response
toys
baby-touch-negatively-frequency
baby-touch-negatively-time
baby-offer

PERIOD VI

Cluster I
(Solitary-Play/.79)
solitary-play-frequency
solitary-play-time
play-episode-frequency
schemes-frequency

Illustrative of Behavior in Tower Building
look-demonstration-frequency
look-demonstration-time
baby-offer

Behaviors Associated with Engaging the Mother in Alternative Play

contact and interpersonal interaction with the mother. Thus, this cluster was viewed as an extension of the attachment.

In the fourth period of free play, attachment appeared as two clusters. The first was Exploratory-Attachment with more time spent with the mother [turn-mother-frequency and proximity-time]. The second cluster was the Exchange-Game-Attachment cluster [baby-take and baby-take-response] linked with the negative interpersonal behaviors of negative touching-time and -frequency. Both the Exploratory-Attachment and Exchange-Game-Attachment clusters were associated with new behaviors.

The fifth period, peek-a-boo game, had clusters of Exploratory-Attachment, Negative-Attachment, and Exchange-Game-Attachment as in the third period of free play.

Finally, in the sixth period, tower building, two large clusters of attachment appeared. The first cluster showed high levels of orienting to the mother [locomotion, turn-to-mother-time and -frequency, proximity-frequency, and look-to-mother-time and -frequency]. In periods one through five, these orienting behaviors were associated with exploration or positive infant-mother exchange; but in this period, these behaviors are conspicuously absent. Instead, this orienting was negatively toned by the inclusion of the negative behavior of negative-vocalizations. This form of orienting behavior associated with negative

elements of interaction has been described by Ainsworth, Bell, and Stayton (1971) as Ambivalent-Attachment.

The second cluster in the sixth period embodied the Exchange-Game [baby-take and take-response] with positive touching behaviors [touch-positively-time and -frequency]. These behaviors were associated with tower construction behavior [mutual-play-time and turn-to-mother-time]. This combination of variables represented mother-infant interaction in tower construction. The last two periods illustrated the dependence of attachment upon the situation in which the infant finds him or herself.

Mutual-Play Clusters. Another stable cluster of infant behaviors was Mutual-Play. In the first four periods of free play, Mutual-Play was composed of mutual-play-frequency, mutual-play-time, look-to-demonstration-frequency, and look-to-demonstration-time. A few other behaviors joined this cluster during free play but not in a consistent manner.

In the peek-a-boo period, Mutual-Play divided into two clusters. The first cluster was Mutual-Play-Time with an emphasis on time spent in play [look-demonstration-time, mutual-play-time, touch positively-frequency, touch-positively time].

The second cluster was Mutual-Play-Frequency [look-demonstration-frequency, mutual-play-frequency, baby-sit-lap-frequency, baby-sit-lap-time]. The cluster anlaysis isolated two ways in which the infants engaged in the

peek-a-boo game (i.e., one of long duration and one of high frequency).

During the tower period, Mutual-Play was again divided into two clusters. The first cluster of Mutual-Play-Time was more clearly defined than the second cluster of Mutual-Play-Frequency. The first cluster was defined by the time variables of mutual-play-time and turn-to-mother-time and made up part of the larger cluster indicative of mother-infant tower building [baby-take, baby-take-response, touch-positively-frequency, touch-positively-time].

The second cluster was a very loosely associated set of variables. Mutual-play-frequency with positive-vocalization joined with the cluster of baby-imitate and proximity-time. These joined the other variables of sitting-in-the-mother's-lap [-time and -frequency]. The overall reliability of this cluster is low ($r = .50$). Here again mutual play frequency is differentiated from mutual play time.

Mutual-Play varied from free play to structured play tasks. In the free play, Mutual-Play was a very stable unitary cluster. In structured play, mutual play breaks down into two forms--one emphasizing duration in play and the other emphasizing the frequency of play.

Solitary-Play Clusters. The third clustering unit, Solitary-Play, remained very stable across periods. A few unstable variables entered the cluster in each period.

Solitary-Play was defined by the three elements of solitary-play frequency, play-episodes-frequency, and solitary-play-time. During the fifth and sixth periods, the use of schemes also joined this cluster. It should be remembered that the use of schemes was measured only in the last two play periods. Solitary-play-time showed some instability in the first two periods. In the first period, it did not cluster with any other variable. In the second period, it was an element defining Exploratory-Attachment. After these two periods, solitary-play-time joined the Solitary-Play cluster in the remaining periods.

While play-episodes-frequency was an element making up the Solitary-Play cluster, the variable play-episodes-time was not. This latter variable did not join any clusters consistently. This contrasted with many other variables in which the time and frequency measures clustered together.

The relationship of the Solitary-Play cluster with other clusters changed across periods. In the first two periods of free play, the Solitary Play cluster linked with Global-Attachment. This was indicative of the exploratory nature of attachment in these periods. In the third and fourth periods of free play, Solitary-Play was an isolated cluster.

During the peek-a-boo game, Solitary-Play was related to two mother-infant clusters. The first cluster was the

Exchange-Game. Instead of participating in the peek-a-boo game as a mutual play event, some infants would stay close to their mothers and frequently would move from toy to toy. They then would attempt to gain the mother's attention in some alternative game. Thus, Solitary-Play and the exchange of toys were used by the infants as an attempt to change the course of the play interaction with the mother. The second cluster was a negative interaction between mother and infant. The infant rejected the peek-a-boo interaction by avoiding the mother and seeking to play by him or herself (Solitary-Play).

In the sixth period, tower building, the Solitary-Play cluster was associated with looking-at-demonstrate and with baby-offering to the mother. Again this interaction was indicative of seeking to engage the mother in other play activities. Infants watched passively while their mothers stacked blocks. They wandered away from their mothers, securing a toy, and returned it to mother. Solitary-Play and toy exchange were used again to engage the mother in play other than the prescribed structured task.

Conclusion. The cluster analysis performed on the infant behaviors isolated three distinct infant behavioral clusters (i.e., Attachment, Mutual-Play, and Solitary-Play). This analysis supported the hypothesis that attachment is differentiated from infant play.

Unstable Clusters and Unclustered Variables. In the second, fourth, fifth, and sixth periods, there were small clusters which occurred only once. Similarly, there were behaviors not associated with any clusters. There was no consistency in these unclustered variables. These clusters and variables were considered unstable.

Reliability Of Maternal Play Behaviors

The reliability for the maternal behaviors was handled in the same fashion as the infant behaviors. The reliability had to reach .75 before scoring could begin. Reliabilities reported here are those found after this criteria was reached. Reliabilites were obtained by computing the correlation between two raters scoring the same mother's behavior. The reliabilities for the mother's behaviors are presented in Table 15.

The reliabilities on maternal behaviors was high. Reliabilities ranged from .72 to 1.00. Reliabilities were checked periodically throughout the scoring process. Only one maternal behavior fell short of the stated criterion of .75. This was touch-negatively with a reliability of .72. This low reliability may be due to this behavior's low occurrence.

Descriptive Statistics On Maternal Behavior

The descriptive statistics on the maternal behaviors are presented in Table 16. The mean, standard deviation, minimum, maximum, and skewness are shown for each variable in each period. An examination of the means of these

Table 15

Reliabilities Of Ratings Of
Maternal Interpersonal And Play Behaviors

Maternal Behavior	Reliability
demonstration-play	.83
game-play	.87
fantasy-play	.91
mother-imitate	.81
mother-offer	1.00
mother-take	1.00
mother-touch-positively	.89
mother-touch-negatively	.72

Table 16

CONDESCRIPTIVE STATISTICS
MOTHER BEHAVIORS
SIXTH PLAY PERIOD

Mother Behavior	Mean	Std. Dev.	Min.	Max.	Skewness
demonst-play-frequency	4.9	3.2	0.0	15.0	.4
demonst-play-time	45.2	35.0	0.0	151.0	.8
game-play-frequency	2.2	2.0	0.0	9.0	.8
game-play-time	45.3	55.2	0.0	162.0	.8
fantasy-play-frequency	.1	.6	0.0	4.0	5.0
fantasy-play-time	2.0	8.2	0.0	47.0	4.4
mother-imitate	.3	.7	0.0	4.0	3.2
mother-offer	4.3	1.0	0.0	16.0	1.0
mother-take	1.1	1.8	0.0	11.0	3.5
mother-take-response	.8	1.5	0.0	10.0	4.1

behaviors showed less variability and more uniformity than did the infant behaviors. There was, however, still a wide range displayed within a variable. For example, fantasy play in the first period ranged from 0.0 to 46.0 seconds and demonstration play in the sixth period ranged from 0.0 to 151.0 seconds.

Again there was some question concerning the inclusion of the touching variables in the analysis. The frequency distributions for touching are presented in Table 17. The level of positive touching was higher for the mothers than for the infants, but still low with as many as 50 to 60 percent of the mothers not touching their infants in any given period. The distribution of positive touching was spread evenly across all periods. Thus, mother-touch-positively was included in the analyses of each period. Negative-touching, on the other hand, was confined mostly to periods five and six (i.e., structural play). Apparently, negative-touching was used to gain control in the structured play situations. Negative-touching was included in the analyses of the last two periods.

Cluster Analysis Of Mother Behavior By Period

The same procedures as outlined for the analysis of infant behaviors were followed here. Skewed behaviors were transformed to yield a more normal distribution. All variables were standardized. Correlations were computed

Table 17

FREQUENCY OF MOTHER TOUCHING BEHAVIORS

Touching Variable	Frequency of Touching	Number of Subjects Within Periods Period I	Period II	Period III	Period IV	Period V	Period VI
positive-touch-freq	0	29	33	34	38	25	22
	1	12	10	11	5	15	20
	2	6	6	3	2	6	1
	3	2	1	2	3	3	7
	4	2	--	1	3	2	1
	5	--	2	5	--	--	--
	6	1	--	--	--	--	1
	7	--	--	--	--	--	--
	8	--	--	--	--	1	--
	9	--	--	--	1	--	--
negative-touch-freq	0	47	46	49	51	30	22
	1	3	5	3	1	9	10
	2	1	1	--	--	7	8
	3	--	--	--	--	5	2
	4	1	--	--	--	--	2
	5	--	--	--	--	--	1
	6	--	--	--	--	--	--
	7	--	--	--	--	1	--
	8	--	--	--	--	--	1
	9	--	--	--	--	--	1
	11	--	--	--	--	--	1
	12	--	--	--	--	--	1
	15	--	--	--	--	--	1

Figure VIII

CLUSTERS OF MATERNAL BEHAVIORS IN PERIOD I

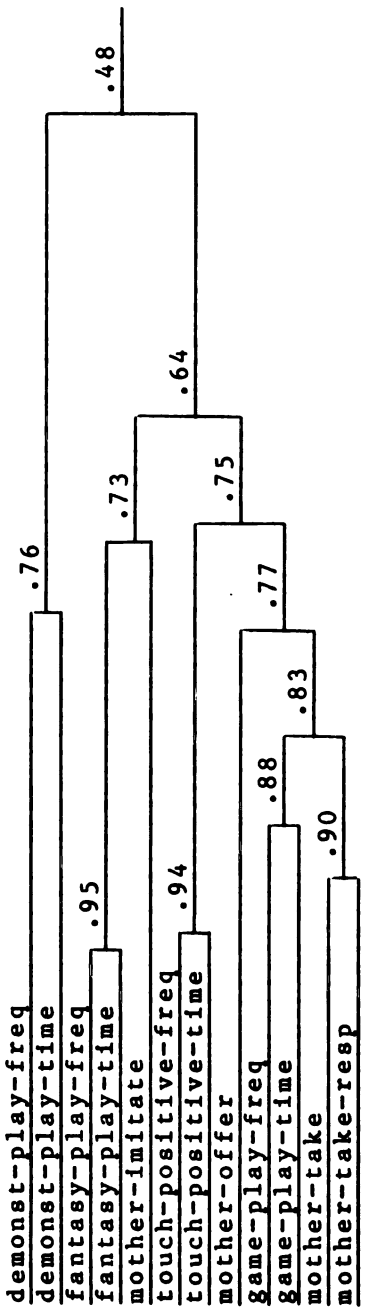


Figure IX

CLUSTERS OF MATERNAL BEHAVIORS IN PERIOD II

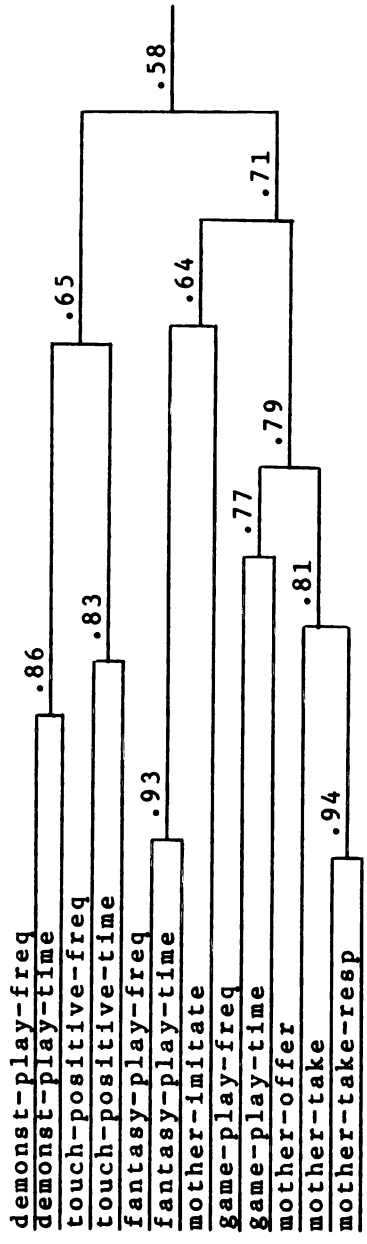


Figure X

CLUSTERS OF MATERNAL BEHAVIORS IN PERIOD III

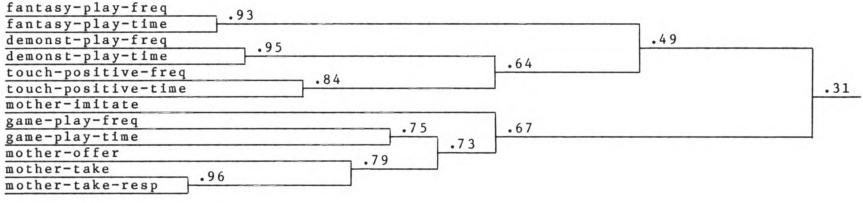


Figure XI

CLUSTERS OF MATERNAL BEHAVIORS IN PERIOD IV

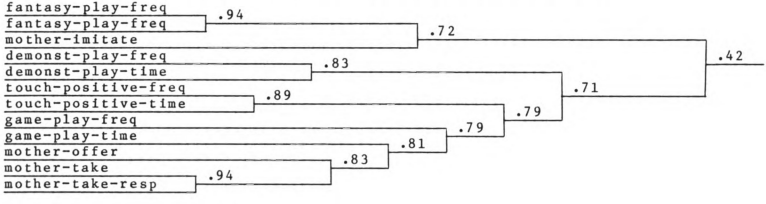


Figure XII

CLUSTERS OF MATERNAL BEHAVIORS IN PERIOD V

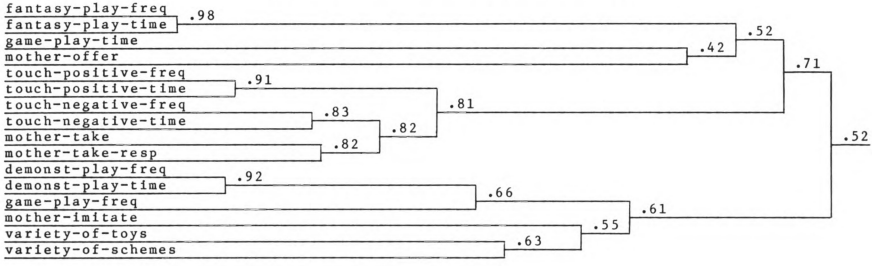
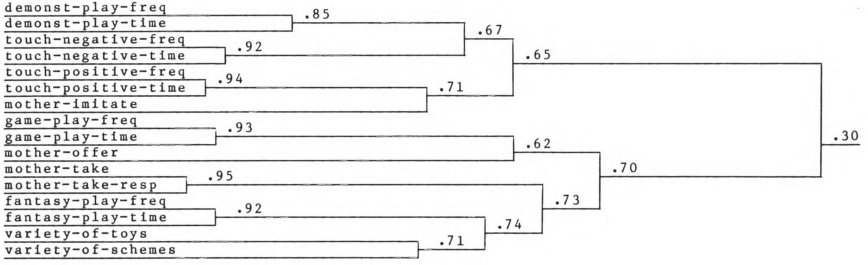


Figure XIII

CLUSTERS OF MATERNAL BEHAVIORS IN PERIOD VI



among the variables in each period. These correlation matrices were then sub- mitted to hierarchical clustering analysis. The results of this analysis are presented below.

The cluster analysis yielded five stable clusters of maternal behavior. Time and frequency measurements of a variable generally clustered together, creating the clusters found in this analysis. For all practical purposes, the measurements of a variable in time or frequency yielded equivalent information. The clusters in this analysis were Demonstration-Play, Fantasy-Play, Positive-Touching, Game-Play, and Mother-Taking.

Demonstration-Play consisted of the two measures of that variable--demonstration-play-time and demonstration-play-frequency. They clustered together at a high level in each period. Similarly, in each period the Fantasy-Play cluster was composed of fantasy-play-time and fantasy-play-frequency. During the first, second, and fourth periods, this cluster was closely associated with the use of imitation by the mother. This latter variable was part of the Fantasy-Play cluster in the fourth period.

The Game-Play cluster was generally composed of game-play-time and game-play-frequency. This cluster appeared in the first, second, third, and sixth play periods. In the fourth period of free play, the Game-Play cluster was linked to the Mother-Take cluster [mother-offer, mother-take, mother-take-response]. During the fifth period,

peek-a-boo game, game-play-time and game-play-frequency did not cluster together. Game-play-time remained unclustered. Game-play-frequency was linked with the Demonstration-Play cluster. This cluster, as in the infant analysis, indicated high frequency interaction in playing the peek-a-boo game.

Positive-Touching cluster was composed of positive-touch-frequency and positive-touching time. This cluster was stable in all six play periods. The Negative-Touching cluster was composed of touch-negative-time and touch-negative-frequency. These variables were included in the last two periods of the analysis.

Lastly, the Mother-Take cluster was composed of mother-take-time and mother-take-frequency in the first, fifth, and sixth periods. Mother-offer-to-baby joined these variables in periods two, three, and four of free play.

General Relationships In The Clusters. In the four periods of free play, the mother's behavior clustered around either Demonstration-Play or Game-Play. During these periods, the Mother-Take cluster was associated closely with the Game-Play cluster. This shows the association between the mother's use of Game-Play and her exchanging toys with the infant. Fantasy-Play was an isolated play strategy which at times associated with Mother-Imitate.

The structured play period clusters associated differently than did clusters in the free play periods. Behav-

iors were associated with strategies in playing the peek-a-boo game or in building the tower. In the fifth period, peek-a-boo game, there were three general clusters. The cluster analysis showed three different approaches used by the mother to involve the infant in the peek-a-boo task (i.e., Fantasy-Play [attention-getting play], Interpersonal-Social-Play, and Task-Oriented-Play). Fantasy-Play was an attention-getting behavior which was flamboyant and directed to the infant. There was a cluster of close Interpersonal-Social Play made up of touching-positively [-frequency and -time], touching-negatively [-frequency and -time], and taking [mother-take, mother-take-in-response]. This close interpersonal interaction was combined with an exchange of the princess mask between mother and infant.

The last cluster was Task-Oriented-Play. In this cluster there was demonstration-play [-frequency and -time], game-play [-frequency], mother imitation, and the mother's use of toys and schemes. The mother engaged the infant in the game by the use of "game-oriented" or "task-oriented" play behaviors.

In the sixth period, tower building, two play strategies were used in the play. Maternal behaviors clustered with Demonstration-Play and Game-Play strategies. The Demonstration-Play-Strategy consisted of demonstration-play [-time and -frequency], negative-touching [time and -frequency], positive-touching [-time and -freqeuncy], and

mother-imitate. Thus, Demonstration-Play was accompanied by close interpersonal contact in the form of touching. The Game-Play-Strategy consisted of game-play [-time and -frequency], mother-offering, mother-take [take, and take-in-response], fantasy-play [-time and -frequency], and the use-of-toys and schemes. This latter strategy was concerned with using task-oriented play behaviors to involve the infant in tower building.

In both the peek-a-boo and the tower tasks, there were two different strategies for involving the infant in the play. The first strategy utilized interpersonal-social contact with the infant. The second strategy centered on play or task-oriented behaviors with the infant. Demonstraton-play was used with both the Interpersonal-Social Cluster (period V) and the Task-Oriented approaches (period VI). In spite of this inconsistency or flexibility, the two approaches of Interpersonal-Social ($r = .81$ and $.65$) and Task-Oriented ($r = .61$ and $.70$) have high reliabilities in each period.

Conclusion. This cluster analysis illustrated that maternal play behaviors were dependent upon task demands of the play. Generally, in free play, maternal behaviors clustered about Demonstration-Play or Game-Play. During the structured periods, maternal play behavior divided along the lines of Interpersonal-Social-Strategy or Task-Oriented-Strategy as a means of involving the infant in the structured tasks.

Second Order Factor Analysis Of Infant And Mother Behaviors

The next step in the analysis was to examine the interrelationships between the infant's and the mother's behaviors. In this analysis, mother and infant behaviors were first combined into the clusters found in cluster analysis. A factor analysis was performed on these clustered behaviors. This constituted a second order factor analysis of the mother and infant and the infant clusters. Those variables which were not members of any cluster were also included in the analysis.

The factor analysis was performed on clustered behaviors for two reasons. First, a factor analysis of the clustered behaviors should localize the holistic dimensions behind mother-infant interaction. For example, it is more interpretable to know that the infant cluster Attachment loaded on the same factor as the mother cluster Game-Play than to know only that infant locomotion is related to game-play-frequency. Secondly, the combination of variables into a cluster reduces the number of variables entering the factor analysis. This increased the ratio of the number of subjects to the number of variables. This was advantageous, given the number of subjects used in this study.

In order to perform the factor analysis for each play period, the standardized variables making up a cluster

were added together to yield a single score. Those variables which were not members of a cluster were also standardized and entered into the analysis. A principle-factor solution was carried out with commonalities placed in the diagonal of the correlation matrix. These factors were then rotated using the varimax method.

The factor analysis of each period showed that the structure of the factors changed from period to period. Three to four meaningful factors are presented for each period.

First Period Of Free Play. The analysis of the first period of free play presented four interpretable factors. These factors are presented in Table 18. In this period the factors pointed to how both the mother and infant adapted to a new play setting. A common element to all of these factors was the mother's engagement in Game-Play. Thus, the first period might be characterized as the Game-Play period.

Factor I which accounted for 16.3 percent of the variance was representative of exploratory behavior by the infant [Solitary-Play] while maintaining interaction with the mother [Attachment]. Mother interaction with the infant was to reciprocate with acceptance of toys offered and use of Game-Play. The Factor II was illustrative of an alternative approach to the new setting. Here the infant engaged in Mutual-Play with the mother responding with Game-Play. Factor II accounted for 12.5 percent of

Table 18

Second Order Factor Analysis
Between Mother and Infant Behaviors
First Free Play Period

	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Factor VII
i) Sex	.004	-.239	-.101	.188	.028	.330*	.396*
i) Mutual-Play	-.090	.967*	.101	-.198	.070	.063	.062
i) Object-Inv	-.031	.000	.022	.164	.013	.112	-.648*
i) sol-play-time	-.030	-.620*	-.010	-.008	.130	-.003	.118
i) neg-vocalization	.029	-.088	-.851*	.117	.061	-.010	.089
i) baby-imitate	-.182	-.066	-.069	-.011	.626*	.188	.183
i) Solitary-Play	.641*	-.122	.225	-.130	.254	-.165	.049
i) Global Attach	.840*	.009	.033	.099	-.217	.172	-.029
m) Demonst-Play	-.089	.107	.127	-.689*	-.013	-.024	.097
m) Fantasy-Play	-.008	.007	-.286	.043	.460*	.043	-.162
m) mother-imitate	.051	-.134	-.014	.382*	.367*	-.265	-.161
m) Touch-Positive	.111	.082	.058	-.020	.132	.750*	-.097
m) mother-offer	.204	.018	.443*	-.022	-.198	.022	-.021
m) Game-Play	.340*	.417*	.414*	.426*	.052	.239	.222
m) Mother-Take	.727*	.085	-.001	.388*	-.252	.143	.044
Percent Variance	16.3	12.5	7.9	6.1	5.5	4.6	4.1
Accumulative Percent	16.3	28.8	36.7	42.8	48.3	52.9	57.0

i) Indicates an infant variable
m) Indicates a mother variable

the variance. Factor III and the Factor IV also represented mother's who used Game-Play as a means of engaging the infant in play; however, with these mothers the infants did not respond to their overtures. Each factor accounted for 7.9 and 6.1 percent of the variance respectively.

The first period was represented by the mother's use of Game-Play. Infants responded in three ways to the mother. There were infants who explored the room [Solitary-Play] but returned to the mother [Attachment] including her in their activity. Then there were infants who spent the time engaged in Mutual-Play with the mother. Lastly, two factors represent no infant response to the mother's use of Game-Play.

Second Period Of Free Play. The second play period had three factors which pointed to the presence or absence of infant-mother play. (See Table 19.) Factor I which accounted for 19.3 percent of the variance focused upon the exchange of toys between the mother and infant and the infant making trips away from and back to the mother. Thus, Factor I may be viewed as an exchange game between the mother and infant. Factor II showed Solitary-Play instead of Mutual-Play by the infant. The mother utilized Fantasy-Play attempting to engage the infant in play. Factor II accounted for 17.6 percent of the variance. Factor III making up 6.9 percent of the explained variance was composed of infant Mutual-Play and maternal Demonstration-Play.

Table 19

Second Order Factor Analysis
Between Mother and Infant Behaviors
Second Free Play Period

	Factor I	Factor II	Factor III	Factor IV
i) Sex	.210	-.020	-.249	.024
i) Play-Time	-.322*	-.203	.035	-.053
i) Mutual-Play	.199	-.451*	.617*	.503*
i) Solitary-Play	.187	.846*	-.246	.129
i) Global-Attach	.855*	.173	.051	-.053
m) Demonst Play	.016	-.187	.883*	-.191
m) Touch Positive	.043	.056	.036	-.440*
m) Fantasy Play	.152	.481*	-.103	.468*
m) mother-imitate	.193	.033	-.033	.173
m) Game-Play	.583*	-.443*	-.144	.053
m) Mother-Take	.797*	.014	-.017	.019
Percent Variance	19.3	17.6	6.9	6.4
Accumulative Percent	19.3	36.9	43.8	50.2

i) Indicates an infant variable
m) Indicates a mother variable

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These factors appeared to represent three forms of play interaction as follows: Exploration--Exchange-Game-Play, Solitary-Play--Fantasy-Play, and Mutual-Play--Demonstration-Play. Factors I and III showed the mother-infant play interaction. As in the first play period, these took on the form of exploration-interaction and mutual-play-interaction. The first of these indicated movement away from and return to the mother. The second, on the other hand, indicated stationary behavior and staying with the mother. Factor II in this period showed the infant engaged in Solitary-Play activity with apparently no acknowledgment of the mother's performance of Fantasy-Play. This, too, has its similarity with the first period in that a group of mothers engaged in attention-getting behaviors with no apparent success.

The Third Period Of Free Play. The third period was very similar to the second period. (See Table 20.) However, in this period there was a reduction in the level of infant activity and involvement. Factor I represented 14.7 percent of the variance and was again the Exchange-Game between mother and infant. But in this period the Exchange-Game did not cluster or factor with the movement activity away from and return to the mother as in the first two periods. Factor II, illustrative of mother-infant play interaction, showed the infant to be more passive. Here the infant looked to the mother while the mother was engaging the infant in Game-Play. Factor II

Table 20

Second Order Factor Analysis
Between Mother and Infant Behaviors
Third Free Play Period

	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI
i) Sex	-.021	-.258	-.584*	-.020	-.091	.471*
i) Solitary-Play	.087	-.147	.556*	-.319*	-.230	-.240
i) Look-Mother	.242	.665*	.196	.069	-.162	-.146
i) Explor-Attach	-.152	.222	.207	-.024	-.373*	-.224
i) Mutual-Play	-.062	.007	.014	.933	.165	-.022
i) play-episode-time	.060	-.100	.052	-.101	.269	-.102
i) proximity-time	.059	-.126	-.165	.078	.798*	.032
i) Neg-Attachment	.001	-.008	.007	-.046	.036	.690*
i) Exchange-Game-Att	.921*	.073	-.159	-.048	-.002	.100
m) Fantasy-Play	-.133	.149	.586*	.092	-.140	.170
m) Demonst-Play	-.047	-.660*	.009	.323*	.211	-.041
m) Touch-Positive	-.161	.072	-.078	.091	.347*	.046
m) mother-imitate	.000	.251	.068	-.363*	.176	.059
m) Game-Play	.265	.449*	-.462*	.127	.094	.007
m) Mother-Take	.802*	.183	-.001	-.035	.030	-.088
Percent Variance	14.7	13.7	8.1	6.6	5.1	3.9
Accumulated Percent	14.7	28.4	36.5	43.1	48.2	52.1

i) Indicates an infant variable
m) Indicates a mother variable

accounted for 13.7 percent of the variance. Factor III again showed Solitary-Play being linked to the mother's utilization of Fantasy-Play as a means of engaging the infant in play. Factor III accounted for 8.1 percent of the variance.

The Fourth Period Of Free Play. In the fourth period there were two general factors and the rest appeared to be specific factors. (See Table 21.) Both of the general factors dealt with the two forms of mother-infant interactive play mentioned before (i.e., Mutual-Play and the Exchange-Game). Factor I, Mutual-Play between the mother and the infant, was accompanied by mother touching the baby positively and her performance of Game-Play with the baby. Factor I accounted for 18.0 percent of the variance. Factor II was the Exchange-Game between mother and infant. In the third period the infant did not move about instead the time was spent in proximity to the mother. Like Factor I, there was also some utilization of Game-Play by the mother. Factor II accounted for 12.0 percent of the variance.

The Fifth Period -- Peek-A-Boo Game. The fifth period analysis generated four interpretable factors. (See Table 22.) The four factors represented differing mother-interaction in the peek-a-boo game. These forms of play were mutual peek-a-boo play, alternative play, ambivalent play, and negative interaction. Factor I represented an Exchange-Game [baby-take, baby-offer] of the princess mask

Table 21

Second Order Factor Analysis
Between Mother and Infant Behaviors
Fourth Free Play Period

	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Factor VII
i) Sex	.015	-.016	-.110	-.073	.130	.447*	.056
i) Solitary-Play	-.621*	-.291	.057	.137	.008	-.076	-.062
i) Play-Time	.006	-.054	.203	-.437*	.085	-.361*	.092
i) B-Touch-Positive	.041	-.032	.024	-.084	.621*	.041	-.044
i) Look-Mother	.079	-.087	.639*	.160	-.303*	-.265	-.021
i) Explor-Attach	-.002	.109	.283	.901*	-.193	-.231	-.072
i) Mutual-Play	.919*	.025	-.197	-.050	-.008	-.019	.076
i) Exchange-Game-Att	.068	.811*	-.055	-.040	.002	.207	-.014
i) B-Touch-Negative	.219	.358*	-.067	-.038	.053	-.033	-.205
i) Baby-Sit-Lap	-.003	.108	.148	.020	-.131	.599*	.043
i) baby-imitate	-.053	-.136	-.095	-.119	-.036	.056	.715*
i) proximity-time	.179	.314*	-.222	.073	.322*	.130	.433*
m) Fantasy-Play	-.123	-.346*	.194	-.057	-.492*	.023	-.093
m) Demonst-Play	.289	-.028	-.831*	-.004	-.147	-.192	.216
m) M-Touch-Positive	.449*	.060	.014	.219	.140	.032	-.221
m) Game-Play	.552*	.371*	.156	.136	.336*	-.144	-.036
m) Mother-Take	.175	.805*	.098	.261	.080	-.033	-.015
Percent Variance	18.0	12.0	7.8	5.4	4.6	4.1	3.7
Accumulative Percent	18.0	30.0	37.8	43.2	47.8	51.9	55.6

i) Indicates an infant variable
m) Indicates a mother variable

Table 22

Second Order Factor Analysis
Between Mother and Infant Behaviors
Peek-A-Boo Play Period

	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Factor VII	Factor VIII
i) Sex	.091	-.066	.047	-.102	.074	-.032	-.015	-.449*
i) Exchange-Game-Att	.489*	-.091	.208	-.047	.339*	.172	-.036	.233
i) Solitary-Play	.133	.312*	.454*	-.690*	-.140	.058	.069	.168
i) B-Touch-Negative	.419*	.225	.326*	.254	-.386*	.238	-.453*	-.058
i) Obj-Involvement	-.218	.429*	-.475*	.462*	.001	.018	.166	.099
i) Explor-Attach	-.204	.481*	-.213	.202	-.007	-.064	-.003	.396*
i) Neg-Attachment	-.083	-.400*	.395*	.323*	.474*	.111	-.011	-.091
i) Mutual-Play-I	.095	-.475*	.244	.241	.048	.022	.065	-.052
i) Look-Mother	.266	-.165	-.357*	.151	.103	.022	.232	.132
i) Mutual-Play-II	.288	-.045	.098	-.049	-.031	.034	.243	.045
m) Fantasy-Play	.193	-.089	.123	.184	-.420*	.582*	.295	-.063
m) game-play-time	.515*	-.526*	-.193	.111	-.176	-.355*	-.088	-.015
m) mother-offer	.787	.024	.077	-.132	.315	-.083	.273	.051
m) M-Touch-Positive	.239	.451*	-.088	.043	.017	-.053	.144	-.416*
m) M-Touch-Negative	.225	.524*	.005	.370*	.249	-.065	-.046	-.233
m) M-Take	-.016	.457	-.010	.302*	.615*	.145	.294	-.068
m) Demonst-Play	-.453*	.027	.225	.066	.171	.173	.064	-.048
m) Game-Play-Freq	-.254	.497*	.190	-.304*	.276	.176	.056	-.066
m) mother-imitate	-.408*	-.291	.285	.284	.027	.045	-.113	.175
m) variety-toys	-.154	.186	.660*	.141	-.282	-.585*	.266	-.002
m) variety-schemes	-.225	.013	.425*	.315*	.007	-.013	.243	.034
Percent Variance	12.1	11.2	9.1	7.1	5.4	4.9	4.1	2.8
Accumulative Percent	12.1	23.3	32.4	39.5	44.9	49.8	53.9	56.7

i) Indicates an infant variable
m) Indicates a mother variable

with the mother engaging in long bouts of peek-a-boo [game play time] with the infant. Factor I accounted for 12.1 percent of the variance. Factor I then represented the mutual engagement of the mother and infant in the peek-a-boo game.

Factor II showed the infant engaged in Solitary-Play, the exploration of objects in the room, and Attachment to the mother. The mother in turn engaged in game play frequency, taking toys from the infant, and touching the infant positively and negatively. The picture here was one of the infant seeking alternative play activities by returning to the mother who attempted to engage the infant in the peek-a-boo game. At this time the mother also utilized both positive and negative touching most likely as an attempt to control the infant in this structured play period. Factor II accounted for 11.2 percent of the variance. Factor II was an attempt by the infant to engage in alternative play behaviors and attempting to divert the mother from the peek-a-boo game.

Factor III also showed the infant in Solitary-Play. But Factor III differed from the Factor II in that the interaction from the infant to the mother had an ambivalent quality with the infant cluster touch negatively being composed both of offering to the mother but touching her negatively. The mother utilized a number of toys and various schemes in the peek-a-boo game attempting to gain the infant's attention. This was somewhat similar to the

mother's use of Fantasy-Play in previous periods when the infant was engaged in Solitary-Play. Factor III represented 9.1 percent of the explained variance. Factor III was a ambivalent reaction of the infant to the peek-a-boo game while the mother attempted to use a number a methods for engaging the infant.

Factor IV showed the infant in "nonconstructive" activity [Object-Involvement] and negative interaction with the mother [Negative-Attachment]. The mother also responded with the negative interpersonal behavior of negative touching. Total percent variance accounted for by Factor IV was 7.1 percent. Thus, in Factor IV the peek-a-boo game was primarily a negative interaction between the mother and the infant with the infant avoiding mother interaction by being involved with the objects in the room.

The Sixth Period -- Tower Building. In the final period, tower building, there were two main factors but four factors appeared interpretable. (See Table 23.) Again these factors may be viewed as differing ways in which the mother-infant responded to the structured task of stacking the blocks. These four types of interaction were tower building time, looking on, attachment, tower building frequency. Factor I showed the mother and the infant engaged together in the tower building task. There was a negative loading with Solitary-Play and a positive loading with the cluster Mutual-Play-I. In Factor I, the infant spent much of the time opposite the mother either

Table 23

Second Order Factor Analysis
Between Mother and Infant Behaviors
Tower Building Play Period

	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Factor VII	Factor VIII
i) Sex	.259	.428*	-.072	-.191	-.188	-.033	.324*	.099
i) Explor-Attach	-.077	-.031	.634*	.153	.046	.115	.232	-.040
i) Look-Demonst	.058	.735*	.018	.044	.071	-.023	-.030	.178
i) Solitary-Play	-.411*	.333*	.162	-.062	.445*	-.140	.033	.035
i) Object-Inv	.002	.011	.268	.145	-.161	.343*	.239	.291
i) Mutual-Play-I	.350*	-.079	-.049	.733*	-.390*	.079	.012	-.290
i) play-epis-time	-.088	-.141	-.905*	-.008	.210	.079	.012	-.290
i) variety-toys	-.032	-.128	-.110	-.075	.359*	.073	-.086	-.000
i) Mutual-Play-II	.052	.001	-.069	-.100	.090	.050	-.548*	.011
m) Demonst-Play	-.814*	-.137	.150	-.009	.097	-.054	.054	.175
m) M-Touch-Negative	-.025	.044	-.001	-.051	-.041	-.088	-.118	.662*
m) M-Touch-Positive	-.365*	.015	-.021	.018	-.246	.366*	-.277	.186
m) mother-imitate	.120	.041	.013	-.006	.024	.778*	-.100	-.168
m) Game-Play	.825*	.088	.177	.104	.030	.035	.082	.122
m) mother-offer	-.030	.086	.178	.752*	.113	-.013	.066	.076
m) mother-take	.046	.757*	.079	.054	-.041	.085*	.044	-.172
m) Fantasy-Play	.177	.099	-.060	-.085	.149	-.063	.524*	-.324*
m) Mother-Toys	.114	.209	-.081	.211	.603*	-.302*	.124	-.240
Percent Variance	13.2	10.0	9.6	7.3	5.3	4.7	4.2	2.9
Accumulative Percent	13.2	23.2	32.8	40.1	45.4	50.1	54.3	57.2

i) Indicates an infant variable
m) Indicates a mother variable

standing or sitting [turn-mother-time]. This was different from the Factor IV in which the infant spent most of the time sitting-on-the-mother's-lap. The mother's response in the Factor I was to use Game-Play as part of the tower building task with limited physical contact toward the infant. Factor I accounted for 13.2 percent of the variance.

In Factor II the infant did not participate in the tower building task. Instead, the infant spent time in Solitary-Play. When attention was given to the mother and the tower building task, the infant only looked at the mother's demonstration. Factor II was also related to the sex of the infant (i.e., positively related to the infant's being a female). The only mother behavior to be associated with this cluster was the acceptance and taking of toys from the infant. Factor II accounted for 10.0 percent of the explainable variance.

Factor III was a specific factor on which only two variables loaded. However, accounting for 9.6 percent of the variance, it is an important variable since the cluster infant Exploratory-Attachment loaded positively on Factor III. This cluster was composed of the traditional attachment behaviors of looking to the mother and movement away from and toward the mother. Of significance was that unlike in most of the previous periods, here Exploratory-Attachment was not related to either the infant's or mother's engagement in play activity. In fact, time spent

in play episodes was negatively related to Factor III. Thus, we can see that Exploratory-Attachment may play very different roles, depending upon whether the situation is a free field or a structured task setting.

Lastly, Factor IV was again a Mutual-Play cluster in which the mother and the infant engaged in tower construction. At this time, however, the infant spent much of the time on the mother's lap. The strategy in Factor IV for tower building was one of the mother offering the infant blocks [mother-offer] and the infant stacking the blocks [mutual-play-frequency, baby-imitate]. Here the tower building would appear to be of a more simplified nature and of greater interpersonal contact than that shown in the Factor I. Factor IV accounted for 7.3 percent of the explained variance.

Conclusion. The factor analyses of the mother's and infant's behaviors in each play period again may be differentiated between the free play and structured play settings. In the free play, the mother-infant interaction appeared generally in three forms: (Exploration) Exchange-Game-Play, Solitary-Play, Fantasy-Play, and Mutual-Play/Demonstration-Play. The first and third forms showed mother-infant play interaction. While in the other form, the infant played while the mother used Fantasy-Play in order to engage the infant in interaction.

During the structured play, the peek-a-boo game and the tower building task yielded differing results for each

play period. In the peek-a-boo game, four factors represented differing mother-interaction as mutual peek-a-boo play, alternative play, ambivalent play, and negative interaction. While in the tower building task, four factors represented mother-infant interaction by tower building time, looking on, attachment, tower building frequency. Thus, in each of these structured tasks, there was positive engagement by the mother and infant in the task. There was also a passive recognition to a negative response to the task. But clearly the structured tasks elicited more in the way of negative and isolationistic behavior patterns on the part of the infant than in free play.

Analysis II: An Examination Of Mother And Infant Play And Interpersonal Behaviors And Expressed Maternal Attributions On The CBC.

Strategy Used In Analysis II

The hypotheses of Analysis II were the main hypotheses of the present report. The hypotheses were as follows:

1. An overall positive score by the mother on the Child Behavior Checklist (CBC) will be related to greater levels of mother-infant interaction during play.

2. An overall negative score by the mother on the CBC will be related to less mother-infant interaction.

3. The null hypothesis states that the overall score of the mother on the CBC as an expressed attitude will not be related to mother-infant behavioral interaction.

These hypotheses were examined in three different analyses. The first of these used a median split on the CBC scores to divide mothers into two groups--a positive CBC score group and a negative CBC score group. Maternal and infant behavioral variables were placed in several multivariate analyses of variance of repeated measures to test for any differences between CBC groups. No significant differences were located in this manner. It was felt that any significant differences in CBC groups were masked by the large error variance associated with having a large number of variables in the analyses. Additionally, the ability to demonstrate a significant difference was

reduced by dividing the subjects with a median split as opposed to maintaining the subjects in one group (Nunnally, 1967).

A second strategy was used to test the hypotheses. The CBC scores were used as the dependent variable in multiple regression analyses. In this manner, the hypothesized relationship between the CBC and infant or mother behaviors could be tested directly while keeping all subjects in a single group. Again since there was such a large number of variables in the analysis, no interpretable results from the multiple regressions could be made.

Finally, the number of variables in the regression analyses was reduced. As in the second order factor analysis of Analysis I, infant and mother variables were added together to yield a single cluster score. These scores, along with the variables not joining any clusters, were placed in the multiple regressions using the CBC as the dependent variable. Clusters of infant behaviors were used whenever possible for two reasons. First, this allows for a reduction in the ratio of variables to subjects. This helps to stabilize the regression results since the number of subjects is small as in the present study. Secondly, a cluster of behaviors in the analysis reduces the redundancy of the information carried by similar variables. Since clusters are more independent of one another, this increases the possiblility that variables will yield maximum predictability and interpretability.

This approach was highly successful. The regression equations yield significant and interpretable relationships, testing the hypotheses of the present study.

Descriptive Statistics On The Child Behavior Checklist

The positive and negative items of the CBC were computed into their respective totals. A CBC difference score was computed for each mother by subtracting the negative CBC score from the positive CBC score. A frequency distribution of the these CBC difference scores is presented in Table 24. The scores showed a wide range extending from -22 to 10. They were spread evenly throughout this range. The means, median, range, and standard deviations for these scores are presented in Table 25. The mean of the difference score was in the negative direction (i.e., -6.9). The CBC difference scores were skewed in the negative direction. This has been found to be typical for the CBC scale (Messe et al., 1979). This unevenness of weight was corrected by standardizing these scores before running the regression analyses.

The Multiple Regression Procedures Utilized

In these analyses, the sex of the infant was forced into the regression equation as the first variable. The logic behind this step was two fold. Not only does this test for the significance of the infant's sex relationship to the CBC difference scores, but it partials out the

Table 24

Frequency Distribution

of the CBC Difference Scores

Difference Scores	Frequency	%	Cumulative Scores
-22	1	1.9	1.9
-18	1	1.9	3.8
-17	2	3.8	7.7
-16	2	3.8	11.5
-15	1	1.9	13.5
-14	4	7.7	21.5
-12	1	1.9	23.1
-11	4	7.7	30.8
-10	4	7.7	38.5
- 9	5	9.6	48.1
- 8	1	1.9	50.0
- 7	3	5.8	55.8
- 6	1	1.9	57.7
- 5	3	5.8	63.5
- 4	2	3.8	67.3
- 3	2	3.8	71.2
- 2	4	7.7	78.8
- 1	1	1.9	80.8
0	3	5.8	86.5
1	2	3.8	90.4
2	1	1.9	92.3
3	2	3.8	96.2
8	1	1.9	98.1
10	1	1.9	100.0

Table 25

Descriptive Statistics On The
Positive and Negative CBC Items And The
CBC Difference Score

Scale	Mean	Median	Min.	Max.	Std. Dev.	Skew	Kurtosis
Positive	11.5	11.5	2.0	22.0	4.2	.24	-.13
Negative	18.5	18.0	5.0	25.0	4.3	-.75	.42
Difference	- 6.9	- 7.5	-22.0	10.0	6.8	.20	-.21

effect due to sex with the other variables. In this manner, sex of the infant was eliminated as a confounding variable. On a number of occasions sex turned out to be a highly significant variable as shall be seen in subsequent analysis. Under this circumstance, sex would have entered the equation on its own.

In reporting the variables which entered the multiple regression equation, a number of variables are reported which enter with a partial F at $p < .10$. These variables are treated as significant if the overall multiple R is significant for the period. In some instances variables which came close to significance were also included in the regression equation. This less than conservative approach was taken if the variable increased the understanding of the analysis and if the next variable to enter the analysis was well beyond reaching sigificance. Although this approach is liberal, it was felt to be justifiable considering the exploratory nature of the present study. By following such a procedure, the results were very consistent and did not appear to take advantage of chance findings.

Infant Behavior and CBC Different Scores. Infant behaviors and clusters of behaviors within each experimental period were placed in a multiple regression analysis with the CBC difference score as the dependent variable. (See Table 26.) The regression of infant behaviors

Table 26

CLUSTERS USED IN INFANT MULTIPLE REGRESSION

FIRST PERIOD	SECOND PERIOD	THIRD PERIOD
Cluster # 1 (Mutal-Play .61)	Cluster # 1 (Play-Time .34)	Cluster # 1 (Solitary-Play .70)
mutual-play-frequency	excited-vocalization	solitary-play-frequency
mutual-play-time	play-episode-time	solitary-play-time
play-episode-time		play-episode-frequency
look-demonstration-frequency		turn-mother-frequency
look-demonstration-time		
proximity-time		
Cluster # 2 (Objective-Involvement	Cluster # 2 (Mutual-Play .68)	Cluster # 2 (Look-Mother .77)
object-involvement-frequency	look-demonstration-frequency	look-mother-frequency
object-involvement-time	look-demonstration-time	look-mother-time
	mutual-play-frequency	positive-vocalization
	mutual-play-time	
	proximity-time	
Cluster # 3 (Solitary-Play .58)	Cluster # 3 (Solitary-Exploratory-Play .70)	Cluster # 3 (Exploratory-Attachment .83)
positive-vocalization	solitary-play-frequency	object-involvement-frequency
excited-vocalization	play-episode-frequency	object-involvement-time
solitary-play-frequency	look-mother-frequency	locomotion-frequency
play-episode-frequency	look-mother-time	locomotion-time
turn-mother-time	object-involvement-frequency	proximity-frequency
	object-involvement-time	
	solitary-play-time	
	baby-imitate	

Table 26 (continued)

CLUSTERS USED IN INFANT MULTIPLE REGRESSION

FIRST PERIOD	SECOND PERIOD	THIRD PERIOD
Cluster # 4	Cluster # 4	Cluster # 4
(Global-Attachment .80)	(Global-Attachment .84)	(Mutual-Play .66)
look-mother-frequency	negative-vocalization	look-demonstration-frequency
look-mother-time	positive-vocalization	look-demonstration-time
locomotion-frequency	turn-mother-time	mutual-play-frequency
locomotion-time	proximity-frequency	mutual-play-time
turn-mother-frequency	baby-offer	
proximity-frequency	locomotion-frequency	
baby-offer	locomotion-time	
baby-take	turn-mother-frequency	
baby-take-response	baby-take	
	baby-take-response	

Table 26 (continued)

CLUSTERS USED IN INFANT MULTIPLE REGRESSION

FIRST PERIOD

Unclustered Variables

solitary-play-time
negative-vocalization
baby-imitate

SECOND PERIOD

Unclustered Variables

THIRD PERIOD

Cluster # 5
(Negative-Attachment .45)

negative-vocalization
baby-imitate
turn-mother-time

Cluster # 6
(Exchange-Game-Attachment .70)

excited-vocalization
baby-offer
baby-take
baby-take-response

Unclustered Variables

play-episode-time
proximity-time

Table 26 (continued)

CLUSTERS USED IN INFANT MULTIPLE REGRESSION

FOURTH PERIOD	FIFTH PERIOD	SIXTH PERIOD
Cluster # 1	Cluster # 1	Cluster # 1
(Solitary-Play .53)	(Exchange-Game-Attachment .71)	(Exploratory Attachment)
solitary-play-time	baby-take	negative-vocalization
solitary-play-frequency	baby-take-response	look-mother-frequency
play-episode-frequency	variety-of-toys	look-mother-time
		locomotion-frequency
		locomotion-time
		turn-mother-frequency
		proximity-frequency
Cluster # 2	Cluster # 2	Cluster # 2
(Play-Time .58)	(Solitary-Play .79)	(Look-Demonstration .61)
play-episode-time	solitary-play-frequency	look-demonstration-frequency
turn-mother-time	solitary-play-time	look-demonstration-time
	play-episode-time	baby-offer
	play-episode-frequency	
	schemes-frequency	
Cluster # 3	Cluster # 3	Cluster # 3
(Touch-Positively .66)	(Touch-Negatively .69)	(Solitary-Play .79)
touch-positively-frequency	baby-offer	solitary-play-frequency
touch-positively-time	touch-negative-frequency	solitary-play-time
	touch-negative-time	play-episode-frequency
		schemes-frequency

Table 26 (continued)

CLUSTERS USED IN INFANT MULTIPLE REGRESSION

FOURTH PERIOD	FIFTH PERIOD	SIXTH PERIOD
Cluster # 4	Cluster # 4	Cluster # 4
(Look-Mother .82)	(Object-Involvement .94)	(Object-Involvement .74)
look-mother-frequency	object-involvement-frequency	object-involvement-frequency
look-mother-time	object-involvement-time	object-involvement-time
excited-vocalization		excited-vocalization
Cluster # 5	Cluster # 5	Cluster # 5
(Exploratory-Attachment .89)	(Exploratory-Attachment .92)	(Mutual-Play-I .63)
object-involvement-frequency	turn-mother-frequency	mutual-play-time
object-involvement-time	locomotion-frequency	turn-mother-time
locomotion-frequency	locomotion-time	baby-take
locomotion-time	proximity-frequency	baby-take-response
turn-mother-frequency		touch-positively-frequency
proximity-frequency		touch-positively-time
positive-vocalization		
baby-offer		
Cluster # 6	Cluster # 6	Cluster # 6
(Mutual-Play .74)	(Negative-Attachment .53)	(Mutual-Play-II .50)
negative-vocalization	negative-vocalization	positive-vocalization
look-demonstration-frequency	baby-imitate	mutual-play-frequency
look-demonstration-time	turn-mother-time	baby-imitate
mutual-play-frequency	proximity-time	proximity-time
mutual-play-time		baby-sit-lap-frequency
		baby-sit-lap-time

Table 26 (continued)

CLUSTERS USED IN INFANT MULTIPLE REGRESSION

FOURTH PERIOD	FIFTH PERIOD	SIXTH PERIOD
Cluster # 7 (Baby-Take .94)	Cluster # 7 (Mutual-Play-I .66)	
baby-take	look-demonstration-time	
baby-take-response	mutual-play-time	
	touch-positive-frequency	
	touch-positive-time	
Cluster # 8 (Touch-Negatively .94)	Cluster # 8 (Look-Mother .67)	
touch-negative-frequency	look-mother-frequency	
touch-negative-time	look-mother-time	
	positive-vocalization	
Cluster # 9 (Baby-Sit-Lap .97)	Cluster # 9 (Mutual-Play-II .71)	
baby-sit-lap-frequency	excited-vocalization	
baby-sit-lap-time	look-demonstration-frequency	
	mutual-play-frequency	
	baby-sit-lap-frequency	
	baby-sit-lap-time	
Unclustered Variables	Unclustered Variables	Unclustered Variables
baby-imitate		play-episodes-time
proximity-time		toys-frequency

on the CBC difference scores showed high consistency. A summary of these results appears in Tables 27 and 28. Thoughout the six periods, the infant being male is negatively related to the CBC. This relationship is somewhat unstable since it falls short of significance in three out of the six periods. The CBC in the second, third, fourth, and sixth periods related positively to play activity. On the other hand, the CBCs in the first and fifth periods are negatively related to play activity.

More specifically, in the first period (initial free play) the relationship with the CBC is a negative one and did not reach even marginal levels of significance. Infant sex [male] ($R = -.16$; $p < .24$), Solitary-Play ($R = -.20$; $p < .13$) and Mutual-Play ($R = -.18$; $p < .19$) although not significant are negatively related to the CBC. These non-significant results indicated that the CBC failed to relate to the infant's initial exploratory activity ($R = .33$; $p < .11$). These results contrast to those found in the next periods of free play where positive relationships are found with infant play.

For example, in the second play period there was a positive relationship with Play-Time and the CBC ($R = .27$; $p < .04$). There was a significant negative relationship between the infant being male and the CBC ($R = -.25$; $p < .06$). The multiple R of .35 for the second period was significant at $p < .03$.

Table 27

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The CBC Difference Score Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	1.39	.24	-.16					
Solitary-Play	2.29	.13	-.20					
Mutual-Play	1.75	.19	-.18	.33	.11	2.08	3,48	.11
Second Period								
Sex	3.57	.06*	-.25					
Play-Time	4.20	.04**	.27	.35	.12	3.51	2,49	.03**
Third Period								
Sex	6.04	.01***	-.34					
Solitary-Play	6.16	.01***	.37					
Mutual-Play	5.68	.02**	.33					
Exchange-Game-Att	3.23	.07*	.23	.48	.23	3.53	4,48	.01***

* $p < .10$
** $p < .05$
*** $p < .01$

Table 28

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The CBC Difference Score Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth period								
Sex	.99	.33	-.12					
Touch-Neg	3.73	.06*	-.26					
Baby-Take	6.29	.01***	.34					
Solitary-Play	3.63	.06*	.25	(.49	.24	3.77	4,47	.01***)
Baby-Sit-Lap	2.32	.13	.19	.52	.27	3.56	5,46	.00***
Fifth Period (Peek-A-Boo Game)								
Sex	1.98	.16	-.19					
Look-Mother	2.75	.10*	-.22	.31	.10	2.75	2,49	.07*
(Obj-Inv	1.72	.19	-.17	.36	.13	2.43	3,48	.07*)
(Touch-Neg	2.02	.16	-.19	.40	.16	2.37	4,47	.06*)
Sixth Period (Tower Building)								
Sex	3.38	.07*	-.24					
Play-Time	3.37	.07*	.24					
Solitary-Play	2.71	.10*	.22	.38	.15	2.83	3,48	.04**

* $p < .10$
** $p < .05$
*** $p < .01$

The third period expands further the positive relationships of infant play behaviors to the CBC. Again the sex of infant (male) is negatively related to the CBC ($R = -.34$; $p < .01$). Then there are all positive relationships with the play behaviors of Solitary-Play ($R = .37$; $p < .01$), of Mutual-Play ($R = .33$; $p < .02$), and of Exchange-Game ($R = .23$; $p < .07$). The multiple R of .48 for the third period was significant at $p < .01$.

The fourth period of free play was very similar to the third period with play behaviors positively related to the CBC. Baby-Takes ($R = .34$; $p < .01$) and Solitary-Play ($R = .25$; $p < .06$) are positive play behaviors associated with the CBC. Consistent with these positive results was the positive non-play behavior Sit-On-Mother's-Lap ($R = .19$; $p < .13$). This latter variable, just missing significance, is included since sitting-on-mother's-lap indicates a positive interaction with the mother. Additionally, positive mother-infant interaction is indicated by the negative correlation of -.26 ($p < .06$) with the cluster Baby-Touch-Negatively and the CBC. The sex of the infant (male) consistently negative in its relationship with the CBC did not reach significance in this period ($R = -.12$; $p < .33$). The multiple R of .52 was significant at $p < .00$ for the fourth play period.

The regression for the fifth period (peek-a-boo game) produced only marginally significant results. The multiple R for the period was .40 with a $p < .06$. The CBC

was not related to the positive behavior of the peek-a-boo game. There was a negative relationship to Look-To-Mother ($R = -.22$; $p < .10$), to Object-Involvement ($R = -.19$; $p < .16$) and to Negative-Attachment ($R = -.19$; $p < .16$). Only the cluster Look-To-The-Mother reached significance. None of the other variables reached significance. However, the consistency of the results show that positive perceptual bias is negatively related to clusters associated with negative mother-infant interactions.

In the sixth period (tower building) the CBC did not show an association with task-related play behaviors. On the other hand, the CBC was associated with the constructive play behavior of play-episodes-time ($R = .24$; $p < .07$) and the cluster Solitary-Play ($R = .22$; $p < .10$). The negative relationship between the CBC and infant sex [male] reached significance with an r of -.24 and $p < .07$. The multiple R for the tower period reached .38 which was significant at $p < .04$.

Summary: The CBC showed a positive relationship to constructive play activities carried out by the infant in the second, third, fourth, and six periods. Positive perceptual bias was negatively related to clusters indicating negative mother-infant interaction in the fifth period. The results of this analysis supported the hypothesis that positive perception would be related to positive play and interpersonal behaviors by the infant. The results also

supported the hypothesis that negative bias would be related to negative mother-infant interaction.

Mother Behavior and The CBC: Multiple Regression Analysis

Mother behaviors and behavioral clusters within each period were placed in a multiple regression with the CBC difference scores as the dependent variable. (See Table 29.) A summary of these results appear in Tables 30 and 31.

Two of the six periods produced multiple Rs which reached significance. These were the second and sixth periods. The first period was marginally significant while the third, fourth, and fifth periods did not reach significance. In spite of this lack of significance, maternal behaviors across periods consistently showed negative relationships to the CBC. This was especially true of the cluster Game-Play which entered into four of the six regression equations. As in the analysis of infant behaviors, the sex of the infant was forced into the regression equation. Since the relationship of the CBC scores with infant sex are covered in the infant analysis, they will not be repeated here.

The regression analysis for the first free play period had a multiple R of .36 which reached a marginal level of significance with $p < .07$. Mother-offer showed a positive relationship to the CBC ($R = .25$; $p < .07$). Consistent with later periods, Game-Play had a negative

Table 29

CLUSTERS USED IN MOTHER MULTIPLE REGRESSION

FIRST PERIOD	SECOND PERIOD	THIRD PERIOD
Cluster # 1	Cluster # 1	Cluster # 1
(Demonstration-Play .76)	(Demonstration-Play .86)	(Fantasy-Play .93)
demonstration-play-frequency	demonstration-play-frequency	fantasy-play-frequency
demonstration-play-time	demonstration-play-time	fantasy-play-time
Cluster # 2	Cluster # 2	Cluster # 2
(Fantasy-Play .95)	(Touch-Positively .83)	(Demonstration-Play .95)
fantasy-play-frequency	touch-positively-frequency	demonstration-play-frequency
fantasy-play-time	touch-positively-time	demonstration-play-time
Cluster # 3	Cluster # 3	Cluster # 3
(Touch-Positively .83)	(Fantasy-Play .93)	(Touch-Positively .84)
touch-positively-frequency	fantasy-play-frequency	touch-positively-frequency
touch-positively-time	fantasy-play-time	touch-positively-time

Table 29 (continued)

CLUSTERS USED IN MOTHER MULTIPLE REGRESSION

FIRST PERIOD	SECOND PERIOD	THIRD PERIOD
Cluster # 4 (Game-Play .88)	Cluster # 4 (Game-Play .77)	Cluster # 4 (Game-Play .75)
game-play-frequency	game-play-frequency	game-play-frequency
game-play-time	game-play-time	game-play-time
Cluster # 5 (Mother-Take .90)	Cluster # 5 (Mother-Take .81)	Cluster # 5 (Mother-Take .79)
mother-take	mother-offer	mother-offer
mother-take-response	mother-take	mother-take
	mother-take-response	mother-take-response
Unclustered Variables	Unclustered Variables	Unclustered Variables
mother-imitate	mother-imitate	mother-imitate
mother-offer		

Table 29 (continued)

CLUSTERS USED IN MOTHER MULTIPLE REGRESSION

FOURTH PERIOD	FIFTH PERIOD	SIXTH PERIOD
Cluster # 1 (Fantasy-Play .72)	Cluster # 1 (Fantasy-Play .98)	Cluster # 1 (Demonstration-Play .85)
fantasy-play-frequency	fantasy-play-frequency	demonstration-play-frequency
fantasy-play-time	fantasy-play-time	demonstration-play-time
mother-imitate		
Cluster # 2 (Demonstration-Play .83)	Cluster # 2 (Touch-Positively .91)	Cluster # 2 (Touch-Negatively .92)
demonstration-play-frequency	touch-positively-frequency	touch-negatively-frequency
demonstration-play-time	touch-positively-time	touch-negatively-time
Cluster # 3 (Touch-Positively .89)	Cluster # 3 (Touch-Negatively .83)	Cluster # 3 (Touch-Positively .92)
touch-positively-frequency	touch-negatively-frequency	touch-positively-frequency
touch-positively-time	touch-negatively-time	touch-positively-time

Table 29 (continued)

CLUSTERS USED IN MOTHER MULTIPLE REGRESSION

FOURTH PERIOD	FIFTH PERIOD	SIXTH PERIOD
Cluster # 4 (Game-Play .79)	Cluster # 4 (Mother-Take .82)	Cluster # 4 (Game-Play .93)
game-play-frequency	mother-take	game-play-frequency
game-play-time	mother-take-response	game-play-time
Cluster # 5 (Mother-Take .94)	Cluster # 5 (Demonstration-Play .92)	Cluster # 5 (Mother-Take .95)
mother-offer	demonstration-play-frequency	mother-take
mother-take	demonstration-play-time	mother-take-response
mother-take-response		

Table 29 (continued)

CLUSTERS USED IN MOTHER MULTIPLE REGRESSION

FOURTH PERIOD	FIFTH PERIOD	SIXTH PERIOD
		Cluster # 6 (Fantasy-Play .92) fantasy-play-frequency fantasy-play-time Cluster # 7 (Toys .71) toys schemes
Unclustered Variables	Unclustered Variables	Unclustered Variables
	game-play-time mother-offer game-play-frequency mother-imitate toys schemes	mother-imitate mother-offer

Table 30

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The CBC Difference Score Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	2.65	.11	-.22	.22	.05	2.65	1,50	.11
(mother-offer	2.30	.13	.20	.30	.09	2.51	2,49	.09*)
(Game-Play	2.33	.13	-.21	.36	.13	2.49	3,48	.07*)
Second Period								
Sex	4.67	.03*	-.28					
Game-Play	6.54	.01**	-.34	.40	.16	4.74	2,49	.01**
Third Period								
Sex	2.65	.11	-.22	.22	.05	2.65	1,50	.11
(Game-Play	2.09	.15	-.19	.29	.08	2.40	2,49	.10*)

* $p < .10$
** $p < .05$
*** $p < .01$

Table 31

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The CBC Difference Score Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	2.58	.11	-.22					
Demonst-Play	1.42	.23	-.16	.27	.07	2.05	2,49	.13
Fifth Period (Peek-A-Boo Game)								
Sex	2.31	.13	-.20					
Mother-Take	2.04	.15	-.19					
variety-toys-freq	1.83	.18	.18	.33	.11	1.98	3,48	.12
Sixth Period (Tower Building)								
Sex	10.48	.00***	-.43					
Game-Play	4.96	.03**	-.28					
Toys	9.07	.00***	.41					
M-Touch-Pos	5.65	.02**	.33					
Mother-Take	2.68	.10*	-.22	.57	.32	4.51	5,46	.00***

* $p < .10$
** $p < .05$
*** $p < .01$

relationship with the CBC; but during this period, this relationship fell short of reaching significance ($R = -.21$; $p < .13$).

In the second free play period only one maternal behavior was significant. This was the negative relationship between the mother's use of Game-Play and the CBC ($R = -.34$; $p < .01$). The multiple R for the second period was .40 with $p < .01$.

The results of the third period of free play were the same as those of the second period except that Game-Play did not enter into the regression equation with a significant partial F ($R = -.19$; $p < .15$). The multiple R of .29 just reached the marginal level of significance with $p < .10$ for this period.

The multiple R of .27 for the fourth period of free play did not reach significance with $p < .13$. Although not significant, Demonstration-Play was negatively related to the CBC during the fourth period ($R = -.16$; $p < .23$).

None of the variables in the fifth period (peek-a-boo game) reached significance. Here the multiple R was .33 with $p < .12$. The cluster Mother-Take was negatively related to the CBC ($R = -.19$; $p < .15$). The variable mothers use of the Toys cluster had a positive relationship with the CBC ($R = .18$; $p < .18$).

Finally, in the sixth period (tower building) the multiple R was .57 which reached significance at $p < .002$.

The mother's use of Toys ($R = .41$; d.f. = 1,46; $p < .02$) were positively related to the CBC. As in earlier periods, there was a negative relationship between the CBC and the mother's use of Game-Play ($R = -28$; $p < .03$) and of Mother-Take ($R = -.22$; $p < .10$).

Summary: The results across most periods showed a negative relationship between the mother's use of Game-Play and the CBC. The sixth period best supports the study hypothesis. In this period, the cluster Toys and Touch-Positive are related positively to the CBC, while Game-Play and Mother-Take were negatively related to the CBC.

The results of the regression analysis for the mother are not as clear as those found in the infant analysis. Why Game-Play should have a negative relationship to the CBC is not clear. This is all the more curious since Game-Play was associated with infant Attachment and Mutual-Play in the second order factor analysis of infant and mother behaviors. As can be seen in the next analyses, the negative relationship between the CBC and Game-Play was due to negative perceptual bias. This was consistent with the proposed hypothesis.

Analysis III: Subscales Of The CBC And An Examination Of Mother And Infant Play And Interpersonal Behaviors

Strategy Used In Analysis III

In order to better understand the relationship of mother and infant behavior with the CBC scale, further analyses were carried out. Additional analysis for the CBC scale itself was necessary, as well as a further investigation of the scale in relation to mother and infant behavior. These results are presented in the following section. The hypotheses of Analysis III were as follows:

1. The positive and negative items from the CBC will make up separate subscales. That is positive attributions will be differentiated from negative attributions.

2. The positive attribution subscales will be related to positive infant-mother play and interpersonal behaviors.

3. The negative attribution subscales will be related to less mother-infant interaction. That is, there will be less infant-mother play and interpersonal interaction associated with these subscales.

Factor Analysis of the CBC

As a first step in the further analysis of the CBC, the items of the CBC were placed in a factor analysis. The factor analysis was carried out to differentiate maternal attributions into positive and negative subscales. The positive and negative items from the CBC were submitted to a factor analysis. A total of 36 CBC items

were used in the analysis. Neutral items were not considered. The analysis was a principle factor solution with commonalities placed in the diagonals of the correlation matrix. These factors were then rotated using the varimax method.

The factor solution produced ten factors of which the first six factors were interpretable. Each of these factors is presented separately in Tables 32 to 37. Items loading at .35 or above were included in a factor. Items below this level are not listed in the tables. Each factor will be examined in turn after a description of a confirmatory analysis is presented.

In order to test the stability of these factors, a confirmatory factor analysis was carried out on a similar set of CBC data. These data were collected from parents of elementary school age children. These parents were participants in a study of family interaction and parental perceptual style (Messe, et al, 1979). In all, 75 parents completed this second CBC. Several items used in the present study were not available from the Stollak and Messe CBC sample (SM-CBC). Therefore, 33 instead or 36 items were submitted to the factoring procedure as previously described. This factor solution produced eleven factors.

Correlations were calculated between the loadings from the first seven factors from both factor solutions. Most factors from the present study (JRN-CBC) correlated with

the factors of the Messe, et al. study (SM-CBC). Four out of six factors from the present study were replicated by the SM-CBC sample. Tables 32 to 37 present the factors from the JRN-CBC analysis with the items and loading from the SM-CBC analysis. As before, items loading .35 or higher were included in the factor.

Factor I, Bully, is presented in Table 32. The three items loading the highest on the JRN-CBC were "plays in rough way," "seems selfish," and "threatens others." These items define the character of this factor. This factor was composed of seven items and accounted for 13.9 percent of the variance. The correlation between this factor and the first factor of the SM-CBC was .74.

Table 33 shows Factor II, Angry. The JRN-CBC factor was composed of six items accounting for 9.9 percent of the variance. Four of the items on this factor were the child displaying anger. The correlation between the JRN-CBC and the sixth factor of the SM-CBC was .75.

Factor III, Competence, is presented in Table 34. Six items loaded on this factor accounting for 8.1 percent of the variance. Items on this factor are concerned with "self-confidence," "making friends easily," "showing appreciation," "being involved with activities," and "being curious." These items certainly suggest a high level of childhood competency. The correlation between the JRN-CBC factor and the fourth factor from the SM-CBC was .41.

Table 32

FACTOR ANALYSIS OF CHILD BEHAVIOR CHECKLIST
WITH A COMPARISON BETWEEN JRN-CBC AND SM-CBC FACTORS

FIRST FACTOR
BULLY

Items From Factor Analysis	Factor I Loadings JRN-CBC	Factor I Loadings SM-CBC	Scale Variance If Deleted
8) Plays with toys in a rough way	.85	.69	2.15
46) Seems selfish, always wants own way	.77	.34	2.07
34) Threatens to hit or hurt others	.52	.53	1.93
4) Can't wait, wants to have things immediately	.49	.44	1.89
14) Acts in ways that makes adults not like him/her	.44	.26	1.97
45) Prefers competitive games	.44	.00	2.06
28) Seems sad and unhappy	.38	.36	1.88
54) *Fidgety and restless	.12	.58	2.07
6) *Gets irritated or angry easily	.03	.87	1.91
Percent Variance Accounted For	13.90	17.20	

Correlation between factor loadings .74
Scale Reliability (Alpha) .74
* Indicates an item dropped from CBC Scale.

Table 33

FACTOR ANALYSIS OF CHILD BEHAVIOR CHECKLIST
WITH A COMPARISON BETWEEN JRN-CBC AND SM-CBC FACTORS

SECOND FACTOR
ANGRY

Items From Factor Analysis	Factor II Loadings JRN-CBC	Factor VI Loadings SM-CBC	Scale Variance If Deleted
38) Has uncontrollable outbursts of temper	.83	.57	2.32
52) Blows up very easily when bothered	.78	.58	2.31
42) When told to do something he/she doesn't want to do, he/she becomes angry	.50	.49	2.46
32) Often has to be reminded of what he/she can can't do	.47	.39	2.50
6) Gets irritated or angry easily	.45	.29	2.95
47) Shows appreciation when other helped or did things for him/her	-.36	-.12	2.93
Percent Variance Accounted For	9.90	3.20	

Correlation between factor loadings .75
Scale Reliability (Alpha) .75
* Indicates an item dropped from CBC Scale.

Table 34

FACTOR ANALYSIS OF CHILD BEHAVIOR CHECKLIST
WITH A COMPARISON BETWEEN JRN-CBC AND SM-CBC FACTORS

THIRD FACTOR
COMPENTENCE

Items From Factor Analysis	Factor III Loadings JRN-CBC	Factor IV Loadings SM-CBC	Scale Variance If Deleted
29) Self-confident	.77	.10	3.71
27) Makes friends quickly and easily	.56	.50	4.31
47) Shows appreciation when others help or did things for him/her	.55	.16	3.66
53) Shows pleasure and involvement in most things he/she does	.45	.18	3.91
43) Is curious about things	.38	.45	3.49
61) *Learns quickly	.35	.N/A	3.66
15) *Shows pride in accomplishment	.28	.58	3.80
49) *Energetic	.22	.45	4.02
14) *Acts in ways that makes adults not like him/her	.07	-.50	4.58
Percent Variance Accounted For	8.1	4.0	

Correlation between factor loadings .41
Scale Reliability (Alpha) .72
* Indictaes an item dropped from CBC Scale.

Factor IV, Impulsive, accounted for 5.3 percent of the variance. Seven items loaded on this factor. An examination of Table 35 is necessary to gain a comprehensive view of this factor. Items 30 and 32 (i.e., "tends to go too far" and "reminded what...can't do") show impulsive behaviors. The other items, though not so obvious, picture the types of complaints often stated about impulsive or hyperactive children (i.e., "has trouble finding words" and "seems out of touch with situation") (Caldwell, 1978). The correlations between the JRN-CBC factor and the SM-CBC factor was .49.

Factor V, Intelligence, was made up of seven items accounting for 4.5 percent of the variance. (See Table 36.) This factor, like Factor IV, Cooperation, accounts for a small percentage of variance. However, these two factors are reported and are included in further analyses. It was felt that such factors as Intelligence and Cooperation are important constructs in a child's development. Three items defined Factor V (i.e., Items 59, 61, and 9)--"quick and clever," "learning quickly," and "handles small objects skillfully." Three of the other items on this factor are found on the Competence factor, but the present factor gives a sense of higher intellectual involvement by the child. No independent confirmation was found for this factor with the SM-CBC. This is likely due to the fact that Items 59 and 61 were not available in the SM-CBC sample data.

Table 35

FACTOR ANALYSIS OF CHILD BEHAVIOR CHECKLIST
WITH A COMPARISON BETWEEN JRN-CBC AND SM-CBC FACTORS

FOURTH FACTOR
IMPULSIVE

Items From Factor Analysis	Factor IV Loadings JRN-CBC	Factor II Loadings SM-CBC	Scale Variance If Deleted
30) Tends to go too far unless reminded of rules	.77	.66	4.45
18) Has trouble finding the right words to say what he/she means	.62	.41	4.54
20) Seems to do things just to get adults angry at him/her	.59	.10	4.96
32) Often has to be reminded of what he/she can can't do	.55	.64	4.22
36) Seems out of touch with what is going on around him/her--often in his/her own world	.36	.62	5.13
42) When told to do something he/she doesn't want to do, he/she becomes angry	.35	.53	4.58
14) *Acts in ways that make adults not like him/her	.35	.15	4.85
10) *Doesn't pay attention to what others say	.22	.41	4.75
46) *Seems selfish, always wants his/her own way	.10	.47	5.40
28) *Seems sad and unhappy	.03	.51	5.33
Percent Variance Accounted For	5.3	9.5	

Correlation between factor loadings .49
Scale Reliability (Alpha) .72
* Indicates an item dropped from CBC Scale.

Table 36

FACTOR ANALYSIS OF CHILD BEHAVIOR CHECKLIST
WITH A COMPARISON BETWEEN JRN-CBC AND SM-CBC FACTORS

FIFTH FACTOR
INTELLIGENCE

Items From Factor Analysis	Factor V Loadings JRN-CBC	No Factor Loadings SM-CBC	Scale Variance If Deleted
59) Quick and clever	.82	...	3.94
61) Learns quickly	.57	...	3.87
9) Handles small objects skillfully	.49	...	3.80
7) *Feelings are apparent in his/her facial	.36	...	3.98
53) *Shows pleasure and involvement in most	.32	...	3.97
15) *Shows pride in accomplishment	.24	...	4.04
43) *Is curious about things	.23	...	3.79
18) *Has trouble findings the right words	-.22	...	4.04
Percent Variance Accounted For	4.50	...	

Correlation between factor loadings N/A
Scale Reliability (Alpha) .70
* Indicates an item dropped from CBC Scale.

Factor VI in the solution contained two items which indicated restlessness [Item 54] and impatience [Item 4]. Factor VI was not considered for inclusion in the present study since Factor IV, Impulsive, already covered impulsive behaviors adequately.

The last factor for inclusion was Factor VII. (See Table 37.) As previously stated, Factor VII was a questionable factor since it accounted for only 3.5 percent of the variance in this analysis. The concept of cooperation, however, would appear to have major importance in a child's development. Factor VII should have heuristic importance in this preliminary investigation; so this factor representing Cooperation was included in the analysis which follows. The factor was composed of seven items. The three most defining items show cooperative behavior (i.e., "pitchs in" [Item 57], "asks sensible questions" [Item 51], and "shows pleasure and involvement" [Item 53]). Other items on the scale covered "showing pride" [Item 15], "handling small objects skillfully" [Item 9], "being curious" [Item 43], and not "acting in ways that" which irritate adults [Item 24]. This factor also shares items with the Competence and Intelligence factors, but a theme of cooperation gives the factor its character. Since this factor was utilized in a heuristic fashion, items were not deleted if they fell below the .35 level as established for other factors.

Table 37

FACTOR ANALYSIS OF CHILD BEHAVIOR CHECKLIST
WITH A COMPARISON BETWEEN JRN-CBC AND SM-CBC FACTORS

SEVENTH FACTOR
COOPERATIVE

Items From Factor Analysis	Factor VII Loadings JRN-CBC	Factor III Loadings SM-CBC	Factor VI Loadings SM-CBC	Scale Variance If Deleted
57) Pitchs in when things have to be done	.66	.66	.25	
51) Asks sensible questions	.44	.25	.12	
53) Shows pleasure and involvement in most things he/she does	.42	.05	.11	
9) Handles small objects skillfully	.30	.16	.08	
43) Is curious about things	.25	.05	.45	
24) Acts in ways that makes adults not like him/her	-.37	-.03	-.49	
27) *Makes friends easily	.15	...	.49	
39) *Is easily embarrassed	.02	...	.30	
49) *Energetic	.17	...	.45	
45) *Prefers competitive games	.13	.47	...	
55) *Is competitive	.03	.79	...	
59) *Fidgety and restless	-.01	.31	...	
Percent Variance Accounted For	3.5	6.7	4.0	

Correlation between JRN-CBC and SM-CBC Factor III r=.42 and Factor IV r=.61
Scale Reliability (Alpha) .67
Items loading below .20 on the JRN-CBC were dropped from the Scale.

In the confirmatory analysis with the SM-CBC analysis, the Cooperative factor was divided between two factors. The JRN-CBC Cooperative factor correlated with a cooperative competitive factor [Factor III] with an r = .42. There was also a correlation with a curious-competence factor [Factor IV] with an r = .61. Although neither of these factors represented the present unified factor, the analysis did confirm cooperativeness as a dimension of childhood behavior.

CBC Subscales and Their Reliability

In order to evaluate the CBC factors in relation to the mother's and infant's behavior, each of the factors was built into a subscale. These subscales were constructed with several criteria in mind. First, an item had to load on the factor at $\pm$ .35. Secondly, items were deleted from the subscale if they had a low loading on the factor and showed low replicability with the independent factor analysis. Lastly, if there was still some question about the utilization of an item, it was dropped if it lowered the reliability of the scale. Tables 32 to 37 present the items from each factor which were included on the subscales.

Exceptions to these rules were applied to Factor V [Intelligence] and Factor VII [Cooperativeness]. In the case of Factor V, no replicating factor could be used as a criterion. With Factor VII, all items which loaded on the

factor at ± .20 were included on the scale. Since Factor VII accounted for such a small portion of the total CBC variance, it was felt that all items which might aid in defining the variable should be used.

Six CBC subscales were developed. Cronbach's alpha for reliability was computed on each subscale. The subscales and their reliabilities were as follows: (1) Bully/.74, (2) Angry/.75, (3) Impulsive/.72, (4) Competence/.72, (5) Intelligence/.70, and (6) Cooperation/.67. The CBC was divided into three subscales with negative attributes and three subscales with positive attributes.

After completing the construction of the subscales, each subscale was used as the dependent variable in a regression analysis with the mother's and infant's behavior. A regression analysis was carried out for each experimental period.

The Negative CBC Subscales And Infant Behavior

Each of the three negative subscales (i.e., Bully, Angry, and Impulsive subscales) was used as the dependent variable in a regression analysis. The independent variables were the same infant behaviors and clusters as used in the regression with the CBC difference scores.

Bully Scale. No consistent trends were shown in infant behavior and the Bully subscale. (See Table 38.) Only in the fourth period of free play was there a significant relationship with infant behaviors, and this was

Table 38

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Bully Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	.12	.72	.05					
imitate	2.34	.13	-.21	.23	.05	1.38	2,49	.26
Second Period								
Sex	.60	.44	.10					
Solitary-Play	2.56	.11	.22	.24	.05	1.49	2,49	.23
Third Period								
Sex	.21	.64	.06					
Exchange-Game-Att	1.93	.17	-.19	.21	.04	1.17	2,49	.31

* $p < .10$
** $p < .05$
*** $p < .01$

Table 38 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Bully Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	1.41	.24	.16					
Explor-Attach	5.03	.02**	-.31	.31	.10	2.74	2,49	.07*
Fifth Period (Peek-A-Boo Game)								
Sex	.52	.47	.10					
Mutual-Play I	2.31	.13	-.21	.23	.05	1.37	2,49	.26
Sixth Period (Tower Building)								
Sex	.44	.50	-.09					
Mutual-Play I	1.25	.26	.15	.18	.03	.83	2,49	.44

* $p < .10$
** $p < .05$
*** $p < .01$

marginal. During this period, Exploratory-Attachment showed a negative relationship to the Bully subscale with an $R = -.31$ ($p < .02$). The multiple R for the period was also .31 with $p < .07$.

Angry Scale. The Angry subscale was positively related to the infant's sex [male]. (See Table 39.) The partial correlation between the subscale and sex ranged between .34 and .41 across the periods. The Angry subscale related negatively to infant interactions with the mother. There was also a negative relationship with the infant's use of constructive play activities.

In the first period Solitary-Play ($R = .21$; $p < .09$) related positively to the Angry subscale. In this period, Solitary-Play may be viewed as a lack of exchange between the mother and the infant in the initial three minutes of the play session. The multiple R for this period was .43 ($p < .005$).

In the second period, only one infant behavior reached significance. This was a negative relationship with Play Time with $R = -.22$ ($p < .08$). From the second period on, there was a negative relationship between infant play and the Angry subscale. The multiple R for this period reached .44 ($p < .005$).

Again in the third period only one infant behavior reached significance. This time it was a negative relationship with the play behaviors in Exchange-Game with $R = -.25$ ($p < .04$). The multiple R for this period was .46 ($p < .003$).

Table 39

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Angry Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	7.82	.007***	.36					
Solitary-Play	2.89	.09*	.21	.43	.19	5.86	2,49	.005***
Second Period								
Sex	9.93	.003***	.40					
Play-Time	3.11	.08*	-.22	.44	.19	5.99	2,49	.005***
Third Period								
Sex	7.35	.009***	.34					
Exchange-Game-Att	4.10	.04**	-.25	.46	.21	6.57	2,49	.003***

* $p < .10$
** $p < .05$
*** $p < .01$

Table 39 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Angry Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	9.50	.003***	.38					
Explor-Attach	3.62	.06*	-.23					
Touch-Neg	5.99	.01***	.31					
Baby-Take	4.30	.04**	-.26	.56	.25	6.04	4,47	.001***
Fifth Period (Peek-A-Boo Game)								
Sex	10.57	.002***	.40					
Touch Neg	6.67	.01***	.32	.49	.24	8.07	2,49	.001***
Sixth Period (Tower Building)								
Sex	12.09	.001***	.41					
Play-Time	9.73	.003***	-.37					
Mutual-Play-II	2.67	.10*	-.19	.56	.32	7.52	3,48	.001***

* $p < .10$
** $p < .05$
*** $p < .01$

During the fourth period, the clearest negative interaction by the infant toward the mother was evident. There was a positive correlation of .31 with Touch-Negatively ($p < .01$). Then there were negative correlations with the clusters Baby-Take ($R = -.26$; $p < .04$) and Object-Attachment ($R = -.23$; $p < .06$). The multiple R for the fourth period was .56 with $p < .001$.

The fifth period, the peek-a-boo game, as in the last period showed a negative relationship from the infant toward the mother. There was a positive correlation between the Angry subscale and Touch-Negatively ($R = -.32$; $p < .01$). The multiple R for this period was .49 ($p < .001$).

During the sixth period, tower building, the negative relationship between the Angry subscale and constructive play again emerges. Both play-episodes-time and Mutual-Play-II are indications of constructive tower building. The correlation with play-episodes-time was -.37 ($p < .001$). The correlation with Mutual-Play-II was -.19 which was marginally significant at $p < .10$. This latter variable is of special interest since it best captures tower building behavior.

Summary: The relationship between the Angry subscale and infant behavior can be characterized as showing negative interactions of the infant toward the mother and a negative relationship toward constructive play behaviors.

Impulsive Scale. The Impulsive subscale is of particular interest when contrasted with the Angry subscale. (See Table 40.) As with the Angry subscale, there is a negative relationship with constructive play behaviors. The sex of the infant [male] was significantly related to the impulsive subscale in every period except the third period. Otherwise, the correlations with the infant's sex ranged from .29 to .37.

Unlike the Angry subscale, the Impulsive subscale relates positively to infant-to-mother interactions. These positive interactions are with distal rather than proximal communications. Although the positive infant-to-mother behaviors do not always reach significance, they are consistently present in four of the six periods.

In the first period of free play, there is a positive correlation of .23 between Solitary-Play and the Angry subscale ($p < .07$). This positive play behavior may be interpreted as consistent with the lack of constructive play involving the mother.

During the second period, the negative relationship of the Impulsive subscale was with Play-Time ($R = -.23$; $p < .01$). A trend showing positive interaction of the infant with the mother is seen in this period. Though not reaching significance, the next variable to enter the regression was Global-Attachment ($R = .14$; $p < .30$). The multiple R in this period was .40 ($p < .01$).

Table 40

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Impulsive Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	5.50	.02**	.30					
Solitary-Play	3.28	.07*	.23	.40	.16	4.84	2,49	.01***
Second Period								
Sex	7.59	.00***	.36					
Play-Time	3.19	.08*	-.23	.40	.16	4.79	2,49	.01***
(Global-Attach	1.05	.30	.14	.42	.18	3.55	3,48	.02**)
Third Period								
Sex	.69	.40	.12					
Neg-Attach	5.20	.02**	-.30					
Exchange-Game-Att	4.81	.03**	-.28	(.48	.23	4.96	2,49	.004***)
Look-Mother	1.90	.17	.19	.51	.26	4.27	3,48	.005***

* $p < .10$
** $p < .05$
*** $p < .01$

Table 40 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Impulsive Scale

Variable	Partial F To Enter	p	Partial r	Mult. R	R^2	Overall F	D.F.	p
Fourth Period								
Sex	6.12	.01***	.33	.33	.19	6.12	1,50	.01***
Fifth Period (Peek-A-Boo Game)								
Sex	4.99	.03**	.29					
Look-Mother	4.82	.03**	.28	.43	.18	5.71	2,49	.00***
Sixth Period (Tower Building)								
Sex	9.14	.004***	.37					
Explor-Attachment	5.52	.02**	.29					
Solitary-Play	4.03	.05**	-.24					
Mutual-Play-II	2.39	.12	-.19	.54	.29	4.95	4,47	.00***

* $p < .10$
** $p < .05$
*** $p < .01$

The Impulsive subscale in the third period had the same negative relationship to play behavior as did the Angry subscale. In this period, there was a negative correlation of -.28 with the Exchange-Game. Again there were indications of a positive infant-to-mother interaction. First, there was a negative correlation of -.30 with the cluster Negative-Attachment ($R = -.30$; $p < .02$). Then there was a positive correlation with the distal communication cluster Look-To-Mother ($R = .19$; $p < .17$). This latter variable missed significance but was the next variable to enter the equation. The cluster Look-To-Mother is cited here since it shows the positive interaction of the infant toward the mother. The multiple R for the third period was .48 ($p < .005$).

The fourth period of free play was interesting for what it did not show. The only variable to show significance in this period was the sex of the infant [male] ($R = .33$; $p < .01$). The point to note here was in contrast to the Angry subscale. In the fourth period, the Angry subscale showed high negative infant interaction toward the mother. In contrast the Impulsive subscale did not relate to any infant behaviors during this period. Even though the lack of significance does not tell us what the Impulsive subscale is, it does indicate what it is not. The Impulsive subscale is not a scale of negative interpersonal interaction.

While there were no signs of positive play during the fifth period, the peek-a-boo game, there was positive communication with the mother. The distal communication cluster of Look-to-Mother again related positively to the Impulsive subscale ($R = .28$; $p < .03$). The multiple R for the fifth period was .43 ($p < .006$).

In the sixth period, tower building, all of the previous trends are brought together into a single equation. Here we find a significant positive relationship with infant sex [male] ($R = .37$; $p < .004$). There is positive communication with the mother shown by Exploratory-Attachment ($R = .29$; $p < .02$). Lastly, there is an absence of constructive play activity. Solitary-Play was negatively correlated with the Impulsive subscale ($R = -.24$; $p < .05$). Mutual-Play-II was also negatively correlated to the Impulsive subscale ($R = -.19$; $p < .12$). This latter variable which missed significance was left in the regression equation to produce a multiple R of .54 ($p < .002$).

Summary On Negative Subscales. The three negative subscales of Bully, Angry, and Impulsive were placed in a multiple regression with the infant behaviors and behavioral clusters. No consistent relationships were found between the Bully subscale and infant behavior. With the Angry subscale, there was a negative relationship in infant-to-mother interaction and a negative relationship

with infant play behaviors. For the Impulsive subscale, there was also a negative relationship with play behaviors. However, this latter subscale showed positive infant-to-mother interaction via distal communication channels.

Regression Analysis: CBC Positive Scales And Infant Behavior

A multiple regression analysis was performed using the three positive CBC subscales as the dependent variable. The infant behaviors and behavioral clusters in each experimental period were used as the independent variables. The three positive subscales of Competence, Intelligence and Cooperative yield similar but differentiating results. There was no relationship of the positive subscales with the infant's sex, unlike the negative subscales of Angry and Impulsive. The positive subscales were not related to the sex of the infant.

The three positive subscales did not relate to infant behavior during the first and second periods of free play nor in the sixth period of tower building. The subscales showed a significant relationship to the positive play behaviors of Solitary-Play and Mutual-Play in the third and fourth free play periods.

The positive relationship was limited during the structured play tasks. None of the positive CBC subscales showed a relationship to the tower building task. The

peek-a-boo game did no better in relation to the Competence and Intelligence subscales. The Cooperative subscale, on the other hand, was positively correlated to the infant behaviors associated with cooperative play in the peek-a-boo game.

The major differences between the Competence, Intelligence, and Cooperative subscales was found in positive interactions toward the mother. The Intelligence and Cooperative subscales, unlike the Competence subscale, had positive interactions of the infant toward the mother. The Cooperative subscale was conspicuous in this quality being the only subscale to relate to participation in the peek-a-boo game.

The Competence Subscale. The regression analysis of infant behaviors with the Competence subscale yielded no significant results for the first, second, or sixth experimental periods. (See Table 41.)

In the third period there was a positive relationship with the play behaviors of Solitary-Play ($R = .38$; $p < .01$), Mutual-Play ($R = .35$; $p < .01$), and play-episodes-time ($R = .24$; $p < .05$). The multiple R for the third period was .50 ($p < .006$).

The fourth period of free play was also positively related to infant play. Again Solitary-Play was positively related to the Competence subscale ($R = .39$; $p < .005$). Additionally, Baby-Take was representative of the

Table 41

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Competent Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	.20	.88	.02					
Mutual-Play	1.60	.21	-.18	.17	.03	.80	2,49	.45
Second Period								
Sex	.42	.83	-.03					
Global-Attachment	2.69	.10*	-.23	.24	.05	1.08	2,49	.40
Third Period								
Sex	2.90	.09*	-.24					
Play-Time	3.76	.05*	.24					
Mutual-Play	6.84	.01***	.35					
Solitary-Play	7.02	.01***	.38	(.50	.25	3.99	4,47	.007***)
Neg-Attach	2.22	.14	-.20	.53	.28	3.72	5,46	.006***

* $p < .10$
** $p < .05$
*** $p < .01$

positive play exchange with the mother. This correlation was .27 ($p < .04$). As in the previous period there was a positive correlation with the time spent in play represented by the cluster Play-Episode-Time ($R = .29$; $p < .02$). The multiple R for the fourth period was .48 significant at $p < .01$.

In the fifth period the Competence subscale, while not indicative of positive participation in the peek-a-boo game, is negatively related to infant behaviors which showed infant rejection of the mother and the structured task. The Competence subscale was negatively correlated to Negative-Attachment ($R = -.31$; $p < .02$) and Object-Involvement ($R = -.25$; $p < .06$). It will be remembered that the clusters of Negative-Attachment and Object-Involvement loaded on the Factor IV in the second order factor analysis of mother and infant behaviors. This factor represented negative interaction between the mother and infant during the peek-a-boo game. So, the Competence subscale is negatively related to the infant behaviors loading on that factor. The multiple R for this period was .36 which was marginally significant at $p < .06$.

Intelligence Subscale. The results of the intelligence subscale were similar to those of the Competence subscale. But in addition to the emphasis on play behavior, there was a positive relationship with interpersonal interaction toward the mother. (See Table 42.) As before

Table 42

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Intelligent Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	.79	.37	.12					
solitary-pl-time	.58	.45	.11	.15	.02	.56	2,49	.57
Second Period								
Sex	.35	.55	.08					
Global-Attach	3.34	.07*	-.25	.27	.07	1.96	2,49	.15
Third Period								
Sex	.77	.38	-.11					
Solitary-Play	14.56	.001***	.56					
Mutual-Play	10.80	.002***	.43					
proximity-time	3.46	.06*	.23	.55	..31	5.28	4,47	.001***

* $p < .10$
** $p < .05$
*** $p < .01$

Table 42 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Intelligence Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	1.12	.29	.12					
Solitary-Play	10.48	.002***	.38					
Touch-Pos	9.09	.004***	.35					
Play-Time	5.45	.02**	.28					
Baby-Sit-Lap	3.92	.05**	.24					
imitate	3.01	.09*	-.20	.61	.37	4.56	6,45	.001***
Fifth Period (Peek-A-Boo Game)								
Sex	.21	.64	.06					
Neg-Attach	4.48	.03**	-.29	.30	.09	2.53	2,49	.08*
(Solitary-Play	2.06	.15	.19	.36	.13	2.41	3,48	.07*)
Sixth Period (Tower Building)								
Sex	.85	.36	.13					
variety-toys-freq	1.26	.26	-.16	.18	.03	.91	2,49	.40

* $p < .10$
** $p < .05$
*** $p < .01$

the first, second and sixth periods did not yield any significant results.

The third period had positive correlations between the Intelligence subscale and the clusters Solitary-Play ($R = .56$; $p < .001$) and Mutual-Play ($R = .43$; $p < .002$). This is similar to the Competence subscale. In addition there was a positive correlation with the interpersonal variable of proximity-time ($R = .23$; $p < .06$). The multiple R in this period reaches .55 with $p < .001$.

In the fourth period the Intelligence subscale related to the positive play behaviors of Solitary-Play ($R = .38$; $p < .002$) and Play-Time ($R = .28$; $p < .02$). Even though the emphasis appeared to be on Solitary-Play, there was also interpersonal interaction toward the mother with Touch-Positively ($R = .35$; $p < .004$) and Sit-On-Lap ($R = .24$; $p < .05$). These latter behaviors indicate mutual play with an emphasis on physical closeness with the mother.

Lastly, the variable baby-imitate was marginally significant with a negative correlation of $-.20$ ($p < .09$). This relationship was consistent with positive interaction since baby-imitate clustered with negative interpersonal behaviors. The multiple R for this period was the next to highest reached for a subscale. The multiple R of .61 was significant beyond the $p < .001$ level.

Table 43

Regression Analysis Of Expressed

Maternal Attitudes And Infant Behaviors

On The Cooperative Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	1.15	.28	.15					
imitate	1.96	.16	.20	.29	.08	1.90	2,49	.21
Second Period								
Sex	.54	.46	.10					
Global-Attach	.84	.36	-.12	.17	.03	.75	2,49	.47
Third Period								
Sex	.21 E-01	.88	-.02					
Mutual-Play	8.24	.006***	.39					
Play-Time	3.02	.08*	.22					
Solitary-Play	5.01	.03**	.34					
proximity-time	3.42	.07*	.24	.53	.28	3.66	5,46	.007***

* $p < .10$
** $p < .05$
*** $p < .01$

Table 43 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Infant Behaviors
On The Cooperative Scale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	1.74	.19	.15					
Solitary-Play	12.76	.001***	.42					
Baby-Take	9.28	.004***	.37					
Play-Time	9.30	.004***	.36					
Touch-Pos	4.55	.03**	.24					
Baby-Sit-Lap	3.43	.07*	.22	.63	.40	5.16	6,45	.00***
Fifth Period (Peek-A-Boo Game)								
Sex	.53	.46	.09					
Look-Mother	6.01	.01**	-.32					
Mutual-Play II	4.08	.04**	.26					
Neg-Attach	2.71	.10*	-.21	.46	.21	3.23	4,47	.02**
Sixth Period (Tower Building)								
Sex	1.06	.30	.14					
variety-toys-freq	1.67	.20	-.14	.21	.04	1.18	2,49	.31

* $p < .10$
** $p < .05$
*** $p < .01$

The fifth period, peek-a-boo game, showed a significant negative correlation of -.29 with the cluster Negative-Attachment ($p < .03$). The multiple R of .30, however, was marginally significant with $p < .08$. As before the negative correlation with Negative-Attachment was indicative of a more positive interaction between infant and mother. The Negative-Attachment cluster was associated with negative participation in the peek-a-boo game.

The Cooperative Scale. It will be remembered that the Cooperative subscale was included in the regression analysis because of its heuristic value. As Table 43 shows this was a successful analytic step since the Cooperative subscale yielded significant results. During the third and fourth periods of free play, this subscale taps the qualities of the other two positive subscales. The play behaviors associated with the Competence subscale are present. Additionally, the interpersonal interaction toward the mother found with the Intelligence subscale are also present. Thus, this subscale combines the qualities found in the other two subscales. In the fifth period, the Cooperative subscale was positively related to task behavior. This was the only subscale to show a positive relationship to the structured play tasks.

There were no significant findings for the first, second, and sixth periods. For the third period of free

play, both positive play and interpersonal interaction are represented in this regression. The infant play behaviors of Mutual-Play ($R = .39$; $p < .006$), Solitary-Play ($R = .34$; $p < .03$) and play-episodes-time ($R = .22$; $p < .08$) were positively related to the Cooperative subscale. Also the positive interpersonal behavior of proximity-time was significant ($R = .24$; $p < .07$). The multiple R in this period reached .52 ($p < .007$).

During the fourth period of free play, there were positive correlations with the clusters of Solitary-Play ($R = .42$; $p < .001$), Baby-Take ($R = .37$; $p < .004$), and the variable play-episode-time ($R = .36$; $p < .004$). There were also positive correlations with the clusters of Touch-Positively ($R = .24$; $p < .03$) and Sit-On-Lap ($R = .22$; $p < .07$). The multiple R of .63 ($p < .001$) was the highest found in any of the regression analyses.

The Cooperative subscale was the only subscale related to task-oriented play. In the fifth period, peek-a-boo game, the Cooperative subscale was positively correlated to Mutual-Play-II ($R = .26$; $p < .04$). This cluster was composed of excited-vocalization, look-to-demonstration-frequency, mutual-play-frequency, sit-lap-frequency, sit-lap-time. These variables represented participation in the peek-a-boo game.

Additionally, during the fifth period there were negative correlations with the clusters Look-To-Mother ($R =$

-.32; $p < .01$) and Negative-Attachment ($R = -.21$; $p < .10$). These negative correlations were consistent with the other positive subscales. Given this subscale's strong relationship with participation in the peek-a-boo game, this lends support to the interpretation that Negative-Attachment was indicative of negative involvement in the peek-a-boo game. The multiple R for the fifth period was .46 ($p < .002$).

Summary of the Positive Subscales. The three positive subscales of Competence, Intelligence and Cooperative were related to positive play behavior during the third and fourth periods of free play. Additionally, the Intelligence and Cooperative subscales were positively correlated with infant interpersonal interaction toward the mother. The findings for structured play were less conclusive. There were no significant results for the sixth period. The results of the peek-a-boo game indicated a negative correlation for the positive subscales with Negative-Attachment. Negative-Attachment was indicative of negative involvement in the structured task. The Cooperative subscale was associated with positive task-oriented play behaviors in the peek-a-boo game. This latter finding supported the value of the concept of cooperation as a subscale.

Regression Analysis: Mother Behavior And The CBC Subscales

The regression analysis of the mother's behavior with the three positive and three negative subscales yielded

more limited results than those found with infant behavior. Even though the results are not as clear for maternal behavior, there are differences between the positive and negative subscales. Sex of the infant was used as a covariate as in previous analyses. Since this covariant was forced into the regression equation as the first variable, the results on sex are the same as those given in the infant analysis. Therefore, the correlations of the subscales with sex will not be repeated here. But it should be kept in mind that they contributed to the multiple correlations reported here.

Mother Behavior And The Negative CBC Subscales

Characteristic of the negative subscales was the attempt by the mother to gain the infant's participation in play activities. An examination of the results for the negative subscales with infant behavior would indicate that the infant's experience was quite different (i.e., negative correlations with the infant's play and interpersonal behaviors).

Bully Subscale. The regression analyses using the Bully subscale did not yield a significant multiple R in the free play periods nor the peek-a-boo game period. (See Table 44.) Tower building produced a marginally significant multiple R of .36 with $p < .07$. During this period the mother's endorsement of the Bully subscale was negatively related to strategies which could be useful in

Table 44

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Bully Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	.33	.56	.07					
mother-offer	3.67	.06*	.26	.27	.07	2.05	2,49	.13
Second Period								
Sex	.55	.46	.10					
mother-imitate	2.71	.10*	-.22	.24	.06	1.57	2,49	.21
Third Period								
Sex	.57	.45	.10					
M-Touch-Pos	3.81	.05**	.26	.28	.07	2.12	2,49	.13

* $p < .10$
** $p < .05$
*** $p < .01$

Table 44 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Bully Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	.40	.52	.08					
Mother-Take	2.16	.14	-.20	.22	.05	1.29	2,49	.26
Fifth Period (Peek-A-Boo Game)								
Sex	.18	.66	.06					
game-play-freq	2.36	.13	-.21	.23	.05	1.39	2,49	.25
Sixth Period (Tower Building)								
Sex	1.28	.26	.15					
Toys	6.16	.01**	-.36					
M-Touch-Pos	3.23	.07*	-.26	.36	.13	2.48	3,48	.07*

* $p < .10$
** $p < .05$
*** $p < .01$

Table 45

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Angry Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	12.05	.001***	.43					
Fantasy-Play	6.71	.01***	.31					
Mother-Take	3.33	.07*	.23	.52	.28	6.24	3,48	.001***
Second Period								
Sex	8.52	.001**	.38	.38	.14	8.52	1,50	.005***
(Game-Play	2.25	.14	.19	.42	.18	5.49	2,49	.007***)
(Dem-Play	2.11	.15	-.18	.46	.16	4.45	3,48	.008***)
Third Period								
Sex	12.01	.001***	.46					
Mother-Take	6.02	.01***	-.32					
Game-Play	3.11	.08*	.23	.50	.25	5.51	3,48	.002***

* $p < .10$
** $p < .05$
*** $p < .01$

Table 45 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Angry Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	9.08	.004***	.37					
M-Touch-Pos	3.88	.05**	.25					
Mother-Take	3.57	.06*	-.24	.49	.24	5.08	3,48	.004***
Fifth Period (Peek-A-Boo Game)								
Sex	8.94	.004***	.37					
mother-offer	1.54	.22	.16					
M-Touch-Neg	4.68	.03	-.31					
Mother-Take	3.50	.06	.28	.52	.27	5.08	3,48	.004***
Sixth Period (Tower Building)								
Sex	16.33	.001***	.48					
Game-Play	12.03	.001***	.41					
Toys	4.43	.04**	-.21	.59	.34	4.52	4,47	.001***

* $p < .10$
** $p < .05$
*** $p < .01$

the tower building task (i.e., use of toys and schemes and positive touching). There were negative correlations with the mother's use of the cluster Toys ($R = -.36$; $p < .01$) and Positive-Touching ($R = -.26$; $p < .07$).

Angry Subscale. Mothers who endorsed angry items engaged in behaviors which attempted to gain the infant's attention. (See Table 45.) In three of the six periods the Angry subscale was positively correlated with Game-Play, while in other periods the mother utilized various interpersonal behaviors in communicating with the infant. However, none of these interpersonal behaviors showed any consistency across periods

During the first period of free play, the regression analysis for the Angry subscale showed the mother's response to the infant's initial exploration was Fantasy-Play. This might then be interpreted as an attempt by the mother to gain the infant's attention during the initial exploration of the room. There were positive correlations to Mother-Take ($R = .23$; $p < .07$) and Fantasy-Play ($R = .31$; $p < .01$). The cluster Fantasy-Play appeared to be a response by the mother to the Solitary-Play behavior of the infant. The Angry subscale was associated with infant Solitary-Play in the first period. This association will be found for other subscales in subsequent analyses. The multiple R for this period reached .52 with $p < .001$.

For the second period of free play, the mother's behavior did not reach significance. The results were consistent with the trend of the Angry subscale to be positively correlated with Game-Play ($R = .19$; $p < .15$). Demonstration-Play was negatively correlated with the Angry subscale with an $r = -.18$ ($p < .15$). The multiple R for the period came to .46 ($p < .008$).

The third period of free play was consistent with the second period. Game-Play had a positive correlation of .23 with the Angry subscale ($p < .08$). The cluster Mother-Take was negatively related to the subscale ($R = -.32$; $p < .01$). Though difficult to interprete, these findings are consistent with the negative play exchange shown in the third period of the infant regression analysis. The mother's use of Game-Play was not reciprocated by the infant. The mother's activity is interpreted as an attempt to gain the infant's attention and participation in play.

The mother's behavior in the fourth period of free play was not as clear as in the third period. Again there was a negative correlation with Mother-Take ($R = -.24$; $p < .06$). There was also a positive correlation of .25 ($p < .05$) with Mother-Touch-Positive. Again these results appear to be consistent with the mother's attempt to gain positive infant interaction. During this period the infant's behaviors associated with the Angry subscale were very negative in interpersonal interaction.

In the fifth period, peek-a-boo game, again the mother used a number of communication channels directed toward the infant. There was a positive correlation with Mother-Take ($R = .28$; $p < .06$). There was a negative correlation with Mother-Touch-Negative ($R = -.31$; $p < .03$). Not reaching significance but consistent with the positive maternal behavior in this period was mother-offer to the infant ($R = .16$; $p < .22$). The multiple R in the peek-a-boo period reached .52 ($p < .004$).

The sixth period, tower building, like the second and the third periods of free play had a positive correlation with Game-Play ($R = .44$; $p < .001$). There was also a negative correlation of -.21 with cluster Toys which represented use of variety-of-toys and -schemes ($p < .04$). So during this period there was a return to Game-Play as a means to gain the infant's attention. The multiple R for this period was .59 ($p < .001$).

Summary: In each period, the mother attempted to gain the infant's attention and/or participation in mother-infant play activities. It is well to remember that these attempts are correlated with the negative Angry subscale. The results from the infant analysis showed an infant which did not engage in play activities nor interact positively with the mother--just the opposite, the infant interacted negatively with the mother.

Impulsive Subscale. The regression of the mother's behavior on the Impulsive subscale yielded results similar to the Angry subscale analyses. (See Table 46.) Here, too, the mother actively attempted to gain the infant's attention and participation in play. However, the results of this analysis showed more consistency than that of the Angry subscale. For example, the mothers used Game-Play only during free play. There are negative correlations with the cluster Mother-Take during the free play periods while the correlations with this cluster are positive during structured play. The Impulsive subscale also showed a change in maternal strategies for attention getting from the free play to the structured play periods.

During the first period of the free play, the only maternal behavior to enter the regression was Fantasy-Play with a positive correlation of .27 ($p < .03$). As pointed out previously, the utilization of Fantasy-Play appeared to be a response by the mother to the infant's use of Solitary-Play. The multiple R for the first period was .43 ($p < .006$).

In the second period there was the positive use of Game-Play ($R = .29$; $p < .02$). There was also a negative correlation with Demonstration-Play ($R = -.24$; $p < .06$). This combination of clusters was interpreted as an attempt by the mother to establish play by using Game-Play but without the desired effect. The multiple R for this period was .50 ($p < .003$).

Table 46

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Impulsive Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	6.78	.01***	.33					
Fantasy-Play	4.64	.03**	.27	.43	.18	5.60	2,49	.006***
Second Period								
Sex	11.13	.002***	.43					
Game-Play	5.29	.02**	.29					
Mother-Take	3.61	.06*	-.24	.50	.25	5.37	3,48	.003***
Third Period								
Sex	11.00	.002***	.42					
Game-Play	6.54	.01***	.33					
Mother-Take	5.82	.02**	-.31	.50	.25	5.49	3,48	.002***

* $p < .10$
** $p < .05$
*** $p < .01$

Table 46 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Impulsive Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	6.12	.01***	.33	.33	.10	3.17	1,50	.01***
(M-Touch-Pos	.73	.39	.11	.34	.12	3.41	2,49	.04**)
Fifth Period (Peek-A-Boo Game)								
Sex	6.48	.01***	.33					
M-Touch-Neg	4.49	.03**	-.32					
Mother-Take	2.63	.11	.24	.43	.19	3.78	3,48	.01***
Sixth Period (Tower Building)								
Sex	15.02	.001***	.50					
Toys	12.15	.001***	-.46					
M-Touch-Pos	9.11	.004***	-.39					
Mother-Take	3.41	.07*	.24					
mother-imitate	2.94	.09*	.20	.61	.37	5.59	5,46	.001***

* $p < .10$
** $p < .05$
*** $p < .01$

The results for the third period were the same as for the second period. Game-Play had a positive correlation of .33 with the Impulsive subscale ($p < .01$). There was also a negative correlation of -.31 with Mother-Take ($p < .02$). The multiple R for this period was .50 with $p < .002$. The interpretation given for the second period was applied here as well.

No maternal behaviors were significantly related to the Impulsive subscale in the fourth period of free play. Likewise in the fourth period analysis of the Impulsive subscale the infant's behavior, also, did not show any relationship with the subscale.

The mother's behavior stands in contrast to the mother's behavior for the Angry subscale. With the Angry subscale, the mother utilized positive interpersonal behaviors to establish interaction with the infant but without apparent success. In the analysis of the Angry subscale, the infant's behavior showed negative play and negative interpersonal behaviors. The mother continued to attempt to gain the infant's participation in play.

The analyses of the free play periods for both the Angry and Impulsive subscales showed a disruption in infant communication. There was an attempt by the mother to gain positive interaction with the infant without much success. However, this disruption would appear to be stronger for the Angry subscale than for the Impulsive subscale.

In the fifth period, peek-a-boo game, there was a negative correlation of -.32 with Mother-Touch-Negative ($p < .03$). There was a positive correlation of .24 with the cluster Mother-Take ($p < .11$). This contrasted to the free play periods in which the relationship with Mother-Take was negative. This latter cluster entered the regression just above marginal significance with $p < .11$. The variable was left in the equation to yield a multiple R for the period of .43 with $p < .01$.

The Impulsive subscale in the sixth period, tower building, was related both positively and negatively to maternal behaviors aimed at tower construction. There were negative correlations with the cluster Toys ($R = -.46$; $p < .001$) and the cluster Mother-Touch-Positive ($R = -.39$; $p < .001$). Positive involvement in tower construction was seen in the positive correlation with the cluster Mother-Take ($R = .24$; $p < .07$). There was a positive correlation of .20 with the mother's use of mother-imitate ($p < .09$), a tower building strategy.

The Impulsive subscale, while showing low use of toys and schemes, was related to a strategy for infant involvement in tower building [Mother-Take and mother-imitate] which was different from the free play strategy [Game-Play]. Maternal behaviors associated with the Impulsive subscale were more flexible and consistent than those found with the Angry and Bully subscales.

The Angry subscale also showed the same lack of using toys and schemes by the mother while engaging the infant in tower building. The strategy associated with infant involvement was the same strategy used during the free play periods (i.e., Game-Play).

The Bully subscale like the Impulsive subscale had negative correlations with the mother's use of toys and schemes and with Mother-Touch-Positive. But unlike either the Angry or Impulsive subscale, there were no strategies for tower building. Thus, the Bully subscale was less flexible than either the Angry or Impulsive subscales.

Summary Of The Regression Analyses Of The Negative Subscales

The analyses of the three negative subscales revealed differences between themselves in relation to the mother's behavior. The Bully subscale only showed a relationship to the mother's behavior during the tower building task. The Bully subscale had the same negative relationships to maternal behaviors found for the Angry and Impulsive subscales but did not show any strategies for play involvement. Thus, the Bully subscale appeared the least flexible of the negative subscales.

In the free play periods, both the Angry and Impulsive subscales were associated with behaviors aimed at gaining the infant's participation in play (i.e., the use of Fantasy-Play and Game-Play). These attempts for infant

involvement were in the opposite direction to the findings of the infant's behavior related to the Angry and Impulsive subscales. The mother's use of Game-Play was interpreted as a response by the mother to the lack of the infant's participation in play. During the peek-a-boo game and the tower building tasks, the mother continued to attempt to gain the infant's participation.

The mother's behavior associated with the Impulsive subscale showed a balanced approach to the infant and differed in strategies from free play to structured play. This was an indication that the mother's behavior associated with Impulsive subscale had a greater degree of flexibility toward the infant across situations than did those behaviors associated with the Angry or Bully subscales.

Analysis Of The Positive Subscales And Maternal Behavior

Maternal behaviors differed in relationship from the negative subscales to the positive subscales. For example, the positive subscale had negative correlations with Game-Play in contrast to the positive correlations shown by the negative subscales. In the third period of free play, the positive subscales were associated with Demonstration-Play. During tower building, the negative subscales of Bully and Impulsive related negatively to Mother-Touch-Positive. However, both the Intelligence and Cooperative subscales were positively related to Mother-Touch-Positive during the tower task.

The positive subscales do not show many associations with maternal behavior. During the fourth period of free play, no maternal behaviors were associated with any of the positive subscales. The context of the present study focused heavily upon the mother's perceptual style and the infant's behavior. Thus, the analyses of the mother's behavior in relation to the positive subscales pointed to the need for a reexamination of maternal behaviors in future research.

The mother's behaviors and behavioral clusters were placed in a multiple regression analyses with the positive subscales as the dependent variable. The sex of the infant was forced into each of the regression analyses partialling out differences due to sex of the infant. The infant's sex was not related to the positive CBC subscales during any experimental period.

Competence Subscale. Even though only one experimental period yielded a significant multiple R, an examination of the results was informative. (See Table 47.) In the first, second, and sixth periods, there were negative correlations with Game-Play. Game-Play was positively correlated the negative subscales. The third period of free play produced the only significant multiple R of .29 ($p < .10$), and this was marginal. During this period there was a positive correlation of .29 with Demonstration-Play ($p < .03$).

Table 47

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Competence Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	.42	.83	-.02					
mother-offer	3.05	.08*	.24	.24	.05	1.53	2,49	.22
(Game-Play	2.49	.12	-.22	.32	.10	1.88	3,48	.14)
Second Period								
Sex	.27	.60	-.07					
Game-Play	4.53	.03**	-.29	.29	.08	2.27	2,49	.11
Third Period								
Sex	.14	.90	.01					
Demonst-Play	4.69	.03**	.29	.29	.08	2.35	2,49	.10*

* $p < .10$
** $p < .05$
*** $p < .01$

Table 47 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Competence Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	.47	.82	-.03					
Fantasy-Play	.34	.55	.08	.08	.00	.18	2,49	.83
Fifth Period (Peek-A-Boo Game)								
Sex	.48	.82	-.03					
mother-imitate	3.45	.06	-.25	.25	.06	1.73	2,49	.18
Sixth Period (Tower Building)								
Sex	.26	.60	-.07					
Game-Play	3.61	.06*	-.26	.26	.06	1.81	2,49	.17

* $p < .10$
** $p < .05$
*** $p < .01$

Intelligence Subscale. The behaviors associated with the Intelligence subscale are limited. However, these results show that the positive subscales are differentiated from the negative subscales. (See Table 48.) In the second period of free play the Intelligence subscale showed a negative correlation of -.27 with Game-Play. The multiple R for this period did not reach significance ($R = .28$; $p < .12$). The third period of free play had a positive correlation with Demonstration-Play ($R = .33$; $p < .01$). The multiple R for the period was .34 ($p < .04$).

In the sixth period, tower building, the Intelligence subscale in contrast to the Bully and Impulsive subscales was associated positively with Mother-Touch-Positive ($R = .36$; $p < .008$). The multiple R in this period was .38 ($p < .02$).

Cooperative Scale. Although five of the six regression analyses did not yield a significant multiple R, the results were consistent with the trends shown by the Competence and Intelligence subscales. (See Table 49.) In the first and second periods of free play, there was a negative, though nonsignificant, correlation with Game-Play.

The Cooperative subscale in the third period was associated with the mother's use of a variety of play behaviors. Like the other positive subscales there was a positive correlation with Demonstration-Play ($R = .44$,

Table 48

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Intelligence Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	.46	.50	.09					
mother-offer	3.32	.07*	.25	.27	.07	1.95	2,49	.15
Second Period								
Sex	.15	.70	.05					
Game-Play	3.78	.05	-.27	.28	.08	2.18	2,49	.12
Third Period								
Sex	1.13	.29	.14					
Demonst-Play	6.20	.01***	.33	.34	.12	3.40	2,49	.04**

* $p < .10$
** $p < .05$
*** $p < .01$

Table 48 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Intelligence Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	.58	.45	.10					
Demonst-Play	.76	.47	-.12	.16	.02	.65	2,49	.52
Fifth Period (Peek-A-Boo Game)								
Sex	.43	.51	.08					
mother-imitate	5.97	.01***	-.32	.34	.11	3.29	2,49	.04**
Sixth Period (Tower Building)								
Sex	.12	.72	.04					
M-Touch-Pos	7.64	.008***	.36	.38	.14	4.13	2,49	.02**

* $p < .10$
** $p < .05$
*** $p < .01$

Table 49

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Cooperative Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
First Period								
Sex	.55	.46	.10					
Game-Play	1.45	.23	-.16	.20	.04	1.06	2,49	.35
Second Period								
Sex	.32	.57	.08					
Game-Play	1.69	.19	-.18	.21	.04	1.19	2,49	.11
Third Period								
Sex	.41	.52	.08					
Demonst-Play	10.40	.002***	.44					
mother-imitate	3.43	.07*	.25					
Fantasy-Play	2.26	.13	.20	.46	.22	3.31	4,47	.01

* $p < .10$
** $p < .05$
*** $p < .01$

Table 49 (continued)

Regression Analysis Of Expressed
Maternal Attitudes And Mother Behaviors
On The Cooperative Subscale

Variable	Partial F To Enter	P	Partial r	Mult. R	R^2	Overall F	D.F.	P
Fourth Period								
Sex	.69	.40	.11					
Mother-Take	1.23	.27	.15	.19	.03	.95	2,49	.39
Fifth Period (Peek-A-Boo Game)								
Sex	.67	.41	.11					
mother-imitate	3.79	.05**	-.26					
variety-toys-freq	2.28	.12	.21	.33	.11	2.00	3,48	.12
Sixth Period (Tower Building)								
Sex	.31	.57	.07					
Touch-Pos	3.02	.08*	.24	.26	.07	1.86	2,49	.16

* $p < .10$
** $p < .05$
*** $p < .01$

$p < .002$). There were also positive correlations with mother-imitate ($R = .25$; $p < .07$) and with Fantasy-Play ($R = .20$; $p < .13$). The latter variable just missing significance was included in the regression equation. The multiple R for the third period was .46 ($p < .01$).

Neither the fifth nor sixth periods had a multiple R which reached significance; but the trends were consistent with those found for the Competence and Cooperative subscales. In the fifth period all three subscales showed a negative correlation with mother-imitate. In this analysis the correlation was $-.26$ ($p < .05$). In the sixth period the Cooperative subscale was associated with Mother-Touch-Positive ($R = .24$; $p < .08$). The Intelligence and Cooperative subscales were also positively related to Mother-Touch-Positive.

Summary Of CBC Scale Analyses And Maternal Behavior

As pointed out earlier, many of the multiple Rs from the regression analyses of the positive CBC subscales did not reach significance except when the direction of the results from the positive subscales contrast to the direction of the negative subscales. The positive subscales were negatively related to the use of Game-Play as a means of gaining the infant's participation. Instead, there was the use of behaviors which showed closer maternal involvement with the infant such as mother-offer, Demonstration-Play, and Mother-Touch-Positive. Although these results

are not of a large magnitude and often fall short of significance, the trend indicates that negative interpersonal interaction and that "distant or less involving" play behaviors are associated with the negative CBC subscales. The positive subscales, on the other hand, appear to be associated with positive interpersonal interaction and "closer or more involving" play behaviors.

A very similar picture is gained from the analyses of infant behaviors in which positive infant interaction and play were associated with the positive CBC subscales and negative interaction and lack of play were associated with the negative CBC subscales. However, the regression results from the infant analyses were much clearer and yielded much higher correlations than those found for the maternal analyses. The higher correlations of infant behavior with the subscales indicated that infant's behavior was more closely associated with the subscales than was the mother's behavior. More will be said on this point in the Discussion Section.

DISCUSSION

Overview

This discussion examines the nature of mother-infant interaction observed in a free and structured setting. Mother-Infant interaction is then related to mothers' perceptions of children's play.

Communication between mother and infant centered within two areas of interpersonal interaction. These areas of interaction were attachment behavior and competence behavior. Different forms of mother-infant interaction accompanied these two spheres of interaction. Four types of attachment were observed: Global-Attachment, Exploratory-Attachment, Exchange-Game-Attachment, and Negative-Attachment. The forms of competence behavior observed were Solitary-Play, Mutual-Play, and Exchange-Game-Play.

In the present study, Attachment appears to be a specific mother-infant interchange which supports caregiving but has little relationship to competence behavior. Moreover, these results show a significant relationship of maternal perceptual style with competence behaviors; but this relationship did not exist with attachment behaviors.

These results lead to the conclusion that attachment is not predictive of long-term mother-child interaction. This conclusion is related to White's (1959) hypothesis of

effectance motivation and competence, and support White's hypothesis that effectance motivation and competence behavior are independent of security needs and attachment behaviors.

Scores on the Child Behavior Checklist were associated with different patterns of mother-infant interaction. The CBC was composed of subscales which reflected positive and negative perceptual images of children. The negative subscales represented major clinical syndromes (i.e., bully behavior, angry interaction, and impulsivity). The positive subscales covered constructive behavioral patterns (i.e., competence, intellectual development, and cooperative behavior). These subscales were related to the infant's behavior in play and provided a validation of the behavioral subscales composing the Child Behavior Checklist.

The multiple regression of infant behaviors to maternal perceptual style was related to infant competence by an interaction model rather than a unidirectional model of communication. There was a high congruence between maternal perceptions and infant behaviors during play. Maternal perceptions of anger, impulsivity, competence, intelligence, and cooperation were associated with such behavioral patterns in the infant. This congruity supports the interpretation that maternal perceptions of competence are shaped by the infant's expressions of competence.

These results support the following interaction model of perception. The mother's perceptions of competence develop from her interaction with the infant's expression of competence behavior. Infant behavior affecting the mother's perceptions of competence may be infant affect, temperament, or cognitive behaviors. Maternal perceptions of competence are seen as important to mother-child interactions during development. These perceptions are then applied more broadly to other children at play.

This interpretation is consistent with the theoretical model of attribution. The attribution model consists of the following stages. Attributions about a person X are built up through interactions with X in situation A. When a new person Y is seen in situation A, the attributions about X are applied to Y. This theoretical model would account for the high congruence between the behaviors of the infant at play and the mother's perceptions endorsed on the CBC.

The items used on the CBC were derived from parental descriptions of elementary aged school children. These items, when endorsed by mothers of infants, made up subscales reflecting global characteristics of children's competence behavior. Since these constructs appear to apply to older children and infants, these constructs are

seen as having generality across age levels. Such generality implies that maternal perception of competence persists after infancy and is reapplied to the child at later stages of development.

Cluster Analysis and Factor Analysis of Infant Behavior

The cluster analysis and factor analysis of the infant behaviors isolated three categories of infant behavior. These three categories were Attachment behavior toward the mother, Mutual-Play with the mother, and independent Solitary-Play.

This analysis suggested that each of these categories was representative of a domain of infant functioning. Infant Attachment focuses on the social interaction of mother and infant related to the infant's need for and sharing in caregiving. Mutual-Play centers on the reciprocal relationship of mother and infant associated with infant competence and cooperation. In Solitary-Play, the infant engaged in independent exploration. Solitary-Play is interpreted as the development of competence behavior carried out by oneself. Each of these areas of infant behavior is discussed below.

Attachment Clusters. Four patterns of attachment were observed in the present study. These were Global-Attachment, Exploratory-Attachment, Exchange-Game-Attachment, and Negative/Ambivalent-Attachment. Global-Attachment appeared in the first two periods. This form of attachment is frequently cited in the literature

(Schaffer & Emerson, 1964; Ainsworth, 1967; Bowlby, 1969). The cluster is composed of looking-to-the-mother-frequency and -time, locomotion-away and to-the-mother-frequency and -time, turning-to-the-mother, and proximity-frequency. These behaviors are used in a number of studies as a measure of attachment. Global-Attachment behaviors occurred in the initial periods of free play. The various forms of attachment observed in later play periods were embodied in the initial Global-Attachment.

In her description of attachment, Ainsworth (1969) described the infant utilization of the mother as a "secure base" for exploration. Attachment is viewed as the infant's attempt to maintain contact and proximity with the mother. Exploration is behavior which promotes movement into the environment.

The present cluster analysis does not picture this "secure base" behavior as two separate behavioral systems. Instead, "secure base" behavior was a single cluster. In the first play periods, the infant explored away from the mother and returned to her as part of the Global-Attachment cluster. In subsequent periods, these behaviors separated from this large cluster to comprise a new cluster called Exploratory-Attachment.

In the first periods of free play, Global-Attachment also included an exchange of toys by the infant and the mother. This exchange was composed of the behaviors baby-offer, baby-take, baby-take-in-response. This cluster is similar to behaviors observed by Rheingold and

Eckerman (1970) who described this exchange game process between mother and infant. They observed this exchange in a setting where attractive toys were placed in one room and the mother was sitting in an adjoining room. The infant would travel back and forth between the toys and the mother, bringing the toys to the mother. This form of interaction took place here as well. After the initial periods, this Exchange-Game became a separate cluster.

The Exchange-Game process at first was a part of the Global-Attachment cluster. Since these behaviors were originally associated with attachment, they are viewed as one of the few links between attachment and competence behaviors. This cluster in later periods was called the Exchange-Game.

In the second period, Global-Attachment included negative-vocalization and turn-to-the-mother-time. In the third and fifth periods, these variables clustered together with baby-imitate and proximity-time to form a negative interactive cluster. This new cluster was called Negative/Ambivalent Attachment. Ainsworth and Bell (1969) observed these behaviors in a group of infants who established interaction with the mother only to then reject this interaction with her.

The three clusters of Exploratory-Attachment, Exchange-Game-Attachment, and Negative/Ambivalent Attachment occurred in peek-a-boo periods.

Each of these clusters loaded on a separate factor in the second order factor analysis of this period. This showed the independence of these clusters from one another and presented the interaction of these clusters with other behaviors.

Exploratory-Attachment, for example, loaded on the separate factor named Alternative Play. This factor represented the attempt of the infant to engage the mother in other play activities. This factor was associated with Solitary-Play and Object-Involvement. Loading negatively on the factor were Mutual-Play, game-play-time, and Negative-Attachment. Mothers used Game-Play frequently and took the toys which were presented to her. This factor showed both mother and infant attempting to interest one another in play activities.

This form of nonparticipation in the structured task by the infant was interpreted positively. The infant used both Exploratory-Attachment and Solitary-Play as a means of engaging in play and as a means of interesting the mother in alternative play. Generally, Solitary-Play did not load with Exploratory-Attachment. Solitary-Play was most often independent of attachment behavior. The interpretation presented later is that Solitary-Play activities are signs of competence. Ainsworth, et al. found solitary play in this type of play setting to be associated with a negative mother-infant relationship. The results of the present study found just the opposite.

A second form of attachment to appear in this period was Exchange-Game-Attachment. This cluster was related to the Peek-A-Boo factor. The infant behaviors associated with this factor were Exchange-Game-Attachment and touching-mother-negatively. Maternal response was to spend time in Game-Play with the infant. During this episode, the mother and infant frequently exchanged the mask and "peeked" at one another. The exchange was a circular pattern of mother and infant mirroring each other's peek-a-boo behavior in reciprocal turns.

The Exchange-Game appears to cut across the two domains of attachment and competence development. The Exchange-Game was closely associated with GlobalAttachment in the first two periods. The behaviors would appear to be part of attachment behaviors. The Exchange-Game also showed constructive play activity. Generally, constructive play activities did not load with attachment behaviors. Instead, such play behavior loading on separate factors indicates competence development. The Exchange-Game appears to serve the special function of making attachment into a game. This is particularly true in the case of the peek-a-boo game.

Negative/Ambivalent-Attachment also occurred during the peek-a-boo period. Negative/Ambivalent-Attachment loaded on the Factor I. With this factor, infants engaged in Solitary-Play, touched-mother-negatively, showed Negative-Attachment, and did not look-at-the-mother.

These infants would turn from the mother, play with a toy for a while, and return back to the mother only to reject her overtures to engage in the peek-a-boo game. The mothers actively attempted to engage their infants in the structured game by using a variety-of-toys and variety-of-schemes.

Negative-Attachment also loaded on a second negative interaction factor, Factor IV. Unlike the first negative interaction factor, there was no constructive play. This time Solitary-Play loaded negatively on the factor while Object-Involvement and Negative-Attachment loaded positively. Mothers responded by controlling the infant with Negative-Touching and and taking toys from the infant. These infants were distressed by the task, often giving negative vocalizations. They would turn from the mother and become involved with objects in the room such as the door, wall sockets, or the radiator. The mother would generally retrieve the infant from such activity and try to engage the infant in peek-a-boo only to have the cycle repeated. This sequence was the most negative of all sequences observed in the experiment.

The two negative interaction factors show that even Negative-Attachment may or may not be associated with constructive behavior. In the first case, the infant acted ambivalent, wavering from constructive activity to protest and rejection of play. In the latter case, the infant protested the play and sought to avoid any interaction

with the mother. This avoidance behavior was not constructive but focused on the objects in the room.

The factor analytic results from the peek-a-boo period illustrate the independence of these forms of attachment. Each form loaded on independent factors. This was a confirmation of Ainsworth's et al. (1979) descriptions of attachment types. The factor analysis also found that attachment was generally unrelated to the competence behaviors of Solitary-Play and Mutual-Play. This latter point will be discussed later. Before leaving the peek-a-boo game, a digression concerning the infant's wariness to the peek-a-boo game is best discussed here.

A Note on Wariness. A number of studies (Bronson, 1974) report that an infant will act upset when exposed to a strange mask or mask covering the mother's face. This upset reaction has been labelled wariness. The wariness reaction covers a wide range of situations where the infant encounters a novel environment (Schaffer & Emerson, 1964). Strange events studied have included presentation of two images of the mother or having the mother's voice come from one direction while her image comes from another direction.

The present study gave an opportunity to study infant wariness to the mother's covering her face with a princess mask during the peek-a-boo sequence. Since the present study used a mask during the peek-a-boo game, the episode of peek-a-boo is not altogether representative of the

naturally occurring game. The use of the mask was convenient in that it allowed a standard manner for the mothers to hide their faces. Additionally, the present study form of the game provided the opportunity to observe the infant's reaction to masks. By adult standards, the mask of the princess was a pleasant face not too different from the ordinary human face. But when the mother put the mask on her face, the mask contrasted with the mother's face.

During the videotaping of the peek-a-boo game, only two infants showed intense wariness to the mask. One infant backed into a far corner of the room and cried. The other infant repeatedly stepped on the mask with his foot after the mask was placed on the floor. Casual observation led to the conclusion that most infants were not wary during the peek-a-boo game.

The second order factor analysis, however, supports the fact that most infants are wary of the princess mask. Infants struck at the mask while it was on the mother's face, whether or not they were engaged positively or negatively in the peek-a-boo game. This was recorded as negative-touching-frequency and -time. Initially, this behavior was interpreted positively as part of the game or negatively as a rejection of the game by the infant.

This interpretation did not account for the high frequency of negative-touching as part of the infant's response to the peek-a-boo game. Instead, this negative behavior is interpreted as a negative reaction toward the

princess mask. Additionally, in this experimental period, there were two factors representing negative mother-infant interaction. This was a much higher incidence of negative interaction than in other periods. In fact, some infants attempted to leave the room by pulling on the experimental room door.

The negative behaviors on each factor in the peek-aboo period support the conclusion that many infants became upset and experienced wariness to the mask. Some infants made their negative behavior, hitting the mask off the mother's face, into part of the peek-a-boo sequence. The consequence of this sequence was positive affect and play. Other infants, after hitting the mask off the mother's face, sought to engage the mother in alternative play or actively avoided her.

Competence Behaviors and Their Relationship to Attachment. Solitary-Play was a well-defined cluster of behaviors in every experimental period. The infant's use of Solitary-Play appeared to serve two purposes. These were to engage the mother in alternative play or to play independently. In the first free play period, peek-a-boo game, the tower building task, Solitary-Play focused on the exploration and manipulation of toys while engaging the mother in play. In the structured play periods, the infant would play solitarily for a while, then would return to the mother to engage her in alternative play activities. During the initial free play and peek-a-boo

periods, this behavior was associated with attachment behavior; however, in the tower task, Solitary-Play was independent of attachment behavior.

In the second, third, and fourth periods of free play, Solitary-Play occurred as an independent infant activity. The infant did not attempt to engage the mother in play. During most of the free play, Solitary-Play, Mutual-Play, and Attachment loaded on independent factors from one another. The mothers' responses to Solitary-Play were to use Fantasy-Play in attempting to gain the infants' attention.

During structured play, Solitary-Play was carried out in association with play directed to the mother. In most of the free play periods, Solitary-Play was carried out more independently and not associated with the mother. Solitary-Play is interpreted as infant behavior in which the infant shows independence and competence. These behaviors may or may not be associated with the mother. In four out of the six periods, Solitary-Play loaded on a play factor which had zero order factor loading with attachment.

Mutual-Play, like Solitary-Play, appeared as a distinct cluster with a well-defined nucleus of behaviors in each of the experimental periods. Mutual-Play and Solitary-Play loaded on separate factors and generally had a negative loading with one another. Thus, infants were engaged in either Solitary-Play or Mutual Play but not in

both types of play during a play period. Mutual-Play loaded on separate factors from the Attachment clusters throughout the experimental session. The emphasis in Mutual-Play was on play distinct from the interpersonal behaviors of proximity, turn-to-mother, and locomotion-time and -frequency which define Attachment. This again supports the hypothesis that competence behavior is independent of attachment behavior.

During free play, Mutual-Play consisted of the infant playing jointly with the mother in a game. The infant would watch the mother demonstrate and would actively participate in playing a game. The mother's behavior was generally Demonstration and Game-Play. In the structured tasks, the infant's behavior was divided into frequency of mutual-play and time spent in mutual-play. This distinction only became important during the tower building task. Time spent in mutual-play loaded on a factor indicating tower building. This sequence between mother and infant occurred in the following manner. The mother offered the infant a block. The infant took the block and stacked it onto the tower. This cycle of offer block, take block and stack block was repeated again and again. This was a mutual approach to building the tower. Such play patterns were characteristic of Mutual-Play between mother and infant. The mother and infant would often take turns in playing a game. The infant's participation in this cycle was reminiscent of Piaget's (1952) description of circular schemes.

In summary, both the cluster analysis and the factor analysis isolated three major infant behavioral patterns during the experimental periods. These were Attachment, Solitary-Play, and Mutual-Play. Generally, these clusters loaded on separate factors. Solitary-Play and Mutual-Play were negatively related to one another. An infant engaged in Solitary-Play activities was not also engaged in Mutual-Play activities in the same period. Both the Solitary-Play and Mutual-Play clusters were often independent of the Attachment clusters. It was concluded that infant competence behaviors as shown in play, whether or not associated with the mother, are generally independent of attachment behaviors. These findings support the hypothesis of separate origins of competence and attachment behaviors.

Attachment in the theoretical work of Bowlby (1969) and the research work of Ainsworth, Blehar, Waters, and Wall (1978) was linked with the development of competence behavior. Ainsworth, et al. (1978) cited an original statement of this hypothesis by William Blatz.

> a young child who had gained security in his relationship with his parents was emboldened thereby to strike out to explore the world, willing to risk the <u>insecurity</u> initially implicit in a learning situation because he could rely on his parents to be available, responsive, protective, and reassuring. If his adventure evoked undue anxiety, the child could easily return to "home base," with the expectation that his parents would provide the reassurance he needed. Likewise, if the child in his relationship with his parents was insecure, then he might not dare to leave them to explore, not trusting them to

> remain available to him if he left or to be responsive when he needed them. Lacking trust, he would stick close to his base, fearing to risk the anxiety implicit in exploration and learning.

This hypothesis means that a secure relationship with the mother in the form of attachment is necessary for the development of exploratory behavior in the strange situation. This is a psychoanalytic hypothesis (Freud, 1930; Erikson, 1963) that the parent serves the role of reducing the child's anxiety. If anxiety is neither too high nor too low, the ego then develops competence behaviors.

According to this hypothesis, the child at an early age incorporates the image of the secure parent in order to sustain himself while away from the parent. The internalized image reduces the anxieties which arise from new environmental situations. If the child does not have a secure image of the parent, then the ego will not be able to cope with the anxiety inherent in learning and exploration.

White (1963) set forth an alternative hypothesis to the traditional psychoanalytic construction of ego development. White proposed that the ego develops competence outside of anxiety reduction. The ego has a motivation to learn and explore which urges the child to move away from the parent. As the ego's motivation for competence develops, the child risks the uncertainty of a strange situation. In a sense, the child's ego rises to meet the challenge of the sitation. The child strives independently to learn and to cope with the strange environment.

This study supports White's hypothesis that competence behaviors are often independent of security behaviors. If the psychoanalytic hypotheses were true (i.e., securely attached infants are the ones who behave competently), then attachment and play behaviors should have loaded on the same factor. However, these variables loaded on separate factors independent of one another.

Two forms of attachment, Exploratory-Attachment and Exchange-Game-Attachment, were related to the competence behaviors of exploration and exchange play. Therefore, some types of attachments are related to competence. Both Exploratory-Attachment and Exchange-Game-Attachment are constructive activities related to the infant's interaction with the mother. These attachment clusters are, nonetheless, also independent of the infant's use of Solitary and Mutual-Play. Even these attachment clusters are independent of <u>other</u> competence behaviors.

This conclusion has received support from other studies. Attachment is also not related to the development of language acquisition, the presence of object permanence, or the score attained on the Bayley Intelligence Test at 24 months (Ainsworth, et al., 1978).

Attachment may be viewed as a function supporting the mother-infant caregiving system. Competency, on the other hand, is seen as arising from autonomous infant development. These competence behaviors then interact with the mother-infant communication network. For example, Pentz

(cited in Ainsworth, et al., 1978), in a study of language development and attachment, found that infants played an active role in their own language acquisition. The strategies adopted by infants for language learning did not relate to attachment behavior. Furthermore, mothers who were sensitive to nonverbal signals were not necessarily sensitive to the use of language.

Maternal Clusters and Second Order Factor Analysis

In earlier research on mothers and infants in a laboratory play setting, the mothers were generally passive participants in the interaction (McCall, 1978; Ainsworth et al., 1978; Rhinegold & Eckermann, 1970; and Cohen, 1974). Mothers in the present study actively participated in play with their infants. Such active participation had the advantage of providing a more natural setting for mothers and infants.

For example, Ainsworth et al. (1978) reported that some mothers felt unnatural and constrained in the experimental situation since they did not participate in play. Ainsworth recognized the artificiality imposed by such experimental constraints. Such constraints were necessary at that time to insure uniformity in an experimental setting.

Several studies, including the present one, have finally moved beyond this point and have taken a closer look at the influence of the mother's participation in

play (Stern, 1974; Rosenberg, 1975). There are two advantages to this strategy. First, the infant's response to the mother should be more natural. Secondly, the mother's behavior is now available for study. Before she was artificially passive, not responding to the infant but to the experimental instructions.

The present study indicated that the active participation of the mother did not hinder the observation of either attachment or play behavior of the infant. Additionally, previously unavailable maternal behavioral patterns were studied. In spite of these advantages, it is rcognized that maternal behavior in this setting was artificial in many respects. Mothers were provided instruction, even though very general, which did place direction and instructional set to their behavior. Less artificial observations have been performed by Clark-Stewart (1973) and White and Watts (1973).

The results of the cluster analysis of maternal behavior is limited in interpretability. Frequency and time measures cluster together. Mother-offer, mother-take, and mother-take-in-response cluster to form an Exchange-Game cluster, as in the infant analysis. These findings by themselves did not yield an interpretation of maternal behavior for the experiment. The second order factor analysis was useful in providing meaning to these maternal behaviors. Reciprocity between mother and infant runs throughout the analysis of maternal behavior.

Maternal responses are interpretable when considered with infant behavior. This was not necessary for interpreting the infant's behavior. The infant's behavior could be explained independently in terms of Attachment, Solitary-Play, or Mutual-Play. No independent constructs emerged from the analysis of maternal behavior. Instead, constructs were developed from the mother-infant interaction. Maternal behavior was related to the proximity of the infant in mother-infant interaction and related to infant participation in play tasks.

Maternal behavior was related to three forms of infant proximal behavior. These three forms were sustained proximity (proximal interaction), movement in and out of proximity (proximal/distal interaction), and lack of proximity (distal interaction). In proximal interaction, mother and infant engaged in free Mutual-Play or task-oriented Mutual-Play. The mother's response during this interaction was Game-Play. During the free play periods, the mother would demonstrate and/or participate in the game. In the structured play periods, Game-Play centered on the tasks of peek-a-boo and tower building. For example, in the tower building task, the mother and infant made the tower building into a circular game. To begin the tower game, the mother would offer a block to the infant. The infant would take the block and stack it on the tower. This cycle was then repeated.

In proximal/distal interaction, the mother's and infant's activity centered about their joint participation in the Exchange-Game. Infants would move out of proximity to examine the toys. The mother would wait for the infant's return or would point out certain toys to the infant. After examining a toy, the infant would usually bring it back to the mother. The mother would take the toy and play with it or demonstrate its use to the infant. Most of the activity of this interaction centered on the seeking and exchanging of the toys.

In the distal interaction, the infant would play away from the mother by him/herself. The infant explored and manipulated the toys about the room. The mother responded by using fantasy play or a variety of toys and schemes to gain the infant's attention. Fantasy-Play took the form of giving the puppets voices, taking Dapper Dan doll for a car ride, or being the princess during the peek-a-boo game. The mother's response then to the infant's independence was increased cognitive complexity.

Although a contingency analysis was not scored, the experimenter's observations were that such cognitive efforts did not lead to an increase in mother-infant interaction. This conclusion was supported by the second order factor analysis. Mother-infant interactions did not load with fantasy behavior or mother's use of schemes and toys. The Fantasy-Play performed by these mothers was considered to be too cognitively complex for this age group of infants.

Ainsworth et al. (1978) stated that the proximal/distal dimension was not an important explanatory concept in their work on attachment. Other investigators (Maccoby & Masters, 1970; Walters & Park, 1965), suggested that this dimension is important in understanding the development of mother-infant communication as the child expresses independence. The present study suggests that both views are correct. In the factor analysis, attachment was unrelated to the proximal/distal dimension as outlined above. Infant competence behaviors, on the other hand, load on different factors as just described. The mother-infant interaction changes along the proximal/distal dimension when independence and competence behaviors are considered.

The age of this group of infants may be a factor in explaining the importance of this dimension. These infants were studied because they were young enough to express attachment as described in literature. This group was also chosen because they were old enough to express independence during play. The role of physical proximity to childhood competence may be of importance only at this stage of development. It is at this time when the infant is beginning to become physically independent.

However, the use of distance may reflect different styles of mother-infant interaction associated with infant competence. Competence was intimate (proximal), then shared (proximal/distal), or solitary (distal). Future

research should investigate whether these forms of competence persist past infancy. Casual observation suggests that there are those who like to share their accomplishment with others; then there are others who keep their achievements to themselves.

Perceptual Style and Infant Behavior

The general hypothesis of the study that the perceptual style of the mother would be positively related to mutual mother-infant interaction was supported. Perceptual style related positively to the infant's use of Mutual-Play, Exchange-Game, and Sitting-On-the-Mother's-Lap. These activities indicated a positive mother-infant interaction associated with positive perceptual style. Perceptual style also related more broadly to infant behavior as well as to the interaction with the mother.

Perceptual style was positively related to the infant's use of Solitary-Play and Play-Time. Both of these clusters represent the infant's constructive use of independent play activities. Thus, perceptual style was related to the infant's competence directed either to the mother or to the playroom environment.

The CBC, as a measure of maternal perception, was predictive of infant competence but not infant attachment. In the multiple regression results, none of the clusters of infant attachment were correlated with the mother's perceptual style. This again points to the independence of these two domains of infant behavior.

Maternal Perceptual Style and Maternal Behavior

The results of the regression analysis of maternal behaviors an the CBC were not as interpretable as in the infant analysis. The mother's use of Game-Play was negatively correlated to the CBC in four of the six play periods. No interpretation of this relationship is apparent until the infant and mother behaviors are regressed on the CBC subscales.

In the sixth period, tower building, the maternal behaviors of variety-of-toys, and positive-touching correlated with the CBC. These positive behaviors appear to support, to a limited degree, the hypothesis that positive maternal behaviors are related to positive maternal perceptions. However, the analysis of the CBC subscales show that maternal behaviors in this play setting are related to the negative subscales and not to the positive subsubscales of the CBC.

The CBC and Perceptual Style

These results may be viewed as triangular. That is, the three measures of the CBC, maternal behavior, and infant behavior can be thought of as points of a triangle. There are positive relationships between mother and infant behavior and the CBC. There is a question mark between the CBC and maternal behavior.

Two conclusions may be drawn from the multiple regression of mother and infant behaviors on th CBC difference

score. First, the infant's behavior had a higher relationship to the mother's CBC score than did the mother's behavior. Second, the CBC measures the mother's perceptions of children's competence behavior. Other perceptions concerning the nature of the mother-child interpersonal relationship, such as attachment, are not captured by the CBC. Each of these conclusions is discussed below.

Three interpretations may be given to the higher predictive value of the CBC for infant rather than maternal behavior. First, one can assume that the maternal behaviors measured were irrelevant or too limited in measuring maternal behavior. If this were true, it would preclude the possibility of finding a predictive relationship between maternal behavior and the CBC. However, this explanation seems inadequate since the factor analysis of mother/infant behaviors found maternal behavior changed in an understandable fashion as infant behavior changed. Thus, this explanation does not account for the positive relationship between mother and infant behavior.

A second interpretation of the positive relationship between maternal perceptual style and infant behaviors is that the CBC is a measure of child behavior. Since the CBC asks questions concerning a child's behavior, it would be reasonable to assume that the scale would predict best to the child's behavior. This explanation then would predict that if the perceptual scale was composed of adult

behaviors, it would predict best then to maternal rather than infant behaviors. However, again this explanation does not account for the positive relationship between maternal behavior and infant behavior.

One could, on the other hand, accept the second explanation by proposing that maternal perceptions and maternal behavior are not related. This, however, would have the effect of undermining the entire significance of this perceptual model for development. The attribution theory, then, would have little consequence for psychology if it did not lead to behavioral results for the perceiver.

A third explanation of the CBC regression results rests in the infant's behavior as the cause of maternal perceptions and maternal behaviors. This explanation assumes that maternal perceptions and behaviors are elicited by her interaction with infant-initiated behaviors. With this explanation, no link between maternal perception and behaviors is necessary. Thus, infant behavior shapes the mother's responses in the two domains of perception and behavior. This also accounts for the stronger link between maternal perceptions with infant behavior and infant behavior with maternal behavior. This approach also assumes that the direction of effect is from infant to mother. Hence, infant behavior is more autonomous of maternal behavior and perceptions than the reverse order of effects. This explanation receives support from the fact that infant competence behaviors are those which

relate to the CBC and to maternal behavior. Infant competence behaviors are seen as arising more autonomously from the infant. The mother then interacts with the infant around these expressions of competence. This interaction leads to the formation of perceptions concerning childhood competence and also influences how she behaves toward the infant. Since the mother's perceptions and behaviors arise from an interaction with the infant, they may be viewed as separate processes.

This approach would account for the less defined link between maternal perceptions and behavior. Cognitive consistency models would hypotehesize that, as time passes, the relationship between parental perception or cognitions and behavior should become positively related. As parental cognitions and behaviors become positively related, parental perceptual style should predict how a parent will respond in a new situation. But assuming cognitions and behaviors to be separate systems which merge toward consistency also accepts a mismatch between the two systems, neither behaviors nor cognitions will satisfactorily predict one another.

This understanding of parental responses becomes important in studying child development. As the child develops and responds independently, the parent's behavior may or may not be guided by an overall perceptual framework. Some perceptual frameworks may guide the parental

response and result in planned-for parent-child interactions. However, at times, the child's behavior may not fit into any of the perceptual frameworks of the parents. At such times, the parent must also act autonomously and without a preconceived or guiding cognitive map. Future research should help define when and how parents utilize perceptual frames of reference. Competence behavior by the infant appears to be one of those areas in which the mothers acquire a perceptual frame of reference. This frame of reference is not very predictive of how the mothers will behave.

The disparity between the mother's perceptions and behaviors is not so great when a less independent domain of development is considered such as attachment. This leads us, then, to the second major finding of the multiple regression that the CBC did not relate to attachment behaviors. The CBC was composed of items which generally were concerned about childhood competence. Therefore, the CBC scale related best to infant competence behavior.

What can we say concerning maternal perceptual style and infant attachment? The work presented by Ainsworth and Bell (1969) and Ainsworth et al. (1978) indicated a strong relationship between cognitive frameworks concerning infant caregiving and maternal behavior during feeding at three months of age. These cognitive frameworks and behaviors were predictive of infant attachment behavior

nine months later. In this case, maternal perception and behavior preceded the observed infant's response.

These results suggest that the direction of effect on infant attachment is from mother to infant. As stated previously, attachment is a set of behaviors which promotes mother-infant interaction centered on the infant's caregiving and security needs. Competence behaviors, on the other hand, are viewed as separate from these needs, and the direction of effect between mother and infant was also seen as more interactional than unidirectional.

What would explain the differences between these two domains of behavior? The difference between the development and influence of the perceptual frameworks regarding attachment and competence appears to rest in the degree of autonomy of the infant's behavior and the level of control available to the mother. In the domain of attachment, the infant has little autonomy concerning his needs, but is dependent upon the mother for satisfaction. Maternal cognitive frameworks have a significant affect on the interaction which takes place in fulfilling these needs. In the domain of competence, the infant is more autonomous in obtaining satisfaction while the mother has less control in fulfilling these needs. For example, the development of language articulation has been found to be self-reinforcing. A parent has less control over this behavior, frequently finding it difficult to stop it or to

elicit it when desired. Hence, maternal cognitive frameworks have less control over the infant's behavior in this domain. Instead, it is hypothesized here that the infant's competence behaviors interact to develop the parental cognitive framework and eliciting parental behaviors in this domain.

The CBC Subscales and Infant Behavior

The CBC was divided into subscales. These subscales were placed in multiple regression analyses with the infants' behaviors. The infants' behaviors were differentiated for each of the subscales. The Angry, Impulsive, Competence, Intelligent, and Cooperative subscales were associated with competence behaviors displayed by the infants during play interactions. These differences in behavior support further the interpretation given earlier that mothers' perceptions of infant competence arise from interaction with the infant. Each of the subscales will be discussed below.

The Negative CBC Subscales and Infant Behavior

The Bully Subscale. None of the infants' behaviors were associated with the Bully subscale. In the fourth period of free play, there was a marginally significant negative correlation with Exploratory-Attachment. Of all the subscales, the Bully subscale was least associated with infant play. This lack of association is hypothesized to be a reflection of the infants' age. With the other CBC subscales, there is a close match between the

perceptual nature of the subscale and the infants' behaviors. This close match between perception and behavior suggests an interaction model of perception formation. Maternal perceptions of infant competence are built from observations of the infant's behavior. This match is missing with the Bully subscale. One may assume that this lack of association is due to a lack of bully behavior in the infants' behavioral repertoire. On the other hand, one has to wonder if another set of infant behaviors would have shown some infants to exhibit bullying behavior. Further investigation may find that mothers who endorse the Bully subscale have infants who bully others. It may also be that these mothers feel bullied by their infants.

The Angry Subscale. The relationship between the Angry subscale and infant behavior can be characterized as a negative interaction between mother and infant. There was a positive correlation between Negative-Touching in periods four and five. There were also negative correlations with the more positive aspects of attachment (i.e., Exchange-Game and Exploratory-Attachment). The subscale was also associated with a lack of constructive play behavior in five out of the six periods. There were negative correlations with various measures of play (i.e., Play-Time, Baby-Take, and Mutual-Play).

The behaviors associated with this subscale present an infant who was having a difficult time associating with the mother and the playroom environment. This is similar

to a description presented by Ainsworth, et al. (1978) for a group of infants. These infants, Group C, were ambivalent about their attachment and were unable to explore the playroom setting. The infant behaviors associated with the Angry subscale, likewise, were associated with a negative relationship with mother-infant exchange and constructive play.

The Impulsive Subscale. The Impulsive subscale, like the Angry subscale, was negatively related to the infants' use of constructive play. There were negative correlations with Play-Time, Exchange-Game, Solitary-Play, and Mutual-Play II. However, unlike the Angry subscale, there was not a negative relationship with attachment. To the contrary, this relationship was positive. The Impulsive subscale was associated with the infants' use of the distal communications of look-to-the-mother and Exploratory-Attachment. Even though these infants did not show constructive play, they did show positive attachment and orienting to the mother. The positive nature of this relationship was reinforced by a negative correlation of this subscale with the Negative-Attachment cluster.

The picture presented in this analysis suggests that these infants were, in fact, impulsive. The clinical picture of impulsivity presents the child as unable to engage in constructive activities. Disturbed relationships with the parents come from the child's inability to

obey limits and not from a disturbance in the love relationship with the child. This is descriptive of these infants. So here the mother's perception of impulsivity matches their infants' impulsive behavior. The description of the infants' behavior also matches the impulsive syndrome at later ages.

Summary of Negative Subscales. The results from the Angry and Impulsive subscales show that these CBC items which were derived from parents of clinically referred children are also descriptive of infant behavior at fifteen months. This is a validation of the importance of these behaviors in understanding childhood clinical syndromes. The Angry subscale is associated with behavior that depicts an angry infant (i.e., a negative interpersonal interaction with the mother and a negative relationship with constructive play. The Impulsive subscale, on the other hand, reflected an impulsive syndrome with a negative relationship to constructive play but a positive mother-infant interpersonal relationship. The Bully Subscale was not related to any infant behaviors. This may be due to the infants' ages or the behaviors scored from the play sessions. Additionally, as in other clinical research, these clinical behaviors were associated more frequently with male children. Both the Angry and Impulsive subscales were positively correlated from .30 to .40 with the infant's being a boy. As early as fifteen months, infants already are demonstrating clinical

behavior patterns and mothers are developing consistent perceptual biases of these behaviors.

The Positive CBC Subscales and Infant Behavior

The positive CBC subscales were related to the infants' use of constructive play activity. Each subscale was differentiated by its association with the interpersonal interaction between mother and infant. These subsubscales were independent of clusters indicative of positive attachment; but each subscale was negatively associated with the cluster Negative-Attachment. Unlike the negative CBC subscales, there was no relationship with the sex of the infant.

The Competence Subscale. The Competence subscale related to constructive play and task-oriented behaviors rather than interpersonal behaviors. The Competence subscale was associated with Solitary-Play, Mutual-Play, and Play-Time. There were no positive correlations with interpersonal behaviors such as looking-to-mother, touching-mother, or proximity-to-mother. Instead, mother-infant interaction was task-oriented with taking-from-mother and Mutual-Play with the mother. Ainsworth, et al. (1978) suggested that exploratory activities may be a displacement behavior indicative of a negative relationship with the mother. In this case, independence and competence behavior were not by-products of a displacement activity or of negative interpersonal relations with the

mother. In the third and fifth periods, there was a negative correlation of the subscale with the Negative-Attachment cluster. The Competence subscale was associated with task-oriented and competence behaviors which were independent of social behaviors indicative of attachment and negatively related to social behaviors indicative of negative attachment.

The Intelligence Subscale. The Intelligence subscale, like the Competence subscale, was related to the infants' use of constructive play activities. There were positive correlations with Solitary-Play, Mutual-Play, and Play-Episodes-Time. Unlike the Competence subscale, the Intelligence subscale was also related positively to social interaction with the mother. Social interaction for this group of infants centered upon close physical contact with the mother. There were positive correlations between the subscale and proximity-time, Touch-Positively, and Sit-On-Mother's-Lap. The Intelligence subscale was also negatively related to the Negative-Attachment cluster in the peek-a-boo period. The subscale was independent of other clusters indicative of attachment. In summary, the Intelligence subscale was positively related to constructive play and close physical contact with the mother. The subscale was independent of most attachment clusters but did show a negative relationship to the Negative-Attachment cluster.

The Cooperative Subscale. Both constructive play and interpersonal interaction with the mother were positively related to the Cooperative subscale. As with the other positive subscales, there were positive correlations with Solitary-Play, Mutual-Play, and Play-Episodes-Time. Like the Intelligence subscales, there was also an emphasis on close physical contact (i.e., proximity-time, Touch-Positively, and Sit-On-The-Mother's-Lap). As with the other positive subscales, the Cooperative subscale was independent of clusters indicative of positive attachment and negatively related to the cluster Negative-Attachment.

The Cooperative subscale also related to infant cooperation with the mother. During free play, the subscale was positively correlated with Baby-Take. Then, in the peek-a-boo game, there was a positive correlation with the cluster Mutual-Play II. This cluster indicated frequent participation by the infant in the peek-a-boo game with the mother.

This display of cooperation was considered important for two reasons. First, the Cooperative subscale was included in the analysis because of its heuristic importance for development. This subscale was related to infant cooperative behaviors validating the value of this subscale. Secondly, the positive correlation between the mother's perceptions of cooperation and the infant's cooperative behavior again showed the validity of maternal endorsements on the CBC subscales to match like infant behavior.

Summary of the Positive Subscales and Infant Behavior

Infant Competence. The three positive subscales of Competence, Intelligence, and Cooperation were related to the infants' use of constructive play activities. These subscales related to the competence behavior of the infant at play. As early as fifteen months, infants already are demonstrating patterns of competence; and mothers are developing consistent perceptual biases about competent patterns of behavior. The positive subscales were based upon behavioral items derived from parents of elementary school-aged children. The positive correlation of these subscales with infant behaviors indicates that the development of competence and perceptions of competence begin at an early age.

The two negative subscales of Anger and Impulsivity were related to infant behaviors representative of clinical syndromes. This discrimination represented a differentiation of clinical behavior at an early age. The same also appears to hold for the competence behaviors and the CBC subscales. Each positive subscale was related differentially to the infant's constructive behavior and communications. Such discrimination represented a differentiation of competence behavior at an early age.

Unlike the negative subscales, the positive subscales were less suggestive of a specific match between maternal perceptions and infant behavior. The exception to this generalization was the Cooperative subscale which related

positively to cooperative behaviors by the infant. This lack of specificity is seen as a measurement problem. Indications are that more specific measures of infant competence and intelligence would relate to the appropriate CBC subscales.

Infant Competence and Attachment

Bowlby (1969) hypothesized that attachment is an inherited behavioral system similar to other behavioral systems observed by ethologists in lower species. The assumption is that similar behavioral systems exist in the human being. For example, the rooting reflex which may be considered such a behavioral system aids the newborn infant in feeding (Crowell, 1967).

Attachment as a behavioral system is timed to appear as the infant gains mobility. This system's goal is to keep the infant close to the caregiver. The system is activated by strange environmental events which arouse "fear" or "anxiety" in the infant. This hypothesis assumes that attachment is an inherited fixed action pattern.

Some problems arise from this approach when interpreting Ainsworth's research. Attachment is seen as an important influence in the development of the infant. This is the psychoanalytic hypothesis outlined earlier. The problem at hand is to evaluate what attachment does mean in the development of the child.

If we continue the ethological line of thinking, then attachment has limited significance for development, just as the rooting reflex has limited significance. Fixed action patterns are highly specific and very limited in their goal and in their interaction with other behavioral systems. For example, the feeding behavior system is for the most part irrelevant to the reproductive behavioral system except in certain courting rituals. By analogy, the attachment behavioral system is generally independent of other developmental systems such as cognitive development, language development, and intellectual development.

Fixed action patterns associated with development are important to development when there is an insult to the developing individual which arrests development. For example, when the infant is born with brain damage, the Babinski reflex remains in the individual's responses and does not disappear as expected. In this context of insult, the psychoanalytic approach is conjoined with the ethological approach in the concept of fixation. The adverse effects of insult on the developing infant during attachment were demonstrated by Bowlby's (1969) observations of children separated from their parents during World War II.

The theory of insult and resulting fixation is a theory concerned with aberrant development. The majority

of individuals pass through the stages of development successfully. Evidence points to the fact that successful passage of stages is sufficient for the achievement of normal development and that optimal passages of stages are not necessary nor predictive of later development (Tanner, 1970).

Attachment between mother and infant may follow a course analogous to that of obtaining an adequate diet. If attachment is lacking, then this disrupts the developmental processes; but if attachment is adequate, then development follows its normal course. Later stages of development would be independent of the attachment behaviors. The reason for this independence arises from the criteria of an adequate level of attachment. Attachment, like diet, may come in amounts which are more than adequate, but anything above the adequate level does not affect the course of development. This is illustrated in the results of the positive CBC subscales. These subscales had a negative correlation with the Negative-Attachment cluster. This result indicates that <u>disturbed attachment</u> is negatively related to the use of competence and the perception of competence. Positive attachment, on the other hand, was independent of infant competent play and the mother's perceptions of competence. Positive attachment is viewed as setting the stage for competence behavior. After adequate attachment is achieved, higher

levels of attachment are unrelated to competence. Disrupted attachment may be viewed as an insult to the growing infant which hinders the developmental process. Positive attachment, on the other hand, enables the independent process of competence maturation to begin.

The CBC Subscales and Maternal Behavior

Even though maternal behaviors had some consistency with the CBC subscales, these behaviors were not readily interpretable. As pointed out in the discussion of the cluster and factor analytic results, maternal behaviors were most easily interpreted in their relationship to infant behavior. Two possible explanations may account for these results.

First, the playroom setting was best in eliciting infant rather than maternal behaviors. Maternal behaviors appeared to be an adjustment to the infants' behaviors. This play-setting filled with infant toys and play was dominated by infant choice. A setting which demands more decisions from the mother concerning her behavior should lead to information concerning mothers' biases in interaction.

Secondly, the CBC subscales may relate more directly to infant behavior because they are derived from descriptions and perceptions of children's behavior. If this is so, then predictions of adult behavior will require a new instrument; namely, the parents should be asked to evaluate and endorse descriptions of adult behaviors. If there

are valid subscales describing infant and child behavior, we must assume the same will be true for adults. Future research should focus upon gathering and classifying descriptions of positive and negative adult behaviors in the same fashion as the child research was conducted.

Maternal behaviors related to the CBC subscales depended upon whether the subscale was positive or negative. The negative subscales were related positively to Game-Play and negatively to Mother-Take during the free play. Mother-Take was related positively during structured play periods. As pointed out in the discussion of the results from the maternal clusters, maternal behaviors were more readily interpretable in relation to the infant's behavior. The positive correlation with Game-Play appears to be the mother's attempt at gaining the infant's attention. However, the negative correlation with Mother-Take indicates a lack of success in obtaining infant interaction in play. The positive subscales were related to Demonstration-Play. This correlation reflects the higher level of Mutual-Play and positive mother-infant interaction which these subscales had with infant behavior. Although the results are limited, they do support the hypothesis that positive perceptual style would be related to higher levels of mother-infant interaction and play and that negative perceptual style would be related to lower levels of mother-infant interaction and play.

GENERAL CONCLUSIONS

The following conclusions were presented in the results and discussion sections:

1. The cluster analysis and factor analysis of infant behaviors isolated three categories of infant behavior: Attachment, Mutual-Play, and Solitary-Play.
2. Four patterns of attachment were observed. These were: Global-Attachment, Exploratory-Attchment, Exchange-Game-Attachment, and Negative/Ambivalent-Attachment.
3. Infants showed wariness to the mothers' use of the princess mask with an increase in negative-touching and/or avoidance of the mother.
4. Infants showed competence at play in either Solitary-Play or Mutual-Play.
5. Infant competence was generally independent of infant attachment behavior.
6. Infant competence was expressed as intimate (proximal), or shared (proximal/distal) or as solitary (distal).
7. The study supported the general hypothesis that perceptual style of the mother would be positively related to mutual mother-infant interation. Positive perceptual style was related to Mutual-Play, Exchange-Game, Sitting-On-Mother's-Lap, Solitary-Play, and Play-Time.

8. The CBC was predictive of infant competence but not infant attachment.
9. The infant's behavior had a higher relationship to the CBC than did the mother's behavior.
10. The CBC was composed of six subscales. These were: Bully, Angry, Impulsive, Competent, Intelligent, and Cooperative subscales.
11. Regression analyses with the negative subscales indicated that these infants demonstrated clinical patterns and mothers held perceptual biases consistent with these patterns.
12. Regression analyses with the positive subscales indicated that these infants demonstrated patterns of competence and mothers held perceptual biases consistent with these patterns.
13. The playroom setting was suited best for studying infant behavior. A setting which demands more decisions from the mother concerning her behavior should lead to information concerning mothers' biases in interaction.

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APPENDIX A

MICHIGAN STATE UNIVERSITY East Lansing, Michigan 48824
Psychology Department - Olds Hall

Dear Mother:

We are psychologists at the Infant Learning Laboratory at Michigan State University who are interested in studying children and families. As part of an ongoing research project, we are studying the development of play during the early years of life.

We are writing this letter to ask you if you and your baby would like to participate in our study. This study involves about a 1-1/2 hour time commitment. Approximately 1 hour is spent in one session by the mother filling out some questionnaires on child-rearing as well as viewing and evaluating a film of an adult and a child playing together. In a second session, lasting about 1/2 hour, you and your 14- to 18-month-old baby are asked to play together. These activities will take place on two separate days at Olds Hall on the MSU campus. All materials gathered during the study will be kept in strictest confidence. Participants will receive $10.00 for their cooperation in the project.

If you think that you might be interested in participating in this study or would like to obtain more information, please fill out and mail to us the enclosed, stamped, addressed postcard. Returning the card to us only indicates your interest in, but not your commitment to, participate. A member of our staff will call and give you further information and answer all questions. At the end of the phone conversation, you can decide to participate or decline participation as you wish. All volunteering mothers will be contacted.

We hope that you will return the card so that we can have the opportunity to contact you further about your participation in our study of play.

Sincerely yours,

James R. Nuttall, M.A.
Research Coordinator

Hiram E. Fitzgerald, Ph.D.
Professor of Psychology

Gary E. Stollak, Ph.D.
Professor of Psychology

JRN:HEF:GES:ekt

APPENDIX B

TELEPHONE CONTACT SHEET (Read slowly)

Hello. Is this Mrs. _____? This is _____ from Michigan State University. I am calling in response to receiving a card which you mailed back to us concerning our study on the development of play in young children.

I wish to thank you for your interest and would like to tell you a little more about our study and to see if you would like to participate with your baby. Before I begin, are there any questions which I may answer for you?

We are asking mothers and their babies to come to our Infant Learning Laboratory and to participate in a study on mother-infant play. We are first interested in obtaining your views on child-rearing and to have you watch and evaluate a film of an adult and child at play. To do this, we will ask you to fill out three questionnaires. This will be done in a meeting with the mothers of our study during the day or an evening time at Olds Hall on the Michigan State University campus. This first meeting will last about an hour and will only involve you and not your baby.

We, then, would like to make an appointment with you to come on another day with your baby to participate in a play session together. We have a playroom which is carpeted and filled with toys which young children enjoy playing with. We are interested in seeing how young children play with toys and how they relate to you during

play. We would like to observe and videotape this play session which will last about 1/2 hour.

For participating in our study, you will receive $10.00 from us.

Do you have any questions which I may answer for you? If you would like to help us in our study, I would like to make an appointment for our first meeting and set a time also for the second session in which you and your baby will participate.

A group of mothers will be meeting for the first session on _____ at _____. You should be able to arrive here from the information on the map we sent to you. Do you still have our map? Do you understand how to get here and where you may park your car?

For the second session in which both you and your baby will participate, we can set a time either in the morning or the afternoon. Our first opening may be several weeks away. We have the following times available? _____ _____. (After setting a time.) O.K., I'll make a note of this time and when you come for the first meeting on the _____, you will receive a reminder card from us.

It was nice talking to you. If you have any further questions or if you find that you cannot make either of these appointments, call us at the numbers listed on the back of the map. Thank you very much. Good-bye.

APPENDIX C

Good Morning: (afternoon, evening)

I am _____. The other research team members are _____.

I would like to welcome you to our research project on play behavior in young children. We are pleased that you are able to come and to help us in our further understanding of why and how children play and spend their time.

We are not only interested in how your babies choose to play, but we want to find out more about how mothers feel about play.

However, before we begin, we will need to ask you to give your consent to participate in our research. Inside the envelope we gave you, you will find a consent form which states how the materials we gather will be used.

At this time, I will read the consent form and ask you to follow along with me as I read. After I am done if you have any questions, feel free to ask. (Read consent form.)

Are there any questions? If not, we would ask you to sign the form and to place your address also in the space provided. This address will allow us to send to you a summary of the findings from our project; so, you will know what we have found from your participation.

Michigan State University
Department of Psychology
Research Consent Form

I, _____, agree to participate in and to be videotaped during the study of the development of young children's play conducted by James R. Nuttall under the supervision of Dr. Hiram E. Fitzgerald and Dr. Gary E. Stollak.

I understand that during the study, I will be asked to fill out several qustionnaires giving my views on child-rearing. I will also be asked to view and evaluate a videotape of an adult and child playing together. As part of the present study my baby, _____, and I agree to participate in a play session together. This session will be videotaped an the tape will be viewed by research assistants who score the tape for research purposes.

I understand that all the materials collected will be held in strictest confidence. These materials will be collected, stored, and remain anonymous, no specific report on me or my baby will be available to me or to anyone else. However, at the end of the research project, I will receive a brief summary of the research findings.

I understand that I may discontinue my participation in the present research project at any time without loss of the $10.00 received by participants. I, also, upon written request may ask that all materials collected on me or my baby be withdrawn from the study files and not entered into the study.

The materials gathered during this study will be stored and protected as confidential materials by the researchers. When the materials are no longer useful for demonstration, instruction, or research purposes, or by written request, they will be withdrawn from use, mechanically erased, or destroyed. However, prior to this time, I authorize Michigan State University to use such materials for demonstration purposes with professional psychology groups and to permit the right of use to other parties for such purposes so long as they also agree to protect the confidentiality of the material.

_____
signature

_____

_____

_____
address

We wish to express our gratitude for your participating in our research project on young children's play. If at any time you have any questions, please feel free to contact us.

James R. Nuttall

Dr. Gary E. Stollak Dr. Hiram E. Fitzgerald

Mother's Background Information Sheet

Mother's Occupation: _____

Years in Occupation: _____

Mother's Highest Level of Education Completed (circle one):

elementary grade: 1 2 3 4 5 6

junior high school: 7 8 9

high school: 10 11 12

college: 1 yr. 2 yr. 3 yr. 4 yr. degree granted

M.A. degree

Ph.D. degree

other degrees or certificates (e.g., R.N., D.D.S., or military service and/or vocational training):

_____

In a similar manner as above, we would like to know your husband's occupation: _____

and highest level of education: _____

Ages of members of baby's family:

Mother _____ Father _____

Brothers _____ Sisters _____

If brothers and sisters are under six years of age, indicate their ages to the nearest 1/2 year.

INFANT'S INDIVIDUALITY SCALE

In order to understand the many individual differences we see in babies, we would like you to fill out the following inventory. This inventory gives us some information on your baby as an individual. Inside you will find sixteen items. Each item consists of two alternative statements "A" and "B." After reading the two alternatives, decide which of them best describes how your baby behaves. On the separate answer sheet, you will find a space to mark your choice. Decide if your baby is (1) like the description in statement "A;" (2) more frequently like description "A" than description "B;" (3) equally like description "A" and "B;" (4) more frequently like description "B" than description "A;" (5) like the description in statement "B."

INFANT'S INDIVIDUALITY SCALE

1. A. Stands in tub, very active, splashes, won't stay seated.
   B. Very passive in tub. Moves very little.

2. A. Very positive reaction to dog (animal pet). Reaches out to him, crawls after him, tries to play with him.
   B. Often ignores dog (animal pet). Would rather play by himself/herself for even an hour.

3. A. Bedtime irregular. To bed from 8:00 P.M. to 10:00 P.M. and also gets up with no schedule.
   B. To bed between 6:30 and 7:00 or 7:00 and 7:30 P.M. Goes to sleep without fuss or special routine. Gets up on schedule.

4. A. His/Her response to strangers is positive; he/she smiles, talks, bounces, stands up, and looks at everyone.
   B. When he/she is with strangers and mother is holding him/her, he/she clings and averts head away from stranger.

5. A. There are some foods he/she has consistently dislikes, such as liver, tomato juice, and stews.
   B. Previous negative reactions to some foods, such as applesauce and peas, have disappeared. Now takes them all well.

6. A. If he/she is wet, he/she cries. Stops when changed.
   B. When diaper is wet, only fusses a little bit.

7. A. Has strong likes and dislikes. For example does not like noodles or spaghetti. Will spit it out.
   B. Eats everything, including all kinds of new foods. No dislikes.

8. A. When having face washed, smiles, sticks tongue out, and licks washcloth.
   B. Fusses and cries when face is washed or hands are cleaned.

9. A. Can entertain self for a half to one hour.
   B. Concentrates on a toy not at all or very little.

10. A. Chins self on window, crib, or chair. Pulls self off of feet.
    B. Won't climb up the stairs of a slide. When standing, likes to put hand on a chair.

11. A. Takes afternoon nap, fairly regular nap times.
    B. Day naps irregular, difficult to get to sleep in afternoon.

12. A. If he/she is given a toy, especially if it is a new toy, he/she will stop crying and play with it.
    B. Was afraid at first of a new toy. Started to cry.

13. A. When dressing, not interested, not cooperative. Yells to show he/she doesn't want to get dressed.
    B. Now cooperates in dressing, moves arms helpfully. Doesn't twist and turn away as he/she used to.

14. A. When told "no" to something, he/she wants or is intent on doing, will hit mother.
    B. When told "no," he/she obeys. He/She will stop activity and is silent.

15. A. Enjoys bath. Splashes, plays, and stands up.
    B. When placed into the tub, he/she cries.

16. A. If something is taken from his/her reach, he/she will cry. He/She is distracted with substitutes.
    B. If something is taken from his/her reach, he/she will cry. He/She is not distracted with substitutes.

Answer Sheet for Infant's Individuality Scale

Place an "X" in the column which best describes how your baby behaves for the sixteen items listed in the questionnaire. After reading each item with alternatives A and B, you have five choices for each item. They are: (1) my baby is like alternative A, (2) my baby is more frequently like A than B, (3) my baby is equally like A and B, (4) my baby is more frequently like B than A, (5) my baby is like alternative B. For each of the sixteen items, decide which of the five choices best describes your baby.

Item	Column 1 like A	Column 2 more A than B	Column 3 equally A and B	Column 4 more B than A	Column 5 like B
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					

APPENDIX D

INSTRUCTIONS FOR VIDEOTAPE VIEWING

On the television, I am going to show you a tape of an adult playing with a child. The adult you will see was a student receiving training in play techniques. The child was one of many children from the local schools who were paid to play with the student once a week for a series of weeks.

We will be showing you some sections from this series of play sessions. This tape will last for about 20 minutes. At times, the sound is a little difficult to hear. But you should be able to understand most of the tape.

We would like you to watch the adult in the videotape since we will ask you to respond to some qustions about what you thought of her.

Do you have any questions?

Now I am going to start the T.V.

ANSWERS TO QUESTIONS

Answer any question the mothers might have except those which alter the instructional set created by the directions. For instance, if the mother asks why she is being asked to watch the film or what the purpose of the film is, just say: "To see what you think about how the adult and child play together." Or if the mother asks about the relationship of the adult and child, just rephrase what the directions explain (i.e., that the adult and child did not know each other before they began to play together and they were paid to play together to make the videotape.

Mothers may ask if the child in the videotape was acting. To this question the experimenter should reply: "Frequently, when tapes are spliced together like this one, this creates such an effect, since the screens are taken out of their original context."

APPENDIX E

TOYS AND SCHEMES

Toys	Schemes
Airplane	fly
	push
	motor sounds
Blocks	knock over
	stack
	throw
Car	push
	motor sounds
Crayons	color
	mouth
	put in box
	take out box
	throw
Doll	hugging
	dress
	undress
	talk
	walk
Mask	label face
	put on
	hide objects
	cover M face
	cover B face
Puzzle	pieces in
	pieces out
	dump
	throw
Teddy Bear	hugging
	kissing
	talking
Xylophone	hit
	pull
	push
Peek-A-Boo	regular
	chair
	animals
	book
	hands
Balls	bounce
	catch
	roll
	throw
Barrels	put in
	take out
	throw
	twist
Coloring Book	flip page
	point
Blocks in Can	dump
	stack
	put in can
	take out can
Jack-In-Box	turn
	crank
	push in
	pull out
	close lid
Puppet	hand in
	hold up
	hug
	eat
	get you
	kiss
	talk
Rings	put on
	take off
Telephone	dial
	talk
	place on ear
	hang up
Xylophone Hammer	hit
	throw
	mouth
I'm Going To Get You	crawl
	crouch
	toys
	tickle

APPENDIX F

INSTRUCTIONS TO PLAY SESSION

As you will see, this is a playroom and on one wall there is a one-way mirror. The one-way mirror allows us to observe and to make videotapes of what happens in the playroom. During our time together today, we will be doing several different kinds of things. We will be videotaping you and your baby as you do them. Later on we'll be going back and looking at the videotapes in order to learn more about what mothers and infants do when they are together.

Today we're going to ask you to be involved in 3 different tasks for us. Each of them will take about 10 minutes to complete. We're pretty sure that all of them will be interesting and we hope that you will enjoy them as you play together.

The first task is very simple. We're just interested in your playing together. During the next 12 minutes, you may do whatever you want to do in the playroom. When the time is over, I'll come back with the instructions for the next task. Again, during the next 12 minutes, you can do whatever you wish to do in the playroom.

Do you have any questions?

(The experimenter leaves the playroom and returns in 12 minutes.)

(After 12 minutes, the experimenter returns and says:)

Mrs. _____. In the second task what we would like you to do is to play two games for us with (baby's name). Each of these games will last for 3 minutes. The first game we would like you to play is "peek-a-boo."

Over among the toys you will find the mask of a princess. We would like you to use this mask as part of the game.

The second game we would like you to play is "I'm going to get you." When I leave, you can begin the first game of "peek-a-boo." Then, after 3 minutes, I'll come back to let you know when to start the second game.

Do you have any questions?

(Experimenter leaves the room and returns in 3 minutes.)

Thank you. Now, we are ready for the second game of "I'm going to get you." Do you have any questions?

(Experimenter leaves the room and returns in 3 minutes.)

Thank you. You have now finished two of the three tasks. For the last task, we would like you to teach (baby's name) two games.

Each of these games will last for 3 minutes, and then we will be done. The first game is to build a tower of blocks to a height of six blocks. Over there (next to the radiator) is a set of blocks which you may use. After 3 minutes, I'll come back to ask you to teach (baby's name) the other game. Do you have any questions?

(Experimenter leaves the room and returns in 3 minutes with the puzzle.)

Thank you. Now we are ready for the other game. We would like you to put together this puzzle. Our puzzle is made up of a circle, triangle, and square. We would like you to teach (baby's name) to place them in the correct holes. Do you have any questions?

(Experimenter leaves the room and returns in 3 minutes with the departing instructions.

(Departure): Thank you, you have now completed all of our tasks for this play session. I'll go now and leave you alone fdor the next few minutes so you can get (baby's name ready to leave. When you are ready, come to the back of the hallway and you may take a look at the videotape we have made.

APPENDIX G

CHILDREN"S BEHAVIOR CHECKLIST FORM B

Date: _____

Directions:

Below is a list of items describing many aspects of children's behavior - things that children do sometimes, ways that they act and feel. Of course, not all of these items applying to the child in the playroom that you first observed on the videotape, but quite a few of them do.

First, read Item 1 carefully and then make up your mind about whether or not it describes the way he acted in the playroom. If so, mark an "X" in column one, if not put a "0" in the first column. Then go on to the second item and decide whether or not this behavior applies to the child's behavior, marking it the same way. Do this for all 64 items, putting an "X" in the first column of each item which you feel is applicable to to his playroom behavior and a "0" for each item you feel is not applicable to the behavior you observed.

Once you have completed this task, go back to the first item, and this time decide if the behavior described applies to the way that you think that the child acts in general - that is, not just his behavior in the playroom, which you saw, but behavior which you think occurs in other situations such as at home, in school, on the playgound, with friends, etc., as well. If you do not think so, put a "0" in the second column. On the other hand, if you think this item applies to his behavior in general, put an "X" in the second column (whether or not you put one in the first column). Again, go through all 64 items deciding for each whether or not each item applies to his behavior in general.

Children's Behavior Checklist Form B

Item	Column 1 Applies to Behavior in Playroom Which I Saw	Column 2 Applies to Her Behavior in General
1. Is happy when she does a "good job."		
2. Gets carried away by her feelings.		
3. Is tidy and neat, perhaps even a little bit fussy about it.	P*	P
4. Can't wait - wants to have things immediately.	N**	N
5. Is concerned about the feelings of adults.	P	P
6. Gets irritated or angry easily.	N	N
7. Feelings are apparent in her facial expression.	P	P
8. Plays with toys in a rough way.	N	N
9. Handles small objects skillfully.	P	P
10. Doesn't pay attention to what others say.	N	N
11. Activity is focused on a particular purpose, seems to accomplisy what she sets out to do.	P	P
12. Looks awkward when she moves around.	N	N

*P = positive item.

**N = negative item.

Children's Behavior Checklist Form B

Item	Column 1 Applies to Behavior in Playroom Which I Saw	Column 2 Applies to Her Behavior in General
13. Accepts new ideas without getting upset.	P	P
14. Acts in ways that make adults not like her.	N	N
15. Shows pride in accomplishment.	P	P
16. Appears stiff in walking or moving about.	N	N
17. Seemed comfortable in the situation that you observed.	P	P
18. Has trouble finding the right words to say what she means.	N	N
19. Wants very much to be approved of.		
20. Seems to do things just to get adults angry at her.	N	N
21. Moves gracefully - well coordinated.	P	P
22. Has a characteristic mannerism or nervous habit.	N	N
23. Plays to win.	P	P
24. Quickly loses interest in an activity.	N	N
25. Does what persons ask her to.	P	P
26. Never gets excited about anything, even when you expected her to be pleased with something.		

Children's Behavior Checklist Form B

Item	Column 1 Applies to Behavior in Playroom Which I Saw	Column 2 Applies to Her Behavior in General
27. Makes friends quickly and easily.	P	P
28. Seems sad and unhappy.	N	N
29. Self-confident.	P	P
30. Tends to go too far unless reminded of rules.	N	N
31. Talks all the time.	P	P
32. Often has to be reminded of what she can and can't do.	N	N
33. Affectionate - enjoys being physically close to adults.		
34. Threatens to hit or hurt others.	N	N
35. Is able to stand up for herself.	P	P
36. Seems out of touch with what is going on around her off in her own world.	N	N
37. Is polite and cooperative.		
38. Has uncontrollable outbursts of temper.	N	N
39. Is easily embarrassed.	P	P
40. Often breaks the rules in games.	N	N
41. Is careful in explanation - precise.	P	P
42. When told to do something she doesn't want to do, she becomes angry.	N	N

Children's Behavior Checklist Form B

	Item	Column 1 Applies to Behavior in Playroom Which I Saw	Column 2 Applies to Her Behavior in General
43.	Is curious about things.	P	P
44.	Plays aimlessly, doesn't seem to make or accomplish anything.	N	N
45.	Prefers competitive games.	P	P
46.	Seems selfish, always wants her own way.	N	N
47.	Showed appreciation when others helped or did things for her.	P	P
48.	Seldom laughs or smiles.		
49.	Energetic.	P	P
50.	Doesn't seem to care about how she looks - often looks sloppy.	N	N
51.	Asks sensible questions.	P	P
52.	Blows up very easily when	N	N
53.	Shows pleasure and involvement in most things she does.	P	P
54.	Fidgety and restless.	N	N
55.	Is competitive.	P	P
56.	Acts as if adults are against her.	N	N
57.	Pitches in when things have to be done.	P	P
58.	Often seems angry for no particular reason, expresses it in many different ways.		

Chilren's Behavior Checklist Form B

Item	Column 1 Applies to Behavior in Playroom Which I Saw	Column 2 Applies to Her Behavior in General
59. Quick and clever.	P	P
60. Aggressive and over-powering.		
61. Learns quickly.	P	P
62. Bossy.		
63. Likes to do things well.		
64. Tires easily in activities.		

APPENDIX H

Infant: Scoring Categories

1.	Looking to mother	Any gaze at the mother. The gaze is an indication of the infant's visual attention to the mother's face or her body (such as in gazing at the mother while walking at her which frequently means looking to her but not at her face). Looking at the mother also includes any exploration of the mother or the articles she is wearing.
2.	Looking at demonstration	This is a gaze in which the infant is looking at the mother demonstrating, showing, playing with or holding objects. Examples are watching the mother engage in puppetry. However, if the infant looks to the puppet and also touches it, then he is engaged in mutual play.
3.	Looking at array	Looking at the array of toys as in standing back from them and taking in a number of undefined toys at a glance. This category also includes a sweeping glance of the array or of several toys at one time.
4.	Looking at toy	A gaze at a toy. This is a sustained visual examination of a particular toy. Frequently, the infant will look to a toy before picking it up. This should be scored as first looking to toy and then as play once the pickup has occurred.
5.	Look at object and object involvement	Looking at the objects in the room. This gaze is a sustained visual exploration of an object. Sweeping gazes into the room or staring off into space are not scored as looking at an object. Examples of this category are examination of the radiator, the door, or the electrical outlets. The category also includes handling, or fingering the objects in the room.
6.	Solitary play	Play is the acting upon an object (toy). It includes handling, fingering, mouthing, bouncing, throwing, stacking or otherwise physically acting on the toys. It may

		include visually following the results of the action (such as in throwing). Play must be accompanied by visual or auditory attention to the object. It DOES NOT include touching or hanging onto a toy with inattention to the toy.
7.	Mutual play	Play in this context is interaction between mother and infant as in playing peek-a-boo. A mutual attention to a common game is mutual play. Also the manipulation of an object together is mutual play as in fitting parts together.
8.	Negative vocalizations	Any distress-type vocalizations made by the infant. These may include the infant crying, wining, fussing, or saying "no" to the mother.
9.	Positive vocalizations	All vocalizations made by the infant which are speech or prespeech sounds and which are not negative or excited emotional vocalizations. If in doubt as to the category, the vocalization is placed in this group.
10.	Excited emotional vocalizations	These are vocalizations which are normally thought of as laughter. The category also includes intensely excited displays of positive affective vocalizations such as squeals for joy.
11.	Offering	Occasions on which the infant offered an object or toy to the mother.
12.	Takes	Infant reaches out and takes the object which the mother is holding.
13.	ATC/toy	Affectionate Tactual Contact/toy: Includes kissing, hugging, or acts of affection directed toward a toy.
14.	ATC/M	Affectionate Tactual Contact/ Mother: Includes kissing, holding onto, touching, or sitting on mother's lap. All touching of the mother is considered positive unless it is negative.

15.	NTC/M	Negative Tactual Contact/Mother: infant actively avoids the mother's touching him/her or actually pushes mother away. This may be done by either moving away from the mother's grasp or by pushing away from or hitting the mother. Also included in this category are those times the baby refuses to take something the mother offers which is more than ignoring the offer but is an active avoidance of the toy offered. Avoidance may also occur in the "I'm going to get you" game if the avoidance is accompanied by signs of fussing or distress in the game.
16.	Turning from mother	If the baby orients himself more than 90° away from the mother so essentially he/she can no longer see the mother. Thus, the infant turns away from the 180° frontal plane of direct facing. (Direction and distance measures will be scored for every ten-second interval.) (This is a duration and not a frequency measure.)
17.	Turn to mother	If the infant's body orientation is within the 180° frontal plane for mother and infant. (Again, this is a duration and not a frequency category.)
18.	Proximity	Following a convention widely observed in human and nonhuman primate research, proximity was defined as the area within 3 feet (.9m) of the mother. Proximity is coded only once in each 10-second time period that the infant is within proximity of the mother. The category is scored as long as mother and infant are within 3 feet of one another. This is a duration rather than a frequency measure.
19.	Imitation of M	An obvious attempt or actual display of some behavior or vocalization which the mother has just completed. If ten seconds pass between maternal display of behavior and infant behavior, imitation is not scored.

20.	Variety of toys	Each time the infant handles a new toy, this is scored for the category variety of toys handled. Each time the infant moves to another toy for play, this category is scored even if the infant has played with the toy previously. (This category yields a measure of number of toys played with and the duration of each play.)
21.	Variety of schemes	This category is scored each time the infant uses a new scheme in playing with toys, objects, or in the context of a game. Schemes are global action patterns performed on or toward objects and people. Examples are: Throwing the ball, pushing the car, building a tower of blocks, knocking the tower of blocks over, putting the pupper on the hand, fingering an object, hitting something with the hammer, kissing the stuffed toy, etc.

APPENDIX I

Mother: Scoring Categories

1.	Looking at baby	A gaze by the mother at the baby. This gaze is an indication of the mother's visual attention toward the baby.
2.	Offering	Offering occurs on occasions when the mother offers an object or toy to the infant.
3.	Takes	The mother reaches out and takes an object or a toy from the baby. A take may occur with or without a proffer from the baby.
4.	Sensory motor play	This play category is scored when the mother manipulates a toy or object by either performing sensory motor schemes on the toy or while holding the object and visually inspecting it. This, as in the other play categories, may be done as a solitary activity or as a mutual play activity. EXAMPLES: In the solitary play situation, the mother's behavior is generally characterized as motor exploration of the toy or object. In mutual sensory motor play, the mother and the infant manipulate a toy or object together. The mother may rotate the object so the infant also may play with it (or hold the toy for baby).
5.	Game play	Game play occurs when it is obvious that the mother is attempting to engage the infant in a game. A game is a sequence of activities performed by rules and has a circular quality to it. EXAMPLES: Peek-a-boo, chase (turn-run-turn-run); building a tower and then knocking it over; throwing a ball to each other or in a throw-retreaval fashion; using the puppet to bite the baby's arm, nose or leg.
6.	Demonstration play	The mother demonstrates the use of a toy to the infant. This play has a "how-to" or "how-it-works" quality. (If the mother holds a toy up to show the infant attempting to gain

		the infant's attention, this act is scored as sensory motor play and offering.) Demonsteration play must have the quality of attempting to teach the functions of or the rules behind the toy or event. EXAMPLES: Showing the infant how to stack blocks, fly the airplane, push the car, or helping the baby to put the puppet on his hand. In addition, if the mother labels body parts during play, they will be placed in this category as well as in "labeling."
7.	Fantasy play	In fantasy play, the mother acts out roles of a "real life" nature with or for the infant in the context of make-believe (i.e., talking on the telephone, taking a trip in the car, dressing or undressing the dolls, or putting the dolls to sleep. If the mother also changes her voice to give the puppets or stuffed animals a voice, this is fantasy play.
8.	Imitates	Imitation is a combined behavioral and verbal category. Imitation is scored if the mother repeats a behavior or vocalization after the infant has just attempted or has actually displayed the behavior or vocalization. EXAMPLES: If the baby picks up the telephone and says "Gampa" and the mother repeats "Grandpa;" or if the baby pushes the car and then the mother takes and pushes the car. Vocal imitations may be quite subtle (e.g., Baby says, "Sha;" mother imitates by saying, "Shoe." Baby says, "Doo;" mother says, "Dog."
9.	Interogative statement	Mother asks the baby a question. EXAMPLES: "What is this?" Where is the ball?" "Where is his eyes?" "Can the dog bark?" "Can you say hello on the telephone?"
10.	Declarative statement	The mother makes a simple statement to the baby which is not an imitation, an interogative, or any of the other verbal categories listed. EXAMPLES: "Cookie mouth." "Zoom, zoom." "There are so many things."

		"The puppet is soft." "It's bright." "Pretty colors."
11.	Labeling	The mother names an object or toy for the baby. EXAMPLES: "It's a rabbit." "Blocks." "It's an airplane." "That's his mouth." "Car, car." "Baby's shoe." "Telephone."
12.	Directing	The mother directs the baby to do something or to play in a certain manner. EXAMPLES: "Let's do the blocks." "Put that one in here." "Look at the toys." "Listen to the music." "Give it to me, give it to mommy." "Put the puzzle down." "Pull the string."
13.	Praise	Mother expresses approval of the baby or of the baby's behavior. EXAMPLES: "Ball, right." "That's right." "What a big girl, how nice." "Oh yes, that's right." "Good, good."
14.	Calling the infant	Calling the baby by name. Also calling for the infant's attention by other means than by calling by name. Attention is to the mother. EXAMPLES: "Look at what mommy is doing." "Look what we can do." "Baby's name, see what mommy did."
15.	Negative vocalizations	All remarks made by the mother forbidding the baby from playing with toys or touching objects. Also remarks made by the mother in a scolding tone or critical remarks about the baby. EXAMPLES: "Stay away from there." "Don't play with the door." "No!" "You should listen to mommy." "Come over here!" "That's stupid." "Don't be clumbsy." "You aren't a very good peek-a-booer." (Directions said in negative tone--"Stack the blocks." "Look over here." "Put that down.")
16.	Positive emotional vocalizations	All vocalizations including laughter or other highly positive emotional statements. EXAMPLES: "Laughter." "You did it (clapping)." "Wee (picking baby up over her head)."

17.	ATC/baby	Affectionate Tactual Contact/Baby: Kissing, hugging or holding the baby are all ATC. The category also includes placing the infant on the mother's lap and will be scored as long as the infant is in the mother's lap.
18.	NTC/baby	Negative Tactual Contact/Baby: This category is scored for either contact or refusal to contact the baby when there is a negative connotation. EXAMPLES: Mother spanks or "mock" spanks the baby, pushes the baby away, or refuses to hold the baby. NTC is scored if the mother holds the baby as in restraining the baby from doing something he/she wishes to do. Mother keeps the baby on her lap when baby wishes to leave or mother holds the baby back from playing with toys or objects (e.g., electrical outlet).
19	Forward body lean	The mother leans toward the infant or maintains a leaning posture directed to the infant. The forward lean must be directed toward the infant. Sideways leans are not counted in this classification. The lean shall be counted when the mother's body orientation is displaced more than 10^{o} forward from upright. Like body orientation and proximity, this measure may be used as a duration measure.
20.	Variety of objects	Each time the mother handles a new toy, this is written down. Each time the mother moves to another toy for play or demonstrates, this is written down even if she has used the toy previously.
21.	Variety of schemes (hand scored)	This category is scored each time the mother uses a new scheme in playing with or demonstrating toys, objects, or used in the context of a game. Schemes are written down. Schemes are global action sequences performed on or toward objects or

people. EXAMPLES: Tickling the baby, picking the baby up and holding him/her over her head, building a tower of blocks, pointing to the pictures on the walls, pushing the car, throwing the ball, and making voices with puppets. (If later in the series of schemes the mother points to the telephone, this would be a repetition of the "point-to" scheme used in pointing to pictures on the wall and thus would not be scored a second time. (Repetition of schemes is not scored.)