

COMPARISON OF ATTACHMENT BEHAVIORS IN  
DOWN'S SYNDROME AND NORMAL INFANTS

By

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To David

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COMPARISON OF ATTACHMENT BEHAVIORS IN  
DOWN'S SYNDROME AND NORMAL INFANTS

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Down's Syndrome (DS) and normal infants were compared at 6 and 12 months on expressions of attachment behavior in the unfamiliar adult situation. Eight normal and eight DS infants were seen within one week of their sixth-month birthday. Nine normal and nine DS infants were seen within two weeks of their twelfth-month birthday. The infants were matched for social class, age, and sex. Behavior was observed in the 16-episode unfamiliar adult situation, wherein an adult female approaches and plays with the infant in the presence of the mother and with the infant alone. Subsequently, the mother approaches and plays with her infant in the same way. The Gesell Developmental Examination was administered to each of the infants.

The first hypothesis was at age 6 months there are no differences in the expression of attachment behavior between DS and normal infants, but differences exist between the DS and normal infants on attachment measures at 12 months. The

second hypothesis was developmental quotient (DQ) is associated with selected attachment behaviors.

The five principal dependent measures: looking, positive and negative affect, postural approach, and postural avoidance were analyzed in a two-way factorial analysis of variance split-plot design for repeated measures. The independent variables were diagnostic status and age; the repeated measures were elicitors: unfamiliar adult and mother. Comparisons of the normal and DS infants at 6 months on acceptance of a toy from unfamiliar adult and mother and exploration of a toy presented by unfamiliar adult and mother were made by means of analysis of variance design for repeated measures. For the 12-month-olds acceptance of a toy from mother and unfamiliar adult, and response on the departure of the mother were analyzed with t-tests. Pearson product-moment correlations were computed between DQ and selected attachment behaviors at age 12 months.

There were no three-way interactions found for the five principal attachment measures. There were no differences between the normal and DS infants at age 6 months in response to the unfamiliar adult or mother in the unfamiliar adult situation. Two-way interactions were found for diagnostic status and elicitor, and age and elicitor for positive affect; diagnostic status and elicitor for negative affect; age and elicitor for postural approach. Main effects found were: diagnostic status for postural adjustment, and age and elicitor for postural avoidance. Analyses of the acceptance

and exploration of a toy presented by both the mother and the unfamiliar adult to the 6-month-old groups indicated no differences between the groups. No differences were found between 12-month-old groups on promptness in accepting a toy from the mother or the unfamiliar adult. Twelve-month-old normal infants responded with distress to mother's departure from the observation room; DS infants were not distressed.

Twelve-month-old DS and normal infants responded similarly to measures of looking, approach, and avoidance. DS infants differed from normals: at both ages they smiled more at mother, were not distressed in the unfamiliar adult situation, and displayed more postural approach. Twelve-month-old infants displayed more postural approach toward mothers than did 6-month-olds. DQ was associated with negative affect directed toward the unfamiliar adult and mother.

CHAPTER I  
INTRODUCTION

Attachment is the study of the relationship between the infant and its caregiver. Attachment and attachment behaviors have been the focus of intense empirical study during the last decade (Ainsworth, 1963, 1964, 1969, 1973; Cohen, 1974; Ricciuti, 1974; Schaffer & Emerson, 1964; Sroufe & Waters, 1977). A number of authors agree that the primary task of the infant-mother dyad during the first year of life is the formation of affective ties or attachments (Ambrose, 1969; Schaffer, 1969; Sroufe & Waters, 1977; Yarrow, 1967). The outcomes for infants deprived of consistent care from a primary caregiver are pathological (Bowlby, 1969, 1973; Heinicke & Westheimer, 1966; Robertson & Robertson, 1971; Schaffer, 1971).

There is evidence to indicate that the active participation of both infant and mother is important in the development of attachment (Ainsworth, 1964; Bell, 1970; Brazelton, Koslowski, & Main, 1974; Stern, 1974). Fraiberg's excellent work (1974, 1975a, 1975b) has pointed out that mothers of blind infants have special difficulties in developing this critical affective relationship. Her work suggests that mothers of infants born with Down's Syndrome (DS) may also have difficulties in the development of attachment because of their

infants' handicaps. There is very little information on the development of attachment between infants with DS and their mothers. There is also very little information on ability of the infant with DS to display attachment behaviors. This lack of information is surprising as persons with DS are numerically the largest clinical group of persons with severe mental retardation (Tizard, 1966).

Only one study deals directly with attachment in children with DS. Serafica and Cicchetti (1976) compared the attachment behaviors of 12 normal and 12 DS children in the Ainsworth and Wittig (1969) "strange situation." They found no significant differences between groups on approach or smiling behavior, and they concluded that at age 33 months, the DS children had formed attachments to their mothers. However, DS children did not cry or vocalize when left alone, as the normal children did, suggesting that they did not use these behaviors to regain proximity to their mothers in the same way as did normal children.

Other studies have investigated related aspects of affective development in DS children. Emde, Katz, and Thorpe (1978) found that the social smile developed about three weeks later in DS infants than in normal infants and that it was not as engaging as in normal infants. Cicchetti and Sroufe (1976, 1978) studied response to stimuli designed to produce laughter. They found that infants with DS responded to the stimulus items in the same order as did normal infants but with less intensity and at an older age. The

same authors (1978) also observed responses of infants with DS to looming and the visual cliff. They found that DS infants were less fearful than normal infants and slower to arouse to cry. When they cried, however, they were not easily quieted during the testing situation.

In a survey of maternal responses to the care of infants with DS, age 15 months, Carr (1975) inquired about crying and temper tantrums. Mothers' responses indicated that infants cried less than the normal comparison group and that their cries were significantly related to physical rather than psychological distress.

In summary, the single study of attachment behaviors in infants with DS at 33 months of age indicates that the children are attached to their mothers. However, the children do not signal distress to their mothers as normal children do. The DS infants are not as affectively intense as normal infants.

#### Statement of the Problem

Research has demonstrated the importance of attachment to mother or caregiver in the development of normal infants. Zigler (1973) has criticized the lack of a sound and extensive body of empirical work in the social development of persons with mental retardation. This lack of information, he contended, is the primary factor in the misunderstanding and stereotyping of persons with mental retardation. Cicchetti and Sroufe (1976, 1978) urged that attention be paid to the emotional growth of infants and children with DS.

Serafica and Cicchetti (1976) have studied the attachment behavior of 33-month-old children and concluded that attachment to the mother was present, although differences in the expression of attachment behaviors were observed.

There is no information on the development of attachment in infants with DS during their first year of life. An observational study of DS infants and normal infants of similar ages in a situation designed to elicit attachment behaviors would provide an understanding of the development of attachment behavior in DS infants.

#### Purpose of the Study

This investigation was designed to compare the attachment behavior expressed by normal infants and DS infants at ages 6 and 12 months. The specific attachment behaviors compared were looking, affect (positive and negative), and postural adjustment (positive and negative). In addition, acceptance of a toy, exploration of a toy, and response to mother's leaving were studied.

The questions asked were these:

1. Are there differences between the DS and normal infants at ages 6 and 12 months when they are engaged by an unfamiliar adult female as opposed to their own mothers?
2. Is there a relationship between DQ and selected attachment behaviors measured at age 12 months?

### Definition of Terms

The terms which require more extensive definition are Down's Syndrome, attachment, and caregiver.

#### Down's Syndrome

Down's Syndrome (DS), sometimes referred to as mongolism or trisomy-21, is a chromosomal anomaly which occurs, on the average, once in every 500 to 600 births (Reed, 1975). The affected individual has 47 chromosomes instead of the normal 46 (Warkany, 1975). Most often there is an extra 21st chromosome. Less frequently, there is a translocation of part of the 21st chromosome to another autosome. In these instances the infant has the normal complement of 46 chromosomes but is nonetheless affected with DS (Donnell, Alfi, Rublee, & Koch, 1975). Translocation, which occurs in an estimated 2% to 3% (Lilienfeld, 1969) of the cases, is important to diagnose because either parent may be a carrier of the translocation, and future pregnancies may be at risk for another infant with DS (Donnell et al., 1975; Kirman, 1970).

The incidence of DS varies with maternal age from less than one in 2,000 births for women under age 20 to one in 40 births for women over 45 years old. For a large number of infants, diagnosis of DS is made during the neonatal period or during the first year of life. Levinson, Freedman, and Stamps (1955), using a sample of 50 children with DS, found that 78% had been diagnosed during the infant's first year of life.

Suspicion of DS is aroused by characteristic physical signs. Smith (1975) listed the occurrence of 50 physical stigmata which were drawn from three clinical studies (Hall, 1964; Levinson et al., 1955; Oster, 1953). The frequency of observation of any one of the physical signs within one study occurred between 4% and 98%. In the newborn the most characteristic signs are: oblique palpebral fissures, dysplastic ears, abundant skin, flat facial profile, dysplastic middle phalanx on the fifth finger, hyperextensibility or hyperflexibility of joints, muscular hypotonia, dysplastic pelvis, and lack of Moro reflex (Hall, 1964). Definite diagnosis of DS is always made by cytogenetic study (Donnell et al., 1975; Kirman, 1970). The diagnosis of DS usually includes mental retardation.

#### Attachment

Attachment is defined by Ainsworth (1973) as ". . . an affectional tie that one person forms with another specific person, binding them together in space and enduring over time" (p. 1). Ainsworth (1969) said that attachment behaviors fall into three categories: orienting, signaling, and executing. Orienting behaviors (looking and listening) track the mother; signaling behaviors (smiling, cooing, crying) alert the mother; and executing behaviors (following, clinging, scrambling, or climbing onto mother) maintain physical closeness to the mother. These are considered to be attachment behaviors when their goal is proximity of the mother. The behaviors themselves are not

exclusively in the service of attachment. They are activated in service of attachment when the infant is in a situation which threatens his/her "set goal," which is proximity to the mother (Bowlby, 1969).

The behaviors indicative of attachment have been measured using the "strange situation" developed by Ainsworth and Wittig (1969) and adapted by users such as Gordon, Beller, Lally, Yarrow, Moreno, Rand, and Fraiberg (1973); Skarin (1977); Waters, Matas, and Sroufe (1975). The purpose of the strange situation is to activate the attachment system of the infant by placing the infant in a situation of mild stress (the presence of an adult female stranger) and then increasing the stress (the mother leaves the infant with the stranger, the stranger leaves the infant alone in the room), and observing the infant's behaviors during these episodes and upon the reunion with mother.

#### Caregiver

Caregiver is used to refer to the person who has the primary responsibility for the day-to-day needs of the infant. For all of the infants in this study, the mother was the primary caregiver. Thus, mother and caregiver will be used interchangeably.

#### Justification for the Study

##### Scope of Attachment in Infant Behavior

As noted earlier, many authors argue that the most important aspect of the infant's development during the first year of life is the formation of the bond or attachment

to the caregiver (Bowlby, 1969; Schaffer, 1969; Sroufe & Waters, 1977; Yarrow, 1969). This aspect of development has been studied in normal infants. There is no literature on the development of attachment in DS infants, although DS occurs once in every 500 to 600 births (Reed, 1975).

Ainsworth and her colleagues (Ainsworth, 1963; Ainsworth, Bell, & Stayton, 1971, 1972) have traced the development of attachments over the first year of life and have demonstrated a relationship between attachment and exploratory behavior. Ainsworth demonstrated that an infant who is securely attached to mother uses the mother as a base from which to explore the world. Those infants insecurely attached are less able to leave the mother and explore. Ainsworth concluded that attachment not only affects the infant's social development, but indirectly, cognitive development, by facilitating or restricting the infant's willingness to explore the environment. Information about attachment in infants with DS may provide an understanding of their developing social abilities and their cognitive abilities as these are related to attachment.

#### Implications for Educators and Program Developers

Because of the probability of severe mental retardation, DS infants are clearly a high risk group in need of special services. One response to this need has been the development of programs for infants with DS (Hayden & Dmitriev, 1975; Rynders & Horrobin, 1975; Zausmer, 1975). Although these programs recognize the importance of the caregiver's

involvement and provide opportunities for the caregiver's participation in the program, the intervention tends to focus on the role of the adult as teacher. Information about the experience and rhythms of attachment behavior in the infant with DS would allow program planners and educators to develop interventions directed toward nurturing attachments. Fraiberg (1974, 1975a, 1975b), in her work with blind infants, provided remarkable examples of the value of such information in facilitating the interaction of mothers and their blind infants. Her results suggest that there is much to be learned about affective development from the systematic observation of a group of handicapped infants and that this information may then be used by educators and program planners in both their own interactions with the infants and in their interventions with the parents.

In addition, there have been recommendations that the public school system be made responsible for the education of identifiably handicapped infants from birth (Hobbs, 1975). This study is a beginning in the important task of gathering empirical data in the social-emotional development of infants with DS.

#### Implications for Social Workers and Therapists

The birth of a defective infant has been described as a "crisis" in the family (Farber, 1968). As such, it often requires the intervention of a social worker or therapist. Information regarding the development of attachment in an infant with DS would provide the professionals who work

with parents following the birth a guide for expectations for development of attachment behaviors in infants with DS.

#### Implications for Caregivers

The current program of state services to families with mentally retarded infants recommends that infants be cared for at home--their own or a foster home (Hobbs, 1975; LaFave, Woodhouse & Grunberg, 1974). Services are then provided to the families. Information about the social development of the infant, particularly about the infant's response to the caregiver, would help the caregiver to be more sensitive to the infant's cues and to understand the process of attachment as it is experienced by the infant and the caregiver.

## CHAPTER II

### REVIEW OF RELATED RESEARCH

The purpose of the present study is to observe and compare the expressions of attachment behaviors in normal infants and infants with DS at ages 6 and 12 months. The literature to be reviewed is first, that relating to the development of attachment behavior in normal infants and second, that relating to the development of infants with DS.

#### Preconditions for Development of Attachment

Attachment is defined as "an affective tie that one person forms to another specific person, binding them together in space and enduring over time. Attachment is discriminating and specific" (Ainsworth, 1973, p. 1). Attachment develops over time by means of caregiver-infant interactions (Ainsworth, 1973; Blehar, Lieberman, & Ainsworth, 1977; Bowlby, 1969). Assuming that the infant receives appropriate caregiving, theory suggests that two preconditions are necessary for attachment to develop: the infant must have learned to discriminate his mother from others, and the infant must have begun to develop an understanding of the separate existence of the other; that is, the infant must have begun to develop object permanence (Ainsworth, 1973; Bell, 1970; Schaffer & Emerson, 1964).

### Discrimination of Mother from Stranger

The discrimination of mother's face from that of a stranger's and the onset of wary responses toward the stranger may appear as early as the third month of life, although a mean age of five months has been reported (Bronson, 1972; Tennes & Lempl, 1964). Differential recognition of mother is included on the Gesell Developmental Examination at age 24 weeks (5.5 months) (Gesell & Amatruda, 1947). Ainsworth (1963) reported maternal discrimination in all of her Ganda infants by age 6 months.

### Person/Object Permanence and Attachment

There is no empirical evidence that object or person permanence is a necessary precondition for attachment. Gouin-Decarie (1965) studied the relationship between the development of object permanence and the Freudian concept of object relations, which is analogous to attachment. She concluded that a "loose-parallel" existed between the development of the two phenomena. Piaget (1972) restated his belief that the two aspects of development are interrelated. He suggested that Gouin-Decarie's results were not decisive because the Freudian and Piagetian theories were conceptualized differently. His own theory of the development of the object is one in which each stage is integrated into the next, whereas Freud's stages are characterized by a dominant feature (for example, orality) which is succeeded by the next stage or dominant feature. Because of this

difference in conceptualization, Piaget (1972) asserted that measurement will not yield comparable data.

Bell (1969, 1970) explored the relationship between the development of object and person permanency and attachment, based on the idea that both processes are established in the mother-infant interaction in the first year of life. Bell (1970) described person permanency as beginning when the infant can conceive of people existing apart from himself/herself, even when they are not present. Bell studied 33 infants longitudinally between their eighth and eleventh months on scales of object and person permanence. At 49 weeks of age, she observed the infants in the strange situation. Bell found a strong positive relationship between the development of person permanence and the adaptive quality of attachment demonstrated in the strange situation. Those infants advanced in person permanence, during the strange situation, demonstrated effective adaptation, defined as being able to use the mother as a secure base for comfort and security in times of stress and to explore toys offered in the strange situation. In contrast, infants advanced in object permanence or equal in their developments of object and person permanence, demonstrated maladaptive behavior during the strange situation.

Bell suggested that the correspondence between person permanence and effective adaptation during the strange situation was due to the sensitive caregiving by the mother as described in the Ainsworth studies (Ainsworth & Bell,

1970; Ainsworth, Bell, & Stayton, 1971). In these studies, mothers who responded to their infants' needs promptly and effectively during the first 12 months of life had infants who at age one year were able to derive comfort and security from their mothers in a stressful situation and freely explore a circumscribed environment.

Neither Bell (1969, 1970) nor Gouin-Decarie (1965) demonstrated that person or object permanence must precede attachment. Outside of the clinical literature (for example, Burlingham & Freud, 1944), there have been very few reports of infants who do not form attachments. Provence and Lipton (1962) studied 75 infants institutionalized from age 5 weeks, who at age 12 months did not show differential attachment behavior. In her study of the Ganda infants, Ainsworth (1963) reported delay of attachment in four of the 27 infants studied. For two infants the study ended when they were 37 weeks of age and no differential behavior was exhibited toward the mother who was the caregiver. The other infants were ages 11 and 12 months when the study ended. Ainsworth attributed the lack of differential response in each of the four infants to insensitive mothering. Nothing is known about the development of object or person permanence in these non-attached infants.

In summary, two preconditions are suggested as necessary for the development of attachment. The first, the ability to distinguish mother from others by responding differentially, is acquired by six months. The second, the

beginning of object permanence prior to the development of attachment, has not been demonstrated. What has been demonstrated is the relationship between the advanced development of person permanence and adaptive attachment behaviors.

#### Attachment Behaviors Relevant to the Unfamiliar Adult Situation

Behaviors are called "attachment behaviors" when they serve to gain proximity to the mother, for example, crying, crawling, looking, and reaching. The unfamiliar adult situation provides a context for eliciting some of these behaviors. The behaviors are in response to an intrusive stranger, to separation from mother, to the return of mother after a brief separation, and to a toy.

#### Response to an Intrusive Stranger

##### Developmental course

Response to the stranger has been studied as "fear of the stranger" (Benjamin, 1963) and more recently as "wariness" (Lewis & Rosenblum, 1974). Fear of the stranger is defined as an anxious response by the infant to an unfamiliar person, because the person belongs to a class of novel things or because the person does things differently (Benjamin, 1963). The indication of fear of the stranger is protest or withdrawal (Bowlby, 1969). Wariness is a broader term which encompasses behaviors such as sobering, pouting, whimpering, turning away, and withdrawal (Waters, Matas, Sroufe, 1975).

The amount of wariness displayed by the infant increases from its onset throughout the first year (Bronson, 1972; Campos, Emde, Gaensbauer, & Henderson, 1975; Gordon et al., 1973; Scarr & Salapatek, 1970; Skarin, 1977; Waters, et al., 1975). The onset of stranger anxiety has been observed at a mean age of 5 months (Bronson, 1972, Tennes & Lempl, 1964). At age 6 months, the typical response to the approaching stranger is a neutral expression (Gordon et al., 1973; Skarin, 1977). By 11 months, the typical response is a wary brow (Skarin, 1977), but a cry face or frank fear occurs with greater frequency by the end of the first year (Bronson, 1972; Gordon et al., 1973). In addition to behavioral manifestations of wariness, heart rate appears to be a sensitive measure of response to stranger. Heart rate covaries closely with facial behavior (Campos et al., 1975) and negative affect (Waters et al., 1975).

The developmental course of smiling at the stranger changes from more to less from the middle of the first year to the end of the first year (Gordon et al., 1973; Waters, 1975). The change is less than that seen in distress reactions. For example, Waters et al. (1975) reported that 44% of 5-month-old subjects versus 37% of 10-month-old subjects smiled at the approaching stranger, indicating that smiling and distress reactions may not be simply opposite reactions, particularly as age increases.

Effect of situation. Research has indicated that the context in which an infant meets a stranger influences the

infant's reaction to the stranger. Infants between ages 8 and 12 months who had a period of familiarization with the stranger did not exhibit fear but instead made friendly overtures to the stranger (Klein & Durfee, 1976; Rheingold & Eckerman, 1973; Skarin, 1977; Sroufe, Waters, & Matas, 1974). Strangers who approached year-old infants with a toy received a positive response from the infant (Bretherton & Ainsworth, 1974; Klein & Durfee, 1976). Factors such as the presence of the mother (Campos et al., 1975; Ricciuti, 1974; Skarin, 1977) and home versus lab as the place of observation (Skarin, 1977; Sroufe et al., 1974) decreased infant distress in the presence of a stranger. Infants seated on mother's lap were more accepting of a stranger than were infants seated on the floor (Bronson, 1972) or in an infant-table (Morgan & Ricciuti, 1969). Sex and age of stranger affected infant reaction, with females greeted more positively than males (Greenberg, Hillman, & Grice, 1973; Lewis & Brooks, 1974; Skarin, 1977), and child strangers preferred to adults (Lewis & Brooks, 1974).

Effect of social experience. Several investigators have found that the infant's response to the unfamiliar adult is influenced by previous experience with adults. Collard (1968) noted that first borns or infants with siblings more than six years older were less sociable at age 6 months than second or later infants raised with siblings. She concluded that fear of the stranger will be more intense in infants receiving social stimulation from few rather

than many people. Schaffer and Emerson (1964) found that children who had a number of caregivers in addition to a primary caregiver tended to form attachments to more people than children receiving care from a few people. Bronson (1972) studied the social experience of infants ages 3 to 9 months by assessing the number of adults living in the home and the number of encounters per week that the infant had with strangers. He found no relation between those two factors and reaction to the stranger. He concluded that exposure, per se, may be insufficient to account for the infant's response. Bronson, in a 1978 review of his 1972 data, argued that in the last quarter of the first year, wariness may be based in part on the accrued experience of the social situation. The infant has learned to react with wariness to certain aspects of the social situation.

Effects of developmental quotient. Scarr and Salapatek (1970) assessed the fear of the stranger in relation to level of developmental quotients (DQ) and found no association between the two when age variance was removed. There was a tendency (not statistically significant) for less well developed infants to be more fearful.

Summary. Wariness of the unfamiliar person may be observed by 5 months. This wariness is expressed with greater frequency at 12 months than at 6 months. During this time the amount of smiling at an approaching stranger decreases. However, the typical response to the stranger at 6 months is a neutral expression and by 12 months, a wary brow.

Context, including the availability of the mother, place of the observation and characteristics of the stranger affect the infant's response to the stranger. Finally, by the end of the first year, response to the stranger has been conditioned by experience.

Response to Brief Separation  
from Mother

Response to separation from the mother is often called separation protest or separation anxiety (Bowlby, 1969). Tennes and Lempl (1964) charted the developmental course of separation anxiety. Although it could be observed as early as 7 months, the mean age of emergence was 8 months, and the peak of intensity was reached between 11 and 18 months. Schaffer and Emerson (1964) observed that the first instance of separation protest occurred between 6 and 9 months in 76% of their subjects.

Schaffer and Emerson (1964) used separation protest as the criterion demonstrating that attachment had been formed. However, Yarrow (1967) observed that not every separation from mother caused separation protest: the frequent brief separations which occurred at home during daily routines did not cause separation distress. Separation protest may be alleviated by the presence of a familiar person (Ricciuti, 1974).

In the strange situation, Ainsworth and Bell (1970) reported that crying among their year-old subjects was minimal when the stranger entered, increased when the mother left, decreased when the mother returned and increased

sharply when she left again. Ainsworth proposed that it was the absence of the mother rather than the presence of the stranger which caused the distress in the strange situation. She reasoned that the mother acted as a "secure base" for the infant. Consequently, the absence of the mother heightened attachment behavior.

Littenberg, Tulkin, and Kagan (1971) proposed that cognitive ability was a primary factor in separation distress. In a home study of 24 infants age 11 months, protest occurred when the mother left the room by way of an unfamiliar rather than a familiar door. The authors concluded that the discrepant event caused by the mother's exiting through an unfamiliar door produced distress because it could not be readily assimilated by the infant.

In summary, separation protest occurs at about 8 months and is manifested by crying when mother leaves the infant. It increases in intensity until about 18 months. Separation distress may not occur during daily routines in the home, and distress may be lessened by the presence of a familiar person.

#### Response to Reunion With Mother

Reunion with mother after a brief separation resulted in an increase of proximity promoting and contact maintaining behaviors among the majority of children (Ainsworth et al., 1971; Coates, Anderson, & Hartup, 1972). Ainsworth (1973) asserted that this only occurs after attachment has been formed. Ainsworth et al. (1971) suggested that the responses

to reunion with the mother involved four systems of behavior: proximity seeking, contact maintaining, proximity avoiding, and contact resisting. The discrete behaviors which make up these systems include approaching, reaching, clinging, greeting, calling, crying, directed looking, and pushing away. Using the profiles of behaviors extracted from the reunion episodes of the strange situation, Ainsworth et al. (1971) divided the infants into three distinct groups: Group A babies (20% of the subjects) showed less proximity seeking and less contact maintaining behaviors; Group B babies (66% of the subjects), considered the normative group, were strongest in proximity seeking and contact maintaining; Group C babies (14% of the subjects) were distinguished by more contact resisting behaviors.

Data from the Gordon et al. (1973) study, comparing the behaviors of 6- and 12-month-old infants in the reunion episode of the unfamiliar adult situation, suggested that distinguishing factors are the increased amounts of negative affect and decreased amounts of positive affect shown by the older infants.

In sum, the reunion with mother after a brief separation has not been widely studied, except by Ainsworth and her colleagues. The normative response in the year old infant is physical closeness to the mother. Although proximity avoiding and contact avoiding behaviors have been seen, they are considered to be atypical. There has been little developmental charting of this response; one study suggests an

increase of negative and decrease of positive response with age.

#### Response to a Toy

Infants' responses to objects change over time. Piaget (1952) noted that infants in stage III of sensorimotor development (ages 4 to 8 months) respond to a new object by repeating certain actions upon it. The infant approaches the new object with a repertoire of behavior. It is as though the object exists in order that this repertoire be exercised. The object may be shaken, mouthed, transferred from hand to hand and banged up and down. By contrast, the stage IV infant (ages 8 to 12 months) examines objects ". . . as though such objects presented a problem to his mind, as though he were trying to 'understand'" (p. 259). The result is that the infant looks at the object for a longer period of time than the younger infant does before acting and relates his/her exploration to the object. In stage V (ages 12 to 18 months) the infant's interest has shifted completely to the object. The infant is able to distinguish act from object and attempts to explore the object by adapting his actions to it. Thus, from ages 4 to 18 months, Piaget sees a progressive shift in the infant's relation to the object, from the extension of his/her own actions to a thing in itself. Data from the Gordon et al. (1973) descriptive study demonstrated this progressive movement. Under both the conditions of unfamiliar adult and mother as presenter of the toy, the younger infants

accepted the toy more often and explored it more vigorously than the older subjects. Similarly, Schaffer, Greenwood, and Parry (1972) observed that the subjects older than 8 months were slower to reach for objects than subjects younger than eight months, and their first contacts with the object were brief. When provided familiarization through repeated trials, the older subjects were quicker to reach for the object and explore it than were younger subjects. Infants under 8 months responded with the same enthusiasm on all trials reaching out as soon as the object was presented. Schaffer (1974) suggested that this behavior exemplified the disjunctive effect in systems development at the younger age: an ". . . ability to register information in terms of a familiarity-unfamiliarity dimension is not yet accompanied by selective approach-avoidance behavior as expressed by the infant's manipulative responses" (p. 14). After 8 months, there is a coordination of systems, and the infant is able to contain its approach responses: the baby may now respond or not.

Another critical factor which affects the infant's exploration of a toy is the presence of the mother. Her presence promotes exploration by the infant, and her absence inhibits exploration (Ainsworth & Bell, 1970; Bowlby, 1969; Cox & Campbell, 1968; Klein & Durfee, 1976; Gordon et al., 1973).

In sum, the relationship of the infant to a toy changes over the first year as a result of certain cognitive and

motor developments. The 6-month-old reacts impulsively and actively to the presentation of a toy. The year-old infant looks longer at the toy before exploring it. The amount of exploration by the infant may be affected by the presence or absence of the mother.

#### Affective Development of Infants With DS

Several studies focused on the affective development of infants and young children with DS. Emde et al. (1978) described the social smile of the 3 $\frac{1}{2}$ -month-old DS infant as being "less engaging" than the smile of the normal infant. The DS baby smiled with less intensity, made less eye contact, and was less active than the comparable normal infant. Cicchetti and Sroufe (1976) did a short-term longitudinal study on the development of smiling and laughing in DS infants. Serafica and Cicchetti (1976) studied attachment behavior in 33-month-old children with DS. Carr (1975) studied infants with DS from one month to four years, observing developmental changes at selected ages and gathering information on infant development from maternal report.

Cicchetti and Sroufe (1976) studied 14 infants with DS between ages 4 and 18 months to assess their response to stimuli designed to produce laughter. Their hypothesis was that infants who show retarded cognitive development would also show a corresponding lag in affective development. Stimuli selected to elicit laughter were one of four types: auditory, tactile, visual, and social. The auditory and

tactile items were intrusive and required less participation from the infant than the visual or social items which were cognitively more complex. The visual items required active attention from the infant, and the social items required active participation to produce the stimulus. Mothers were trained to administer the items at home.

The median onset of laughter in infants with DS was at 10 months (range 6 to 15 months) compared to age 3 or 4 months in normal infants. In spite of the delay in laughter in infants with DS, the order in which they responded to the items paralleled the order in which normal infants (Sroufe & Wunsch, 1972) responded: they responded first to the auditory and tactile stimuli, then to the visual stimuli, and finally to the social stimuli. The infants with DS smiled at the items to which normal infants responded with laughter. Smiling was determined to be a more powerful sign of affective response in infants with DS than laughter. Negative affect or fear responses were reported to have occurred infrequently.

Response to the cognitively complex social items began at 10 months in DS infants and at 5 months in normal infants. DS and normal infants responded the same way on one item: holding the infant in the air elicited laughter from both normal and DS infants. The authors noted that the DS infants had been observed to laugh in informal settings and suggested that the standardized test situation did not allow

the infants to process incongruity rapidly enough to generate the tension which is required for laughter.

In addition, Cicchetti and Sroufe (1976) found a strong positive correlation between the age of onset of laughter and smiling and scores on the Hunt-Uzgiris Scales and the Bayley Mental Scale (range = .62 to .92), indicating an association between cognitive and affective development. Furthermore, prediction of scores on the Bayley Mental Scale at 16 months could be made from the onset of smiling and laughing. There was no overlap of Bayley Mental scores for DS infants who laughed by 10 months ( $N = 9$ ; DQ range = 58 to 83,  $\bar{X} = 72$ ) and those infants who laughed after 10 months ( $N = 5$ , DQ range = 40 to 55,  $\bar{X} = 47$ ).

Carr's (1975) longitudinal study of the development of infants with DS followed 45 home-reared infants with DS and an equal number of normal infants matched for age, sex, and social class from age 1.5 months to 4 years. One aspect of the study included a parental report on the behaviors of the infants at 15 months. Mothers reported on the incidence of temper tantrums and crying in their infants. Tantrums were defined as ". . . the physical expression of an outburst of anger which lasted for at least a few minutes" (p. 56). Tantrums included some of the following behavior: kicks or stamps, screams, stiffens or throws self back, throws or bangs things, goes red in the face, waves arms about, lies down or throws self onto the floor. Mothers responded that 0% of their children with DS had temper tantrums "often"

versus 21% of normal children ( $p < .01$ ) and that 44% of their children with DS "never" had tantrums versus 15% of the comparison group ( $p < .05$ ). The amounts and causes of crying were reported to be significantly different. Normal children cried more often for psychological reasons (frustration), and children with DS cried in response to physical distress. In general, normal children cried more frequently.

Thirty children with DS were tested with a looming stimulus and on the visual cliff at ages 4, 8, 12, and 16 months (Cicchetti & Sroufe, 1978). In the looming stimulus condition, DS infants took more trials than the normal infants to cry. When the DS infants cried, they remained upset throughout the testing, unlike normal infants who could be soothed. On the visual cliff, the infants with DS remained placid, while the tendency among normal infants was to become fearful. Comparisons of amount of crying in these two situations revealed that the normal 12-month-old infants cried more than the 16-month-old DS infants.

Serafica and Cicchetti (1976) examined the attachment behaviors of young children with DS in the strange situation. The subjects were 12 normal children with a mean age of 32.8 months and 12 children with DS with a mean age of 33.5 months. The mean Bayley DQ for DS children was 56.45 (range = 50 to 65). No DQs were reported for the normal children. All the subjects were white, family reared, and middle-class. The children were tested in Ainsworth and Wittig (1969) strange situation, a ". . . series of episodes

designed to be progressively more stressful but not any more so than any experience a child was likely to encounter in his everyday life" (Serafica & Cicchetti, 1976, p. 140).

All episodes except the first were three minutes long, and all episodes were presented to all subjects in the following order:

1. (M, C, E) Mother (M) and child (C) were escorted by the experimenter (E) to the experimental room.
2. (M, C) M puts C in the starting position (on the floor) then sits quietly in her chair, interacting only if C seeks her attention.
3. (S, M, C) A female stranger (S) enters, sits quietly for one minute, and then gradually approaches C, showing him a toy. At the end of the third minute, M. leaves unobtrusively, leaving her purse on the chair.
4. (S, C) If C is happily engaged with one of the toys, S plays a nonparticipant role. If C is inactive, S tries to get him interested in the toys. When C is distressed, S tries to distract him, assuage his stress or comfort him.
5. (M, C) M enters, calls the child's name twice, pausing in the doorway to give C an opportunity to spontaneously respond to her. S then leaves unobtrusively. If C does not require being comforted, M sits quietly in her chair, interacting only in response to C's overtures. At the end of three minutes M leaves the room.
6. (C) C is left alone for three minutes, unless he becomes so distressed that the episode has to be curtailed.
7. (S, C) S enters and behaves as in episode 4.
8. (M, C, S) M returns and behaves as in episode 5. S leaves unobtrusively. After three minutes transpire, the observation period is terminated. (p. 141)

The dependent measures, all of which were considered to be attachment behaviors, were crying, smiling, locomotion or approach to an adult, physical contact initiated by the child and directed toward an adult, and vocalization. The study also examined exploratory behavior in the strange

situation and the dependent measures were locomotion around the room, visual regard directed to objects in the room or visual scanning of the room, gross motor manipulations, and fine motor manipulations of objects.

The infants were not significantly different on any of the attachment measures except vocalizing and crying. The normal children were more vocal in seven of the eight episodes. Significant differences were found on reunion with mother (episode 5), when the child was left alone (episode 6), and when the stranger returned to the child (episode 7). Significantly more normal children cried during episodes 4, 6, and 7. A difference in exploratory behavior was found when the children were left alone (episode 6). The DS children looked around the room, while normal children remained visually oriented to the door.

The authors concluded that the children with DS had formed an attachment to mother. The differences in crying and vocalizing behavior were thought to reflect differences in the meaning that the experience of being left alone had for the children. The normal children perceived the situation as stressful and responded with distress and attempts at regaining proximity to mother by vocalizing. The DS children did not respond with distress and did not attempt to regain proximity to mother by calling to her. The authors suggested that the few differences they found supported Zigler's (1973) position that a lag in cognitive development does not imply a lag in social development. It is well to

note, however, that the strange situation task was designed for year-old infants; Waters (1978) suggested that it should be interpreted with caution if used with children over age 2 years. If differences exist between the children with DS and the normal children, they may be obscured by the task itself which has not been validated for 33-month-old children.

The conclusions of the Cicchetti and Sroufe (1976) study and the Serafica and Cicchetti (1976) study disagree as to the relationship between cognitive and affective development. Cicchetti and Sroufe (1976) concluded that a delay in cognitive development was associated with a delay in affective development. Serafica and Cicchetti (1976) suggested that the lag in cognitive development was not associated with a lag in affective behavior as expressed in attachment behavior at age 33 months. Their findings may be due to the fact that their measure of attachment was designed for year-old infants and may not be valid for normal infants at 33 months.

In summary, the study of affective expression in infants with DS concluded that the lag in cognitive development was accompanied by a lag in affective response. Responsiveness to stimuli paralleled normal development but at a reduced rate. Infants with DS were most responsive to intrusive stimuli beginning at 6 months and continuing throughout the first year. Response to cognitively complex stimuli was not made until 10 months versus 5 months for

normal infants. Infants with DS expressed less intense affect; they smiled when the normal infants laughed. Reports by mothers of infants with DS noted significantly fewer temper tantrums and less crying with the principal cause for crying listed as physical distress. In the attachment study of 33-month-old infants, the children with DS did not cry when the mother was absent from the experimental room, suggesting that although attachment had been formed, the absence of mother was not as psychologically stressful for the children with DS as it was for the normal subjects.

#### Developmental Examinations and Attachment

##### Developmental Quotients and Attachment in Normal Infants

Studies of normal development suggest a relationship between DQ and attachment. Schaffer and Emerson (1964) found a positive correlation between early onset of attachment measured by separation protest and high DQ. In a comparative study of 41 children, 23 of whom had their mothers as primary caregivers and 18 of whom had been in day care from age 12 months, Caldwell and her associates found that children with higher DQs at age 30 months had stronger attachments to their mothers (Caldwell, Wright, Honig, & Tannenbaum, 1970).

These studies lend support to the hypothesis that a lag in cognitive development may be accompanied by a lag in affective-attachment development.

Developmental Examinations  
of Infants with DS

There is conflicting evidence about the developmental progress of infants with DS during the first six months of life. Fishler, Share, and Koch (1964), using the Gesell Developmental Examination, and Dameron (1963), using the California First Year Mental Scale, reported that infants with DS develop relatively normally between birth and 6 months. Dicks-Mireaux (1972) found differences as early as 3 months using the Gesell Developmental Examination. Carr (1975), using the Bayley Scales, found differences between her comparison group and DS infants as early as 1.5 months. Carr acknowledged, however, that on the basis of test scores alone 68% of her DS subjects at age 1.5 months were within the normal range. They scored 80 or over. This was also the case in the Dicks-Mireaux study. At 3 months (12 weeks), the infants with DS had average DQs of 71.3; the normal infants had DQs of 99.6. Although significantly different, the DS subjects were within the "normal" range.

Both Carr (1975) and LaVeck and LaVeck (1977) found that infants with DS had higher mental than motor scores in the second half of the first year. Dicks-Mireaux (1972) reported that social, adaptive, and motoric development were equivalent throughout the first year.

The conclusion reached by all of the researchers was that infants with DS have developmental patterns which parallel normal development during the first six months of

life. By age 6 months the DQ ranges from 71 (Dameron, 1963; Dicks-Mireaux, 1972) to 77 (Carr, 1975). Carr (1975) reported a sharp drop in DQ scores between 6 and 10 months. By age 12 months, there is general agreement that the child with DS lags behind his normal peers by about four months (Carr, 1975; Dameron, 1963; Dicks-Mireaux, 1972).

Children with DS who are raised in their own homes score higher on developmental examinations, IQ tests, and tests of social maturity than children in foster homes (Carr, 1975) or institutions (Centerwall & Centerwall, 1960; Cornwall & Birch, 1969; Shipe & Shotwell, 1965; Stedman & Eichorn, 1964).

Developmental inventories are not predictive; they are descriptive (Dicks-Mireaux, 1972). The Gesell Developmental Examination is not an intelligence test; it is a tool for observation of behavior and provides a score which is an average (DQ) of five evaluations (Ames, 1967). It is also a measure of psychobiological integrity (Crano, 1977; Gesell & Amatruda, 1947). It is particularly useful in understanding delayed development (Gesell & Amatruda, 1947).

In summary, although differences in development between normal infants and infants with DS have been recorded as early as 1.5 months, during the first six months of life, the infant with DS responds to developmental testing within the lowest end of the normal range. The second six months of life are marked by a progressive deceleration of development, and by age one year the DS infant is functioning on

an eight month level. Infants raised at home are cognitively and socially more advanced than those placed in foster homes or institutions.

Visual Preference and Visual Discrimination  
Ability of Infants With DS

In studies of visual preference of normal and DS infants age 8 months, Miranda and Fantz (1973) found that both groups showed equal interest in patterned versus plain surfaces, a finding consistent with normal development. Infants with DS were able to discriminate stripes of 1/32 inch wide, although their normal peers were able to make finer distinctions. The infants with DS did significantly poorer on tasks of discrimination in pairs of patterns of differing depth, arrangement of elements, or form of the contours. The inability of the infants with DS to discriminate on this latter task raised questions as to their ability to make simple pattern discriminations which normal infants do at 2 months.

In a longitudinal study of infants with DS between age 5 and 33 weeks, Miranda (1976) reported that at five weeks infants with DS were able to discriminate patterned over plain surfaces. The ability to discriminate patterned surfaces improved with age but lagged behind the development of normal infants. Using the same patterned pairs, as in the study of eight month olds by Miranda and Fantz (1973), Miranda determined that infants with DS were able to select curved over straight lines between 7 and 11 weeks, checked over lattice arrangements at 9 weeks

and irregular over regular arrangements at 11 weeks. Clearly, the inability to discriminate patterns at 8 months was not due to an inability to discriminate patterns between ages 3 and 6 months.

Miranda's data showed differences between the groups at different ages. Preferences among the DS infants emerged in the same order but four to six weeks later than preferences in normal infants. This suggests that the sensory and motor capacities of the DS infant are not deficient but require more time to develop. The most startling finding was that beginning at 6 months the ability of the subjects with DS to distinguish patterns by showing preferences dropped off to chance level. This change in performance was reflected in the study of eight month olds by Miranda and Fantz (1973).

Miranda (1976) argued that it is reasonable to assume that discrimination and attention to pattern variation (for example, form of contours and arrangements) are important aspects of perception and, therefore, in assimilating the environment. They may be early evidence of cognitive functioning. The movement toward a chance level of pattern discrimination at age 6 months in infants with DS may be a better predictor of cognitive deficit than the lag in the appearance of the preferences.

In a study of visual perception of novelty, Miranda and Fantz (1974) observed normal infants and DS infants between 5 and 33 weeks of age. Novel stimuli were

preferred by the normal infants at 9 weeks and by the DS infants at 17 weeks. Infants with DS also looked at the novel stimulus longer than the normal infants. The most difficult discriminations of novelty required seeing the overall configuration. The differences in ability between the normal and DS infants were greatest for this task, suggesting a retardation in form perception or, as Miranda (1976) added, a difference in the onset of memory for features of the environment. A delay of two months, whether in form perception or memory, as was demonstrated in the novelty tasks, can be a serious handicap in learning.

In summary, the infant with DS develops normal pattern discrimination between birth and 6 months at a rate slower than the normal infant. At 6 months, however, the ability to discriminate between patterns drops off to a chance level in infants with DS, indicating a loss of ability. Evidence from visual discrimination of novelty suggests that there is a two month lag in the onset of this ability in infants with DS, but that once the subjects are able to discriminate novelty, they perform comparable to their normal counterparts. None of the DS subjects was able to discriminate the most complex configural stimulus, suggesting an inability to perceive this complexity or an inability to remember between presentation intervals.

Retardation in DS infants may be seen as early as 3 months; however, it is most dramatic at 6 months, when there is a degenerative response to pattern discrimination.

These observations are similar to those from developmental testing. It is also supportive of Kirman's (1970) observation of the pattern of decline and deceleration shown by infants with DS:

The measures of performance applied to the young infant do not reveal the full extent of the defect, which only becomes apparent when more sophisticated demands in the way of learning and social adaptation are made at a later stage in development. (p. 64)

#### Relationships Between Attachment and Infants With DS

In normal infants attachment is not established until the end of the first year (Ainsworth, 1963; Schaffer & Emerson, 1964). As the infant with DS is within normal limits on tests of development during the first six months of life (Carr, 1975; Dameron, 1963; Dicks-Mireaux, 1972; Fishler, Share, & Koch, 1964), it would be expected that in an assessment of attachment behaviors there would be no differences between normal infants and infants with DS at age 6 months.

After 6 months, the differences in the rate of development between normal infants and DS infants are marked (Carr, 1975; Miranda & Fantz, 1974). Cicchetti and Sroufe (1976) have suggested that a lag in cognitive development in children with DS is accompanied by a lag in affective development. The intensity of affective behavior, both laughing and crying, is less in infants with DS (Carr, 1975; Cicchetti & Sroufe, 1976, 1978), and DS infants are less responsive to psychological stress (Carr, 1975; Serafica & Cicchetti,

1976). The strange situation, the technique used to elicit attachment behaviors, was designed as a stressful situation for normal infants (Ainsworth & Wittig, 1969; Gordon et al., 1973). The expectation for DS infants at age 12 months, observed in the strange situation, is that they will discriminate their mothers from strangers, but will display little or no negative affect toward the stranger or in response to their mother's departure. They will show less need for proximity or contact maintaining behaviors directed toward mother in the reunion episode.

#### Summary

The review of the literature had three main foci, first, the preconditions necessary for the formation of attachment in normal infants; second, the developmental course of behaviors evidenced in attachment: response to the stranger, response to brief separations from mother, response to reunion with mother, and response to a toy; third, studies relative to the affective and cognitive development of infants with DS.

1. Current theory suggests that the infant must be able to discriminate mother from other and to respond differentially to her before attachment can be made. Empirical studies of infants indicate that they are capable of discrimination and differential response to caregiver by age 6 months and probably earlier. Theory further suggests that the infant must have developed the beginnings of person

permanency in order that mother may be seen as a separate entity. None of the studies has demonstrated the developmental sequencing of these phenomena. However, Bell has associated adaptive attachment with the advanced development of person permanence and maladaptive attachment with a delayed development of person permanence. The beginnings of the development of person permanence are between 7 and 9 months; attachments to mother are usually formed by the end of the first year.

2. Infant response to the stranger, response to brief separations from mother, response to reunion with mother and response to a toy are dependent on age of the infant and context in which the event occurs. In general, wariness and distress in response to separation increase with age between their onset and the end of the first year. The typical response to a stranger is a neutral one at 6 months and a wary brow by 12 months; when familiarized with the stranger, infants may demonstrate friendly behaviors. Younger infants respond to a toy by taking it quickly and exploring it by repeating behavior sequences upon it. Infants over 8 months are more cautious in accepting a toy, look at it longer, and explore it according to its structure.

3. Studies of affective behavior of DS infants indicate that they express affective behavior with less intensity than normal infants. Overall, they achieve normal milestones but at a slower rate. By the end of the first year they are developmentally four months behind normal peers.

They demonstrate attachment behavior at age 33.5 months, but they do not use crying or vocalizing to regain proximity to mother. There is evidence that a degenerative effect occurs in visual discrimination after age 6 months.

The hypothesis of this study is that at age 6 months there will be no differences in the expressions of attachment behaviors between normal infants and DS infants, including ability to discriminate mother from stranger, affective orientation to mother and stranger, postural approach and postural avoidance of mother and stranger, acceptance and exploration of a toy when presented by mother and stranger. At age 12 months, there will be differences between the behaviors of normal infants and DS infants. The normal infants will demonstrate a negative affective orientation to the intrusive behavior of the stranger and will posturally avoid her, will be distressed by the separation from mother, will demand proximity to mother by postural approach, and will be distressed by her second leaving. The normal infants will be less accepting of a toy from the stranger.

The DS infants will not display negative affect toward the stranger or be distressed when mother leaves, will not demand proximity to her, as demonstrated by postural approach, will not posturally avoid the stranger, and will not be distressed on mother's second departure. The DS infants will accept and explore the toy readily when it is presented by the stranger and the mother.

The second hypothesis involves the relationship between DQ and attachment behaviors at age 12 months. There will be an association between DQ and looking at the unfamiliar adult, positive and negative affect directed toward the unfamiliar adult, positive and negative affect directed toward the mother, postural avoidance of the unfamiliar adult, and postural approach toward the mother.

CHAPTER III  
METHODOLOGY

This study was planned to provide comparisons of attachment behavior in DS and normal infants at ages 6 and 12 months.

Design

In this cross-sectional study, carried out in a laboratory situation, the independent variables were diagnostic status, age, and elicitor of behavior. The dependent variables were looking, positive affect, negative affect, postural approach and postural avoidance, acceptance and exploration of a toy, and response to maternal departure. In addition, the Gesell Developmental Examination was administered to each infant and a DQ score obtained.

The hypotheses to be tested in this study are as follows:

1. Looking behavior is different as a function of diagnostic status, age, and elicitor of behavior.
2. Positive affect is different as a function of diagnostic status, age, and elicitor of behavior.
3. Negative affect is different as a function of diagnostic status, age, and elicitor behavior.
4. Postural approach is different as a function of diagnostic status, age, and elicitor of behavior.

5. Postural avoidance is different as a function of diagnostic status, age, and elicitor of behavior.

6. Normal and DS infants age 6 months accept the toy equally promptly when it is presented by the unfamiliar adult or the mother.

7. Normal and DS infants age 6 months explore the toy with equal amounts of enthusiasm when it is presented by the unfamiliar adult or the mother.

8. Normal infants age 12 months are more hesitant than DS infants in accepting a toy from the unfamiliar adult.

9. Normal infants and DS infants at 12 months accept the toy equally promptly from their mothers.

10. Normal infants age 12 months display more negative affect than DS infants when their mothers depart for the second time.

11. DQ, as measured by the Gesell Developmental Examination at 12 months, is associated with looking at the unfamiliar adult.

12. DQ, as measured by the Gesell Developmental Examination at 12 months, is associated with positive affect toward the unfamiliar adult.

13. DQ, as measured by the Gesell Developmental Examination at 12 months, is associated with negative affect toward the unfamiliar adult.

14. DQ, as measured by the Gesell Development Examination at 12 months, is associated with postural avoidance of the unfamiliar adult.

15. DQ, as measured by the Gesell Developmental Examination at 12 months, is associated with positive affect directed toward the mother.

16. DQ, as measured by the Gesell Developmental Examination at 12 months, is associated with negative affect directed toward the mother.

17. DQ, as measured by the Gesell Developmental Examination at 12 months, is associated with postural approach toward the mother.

### Subjects

The subjects of the study were 17 white infants with DS diagnosed by cytogenetic study and an equal number of normal infants matched for age, sex, and socio-economic status. (Appendix A contains social class, age, and sex for each subject.) Eight of the DS and eight of the normal infants were seen within  $\pm$  one week of their sixth-month birthday (age 26 weeks), and nine of the DS and nine of the normal infants were seen within  $\pm$  two weeks of their twelfth-month birthday (age 52 weeks).

Ten of the 17 mothers of the normal infants and 14 mothers of the infants with DS reported some problem or special circumstance associated with their pregnancy, the labor, or the delivery of their baby. (See Appendix B for details.) Table 1 gives the mean birth weight by age and diagnosis. A t-test for the difference between means indicated no significant birth weight differences between the normal and DS infants. One infant with DS was adopted at

age one week and taken from the hospital by his adoptive parents. Two of the DS infants had congenital heart abnormalities. (Thirty percent of all DS infants have some congenital heart problems according to Levinson et al., 1955.) Among the normal infants, 11 (58%) were breast fed, and among the DS infants, 7 (38%) were breast fed.

Table 1  
Mean Birth Weight and Standard Deviations  
by Age and Diagnosis

| Age in<br>Months | N | Birth Weight in Pounds |      |                |      |
|------------------|---|------------------------|------|----------------|------|
|                  |   | DS Infants             |      | Normal Infants |      |
|                  |   | Mean                   | S.D. | Mean           | S.D. |
| 6                | 8 | 6.41                   | 1.4  | 8.18           | .46  |
| 12               | 9 | 6.5                    | .42  | 7.49           | .85  |

The Gesell Developmental Examination was given to each infant. The mean age of the infants at the time of testing and their mean DQ may be seen in Table 2. (See Appendix C for each infants' age and DQ.) In the case of one infant who was small for date and one infant who was premature, corrected chronological ages were calculated, and the corrected birthdays were used both for the administration of the Gesell Developmental Examination and for the observation procedure (Gesell & Amatruda, 1947; Tilford, 1976).

Table 2  
Mean Ages and Gesell Developmental  
Quotients of Subjects

|                 | N | Mean Age<br>in Weeks | Gesell Developmental<br>Quotients, Weeks |      |
|-----------------|---|----------------------|--|------|
|                 |   |                      | Mean                                     | S.D. |
| Down's Syndrome | 8 | 27                   | 19.63                                    | 3.25 |
|                 | 9 | 52                   | 41.50                                    | 4.66 |
| Normal          | 8 | 25.40                | 31                                       | 3.34 |
|                 | 9 | 51.80                | 54.30                                    | 4.64 |

#### Families of the Subjects

The families of the subjects were matched on the Hollingshead Two-Factor Index of Social Position (Hollingshead & Redlich, 1958). (See Appendix A for social position of subject.) All parents were married and living together. Table 3 presents the mean number of years married and the mean ages of mother and fathers. Table 4 presents the birth order of the subjects. All families of the DS infants had chosen to keep their infants at home, and all were involved with an agency for handicapped children.

Table 3  
 Mean Ages of Parents and Mean  
 Number of Years Married

| Age/Diagnosis | Age of Mother |       | Age of Father |       | Years Married |      |
|---------------|---------------|-------|---------------|-------|---------------|------|
|               | Mean          | S.D.  | Mean          | S.D.  | Mean          | S.D. |
| 6 month olds  |               |       |               |       |               |      |
| DS            | 27.85         | 12.57 | 28.34         | 13.75 | 8.75          | 5.01 |
| N             | 28.63         | 5.34  | 29.13         | 6.06  | 8.63          | 4.87 |
| 12 month olds |               |       |               |       |               |      |
| DS            | 32.22         | 8.12  | 38.89         | 8.20  | 8.88          | 3.92 |
| N             | 29.77         | 4.32  | 32.44         | 8.10  | 7.22          | 4.32 |

Table 4  
 Subject's Ordinal Position

| Position in Family | 6 month olds |   | 12 month olds |   |
|--------------------|--------------|---|---------------|---|
|                    | DS           | N | DS            | N |
| Firstborn          | 2            | 3 | 4             | 3 |
| Second             | 3            | 2 | 2             | 3 |
| Third              | 2            | 2 | 1             | 3 |
| Fourth             | 0            | 0 | 0             | 1 |
| Fifth              | 0            | 1 | 1             | 0 |
| Sixth              | 0            | 0 | 0             | 0 |
| Seventh            | 0            | 0 | 1             | 0 |
| Eighth             | 0            | 0 | 0             | 0 |
| Ninth              | 1            | 0 | 0             | 0 |

## Procedures

### Recruitment of Subjects

Subjects with DS were recruited through agencies and groups working with retarded children. (See Appendix D for a listing of agencies.) After the agency agreed to assist in recruiting subjects, one agency staff person contacted the eligible families. Those families agreeing to participate in the study were then contacted by the investigator who explained the purpose of the study, the procedures, answered any questions, and made tentative arrangements for the observation.

Normal infants were recruited through personal contacts, newspaper and newsletter advertisements, and community agencies. When a mother agreed to participate, she was told:

The purpose of this study is to compare the way in which infants with Down's syndrome and normal infants relate to unfamiliar adults and to their own mothers. The observation begins by having you and your infant come to the study room which has a one-way mirror. A woman enters and begins to play with your baby. After a short time, you leave the room; you may see your baby through the oneway glass. During your absence, the woman continues to play with your baby. Then, the woman also leaves the room. The baby is left by himself/herself, seated in an infant-table for a few moments. You return to the room and play with your baby the same way as the woman did. During the entire episode, which lasts about 12 minutes, one or two observers, sitting behind the oneway mirror, have noted what your baby was doing.

After the observation, the Gesell Developmental Examination will be given. The purpose of this is to record the developmental progress of your infant. It involves observing the way your baby plays with small cubes and toys. You are present throughout this part of the session, which takes about 20 minutes.

The refusal rate among the families of DS infants appeared small. Two agencies reported that two families among those solicited chose not to participate. Among the normal infants, one baby was ill during the critical time for observation and two mothers recruited through a family agency reneged, explaining that their husbands did not wish them to participate. Because the families of the normal infants were of a higher socio-economic status than the families of the DS infants, the infants were matched on age, sex, and socio-economic status. Of 50 infants observed 16 were excluded because of the matching (11 normals and four infants with DS).

Final arrangements for the observation were made by telephone. The mother was asked to select a time of day when the infant was well fed and alert. The observation was scheduled for that time. When the mother and infant arrived at the observation center, they were greeted by the investigator. They were made comfortable in the waiting room, and the mother was asked to fill out the information form sheet and to sign the informed consent form. (Appendix E contains informed consent form and Appendix F the information form.) The procedure for the observation was reviewed. The mother was given a cobbler's apron with a toy in the pocket, and she and the infant were brought to the observation room.

The instructions for each episode, as narrated by the investigator, were played on a cassette recorder located in the observation room. The unfamiliar adult was a white

female who wore an apron identical to that worn by the mother. The infant's behaviors were recorded on a coding form by the observer who was stationed behind the oneway mirror. (The coding form is contained in Appendix G.) When the observation procedure was completed, the Gesell Developmental Examination was administered by the investigator for the purpose of determining developmental status of the infants.

#### Materials and Observation Room

Because the subjects with DS were drawn from different parts of the state, eight testing sites were used. Although the rooms were different in shape and purpose, the arrangement of the equipment was standard relative to the oneway mirror. Directly opposite the oneway mirror was the screen. To the right and in front of the screen was the mother's chair and the infant-table. A cassette recorder was placed on the floor near the infant-table. To the left of the oneway mirror was the entry.

The equipment used was:

1. a straight-back chair for the mother
2. an infant-table
3. a screen six feet high x four feet wide
4. A cassette recorder with a tape of instructions
5. two pink cobbler aprons
6. two circular infant toys (6 inches in diameter).

## Instrumentation

### Assessment of Attachment Behavior

Observations of attachment behavior were made using the Gordon et al. (1973) unfamiliar adult situation. Like Ainsworth's strange situation, each infant is exposed to a scenario enacted by an unfamiliar adult and the mother. Throughout, an observer coded infant behaviors on eight variables: looking, positive affect, negative affect, postural approach, postural avoidance, acceptance and exploration of a toy, and response to mother's departure. (Appendix H contains the interobserver reliabilities for the Gordon et al. (1973) unfamiliar adult scale or "trust" scale.)

The scenario begins with the infant seated on the mother's lap. It was divided into consecutive episodes as follows:

1. The unfamiliar adult (UA) enters and stands six feet in front of the baby (B) and smiles.
2. UA talks to the B in a cheerful manner.
3. UA approaches the B, smiles, and says "Hello."
4. UA pats B's fingers in a game-like fashion several times.
5. UA picks B up, holds him/her, and walks around the room.
6. UA wiggles B in the air several times.
7. Transition: UA walks behind screen and mother (M) leaves the room quietly. UA returns holding B, M is gone.

8. UA puts B into infant-table.
9. UA offers toy to B. UA offers toy repeatedly if B does not take it immediately.
10. Transition: UA takes toy from B and leaves. M enters and stands six feet in front of B. She talks and smiles.
11. M pats B's fingers in a game-like fashion several times.
12. M holds the B and walks around the room.
13. M wiggles B in the air several times.
14. M returns B to the infant-table.
15. M offers toy to B. M offers it repeatedly if B does not take it immediately.
16. M leaves slowly waving "Bye-bye."

The coding form itself comprised the operational definitions for each of the dependent variables (see Appendix G). These behavioral definitions together with the videotapes of the procedure provide the means for learning to code the behaviors. (The videotapes are available from the Ira J. Gordon Library Collection, College of Education, University of North Carolina, Chapel Hill, North Carolina 27514.)

Behaviors were coded on a four-point scale of intensity. Appendix G provides a sample coding form for all of the scales and designates the behaviors coded during each episode.

Coders, Training for Coding,  
and Interobserver Agreement

In the present study, three women, two psychology students and one an assistant in a class for handicapped children, were trained to code infant responses. The categories of infant behavior were described in the original study and

were used to score behavior during training. Videotapes from the original study were coded for practice. Disagreements were resolved by reviewing the tapes and by discussion. After one week of viewing tapes, three infants were placed in the unfamiliar adult situation, and their behaviors were coded. Interobserver agreement in the practice situation was 95%. Interobserver agreement, assessed during the data gathering sessions, was 92% for two observers for seven observations. The formula used for computing agreement was:

$$\text{Agreement} = \frac{\text{Total number of agreements}}{\text{Total number of observations}} \quad (\text{Fox, 1969}).$$

#### Training for Administration of the Gesell Developmental Examination

The investigator administered the Gesell Developmental Examination to each infant. The investigator had been trained by Hilda Knobloch. Training included scoring from videotape, from direct observation, and administering the examination under supervision. Interrater agreement after training was 96% with Dr. Knobloch.

#### Data Analysis

The intensity scores for the five principal dependent measures were summed across episodes and under elicitors as follows:

1. looking: episodes 1 + 4 compared to episode 10 + 11.
2. positive affect: episodes 1 + 4 + 5 + 6 + 9 compared to episodes 10 + 11 + 12 + 13 + 15.
3. negative affect: episodes 1 + 4 + 5 + 6 + 9 compared to episodes 10 + 11 + 12 + 13 + 15.

4. postural approach: episodes 3 + 4 + 5 compared to episodes 10 + 11 + 12.

5. postural avoidance: episodes 3 + 4 + 5 compared to episodes 10 + 11 + 12.

Episodes were excluded from the analysis (for example, 2 and 3) when there were no comparable episodes under the other elicitor. A split-plot factorial analysis of variance for age and diagnostic status over subjects and elicitors over repeated measures was performed for each of the five principal dependent measures. Analyses of variance for repeated measures were performed for:

1. acceptance of a toy: episode 9 compared to episode 15
2. exploration of a toy: episode 9 compared to episode 15

for DS and normal infants at age 6 months. To analyze the response of the 12-month-olds to the acceptance of the toy from the unfamiliar adult (episode 9), acceptance of the toy from their mothers (episode 15), and the departure of their mothers, t-tests were used. Gardner (1975) suggested that parametric statistics are appropriate for use in summated scales in which ". . . the items will display a limited range of popularity (the attitudinal equivalent of cognitive difficulty) and will be differentiating (discriminating)" (p. 53).

Pearson product-moment correlations were computed to determine the association between DQ at 12 months and looking, positive and negative affect, and postural avoidance of the unfamiliar adult, and positive and negative affect and

postural approach directed toward the mother. For all statistical tests differences were deemed to be significant if  $p \leq .05$ .

## CHAPTER IV

### RESULTS

This study examined the interaction of three independent variables: diagnostic status, age, and elicitor on five dependent measures of attachment: looking, positive affect, negative affect, postural approach, and postural avoidance. The variables were analyzed in a two-way analysis of variance split-plot design for repeated measures. Acceptance and exploration of a toy presented by the mother and unfamiliar adult were analyzed at age 6 months by means of an analysis of variance for repeated measures. Acceptance of the toy from the mother, acceptance of the toy from the unfamiliar adult, and response on the second departure of the mother were analyzed for the 12-month groups by means of t-tests. In addition, Pearson product-moment correlations were computed on selected attachment behaviors at age 12 months.

Hypothesis 1. The first hypothesis that looking behavior as observed in the unfamiliar adult situation was different as a function of diagnostic status, age, and elicitor of behavior was not confirmed. Cell means and standard deviations are presented in Table 5. The three-way interaction was not significant. Neither were the two-way interactions nor any of the main effects significant. The summary table is presented in Table 6.

Table 5

Cell Means and Standard Deviations for Looking, Positive Affect, Negative Affect, Postural Approach, Postural Avoidance, Negative Affect, Positive Affect, Negative Affect, Postural Approach, and Postural Avoidance by Diagnostic Status, Age, and Elicitor (Mother = M and Unfamiliar Adult = UA)

| Variable<br>Diagnostic/Elicitor<br>Status | Looking |        | Positive Affect |        | Negative Affect |        | Postural Approach |        | Postural Avoidance |        |        |
|---|---------|--------|-----------------|--------|-----------------|--------|-------------------|--------|--------------------|--------|--------|
|   | UA      | M      | UA              | M      | UA              | M      | UA                | M      | UA                 | M      |        |
| 6 months                                  | Mean    | 3.50   | 3.87            | 1.25   | 3.50            | 0.38   | 0.38              | 3.25   | 2.89               | 1.50   | 0.13   |
|   | SD      | (3.55) | (2.10)          | (1.58) | (1.69)          | (.74)  | (.74)             | (1.90) | (1.80)             | (1.06) | (0.35) |
| Down's Syndrome                           | Mean    | 3.55   | 3.88            | 2.33   | 5.33            | 0.78   | 0.55              | 3.00   | 4.67               | 2.89   | 0.44   |
|   | SD      | (1.50) | (1.69)          | (1.60) | (1.73)          | (.97)  | (1.01)            | (1.11) | (1.41)             | (2.75) | (0.88) |
| Normal                                    | Mean    | 2.88   | 2.25            | 3.87   | 2.50            | 1.75   | 2.50              | 1.50   | 2.13               | 1.13   | 0.75   |
|   | SD      | (1.55) | (1.18)          | (3.52) | (1.51)          | (2.95) | (4.37)            | (1.69) | (2.94)             | (1.24) | (1.48) |
| 12 months                                 | Mean    | 4.55   | 3.00            | 2.09   | 4.66            | 3.11   | 5.56              | 1.56   | 4.44               | 3.22   | 1.35   |
|   | SD      | (1.13) | (1.32)          | (2.17) | (2.41)          | (2.42) | (3.71)            | (1.90) | (1.81)             | (2.01) | (1.93) |

Table 6

Summary Table for Analysis of Variance Split-Plot  
for Repeated Measures for Looking

| Source                                  | Sum of Squares | df | Mean Square | F    | p    |
|---|----------------|----|-------------|------|------|
| Diagnostic Status                       | 4.84           | 1  | 4.84        | 2.61 | 0.12 |
| Age                                     | 6.62           | 1  | 6.62        | 3.57 | 0.07 |
| Diagnostic Status<br>x Age              | 5.90           | 1  | 5.90        | 3.19 | 0.08 |
| Error                                   | 55.60          | 30 | 1.85        |      |      |
| Elicitor                                | 2.29           | 1  | 2.29        | 0.89 | 0.35 |
| Elicitor x Diagnos-<br>tic Status       | 8.83           | 1  | 8.83        | 3.44 | 0.07 |
| Elicitor x Age                          | 1.00           | 1  | 1.00        | 0.39 | 0.54 |
| Elicitor x Diagnos-<br>tic Status x Age | 0.84           | 1  | 0.84        | 0.33 | 0.57 |
| Error                                   | 76.99          | 30 | 2.56        |      |      |

Hypothesis 2. The second hypothesis that positive affect as observed in the unfamiliar adult situation was different as a function of diagnostic status, age, and elicitor of behavior was not confirmed. The three-way interaction for diagnostic status, age, and elicitor of behavior was not statistically significant,  $F(1,30) = 3.97$ ,  $p \leq .06$ . Cell means and standard deviations are reported in Table 5. The analysis of variance summary table for positive affect is presented in Table 7.

A statistically significant interaction was found between elicitor and diagnostic status,  $F(1,30) = 5.74$ ,  $p \leq .02$ . Marginal means for elicitor and diagnostic status were: unfamiliar adult at DS infants = 1.79; mother at DS infants = 4.41; unfamiliar adult at normal infants = 2.94; mother at normal infants = 3.58. Analysis of simple main effects for elicitor x diagnostic status, seen in Table 8, indicated there was a significant difference between positive affect for the DS infants when the mother rather than the unfamiliar adult was the elicitor. The infants smiled more at their mothers than at the unfamiliar adult. There was no difference in intensity of smiling between the normal infants whether the elicitor was the mother or the unfamiliar adult. Figure 1 depicts this relationship.

Age and elicitor were also significant,  $F(1,30) = 8.41$ ,  $p \leq .01$ , and the marginal means were: unfamiliar adult at 6 months = 2.56; mother at 6 months = 3.00; unfamiliar adult at 12 months = 2.16; mother at 12 months = 4.99. Analysis

Table 7

Summary Table for Analysis of Variance Split-Plot  
for Repeated Measures for Positive Affect

| Source                                  | Sum of Squares | df | Mean Square | F     | p    |
|---|----------------|----|-------------|-------|------|
| Diagnostic Status                       | 0.41           | 1  | 0.41        | 0.07  | 0.80 |
| Age                                     | 10.90          | 1  | 10.90       | 1.72  | 0.20 |
| Diagnostic Status<br>x Age              | 7.30           | 1  | 7.30        | 1.15  | 0.29 |
| Error                                   | 189.69         | 30 | 6.32        |       |      |
| Elicitor                                | 45.31          | 1  | 45.31       | 15.68 | 0.00 |
| Elicitor x Diagnos-<br>tic Status       | 16.59          | 1  | 16.59       | 5.74  | 0.02 |
| Elicitor x Age                          | 24.31          | 1  | 24.31       | 8.41  | 0.01 |
| Elicitor x Diagnos-<br>tic Status x Age | 11.47          | 1  | 11.47       | 3.97  | 0.06 |
| Error                                   | 86.69          | 30 | 2.89        |       |      |

Table 8

Summary Table for Simple Main Effects for  
Positive Affect: Diagnostic Status  
x Elicitor and Elicitor x Age

| Source  | Sum of Squares | df | Mean Square | F       |
|---|----------------|----|-------------|---------|
| <u>Diagnostic Status</u><br><u>x Elicitor</u> |                |    |             |         |
| Elicitor at<br>Down's Syndrome                | 60.29          | 1  | 60.29       | 13.08** |
| Elicitor at Normal                            | 4.97           | 1  | 4.97        | 1.08    |
| *Pooled Error                                 |                | 60 | 4.61        |         |
| <u>Age x Elicitor</u>                         |                |    |             |         |
| Age and Unfamiliar<br>Adult                   | -1.27          | 1  | -1.27       | .27     |
| Age and Mother                                | 33.89          | 1  | 33.89       | 7.35**  |
| *Pooled Error                                 |                | 60 | 4.61        |         |

$$\frac{*MS_{\text{Subj w. groups}} + MS_{\text{B x Subj w. groups}}(q-1)}{q}$$

(Kirk, 1968, p. 289)

\*\*p  $\leq$  .02.

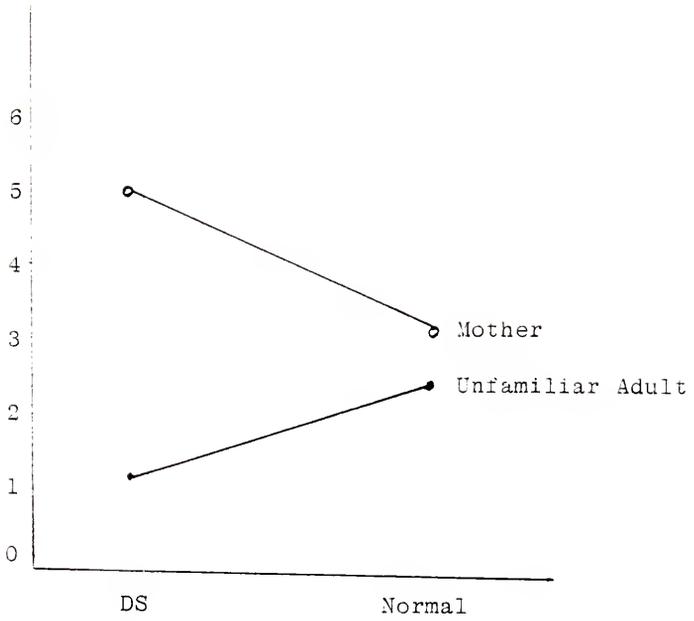


Figure 1. Positive Affect: Elicitor x Diagnostic Status.

for simple main effects for age and elicitor indicated that 6- and 12-month-olds differ when the mother is the elicitor of behavior. Table 8 presents a summary table. The 12-month-olds display more intense positive affect toward her than do the 6-month-olds. There was no difference between the age groups for positive affect directed toward the unfamiliar adult. At both ages, the infants smiled less at the unfamiliar adult than at the mother. This relationship may be seen in Figure 2.

Hypothesis 3. The third hypothesis that negative affect as observed in the unfamiliar adult situation was different as a function of diagnostic status, age, and elicitor of behavior was not confirmed, as reference to Table 9 indicates. Cell means and standard deviations are reported in Table 5. The three-way interaction for negative affect was not statistically significant,  $F(1,30) = 2.94$ ,  $p \leq .10$ . The two-way interaction for elicitor and diagnostic status was statistically significant,  $F(1,30) = 9.35$ ,  $p \leq .01$ . Table 10 provides a summary table for the analysis of simple main effects. Marginal means for DS infants at unfamiliar adult = .58; for DS infants at mother = .47; for normal infants at unfamiliar adult = 2.43; for normal infants at mother = 4.03. The normal infants displayed significantly more negative affect than the DS infants in the presence of the mother but not the unfamiliar adult. The infants with DS showed virtually no negative affect in the presence of either the mother or the unfamiliar adult. Figure 3 displays this relationship.

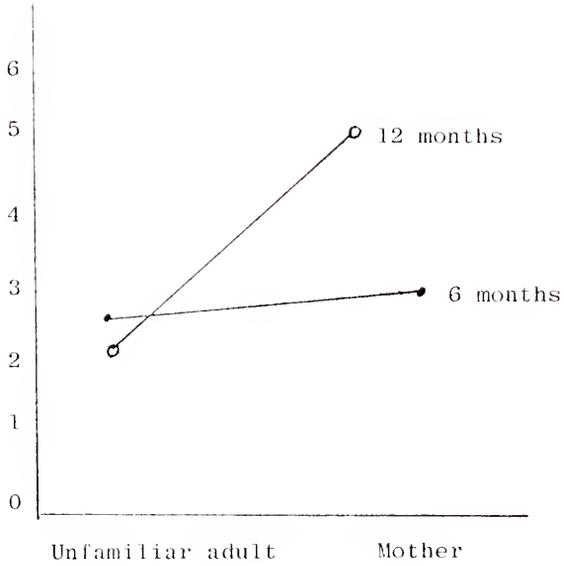


Figure 2. Positive Affect: Elicitor x Age.

Table 9  
 Summary Table for Analysis of Variance Split-Plot for  
 Repeated Measures for Negative Affect

| Source                                  | Sum of Squares | df | Mean Square | F     | p     |
|---|----------------|----|-------------|-------|-------|
| Diagnostic Status                       | 124.26         | 1  | 124.26      | 11.08 | 0.002 |
| Age                                     | 26.47          | 1  | 26.47       | 2.36  | 0.14  |
| Diagnostic Status<br>x Age              | 15.56          | 1  | 15.56       | 1.39  | 0.25  |
| Error                                   | 336.50         | 30 | 11.22       |       |       |
| Elicitor                                | 9.35           | 1  | 9.35        | 7.08  | 0.01  |
| Elicitor x<br>Diagnostic Status         | 12.36          | 1  | 12.36       | 9.35  | 0.01  |
| Elicitor x Age                          | 2.29           | 1  | 2.29        | 1.74  | 0.20  |
| Elicitor x Diagnos-<br>tic Status x Age | 3.89           | 1  | 3.89        | 2.94  | 0.10  |
| Error                                   | 39.64          | 30 | 1.32        |       |       |

Table 10  
 Summary Table for Simple Main Effects for  
 Negative Affect: Diagnostic  
 Status x Elicitor

| Source                                   | Sum of<br>Squares | <u>df</u> | Mean<br>Square | <u>F</u> |
|--|-------------------|-----------|----------------|----------|
| Diagnostic Status at<br>Unfamiliar Adult | 30.11             | 1         | 30.11          | 4.79     |
| Diagnostic Status at<br>Mother           | 113.05            | 1         | 113.05         | 18.03**  |
| *Pooled Error                            |                   | 60        | 6.27           |          |

\*(Kirk, 1968).

\*\* $p \leq .02$ .

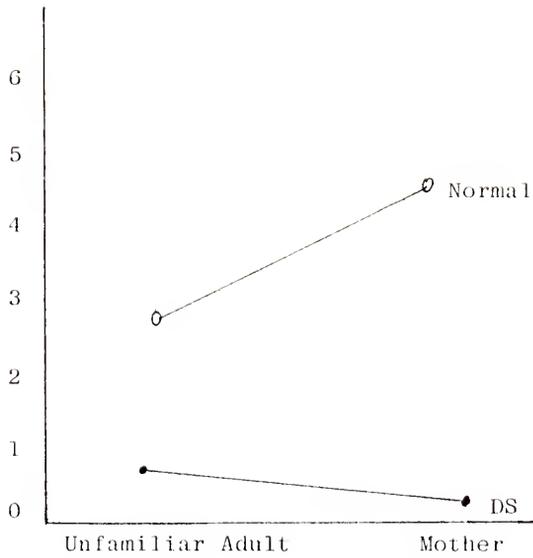


Figure 3. Negative Affect: Elicitor x Diagnostic Status.

Hypothesis 4. The fourth hypothesis that the postural approach of the infants observed in the unfamiliar adult situation was different as a function of diagnostic status, age, and elicitor of behavior was not confirmed as reference to Table 10 indicates. Cell means and standard deviations are reported in Table 5. There was no statistically significant three-way interaction,  $F(1,30) = .02, p \leq .88$ . There was a statistically significant two-way interaction for elicitor and age,  $F(1,30) = 7.82, p \leq .01$ . Simple main effects were analyzed (see Table 11).

Marginal means for age 6 months at unfamiliar adult = 2.37; for age 6 months at mother = 2.50; for age 12 months at unfamiliar adult = 2.28; for age 12 months at mother = 4.55. At age 6 months, there was no difference between the infants when either the mother or the unfamiliar adult was the elicitor. At 12 months, there was a significant difference between the postural approach toward the mother and the unfamiliar adult. The older infants approached their mothers significantly more than they approached the unfamiliar adult. There was no difference for either age group when the unfamiliar adult was the elicitor of behavior, but when the mother was the elicitor, the 12-month-olds approached her more than the 6-month-olds. These relationships may be seen in Figure 4.

The main effect for diagnostic status was statistically significant,  $F(1,30) = 4.23, p \leq .05$ . Infants with DS displayed more postural approach than normal infants.

Table 11  
 Summary Table for Analysis of Variance Split-Plot for  
 Repeated Measure for Postural Approach

| Source                                  | Sum of Squares | df | Mean Square | F    | p    |
|---|----------------|----|-------------|------|------|
| Diagnostic Status                       | 18.38          | 1  | 18.38       | 4.23 | 0.05 |
| Age                                     | 16.24          | 1  | 16.24       | 3.74 | 0.06 |
| Diagnostic Status<br>x Age              | 0.74           | 1  | 0.74        | 0.17 | 0.68 |
| Error                                   | 130.38         | 30 | 4.35        |      |      |
| Elicitor                                | 24.45          | 1  | 24.45       | 9.74 | 0.01 |
| Elicitor x Diagnos-<br>tic Status       | 5.23           | 1  | 5.23        | 2.08 | 0.16 |
| Elicitor x Age                          | 19.63          | 1  | 19.63       | 7.82 | 0.01 |
| Elicitor x Diagnos-<br>tic Status x Age | 0.05           | 1  | 0.02        | 0.02 | 0.88 |
| Error                                   | 75.32          | 30 | 2.51        |      |      |

Table 12  
 Summary Table for Simple Main Effects for  
 Postural Approach: Elicitor x Age

| Source                    | Sum of Squares | <u>df</u> | Mean Square | <u>F</u> |
|---------------------------|----------------|-----------|-------------|----------|
| Age 6 months at Elicitor  | .10            | 1         | .10         | .03      |
| Age 12 months at Elicitor | 84.02          | 1         | 84.02       | 24.50**  |
| *Pooled Error             |                | 60        | 3.43        |          |

\*(Kirk, 1968).

\*\* $\underline{p} \leq .02$ .

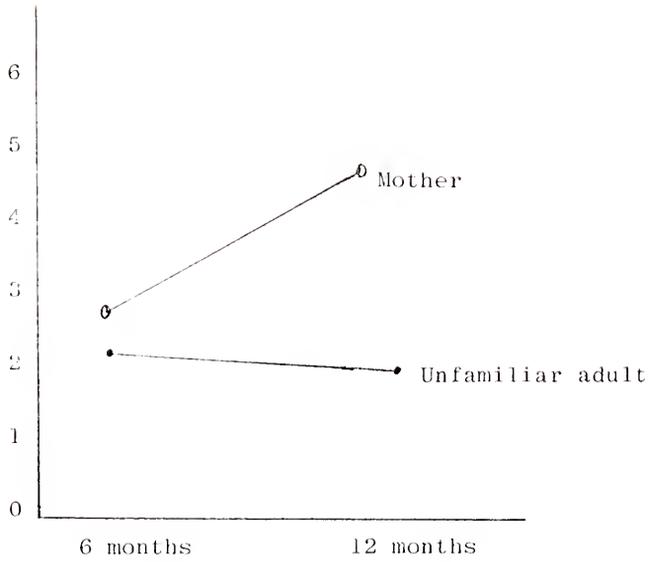


Figure 4. Postural Approach: Elicitor x Age.

Hypothesis 5. The fifth hypothesis that postural avoidance as measured in the strange situation was different as a function of diagnostic status, age, and elicitor of behavior was not confirmed, as reference to Table 13 indicates. Cell means and standard deviations are reported in Table 5. Neither the three-way nor any of the two-way interactions were statistically significant. Main effects for age,  $F(1,30) = 7.16$ ,  $p \leq .01$ , and elicitor,  $F(1,30) = 14.62$ ,  $p \leq .001$ , were statistically significant. The summary table is presented in Table 13. The older infants were more avoidant than younger ones, and the unfamiliar adult was avoided more than the mother.

Hypothesis 6. The sixth hypothesis that normal and DS infants age 6 months accepted the toy equally promptly when presented by the unfamiliar adult and equally promptly when presented by the mother was confirmed, as reference to Table 14 indicates. The two-way interaction was not statistically significant,  $F(1,14) = 2.03$ ,  $p \leq .18$ . Both groups accepted the toy equally promptly when presented by the unfamiliar adult and by the mother. There was a statistically significant main effect for elicitor,  $F(1,14) = 5.65$ ,  $p \leq .03$ . The main effect indicated that the infants accepted the toy more readily when presented by their mothers. Cell means and standard deviations are presented in Table 15.

Hypothesis 7. The seventh hypothesis that normal and DS infants age 6 months explored the toy with equal amounts of enthusiasm when it was presented by the unfamiliar adult

Table 13

Summary Table for Analysis of Variance Split-Plot for Repeated Measures for Postural Avoidance

| Source                                  | Sum of Squares | <u>df</u> | Mean Square | <u>F</u> | <u>p</u> |
|---|----------------|-----------|-------------|----------|----------|
| Diagnostic Status                       | 2.29           | 1         | 2.29        | 0.81     | 0.38     |
| Age                                     | 20.40          | 1         | 20.40       | 7.16     | 0.01     |
| Diagnostic Status<br>x Age              | 1.00           | 1         | 1.00        | 0.35     | 0.56     |
| Error                                   | 85.49          | 30        | 2.85        |          |          |
| Elicitor                                | 39.18          | 1         | 39.18       | 14.62    | 0.001    |
| Elicitor x Diagnos-<br>tic Status       | 2.56           | 1         | 2.56        | 0.96     | 0.34     |
| Elicitor x Age                          | 7.07           | 1         | 7.07        | 2.64     | 0.12     |
| Elicitor x Diagnos-<br>tic Status x Age | 0.21           | 1         | 0.21        | 0.08     | 0.78     |
| Error                                   | 80.43          | 30        | 2.68        |          |          |

Table 14

ANOVA Summary Table for Acceptance of Toy at 6-Months  
from Unfamiliar Adult and Mother

| Source                       | Sum of Squares | <u>df</u> | Mean Square | <u>F</u> | <u>p</u> |
|------------------------------|----------------|-----------|-------------|----------|----------|
| Diagnostic Status            | 10.13          | 1         | 10.13       | 3.57     | .08      |
| Error                        | 39.75          | 14        | 2.84        |          |          |
| Elicitor                     | 3.13           | 1         | 3.13        | 5.65     | .03      |
| Elicitor x Diagnostic Status | 1.13           | 1         | 1.13        | 2.03     | .18      |
| Error                        | 7.75           | 14        | .55         |          |          |

Table 15

Cell Means and Standard Deviations for Acceptance and  
Exploration of Toy by 6-Month-Old DS and Normal  
Infants by Unfamiliar Adult and Mother

| Variable              | Diagnostic<br>Status | Unfamiliar Adult |      | Mother |      |
|-----------------------|----------------------|------------------|------|--------|------|
|                       |                      | Mean             | SD   | Mean   | SD   |
| Acceptance<br>of Toy  | DS                   | .88              | 1.36 | 1.13   | 1.25 |
|                       | Normal               | 1.63             | 1.50 | 2.63   | 1.06 |
| Exploration<br>of Toy | DS                   | .64              | .58  | 1.33   | 1.53 |
|                       | Normal               | 1.60             | 1.14 | 2.60   | .55  |

or the mother was confirmed, as reference to Table 16 indicates. The two-way interaction was not statistically significant,  $F(1,6) = .12$ ,  $p \leq .74$ . (Degrees of freedom were adjusted to indicate that not all of the infants accepted the toy and, therefore, not all explored the toy.) The 6-month-old groups explored the toy with equal intensity, when both mother and unfamiliar adult presented it. Cell means and standard deviations are presented in Table 15.

Hypothesis 8. The eighth hypothesis that the normal infants at age 12 months were more hesitant than the DS infants in accepting a toy from the unfamiliar adult was rejected,  $t(16) df = -.22$ ,  $p \leq .83$ . Table 17 presents the cell means, standard deviations, and results of the t-test. Both groups of infants accepted the toy with the same degree of promptness.

Hypothesis 9. The ninth hypothesis that normal and DS infants at 12 months did not differ in promptness in accepting a toy from their mothers was confirmed,  $t(16) = 1.51$ ,  $p \geq .05$ . Table 17 presents the cell means, standard deviations, and results of the t-test. Both groups accepted the toy equally promptly when it was presented by the mother.

Hypothesis 10. The tenth hypothesis that normal infants at 12 months displayed more negative affect than comparable age DS infants when their mothers depart for the second time was confirmed. Table 17 presents the cell means, standard deviations, and results of the t-test. There was a statistically significant difference between the 12-month-old DS and normal infants,  $t(14) = -2.82$ ,  $p \leq .05$ .

Table 16

ANOVA Summary Table for Exploration of Toy at 6 Months  
When Presented by Unfamiliar Adult and Mother

| Source                       | Sum of Squares | <u>df</u> | Mean Square | <u>F</u> | <u>p</u> |
|------------------------------|----------------|-----------|-------------|----------|----------|
| Diagnostic Status            | 4.54           | 1         | 4.54        | 4.25     | .09      |
| Error                        | 6.40           | 6         | 1.07        |          |          |
| Elicitor                     | 2.60           | 1         | 2.60        | 2.93     | .14      |
| Elicitor x Diagnostic Status | 0.10           | 1         | .10         | .12      | .74      |
| Error                        | 5.33           | 6         | .89         |          |          |

Table 17

Cell Means, Standard Deviations, and t-Statistics for  
 Acceptance of Toy from Mother, from Unfamiliar  
 Adult, Response to Departure of  
 Mother at 12 Months

| Variable                                      | Group | Cell Means | <u>SD</u> | <u>df</u> | <u>t</u> |
|---|-------|------------|-----------|-----------|----------|
| Acceptance of toy<br>from unfamiliar<br>adult | DS    | 2.33       | 1.11      | 16        | -.22     |
|   | N     | 2.44       | 1.01      |           |          |
| Acceptance of toy<br>from mother              | DS    | 3.00       | 0         | 16        | 1.51     |
|   | N     | 2.33       | 1.32      |           |          |
| Response to mother's<br>second departure      | DS    | 0          | 0         | 16        | -2.82*   |
|   | N     | 1.55       | 1.33      |           |          |

\* $\leq$  .05.

The following hypotheses dealt with the relationship of DQ as measured by the Gesell Developmental Examination at 12 months and attachment behaviors measured at 12 months in the unfamiliar adult situation. Results are listed in Table 18.

Hypothesis 11. The eleventh hypothesis that DQ was associated with looking at the unfamiliar adult was not confirmed. No association was found,  $\underline{r} = .35$ ,  $\underline{p} \leq .17$ .

Hypothesis 12. The twelfth hypothesis that DQ was associated with positive affect directed toward the unfamiliar adult was not confirmed. No association was found,  $\underline{r} = .14$ ,  $\underline{p} \leq .61$ .

Hypothesis 13. The thirteenth hypothesis that DQ was associated with negative affect directed toward the unfamiliar adult was confirmed. The correlation was  $\underline{r} = .46$ ,  $\underline{p} \leq .05$ .

Hypothesis 14. The fourteenth hypothesis that DQ was associated with postural avoidance of the unfamiliar adult was not confirmed. No association was found,  $\underline{r} = .17$ ,  $\underline{p} \leq .49$ .

Hypothesis 15. The fifteenth hypothesis that DQ was associated with positive affect directed toward the mother was not confirmed. No association was found,  $\underline{r} = -.14$ ,  $\underline{p} \leq .59$ .

Hypothesis 16. The sixteenth hypothesis that DQ was associated with negative affect directed toward the mother was confirmed. The association found was  $\underline{r} = .63$ ,  $\underline{p} \leq .005$ .

Table 18

Pearson Product-Moment Correlations Between DQ and Attachment Behaviors at Age 12 Months

| Behavior                                 | Correlation Coefficient | Probability |
|--|-------------------------|-------------|
| Looking at Unfamiliar Adult              | .35                     | .17         |
| Positive Affect--<br>Unfamiliar Adult    | .14                     | .61         |
| Negative Affect--<br>Unfamiliar Adult    | .46                     | .05*        |
| Postural Avoidance--<br>Unfamiliar Adult | .17                     | .49         |
| Positive Affect--Mother                  | -.14                    | .59         |
| Negative Affect--Mother                  | .63                     | .005*       |
| Postural Approach--Mother                | -.05                    | .85         |

Hypothesis 17. The seventeenth hypothesis that DQ was associated with postural approach toward the mother was not confirmed. No association was found,  $r = -.05$ ,  $p \leq .85$ .

#### Summary

Hypotheses one through five which predicted that there would be interactions between the independent variables: diagnostic status, age, and elicitor of behavior and each of the principal dependent variables: looking, positive affect, negative affect, postural approach, and postural avoidance, were not confirmed. There were no statistically significant three-way interactions for any of the attachment variables. There were statistically significant two-way interactions for diagnostic status and elicitor, and elicitor and age for positive affect, elicitor and diagnostic status for negative affect, and elicitor and age for postural approach. Main effects were statistically significant for diagnostic status for postural approach and for both age and elicitor for postural avoidance.

Hypotheses six and seven which predicted that there would be no difference between the groups of 6-month-olds on the acceptance and exploration of a toy presented by the unfamiliar adult or the mother were confirmed. There was a main effect for elicitor on acceptance of toy, indicating that both groups of infants accepted the toy more readily when it was presented by their mothers.

Hypothesis eight which predicted that the 12-month-old normal infants would be more hesitant in accepting the toy from the unfamiliar adult than the DS infants was rejected.

Hypothesis nine which predicted no difference between the groups of infants at age 12 months in accepting the toy from their mothers was confirmed.

Hypothesis ten which predicted that the normal infants at age 12 months would display more negative affect than DS infants when their mothers left the room for the second time was confirmed.

Hypothesis 11 through 17 predicted that DQ as measured by the Gesell Developmental Examination at 12 months was associated with specific attachment behaviors observed in the unfamiliar adult situation. Hypotheses 15 and 18 which predicted an association between DQ and negative affect displayed toward the unfamiliar adult and the mother respectively were confirmed. There were no statistically significant associations between DQ and looking at the unfamiliar adult, positive affect directed toward the unfamiliar adult, postural avoidance of the unfamiliar adult, positive affect directed toward mother, or postural approach directed toward mother.

CHAPTER V  
DISCUSSION AND IMPLICATIONS

Overview

This study compared the expressions of attachment behavior of normal and DS infants at ages 6 and 12 months. The subjects were eight normal and eight DS infants seen within one week of their sixth-month birthday and nine normal and nine DS infants seen within two weeks of their twelfth-month birthday. The infants were matched for sex, age, and social class.

DQ for each infant was measured on the Gesell Developmental Examination. The infants were observed in the unfamiliar adult situation, a procedure designed to elicit attachment behaviors. The independent variables were diagnostic status, age, and elicitor of behavior (unfamiliar adult or mother) and the five principal dependent measures were: looking, positive affect, negative affect, postural approach, and postural avoidance. The variables were analyzed in a two-way factorial analysis of variance split-plot design for repeated measures. Measures of the acceptance and exploration of a toy presented by the mother and the unfamiliar adult to the 6-month-olds were analyzed in a two-way analysis of variance for repeated measures. Differences between 12-month-old DS and the normal infants on acceptance

of the toy from the mother, from the unfamiliar adult, and response to a second departure by the mother, were analyzed by means of t-tests. Pearson product-moment correlations were computed on DQ at age 12 months and selected attachment behaviors.

The hypothesis predicted that there were no differences in the expression of attachment behavior by the 6-month-old groups, but there were differences between the 12-month-old groups on the measures of attachment. DQ was predicted to be associated with selected attachment behaviors. There were no statistically significant three-way interactions. There were statistically significant two-way interactions for elicitor x diagnostic status and age x elicitor for positive affect, elicitor x diagnostic status for negative affect, and age x elicitor for postural approach as well as significant main effects for elicitor for postural approach, and age and elicitor for postural avoidance.

For the 6-month groups there were no differences between the promptness with which the infants accepted a toy, or explored a toy whether it was presented by the mother or the unfamiliar adult. However, both groups of infants accepted the toy more readily from the mother.

For the 12-month-old infants there were no differences in the promptness with which they accepted a toy from either the mother or the unfamiliar adult. There were differences in negative affect when the mother left the room the second time. Finally, at age 12 months DQ was found to be associated

with negative affect directed toward the mother and the unfamiliar adult.

## Discussion

### Looking Behavior

No differences were found between the groups of infants at either age or between the DS and the normal infants on looking behavior. The 6-month-old DS infants tended to look at the unfamiliar adult and their own mothers more than the 6-month-old normal infants. Studies of discrimination and novelty perception in DS infants ages 19 to 35 weeks indicated that they fixate on the stimulus longer than comparable age normal infants (Cohen, unpublished; Miranda & Fantz, 1974).

The most intense looking was directed toward the unfamiliar adult by the normal 12-month-old. Although not statistically significant this trend is in agreement with the findings of Bretherton and Ainsworth (1974) and Gordon et al. (1973). Bretherton and Ainsworth (1974) suggested that looking at the stranger is a form of appraisal which occurs prior to the expression of affiliation or wariness. The 12-month-old DS infants looked with equal intensity at the unfamiliar adult and their mothers.

Looking behavior in this study did not indicate a difference either between the DS and normal infants or between the groups at 6 and 12 months.

### Positive Affect

The 12-month groups of infants expressed significantly more positive affect toward their mothers than the 6-month

groups regardless of diagnostic status. The most intense positive affect was expressed by the 12-month-old DS infants toward their mothers. Both age groups expressed equal amounts of positive affect toward the unfamiliar adult, but the normal infants decreased the intensity of expression of positive affect toward the unfamiliar adult between 6 and 12 months although this decrease was not statistically significant. A decrease in positive affect toward the unfamiliar adult between ages 6 and 12 months is supported by other studies of normal infants (Bronson, 1972; Waters, Matas, & Sroufe, 1975). From 6 to 12 months the infants with DS increased positive affect toward the unfamiliar adult. This increase was not statistically significant.

Positive affect did not differentiate the groups in the expected way. The literature on DS infants indicates that DS infants have less intense affective expression than normal infants (Cicchetti & Sroufe, 1978; Emde et al., 1978). Prediction was that the 12-month-old DS infants would show less positive affect toward their mothers than the 12-month-old normal infants. Thus, one of the most interesting findings was that the infants with DS at both ages showed more intense positive affect toward their mothers than their normal counterparts.

Emde et al. (1978) reported that the most intense smile of the  $3\frac{1}{2}$ -month-old infant with DS was less intense and qualitatively different--lacking crinkling around the eyes and upturning at the corners of the mouth--than the smile of the normal infant. McCall (1972) suggested that

when the memory for a given stimulus is immature, smiling will intensify when that stimulus is presented. The DS infants in this study were sufficiently different in intensity of smiling to indicate a discrimination of mother vis a vis the unfamiliar adult.

Zelazo (1972) noted that the smiling response in infants is curvilinear with regard to familiarity: smiling increases with increasing familiarity to a stimulus and decreases with continued familiarization--a habituation effect. This may explain the smiling response of the normal infants compared with the DS infants. The discussion of this finding of differences between the normal and DS infants in smiling at the mother, however, may be best understood by reference to the following measure--negative affect.

#### Negative Affect

The normal infants are distinguished from their DS counterparts by expression of negative affect toward their mothers. Gordon et al. (1973) suggested that it was an attachment behavior in the unfamiliar adult situation. This negative affect expressed by the normal infants may explain why there is an unexpected difference in the expression of positive affect by the normal infants.

The expectation from the literature was that there were no differences between the groups of 6-month-olds. This hypothesis was based upon the fact that although distress reactions to separation have been recorded as early as seven months and distress reactions to the stranger have been

reported to occur as early as five months (Bronson, 1972; Tennes & Lempl, 1964), the response to the approaching stranger at age 6 months is neutral or smiling (Gordon et al., 1973; Skarin, 1977).

Year old normal infants have been shown to respond with wariness and distress to the intrusive behavior of a stranger (Gordon et al., 1973; Skarin, 1977; Sroufe, 1977) and to separation from the mother (Ainsworth, 1973). The normal infants in this study reacted in exactly that way. In addition, the sequence of interactions with the mother occurred after those with the stranger. The infant's distress at seeing the mother after her brief absence, after the experience with the unfamiliar adult and finally in response to the mother's departure, is in sharp contrast to the DS infants, who did not respond with distress to these events.

When negative affect was compared between the 12-month-old DS and normal infants after mother left the infant alone in the observation room, the normal infants were significantly more distressed than the DS infants. This is predicted from the literature on the "strange situation" (Ainsworth & Bell, 1970) as well as from the literature on separation distress in 12-month-old infants (Schaffer & Emerson, 1964; Tennes & Lempl, 1964) and reveals one of the predicted distinctions between DS and normal infants (Serafica & Cicchetti, 1976).

The responses of the DS infants were predominantly neutral, a finding consistent with previous research on DS infants (Carr, 1975; Serafica & Cicchetti, 1976). Waters et al. (1975) noted that the expressions of positive and

negative affect in the year old infant were not mutually exclusive. (In this study, there were 16 instances of year-old infants expressing both dimensions of affect in the same episode.) The response to the mother particularly by the year old normal infants in these circumstances was often tearful. The frustration on seeing the mother after a brief absence was compounded for the normal 12-month-olds by the infant-table which restrained the infants who frequently opened their arms in a gesture indicating a wish to be removed and held by the mother. The affect of the normal infants in this situation was more complex than that of the DS infants which was expressed in fewer dimensions. Although the difference between the DS and the normal infants was significant, the difference between the normals at 6 and 12 months was not. Nonetheless, the intensity of negative affect for the 6-month-old normals was half of that measured for the 12-month-old normals. This result is similar to the findings of Gordon et al. (1973) and Skarin (1977): younger infants display less negative affect in the presence of a stranger than do older infants.

The finding of a difference in negative affect between normal and DS infants supports the findings of Carr (1975) and Cicchetti and Sroufe (1978). These authors concluded that negative affect is more difficult to arouse in DS infants. Serafica and Cicchetti (1976) in their study of 33-month-old DS infants found almost no negative affect aroused during the strange situation among the DS as opposed

to the normal infants. An interesting finding in this study is that there was no difference in the expression of negative affect for the DS infants between ages 6 and 12 months.

#### Postural Approach

The DS infants, as a group, displayed more approach behavior than normal infants regardless of the elicitor. No significant difference was found on approach behavior between the groups of 6-month-old infants. There was a tendency for the DS infants to approach the unfamiliar adults more than their mothers. This approach behavior may be an artifact of the poor muscle tone of the DS infants which may have caused the unfamiliar adult to hold them closer and gave the appearance of the infant's molding to the adult. In contrast, the mothers would have adapted to the infant's tone and did not have to hold the baby so close. Approach toward the unfamiliar adult is consistent with the infant's lack of distress with her. The finding of no difference between approach to the unfamiliar adult or mother by the 6-month-old normal infants supports the findings of Gordon et al. (1975).

At age 12 months the postural response toward the mother was significantly different than the response to the unfamiliar adult. The postural approach of the 12-month-olds was more deliberately toward their own mothers for both the normal and DS groups. The prediction was that the normal infants would respond to their mothers more than the DS infants. Proximity seeking is predicted by the literature

(Ainsworth et al., 1971; Coates et al., 1972), Ainsworth (1973) noted that approach after a brief separation only occurs after attachment has been formed. Twelve-month-old DS infants and normal infants display the same approach behavior in the unfamiliar adult situation.

#### Postural Avoidance

No differences were found between the 6-month-old groups when postural avoidance was measured. Differences were found between ages: younger infants were less avoidant than the older groups. This is a finding consistent with previous research on normal infants (Gordon et al., 1973). The unfamiliar adult was avoided more than the mother.

Although the 12-month-old groups were more avoidant than the younger infants, there were no differences between the 12-month-old groups as the hypothesis predicted there would be.

#### Acceptance and Exploration of a Toy

At age 6 months, no difference was found in the promptness with which the DS and normal infants accepted a toy presented by the unfamiliar adult. No difference was found in the promptness with which both groups of infants accepted a toy presented by the mother. Both groups of infants accepted the toy more readily when it was presented by their own mothers. There were no differences in the enthusiasm with which they explored a toy whether presented by the mother or the unfamiliar adult.

Schaffer et al. (1972) observed that normal infants younger than 8 months accepted a toy readily and explored it actively. Although the hypothesis predicted no differences

between the 6-month-old infants in their responsiveness to the unfamiliar adult or their own mothers, this response measure may obscure differences in the infants.

On the Gesell Developmental Examination, all of the normal 6-month-old infants demonstrated the ability to reach and grasp and six of the eight infants were able to sit independently for a brief time. Among the 6-month-old infants with DS only half (four of eight) demonstrated ability to reach and grasp an object on sight and none of the infants was sitting independently even for a brief time. When the toy was presented by the unfamiliar adult, four (of eight) normal infants seized it immediately and three explored it actively. Three did not explore it at all. Among the DS infants, five did not accept the toy and two reached for it immediately, and only two infants explored it. The DS infants responded congruently with their abilities to presentations by the unfamiliar adult. The normal infants, by contrast, did not. Although approximately the same number of normal 6-month-old infants accepted the toy, their acceptance from the unfamiliar adult was tentative. Acceptance was immediate for all infants when the toy was presented by their mothers. The hesitancy by the normal infants in accepting the toy from the unfamiliar adult is not predicted from the literature. Schaffer et al. (1972) suggested that hesitancy in acceptance of the toy may be viewed as the beginnings of appraisal leading to inhibition of the rapid response. It may be that some of the normal

6-month-old infants are responding to the stranger with hesitation; whereas the DS infants are not responding because of their disabilities.

At 12 months, there were no differences between the groups of infants in their acceptance of the toy presented by the unfamiliar adult or the mother. At this age all of the DS infants were able to reach and grasp. The hypothesis of difference between the groups on presentation from the unfamiliar adult was not confirmed.

#### DQ and Attachment at 12 Months

DQ was hypothesized to be associated with the expression of attachment behaviors. A Pearson product-moment correlation was significant for the relation between DQ and negative affect directed toward mother and the unfamiliar adult. This finding is congruent with the Schaffer and Emerson (1964) finding of an association between early onset of attachment behavior measured by separation protest and higher DQ. Increased negative affect in the unfamiliar adult or strange situation has been related to increased age (Bronson, 1972; Gordon et al., 1973; Skarin, 1977). As the Gesell DQ is measured in weeks, it presumably reflects this age-development relationship. However, Serafica and Cicchetti (1976) found little distress in the DS infants at age 33 months in the strange situation. These infants had an average Bayley DQ of 56.45. This may be interpreted to mean that these children were performing on the level of a 16-month-old infant. The fact that they were still not

displaying the "normal" response to the strange situation suggests that, in this aspect of development, the DS infant and child may be different rather than delayed. The child with DS may never signal distress under the conditions of the unfamiliar adult situation.

DQ was not associated with looking at the unfamiliar adult, positive affect toward the unfamiliar adult or the mother, postural approach towards the mother, or postural avoidance of the unfamiliar adult. Cicchetti and Sroufe (1976) found an association between the onset of laughter in DS infants and Bayley DQ at 16 months. Caldwell et al. (1970) found an association between strength of attachment and DQ in infants 30 months old. The findings of this study did not support a relationship between DQ and attachment behaviors measured at age 12 months.

#### Summary

In summary, no differences were found between the groups of infants on looking behavior. The direction of looking behavior of 6-month-old DS and 12-month-old normal infants although not statistically significant followed predictions from the literature. The 12-month groups expressed more positive affect toward their mothers than the 6-month-olds. The most intense positive affect was directed toward their mothers by the 12-month-old DS infants. This finding may be due to the contrast in the expression of negative affect directed by the normal infants to their mothers. The DS infants expressed almost no negative affect toward either the unfamiliar adult or their own mothers.

The 12-month-old normal infants were distressed when their mothers left the observation room; the 12-month-old DS infants were not. This difference between DS and normal infants in expression of negative affect is consistent with other research findings.

The DS infants displayed more approach behavior than the normal infants. The 12-month-old infants were distinguished from the 6-month-olds in postural approach toward the mother. The older infants approached their mothers more than the younger infants. There was no difference by diagnostic status indicating a development of this ability for both the DS and normal infants between 6 and 12 months. The older infants were also more avoidant than the younger infants, and the unfamiliar adult was avoided more than the mother. There was no difference in the measure of response between the 6-month-old groups in accepting and exploring a toy presented by the unfamiliar adult or the mother. This measure of toy acceptance may conceal differences between the groups. Some of the DS infants were unable to reach and grasp a toy. Some normal infants were experiencing hesitancy in accepting a toy from an unfamiliar person. There were no differences between the 12-month-old groups when acceptance of the toy was measured under the condition of either the mother or the unfamiliar adult as elicitor.

When DQ at 12 months was correlated with attachment behaviors, negative affect directed toward unfamiliar adult and the mother was associated with it. Looking, positive

affect, and postural avoidance of the unfamiliar adult, and postural approach toward mother were not associated with DQ.

#### Implications

The primary findings in this study are that the infants with DS do not differ from the normal infants at either age in looking behavior directed toward the unfamiliar adult or mother. The DS infants distinguish their mothers from a stranger and display positive affect more intensely than the normal infants at both 6 and 12 months. They demonstrate approach behavior toward the mother and avoidance of the unfamiliar adult by age 12 months. In addition, the DS infants differ from normal infants in that they do not display negative affect toward the stranger at 6 and 12 months or toward the mother's departure at 12 months. These insights into the development of attachment in infants with DS can provide the educator, program developer, social worker, therapist, and caregiver information on which to base interventions to promote the caregiver-infant relationship.

#### Educators and Program Planners

Educators and program planners working with DS infants and their parents can add this information on attachment ability to their existing knowledge of social development and may modify programs to include it. For example, mothers might be trained in programs to work with their own infants on the premise that the mother may be a better source of motivation for the infant because the infant is more responsive to her. Teachers, sensitive to the role of face

to face interaction during the first months of life can include discussions of the role of attachment in development and can point out the meaningfulness of the subtle changes in approach, avoidance, and smiling over time. Teachers can encourage parental behaviors which will maximize responsiveness.

#### Social Workers and Therapists

Social workers and therapists who counsel parents during the period following the birth of an infant with DS can inform the parents that their infant with DS is capable of being an active, responsive partner in the social exchanges of infancy. This knowledge can allow the parents to begin to see the infant as having positive attributes. This responsive behavior can also be a basis for assisting the parents to see the infant as a separate person. The knowledge that they, as parents, can experience a relationship with their infant and that this begins in the earliest months of life allows the parents to focus their attentions on the infant in the present moment. The discussion of attachment in infant development can also serve to introduce the exploration of feelings about parenting a handicapped infant.

#### Parents and Caregivers

The knowledge that their handicapped infant is sensitive to their caregiving and will be able to acknowledge them as individuals can be crucial information for parents who have just learned that their infant will probably be mentally retarded. The fact that their infant will be a responsive

partner in a relationship may permit parents to be emotionally involved with their infant earlier than if they had to learn this from the infant over time. In addition, the fact that the attachment behavior expressed at 6 months will continue to develop and change over the next six months by increased positive affect in the presence of the mother, approach toward mother, and avoidance of a stranger communicates to parents that their infant has the ability to grow and change. The awareness of these expressions of attachment by their infants which are more subtle than those of the normal infant can assist parents with the difficult judgments that parents of handicapped children face in knowing what is "normal" for any child at a particular stage and what is disability related.

#### Limitations

The limitations of this research are fourfold: first, the small size of the sample; second, the inherent limitations of ex-post-facto studies--lack of control of the independent variables by the investigator and, thus, inability to randomize assignments to groups (Campbell & Stanley, 1963); third, the reliability of the unfamiliar adult situation; fourth, the overall alpha rate in the analyses.

The rate of occurrence of DS, although high relative to any other seriously disabling genetic condition, is relatively infrequent in any birth population at one time. This is especially true as the birth population declines and as amniocentesis provides prenatal detection of DS and the mother with the option of abortion. If additional restrictions are

added to the study of population with DS, such as race or social class, size of the sample can be drastically reduced. All researchers in this area are faced with the problem, and studies of populations with DS tend to be on small samples. Replication may provide a solution. The difficulty with a small sample is that the error variance may distort the results. The cross-sectional design used in this study is a conservative procedure as is the single observation; both minimize the opportunity for behavior to be elicited.

Although the investigator lacks control of the independent variable--diagnostic status, DS is not known to be restricted to a particular social class, race, or sex. The occurrence of DS is higher among women over 35. The families in this study come from social classes I through IV on Hollingshead's Index. Mean maternal ages for the normal infants were 29.2 years and for the DS infants 30.5 years.

The interobserver reliability on the original instrument (Gordon et al., 1973) was  $r = .62$ ,  $p < .05$ . That study was coded from videotapes which provided a static perspective on the interaction. Coding the observations live as was done in this study provides the coder with an unobstructed view of the interchanges between the baby and the adult and reduces the opportunity for discrepancy between the coders.

In cases where there are many analyses performed on the data, Kirk (1968) suggests caution in interpreting significant differences because of the probability of finding significant differences by chance. The rule for estimating chance

differences is the number of significant differences over the number of comparisons x the overall alpha level.

#### Suggestions for Future Research and Practice

The findings of this study indicate that attachment behaviors are exhibited by DS infants. Attachment behaviors are expressed on dimensions of looking, smiling, approach toward mother, and avoidance of the stranger and are demonstrated by age 12 months. A curriculum designed for DS infants which incorporated these findings would be sensitive to the infant's response to strangers and separation from mother.

The study of the attachment behavior of infants with DS would be enlarged by a longitudinal, observational study of infants and their mothers at home during the first year of life. There are few observational studies on the interactions of mothers and their handicapped children (Kogan, Wimberger, & Bobbitt, 1975). The observational approach to the study of DS infants would provide data bases for further comparative study of the development of DS and normal infants.

#### Conclusions

Bowlby (1969) stated that attachment behavior is a special kind of species adaptation which has as its goal survival of the individual. The function of attachment behavior appears to be the same for both normal and DS infants. Results of this study indicate both groups of infants demonstrate Ainsworth's (1969) categories of attachment behaviors including orienting behaviors (looking), signalling behaviors (smiling), and executing behaviors (postural approach). Infants with DS can indicate differentiation of their mothers from strangers

by expression of positive affect at 6 months, and their responsiveness toward mother in terms of positive affect increases between 6 and 12 months. In addition, proximity behavior, as demonstrated in this study by postural approach, increases between 6 and 12 months. These findings are congruent with those of Serafica and Cicchetti (1976) who studied attachment behavior in 33-month-old normal and DS infants.

The infants differ, however, in their response to the "stress" of the unfamiliar adult situation. The normal infants at 6 and 12 months are distressed by the intrusive behavior of the unfamiliar adult, and the 12-month-old normal infants are distressed by the departure of their mothers. The infants with DS do not respond with distress to either of these events. These results are in accord with the Serafica and Cicchetti (1976) findings on DS and normal infants at age 33 months in the strange situation. The criterion on which the infants in that study were distinguished was negative affect.

The physical capability of DS infants to become distressed has been noted by Carr (1975) and Cicchetti and Sroufe (1978). Cicchetti and Sroufe (1978) have suggested that the low amount of affectivity displayed in their studies on laughter, the visual cliff, and looming stimuli was due to the interaction of the infant's physiological make-up which produced high thresholds for emotional arousal and the cognitive deficit which resulted in their not processing rapidly enough to generate meaning from complex cognitive events.

Although there was an association found in this study between DQ and the expression of negative affect at 12 months, the absence of negative affect by DS children at age 33 months (Serafica and Cicchetti, 1976) may indicate that the infants are not merely delayed but are different than normal infants and children in their ability to express negative affect. This difference may be seen as early as 6 months.

As a group, the DS and normal infants were distinguished by expression of positive and negative affect toward their mothers. The 6- and 12-month-old infants were distinguished by expression of positive affect toward mother, postural approach toward mother, and postural avoidance. The hypothesis of no differences between the groups at age 6 months was sustained. The hypothesis of differences between the groups of infants at age 12 months was not confirmed. Attachment as the ". . . affectional tie that one person forms to another specific person, binding them together in space and enduring over time" (Ainsworth, 1973, p. 1) is substantially independent of the developmental differences between DS and normal infants during the first year of life.

APPENDIX A  
 SOCIO-ECONOMIC STATUS, SEX, AND  
 AGE OF SUBJECTS

| <u>Age</u> | <u>Sex</u> | <u>Social Class</u> |
|------------|------------|---------------------|
| 6 months   | M          | I                   |
|            | M          | IV                  |
|            | F          | III                 |
|            | F          | II                  |
|            | M          | IV                  |
|            | M          | IV                  |
|            | F          | IV                  |
|            | F          | III                 |
| 12 months  | M          | IV                  |
|            | M          | II                  |
|            | F          | II                  |
|            | F          | III                 |
|            | M          | II                  |
|            | M          | IV                  |
|            | M          | III                 |
|            | F          | II                  |
| M          | I          |                     |

APPENDIX B

PREGNANCY, LABOR, AND DELIVERY  
EXPERIENCES OF MOTHERS

Infants with DS

- 001 Respiratory distress; 10 days in NICU;  
mother's labor was 27 hours.
- 002 Mother's labor was 16 hours for this ninth  
child.
- 003 No difficulties.
- 004 Three weeks early by date; birth weight was  
normal.
- 006 Mother felt no fetal movement until sixth  
month of pregnancy.
- 007 Baby was a footling breech and was delivered  
by C-section. Mother reported that she  
felt very anxious throughout this pregnancy.
- 008 Placenta previa; baby delivered six weeks  
early; baby weighed 4 pounds 5 ounces at  
birth and was in NICU for five weeks.
- 009 Small-for-date baby (birth weight 5 pounds  
1 ounce).
- 011 Mother reported jerky fetal movement.
- 012 Baby was a breech birth and the mother re-  
ported some staining during the early  
months of the pregnancy.
- 014 No difficulties.
- 016 Adopted. No information about the pregnancy.
- 018 A vacuum extractor was used.
- 019 Baby was a breech birth and the mother re-  
ported that she felt very anxious through-  
out the pregnancy.
- 020 Baby was of normal weight but arrived three  
weeks early.
- 021 Baby was delivered by C-section (as was  
sibling two years older).
- 022 No difficulties.

Normal Infants

- 101 Labor was induced.
- 102 Baby was delivered using the Leboyer method.
- 105 No difficulties.
- 106 Baby was a breech birth and had a brachial  
plexus injury.
- 107 Mother experienced premature labor which  
was halted. Baby was born on time.
- 108 No difficulties.
- 110 Baby was delivered by C-section.
- 111 No difficulties.
- 112 Baby was delivered by C-section.

## Normal Infants Cont.

- |     |   |
|-----|---|
| 113 | No difficulties.  |
| 115 | No difficulties.  |
| 122 | Mother had diabetes during pregnancy.                             |
| 124 | No difficulties.  |
| 125 | Mother had a "difficult" delivery due to<br>the size of the baby. |
| 126 | Baby was born with a broken collar bone.                          |
| 127 | Mother had high blood pressure during preg-<br>nancy.             |
| 128 | Baby had to be turned before delivery.                            |

## APPENDIX C

## AGE OF SUBJECTS AND DEVELOPMENTAL QUOTIENT

| DS Subject's Age |   | DQ      | Normal Subject's Age |   | DQ      |
|------------------|---|---------|----------------------|---|---------|
| Weeks + Days     |   | (weeks) | Weeks + Days         |   | (weeks) |
| 26               | 5 | 21      | 26                   | 1 | 34      |
| 27               | 5 | 22      | 24                   | 6 | 31      |
| 28               | 2 | 24      | 25                   | 4 | 27      |
| 27               | 1 | 16      | 25                   | 6 | 36      |
| 27               | 1 | 22      | 24                   | 5 | 32      |
| 27               | 1 | 20      | 25                   | 1 | 30      |
| 27               | 2 | 15      | 25                   | 1 | 26      |
| 25               | 0 | 17      | 25                   | 5 | 32      |
| 53               | 2 | 44      | 54                   | 5 | 53      |
| 53               | 2 | 42      | 53                   | 1 | 53      |
| 54               | 4 | 30      | 53                   | 0 | 54      |
| 50               | 0 | 42      | 51                   | 0 | 52      |
| 50               | 5 | 45      | 53                   | 2 | 57      |
| 50               | 2 | 43      | 50                   | 1 | 53      |
| 51               | 1 | 41      | 51                   | 0 | 60      |
| 53               | 6 | 41      | 50                   | 1 | 51      |
| 51               | 0 | 46      | 50                   | 1 | 56      |

APPENDIX D

AGENCIES THROUGH WHICH SUBJECTS WERE RECRUITED

Capital District Association for Parents of People  
with Down's Syndrome, Albany, New York.

Columbia County Association for Retarded Children,  
Hudson, New York.

Prospect Preschool Project, Hudson Falls, New York.

St. Agnes Hospital, Children's Unit, White Plains,  
New York.

Association for Children with Down's Syndrome, East  
Meadow, New York.

Orange County Association for Retarded Citizens,  
Middletown, New York.

APPENDIX E  
INFORMED CONSENT

DISSERTATION: Attachment Behavior in Infancy

INVESTIGATOR: Judith C. Tate  
46 Green Meadows Lane  
Loudonville, New York 12211  
(518) 489-8919

The purpose of this study is to compare the way in which infants with Down's syndrome and normal infants relate to adults whom they do not know and to their own mothers. The observation begins by bringing the infant and his mother into the study room which has a oneway mirror. An adult, who is a stranger to the infant, enters and begins to play with the infant. After a short time, the mother leaves the room; she may see her baby through the oneway glass. During her absence, the stranger continues to play with the infant. Then, the stranger also leaves the room. The baby is left by himself, seated in an infant-table for a few moments. The mother comes in; she plays with the baby in the same way as the "stranger." During the entire episode, which lasts about 12 minutes, two observers, sitting behind the oneway mirror, have noted what the baby was doing.

After the observation described above, the Gesell Developmental Examination will be given. The purpose of this is to record the developmental progress of the infant. It involves observing the way the infant plays with small cubes and toys. The mother is present throughout this part of the session, which takes about 20 minutes.

You will receive no money for your participation. I will send you a summary of my findings when my work is completed. Please feel free to ask any questions you may have about any part of the study. Thank you for your interest.

Yours truly,

Judith C. Tate

DISSERTATION: Attachment Behavior in Infancy

INVESTIGATOR: Judith C. Tate  
46 Green Meadows Lane  
Loudonville, New York 12211  
(518) 489-8719

This research study, which is being conducted by Judith Tate as partial fulfillment for the degree of Doctor of Philosophy at the University of Florida, has been explained to me. I understand that my child and I will come for one observation session. I understand that I will participate in parts of the session and will be absent for other parts. I understand that the study may not benefit my child directly. I have read and I understand the attached procedure. I agree to participate in the procedure and I have received a copy of this description.

Signed \_\_\_\_\_ parent.

Observer's Signature \_\_\_\_\_

APPENDIX F  
INFORMATION FORM

Baby's Name \_\_\_\_\_ ID# \_\_\_\_\_

Parents' Name \_\_\_\_\_ Today's date \_\_\_\_\_

Date of baby's birth \_\_\_\_\_

Date baby was expected \_\_\_\_\_

Marital status: Single \_\_\_ Widowed \_\_\_ Separated \_\_\_\_\_

Married and living with spouse \_\_\_ Divorced \_\_\_\_\_

If married, number of years \_\_\_\_\_. If divorced or separated,  
how many years married prior to divorce or separation \_\_\_\_\_.

Other children:

| Sex | Date of birth | Year in school (grade) |
|-----|---------------|------------------------|
|-----|---------------|------------------------|

|       |       |       |
|-------|-------|-------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

|                                  | Mother | Father |
|----------------------------------|--------|--------|
| Last year completed<br>in school | _____  | _____  |
| Age                              | _____  | _____  |
| Occupation                       | _____  | _____  |

Was there any thing different about the pregnancy, delivery,  
and labor for this baby? \_\_\_\_\_

Bottle fed \_\_\_\_\_

Breast fed \_\_\_\_\_

APPENDIX G

CODING FORM

Name \_\_\_\_\_ Coder \_\_\_\_\_

Coding number \_\_\_\_\_

Age \_\_\_\_\_ Place \_\_\_\_\_

Date \_\_\_\_\_

1. UA enters and stands 6 feet in front of the baby and smiles

Scale 1: Looking

- \_\_\_\_\_ 0 fleeting or no look at UA
- \_\_\_\_\_ +1 one or two brief looks (off and on) at UA
- \_\_\_\_\_ +2 looks half of the time at UA (steadily or off and on)
- \_\_\_\_\_ +3 looks most of the time at UA
  
- \_\_\_\_\_ 0 fleeting or no look at M
- \_\_\_\_\_ -1 one or two brief looks (off and on) at M
- \_\_\_\_\_ -2 looks half of the time at M (steadily or off and on)
- \_\_\_\_\_ -3 looks most of the time at M

Scale 2: Affect

- \_\_\_\_\_ 0 no positive affect
- \_\_\_\_\_ +1 brief smiles or positive vocalizations
- \_\_\_\_\_ +2 smiles most of the time
- \_\_\_\_\_ +3 laughs, excited, or wiggles with delight
  
- \_\_\_\_\_ 0 no negative affect
- \_\_\_\_\_ -1 silent cry face or brief fret
- \_\_\_\_\_ -2 frets, whines, or brief cry
- \_\_\_\_\_ -3 more than brief cry or scream

2. UA talks to the baby in a cheerful manner

Scale 1: Looking

- \_\_\_\_\_ 0 fleeting or no look at UA
- \_\_\_\_\_ +1 1 or 2 brief looks at UA (off and on)
- \_\_\_\_\_ +2 looks half of the time at UA (steadily or off and on)
- \_\_\_\_\_ +3 looks most of the time at UA
  
- \_\_\_\_\_ 0 fleeting or no look at M
- \_\_\_\_\_ -1 1 or 2 brief looks at M (off and on)
- \_\_\_\_\_ -2 looks half of the time at M (steadily or off and on)
- \_\_\_\_\_ -3 looks most of the time at M

Scale 2: Affect

\_\_\_ 0 no positive affect  
 \_\_\_ +1 brief smiles or positive vocalizations  
 \_\_\_ +2 smiles most of time  
 \_\_\_ +3 laughs, excited, or wiggles with delight

\_\_\_ 0 no negative affect  
 \_\_\_ -1 silent cry face or brief fret  
 \_\_\_ -2 frets, whines, or brief cry  
 \_\_\_ -3 more than brief cry or scream

## LOOKING

## AFFECT

## ADJUSTMENT

## 3. UA approaches baby, smiles and says, "Hello."

Scale 1: Looking

\_\_\_ 0 fleeting or no look at UA  
 \_\_\_ +1 one or two brief looks (off and on) at UA  
 \_\_\_ +2 looks half of the time at UA (steadily or  
 off and on)  
 \_\_\_ +3 looks most of the time at UA

\_\_\_ 0 fleeting or no look at M  
 \_\_\_ -1 one or two brief looks (off and on) at M  
 \_\_\_ -2 looks half of the time at M (steadily or  
 off and on)  
 \_\_\_ -3 looks most of the time at M

Scale 2: Affect

\_\_\_ 0 no positive affect  
 \_\_\_ +1 brief smiles or positive vocalizations  
 \_\_\_ +2 smiles most of the time  
 \_\_\_ +3 laughs, excited, or wiggles with delight

\_\_\_ 0 no negative affect  
 \_\_\_ -1 silent, cry face, or brief fret  
 \_\_\_ -2 frets, whines, or brief cry  
 \_\_\_ -3 more than a brief cry or scream

Scale 3: Postural adjustment

\_\_\_ 0 no postural approach  
 \_\_\_ +1 leans towards and looks at UA  
 \_\_\_ +2 single or brief reaches toward UA. May  
 stop before completing gesture  
 \_\_\_ +3 prolonged reach for UA or several brief  
 reaches or actively tries to get UA.

- \_\_\_ 0 no postural avoidance
- \_\_\_ -1 coy response or shy (i.e., peeks at UA or yawns or rubs eyes or scratches self.
- \_\_\_ -2 leans away at least briefly from UA with eye aversion and head turn. May result from activity burst.
- \_\_\_ -3 usually leans or turns body and head away from UA. May appear to result from interest in objects.

LOOKING  
AFFECT  
POSTURE

4. UA pats the baby's fingers in a game-like fashion several times.

Scale 1: Looking

- \_\_\_ 0 fleeting or no look at UA
- \_\_\_ +1 1 or 2 brief looks at UA (off and on)
- \_\_\_ +2 looks half of the time at UA (steadily or off and on)
- \_\_\_ +3 looks most of the time at UA
- \_\_\_ 0 fleeting or no look at M
- \_\_\_ -1 1 or 2 brief looks (off and on) at M
- \_\_\_ -2 looks half of the time at M (steadily or off and on)
- \_\_\_ -3 looks most of the time at M

Scale 2: Affect

- \_\_\_ 0 no positive affect
- \_\_\_ +1 brief smiles or positive vocalization
- \_\_\_ +2 smiles most of the time
- \_\_\_ +3 laughs, excited, or wiggles with delight
- \_\_\_ 0 no negative affect
- \_\_\_ -1 silent, cry face, or brief fret
- \_\_\_ -2 frets, whines, or brief cry
- \_\_\_ -3 more than brief cry or scream

Scale 3: Postural adjustment--Hand touching

- \_\_\_ 0 no postural adjustment
- \_\_\_ +1 eventually allows UA to touch hand or lean towards and looks
- \_\_\_ +2 allows UA to touch hand on first time or briefly reaches for UA
- \_\_\_ +3 touches, clasps or reaches for UA's hand, or steadily reaches for UA

- \_\_\_ 0 no postural avoidance
- \_\_\_ -1 removes hand when touched once or twice or rubs eyes or yawns or scratches self or coy avoidance, "sigh"
- \_\_\_ -2 jerks hand away one or more times or removes hand when touched three or more times
- \_\_\_ -3 never allows hand to be touched or usually leans or turns body and head away from UA

LOOKING--MOTHER  
AFFECT  
POSTURE

5. UA picks baby up, holds him, and walks around the room.

Scale 1 (b): Looking at mother

- \_\_\_ 0 fleeting or no look at M
- \_\_\_ -1 one or two brief looks (off and on) at M
- \_\_\_ -2 looks (or tries to look) half of the time at M (steadily or off and on)
- \_\_\_ -3 looks (or tries to look) most of the time at M

Scale 2: Affect

- \_\_\_ 0 no positive affect
- \_\_\_ +1 brief smiles or positive vocalizations
- \_\_\_ +2 smiles most of the time
- \_\_\_ +3 laughs, excited, or wiggles with delight
- \_\_\_ 0 no negative affect
- \_\_\_ -1 silent, cry face, brief fret
- \_\_\_ -2 frets, whines, or brief cry
- \_\_\_ -3 more than a brief cry or scream

Scale 4: Postural adjustment when held

- \_\_\_ 0 no positive adjustment
- \_\_\_ +1 briefly rests torso on UA
- \_\_\_ +2 rests torso on UA most of the time
- \_\_\_ +3 rests torso on UA most of the time and clearly enjoys physical contact, e.g., cuddles or clings or reaches for UA or grasps with legs
- \_\_\_ 0 no negative adjustment
- \_\_\_ -1 holds both hands away from UA
- \_\_\_ -2 posture is arched backwards or strains torso to turn away from UA or to look at M
- \_\_\_ -3 struggles when held; desires to terminate contact

## LOOKING

## AFFECT

6. UA wiggles baby in the air several times

Scale 1 (b): Looking at mother

- \_\_\_ 0 fleeting or no look at M
- \_\_\_ -1 one or two brief looks (off and on) at M
- \_\_\_ -2 looks (or tries to look) half of the time  
at M (steadily or off and on)
- \_\_\_ -3 looks (or tries to look) most of the time  
at M

Scale 5: Affect in relation to frolic

- \_\_\_ 0 no positive affect
- \_\_\_ +1 brief smiles or positive vocalizations
- \_\_\_ +2 warms up to play or smiles most of the time
- \_\_\_ +3 enthusiastic, laughs, or wiggles with delight
- \_\_\_ 0 no negative affect
- \_\_\_ -1 silent, cry face, or brief fret
- \_\_\_ -2 frets, whines, or brief cry
- \_\_\_ -3 more than a brief cry or scream, struggles  
to be put down when lifted over head

## AFFECT

Transition: Stranger walks behind barrier. Mother leaves.

7. UA returns holding baby. Mother is gone.

Scale 2: Affect

- \_\_\_ 0 no positive affect
- \_\_\_ +1 brief smiles or positive vocalizations
- \_\_\_ +2 smiles most of time
- \_\_\_ +3 laughs, excited, or wiggles with delight
- \_\_\_ 0 no negative affect
- \_\_\_ -1 silent, cry face, brief fret
- \_\_\_ -2 frets, whines, or brief cry
- \_\_\_ -3 more than brief cry or scream

## 8. UA puts baby into infant table

Scale 6: Reaction to return to infant table

- \_\_\_ 0 no positive reaction  
 \_\_\_ +1 brief smiles, positive vocalization, or  
     brief examination of table  
 \_\_\_ +2 smiles most of the time or sustained  
     exploration of table  
 \_\_\_ +3 excited and smiles or laughs with real  
     enjoyment  
  
 \_\_\_ 0 no negative reaction  
 \_\_\_ -1 some clinging or brief fret but fairly  
     quickly accepts being put down  
 \_\_\_ -2 clings to UA or frets, or whines  
 \_\_\_ -3 clings tightly to UA or resists being put  
     down or more than a brief cry or scream.  
     May thrash wildly.

AFFECT  
 INTENSITY  
 ACCEPTANCE

## 9. UA offers toy to baby. UA offers it repeatedly if baby does not take it.

Scale 2: Affect

- \_\_\_ 0 no positive affect  
 \_\_\_ +1 brief smiles or positive vocalizations  
 \_\_\_ +2 smiles most of the time  
 \_\_\_ +3 laughs, excited, or wiggles with delight  
  
 \_\_\_ 0 no negative affect  
 \_\_\_ -1 silent, cry face, or brief fret  
 \_\_\_ -2 frets, whines, or brief cry  
 \_\_\_ -3 more than brief cry or scream

Scale 7: Acceptance of toy

- \_\_\_ 0 never takes toy  
 \_\_\_ +1 takes toy after offered three or more times  
 \_\_\_ +2 takes toy on second offer or with hesita-  
     tion on first offer  
 \_\_\_ +3 reaches immediately for and takes toy as  
     soon as sees toy

Scale 8: Intensity of exploration IF accepts toy

- \_\_\_ 0 Very minimal exploration: puts toy down soon after taking it
- \_\_\_ +1 little exploration: touches or holds toy passively with little manipulation. May include some mouthing.
- \_\_\_ +2 moderate exploration: manipulation of toy is intermittent or sustained + casual or brief + intense.
- \_\_\_ +3 high exploration: sustained visual attention while manipulating toy or enthusiasm while banging toy. May include some mouthing.

## LOOKING

## AFFECT

## POSTURAL ADJUSTMENT

10. Transition: Stranger takes toy from the baby and leaves. M enters and stands six feet in front of baby. She talks and smiles.

Scale 1: Looking

- \_\_\_ 0 fleeting or no look at M
- \_\_\_ +1 one or two brief looks (off and on) at M
- \_\_\_ +2 looks half of the time (steadily or off and on) at M
- \_\_\_ +3 looks most of the time at M

Scale 2: Affect

- \_\_\_ 0 no positive affect
- \_\_\_ +1 brief smiles or positive vocalizations
- \_\_\_ +2 smiles most of the time
- \_\_\_ +3 laughs excited, or wiggles with delight
- \_\_\_ 0 no negative affect
- \_\_\_ -1 silent, cry face, or brief fret
- \_\_\_ -2 frets, whines, or brief cry
- \_\_\_ -3 more than a brief cry or scream

Scale 3: Postural adjustment

- \_\_\_ 0 no postural approach
- \_\_\_ +1 leans towards or looks at M
- \_\_\_ +2 single or brief reaches to M (may stop before completing gesture)
- \_\_\_ +3 prolonged reach for M or several brief reaches or actively tries to get to M

- \_\_\_ 0 no postural avoidance
- \_\_\_ -1 coy response or shy (e.g., peeks at M) or yawns or rubs eyes or scratches self
- \_\_\_ -2 leans briefly away from M with eye aversion and head turn. May result from activity burst.
- \_\_\_ -3 usually leans or turns body and head away from M. May appear to result from interest in objects.

LOOKING  
AFFECT  
POSTURE

11. M pats the baby's fingers in a game-like fashion several times.

Scale 1: Looking

- \_\_\_ 0 fleeting or no look at M
- \_\_\_ +1 one or two brief looks (off and on) at M
- \_\_\_ +2 looks half of the time (steadily or off and on) at M
- \_\_\_ +3 looks most of the time at M

Scale 2: Affect

- \_\_\_ 0 no positive affect
- \_\_\_ +1 brief smiles or positive vocalizations
- \_\_\_ +2 smiles most of the time
- \_\_\_ +3 laughs, excited, or wiggles with delight
- \_\_\_ 0 no negative affect
- \_\_\_ -1 silent, cry face, or brief fret
- \_\_\_ -2 frets, whines, or brief cry
- \_\_\_ -3 more than a brief cry or scream

Scale 3: Postural adjustment--hand touching

- \_\_\_ 0 no postural adjustment
- \_\_\_ +1 eventually allows M to touch hand or leans body towards and looks
- \_\_\_ +2 allows M to touch hand on first time, or briefly reaches for M
- \_\_\_ +3 touches clasps or reaches for M's hand or steadily reaches for M
- \_\_\_ 0 no postural avoidance
- \_\_\_ -1 rubs hand when touched once or twice, or rubs eyes or yawns or scratches self or coy avoidance "shy"
- \_\_\_ -2 jerks hand away one or more times or removes hand when touched three or more times
- \_\_\_ -3 never allows hand to be touched or usually leans or turns body and head away from M

AFFECT  
POSTURE

12. M holds the baby and walks around the room.

Scale 2: Affect

- \_\_\_ 0 no positive affect  
 \_\_\_ +1 brief smiles or positive vocalizations  
 \_\_\_ +2 smiles most of the time  
 \_\_\_ +3 laughs, excited, or wiggles with delight
- \_\_\_ 0 no negative affect  
 \_\_\_ -1 silent, cry face, or brief fret  
 \_\_\_ -2 frets, whines, or brief cry  
 \_\_\_ -3 more than brief cry or scream

Scale 4: Postural adjustment when held

- \_\_\_ 0 no positive adjustment  
 \_\_\_ +1 briefly rests torso on M  
 \_\_\_ +2 rests torso on M most of the time  
 \_\_\_ +3 rests torso on M most of the time and clearly enjoys physical contact, e.g., cuddles or clings or reaches for M or grasps with legs.
- \_\_\_ 0 no negative adjustment  
 \_\_\_ -1 holds both hands away from M  
 \_\_\_ -2 posture is arched backwards or strains to turn away from M  
 \_\_\_ -3 struggles when held and desires to terminate contact.

13. M wiggles the baby in the air several times.

Scale 5: Affect in relation to frolic

- \_\_\_ 0 no positive affect  
 \_\_\_ +1 brief smiles or positive vocalizations  
 \_\_\_ +2 warms up to play or smiles most of the time  
 \_\_\_ +3 enthusiastic, laughs, or wiggles with delight
- \_\_\_ 0 no negative affect  
 \_\_\_ -1 silent, cry face, or brief fret  
 \_\_\_ -2 frets, whines, or brief cry  
 \_\_\_ -3 more than brief cry or scream, or struggles to be put down when lifted over head

14. M puts baby into the infant table.

Scale 6: Reaction to return to infant table

- \_\_\_ 0 no positive reaction  
 \_\_\_ +1 brief smiles or positive vocalization or  
 brief examination of table  
 \_\_\_ +2 smiles most of the time or sustained explor-  
 ation of the table  
 \_\_\_ +3 excited and smiles or laughs with real en-  
 joyment. May be in reaction to mothers game.
- \_\_\_ 0 no negative reaction  
 \_\_\_ -1 some clinging or brief fret but fairly  
 quickly accepts being put down  
 \_\_\_ -2 clings to M or frets or whines  
 \_\_\_ -3 clings tightly to M or resists being put  
 down or more than a brief cry or scream--  
 may thrash wildly.

AFFECT  
 ACCEPTANCE  
 INTENSITY

15. M offers toy to baby. M offers it repeatedly if the  
 baby does not take it.

Scale 2: Affect

- \_\_\_ 0 no positive affect  
 \_\_\_ +1 brief smiles or positive vocalizations  
 \_\_\_ +2 smiles most of the time  
 \_\_\_ +3 laughs, excited, or wiggles with delight
- \_\_\_ 0 no negative affect  
 \_\_\_ -1 silent, cry face, brief fret  
 \_\_\_ -2 frets, whines, or brief cry  
 \_\_\_ -3 more than brief cry or scream

Scale 7: Acceptance of toy

- \_\_\_ 0 never takes toy  
 \_\_\_ +1 takes toy after offered three or more times  
 \_\_\_ +2 takes toy on 2nd offer or with hesitation  
 on 1st offer  
 \_\_\_ +3 reaches immediately for and takes toy as  
 soon as sees toy

Scale 8: Intensity of exploration IF accepts toy

- \_\_\_ 0 very minimal exploration: puts toy down soon after taking it
- \_\_\_ +1 little exploration: touches or holds toy passively with little manipulation. May include some mouthing.
- \_\_\_ +2 moderate exploration: manipulation of toy is intermittent or sustained and casual or brief and intense
- \_\_\_ +3 high exploration: sustained visual attention while manipulating toy or enthusiasm while banging toy. May include some mouthing.

LOOKING  
AFFECT

16. M leaves slowly, waving bye-bye.

Scale 1: Looking

- \_\_\_ 0 fleeting or no look at M at departure point
- \_\_\_ +1 one or two brief looks (off and on) at M or at departure point
- \_\_\_ +2 looks half of the time (steadily or off and on) at M or at the departure point
- \_\_\_ +3 looks most of the time at M or at departure point

Scale 2: Affect

- \_\_\_ 0 no positive affect
- \_\_\_ +1 brief smiles or positive vocalizations
- \_\_\_ +2 smiles most of the time
- \_\_\_ +3 laughs, excited, or wiggles with delight
- \_\_\_ 0 no negative affect
- \_\_\_ -1 silent, cry face, or brief frets
- \_\_\_ -2 frets, whines, or brief cry
- \_\_\_ -3 more than brief cry or scream

Transition: Mother and stranger return to room.

APPENDIX II

COEFFICIENTS OF RELIABILITY, 6 and 12 MONTHS  
 GORDON et al. (1973) STUDY FROM VIDEO  
 TAPES--7 CHILDREN, 3 CHILDREN  
 ( $r = .62, p < .05$ )

| <u>Item</u>                                    | <u>Coefficient</u> | <u>Comment</u> |
|--|--------------------|----------------|
| 1. UA Enters and stands 6' in front of baby    |                    |                |
| 1. looks at UA                                 | .83                |                |
| 2. looks at M                                  |                    | all 0          |
| 3. positive affect                             | .92                |                |
| 4. negative affect                             |                    | all 0          |
| 2. UA Talks to baby                            |                    |                |
| 5. looks at UA                                 | .57                |                |
| 6. looks at M                                  |                    | all 0          |
| 7. positive affect                             | .97                |                |
| 8. negative affect                             | .81                |                |
| 3. UA Approaches baby                          |                    |                |
| 9. looks at UA                                 | .79                |                |
| 10. looks at M                                 |                    | all 0          |
| 11. positive affect                            | .98                |                |
| 12. negative affect                            | .66                |                |
| 13. postural approach                          | .46                | not reliable   |
| 14. postural avoidance                         | .59                | not reliable   |
| 4. UA Pats baby's fingers in game-like fashion |                    |                |
| 15. looks at UA                                | .62                |                |
| 16. looks at M                                 | .82                |                |
| 17. positive affect                            | .93                |                |

|    | <u>Item</u>                                       | <u>Coefficient</u> | <u>Comment</u> |
|----|---|--------------------|----------------|
|    | 18. negative affect                               | .81                |                |
|    | 19. postural approach                             | .63                |                |
|    | 20. postural avoidance                            | .59                | not reliable   |
| 5. | UA Picks up baby, holds him,<br>walks around room |                    |                |
|    | 21. positive affect                               | .89                |                |
|    | 22. negative affect                               | .81                |                |
|    | 23. postural approach                             | .65                |                |
|    | 24. postural avoidance                            | .62                |                |
|    | 25. looks at M                                    | .71                |                |
| 6. | UA Wiggles the baby in the air                    |                    |                |
|    | 26. positive affect                               | .96                |                |
|    | 27. negative affect                               |                    | all 0          |
|    | 28. looks at M                                    | .89                |                |
| 7. | Transition: UA Returns holding<br>baby            |                    |                |
|    | 29. positive affect                               | .81                |                |
|    | 30. negative affect                               |                    | all 0          |
| 8. | UA Puts baby into infant table                    |                    |                |
|    | 31. positive affect                               | .84                |                |
|    | 32. negative affect                               |                    | all 0          |
| 9. | UA Offers toy to baby                             |                    |                |
|    | 33. positive affect                               | 1.00               |                |
|    | 34. negative affect                               | .81                |                |
|    | 35. acceptance of toy                             | .87                |                |
|    | 36. intensity of exploration                      | .81                |                |

| <u>Item</u>   | <u>Coefficients</u> | <u>Comment</u> |
|---|---------------------|----------------|
| 10. Transition: Stranger takes toy from baby and leaves |                     |                |
| 37. looks at M  | .68                 |                |
| 38. positive affect                                     | .93                 |                |
| 39. negative affect                                     | .88                 |                |
| 40. postural approach                                   | .49                 | not reliable   |
| 41. postural avoidance                                  | .74                 |                |
| 11. M. Pats the baby's fingers in a game-like fashion   |                     |                |
| 42. looks at M  | .52                 | not reliable   |
| 43. positive affect                                     | .83                 |                |
| 44. negative affect                                     | .95                 |                |
| 45. postural approach                                   | .42                 |                |
| 46. postural avoidance                                  | .60                 | not reliable   |
| 12. M. Holds the baby, walks around room                |                     |                |
| 47. positive affect                                     | .60                 |                |
| 48. negative affect                                     |                     | all 0          |
| 49. postural approach                                   | .61                 | not reliable   |
| 50. postural avoidance                                  | .31                 | not reliable   |
| 13. M. Wiggles baby in the air                          |                     |                |
| 51. positive affect                                     | .82                 |                |
| 52. negative affect                                     |                     | all 0          |
| 14. M. Puts baby into the infant table                  |                     |                |
| 53. positive reaction                                   | .82                 |                |
| 54. negative reaction                                   | .90                 |                |

|     | <u>Item</u>                  | <u>Coefficient</u> | <u>Comment</u>                      |
|-----|------------------------------|--------------------|-------------------------------------|
| 15. | M. Offers toy to baby        |                    |                                     |
|     | 55. positive affect          | .89                |                                     |
|     | 56. negative affect          |                    | all 0                               |
|     | 57. acceptance of toy        | .71                |                                     |
|     | 58. intensity of exploration |                    | rated at<br>only 1 site<br>of the 3 |
| 16. | M. leaves slowly             |                    |                                     |
|     | 59. looks at M               | .41                | not reliable                        |
|     | 60. positive affect          | .79                |                                     |
|     | 61. negative affect          | .85                |                                     |
|     | 62. environmental control    | .66                |                                     |

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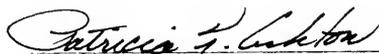
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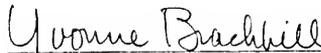
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