MOTHER-INFANT INTERACTION WITH FACIALLY DEFORMED INFANTS

DISSERTATION

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By

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This study investigated the interactions of facially-deformed infants (FD) with their mothers compared to a facially nondeformed control group (FND). All mother-infant dyads were videotaped for 10 minutes during a free play period. Mothers were instructed to spend time with their baby as they normally would. The videotaped interactions of 14 FD dyads and 14 FND dyads were rated by five raters for quality of interactions, amount of vocalization, touch, and face-to-face gaze. The infants were rated on their level of attractiveness from polaroid pictures and videotapes. Mothers also completed a questionnaire which assessed their infants' temperament. Three of the studies' four hypotheses were confirmed. First, the more attractive an infant was, the better his/her interactions with the mother were judged to be. Second, FD infant dyads were rated as significantly poorer in quality of interaction than FND dyads, although FD dyads did not spend significantly less time vocalizing, touching, or in face-to-face gaze as predicted. A significantly higher percentage of FD infants were judged as having difficult temperament relative to FND infants. Finally, as
predicted it was found that infants with difficult temperaments were more likely to exhibit poorer quality interactions than infants with less difficult temperaments. These results have important implications for providing anticipatory guidance to caregivers of FD infants. Without intervention, FD infants appear at risk for subsequent developmental problems stemming from disrupted early mother-infant interactions. Future research should focus on these interactions soon after the infant's birth, attempt to determine if FD infants' emotions can be reliably understood from their facial expressions (as has been found in normal infants) and extend the current research paradigm to include fathers of FD infants.
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CHAPTER I

MOTHER-INFANT INTERACTION WITH FACIALLY DEFORMED INFANTS

From developmental psychology's inception the importance of the mother-infant relationship on subsequent child socialization and personality adjustment has been recognized. The socialization process has been traditionally construed as occurring via the effects of parent child-rearing practices on the subsequent characteristics of children. The socialization process has come under scientific scrutiny only in the last 40 years. The conceptualizations of how this relationship functions have markedly changed in emphasis during this time. Traditional theoretical approaches to development were based on the assumption that the mother-infant dyad was controlled by the parent or primary caregiver (Gewirtz & Boyd, 1977). The parent was seen as the primary environmental determiner of child behavior and development. Such views conformed to the 17th century Lockean notion of the infant being a "tabula rasa" at birth. The role a child's own behavior played in its socialization was viewed as minor or nonexistent. This assumption generated many studies demonstrating that specific child responses could be conditioned by parent behavior (Brackbill, 1958; Haugan & McIntire, 1972; Routh, 1969). The limitations of such a unidirectional model were known even
as early as 1940. While reciprocal influences between mother and infant were considered, methodological limitations dictated research to be confined to exploring parents' effects alone (Bell, 1979). Such research yielded few consistent relationships and the unidirectional model of child socialization soon gave way to an assumption of a two-way flow of influence, from parent to child and from child to parent.

In 1951, Sears researched the dyadic interaction between parent and child, specifically viewing situations where the child influenced the parent. Contrasting the learning theory underlying Sears' work, Bowlby (1958) looked at child development from an ethological perspective. Bowlby (1958, 1969) set the stage for scientists to look at the child's effect on the parent by positing that human infants are similar to other mammals in that they seek proximity and contact with adults of their own species. Bowlby proposed the existence of innate releaser mechanisms in the infant as a way to maintain contact with the caregiver. Behaviors such as smiling, crying, grasping and babbling comprised an "instinctual response system" geared to release species-specific maternal behavior. These maternal behaviors act like social releasers, "terminating" the infant's behavior and thereby creating a bond between the infant and mother. Despite this position, Bowlby did not directly propose a mutual influence model of mother-infant interaction.

Several occurrences during the 1960's moved for a mutual influence model to become central in the study of early child
development. New data on the sensoriomotor, information seeking/processing skills of the infant made it difficult to ignore the infant's ability to shape its world, all but erasing the "tabula rasa" notions. The view that this infant came into the world equipped to impact/master his environment gained acceptance, fostered by the surge of knowledge acquired from cognitive psychology. Gewirtz (1961) suggested that infants and mothers respond differentially to the other's behavior, and that the responses of one could simultaneously influence or condition the responses of the other. Gewirtz essentially saw the maternal-infant interaction as a mutual conditioning process (potentially occurring out of the mother's awareness) in which the infant's cues (as per Bowlby) were reinforced by the mother's systematic responses to them. The infant's subsequent responses then further influenced the mother's future behaviors. Thus, the 1960's saw the research emphasis shift toward ascertaining the direction of influence in the mother-infant interaction (e.g., Bell, 1968, 1971; Harper, 1971; Kessen, 1963; Korner, 1965; Wenar & Wenar, 1963). As it became evident that parent to infant effects would not simply explain subsequent results, research shifted its focus to the effects of child behaviors or features on caregivers (Moss, 1967; Osofsky & O'Connell 1972; Yarrow, Waxler, & Scott, 1971). Bell (1968) criticized past research reporting correlational socialization data, stating that such information did not speak to the
directionality of the influence. Bell cogently pointed out that even the most helpless of infants exerts a powerful influence on parents. For example, the infants' cry beckons the parent to be near but may even lead to abuse if the cry is irritating and prolonged. While parent actions will change infant behavior, they will also affect and modify their own future approaches to him. Congenital characteristics such as physical abnormalities (Bell, 1977) and "innate" temperament patterns (Thomas, Chess, & Birth, 1968) constitute important infant characteristics affecting parental responses. Bell (1977) summarizes by stating

Just as the experimenter's behavior is shaped and controlled by the nature of the particles, the nature of the child's behavior must require an adjustment of some sort by the parent and, at this very basic level, there is a reciprocal relation despite the inequality of maturity. (p. 53)

Research inevitably moved to the examination of the interaction itself and to the reciprocal nature of the mother-infant transaction in the ultimate socialization of the infant. As technology improved (electronic event recorders and videotaped technique) the interlocking mother-infant "dance" was subjected to microanalytic investigation. Reciprocal phasing in vocalization and face-to-face gazing in the dyads was studied (Brazelton, Koslowski & Main, 1974; Schaffer, 1974; Stern, 1974). The mother-infant system was now (and currently
is) viewed as a complex feedback system involving subtle/mutual influences (Goldberg, 1977).

Thus, the focus of research in the socialization of the child has evolved from one of exclusively accounting for parent controlled variables to an increased emphasis on the contributions the infant/child brings to the caregiver dyad and finally to the reciprocal, interactive nature of the exchange. As Richards (1974) states

Really, socialization can be seen from a broad perspective, viewing it as the integration of a child into his social world – a world that shapes him but that he also shapes. (p. 123)

Effects of Infant Variables on Mother-Infant Dyads

Only recently have researchers studied the ways in which the attributes of children affect parental behavior (Bell, 1968, 1974; Bell & Harper, 1977; Grusec & Kuczynski, 1980). As stated above, two child variables that seem crucial contributors to the infant-caregiver dyad are temperament and physical/biological attributes.

Temperament. The study of temperament has evolved from observations by parents, pediatricians and nurses that marked individual differences among neonates apparently exist. The theoretical base for much of the subsequent research on temperament stems from the original work of the New York Longitudinal Study (NYLS) of Thomas, Chess and Birch (1973). Viewing infant temperament as making a crucial contribution to the individual's
psychological development, they collected data via parent interview, rating children on nine dimensions of temperament. Three categories of temperament traits (easy, difficult, and slow to warm up) emerged from analysis of the data. Thomas et al. (1968) have described the easy child as being characterized by demonstrating regularity in biological functions, being adaptable to change and tending to approach rather than withdraw, as generally positive in mood, and having mild reactions to new stimuli. At the opposite end of the temperament spectrum, the difficult child is unpredictable in biological functions such as when they will eat and sleep. New situations are met with loud protests and crying, and frustrating events are often met with tantrums.

While most subsequent work on temperament has built upon Thomas et al.'s work, the theory and methodology has been challenged (Goldsmith & Campos, in press; Rothbart & Derryberry, 198; Rutter, 1970). Carey (1970) has developed a maternal perceptions questionnaire to assess temperament which is based on the NYLS (instrument to be described below).

While individual differences found can be attributable to birth history, bio/medical status, early mother-infant interaction or a combination of these, the etiology of perceived infant individual differences has been debated (Hubert, Wachs, & Gandour, 1982). While there currently seems to be a lack of agreement on a universally accepted definition of temperament (Goldsmith & Gottesman, 1981; Lyon & Plomin,
1981; Rothbart & Derryberry, 1981), two etiological explanations have been proposed under the general term of temperament. One states that temperament (early individual differences) has essentially a constitutional basis, with constitutional defined as a relatively enduring biological makeup of the person. This position is represented by the approach of Buss and Plomin (1975). They view temperament as a stable and evolutionary-genetic aspect of the individual, not recognizing in a detailed way the role of the environment. The work of Thomas, Chess & Birch (1968) in the NYLS perhaps best represents the concept of temperament as a style of behaving, which is greatly effected by the environment. Thomas and Chess (1977) point to the "goodness of fit" between the infant and mother as the main factor deciding behavioral adjustment of the child. Seen as a psychobiological phenomenon, temperament "relies" upon this complex "goodness of fit" concept. Essentially, the concept suggests developmental outcome is contingent upon many child variables such as temperament, sex, age, etc., interacting with various parental variables (Scholom & Zucker, 1979). Thomas et al. (1963) make it clear that neither child nor parent individual characteristics can be considered alone, but that an interactive model must be used in explaining eventual infant development and even the very perception of temperament.

Sameroff (1975) has developed a transactional model of child development, viewing socialization as a complex
interactive process between child and environment. Following Sameroff's model, it appears logical that an infant's temperament is influenced by his or her mother's behavior, and conversely that maternal perception is influenced by the behavior of the infant. Cameron (1978) stresses the need to evaluate parental attitudes and behaviors as well as infant temperament to avoid a mismatch which could severely hinder later development.

Thus, current theory is increasingly focusing on temperament as an interactive phenomenon rather than simply as an "inherent," stable trait of the infant. However, as Hubert, Wachs, and Gandour (1982) note, there appears to be a significant lack of agreement on the theoretical definitions of temperament (Goldsmith & Gottesman, 1981; Lyon & Plomin, 1981; Thomas & Chess, 1980). Given that no suitable appropriate definition of temperament presently exists, temperament may best be defined operationally by the instrument used to measure it. Hubert et al. extensively reviewed the content, standardization samples, reliability and validity of 26 temperament scales and concluded that "no single psychometrically adequate instrument is available . . . although specific instruments may be useful in certain situations" (p. 572). Thus, the concept of temperament may be best viewed as an interactive phenomenon, but in doing so the instrument used to measure it must be sensitive to that dimension. From an interactional perspective, infant
temperament has increasingly been assessed via maternal perception (Carey, 1970; Campbell, 1979; Gordon, 1981) with data gathered either through parent interview or questionnaire. By tapping parental perception of infant temperament, the independent contribution of parental perceptions to the interactional process is accounted for. Thus, parents' perceptions of infant characteristics are but one important facet. The parents' evaluation of the traits they perceive seems equally crucial.

While past research has extensively focused on mother-infant interaction, new studies have explored the effects of perceived infant temperament on subsequent mother-infant interactions. Moss (1967) demonstrated that infants rated as more irritable received increased maternal contact. Gordon (1981) observed the mother-infant interactions of dyads containing infants rated (via temperament questionnaire) as either "difficult" or "easy." Results suggested there was a minimal relationship between maternal perception of child temperament and the child's observed behavior. However, Campbell (1979) studied mother-infant interaction as a function of maternal ratings of temperament and found that early infant behavioral differences influenced the mothers' perceptions of their babies as temperamentally easy or difficult. These perceptions continued, even after behavioral differences were no longer apparent. It seems early perceptions/interactions set the tempo of the mother's relating to the infant,
and that once such a set is established, it continues independent of subsequent behavioral changes in the infant. Bell (1974) and Thomas et al., (1968) assert that early mother-infant interactions and the resulting reciprocal behavioral patterns will dictate to a large degree the infant's socialization.

Physical/Biological Difficulties

A second child variable crucial to the establishment and maintenance of a healthy mother-infant interaction is the physical condition of the infant (Bell, 1977). Given the reciprocal interactive complexity of the dyad with its reliance both upon the mother's ability to correctly read the infant's cues and the ability of the infant to emit such cues in a communicative fashion, any handicapping condition of the infant may adversely effect the mother-infant dyad and ultimately place the socialization/development of the child at risk. Both assessment of temperament and mother-infant interaction may be affected. As Bridge and Cicchetti (1982) state

Synchrony in the caregiver-infant interactions involves not only contingent responsiveness between infant and caregiver but also the caregiver's tuning into to the infant's arousal level and temperament characteristics. In this regard, studies comparing the variability of temperament characteristics among handicapped and normal infants are important for identifying individual
differences that may be of the greatest consequence to
the caregiver-infant interactive system. A handicapped
infant may produce irregular signals or may respond
differently than a normal infant to caregiver's signals
and it is reasonable to suggest that such events may
disrupt the processes involved in the harmonious func-
tioning of the caregiver-infant interactive system.
(p. 239)

Only recently has research focused on the effects of a
handicap both on the very perception of temperament as well
as on the quality of the mother-infant interaction. Various
physical abnormalities have been researched.

Assessment of Temperament in Handicapped Infants

Bridges and Cicchetti (1982) included mothers' ratings
of their Down's Syndrome (DS) infants in the Carey's (1970)
standardization sample of normal infants. Several results
of this study are significant. First, the stereotype that
DS infants are placid, and less intense than normals was
not supported. The researchers suggest examining the
dynamics of dyadic interactions both in normal and atypical
samples as well as behavioral patterns, in determining the
salient factors affecting the maternal perceptions of their
infants. This may in part explain the current rejection of
the stereotypic view of (in this case) the DS infant. Second,
a greater percentage of DS infants were rated in the "diffi-
cult" temperament category than were normals. DS infants
were seen as less persistent and approaching and having a lower stimulation threshold than normals. It was hypothesized that this may be due to DS infants demonstrating a less expressive behavior rather than a more negative style. Subsequently, the parents may have to more actively engage their infant and such effort may then be rated as an infant characteristic when in fact it reflects the mother's role with the infant. Bridges and Cicchetti conclude by suggesting that additional research be directed at teasing out which factors (actual infant behavior, parental attitudes and expectations) contribute to actual temperament ratings and parental perceptions.

Hefferman, Black, and Poche (1982) did not find a greater incidence of the "difficult" temperament pattern among neurologically impaired children relative to normals. The children were not referred for behavioral problems but rather for medical concerns such as seizure disorders and cerebral palsy. The authors conclude that a "difficult" temperament rating does not always occur at a higher rate in atypical groups of children although specific handicaps may mask or modify some individual temperament characteristics in a systematic fashion.

Chess, Korn and Fernandez (1971) found children with prenatal rubella and physical handicaps had a greater number of "difficult" temperament ratings than did children with prenatal rubella but without existing physical deficits.
Field and Greenberg (1982) compared normals with same-age developmental level DS, cerebral palsied, developmentally delayed, and audiovisually handicapped infants using the Carey Infant Temperament Questionnaire (1970). Results were as follows: normal and DS infants were rated as less difficult than cerebral palsied or audiovisually impaired infants; on the intensity dimension, handicapped infants were rated lower than normals; DS and cerebral palsied infants seemed to exhibit a more neutral affect relative to normals. The authors conclude that some temperamental differences between normals and handicapped infants do exist and that such differences vary contingent upon the specific type of handicap.

It appears handicaps do impact the perception of the infant's temperament by caregivers. Specifically, research suggests such infants are viewed as more difficult than normals. As documented by Cameron (1978), Carey, Fox, and McDevitt (1977), and Thomas and Chess (1977), infants rated as temperamentally difficult are at higher risk for later behavioral/psychological problems. Further study is needed to delineate specific problematic maternal-infant interactions or factors which may contribute to an increased difficult rating.

Assessment of Interaction in Handicapped Infants

The effects of handicaps on the mother-infant interaction have also only recently been researched. With respect to attachment, Stone and Chesney (1978) report a one year
observational study of 15 handicapped infants and their mothers. Noting that the success of the infants' development is reliant upon maternal sensitivity to infant cues, the researchers found disturbances in one or more attachment behaviors in all handicapped dyads observed. Disturbances in vocalization were most frequently reported, with infrequent smiling also noted. The authors caution that the handicapped infants behavior may create an unfavorable cyclic effect with mothers responding in unproductive ways to the infants decreased emitting of "signals," which may then further decrease the infant's signaling processes.

Goldberg (1978) reviewed research on the effects of prematurity on parent-infant interactions. Goldberg summarized her findings by stating that consistent evidence exists revealing differences in parent-infant interaction between neonates with and without medical problems. Pre-term infants appear less alert and responsive to social stimulation than normals, with parents of pre-term infants demonstrating a decreased degree of active involvement with their babies. As Goldberg notes, other studies document pre- vs. full-term differences. Parents of pre-term infants made less bodily contact with their babies (DiVitto & Goldberg, in press; Klaus, Kennell, Plumb, & Zuehlke, 1970; Leifer, Leiderman, Barnett & Williams, 1972), smiled at their infants less (Leifer et al., 1972), and talked to them less (DiVitto & Goldberg, in press). However, as the infant got older, the pattern shifted. Parents of pre-term infants
were not more active. Positive affect was found more often in full-term dyads (Lederman & Seashore, 1975).

In sum, the research reviewed suggests the normal establishment of interactive skills by parents and child is disrupted by the prematurity of the infant.

Berger and Cunningham (1983) studied vocal interactions of normals vs. DS infants over the first six months of life. Results suggested significant differences between handicapped and nonhandicapped infants along this dimension. Vocal output of DS infants was significantly decreased during the first three months relative to normals. Maternal vocal stimulation was inversely related to age in the nonhandicapped group, yet steadily increased with the DS group. Also found was an age related increase in vocal dysynchrony in the handicapped group.

The evidence seems clear that physical abnormalities significantly affect caregiver-infant interactions.

**Physical Appearance/Attractiveness**

The effect of infant's physical appearance/attractiveness on the mother-infant interaction appears to be a crucial child variable as yet methodically researched. However, the importance of physical attractiveness on social interactions is well documented. Lorenz (1943) first underscored the impact of infant physical characteristics ("babyishness") on adult approach care behaviors. Bell (1974) states that morphological characteristics (e.g., protruding cheeks) are as
powerful elicitors of parental behavior as are behaviors creating the picture of helplessness (such as arm thrashing). Gardner and Wallach (1965) have noted that facial features such as a high protruding forehead, large eyes (in the middle of the face), small nose and mouth and fat cheeks all contribute to a "babyish" appearance. Further studies indicate adult preferences for infant over adult pictures (Fullard & Reiling, 1976; Hess & Pott, 1960). Studies using line drawings of infants have demonstrated that infants with more infantile features are preferred over infants whose appearance is less infantile (Sternlanz, Gray & Murakami, 1977). Using actual photographs rather than drawings, Hildebrandt and Fitzgerald (1979) found support for the "babyishness," ethological concept as adult preferential responsivity varied with higher baby cuteness ratings. That attractiveness of children can be reliably rated by adults has been demonstrated (Berscheid & Walster, 1974). Beauty may in fact not be in the eye of the beholder but rather exist as an externally agreed upon quality. Level of attractiveness has been shown to affect many facets of social exchange. Clifford and Walster (1973) demonstrated adults' judgement of child intelligence and adult level of punitiveness (Dion, 1974), varied as related to the child's perceived attractiveness. Dion and Berscheid (1974) found adult ratings of attractiveness in children significantly correlated with the child's popularity in nursery school.
Physical Deformity

While the literature on school age attractiveness is significant in number, few studies focus on infant attractiveness and no study has been found dealing specifically with level of attractiveness in facially deformed (FD) children. It is possible that FD infants are responded to in very different fashions than facially nondeformed (FND), perhaps not even appropriately ranked on the attractive-unattractive continuum. However, this remains to be answered.

The impact of giving birth to a deformed baby seems to adversely effect parents' perceptions and emotional state. Denial, emotional withdrawal and reaction formation are common defense mechanisms employed by parents of a deformed child (Belfer, Harrison, Pillemer, & Murray, 1982) in dealing with the trauma of the child's birth. Clifford (1974) found mothers of craniofacially disfigured children reported significantly less parental pride in their baby, and greater negative emotions and attitudes toward caretaking. Solnit and Stark (1961) suggest a period of parental mourning exists after the birth of a deformed child. Greenberg (1979) asserts that the impaired infant represents both a narcissistic injury to the mother and an impaired sense of self. Facial disfigurement has been reported to negatively effect peer relationships (Richardson, Goodman, & Hastorf, 1961) and teacher expectations (Clifford & Walster, 1973). Normal, Larson, and Parshall (1964) in studying mothers
of cleft palate infants found that greater than 50 percent of them felt their babies were difficult to care for. Brantley and Clifford (1979) report mothers of cleft palate babies experience a significantly greater degree of anxiety about their babies than normals.

**Rationale of Current Study**

While it seems obvious that they way the parents deal with the trauma of having a FD infant will have great effect upon the child and its development, the actual behavioral exchanges between these mothers and their infants have as yet to be studied. The purpose of the present study was to assess the impact of infant facial deformity on mother/infant interactions. The following hypotheses were asserted.

1. **FD mother-infant dyads** would be rated as having poorer interactions, as determined by quality ratings, and would be rated as spending less time vocalizing, touching and in face to face interaction than the control dyads.

2. **FD infants** more often would be perceived by their mothers as being in the difficult temperament category relative to the perceptions of the mothers of the FND infants.

3. As the temperaments of infants became increasingly more difficult, mother-infant interaction would become increasingly dysfunctional.

4. More attractive infants would have more positive interactions with their mothers.
CHAPTER II

Method

Subjects

The subjects were 28 infants, 14 facially deformed (FD) and 14 facially nondeformed (FND), and their mothers. The age of the infants ranged from four to eight months for both groups, with a mean age of 182 days for the FD group and 177 days for the controls. This difference was not significant ($t(26) = .211; p = .41$). There were seven boys and seven girls in each group. The FND infants were "well" babies with no major physical problems, recruited from a local pediatrician's practice via a letter and a follow-up phone call. The FD infants were recruited from a Craniofacial Clinic at the University of Texas Health Science Center, at Methodist Hospital in San Antonio, and through Baylor Medical School in Houston via a letter and a follow-up phone call. The FD infants presented with some partially repaired craniofacial deformity, the majority having Cleft lip and/or Cleft palate (see Appendix A). Infants with mental retardation, moderate to severe hearing loss, or visual impairments were not included. These criteria were given to the physicians at the craniofacial clinics and they made the appropriate screenings prior to giving the researchers any names. Social class was determined from demographic information obtained during the study.
The Hollingshead (1957) two-factor index of social position was calculated for each subject. A t-test demonstrated that no significant differences existed between these groups along this dimension, $t(26) = -0.132, p > .05$. All mothers in both groups were the primary caretakers, and no significant differences in the mothers' ages in both groups were seen, $t(26) = 0.12, p > .05$.

**Apparatus**

A General Electric X6 video camera was used to tape all experimental sessions. The recordings were played back on an NEC JL37 video cassette recorder and viewed on an RCA XL100 monitor for rating purposes. A Polaroid SUN660 camera was used to take photographs of each infant.

**Questionnaires**

Two questionnaires were completed by each mother. The first questionnaire requested demographic information including race, family constellation, educational level of family members, socioeconomic status, and medical and developmental history of the infant (Appendix B). The second questionnaire was the Infant Temperament Questionnaire (Carey & McDevitt, 1978). This is a scale based on the work of Thomas and Chess (1963). It consists of 95 items, rated on a six point descriptively anchored scale, yielding nine temperament categories. These categories can be further divided into four classifications, those of Difficult, Easy, Slow to Warm Up (STWU) and Intermediate. The scale has been standardized on over 200 subjects. A test-retest correlation of .83 is
reported for the nine scales. Construct validity is demonstrated by the finding of significant correlations between the ITS categories and Piagetian sensorimotor development (range $r = .37$ to $r = .77$). The mothers were also asked to sign a standard consent form (Appendix C).

**Procedure**

When the names of potential subjects were obtained from the participating pediatricians and Craniofacial Clinics, the mothers of the infants were mailed letters containing information regarding the study's purpose and procedures, confidentiality, and risks involved. The letters informed them that they would receive a phone call in a few days from the investigators in order to invite them to participate and answer any questions they might have. If the mothers agreed to participate when telephoned, an appointment was set up at their convenience. Only two mothers of those contacted refused to participate.

Each mother/infant dyad was tested individually. The purpose and the procedures were again explained to the mothers. To standardize the experience, the same comforter (4 x 4 ft.) and toys were used during each taping. The comforter was placed in the middle of the room with toys approximately four inches from the infant. Both researchers were trained to give the same instructions to the parents and follow the same procedures during filmings. The consent form, which included information regarding risks and confidentiality, was read to
the mothers. They were asked to sign the form and given a copy of it. Mothers were then instructed by the researcher to "sit on the floor with your baby and interact with him/her as you normally would when alone with your infant." Repetition of this instruction occurred if requested by the mothers. The mothers were then allowed to interact freely with their infants for 10 minutes while the experimenter videotaped the interaction. Following the end of the 10 minute interaction sequence, the mothers were requested to complete two questionnaires (i.e., the demographic questionnaire and the ITQ). Completion of the questionnaires required approximately 30 minutes of the mother's time. While no reading difficulties were noted in the mothers, the researcher remained to answer questions. Finally, a photograph was taken of the infant. The experimenter remained with the mother and infant for the entire 45 minutes to an hour it took for both phases of the session to be completed.

Behavioral Measures

Experimenters. Five raters, two male and two female medical students, and a female student in graduate psychology served as coders for behavioral and impression rating scales. They received fifty dollars for their participation in the research. All raters were uninformed about the purpose and design of the experiment.

Following the completion of the collection of the data, the videotapes were rated by the raters for quality of
interaction. The fifth rater rated all behavioral interactions. The photographs of each infant were rated for attractiveness. The rating procedures are described below.

Two types of interaction measures were used—a behavioral objective index and a qualitative measure. The qualitative interaction measure used was that cited by Chibucos and Kail (1981). Each mother/infant dyad was rated on five interactional behavioral indices. Ratings were completed using a Likert scale with five points (1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent). The following behaviors were rated on the Chibucos and Kail Quality of Interaction Scales (1981).

**Sensitivity Scale.** The mother's sensitivity toward the infant. Was the mother aware of the infant's state? Was she able to quiet the distressed infant? When the infant was quiet or happy, did the mother move, bounce, or jostle the infant unnecessarily? Was the mother's handling of the infant appropriate?

**Playfullness Scale.** The playfullness of the mother's behavior with the infant. Was the mother relaxed, laughing, gay, or silly-acting rather than routine or bored with the infant? Did the mother try to entertain or stimulate the infant? Did the mother move her body in order to entertain the infant? Did the mother tickle the infant, move the infant's arms and legs or entire body in a playful manner? Did the mother use the blocks to entertain the infant? Was
the mother creative in finding alternative methods of entertaining the infant?

Initiation Scale. The quality of initiation of interactions by the mother. Did the mother try to get the infant's attention? Did the mother smile or look at the infant to elicit the infant's attention? How lively was the mother while trying to get the infant's attention? Did the mother move herself or the infant while trying to get the infant's attention? Did the mother use games to get the infant's attention? Was the mother able to adjust the attention-getting stimulation to the infant's responsive behavior?

Intensity Scale. The intensity of the infant's response to the mother. Did the infant smile and vocalize while responding to the mother? Did the infant increase body activity, arm waving, leg kicking while responding to the mother? Was the infant lively during responses to the mother?

Reciprocity Scale. The reciprocal nature of the interaction between the mother and the infant. Did they respond to one another's efforts? Did mutuality occur between the pairs; did they exchange like behaviors? Were the exchanges lively? Were the interactions intentional and enjoyable? Were the interactions only brief and perhaps accidental or routine? During the interactions was the pair intently involved or was one of the pair easily distracted?
Three behavioral indices of interaction were recorded, those of vocalization, touch and face-to-face interaction. These behaviors were coded for three two-minute time samples during the 10 minute experimental sessions. These observations occurred during the second to third, fifth to sixth, and eight to ninth minutes of each session.

**Infant Vocalization**

Infant vocalization was defined as total time (during each two minute sample) the infant emitted vocal sounds; coughs, sneezes, hiccups, and crying were not coded.

**Mother's Vocalization**

Mother's vocalization was defined as all total time of vocal/verbal behaviors directed toward the infant during the time sample.

**Face-to-Face**

Face-to-face interaction was defined as total time during the time sample in which the infant and mother were actually gazing at each other.

**Touch**

Touch was defined as the total amount of time in which physical contact was occurring during the time sample.

Two measures of physical attractiveness were also taken. The frontal color Polaroid snapshots of all 28 infants were rank ordered by all raters. A rank order correlation was then computed for all raters to assess whether an acceptable "standard" of attractiveness was obtained. The Kendall
Coefficient of Concordance yielded an average rank-order correlation of .86 (df = .27, p < .001). The raters also rated the attractiveness of each infant they assessed using a five-point-Likert scale (1 = very unattractive; 2 = somewhat unattractive; 3 = attractive; 4 = very attractive; 5 = extremely attractive) at the end of viewing the videotape. The polaroid picture was also available to them at that time.

**Interrater Reliability**

Four raters made 15 ratings in common. Reliability estimates were based on these shared ratings. All raters assessed a training tape and their ratings were compared using Ebel's (1951) correction of the Spearman Brown interrater reliability formula. Training continued until a high degree of interrater reliability was obtained. As a check on reliability, every fourth dyad was rated by all four raters. The interrater reliability for these and the training tapes was r = .82. All tapes were rated in a counterbalanced fashion. The fifth rater was trained to a high degree of concordance with the author on the behavioral indices (r = .85) and then rated all tapes. There was a high degree of reliability among all the three two-minutes segments rated (r = .78 to r = .89).
CHAPTER III

Results

In order to adequately address the major hypotheses of the study, several initial correlations were performed. A comparison of attractiveness measures was made to assess potential differences in the measures resulting from the method in which the data was collected. Specifically, the attractiveness ratings made from the videotaped interactions were compared with those obtained through the rank ordering procedure. To compare these two measures, the average attractiveness rankings for each subject from the rank ordering procedure (from polaroid snapshots, PA) were computed and those values were compared to the attractiveness ratings from the video taped interactions (A). This comparison yielded a small yet significant correlation ($r = .37$, $p < .05$). Thus, as ratings based on PA increased, higher ratings on A were also given. While accounting for only approximately 10 percent of the variance when compared with each other, comparisons between PA and A with group membership were more strongly correlated (PA with Group, $r = .61$, $p < .05$; A with Group, $r = .57$, $p < .05$). However, while PA and A's correlate at the same level with Group, further analysis suggest that the similar correlations may actually reflect different bases of rater judgements.
As seen in Table 1, several interesting differences are noted between groups and depending upon which attractiveness ratings were used. The Quality score correlates highly with either A or PA in the control group, with high quality interactions occurring with increased attractiveness, independent of method of rating attractiveness. In the FD group, BVOCTOT is more strongly related to A than PA, suggesting raters interpret babies who vocalize in this group to be more attractive, although without interactive data, the relationship is much weaker (A with BVOCTOT, r = .42; PA with BVOCTOT, r = .06). While this same directionality is seen in the controls, the correlations do not approach significance. The same directionality is seen with MVOCTOT (A with MVOCTOT, r = .29; PA with MVOCTOT, r = .09). In contrast, rated A is negatively correlated with two of the four behavioral measures. In the control group, three of the four behavioral measures are negatively related with PA, further supporting the idea of a negative bias. The attractiveness effect is also demonstrated in the mothers temperament ratings of their deformed infants. On the nine scales, the more attractive babies were seen as less difficult. The controls also showed this trend, but to a lesser degree.

As seen in table 2, the groups cannot be distinguished on these correlations. In the FD group, MVOC appears to covary with FTOF, and dyads exhibiting more FTOF and MVOC are judged as higher in QUALITY. This does not occur in the same direction in the FND group.
Table 1

Pearson Correlations of Attractiveness and Polaroid Attractiveness with Behavioral Measures and Temperament for FD and FND Groups

<table>
<thead>
<tr>
<th></th>
<th>Facially Deformed A</th>
<th>Facially Deformed PA</th>
<th>Facially Non-Deformed A</th>
<th>Facially Non-Deformed PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>.28</td>
<td>.16</td>
<td>.48**</td>
<td>.44</td>
</tr>
<tr>
<td>Mother's Vocalization</td>
<td>.29</td>
<td>.09</td>
<td>.10</td>
<td>.19</td>
</tr>
<tr>
<td>Babies' Vocalization</td>
<td>.42</td>
<td>.06</td>
<td>.29</td>
<td>-.26</td>
</tr>
<tr>
<td>Face-To-Face Interactions</td>
<td>-.02</td>
<td>.22</td>
<td>-.61**</td>
<td>-.27</td>
</tr>
<tr>
<td>Touch</td>
<td>.08</td>
<td>.21</td>
<td>-.24</td>
<td>-.34</td>
</tr>
<tr>
<td>Activity</td>
<td>.10</td>
<td>.09</td>
<td>-.28</td>
<td>-.56**</td>
</tr>
<tr>
<td>Rhymicity</td>
<td>-.57**</td>
<td>.10</td>
<td>-.13</td>
<td>-.15</td>
</tr>
<tr>
<td>Approach/Withdrawal</td>
<td>.18</td>
<td>.47**</td>
<td>-.24</td>
<td>.17</td>
</tr>
<tr>
<td>Adaptability</td>
<td>.07</td>
<td>.50**</td>
<td>-.39</td>
<td>-.10</td>
</tr>
<tr>
<td>Intensity</td>
<td>-.08</td>
<td>.19</td>
<td>.04</td>
<td>.29</td>
</tr>
<tr>
<td>Mood</td>
<td>-.30</td>
<td>.32</td>
<td>.02</td>
<td>.13</td>
</tr>
<tr>
<td>Persistence</td>
<td>.22</td>
<td>.61**</td>
<td>.04</td>
<td>-.10</td>
</tr>
<tr>
<td>Distractability</td>
<td>-.25</td>
<td>.40</td>
<td>.02</td>
<td>.33</td>
</tr>
<tr>
<td>Threshold</td>
<td>-.16</td>
<td>.34</td>
<td>.04</td>
<td>.28</td>
</tr>
</tbody>
</table>

**p < .05.

Note. A difference of .60 is needed between correlations coefficients for significance. A = attractiveness; PA = Polaroid attractiveness.
Table 2
Pearson Intercorrelations of Behavioral Indices and Quality of Interaction Scores

<table>
<thead>
<tr>
<th>MVOC</th>
<th>BVOC</th>
<th>FTOF</th>
<th>TOUCH</th>
<th>QUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facially Deformed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVOC</td>
<td>-.05</td>
<td>.64**</td>
<td>.07</td>
<td>.63**</td>
</tr>
<tr>
<td>BVOC</td>
<td>.38</td>
<td>.38</td>
<td>-.16</td>
<td></td>
</tr>
<tr>
<td>FTOF</td>
<td>.24</td>
<td>.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOUCH</td>
<td></td>
<td></td>
<td></td>
<td>-.17</td>
</tr>
<tr>
<td>Facially Non-Deformed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVOC</td>
<td>-.21</td>
<td>.06</td>
<td>.22</td>
<td>.48</td>
</tr>
<tr>
<td>BVOC</td>
<td>-.11</td>
<td>.45**</td>
<td>-.42</td>
<td></td>
</tr>
<tr>
<td>FTOF</td>
<td>.25</td>
<td>-.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOUCH</td>
<td></td>
<td></td>
<td></td>
<td>-.37</td>
</tr>
</tbody>
</table>

**\( p < .05 \).

Note. A difference of .60 is needed between correlations coefficients for significance. QUALITY = quality of interaction scores; MVOC = Mother's vocalization; BVOC = Babies vocalization; FTOF = Face-to-interactions; TOUCH = touch.

With the above analyses in mind, the primary hypotheses will now be considered. For each hypothesis specific statistical analysis were used. Results will be presented in the order each hypothesis was made. The first hypothesis that a significant difference existed between groups on the quality of interactions was confirmed, \( t(26) = 1.96, p < .05 \). Table
Table 3

Means and Standard Deviations for Quality of Interaction Scores

<table>
<thead>
<tr>
<th></th>
<th>Facially-Deformed</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>2.86</td>
<td>.86</td>
</tr>
<tr>
<td>Play</td>
<td>2.79</td>
<td>.98</td>
</tr>
<tr>
<td>Initiation</td>
<td>2.57</td>
<td>.85</td>
</tr>
<tr>
<td>Intensity</td>
<td>2.57</td>
<td>.64</td>
</tr>
<tr>
<td>Reciprocity</td>
<td>2.36</td>
<td>.84</td>
</tr>
<tr>
<td>Totals</td>
<td>13.14</td>
<td>3.30</td>
</tr>
</tbody>
</table>

**p < .05.

As observed in Table 3, a significant difference exists in quality of interaction with the FD dyads rated as poorer on all five indices. Particularly important differences exist on the indices of specific quality of initiation and reciprocity of interactions.

The next hypothesis, that FD mothers and infant would spend less time in touch, face-to-face gaze and in vocalizations was not confirmed. Hypothesis 1 involved the amount of vocalization observed in the dyads.

As can be seen in Table 4, no significant differences were seen between groups on vocalization, although the amount
of babys' vocalization did occur in the predicted direction. A significant difference was noted in total touch behavior, although not in the predicted direction. No significant difference was seen on face-to-face gaze time although again it was in the predicted direction.

Table 4

Means and Standard Deviations for Behavioral Indices of Interaction

<table>
<thead>
<tr>
<th></th>
<th>Facially Deformed</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Vocalizations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Babys'</td>
<td>20.86</td>
<td>20.37</td>
</tr>
<tr>
<td>Mothers'</td>
<td>92.14</td>
<td>66.95</td>
</tr>
<tr>
<td>Touch</td>
<td>282.43</td>
<td>104.13</td>
</tr>
<tr>
<td>Face-To-Face Gaze</td>
<td>27.64</td>
<td>29.47</td>
</tr>
</tbody>
</table>

t test, **p < .05.

Hypothesis 2, which states that a larger percentage of FD infants will be rated by their mothers as more difficult in temperament, was confirmed. As can be seen in Table 5, the groups were significantly different in four of the nine temperament categories.

Mothers of FD infants consistently rated their children as exhibiting behavior suggestive of difficult or slow to warm up temperaments. The FD temperament profiles are
Table 5
Means and Standard Deviations of Temperament Scores for Facialy Deformed and Facialy Nondeformed Infants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>t-test</th>
<th>Facially Deformed</th>
<th>Facially Nondeformed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Activity</td>
<td>4.2</td>
<td>.78</td>
<td>4.3</td>
</tr>
<tr>
<td>Rhythmicity</td>
<td>2.8</td>
<td>.81</td>
<td>2.3</td>
</tr>
<tr>
<td>Approach/Withdrawal</td>
<td>2.7</td>
<td>.70</td>
<td>2.5</td>
</tr>
<tr>
<td>Adaptability</td>
<td>2.6</td>
<td>.69</td>
<td>2.0</td>
</tr>
<tr>
<td>Intensity</td>
<td>3.5</td>
<td>.46</td>
<td>3.4</td>
</tr>
<tr>
<td>Mood</td>
<td>3.4</td>
<td>.99</td>
<td>2.5</td>
</tr>
<tr>
<td>Persistence</td>
<td>3.4</td>
<td>.64</td>
<td>3.2</td>
</tr>
<tr>
<td>Distractibility</td>
<td>2.9</td>
<td>.80</td>
<td>2.0</td>
</tr>
<tr>
<td>Threshold</td>
<td>4.1</td>
<td>.45</td>
<td>3.9</td>
</tr>
</tbody>
</table>

**p < .05.
++p < .001.

As can be seen in Table 5, the FD infants were rated as being significantly less rhythmic in their behavioral patterns, less adaptable, with more negative mood and more highly distractable. No significant differences were noted between groups on the Activity, Approach, Intensity, Threshold, or Persistence categories.
Hypothesis 3, that temperament ratings would move toward the more difficult pole as the quality of interaction decreased, was confirmed. As seen in Table 6, the quality of interaction was negatively correlated with temperament categories used in determining the "difficult" profile. That is, as quality of interactions decreased the infants' temperaments were rated as more difficult.

Table 6

Pearson Correlations for Difficult Temperament Categories with Quality of Interaction Scores

<table>
<thead>
<tr>
<th></th>
<th>RHY</th>
<th>APP</th>
<th>ADA</th>
<th>INT</th>
<th>MOO</th>
<th>QUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHY</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APP</td>
<td>.235</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADA</td>
<td>.528</td>
<td>.692</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>.107</td>
<td>-.008</td>
<td>.286</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOO</td>
<td>.568</td>
<td>.421</td>
<td>.644</td>
<td>.313</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>QUALITY</td>
<td>-.470*</td>
<td>-.318*</td>
<td>-.373*</td>
<td>-.014</td>
<td>-.215</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*p < .05.

Note. QUALITY = quality of interaction scores; RHY = rhythmicity; APP = approach/withdrawal; ADA = adaptability; INT = intensity; MOO = mood; PER = persistence; DIS = distractability; THR = threshold.
CHAPTER IV

Discussion

Current findings concurred with and expanded upon past research demonstrating the significant impact of infant attractiveness upon adult-infant interactions and also suggests steps to be taken in providing anticipatory guidance to families having a FD infant. Hildebrandt and Fitzgerald (1978) state that perceived infant attractiveness may have profound consequences for bonding, attachment and subsequent interactions and development. Stephan and Langlois (1984) found that attractiveness elicits strong and consistent expectations for individuals' behaviors and this occurs soon after birth. This is compatible with Lorenz (1981) who states that physical characteristics of infants are powerful determinants of caregivers responses. Hildebrandt (1978) found mothers' ratings of their infants cuteness was correlated .76 with the perceived relationship to the infant. Langlois (1984) also noted that differing levels of attractiveness bring about a set of behavioral expectations such that more attractive children are thought to be exhibiting more positive traits and viewed as more intelligent than unattractive children. This finding is also consistent with several studies (Adams & Crane, 1980;
Hildebrandt et al., 1983) which have demonstrated that attractive infants receive more positive reinforcement and more immediately than unattractive infants and are judged less punitively for transgressions than their unattractive peers. In general, attractive babies are responded to in ways which encourage positive, quality interactions. Presently, attractiveness was found to be highly and significantly correlated with quality of interaction in the control group, but not significantly correlating with quality of interaction in the experimental group. That group membership did not predict quality as well as attractiveness can be understood by more closely examining the subjects in each group. If a child had a cleft lip or other facial deformity, he/she was included in the FD group, independent of the deformity's current state of surgical repair. Some of the FD infants had surgical repair such that, combined with an otherwise attractive face, they were viewed as attractive. Thus, while one can presume that infants with facial malformations will typically be seen as less attractive than infants without such problems, if the malformation is corrected, its negative impact on judged attractiveness may be minimized.

Similar, yet somewhat different results were noted in the FD group as the relationship between attractiveness and quality of interaction was in the same direction as the controls but was less strongly correlated. It appears that
a different relationship exists between attractiveness and caregiver behavior. This finding concurs that past research (Hildebrandt, 1978) demonstrating that caregivers of FD infants may subconsciously alter the way they feel and behave toward unattractive babies. Hildebrandt also suggests that relationships between perceived attractiveness and face-to-face gaze may be U-shaped with extremes of attractiveness or unattractiveness encouraging longer gazing times. This tendency may in part explain the negative correlations between attractiveness and some behavioral measures demonstrated in the control group. As attractiveness proved to have a great affect upon this study's results, hypothesis 4 (more attractive babies will have more positive interactions than controls) which was confirmed, will be discussed first. Interestingly, higher correlations were found in the FD group between attractiveness and mothers' vocalizations than in the FND group. While it appears that the attractiveness attribution is operating in the FND group and affects quality of interaction, with FD infants the raters are confronted with an "unusual" task and appear to shift the attractiveness attributions to behavioral (vocalizations, face-to-face gaze) rather than quality measures. Raters may therefore, as Hildebrandt suggests, be using a different cognitive set when judging FD versus FND infants. Interestingly, in the control group, attractiveness seemed to work against some behavioral manifestations as it was negatively correlated with face-to-face gaze. This also
concurs with Hildebrandt's assertions. While in the current study, the number of subjects was too small to test whether a curvilinear relationship did in fact exist between attractiveness and interaction measures, it is a hypothesis worthy of investigation in future research.

To further understand the effect of physical appearance upon interaction, attractiveness was divided into PA and A. This was done in an attempt to differentiate measures possibly biased by the raters viewing of the interactions (A) from attractiveness which may present a clearer understanding of the impact of attractiveness on the mothers' perspective (PA). In general, mothers were found to operate with the same attractiveness bias as raters, as demonstrated by the significant correlation between PA, A and group. This finding again agrees with current research.

Anecdotally, experimenters seemed uncomfortable rating FD infants as unattractive, with three of the four raters verbalizing guilt feelings about judging an FD infant as unattractive. This suggests that the experimenters were painfully aware of their own attractiveness bias. Additionally, the possible dissonance created by this bias may have masked a stronger attractiveness effect as experimenters tended not to give extreme negative scores.

An attractiveness bias was also noted in the parents' report of temperament. Less attractive babies were typically rated as more difficult although this was not a consistent finding.
In summary, attractiveness greatly contributes to the rating of a mother-infant interaction as a quality one. The high correlation between quality of interaction and attractiveness suggests that in both groups, dyads with attractive babies seemed more in tune and sensitive to each other's needs and more able to respond to these needs. It is also clear from the research that FD and FND infants can be reliably rated on attractiveness although this may not generalize to infants with more serious facial deformity. With FD infants, it appears that adults shift to a different criteria when judging interactions, relying more on behavioral data such as vocalizations when exercising their attractiveness bias.

The first hypothesis that FD mother-infant dyads will be rated as having poorer interactions, and spend less time vocalizing, in face-to-face gaze, and in touching was partially confirmed. The finding that rated quality of interaction was significantly different between groups being of better quality in the FND group, may be explained from two perspectives. The first is that the above mentioned attractiveness bias affected the mothers such that differential/subconscious behaviors were engaged in that adversely affected the quality of the interaction. The second perspective is that facial malformations did disrupt the infant's signaling mechanism. If so, perhaps early in the dyad's life communication of needs and wants may be obscured by the infants'
deformity making it difficult for caregivers to correctly interpret the infant's wishes. This seemed supported by the current research as, in addition to the overall quality of interaction being significantly different, two particular subscales, Quality of Initiation and Reciprocity were significantly different. Mothers of FD infants' consistently had difficulties in getting their infants attention and adjusting the stimulation to the infants responsive behavior. The FD dyads did not consistently respond to one another's efforts or show mutuality by exchanging like behaviors. While it is beyond the scope of the present research to determine if either attractiveness or inability to decode and interpret infant cues contributed to the poorer interactions of the FD group, and that is clearly an area in need of future research, it seems likely that both are involved and perhaps interact to disrupt the harmony between mother and infant. As Norval et al. (1964) found, over half the mothers questioned felt that their cleft lip/palate babies were hard to parent. The quality of interaction scores may be a reflection of the mothers' reported experiences.

The second part of the hypothesis was disconfirmed. FD dyads did not spend significantly less time vocalizing, in face-to-face gaze and touching. In fact, these dyads spent significantly more time touching and mother vocalizing. These results can be explained, however, by assessing the "type or quality" of behavior exhibited. For example, while...
the mothers of FD infants spent more time touching their children, much of the touching behavior consisted of holding the infant in their laps, facing the infant away from them. While correctly recorded as touching, it is readily apparent that this type of touching is qualitatively different from touching that occurs in the form of stroking, guiding or supporting exploration. And while the differences between groups on face-to-face gaze was not significant, it was in the predicted direction, as was the amount of time the baby vocalized. It appeared that FND mothers were more encouraging of autonomous behaviors, allowing their babies to crawl freely (and thereby decreasing the amount of touch time) yet working to maintain face-to-face contact to seemingly encourage the infants' mastery strivings. In contrast, FD mothers vocalized to their infants more, although often the content of the vocalizations centered upon directing their infants' behavior. Finally, as Hildebrandt (1978) notes, there may be a curvilinear relationship between the level of attractiveness and manifested behavior. While a "the more the better" perspective with regards to touch, face-to-face gaze and vocalization is accurate for FND infants, perhaps a different standard is needed for FD dyads. This also is an area in need of further research.

The second hypothesis, that FD infants would more often be perceived by their mothers as being in the difficult temperament category was confirmed. Of the scales which
reflect difficult temperament (Rhythmicity, Approach, Adaptability, Intensity, and Mood) five of the FD infants were rated as more difficult compared to only one infant being so rated in the FND group. This finding adds important information to the attempt to explain the problems in the interactions of FD dyads described above. Certainly if an infant is less rhythmic, more withdrawn, less adaptable, and with poor mood, the quality of the interaction between caregiver and infant will be adversely affected. As Bridges and Cicchetti (1982) state, reciprocity in infant-caregiver dyads relies upon the caregivers' ability to tune into the infant's arousal level and temperamental characteristics. Whether the FD infants are constitutionally more difficult, are simply perceived by their mothers as more difficult (perhaps because of disrupted infant signaling systems) or both, this finding has significant implications for FD infants' future development. That malformed infants have more difficult temperaments is consistent with past research. Bridges and Cicchetti (1982) found that Downs syndrome children were consistently rated as less approaching and having a lower threshold for stimulation than nonhandicapped infants. Greenburg and Field (1982) found severely handicapped children to be rated by their teachers as more difficult. However, Hefferman et al. (1982) found that neurologically impaired infants had no greater incidence of difficult temperaments than normals and suggest that
while handicapped infants might modify some individual temperament characteristics, not every group of handicapped children will be rated as difficult. The characteristic feeding difficulties of cleft lip/palate infants may have greatly contributed to the difficult perception in the present study as anecdotally mothers of FD infants seemed most concerned about this aspect of their children's behavior. Further research is needed to first replicate this study's findings with a larger population of FD infants and next to determine what components (constitutional patterns, medical concerns inherent to facial malformations, difficulty in interpreting infant cues) are most salient in the mother's judgement of the child as having a difficult temperament. Subsequent study should also be directed toward determining whether current temperament measures are appropriately used with a handicapped population.

The third hypothesis, that mother-infant interactions would become increasingly dysfunctional as temperaments of infants became more difficult was confirmed. All five temperament subscales used to determine difficult versus easy temperament infants were negatively related to the quality of the interaction; that is, the more difficult the temperament the poorer the interaction. Not surprisingly, Rhythmicity, Approach/Withdrawal and Adaptability were the most significantly related to quality for it logically follows that if an infant is not predictable in its
functions, caregivers will find it difficult to enter a synchronous, reciprocal relationship with them. This lack of synchrony is seen as a prime determiner of poor infant-caregiver interactions and places the infant at risk for subsequent behavioral/developmental difficulties. These findings concur with those of Bridges and Cicchetti (1982) who found that handicapped infants (Downs syndrome) showed dampened intensity and a lack of crescendoing activity and these characteristics may have lead to the parents misinterpreting the infants' signals as manifesting low approachability. If caregivers then act on this "misinterpretation" they may disengage from their infants as an attempt to synchronize to the infant's supposed wishes. Cambell (1979) found that infants rated irregular, nonadaptable and negative in mood were responded to by their mothers with less interaction, responsiveness and social bids, than nondifficult babies. In the current study, the parents may have similarly misinterpreted their infants' facial expressions and, for example, judged them as less approachable. Should this not have been the intended infant signal, the FD child may feel "rejected" and withdrawn, the misinterpretation now becoming a self-fulfilling prophecy. Interestingly, once a "my baby is a difficult baby" set is established by the caregiver, they react accordingly to the infant, even if later independent observation of the infant suggests they no longer fit the difficult classification (Cambell,
The ramifications for infants' later development are obvious.

In summary, infants born with facial malformations can be considered at risk for the development of dysfunctional interactions with their caregivers and later developmental difficulties. The results of the current study suggest several clinical applications. These interventions are needed as past research (Thomas & Chess, 1977) has demonstrated that children with difficult temperaments are at greater risk for behavioral problems. Additionally, as has been stated above, less attractive infants receive less positive response from their environments and this may lead to increasing difficulties in establishing a secure self-esteem. The first clinical application suggested by the present research findings is to provide information and support to the parents shortly after the birth of NF infant. As Drotar, Baskiewicz, Irvin, Kennell, and Klaus (1975) cogently note, the birth of a malformed child evokes tremendous stress in a family and sets into a motion a grieving process not unlike that seen with death. Many of the mothers in the current study reported feelings of shame, loss and confusion when first hearing of their babies' medical problem. Additionally, the fathers often were described by their wives as being distant after the birth and obviously upset. Anticipatory guidance should be provided to the parents of NF infants, both to prepare them for the grieving process and
also to begin assisting them in correctly interpreting their babies facial cues. The mothers of FD infants should be helped to correctly identify "approach" signals from their infants and not interpret a lack of infant rhythmicity, for example, as a sign of poor mothering or rejection. The attractiveness bias should be discussed too and the potential that subconsciously it will impact the interaction in a negative way.

As with many applied clinical research endeavors, there are factors in the current research which limit its generalizability. The subject sample evaluated in the present study was small. This was due in part, to the rareness of the medical disorder studied and to the realities of financial and time limitations. In addition to the relatively small sample size, several other limitations of the study are noted. First, this study did not include a true random sample. While rejection rates of those contacted were small, participation was on a voluntary basis for both experimental and control groups, and self-selection for inclusions may have introduced an uncontrolled bias. Second, the infants in the FD group were in various stages of surgical repair and it is unknown what effect this had on the dyads' interactions. Third, the experimental subjects were primarily children with cleft lips. The current study's findings may not accurately generalize to children with other and more severe facial deformities. An additional limitation involves
the method of statistically analyzing the data. Again, in part due to the small sample size, internal validity may have been compromised by using multiple group comparisons and correlations. However, external validity was enhanced as results of several separate measures used in this study yielded consistent results.

Despite the above mentioned limitations this study provides useful information in understanding the complicated interactions of mothers with their FD infants and suggests areas in need of further study. Replication of the current study is important to more confidently accept the findings as contradictory data do exist. Sroufe (1985) found little support for the assertion that temperamental pattern adversely affect attachment patterns. Bates, Olson, Pettit and Bayles (1982) found mothers' perceptions of difficult temperament in their infants did not affect maternal behavior. Nonetheless, there appears sufficient evidence to continue research which attempts to elucidate the relationship between perceived temperament, attractiveness, and caregiver interactions.

There seems to be much merit in including a qualitative measure of interaction in future research. It appears that behavioral indications of positive attachment in normal infants may not readily apply to infants with medical problems and without quality measures crucial information would have remained undiscovered in the current research. Future
research should attempt to measure FD dyadic interactions soon after birth to minimize the effect different surgical histories may have upon subsequent interactions, and to better understand the beginnings of the mother-infant "dance." Future research should also focus on the fathers reactions at the time of the birth of a malformed child and subsequent affects upon interactions. Research should attempt to determine if FD infants' facial expressions can be reliably understood as representing particular emotions as has been the case with normals. This may help in determining whether facial malformation does in fact obscure emitted infant facial cues. Future studies should also assess the impact birth order may have on interactions and control for the mother's expectancy of recovery for their infant.
Appendix A

Types of Facial Deformity Studied

<table>
<thead>
<tr>
<th>Facial Cleft (Lip)</th>
<th>8 subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleft Palat (Only)</td>
<td>5 subjects</td>
</tr>
<tr>
<td>Reyners Disease</td>
<td>1 subject</td>
</tr>
</tbody>
</table>
Appendix B

Name: ___________________________ Date: ______________________

Address: ____________________________________________________

Home Phone: __________________________________________________

Race: ________________________________________________________

Occupation: ____________________________________________________

Date of Birth: _________________________________________________

Marital Status: Single____ Married____ Divorced____

Any previous marriages; if so, when and for how long? ______

People Currently Living in Household (Include Self):

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Educational Level</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>6.</td>
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</tbody>
</table>

Infant's name: ________________________________________________

Date of birth: __________ Sex of infant: Male____ Female____

Born to you? __________________________ Adopted? ____________

Was the birth vaginal? _________ or Caeserian? ____________

Birth order of infant: 1st child 2nd 3rd 4th 5th 6th ______

Duration of Pregnancy (in months): ______ Duration of delivery
(in hours): __________________________
Appendix B—Continued

Any problems with delivery? If so, explain: ________________________________

______________________________

Bottle fed? ______ Breast fed? ______ Other? _______________________________

Birth weight: ________________________________

These questions ask you to provide some information about your family.

Are you employed now?  
1. No  
2. Yes, full-time  
3. Yes, part-time  

If you are not currently employed, what is the main reason?  
1. Temporarily laid off  
2. Not employed; looking for work  
3. Not employed; not looking for work  
4. Student  
5. Doing volunteer work  

What is your ethnic background? (If you choose not to answer, check #5—No answer).  
1. American Indian  
2. Black  
3. Oriental  
4. White  
5. No answer  

Is your spouse (or male/female friend) employed now:  
1. No  
2. Yes, full-time  
3. Yes, part-time  

If he is not currently employed, what is the main reason?  
1. Temporarily laid off  
2. Not employed, looking for work  
3. Not employed, not looking for work  
4. Student  
5. Doing volunteer work  

What is your child's mother or father's ethnic background?  
(If you choose not to answer, check #5—No answer.)  
1. American  
2. Black  
3. Oriental  
4. White  
5. No answer
What were the highest levels in school or college you and the child's father have completed?

Mother:  1. 1st-8th grade
2. 9th-12th grade
3. Vocational or some college
4. College graduate
5. Graduate or professional school

Father:  1. 1st-8th grade
2. 9th-12th grade
3. Vocational or some college
4. College graduate
5. Graduate or professional school

Are your currently living with your spouse?
1. Yes
2. No; separated
3. No; never married
4. No; divorced
5. No; widowed

How many children are living in your home:
1. 1 child
2. 2 children
3. 3 children
4. 4 children
5. 5 or more children

What is your family's total annual income:
1. Over $20,000
2. $15,000 to $20,000
3. $10,000 to $15,000
4. $5,000 to $10,000
5. Less than $5,000

During the last six months, have any family members been in the hospital? Indicate the number of days.
1. 0-2 days
2. 3-4 days
3. 5 days
4. 6-7 days
5. 8 or more days

What is the total number of times members of your family saw a doctor during the last 6 months? (Do not count check-ups.)
1. 0-2 times
2. 2-5 times
3. 6-10 times
4. 11-20 times
5. more than 20 times
Are persons other than your children living with you?

1. No  
2. Yes
Appendix C

Informed Consent Form

You are invited to participate in a study designed to increase our understanding of craniofacial problems. Our project focuses on the interactions between mothers and their facially deformed infants.

If you agree to participate, you will be asked to complete several questionnaires. We will photograph your baby. Then, you and your baby will be asked to interact for 15 minutes while we videotape the two of you. The entire session will take about one hour. If at any point during the project you decide that you would like to withdraw your participation, you will be free to do so.

A couple of days after your participation, you will receive a telephone call in order that we might give you the results of the questionnaires you completed. When the entire research project is finished, we will gladly provide for you a general summary of the results of the study; however, the results for individual children and mothers will not be available to protect families' privacy. All information obtained will be completely confidential. The names of the participants will be removed from the questionnaires and replaced with code numbers which will be used for the purpose of data analysis.

If you agree for you and your child to participate in this study, please sign the form. If you have any questions at any later date, please, call John Sterling or Rebecca Smith at 690-0498.

Parent  ___________________________  Date  ___________________________

Child  ___________________________

Witness  ___________________________
References


