PSYCHOSOCIAL ADJUSTMENT OF CHILDREN WITH CRANIOFACIAL ANOMALIES:
EFFECTS OF FACIAL APPEARANCE, SPEECH QUALITY, AND HEARING LEVEL

By

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGMENTS</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>vi</td>
</tr>
</tbody>
</table>

## CHAPTERS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>REVIEW OF THE LITERATURE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Attractiveness Literature</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Speech Impairment Literature</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Hearing Impairment Literature</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Craniofacial Anomalies Literature</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Overview of Findings</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>A Model of Adjustment</td>
<td>52</td>
</tr>
<tr>
<td>3</td>
<td>OBJECTIVES</td>
<td>59</td>
</tr>
<tr>
<td>4</td>
<td>HYPOTHESES</td>
<td>61</td>
</tr>
<tr>
<td>5</td>
<td>METHOD</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Subjects and Settings</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Measures</td>
<td>65</td>
</tr>
<tr>
<td>6</td>
<td>RESULTS</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Description of Sample</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Gender Comparisons</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>Group Comparisons</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>Intercorrelations of Variables</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Multiple Regression Analyses</td>
<td>84</td>
</tr>
<tr>
<td>7</td>
<td>DISCUSSION</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>Directions for Future Research</td>
<td>109</td>
</tr>
<tr>
<td></td>
<td>Conclusion</td>
<td>112</td>
</tr>
</tbody>
</table>

## APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SPEECH VISUAL ANALOG SCALE</td>
<td>115</td>
</tr>
<tr>
<td>B</td>
<td>ATTRACTIVENESS VISUAL ANALOG SCALE</td>
<td>116</td>
</tr>
<tr>
<td>C</td>
<td>MEDICAL EXPERIENCES QUESTIONNAIRE</td>
<td>117</td>
</tr>
</tbody>
</table>
Abstract of Dissertation Presented to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

PSYCHOSOCIAL ADJUSTMENT OF CHILDREN WITH CRANIOFACIAL ANOMALIES: EFFECTS OF FACIAL APPEARANCE, SPEECH QUALITY AND HEARING LEVEL

By

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The relationship of attractiveness, speech quality, and hearing level to psychosocial adjustment was examined in 63 children with craniofacial anomalies (ages 7 years, 6 months to 13 years, 11 months). These variables were not found to be related to measures of internalizing (Child Behavior Checklist internalizing scale, Child Depression Inventory, Revised Children's Manifest Anxiety Scale), externalizing (Child Behavior Checklist externalizing scale), or self-esteem (Harter Self-Perception Profile for Children). Furthermore, subjects scored in the normal range on these measures and were not different from a comparison group of 65 children without anomalies. These findings are consistent with previous research, which demonstrates essentially normal adjustment in children with craniofacial anomalies, but are contrary to expectations of increased adjustment problems based on literature which describes the relationships of speech, attractiveness, and hearing to social perceptions and interactions. Possible explanations for the normal adjustment of children with
craniofacial anomalies are described, with suggestions for future research emphasizing the strengths of these children.
CHAPTER 1
INTRODUCTION

When a child is born with a craniofacial anomaly, parents are frequently concerned about the effect that the anomaly might have on the child's future psychological well-being. This concern is often shared by the child's treatment team, who may base decisions on the timing and extent of surgical corrections on beliefs about the effects of the child's appearance on his or her psychosocial adjustment. Research literature on appearance suggests that these concerns may be well-founded. There is abundant evidence that physical appearance has an effect on the way individuals are perceived and treated by others (e.g. Lefebvre & Arndt, 1988; Eagly, Ashmore, Makhijani, & Longo, 1991). On the basis of this literature, it might be expected that children with craniofacial anomalies are at increased risk for poor psychological adjustment because of their appearance.

Research with children with craniofacial anomalies, however, tends to show only minimal psychosocial problems, if any (for a review, see Richman & Eliason, 1982). Methodological problems in the studies may account for this pattern of results. For example, even though unattractive facial appearance is presumed to be a cause of the children's hypothesized problems, many studies do not include measures of physical appearance (Bjornsson & Augustsdottir, 1982; Broder & Strauss, 1989; Kapp, 1979; Kapp-Simon, 1986; Schneiderman, & Auer, 1984). Children with cleft lip and palate are most often the subjects of such studies. With good surgical repair, these children are near-normal in appearance; therefore, they probably do not receive the same social treatment to which more disfigured children might be subjected. In addition, many children with craniofacial anomalies have associated speech and hearing
impairments. Only a few studies, however (e.g. Richman, 1983; Glass & Starr, 1979), have examined the effects of impaired speech and hearing, despite the fact that research has shown that speech and hearing impairments impact children's psychosocial development (Davis, Elfenbein, Schum & Bentler, 1986; Lass, Ruscello, & Lakawicz, 1988). This paper will review literature on attractiveness and the psychosocial effects of speech and hearing impairments, as well as summarize existing research with children with craniofacial anomalies, before describing a research program which will attempt to more adequately assess the effects of craniofacial anomalies on children's psychosocial adjustment.
CHAPTER 2
REVIEW OF THE LITERATURE

Attractiveness Literature

Influence of Attractiveness on Perception of Others

"Beauty is only skin deep," proclaims the familiar adage, yet research suggests that we do not really believe this. Since the early 1970s, numerous studies have shown that people do make character attributions on the basis of physical appearance and that positive characteristics are more often attributed to attractive than unattractive people.

In one of the earliest studies of the influence of physical attractiveness on impression formation (Miller, 1970), 720 college students rated yearbook photographs of other college students on a bipolar adjective checklist. The attractiveness of the photographs had been previously rated by an independent sample of college students on a nine-point attractiveness scale. For eight of the 17 items, raters of both sexes rated attractive photographs of both sexes significantly more positively (p< .01) on the bipolar adjective scale than they did the less attractive photographs. For seven of the remaining variables, raters of at least one sex rated more attractive photographs of at least one sex more positively than less attractive photographs, but the difference was not significant for all rater-photograph combinations. On two items, differences between groups were insignificant at the p < .01 level. This study provided some of the first evidence that, in the absence of other information, attractive individuals are perceived more positively than unattractive individuals.
In 1972, Dion, Berscheid, and Walster published a study in which they concluded "what is beautiful is good." Sixty college students rated three photographs each from a set of 12 college yearbook pictures which had previously been rated as attractive, average, or unattractive. Subjects rated the photographs on bipolar adjective scales and ranked them on personality traits by indicating which photographed person had the least or most of each trait. In a separate task, subjects indicated which photographed individuals were most and least likely to "ever be divorced," "be a good parent," "experience deep personal fulfillment." Finally, subjects indicated which photographed students were most and least likely to obtain employment in thirty jobs which had been chosen to represent high, average, and low status. Subjects rated the attractive individuals higher on socially desirable traits than they did unattractive individuals. They also rated them as more likely to obtain high status employment. Finally, attractive individuals were rated as less likely "to ever be divorced" and more likely "to experience deep personal fulfillment" than unattractive individuals. Attractive individuals were not rated as more likely "to be a good parent." There were no differences in any ratings on the basis of sex of either the rater or the photographed individual. In summary, on every measure except for predicted quality of parenting, attractive individuals were assumed to have an advantage over their less attractive peers in terms of both the socially desirable traits they possessed and the personal and occupational fulfillment they were expected to obtain.

A limitation of the Dion, Berscheid, and Walster (1972) study and the Miller (1970) study is that they were based on college students' rating of photographs from college yearbooks. The generalizability of the findings to other age groups or SES groups is thus unknown. In addition, facial expression, clothing, and hairstyle of the college photographs may have influenced both the attractiveness ratings and the attributional ratings. For example, the same person may be perceived as both more attractive and friendlier when smiling than when frowning. Despite these limitations,
the studies do indicate that college students perceive strangers who present an attractive appearance as possessing more positive traits than individuals whose appearance is unattractive.

Gross and Crofton (1977) examined a corollary of "what is beautiful is good" -- "what is good is beautiful" -- and found it to be true. They presented each of 125 college students with a photograph of a female who had previously been rated as either high, average or low in attractiveness. The photograph was paired with either a favorable, average or unfavorable personality description. Attractiveness ratings made by the subjects were positively related to the favorableness of the personality description paired with the photo. This effect was particularly pronounced for the photos which had previously been rated as unattractive. This study demonstrated that, not only are individuals who are attractive assumed to have other positive attributes, but individuals known to have positive personality attributes are considered to be more attractive.

More recently, Gillen and Sherman (1980) examined the relationship between attractiveness and gender in the formation of trait attributions. Ten male and ten female college students rated yearbook photographs of two individuals of each sex at each of three levels of attractiveness (high, average, low). There were no significant differences in scores by male versus female raters. Attractive individuals of both sexes were rated higher on the "good" traits of "friendly," "honest," and "helpful," and were rated lower on the "bad" of traits "irresponsible," "lazy," and "daydreamer". Attractive individuals of both sexes were also rated higher on traits that were categorized as either "masculine-good" or "feminine-good" and lower on traits categorized as "feminine-bad" than unattractive individuals. The "masculine-bad" traits of "tactless," "insincere," and "deceitful" were not significantly related to attractiveness for either sex. In addition, attractive individuals of both sexes were rated higher on "non-evaluative masculine" traits, but females were rated equally across attractiveness groups
on "non-evaluative feminine" traits, and attractive males were actually rated lower on "non-evaluative feminine traits" than unattractive males. On closer inspection, the "non-evaluative feminine" traits of "emotional," "feelings easily hurt," and "needs security" may have the potential for more negative connotations than the "non-evaluative masculine" traits of "dominant," "independent," "direct." It may be that the "non-evaluative feminine" traits did carry negative connotations, but only when applied to males, or that they are negative for both sexes, but that the female stereotype is so strong for these three traits as to override the effects of attractiveness. These results suggest that, in general, attractive individuals are perceived more positively than their unattractive counterparts, but that the effect of attractiveness on impression formation is influenced by the sex of the individual being judged. This is congruent with Ashmore's (1981, in Eagly et al., 1991) identification of positive intellectual qualities and negative social qualities that are attributed to males and negative intellectual qualities and positive social qualities that are attributed to females. Both gender of the subject being rated and masculine/feminine quality of a trait therefore should be considered when interpreting associations between attractiveness and trait attributions.

For certain character attributions, attractive people may not have the advantage. Two-hundred eighteen male freshmen from two universities were given biographical information forms paired with a picture of either an attractive female or an unattractive female (Tanke, 1982). Although they rated attractive female students higher than unattractive females on items measuring social and sexual excitement, unattractive females were rated higher on items measuring modesty, concern for others, and interpersonal sensitivity. Thus, for young adult females rated by male peers, the "beauty is good" stereotype may not necessarily translate to "beauty is kind."

Agnew and Thompson (1994) also demonstrated that being attractive may have both positive and negative consequences for how one is perceived by others. One hundred eighty undergraduate students read a fictitious description of a male recent
college graduate who had been diagnosed as HIV-positive. All students read the same vignette, except that the attractiveness of the man was varied. He was described as either "very attractive," "neither attractive nor unattractive," or "very unattractive." Students who read the attractive description rated him more positively on a number of personality dimensions than did those who read the very unattractive description. They also rated him as more likely to have contracted the virus through multiple heterosexual contacts, whereas the unattractive man was rated more likely to have contracted the virus through a single homosexual partner. This may be interpreted as another positive attribution of attractiveness, since students also rated homosexual contact as being a more negative means of contracting the virus than heterosexual contact. A negative effect of attractiveness, however, was demonstrated by the fact that the attractive man was judged to be more to blame for his condition than the unattractive man. (Ratings for the neutral attractiveness condition were between the attractive and unattractive conditions for most items.)

Eagly, Ashmore, Makhijani, and Longo (1991) conducted a meta-analysis of research on physical attractiveness stereotyping. They selected studies from psychological, sociological, medical, and educational databases extending from 1963-1987. From an initial pool of 600 reports on physical attractiveness, they selected 76 studies which met the following criteria: 1) General physical attractiveness (as opposed to a specific physical characteristic such as weight or body type) was an independent variable. 2) Ratings of physical attractiveness were not made by the same individuals who rated the targets' other characteristics. 3) Personality traits or life outcomes which could clearly be defined as either positive or negative were used as at least one of the dependent variables. 4) Subjects rated targets with whom they were not previously acquainted and were not asked to assume a hypothetical relationship to the target when making the rating. 5) Targets were not described as having specific characteristics or experiences (such as mental illness, being sexually active before marriage, having been
raped) which might affect subjects' ratings of them. 6) Subjects and targets were over the age of 14. 7) Sufficient information was provided to permit computation of at least one effect size. Effect sizes were computed for eight attribution categories: "social competence," "adjustment," "potency," "intellectual competence," "integrity," "concern for others," "general evaluation," and "other" (specific attributes which could be characterized as positive or negative and did not fit the other categories). Effect sizes for the variables "integrity" and "concern for others" were very small. The variables "adjustment," "potency," "intellectual competence," "general evaluation," and "other" had mean weighted effect sizes (d_s) ranging from 0.46-0.57. (Values of d close to 0.50 are classified as "medium" and have been described as being characteristic of phenomena which would be noticeable in everyday situations (Cohen, 1977, in Eagly, et al., 1991)). The variable "social competence" had the greatest d (0.68). (A d of 0.80 is considered "large" [Cohen, 1977, in Eagly, et al, 1991].) The results of this analysis indicate that physical attractiveness does indeed exert a noticeable effect on perceptions of a stranger's personality characteristics. Attractive people are perceived as being better adjusted, more powerful, smarter, and generally having more positive characteristics than unattractive people. There is a particularly strong tendency to perceive them as socially competent. Attributions of integrity and concern for others, however, are not related to ratings of physical attractiveness. This suggests that, for adults evaluating non-acquaintances, physical attractiveness is perceived as being positively related to characteristics that benefit the attractive person (intelligence, social competence, power), but unrelated to the manner in which the attractive person will treat others (with or without concern or integrity). The analysis does not address the effects of attractiveness on the perceptions of individuals who are acquainted with each other or young children's attractiveness stereotypes.

In general, these studies indicate that attractive individuals are perceived more positively than unattractive individuals. Important exceptions to this are the findings
that attractive individuals are not perceived as having more integrity and concern for others than unattractive individuals and that they may be seen as more to blame for certain of their problems. In addition, when a characteristic is strongly associated with one gender, there may be an interaction between sex and attractiveness in determining whether a person will be perceived as possessing that characteristic.

Attractiveness and Social Interaction

Given that attractiveness has been shown to affect the ways in which individuals are perceived by others, the question remains of whether attractiveness affects the treatment people receive. Research indicates that it has a pervasive effect on social interaction. It has been shown to influence preschool children's preferences for playmates, dating choices of high school and university students, and even whether a child will be punished for a misdeed or a criminal convicted for a crime (Lefebvre & Arndt, 1988).

Walster, Aronson, and Abrahams (1966) provided some of the earliest evidence of the effects of attractiveness on social interaction in their study of dating behavior. Among 376 randomly computer-matched couples who evaluated their blind dates at a freshman college dance, attractiveness was by far the strongest predictor of liking (for male raters, \( r = .78 \), for female raters, \( r = .69 \)). It was also the strongest predictor of asking the partner for another date, regardless of the attractiveness of the person (usually male) who was asking for the date. In contrast, intelligence and achievement were not significantly correlated with liking of the partner, and personality variables were correlated only weakly with liking.

Goldman and Lewis (1977) examined whether attractive individuals would maintain their advantage in social interactions when their attractiveness was hidden from their interaction partner. They had 120 college students rate the social skills and likability of opposite-sex partners whom they had never seen, after a five minute telephone conversation. Even when the individual's attractiveness was not visible to
their partner, more attractive individuals received higher ratings of social skills and likability. Goldman and Lewis offered the explanation that attractive individuals may be socialized differently in their daily interactions. They may receive more positive attention, which facilitates the development of social skills that increase the individual's likeability beyond the effects of attractiveness alone.

Attractiveness has also been shown to affect the process of trial by jury. Efran (1974) provided 66 college students with a simulated case description of a student who was being tried by a student-faculty court on the charge of cheating on an examination. Attached to the description was either a photograph of an individual who had been previously rated as attractive, a photograph of an unattractive individual, or no photograph. All descriptions were identical, and all subjects were given photographs of opposite-sex individuals. Efran found that male subjects indicated less certainty of guilt, recommended less severe punishment, and rated themselves as more attracted to the attractive "defendants" than either the unattractive ones or the defendants who were not pictured. The effects for female "jurors" were nonsignificant, but in the same direction, for all three ratings. When the "jurors" rated the photographs for attractiveness, there was less difference between the ratings given by female judges to attractive versus unattractive photographs than by male judges. It is therefore difficult to determine whether men are more influenced by attractiveness of opposite-sex defendants than are women or whether attractiveness was not manipulated effectively for the female raters. In addition, this study addressed judgments of only one type of offense. Nonetheless, it provides evidence that the effects of attractiveness on an individual's treatment by others extends even to judgments of guilt and recommendation of sentences.

Infants as young as four months of age demonstrate a preference for attractive faces, suggesting that the effects of attractiveness on social interaction may begin at a very early age. Samuels, Butterworth, Roberts, Graupner, and Hole (1994) presented
attractive and unattractive photographs of young adult females to 25 infants (ages 4-15 months, mean age 7.94 months). In addition, they presented photographs which had been altered by computer to eliminate the slight asymmetry which is present in normal faces. The infants spent more time looking at attractive versus unattractive faces, but did not demonstrate a preference for either the natural photographs or those which were altered to produce symmetrical facial images. This suggests that attractiveness affects the behavior even of very young infants. Furthermore, it appears that infants perceptions of attractiveness are consistent with those of adults and that this is not merely the result of a bias towards facial symmetry.

Dion and Berscheid (1974) demonstrated that, by the preschool years, children's preferences for attractive individuals are evident in their choice of friends. Peer nominations were used in four nursery school groups of 77 children (ages 4-6) to rate the children on a number of social variables. Attractiveness of the children was rated by adult judges. For children over the age of 5 years 4 months, attractive children of both sexes received higher popularity ratings than unattractive children. For the younger boys, this relationship was also true, but unattractive girls were more popular than attractive girls among children aged 4 years 4 months to 5 years 4 months. It is unclear why unattractive females were more popular among children younger than 5 years 5 months, but it is apparent that by the age of 6, attractive children of both sexes are more popular than their unattractive peers. In addition, unattractive male children received more nominations for aggressive behavior and unattractive children of both sexes received more nominations for being "scary" than attractive children. Attractive children received more nominations for being independent. This suggests that, in addition to being related to popularity, attractiveness is associated with specific child character attributions as early as the preschool years.

Vaughn and Langlois (1983) also examined the relationship between attractiveness and peer relationships during the preschool years. College students rated
the attractiveness of photographs of fifty-nine preschool children aged 4 years 8 months through 5 years 7 months. Two sociometric ratings and one measure of attention received from classmates were obtained for each of the children. Attention received was not associated with physical attractiveness, but physical attractiveness was significantly positively correlated (r=.42, p<.01) with the paired-comparisons sociometric rating. The association between the picture board sociometric rating and physical attractiveness showed a similar trend as the paired-comparisons data, but was nonsignificant. Examining the paired-comparisons data more closely revealed that the association between physical attractiveness and sociometric rating was due to a strong association between the two variables for the girls, but that the relationship between the two variables for boys was nonsignificant. In the Dion and Berscheid (1974) study, the relationship was positive for males in this age range, but was negative for females. This may be due to problems in sampling (there were fewer than twenty females in the young age group in the Dion and Berscheid study) but may also reflect a weaker effect of attractiveness among children under the age of 5 years 6 months.

There is evidence that the relationship between attractiveness and social interactions extends beyond the peer group to adult-child interactions. Dion (1972, in Rich, 1975) found that undergraduate college women rated misbehavior by an attractive child as less undesirable than the same behavior committed by an unattractive child. Furthermore, misbehavior by unattractive children was perceived as being part of the child's personality style, whereas misbehavior by attractive children was seen as an isolated incident. Unattractive children were also rated as more dishonest and unpleasant than attractive children. Attractiveness rating was not, however, related to the severity of punishment recommended.

In a study by Rich (1975) attractiveness was related to the severity of recommended punishment, but there was an unexpected interaction of sex and attractiveness. Subjects were 144 female teachers who made ratings of blame,
personality, and recommended punishment after reading a description of a hypothetical third grader who had committed a classroom offense. Either an attractive or unattractive photograph was attached to each description. Although attractive children received more positive ratings for personal and academic development, unattractive girls were perceived as more intelligent than attractive girls, whereas attractive boys were perceived as more intelligent than unattractive boys and girls of any attractiveness level. Furthermore, unattractive boys were most often recommended for punishment and received the most severe punishment recommendations, whereas unattractive girls were least likely to be recommended for punishment and received the most lenient punishment recommendations. These results indicate that the sex of the child is an important variable in determining how the child's attractiveness will effect his or her interactions with adults. Unfortunately, no male teachers were included in this study, so it is uncertain whether the same pattern would emerge with male teachers.

**Relationship Between Physical Appearance and Psychosocial Adjustment**

Because in many circumstances they are perceived and treated less positively than attractive individuals, it might be predicted that unattractive individuals would have more psychosocial adjustment problems than attractive individuals. The research which addresses this hypothesis, however, is not uniformly supportive of it.

Feingold (1992) completed a meta-analysis of 93 published and unpublished studies which correlated ratings of physical attractiveness with measures of personality, social behavior, cognitive ability, and sexuality. All subjects were either adolescent or adult. Physical attractiveness was only trivially related to most mental health measures (average correlations below $r = .10$), except for loneliness ($r = -.15$) and lack of social anxiety with the opposite sex ($r = .22$). Physical attractiveness was positively related to social behaviors such as social skills ($r = .23$) and popularity with the opposite sex ($r = .31$). There were only small associations to sexuality measures (average correlations from $r = .01 - .18$), and cognitive ability was virtually unrelated to
attractiveness (mean $r = .04$, median $r = .00$). In contrast, in the additional 57 studies of self-rated attractiveness which Feingold also meta-analyzed, self-rated attractiveness did have a moderate association to general mental health ($r = .24$) and self-esteem ($r = .27$). This suggests that, among adolescents and adults, self-perception of attractiveness may be more important to psychological adjustment than physical appearance as judged by others.

There is some evidence that, for children, self-rated attractiveness may also be more important than others-rated attractiveness. Kenealy, Frude, and Shaw (1989) examined the relationship between attractiveness and psychosocial adjustment in 1018 children age 11 to 12. Attractiveness ratings were obtained from the child's teacher, a panel of judges, an interviewer, and the child. The child also completed the Piers-Harris Self-Concept Scale (Piers & Harris, 1984), and a number of parent and teacher ratings of behavior were made. In addition, a popularity score was derived from peer nominations in the child's classroom. There was a strong positive relationship between child self-ratings of attractiveness and self-esteem scores. Teacher ratings of attractiveness were positively, but weakly, related to the self-esteem score. Attractiveness ratings by judges who were unacquainted with the children were unrelated to self-esteem. Attractiveness ratings by all raters were positively associated with teacher's ratings of the child's popularity, confidence, leadership, and academic brightness, as well as with sociometric ratings of the child's popularity. These results suggest that appearance as judged by others has an effect on children's behavior and popularity, but that self-esteem may be mostly associated with the children's own perception of their appearance.

In contrast, a study by Cooper (1993) did find an effect of others-rated physical attractiveness on self-esteem and children. The relationship between self-esteem and facial attractiveness in 55 learning disabled children ages 8-13 was examined. Subjects completed the Piers-Harris Children's Self-Concept Inventory and
posed for a facial photograph. Photographs were rated on a nine point Likert scale by six adult raters and six sixth grade students. Self-esteem was positively related to both adult and peer ratings of attractiveness in this sample of learning-disabled children. It should also be noted that 56 percent of the subjects and 50 percent of the raters were African-American, suggesting that the importance of attractiveness to self-esteem may generalize across racial lines. Unfortunately, the author did not perform any analyses for effects of race.

A 1994 study by Appleton et al., found a relationship between self-esteem and self-perceived attractiveness among individuals with spina bifida. Subjects were 79 children ages 7 years to 18 years, 11 months who had spina bifida. As part of a larger test battery, subjects were given the Harter Self-Perception Profile for Learning Disabled Students (HSPPLDS) (Renick & Harter, 1988). The HSPPLDS assesses nine domains of competence including general intellectual ability; competence in reading, writing, spelling, and math; social acceptance; athletic competence; behavioral conduct; and physical appearance. Discrepancy scores for each domain may also be calculated. These scores take into account both the child's self-perceived competence in a domain and the importance of that domain to the child. High discrepancy scores represent low perceived self-competence in areas the child rates as important. Discrepancy scores for physical appearance had a stronger negative relationship to global self-worth than any other domain, particularly among females. This study provides further evidence of the importance of self-perception of physical attractiveness to general self-esteem.

Two recent studies failed to find enhancement in psychosocial adjustment after orthodontic treatment to improve dental-facial appearance. Although these may be interpreted as contradictory evidence against a relationship between attractiveness and adjustment, the designs of the studies do not necessarily justify such a conclusion. The first study (Korabik, 1994) did not directly assess attractiveness of the subjects.
Furthermore, as the article notes, the adolescents in the study had higher than average self-esteem at pre-treatment and thus may have failed to demonstrate significant improvement due to ceiling effects. (The mean score on the Piers-Harris Children's Self-Concept Scale prior to treatment was at the 79th percentile). Albino, Lawrence, and Tedesco (1994) compared adolescents who received orthodontic treatment with waitlist controls and found no group differences in self-esteem or positive social interactions in spite of higher dental-facial attractiveness ratings (by self, peers, and parents) obtained by the treatment group. It should be noted, however, that all subjects were selected on the basis of having been excluded from treatment at the county clinic due to the fact that their orthodontic conditions were not considered disabling, and all were judged as having only mild to moderate malocclusions. Furthermore, their baseline scores on the Rosenberg Self-Image Inventory (Simmons, Rosenberg, & Rosenberg, 1973) were in the average range. It is possible that changes in appearance did not lead to enhanced psychosocial adjustment in these children because they were well-adjusted to begin with and did not have significant physical appearance concerns. These findings therefore cannot be generalized to children whose physical appearance is judged to be very unattractive.

In summary, the literature suggests that individuals who are unattractive are perceived less positively and have less positive social interactions than their attractive counterparts. There is contradictory evidence as to whether they may also be less well-adjusted than attractive peers, and it appears that self-rated attractiveness is more important than others' judgments of appearance. These findings have important implications for children with craniofacial anomalies. Physical appearance is not the only concern of these children, however. Many of them also have speech and hearing impairments. This review therefore will turn to the psychosocial concomitants of speech and hearing impairments before examining the literature dealing specifically with children with craniofacial anomalies.
Speech Impairment Literature

Perception and Social Interaction of Individuals with Speech Impairments

Like unattractive children, children whose speech differs from that of peers may be perceived negatively by others. A study by Lass, Ruscello, and Lakawicz (1988) demonstrated that dysarthric speakers (individuals who have problems with articulation of speech) are perceived more negatively than children with normal speech on a broad range of personality characteristics. Eight children (ages 6 to 11) with dysarthric speech and eight children with normal speech were recorded speaking six three-word phrases. The tapes were played to 25 college students who had normal speech and hearing. The students rated each of the speakers on 24 bipolar semantic differential scales. On 22 of the scales, dysarthric children were rated significantly more negatively than normal speakers. This suggests that, when little or no information other than speech quality is available, children with poor speech are evaluated negatively by others. This was also demonstrated in a later study with identical design which used 13-year-old students as raters (Lass, Ruscello, Harkins & Blankenship, 1993). The 19 adolescent raters in that study rated dysarthric students significantly more negatively than normal speakers on all of 22 semantic differential scales.

Negative responses to speech impairment are evident even in very young children. Blood and Hyman (1977) played audiotapes of four girls reading a short passage to 120 children in kindergarten through second grade. The readers varied in speech quality from normal to severely hypernasal. After each tape, the children were asked whether they liked the reader, liked the way the reader talked, thought the reader had trouble talking, would like to talk to the reader, and thought the reader needed help with talking. The percentage of negative responses increased with the severity of the hypernasality. None of the raters indicated that they liked the severely hypernasal
reader. This indicates that hypernasality could have a significant impact on peer acceptance of an elementary-school child.

Silverman and Paulus (1989) found that high-school aged children who substitute "w" for "r" are also perceived negatively by their peers. In this study, 26 high school sophomores completed a semantic differential scale based on the following scenario "A classmate who says /w/ when he means to say /r/. For example, he or she might say 'wed' when he means to say 'red'." These ratings were compared with ratings of a "typical classmate" by 22 sophomores from the same school. Speakers who substitute "w" for "r" were rated "more tense, nervous, afraid, handicapped, isolated, and uncomfortable, and less employable, friendly, sane, educated, and confident" than the typical classmate. Although this study is quite unsophisticated, the results do indicate that students judge peers more negatively when they have even a minor speech impairment such as substitution of one sound for another.

A weakness shared by all of the preceding studies is the lack of any information about the speakers other than speech quality. This is an artificial situation which forces the subject to use the quality of each child's speech as the basis of judgments about the child. In a naturalistic setting, where other information is available, the importance of the children's speech quality in determining how they are perceived by others may decline.

Perrin (1954) found a negative relationship between speech impairment and popularity of elementary school children. Positive peer nominations were obtained from 444 children in grades one through six. Thirty-seven of the subjects were speech impaired. There was a significantly higher percentage of "social isolates" (children receiving fewer than two nominations) in the speech impairment group than in the control group (21.6% vs. 13.5%). Furthermore, there were no "stars" (children receiving 20 or more votes) in the speech impaired group, whereas 6.5% of the control group were "stars." These results indicate that speech impairment is associated with
decreased popularity among elementary school children. The more recent finding of Rice, Sell, and Hadley (1991) that preschool children with normal speech and language receive more peer-initiated interactions than those with speech or language problems is also consistent with the hypothesis that clear communication skills are important for the development of positive social interactions. Unfortunately, the 1991 study did not separate the effects of speech versus language disorder, and the sample size was very small for the speech impaired group (n=3).

Adjustment of Children with Speech Impairment

Negative peer reactions and social isolation might be expected to produce social inhibition in a child. Lindholm and Touliatos's (1979) study of 3097 children in kindergarten through sixth grade provides some support for that expectation, but is not conclusive. Teachers completed the Quay Behavior Problem Checklist on 2991 control children and 106 children who had been placed in special education classes for speech therapy. The speech disordered children scored significantly higher on the "personality problems" (anxiety and withdrawal) scale of the checklist than children with normal speech. The difference, however, while statistically significant, may not have been clinically meaningful (control M = 1.25, SD = 2.16; speech impaired M = 2.25, SD = 2.86).

Baker, Cantwell, and Mattison (1980) also examined behavior problems in children with speech impairments. They examined parent and teacher ratings for speech impaired children on the Conners' Parent and Teacher Questionnaire (Conners, 1973) and the Rutter Parent and Teacher Questionnaire (Rutter, Graham, & Yule, 1970). The most frequently reported problems were oversensitivity, frustration, shyness, short attention span, and restlessness. Unfortunately, no normal control group was used and mean scores were not compared to scale norms, so it uncertain whether speech-disordered children display a higher incidence of these problems than
the general population. Clearly, more research is needed on the adjustment of children with speech disorders.

**Hearing Impairment Literature**

**Hearing Impairment: Social Effects**

Many children with craniofacial anomalies have related hearing impairments which may also influence their psychosocial well-being. A study by Silverman and Klees (1989) indicates that the presence of a visible hearing aid has an impact on peer perceptions. Forty eleventh and twelfth graders used a semantic differential scale to rate a photograph of a male peer. Half of the subjects were given a photograph of the peer wearing a visible hearing aid; the other 20 subjects were given a photograph of the peer without a visible hearing aid. There were significant differences on 19 of the scales. In general, the individual with the hearing aid was described as being more introverted, anxious and depressed, and as having lower self-esteem than the same individual without the hearing aid. The only positive effect was that the hearing-aid photograph received higher ratings on maturity. This demonstrates that knowledge of an adolescent male's hearing impairment is sufficient to negatively influence peer perceptions of him; it is apparently not necessary for high-school aged peers to directly experience difficulty communicating with the hearing impaired individual for negative attributions to be made. Dengerink and Porter (1984), using similar methodology as Silverman and Klees (1989), found that negative peer perceptions of males with hearing aids begins at least as early as fifth grade.

When teachers rate female children, a different picture emerges (Cox, Cooper, & Mc Dade, 1989). Sixty teachers gave lower achievement ratings to girls (ages 10 through 14) who were pictured wearing hearing aids than to girls pictured without
aids. However, they also rated girls pictured with hearing aids as being more attractive and assertive and as having better personalities than girls without hearing aids.

It is uncertain whether the difference in findings of these two studies is due to the sex of the child or to the fact that the ratings were made by teachers instead of peers. Teachers may have consciously avoided giving low ratings to deaf children except in the area of achievement (where it is known that deaf children have problems) because they were aware of the dangers of stereotyping. On the other hand, the discrepant results may reflect a true difference in the effect of hearing impairment on the personality attributions of male versus female children.

Mother-Child Interaction of Hearing-Impaired Children

It has been hypothesized that psychosocial difficulties of a hearing impaired child may begin with impaired parent-child interactions due to communication difficulty between a hearing parent and hearing-impaired child. Wedell-Monnig and Lumley (1980) analyzed mother-child interaction patterns in six deaf child/hearing mother dyads and six hearing child/hearing mother dyads. ("Deaf" children had severe to profound hearing loss.) Children were between 13 and 29 months old. They found that hearing mothers of hearing impaired children were more dominant (made more spontaneous attempts to interact) than mothers of hearing children and that hearing-impaired children were more passive (inactive) than hearing children when not being stimulated by their mothers. Furthermore, they noted that mothers of hearing children interacted more with older children, whereas mothers of hearing-impaired children interacted less with older children.

Meadow-Orlans and Steinberg (1993) observed hearing mothers' interactions with their 18-month-old infants. Twenty infants had significant hearing loss and 20 were normal-hearing. Mothers of hearing-impaired infants scored higher on intrusiveness and lower on flexibility, consistency, and use of positive touch than mothers of hearing infants. This was true of mothers who reported low levels of social
support, but not of those who reported high social support. Social support was not related to mothers' interactions with hearing infants. Social support for the mothers of deaf children was more likely to include help from professionals and the community than was the case for mothers of hearing children. This suggests that support from individuals who have experience with the hearing-impaired may be very useful to hearing parents in learning to communicate with their deaf children. On the other hand, the deaf children's contributions to the interactions were not rated significantly less positively than the hearing children's. The researchers offer several explanations for this. It may be that the hearing mothers were adapting their communication in a manner which was simply not measured by the researchers but was nonetheless effective, or that the children may have benefitted from outside influences. (All of the children were enrolled in early intervention programs).

Henggeler and Cooper (1983), using a sample of older children (3.42-6 years, hearing loss of 28 to 80 dB with aids), found that mothers of hearing-impaired children interacted less with their children than mothers of hearing children, used more direct commands and were less responsive to their children's questions. Hearing impaired children were less compliant with direct and indirect commands, less responsive to questions, and asked fewer questions than hearing children.

Jamieson (1994) compared communication patterns in dyads of either a hearing mother-hearing child, hearing mother-deaf child, or deaf mother-deaf child (ages 4 years 9 months to 5 years 5 months). Mothers were asked to teach their child how to build a pyramid of blocks and were observed during this instruction. The deaf children with hearing mothers made the lowest number of child-initiated interactions. Furthermore, it was noted that hearing mothers of deaf children tended to repeat verbal instructions that the child did not understand rather than attempting to shift the instruction to a visual modality. There were only three dyads in each group, so it is not known whether these results generalize to the majority of the deaf population.
However, if these findings are replicated with larger groups, they would indicate that the 90 percent of deaf children who have hearing parents may face problems in communicating in their own families due to the difficulty of the hearing parent in adjusting to the child’s need for visual input.

It is hypothesized that mothers initially give their hearing-impaired children extra stimulation to compensate for the hearing loss, but progressively withdraw as an age-appropriate method of communication fails to develop. The parents are forced to rely on simple communication, which tends to take the form of commands and attention-getting, and the child becomes passive under this direction. The children may also decrease efforts to communicate as their needs and ideas become too complex to express with the communication system they shares with their parents (Greenberg, Calderon, & Kusche, 1984). There is some evidence, however, that early intervention and high levels of maternal social support may alter these interactions in a positive direction (Meadow-Orlans & Steinberg, 1993).

The pattern described above may be at the root of Stinson’s (1978) finding that mothers of hearing impaired children do not expect hearing impaired children to reach certain social/emotional milestones as rapidly as other children. Mothers of profoundly hearing impaired (n = 31) and normal (n = 33) boys ages 8 to 12 completed a questionnaire on which they indicated the appropriate ages at which mothers should expect their children to reach milestones in verbal skills acquisition, independence, and social/emotional development. Not surprisingly, they predicted that hearing-impaired children would develop language at a later age than normal peers. More interestingly, mothers of hearing-impaired children also recommended that a mother of a hearing-impaired child "teach her child that crying is not the way to get what he wants," "teach her child not to use his fingers when eating," and "teach her child not to cry every time he gets hurt" at later ages than mothers of normal children recommended for a normal child. These lowered expectancies for psychosocial development may be due
in part to the difficulty of communicating these type of ideas to a deaf child and to the parents' need to focus their finite energies on communication of more basic ideas such as health and safety issues.

**Adjustment of Hearing-Impaired Children**

A myriad of psychosocial and educational problems have been linked to hearing disability. The educational achievements and earning potential of deaf individuals are well below average (Compton, 1993; Northern & Downs, 1991). In addition, some authors have stated that deaf individuals are more likely to be perceived as immature, egocentric, impulsive, and as displaying an above-average level of conduct problems than individuals with normal hearing (Feinstein & Lytle, 1987; Schlesinger & Meadow, 1972; Meadow, in Stein, Mindel, & Jabaley, 1981). Most of these difficulties are believed to be the result of the deaf individual's limited ability to communicate with the hearing world. Without hearing, speech development is delayed or nonexistent, so that the child is not only unable to understand the verbal communication of others, but is also unable to effectively express himself. Compton and Niemeyer's (1994) review indicates that hearing-impaired children's exchange of affectionate behavior is also hindered by their inability to perceive auditory cues of affection (such as tone of voice) and that their initiations of affection are often rejected by peers with normal hearing. "Acting-out" immaturity or aggressively may thus be the child's only recourse (Schlesinger & Meadow, 1972). Poor self-esteem may result when these interactional difficulties lead to isolation from or rejection by peers and even family (Feinstein & Lytle, 1987). Furthermore, research indicates that hearing loss well below the level of profound deafness may have negative developmental consequences. Hearing losses as low as 15 dB have been associated with language delay (Northern & Downs, 1991), and hearing losses of less than 40 dB have been associated with psychological adjustment difficulties (Davis, Elfenbein, Schum, & Bentler, 1986).
In an effort to test the assumption that children with disabilities experience greater psychological and emotional difficulties, Tavormina, Kastner, Slater, and Watt (1976) gave a battery of psychological tests to 144 children with physical problems, including 16 hearing impaired children. Subjects were described as having "mild disability" - decibels hearing loss was not reported. The hearing impaired children scored significantly below scale norms and significantly below the other children in the study on the Piers-Harris Self-Concept Scale. In addition, they scored as significantly more external on the Nowicki-Strickland Locus of Control Scale (Nowicki & Strickland, 1973) and scored higher on aggression and immaturity than scale norms on the Missouri Children's Picture Series (Sines, Pauker, & Sines, 1971). This suggests that hearing-impaired children may experience psychosocial adjustment difficulties related to their condition. Due to the small sample size of 16, however, these results should be interpreted cautiously.

Raymond and Matson (1989), using a sample of approximately 50 hearing impaired children (84% were severely or profoundly hearing impaired), found that hearing impaired children scored within the normal range on the Teacher Report Form of the Child Behavior Checklist (Edelbrock & Achenbach, 1984), Aggression, Withdrawal, and Unpopular subscales and on the Inappropriate Assertiveness/Impulsiveness subscale of the Matson Evaluation of Social Skills with Youngsters, Teacher Report Form (MESSY) (Matson, Macklin, & Helsel, 1984). However, a greater than expected number scored below normal limits on the appropriate Social Skills Subscale of the MESSY. This suggests that hearing impaired children may be deficient in social skills (or may use skills not measured by the MESSY), but that they are not grossly impaired. A large proportion of children in the Raymond study were residents at a school for the deaf, which may have eased their adjustment by providing them with an environment tailored to their disability and in which they were not different from other children. This makes it difficult to compare
these results those of Tavormina et al. (1976) or to generalize the Raymond and Matson findings to children who live at home. In addition, the lower scores on the MESSY may be attributable to differences in social interactions between deaf versus hearing children and may be representative of normal functioning within the child's usual social context. Whether mainstreamed deaf children demonstrate appropriate social skills in interactions with hearing peers is not addressed by this study.

Bat-Chava's (1993) meta-analysis of 42 studies of self-esteem in deaf people revealed a pattern of lower self-esteem scores for deaf versus hearing individuals. Bat-Chava notes, however, that in those studies in which measures were administered in sign language or were modified to be more easily understood by the hearing impaired, deaf individuals did not receive lower self-esteem ratings. Furthermore, self-esteem was positively related to use of sign language in the home and to presence of other deaf people in the child's environment. This underscores the importance of the social context to the hearing-impaired child's adjustment. Isolation from other deaf individuals and failure of others to adjust to the child's communication needs may be partially responsible for frequent descriptions of maladjustment in deafness literature.

Cole and Edelmann (1991) administered the Porteous Checklist (Porteous, 1985) to 51 deaf adolescents (ages 14-16). Subjects scored within the normal range on seven of nine problems areas addressed by the scale. Only in the area of employment did the deaf students report significantly more problems than the hearing norms, although problems in boy/girl relationships also approached significance. The scale was administered in sign language, again suggesting that the strengths of deaf individuals may be more apparent when they are observed functioning in situations which are adjusted to their needs rather than when they are forced to accommodate to hearing people.

Adverse effects of mild hearing loss on academic as well as psychosocial development were found in a study of 40 children of normal intelligence between the
ages of 5 and 18 (Davis, Elfenbein, Shum, & Bentler, 1986). The children were grouped according to pure tone average hearing loss. There were no significant group differences in IQ, but the combined sample mean verbal IQ was 9 points below WISC-R population norms, whereas the performance IQ was 5 points above average. Furthermore, the average verbal-performance difference was significant at the $p < .001$ level. On the Peabody Picture Vocabulary Test, Revised (Dunn & Dunn, 1981), children with moderate impairment scored an average of one year below age level, while severely impaired children scored three years below age level. Reading achievement was also significantly below normal, although math achievement was not. Clearly, verbal ability was adversely affected by hearing loss in even mild and moderately impaired children. Personality measures were also administered. There were no differences between hearing-impairment groups on any of these measures. On the Missouri Children's Picture Series, the hearing-impaired mean aggression and somatizations scores were significantly above the test population mean. On the Achenbach Child Behavior Checklist, hearing impaired children scored significantly below the test mean on the social interaction ($T = 40.1$) and school scales ($T = 37.1$), indicating that they had difficulty establishing friendships and interacting with peers, parents, and siblings, and that their academic achievement was below average. They also scored significantly above the test mean for Externalizing, although the group mean Externalizing score was not clinically elevated ($T = 54.2$). These results indicate that children with even mild-to-moderate hearing impairment are likely to exhibit school performance problems, difficulty in social interaction, and slightly increased incidence of externalizing behaviors.

Simon, Larson, and Lehrer (1988) also found a relationship between hearing loss and social and educational development. Two hundred ninety-one preschool children ages 3 to 5 were administered brief screening measures for hearing and cognitive, linguistic, and social development. Hearing loss (classified as present or
absent, with a 25 dB loss cut-point) was associated with decreased cognitive and social development. The association between hearing loss and both cognitive and social problems was largely accounted for by the language delay in the hearing-impaired children. In addition, the relationship between lower social development scores and hearing impairment was mediated by an association between hearing loss and socioeconomic status (greater incidence of hearing impairment at lower socioeconomic status levels).

In summary, hearing-impairment has been associated with decreased verbal skills and problems in psychosocial adjustment, particularly the development of excessive externalizing behavior. Literature suggests that individuals with impaired speech or unattractive appearance may also be at risk for certain psychosocial problems. Because craniofacial anomalies may be associated with unattractive appearance, hearing impairment, speech impairment, or any combination of the three, children with these anomalies may also be at high risk for psychosocial adjustment difficulties. Following is a review of the literature that focuses specifically on individuals with craniofacial anomalies.

Craniofacial Anomalies Literature

Perception of Individuals with Facial Anomalies

Research suggests that individuals with facial anomalies are perceived by others as having more negative personality characteristics than individuals with normal faces. For example, Tobiasen (1987) presented 317 children with color photographs of children with clefts of the lip and palate. Copies of the eleven photographs were altered so that all evidence of the cleft was removed. Subjects were shown pictures of normal children, plus either corrected or uncorrected versions of the children with clefts. Children rated each of the photographs on friendliness, popularity, intelligence,
attractiveness, and desirability as a friend. Uncorrected photographs received significantly lower ratings on all scales than corrected photographs. Furthermore, the differences between ratings of attractiveness and friendliness, popularity, and desirability as a friend, for corrected versus uncorrected photographs, were twice as large for female faces than for males faces. These results suggest that the negative social impact of facial deformity may be more severe for females aged 8 through 16 years than for males of the same age, but that craniofacially anomalous children of both sexes are perceived more negatively by peers than children with normal faces.

Two studies have examined the development of attractiveness stereotypes by comparing ratings of photographs of individuals taken before and after oral surgery to correct malocclusions. Elliot, Bull, James, and Lansdown (1986) compared ratings of photographs taken before and after oral surgery to correct malocclusion. Four age groups (6-7 year olds, 9-11 year olds, 13-15 year olds, 25-35 year olds) rated pre-surgery and post-surgery photographs on attractiveness, friendliness, happiness, intelligence, and social skill. For the two youngest age groups there were no significant differences between ratings of pre- and post-surgery pictures, but the older groups rated the post-surgery pictures as more attractive, intelligent, and happy than the pre-surgery photographs. Rumsey, Bull, and Gahagan (1986) also compared pre- and post-surgery ratings, using 5 through 11 year old raters. They found that 11 year olds rated the post-surgery photographs as more attractive and gave them more positive personality ratings than the pre-surgery photographs. Children under 11 did not rate photographs differentially on the basis of surgery status. Among children ages 7 and older, however, personality ratings were related to the child's rating of the photograph's attractiveness. These results suggest that, for relatively minor anomalies such as malocclusions, children may not begin to equate abnormality with unattractiveness until about the age of eleven. However, children as young as 7 may
begin to form personality stereotypes on the basis of their own idiosyncratic judgments of attractiveness.

Schneiderman and Harding (1984) used a bi-polar adjective checklist to compare elementary school children's perceptions of children with repaired cleft lips versus children without clefts. Color slides of children (ages 4 through 9 years) with repaired bilateral clefts, repaired unilateral clefts, and without clefts were shown to 78 children ages 7 to 10 years. Each child rated all of the photographs on the adjective checklist. Children with clefts were rated significantly more negatively on each of the scales than were children without clefts. Furthermore, children with bilateral clefts were rated more negatively on seven of the items than were children with unilateral clefts.

It should be noted that children under the age of 11 did not stereotype consistently by facial abnormality in the Rumsey et al. (1986) and Elliot et al. (1986) studies described above. Those over the age of six did, however, make personality attributions on the basis of their own attractiveness judgments. Taken together, these studies indicate that children as young as seven do make negative character attributions on the basis of appearance, but that there is less agreement among young children than adults regarding standards of attractiveness. The lack of agreement may reflect the fact that the cognitive development of very young children is such that it is difficult to obtain reliable ratings from them. It may also be that children agree on the unattractiveness of clefts at an earlier age than they agree on the unattractiveness of malocclusions. An alternative explanation is that the clefts were more severe than the malocclusions and that it is the degree rather than the type of abnormality to which child raters in the Schneiderman and Harding (1984) study were responding.

Social Interactions of Individuals with Craniofacial Anomalies

If individuals with craniofacial anomaly are perceived differently than others, are their interactions with others also affected? This question has been the basis of a
group of studies on the social interactions of individuals with craniofacial anomalies. This research deals with the very earliest social relationship--the parent/child dyad. Mothers are typically used in this research because they tend to be more available to the researchers and have traditionally assumed the bulk of child-care responsibilities.

Barden, Ford, Jensen, Rogers-Salyer, & Salyer (1989) compared mother-child interactions of five, four-month old infants with craniofacial anomalies to interactions of five infants without anomalies. The anomaly group included infants with the following diagnoses: Crouzon's syndrome, Aperts syndrome, hemifacial microsomia, unilateral cleft lip and palate, and bilateral cleft. None of the infants had neurological or mental disorders or had physical problems in addition to those associated with the diagnosis. Infants and their mothers were observed in three interaction situations. They were coded on six specific mother behaviors and six specific child behaviors, as well as general ratings of gratification, responsiveness, and affective tone for each member of the dyad. In addition, mothers completed the Life Experience Survey (LES) (Sarason, Johnson, & Siegel, 1978), the Satisfaction with Parenting Scale (SWPS) (Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982) and a social support questionnaire. Mothers of the infants with anomalies reported more satisfaction with parenting and more positive life experiences following pregnancy then mothers of normal children. There were no differences in self-reported general life satisfaction or social support. Observational measures demonstrated significant differences between the groups. Mothers of infants with anomalies touched their baby with affection less often, engaged their infants in less tactile-kinesthetic stimulation, were less responsive to the infant, and held the infant face-to-face less often than control mothers. The infants' contributions to the interactions were also different between the groups. Infants with anomalies were less responsive to their mothers, touched their mothers less often, turned away from their mothers more frequently, and smiled and laughed less often than their normal counterparts. This suggests that, despite the positive
self-report of mothers of children with craniofacial anomalies, presence of craniofacial anomaly appears to be associated with disturbance in the mother-child interaction in the direction of less responsive, physically stimulating and affectionate, face-to-face interaction between mother and child. The results of this study must be viewed with caution, however, due to the extremely small sample size.

Speltz, Armsden, and Clarren (1990) also compared infants with craniofacial anomalies and normal controls on both observational measures of mother-child interaction and parent self-report measures. In the anomaly group were 12 infants with cleft palate, 11 infants with cleft lip and palate, and 10 infants with sagittal synostosis. The control group consisted of 22 normal infants. The average age of both groups was 20 months. In contrast to the findings of Barden et al. (1989), there were no differences between groups on the observational measures. There were, however, significant differences on parent report measures. Specifically, mothers of infants with craniofacial anomalies had higher PSI Parent Domain and Parental Competence scores (greater stress related to being a parent and lower feeling of parental competence) lower General Well-being Schedule (Dupuy, 1979) scores (lower psychological and emotional well-being), and lower Locke-Wallace Marital Adjustment Scale (Locke & Wallace, 1959) scores (less marital satisfaction) than mothers of normal infants. These results indicate that mothers of children with craniofacial anomalies experience increased stress related to parenting and decreased general and marital well-being when compared to mothers of normal children.

That Barden et al. (1989) failed to find differences between groups on self-report measures may have been due to the extremely small sample size of that study. Barden et al did, however, detect differences in mother-child interaction which were not apparent in the Speltz et al.(1990) study, despite the larger sample size. This difference in findings may be due to the fact that the Speltz et al. study focused primarily on verbal interaction measures, whereas Barden et al found differences in
nonverbal interactions such as touching the infant and sitting face-to-face with it. Children in the Speltz et al. study were also approximately 16 months older than children in the Barden et al study, so differences may reflect the course of the families' adaptation to the presence of a child with a craniofacial anomaly. The combined results of both studies indicate that parenting an infant with a craniofacial anomaly is stressful and may be associated with less positive non-verbal mother-child interaction patterns.

Clifford (1969) found evidence that the effects of different types of anomalies on the social development of the child between birth and two years of age may be additive. Thirty pairs of parents of children with clefts of the lip and palate and 30 pairs of parents of children with clefts of the lip or palate were interviewed within the first two years of their child's life. Parents of children with clefts of the lip and palate described their children as having more difficult temperaments and as being less likable and cute than did parents of children with clefts of either the lip or palate. Children with clefts of the palate may be more irritable as a result of feeding difficulties and discomfort related to ear infections. Children with cleft lips may be perceived as less cute and likable than children without visible defects because of their appearance. In addition, both feeding difficulties and appearance may impact on parental treatment of the child, which could itself affect the child's behavior. Clifford's results suggest that the problems of both types of defects are additive in their influence of the parent's perception of the child, which may or may not be reflective of the child's actual characteristics.

Speltz, Goodell, Endriga, and Clarren (1994) compared three-month-old infants with either cleft palate (CP) (n = 19), cleft lip and palate (CLP) (n = 15) or no cleft (NC) (n = 17) on measures of feeding interaction. They found that infants with clefts gave less clear signals of readiness to feed and smiled less during feeding than infants without clefts. Mothers of infants with cleft lip and palate also were rated as less
sensitive to infant feeding cues than mothers of children with cleft palate only or infants without clefts.

The authors suggest that the maternal insensitivity to infant feeding cues in the CLP group may be the result of difficulty with the physical aspects of nursing a CLP child. CLP mothers have to be particularly diligent about ensuring that their children receive adequate nourishment, which may cause them to focus more on the goal of feeding a certain amount of formula than on the interactive qualities of the nursing experience. These results suggest that, in the earliest important social interaction (feeding), children with clefts may be at a disadvantage because of the physical difficulties involved in nursing.

At the age of three, differences remain in the mother-child interaction patterns of children with craniofacial and other physical anomalies as compared to peers without anomalies. Allen, Wasserman, and Seidman (1990) observed 37 children with a wide range of anomalies (all of whom were mobile and able to manipulate objects independently) and 44 normal children interacting with their mothers during four situations. Stanford-Binet (Form L-M, 1972 norms) (Terman & Merrill, 1973) and Preschool Language Scale (Zimmerman, Steiner, & Pond, 1979) scores were also obtained. Presence of anomaly did not account for variations in performance on intellectual measures. During the mother-child interaction period, children with anomalies were more compliant and passive, and their mothers were more active and controlling than normal mother-child dyads. Children with anomalies also made fewer demands on their mothers during free play. It appears that a pattern of passivity and low demandingness of adult attention is already in place during the preschool years. The continuation of this pattern during the school years will be discussed in the following section.
Adjustment of Children with Craniofacial Anomalies

Richman and Eliason (1982) reviewed the early literature on the intelligence, achievement, and psychological adjustment of children with clefts of the lip and/or palate. They reported that children with clefts score slightly lower on tests of verbal intelligence than children without clefts, but do not differ on tests of non-verbal intelligence and generally fall within the normal range of intellectual functioning. They noted that children with clefts who also have additional physical anomalies tend to score lower than children without additional anomalies, and that speech and hearing problems may be responsible for language delays in some children with clefts, accounting for the slightly lower verbal intelligence scores of children with clefts as compared to controls.

Despite nearly comparable intelligence scores, children with clefts score significantly lower than controls on tests of academic achievement. Richman and Eliason (1982) speculated that several factors may be responsible for the reduced achievement of children with clefts, including language deficits, decreased expectations of teachers and parents, and behavioral inhibition of children with clefts in the classroom. On the Behavior Problem Checklist (Quay & Peterson, 1967), teachers rated children with clefts as more inhibited than other children in their classrooms (Richman, 1978, in Richman & Eliason, 1982). Richman and Eliason hypothesized that children with clefts develop an inhibited interaction style to avoid teasing about their speech or appearance, and that this inhibition interferes with their classroom participation, thereby lowering their achievement. In reviewing research on the personality and behavioral characteristics of children with clefts, Richman and Eliason found additional support for the idea that children with clefts are more inhibited than their peers without clefts. They noted that there was no evidence of severe psychopathology in children with clefts, but that several studies did find evidence of increased inhibition, using such measures as the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1943) (Harper & Richman, 1978, in Richman &

Since the Richman and Eliason review, a number of additional studies of the adjustment of individuals with craniofacial anomalies have been added to the literature. Schneiderman and Auer (1984) used both parent and teacher reports on the Behavior Problem Checklist to evaluate the adjustment of 58 children with cleft lip and palate from preschool through grade nine. They found that very young children of both sexes and girls in junior high school tended to be categorized as having "personality problems," whereas elementary and junior high school boys were more likely to be categorized as having "conduct problems." Unfortunately, it is difficult to determine how this pattern compares with the adjustment of children without clefts, because a control group was not used. The authors did note, however, that teacher ratings of conduct problems were "higher" (statistical comparison was not performed) than the normative data of the Behavior Problem Checklist. It is difficult to evaluate the adjustment of children with clefts as compared to normals on the basis of this study. The study does, however, highlight the need to consider the effects of age and sex when studying the psychosocial adjustment of children with craniofacial anomalies.

Tobiasen and Hiebert (1984) examined the behavior of 41 male children (aged 2-12 years) with cleft lip and palate, using the Eyberg Child Behavior Inventory (ECBI) (Robinson, Eyberg, & Ross, 1980). The ECBI provides two scores, an Intensity Score which is the sum of the frequency of disruptive behaviors reported by the parent, and a Problem Score which is the number of behaviors the parent considers to be problematic. Comparing each of the 36 items separately, Tobiasen and Hiebert found no differences between the group with clefts and the ECBI norm group on frequency of the problematic behaviors, except that the norm group scored higher on the item "Is overactive or restless." They did not report the total Intensity score for the group with clefts or statistically compare the total Intensity score to the norm group.
score. For the Problem score, they found that parents of children with clefts reported an average of 4.7 problem behaviors, as compared to an average of 7.1 for the normative group. Although they did not report a statistical comparison of the two groups on the Problem Score, they stated that "parents of children with clefts were tolerant of a greater number of behavior problems than parents of children without clefts." Because they had not found a difference between groups on the intensity score, they concluded that parents of children with clefts are "more tolerant of misbehavior" than other parents, a conclusion which has widely been quoted. Considering that no statistical comparison of the Problem score was reported, and that the parents of children with clefts reported only 2.4 fewer problems than the normative group, it is surprising that this conclusion has been so uncritically accepted. Furthermore, for every behavior which a significantly smaller percentage of parents of children with clefts endorsed as problematic than the norm group, the mean frequency (intensity) score was also lower, although this reached statistical significance for only one item. It should not be concluded on the basis of this study (as it often has) that parents of children with clefts of the lip and palate are more lenient than parents of normal children. What can be concluded is that male children with clefts ages 2-12 years display no more (and possibly fewer) disruptive behaviors in the home than do their peers without clefts.

Palkes, Marsh, and Talent (1986) found that six of ten children (ages five through fifteen years) with craniofacial anomalies were rated as having significant problems in family interactions, school productivity, and peer relationships as measured by the Missouri Behavior Checklist (Sines, Pauker, & Sines, 1971). Due to the extremely small sample size of this study, any interpretations must be made with caution. A strength of the study, however, was that it departed from the usual sampling of children with cleft lip and palate to include children with craniosynostoses, craniofacial microsomia, craniofacial dystoses, and Hallermann-Streiff syndrome, in
addition to those with major facial clefts. Although the difference in findings may have been attributable to the small sample size of this study, it may also be that children with other types of anomaly differ in adjustment from children with clefts.

Kapp-Simon (1986) compared scores on the Primary Self-Concept Inventory (PSCI) (Muller & Leonetti, 1974) of 50 children with cleft lip and/or palate (ages five through nine years) with those of 172 control children. She found that a significantly higher percentage of children with clefts than control children fell into the "at risk" category for Total Self-Concept and the Social-Self Domain. Kapp-Simon interprets this as indicating that children with clefts are at risk of developing poor self-concepts, particularly in the social domain. It should be noted however, that "at risk" was defined as "falling below the 50th percentile of the original sample for Total Self-Concept," and that only 41.9% of the control group scored in this range. This suggests that the control group may have been unusually well-adjusted and therefore not an appropriate comparison group. In actuality, only 54% of the group with clefts scored in the "at risk" range, a percentage which would probably not have been significantly different from a more "average" comparison group. Fully 74% of the group with clefts did score in the "at risk" range on the social self domain, suggesting that children with clefts may have circumscribed self-esteem problems in the area of social interaction.

An earlier study by Kapp (1979), using the Piers-Harris Children's Self-Concept Scale, failed to find differences in the social domain of self-concept for children with clefts versus controls. This difference in findings may be due to age differences in the groups studied (the 1979 study examined 11 through 13-year-olds) or in the measures utilized. The social domain of the Piers-Harris examines children's feelings about their relative popularity, whereas the Primary Self-Concept Inventory social domain encompasses both peer acceptance and helpfulness. Children with clefts scored lower on the helpfulness items, but not on the peer acceptance items of PSCI. Children with clefts may have more concerns about the social roles they play (help-
recipient versus helper) than about whether they will have friends at all. The 1979 study did not find differences in Global Self-Concept between children with clefts and controls, but children with clefts did report significantly less satisfaction with physical appearance. In addition, girls with clefts (but not boys) reported being more anxious, less happy and satisfied, and less confident about school performance than girls without clefts. This pattern of findings suggests that concerns with physical appearance and social roles may be a problem for some children with clefts and that adolescent girls may be more at risk for poor self-esteem than other children with clefts.

Broder and Strauss (1989) also examined the self-concept of children with clefts, using the Primary Self-Concept Inventory. Their subjects were 20 children between the ages of 6 and 9 years who were of normal intelligence and did not have additional associated congenital anomalies. Subjects were divided into three groups, cleft lip only, cleft palate only, cleft lip and palate. All groups with clefts combined scored in the at risk range and significantly below the controls (18 first graders without clefts) on the total self-concept score, both factors of the social domain, and the physical factor of the personal self domain. This is consistent with previous findings of low self-esteem in elementary school-aged children with clefts, particularly in regard to social self-concept and physical self-concept. In addition, children in the group with clefts of the lip and palate scored significantly lower than the groups with clefts of the lip or of the palate only on the intellectual, social and total self-concept scales. Broder and Strauss proposed that "the visible (cleft lip) and invisible (cleft palate) defects have a compounding negative effect on self-concept." It may be that the added negative effect of the cleft palate is associated with problems in speech. Unfortunately, no speech ratings were reported.
Studies with Measures of Physical Appearance

Although physical appearance is presumed to be responsible for adjustment difficulties of children with craniofacial anomalies, only a few studies actually employ measures of physical appearance. A rating of facial disfigurement was included in Richman's (1976) study of children with cleft palates who were ages nine to fourteen years. The facial disfigurement rating was not significantly correlated with measures of achievement or behavioral ratings. Unfortunately, neither the method of rating nor the distribution of disfigurement scores was reported, so it is difficult to determine whether the lack of association was due to poor measurement, low variability, or a true independence of attractiveness and adjustment. Richman did find differences between the group with clefts and controls. Children in the group with clefts (n=44) scored higher on the personality disorder scale (a measure of internalizing) of the Behavior Problem Checklist and lower on the Iowa Tests of Basic Skills (Hoover, Hieronymus, Frisbie, & Dunbar, 1993) (a measure of academic achievement) than did controls (n=44). Boys with clefts performed an average of one year below the mean of boys without clefts on the Iowa Tests of Basic Skills, while girls with clefts performed one half year below the mean of girls without clefts, despite nearly identical mean intelligence quotients for the two groups (cleft mean IQ =104, non-cleft mean IQ = 103.8). This study suggests that children ages 9-14 years with clefts of the palate or lip and palate are inhibited and underachieving when compared with their peers without clefts. It is difficult to determine whether these characteristics are related to appearance, due to the lack of information on the facial disfigurement measure used in the study.

Starr (1980) examined the relationships between physical attractiveness, self-esteem, ratings on the Missouri Children's Behavioral Checklist, and an attitudes toward clefting scale. Subjects were 49 clinic patients ages ten years and older. Starr examined the relationship between the psychosocial adjustment variables and
attractiveness in two ways. First, he selected 14 patients with scars on their upper lips, as rated by the clinic's Social Service staff. These patients were compared with 14 patients without scars, who were matched on age, sex, and cleft type. There were no significant differences between groups on any of the three adjustment measures. For the next investigation, full-face photographs of the patients were given attractiveness ratings by five college students, using a five-point scale. Patients receiving a sum score of 11-15 (n = 19) were placed in the attractive group, while patients with sum scores of nine and below (n = 19) were placed in the unattractive group. Eleven patients whose sum score was 10 were omitted from the analyses. No differences were found between groups on any of the measures. Unfortunately, the distribution of attractiveness scores was not reported, so it is difficult to determine whether the groups' differences in attractiveness were large enough to be meaningful. None of the patients in the "attractive" group received a rating higher than 15, which means that the average score of the most attractive person was three, exactly in the middle of the attractiveness rating scale. Larger group differences in attractiveness may be necessary to adequately test the relationship between attractiveness and adjustment.

Lefebvre and Barclay (1982) used the Hay's Standardized Rating Scale of Appearance (Hay & Heather, 1973) to examine the relationship between appearance and psychosocial adjustment in 175 patients undergoing craniofacial surgery. Patients presented with a wide range of facially disfiguring conditions. Patients and their parents rated the child's appearance before and after reconstructive surgery. In addition, 76 patients completed the Piers-Harris Self-Esteem Inventory (Piers, 1969) and all patients completed pre and post-operative semistructured interviews addressing social adjustment, school performance, peer reactions to appearance, and future plans. Children under the age of 13 rated their appearance significantly more positively than did their parents. Adolescents' appearance self-ratings were not significantly different from parental ratings. No analyses of the relationships between improvement in
appearance and the adjustment measures were reported; however, a large percentage of patients reported better psychosocial adjustment after surgery to improve appearance, suggesting that improved appearance may have had a beneficial effect on psychosocial adjustment. On the Piers-Harris Self-esteem Inventory, 24 percent of patients scored in the below average range pre-operatively, compared with 14 percent post-operatively, but the difference was not significant. Only 35 post-operative ratings were available, and these were compared with the entire pre-operative group rather than matched to the individual patient's pre-operative rating, so the lack of a significant difference is not conclusive. In summary, both subjective and objective improvements in psychosocial adjustment were noted in patients following craniofacial surgery to improve appearance.

Arndt, Travis, Lefebvre, Niec, and Munro (1986) also examined patients' adjustment both pre and post-operatively. Subjects were 22 children between the ages of 8 and 17 years, with a variety of diagnoses involving facial disfigurement. Subjects were divided into two groups, severely affected (n=14) and moderately affected (malocclusions only, n=8). Patients completed the Piers-Harris Self-Concept scale and made self-ratings of disfigurement, using the Hays Rating Scale. Patients were also rated by their parents and a panel of 15 judges, using the Hays Rating Scale. Prior to surgery, patients' and parents' disfigurement ratings were equal or higher than those of judges for both groups. Post-surgery, appearance ratings by judges, parents, and patients improved significantly for the mildly affected children. For the severely affected patients, only ratings by parents and patients improved significantly. Judge ratings indicated that the severely affected children continued to appear quite disfigured to outside observers, yet there were significant increases in self-esteem for both groups. These results suggest that it is the patients' belief about his or her appearance which affects self-esteem, not the "reality" which others see. This echoes the findings of Kenealy, Frude, and Shaw (1989) with a normal population. In that study,
children's self-ratings of attractiveness correlated highly with self-reported self-esteem, but unacquainted judges' ratings of the children's appearance were not related to the children's self-esteem ratings.

Richmond, Holmes, and Eliason (1985) examined the relationships between self-ratings of disfigurement, teacher ratings of disfigurement, and parent and child ratings of adjustment as measured by the Behavior Problem Checklist (BC). Thirty-six adolescents ages 14 through 17 years were divided into two groups based on parent ratings on the BC. Adolescents with both conduct problem and personality problem scores within one standard deviation of the normative means on the BC were placed in the "well-adjusted" group, while those with scores more than one standard deviation above the normative mean on either dimension were considered "poorly adjusted." In the well-adjusted group, there were no significant differences between parent and child ratings on the BC or between teacher and child ratings of appearance. Adolescents in the poorly adjusted group agreed with parental ratings on the conduct problems dimension of the BC, but rated themselves as having significantly fewer personality problems (internalizing) than did parents and as significantly more attractive than did teachers. Adolescents' self-ratings on all three measures were not significantly different between the two adjustment groups. The authors hypothesized that some adolescents use denial of their facial disfigurement as a defense mechanism and that their social withdrawal is a consequence of this use of denial. Thus, children who are rated by parents as being the most withdrawn may have higher self ratings as a result of their use of denial. Closer inspection of the data provides a clue as to which children may be most likely to use denial. Children in the poorly adjusted groups were rated by teachers as much more disfigured than children in the well-adjusted group. It might be that more severe disfigurement is associated with the use of denial and, consequently, with increased introversion. Although severely affected children in the Arndt, et al. (1986) study did not rate their appearance unrealistically (use denial), they were
anticipating surgery and may have had less of a need to deny the extent of their unattractiveness because of the hope that surgery would change their appearance.

Broder and Strauss (1989) did not directly measure physical attractiveness, but did compare invisible (cleft palate only) versus visible (cleft lip or cleft lip and palate) defects. As described above, children ages 6-9 years with either a visible or an invisible defect scored lower than normals on a measure of self-esteem, but children with both visible and invisible defects scored significantly lower than either group with only one type of defect. This suggests that the appearance of the child made an independent contribution to the decrease in self-esteem, apart from the effects having a defect or of having problems specifically related to clefts of the palate (such as speech deficits).

In addition to appearing different from their peers, many children with craniofacial anomalies also have to contend with speech and hearing impairments. Several studies therefore have focused on speech and hearing impairments in children with craniofacial anomalies.

Influence of Speech Impairment on Perception of Others

In a study by Glass and Starr (1979), color photographs and slides of 50 adults were rated on a seven point attractiveness scale by adult judges. Judges also made speech ratings, based on two-minute recordings of patients reading a standard paragraph. Judges were presented with both a picture and the audio tape, and were required to rate either appearance or the acceptability of the speech. There was a trend for appearance of the photograph to affect speech ratings, while acceptability of the speech significantly affected appearance ratings. Judges' ratings of appearance of the photographs decreased as the photographs were paired with decreasingly acceptable speech recordings. This suggests that individuals whose speech is negatively affected by the presence of a craniofacial anomaly (such as cleft palate) may be viewed less positively than others because of the quality of their speech.
Sinko and Hedrick (1982) also examined the effects of speech on ratings of appearance and appearance on ratings of speech, using similar methodology as in the Glass and Starr (1979) study, with the exception that the faces were presented via videotape rather than still photography, and faces were paired only with the individual's own speech. They found that, not only did speech acceptability influence ratings of facial attractiveness, but facial attractiveness also influenced ratings of speech acceptability. That Sinko and Hedrick found a significant influence of appearance on speech acceptability while the effect was only a trend in the Glass and Starr study is probably due to the greater variability in attractiveness ratings in the Sinko and Hedrick study versus the Glass and Starr study. The results of these studies suggest that both children's appearance and speech should be accounted for when examining the effects of either.

The adverse effects of speech impairment may extend to potential employers' impressions of an individual. Scheuerle, Guilford, and Garcia (1982) videotaped a 24 year old male with a cleft palate reading 2 minute passages with and without an obturator (an appliance which is used to seal palatal clefts). Twenty-six adult male judges rated the speaker after each passage on bi-polar adjective scales assessing the dimensions of competence, agreeableness, and self-assurance. These dimensions were chosen as "three characteristics of a desirable employee" on the basis of previous research. Subjects rated the speaker as less competent, agreeable, and self-assured after viewing segments during which the obturator was removed than after segments during which the obturator was in place. Ratings of the competence dimension were particularly affected. This indicates that speech impairment may negatively affect potential employers' perceptions of an applicant's competence.
Tobiasen, Levy, Carpenter, and Hiebert (1987) compared children (ages 2-12 years) with clefts only with children who had clefts and associated congenital malformations, on measures of conduct and school problems. Although children in the associated anomalies group received significantly higher frequency scores on eight disruptive behavior items of the Eyberg Child Behavior Checklist (Robinson, Eyberg, & Ross, 1980) than did children without associated anomalies, there were no group differences in number of problems behaviors, and none of the groups received abnormally high problem behavior ratings. Parents were significantly more likely to rate children in the associated anomalies group as having the following school problems: following instructions, slow learner, short attention span, and not finishing work. When a post hoc analysis of speech deficits was also conducted, children with associated congenital anomalies were found to have been given significantly poorer speech ratings by speech language pathologists during routine clinic evaluations than children without associated congenital anomalies. Interpretation of these findings is limited by the small sample size (as few as six subjects in a group), but they do suggest that there is an association between speech deficits and school problems in children with clefts. The speech problems of children with associated anomalies may have a causative role in school problems. Alternatively, the association may due to a common variable underlying the associated anomalies, the speech deficits, and the school problems.

Richman (1983) examined the relationship between self-reported speech concerns, appearance concerns, elevated MMPI scales (2 - depression, 7 - psychaesthenia, and 0 - introversion), satisfaction with social interactions, and satisfaction with school performance among adolescents (15-18 years; 16 male, 14 female) with cleft lip and palate. Social and educational dissatisfaction were positively associated with elevated MMPI scales. MMPI elevations were positively
related to level of facial appearance concern, but not to level of speech concern. These results suggest that, during adolescence, appearance assumes a greater role in the child's adjustment than does speech quality.

McWilliams and Musgrave (1972) compared children (ages 3-16 years) with normal speech \( (n = 32) \), children with normal voice quality who misarticulated \( (n = 77) \), and children whose speech was hypernasal and who misarticulated \( (n = 61) \). All children had clefts of the palate or of the lip and palate. On intelligence tests, the children with the poorest speech scored significantly lower than the other groups, although their mean IQ (96) was still well within the normal range. Mothers also completed a behavior problem inventory for each of the children. Both groups with speech impairments were reported to have significantly more behavior problems than the normal speech group. The group of children with normal voice quality and misarticulation had a higher incidence of bad temper, fearfulness, bed wetting and preferring to be alone than either of the other groups. Children with poor voice quality and articulation errors were not distinguishable from the other groups in frequency of individual behavior problems. The results of this study suggest that children with speech deficits manifest more behavioral problems than their peers with normal speech. A possible confound is the fact that there was a higher percentage of children with clefts of the lip and palate (vs. palate only) in the speech disordered group than in the normal group. It may be that differences in adjustment were due to differences in appearance rather than speech.

In brief, the literature implies that there is some connection between speech impairment and adjustment difficulties. The evidence is far from conclusive, however, and no consistent pattern of behavioral disorder emerges.
Hubbard, Paradise, McWilliams, Elster, and Taylor (1985) found no differences between scores of children with cleft palates and test population norms on the WISC-R (Wechsler, 1974) (verbal and performance subscales), the Vineland Social Maturity Scale (Doll, 1965), the Coopersmith Self-Esteem Inventory (Coopersmith, 1959), and the Child Behavior Checklist (Achenbach, 1979; Achenbach & Edelbrock, 1979). The 48 children (ages 5 through 11 years) in this study were enrolled in two cleft palate treatment centers which provided management of otitis media. Perhaps as a result of this treatment, their average hearing loss was below 13 dB. The lack of intellectual and social difficulties in this sample may have been due to minimization of hearing loss due to good medical management.

Kommers and Sullivan (1979) examined written language skills of 17 children (10 male, 7 female; ages 8 to 13 years) with cleft palates, using the Myklebust Picture Story Language Test (PSLT) (Myklebust, 1965). Sixteen of the children had histories of hearing loss, tube placement, and/or ear infections. Twelve of the subjects had nasal speech or difficulty pronouncing sibilants. All subjects had WISC performance IQ scores of at least 85 and were above average intelligence as a group. Mean scores on the PSLT were below average, with the exception of abstract-concrete relationships. Performance IQ was not significantly related to PSLT scores. Kommers and Sullivan suggest that the poor written language performance relative to performance IQ scores may be related to speech impairments. Specifically, they hypothesize that children with clefts palates simplify their speech in order to accommodate difficulties in production, and that this simplification is carried-over into their written communication. It is also possible that hearing loss during early childhood may have had a negative impact on language acquisition in this sample.

Estes and Morris (1970) examined the relationship between hearing sensitivity, speech proficiency, and intellectual functioning in a sample of 167 children under the
age of 15 years with clefts of the lip and/or palate. Children with cleft palate only scored lower on intelligence measures than either children with cleft lips or cleft lips and palates. Verbal IQ was particularly depressed. There was only a weak relationship between communication defectiveness and hearing loss. For all groups, speech proficiency was related to WISC performance and full-scale IQ, but not to verbal IQ, Binet IQ or to ratings on the Vineland Social Maturity Scale. The authors note that the lack of relationship between WISC verbal IQ and speech proficiency suggests that the decreased verbal IQ of children with cleft palates only is due to underlying factors independent of speech or hearing related communication deficits. This is in line with findings by Richmond and Eliason (1984) of general language deficiency in children with cleft palates only.

Richman (1980) identified two types of verbal disability in children with clefts, depressed verbal IQ with intact symbolic mediation skills and depressed verbal IQ with deficits in basic symbolic language. She hypothesized that the first type of verbal deficit was related to speech and hearing impairments, whereas the second type may be due to an underlying general language disability. There was a higher proportion of children with cleft palate only in the group with symbolic language deficits. In light of this, the effects of underlying general language deficiency must be considered when children with cleft palate only are included in studies of the relationship between speech or hearing deficits and intellectual achievement.

Need for a Model

Studies of children with craniofacial anomalies suggest that poor self-esteem, social inhibition and decreased school achievement may be problems for subgroups of these children, as would be predicted from literature on attractiveness, speech impairments, and hearing loss. Findings are inconsistent, however, and little attempt has been made to reconcile differences between studies. Furthermore, few studies examine more than one or two variables at a time, and there currently exists no unifying
model which accounts for attractiveness, hearing impairment, speech impairment, age, 
and sex in predicting psychosocial adjustment of children with craniofacial anomalies. 
Such a model is necessary to provide structure for future research and to make sense of 
what is currently known.

Overview of Findings

Development of a model of psychosocial adjustment of children with 
craniofacial anomalies may best begin with an examination of what is already known. 
Due to the high prevalence of clefts of the lip and palate relative to other craniofacial 
anomalies, most of this literature focuses on children with clefts. The major findings of 
the craniofacial literature may be summarized as follows. 

By age seven, children perceive children with craniofacial anomalies less 
positively than children with normal faces (Schneiderman & Harding, 1984; Tobiasen, 
1987; Elliot, et al., 1986). The difference between ratings of children with clefts 
versus normal children is greater for females than for males (Tobiasen, 1987), and for 
children with bilateral clefts than those with unilateral clefts (Schneiderman & Harding, 
1984). Speech quality of an individual with a cleft may also have an effect on the 
characteristics attributed to that person by others (Scheurle, et al., 1982). Perception of 
an individual's attractiveness is affected by speech quality, and acceptability of speech 
is affected by attractiveness (Glass & Starr, 1979; Sinko & Hedrick, 1982). 

There is some evidence that mother-infant interaction at 4-5 months is different 
for children with craniofacial anomalies. Less face-to-face holding, decreased 
touching, and less responsiveness of mother and infant toward each other than in 
normal dyads has been observed (Barden et al., 1989). In addition, mothers of 
toddlers report increased parenting stress, lower feelings of competence, and decreased 
well-being and marital satisfaction (Speltz et al., 1990). Between birth and age two,
children with clefts of the lip and palate are perceived as having more difficult temperaments than children with clefts of the lip or palate alone, suggesting an additive effect of the problems unique to each type of cleft (Clifford, 1969). By age three, mothers of children with craniofacial anomalies are more active and controlling of interactions than mothers of normal children, and the children with craniofacial anomalies are more passive and compliant than their peers (Allen, et al., 1990).

Children with clefts generally score in the average range of intellectual functioning, although their verbal IQ is typically slightly depressed (Richman & Eliason, 1982; Estes & Morris, 1970). Despite this, the achievement of children with clefts is typically below average by about 1 year for males and 1/2 year for females (Richman & Eliason, 1982). Speech and hearing problems are thought to account for the low written language achievement of some children with clefts (Kommers & Sullivan, 1979; Richman, 1980; Richman & Eliason, 1984; Estes & Morris, 1970). In addition, it has been suggested that a subgroup of children with cleft palate also have a general language learning disability (Richman, 1980; Richman & Eliason, 1984). Children whose craniofacial anomalies are associated with genetic syndromes may also have learning disabilities or retardation, but these are not the focus of this review. Interestingly, self-reported concerns about appearance have also been associated with self-reported dissatisfaction with education among adolescents (Richman, 1983).

In general, children with clefts have been described as inhibited and as having a relatively high incidence of internalizing problems (Richman & Eliason, 1982). By elementary and junior high school, however, boys with clefts have also been reported to display increasing incidence of conduct problems. Adolescent girls do not show this tendency (Schneiderman & Auer, 1984). They are more likely to be anxious and dissatisfied with school problems than their male peers with clefts, despite better school performance (Kapp, 1979). More disruptive behavior problems have been noted in
children with associated anomalies and those with greater speech problems than in other
children with clefts (Tobiasen, 1987; McWilliams & Musgrave, 1972).

The self-esteem of both males and females with clefts is lower than average at
all ages, but most studies show only a mild effect (Kapp-Simon, 1986; Broder &
Strauss, 1989; Kapp, 1979). Clefts of the lip and palate are associated with greater
decreases in self-esteem than either cleft lip or cleft palate alone, possibly reflecting
additive effects of speech impairment and appearance (Broder & Strauss, 1989).

Increases in self-esteem, subjective measures of well-being, and objective
measures of well-being have been noted following surgery to correct the appearance of
individuals with craniofacial anomalies (Arnt et al, 1986; Le Febvre & Barclay 1982).
Concerns about appearance are related to increased introversion in late adolescence
(Richman, 1983). Among midadolescents, deformity ratings made by others are
positively associated with parent ratings of internalizing problems and conduct
problems, but not with adolescent ratings. In addition, severely deformed adolescents
rate their appearance less negatively than others, whereas less severely deformed
adolescents' ratings of both appearance and internalizing are close to ratings made by
others (Richman, Holmes, & Eliason, 1985). Elementary school children with
craniofacial anomalies have also been observed to rate their own appearance more
highly than others (Lefebvre & Barclay, 1982).

A Model of Adjustment

Based on the previously listed observations, the following model is proposed. It is presented not as a final model, but as a framework to be tested and modified, and as a guide for future research. For clarity of reading, variable relationships will be presented below in statement form, but they represent hypotheses only.
Figure 1 illustrates variables affecting the child's development from birth through the first year of life. "Child characteristics" include the infant's attractiveness, temperament, responsiveness, and ease of feeding. "Parent characteristics" include the parents' feelings of responsibility for the child's condition, sense of parental competence, personality adjustment prior to the child's birth, and general well-being. "Family stresses and resources" include child hospitalizations, medical costs, financial resources, social supports, and career demands.

According to this model, the child is directly affected by family stressors and resources, such as the ability of the parents to provide adequate food and medical care. Child characteristics, in turn, influence family resources (Benson, Gross, Messer, Kellum, & Passmore, 1991). For example, friends and relatives may be reluctant to baby-sit for an infant that is difficult to feed or is extremely disfigured. Parental personality characteristics also play a role in determining family resources, both in terms of job opportunities and the formation of social support networks. At the same time, parental well-being is affected by family stresses and resources. The parent may be fatigued and worried by frequent child hospitalizations and concerned about financial costs of the infant's medical care. On the other hand, adequate insurance coverage, a career situation which allows absences for the child's medical care, and a network of relatives and friends who are willing to help care for the child increase parental well-being.

Characteristics of both the parent and the child contribute to the quality and quantity of their interactions with each other. Child characteristics of attractiveness, temperament, and responsiveness influence the parent's response to infant. The parent's contribution to the interaction is affected by the parent's physical and mental well-being and by the parent's pre-existing personality traits. In addition, characteristics of both the parent and child are influenced by their interactions with each other. Responsiveness and mood of the infant are affected by the parents' interactions
with it, and the parents' sense of competence and well-being are affected by their interactions with the child.

**Family Stresses / Resources**

```
Child Characteristics ←—— Parental Characteristics
```

Figure 1
Factors Affecting Adjustment: First Year of Life

Figure 2 continues to follow the child's development from 12 months through the beginning of school. The variable relationships outlined in the previous model remain. At this point, it also becomes useful to distinguish between child characteristics which are a direct result of the craniofacial anomaly and variables which are representative of the psychosocial development of the child. "Craniofacial variables" include physical attractiveness, speech quality, and hearing ability. "Child psychosocial variables" include internalizing behavior problems, externalizing behavior problems, social skills, and self-concept.

At this stage, acquisition of language becomes an important influence on the child's psychosocial development. Language acquisition is affected by the child's hearing ability and physical speech apparatus. Development of speech affects the parent-child relationship through its effect on the child's ability to verbally respond to the parent. The child's responsiveness to the parent is also affected by the child's ability to hear the parent's speech. The child's responsiveness to the parent in turn
influences the parent's manner of interacting with the child. In particular, parental activity may increase in order to elicit responses from a passive or speech-delayed child. Completing the cycle, degree of parental control and activity influences the child's activity and responsiveness, the child becoming more passive in response to an active, controlling parent.

![Diagram](image)

Figure 2
Factors Affecting Adjustment: One Year - School Entry

The child's developing self-concept is also affected by the cycle described above. Opportunities for mastery experiences may be determined by the child's activity level and the parent's degree of control. The child who is active and whose parent permits exploration has increased opportunities for esteem-enhancing mastery experiences.

The child's self-concept is also influenced by attractiveness, as the child becomes aware of the social meanings of attractiveness and of her or his own attractiveness level. This is moderated by parental attitudes towards the child's appearance. Accepting parents may decrease the negative impact of unattractiveness by emphasizing their child's positive attributes.
Figure 3 illustrates the child’s development in the preschool and early elementary school years. Academic performance is added to the child psychosocial development variables, and a new factor, peer relationships, is also included. At this time, peer interactions become very important. Both attractiveness and speech quality are associated with varying amounts of teasing by peers. Although parental attitudes continue to modify the direct influence of appearance on the child’s self-esteem, both appearance and speech indirectly affect self-concept through teasing by peers. The degree to which a child is behaviorally inhibited and experiences internalizing problems (anxiety, depression) is also affected by teasing, which may cause the child to withdraw or become anxious and depressed.

Speech and hearing quality impact on the child’s school performance due to their effects on language acquisition and on the child’s ability to hear the teacher. Hearing loss is also related to degree of conduct problems, probably as a result of frustration with communication limitations.

Figure 3
Factors Affecting Adjustment: Preschool and Early Elementary School

Within the child psychosocial category, variables may be mutually influential. For example, child self-concept and degree of internalizing may affect school
performance by influencing the degree to which the child participates in classroom discussions and activities. Conversely, school performance impacts on the child's self-esteem and degree of internalizing problems.

Figure 4 demonstrates that, by late elementary school, gender differences begin to modify the effects of some of the variables. Conduct problems (included in the psychosocial development category) begin to develop in more male than female children with craniofacial anomalies. Conduct problems develop in response to teasing (fighting), as an expression of frustration with communication limits imposed by hearing difficulties, as a response to frustration or boredom with school, and as a manifestation of poor self-concept. Development of conduct problems is also moderated by parenting style. School performance is affected by conduct problems and by gender. The school performance of females exceeds that of males at this age. The rest of the model is unchanged from Figure 3.

Figure 4
Factors Affecting Adjustment: Late Elementary School

Figure 5 illustrates the variables influencing the psychosocial adjustment of the adolescent. The basic structure of Figure 4 remains. Females exhibit more
internalizing and self-concept problems than males at this age. Therefore, gender now moderates all effects in the model which are related to internalizing problems, in addition to those related to conduct problems. In addition, the effect of attractiveness on self-concept is stronger for females than for males. A new variable is also added at this age-"denial." During adolescence, appearance is extremely important to the individual's social functioning and self-concept. Denial of severity of disfigurement develops as a defense mechanism to preserve self-esteem. Use of denial is influenced by appearance; the most severely disfigured are the most likely to use denial. Withdrawal may be necessary to maintain denial by limiting social feedback, consequently, inhibition is increased with increased use of denial. Other elements of the model are unchanged.

Figure 5
Factors Affecting Adjustment: Adolescence
The model presented above is complicated by the wide age range and large number of variables it encompasses. Many of the hypothesized relationships are based on sparse empirical evidence or attempts to fill gaps in current knowledge with logical speculation. The model is therefore proposed as a framework for a program of research, by the end of which it may be altered appreciably. In the process, much may be learned about the problems faced by children with craniofacial anomalies and their families throughout the developmental stages of the child. It is hoped that this knowledge may eventually be used to identify children who are particularly at risk for psychological maladjustment, as well as factors which are conducive to good adjustment. This knowledge may ultimately be useful not only to psychologists working with this population, but to plastic surgeons, orthodontists, speech therapists, and other professionals who must make treatment decisions by balancing the time, discomfort, and financial costs of their interventions with potential benefits to the child. Knowledge of which variables are most salient to a child's adjustment at each stage of his or her development would clearly be helpful in making such decisions. To this end, the study outlined below represents the first step of a research program designed to identify risk and resiliency factors which are important to the psychosocial adjustment of male and female children with craniofacial anomalies from birth through adolescence.

The objective of this study is to examine the impact of facial attractiveness, speech disorders and hearing impairment on the psychosocial adjustment of children
with craniofacial anomalies during the ages of eight through 13 years. These variables were chosen both because craniofacial anomalies are frequently associated with disfigurement, speech deficits, and hearing loss, and because all three variables have been associated with psychosocial adjustment difficulties in individuals without craniofacial anomalies. The inclusion of all three of these variables represents an improvement over much of the current literature, which typically focuses on one variable at a time, without taking into account the effects of the other variables on children’s adjustment. Effects of one variable may therefore be masked due to failure to control for variations in another variable, and interactions between variables cannot be assessed.

The age range of the subjects was determined by a logical partitioning of the model into those ages at which changes in variable effects are noted in the literature. Specifically, middle childhood is an age range during which sex differences begin to become more apparent than previously, but the social pressures of adolescence are not yet in full effect. It is important that future studies also be derived from models which account for age and sex effects. If they fail to due so, effects may be obscured due to their differential impact on children of different ages or sex. In addition, use of such a model for structural research will allow the results to be more effectively integrated across studies. Present studies of the adjustment of children with craniofacial anomalies tend to stand in isolation. They provide snapshots of children at diverse ages, but there has been little attempt to unite their findings in a manner which would portray the story of the child’s adjustment from birth through adulthood. It was the purpose of the investigator to use the results of this study to verify or modify the proposed model, which could then be used as a basis for further studies of the psychosocial adjustment of children with craniofacial anomalies.
The hypotheses of this study were as follows:

1) It was hypothesized that there would be a negative relationship between internalizing behavior problems and the child characteristics of physical attractiveness, quality of speech, and hearing level.

2) It was hypothesized that the relationship between internalizing behavior problems and the child characteristics of physical attractiveness, quality of speech, and hearing level would be mediated by the quality of peer interactions.

3) It was hypothesized that there would be a higher level of externalizing problems among males than females.

4) It was hypothesized that physical attractiveness, hearing level, and speech quality will be negatively related to externalizing behavior problems.

5) It was hypothesized that the relationship between externalizing behavior and the child characteristics of physical attractiveness, quality of speech, and hearing level would be mediated by the quality of peer interactions.
CHAPTER 5
METHODS

Subjects and Settings

Sixty-one children with craniofacial anomalies (31 male, 30 female) and 65 children without anomalies (32 male, 33 female) were subjects in this study.

Subjects with craniofacial anomalies were recruited from two outpatient craniofacial clinics in two Florida cities. Subjects were screened for mental and physical disability through information obtained from their medical records. Children who were enrolled in educable or trainable mentally handicapped classes or who had significant physical disabilities such as blindness or inability to walk were not asked to participate in the study. Of those approached, eight declined and two were not tested because the child could not read. In addition, data for two individuals were discarded because the children were later determined to have significant physical disabilities. Of those who declined, three parents had concerns about their child being photographed, two parents reported previous negative experiences with research, one child reported feeling ill, and two children stated that they did not want to participate. Data from six children were discarded because of equipment problems and from two children because hearing data were unavailable. Subjects ranged in age from 7 years, 6 months to 13 years, 11 months. Mean age was 10 years, 9 months (SD = 21 months). Annual household income ranged from 2892 to 200,000 dollars (M = 34630, SD = 34,331, n = 38). Caucasians accounted for 90.16 percent of clinic subjects, 6.56 percent were African-American, and 3.28 percent were of other racial groups. Twenty-three clinic subjects (37.71%) were enrolled in special classes for speech, learning problems, or
behavior problems (see Table 1). Twenty-six children (43%) presented with cleft lip and palate, 5 (8 percent) had cleft lip only, 16 (26%) had cleft palate only, and 14 (23%) had other diagnoses such as Crouzon's syndrome or facial asymmetries.

Table 2 gives a complete list of the conditions represented. Clinic subjects reported a mean of 4.9 hospitalizations (n=57, SD =6.552).

Children without craniofacial anomalies were recruited from two private schools in the same city as one of the clinics. Of 158 parents contacted by letter and phone follow-up, 74 (47%) gave written consent for their child to participate. One child was not tested due to scheduling difficulties. Data for eight children were discarded because parents did not return measures to the researcher. Non-clinical subjects ranged in age from 8 years 0 months to 13 years, 11 months. Mean age was 10 years, 9 months (SD = 16 months). Annual household income ranged from 6150 to 200,000 dollars (M = 50516, SD = 31450, n=50). Caucasians accounted for 90.77 percent of non-clinic subjects, 7.69 percent were African-American, and 1.54 percent were of other racial groups. One subject was enrolled in a special class for reading problems. Non-clinic subjects reported a mean of .5 hospitalizations (n = 64, SD=.96).

The craniofacial and control groups did not differ in age (t (124) = .24, p = .82) or racial composition (Mann Whitney U = 1997.50, p = .886). The control group reported significantly higher annual household income than the group with craniofacial anomalies (t (78) = -2.35, p = .02).
Table 1
Percentage of Children in Special Classes - Craniofacial Group (n = 61)

<table>
<thead>
<tr>
<th>Type of Class</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech</td>
<td>16.39</td>
</tr>
<tr>
<td>Learning Problems</td>
<td>6.56</td>
</tr>
<tr>
<td>Waiting Placement (Learning)</td>
<td>1.64</td>
</tr>
<tr>
<td>Speech and Learning Problems</td>
<td>8.20</td>
</tr>
<tr>
<td>Behavioral</td>
<td>1.64</td>
</tr>
<tr>
<td>Unspecified</td>
<td>3.28</td>
</tr>
<tr>
<td>Total</td>
<td>37.8</td>
</tr>
</tbody>
</table>

Table 2
Craniofacial Diagnoses

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleft Lip and Palate</td>
<td>26</td>
<td>42.62</td>
</tr>
<tr>
<td>Cleft Palate</td>
<td>16</td>
<td>26.23</td>
</tr>
<tr>
<td>Cleft Lip</td>
<td>5</td>
<td>8.20</td>
</tr>
<tr>
<td>Crouzon's Syndrome</td>
<td>3</td>
<td>4.92</td>
</tr>
<tr>
<td>Ectodermal Dysplasia and CP or CLP</td>
<td>2</td>
<td>3.28</td>
</tr>
<tr>
<td>Pierre-Robin Syndrome</td>
<td>2</td>
<td>3.28</td>
</tr>
<tr>
<td>Crouzon's with Apert's Components</td>
<td>1</td>
<td>1.64</td>
</tr>
<tr>
<td>Rhomberg's Disease</td>
<td>1</td>
<td>1.64</td>
</tr>
<tr>
<td>Maxillary Hypoplasia</td>
<td>1</td>
<td>1.64</td>
</tr>
<tr>
<td>Facial Asymmetry and Mosaic Trisomy</td>
<td>1</td>
<td>1.64</td>
</tr>
<tr>
<td>Hemifacial Microsomia and CLP</td>
<td>1</td>
<td>1.64</td>
</tr>
<tr>
<td>Macrostomia with Dental and Tear Duct Anomalies</td>
<td>1</td>
<td>1.64</td>
</tr>
<tr>
<td>Bi-coronal Synostosis</td>
<td>1</td>
<td>1.64</td>
</tr>
</tbody>
</table>
Measures

Achenbach Child Behavior Checklist (CBCL)

The CBCL (Achenbach, 1991) is a parent report measure of child internalizing behavior problems, externalizing behavior problems, school performance, and social competence. The CBCL was normed on a sample of 1300 children and has good psychometric properties. Test-retest reliability and inter-parent agreement coefficients have exceeded $r = .90$. The social competence score of the CBCL was used to assess positive aspects of peer interactions. It has correlated positively with the positive interactions factor ($r = .47$, $p < .01$) and the extensiveness of peer interactions factor ($r = .48$, $p < .01$) of the Friendship Questionnaire, which is described below (Bierman & Mc Cauley, 1987).

Harter Self-Perception Profile for Children (Harter)

The Harter (Harter, 1982) provides six factor scores assessing the child's perception of academic competence, social competence, athletic competence, physical appearance, conduct, and general self-worth. It was normed on a total of 1543 children in grades three through eight. Chronbach's alpha for each of the subscales has ranged from .71 to .86 (Harter, 1982). An advantage of the Harter over other measures of child self-esteem is its inclusion of a separate global self-worth scale, rather than summing all items to derive a total self-worth score. On this measure, children who know they perform well in school and sports may still report being generally dissatisfied with themselves, and children who admit to being unattractive or poor at sports may still report feeling generally pleased with themselves.
Children’s Depression Inventory (CDI)

The CDI (Kovacs, 1985) is a 27 item child-report measure designed to detect depression in children ages 8-17 years. Internal consistency based on a sample of 870 children was $r = .87$, and nine-week test-retest reliability on a sample of 90 children was $r = .84$ (Kramer & Conoley, 1990, p. 47). One-week test-retest reliability was $r = .87$ for a group of 28 emotionally disturbed children and $r = .38$ for a group of 69 normal fifth and sixth graders (Saylor, Finch, Spirito & Bennett, cited in Kramer & Conoly, 1990). High scores on the CDI have been found to be related to independent diagnoses of clinical depression in 102 children undergoing psychiatric treatment (Cantwell & Carson, cited in Kramer & Conoly, 1990).

Revised Children’s Manifest Anxiety Scale (RCMAS)

The RCMAS (Reynolds & Richmond, 1985) is a 37 item self-report measure of anxiety for children ages 6-19. It was standardized on 4972 children from 13 states. Internal reliability estimates range from $r = .79$ to .85. Three-week test-reset reliability is reported to be $r = .98$. Nine month test-reset reliability based on a sample of 534 children was $r = .68$. Convergent validity was demonstrated by a $r = .85$ correlation of the RCMAS with the trait scale of the State-Trait Anxiety Inventory for Children (Conoly & Kramer, 1989).

The Friendship Questionnaire

The Friendship Questionnaire (Bierman & Mc Cauley, 1987) is a self-report measure of children’s interactions with peers. The negative interactions factor of the scale consists of 16 items describing negative peer interactions in the home and school settings. Item examples are "Is there someone who teases you or makes fun of you - how often?;" "Is there someone you get mad at - how often?." The Friendship Questionnaire also contains a positive peer interaction factor and an extensiveness of peer interactions factor. Only the negative interactions factor was used because it correlates significantly with sociometric ratings for children in grades three through
six, whereas the other factors do not correlate significantly with peer nominations for children below the fifth grade. In a sample of 176 school children ages 8 through 13 years, the negative interactions factor of the Friendship Questionnaire was significantly related to both negative peer nominations ($r = .24, p < .01$) and score on the Roster and Ratings Scale (Roistacher, 1974), a measure on which classmates rate each other on a five point scale ranging from 1 - "not friends" to 5 - "best friends" ($r = .25, p < .01$) (Bierman & Mcauley, 1987). Higher scores on the negative interactions factor indicate more negative peer interactions.

**Hearing Measure**

For the group with craniofacial anomalies only, each subject's speech reception threshold (SRT) was obtained from the child's medical chart as a measure of the child's hearing loss. The SRT is the decibel level at which an individual is able to correctly repeat 50 percent of stimulus words spoken to him. Spondee words (words with two equally stressed syllables) were used as the stimuli for measurement of the SRT. GSI 10 and Belltone 2000 audiometers were used to regulate the decibel level of the spondee words during clinical administration of the assessment, which was performed by certified audiologists with previous experience assessing children with clefts. Normal hearing is indicated by an SRT of 0-20 dB; 20-40 dB is indicative of mild hearing loss; 40-60 dB is classified as moderate hearing loss; 60 to 70 dB falls in the moderate-severe range; 70-90 dB is categorized as severe hearing loss; and SRT greater than 90 dB is indicative of profound hearing loss. The SRT in the child's better ear was used as the measure of hearing level, as is customary in the hearing loss literature. All children in the non-clinical sample had normal hearing by parent report.

**Speech Measure**

Speech samples were recorded during the subject's clinic visit or at the child's school. Subjects read a brief paragraph and seventeen sentences which had been chosen by consultation with two speech pathologists to provide a sample of speech
varied enough to reveal most problems of articulation and hypernasality which may be associated with craniofacial anomalies. All speech samples were rated on a visual analog scale by three speech pathologists (Appendix A). The scale was weighted at each end with the descriptors "very unacceptable" and "very acceptable." The average of the speech pathologists' ratings were used as the child's speech score. Glass and Starr (1979) reported intrarater reliability estimates for this method ranging from $r = .81-.86$, and Sinko and Hedrick (1982) reported intrarater reliability of $r = .98$ using this method. High reliability for this method of speech rating has also been reported using as few as two speech pathologists as raters (Estes & Morris, 1970). In that study, the two raters assigned identical scores (on a seven-point scale) to seven of eleven children and assigned ratings of no more than one point difference to the remaining four children. Speech intelligibility was rated at the same time as speech acceptability, using a visual analog scale anchored with the descriptors "very intelligible" and "very unintelligible."

**Physical Attractiveness Measure**

The subject's appearance was rated by a plastic surgeon, an orthodontist, and an oral and maxillofacial surgeon. Subjects were photographed from the shoulders up, wearing a drape over their clothing and stocking cap over their hair, without jewelry. All photographs were taken against the same background, and subjects assumed a neutral facial expression. The photographs were rated on a visual analog scale, weighted at each end with the descriptors "very unattractive" and "very attractive" (Appendix B). The average of the professionals' ratings was used as the child's attractiveness score. Adequate reliability has been reported for this method in numerous studies (e.g., Dion & Berscheid, 1974; Farina, Burns, Austad, Bugglin & Fischer, 1986; Reis et al., 1982; Rich, 1975; Richman, Holmes & Elias, 1985).
Medical Experiences Questionnaire

The Medical Experiences Questionnaire (see appendix C) is a six-item questionnaire on which the parent listed the number and recency of child hospitalizations, child reaction to past dental and medical experiences, medical and dental procedures planned for the near future, anticipated child reactions to upcoming procedures, and the child's current anxiety about upcoming procedures. It was used as a control measure for effects of medical and dental experiences. Three of the items were taken from a measure by Johnson and Baldwin (1969). Similar parent questionnaires have been found to predict behavioral observations of children's distress during medical and dental procedures (Dahliquist et al., 1986; Johnson & Balwin, 1969) and post-surgery scores on the Behavior Problem Checklist (Melamed & Siegel, 1975), suggesting that they tap child anxiety and distress related to medical and dental procedures.

Procedures

Subjects with craniofacial anomalies were asked to participate while waiting for appointments at the craniofacial clinics. Questionnaires were completed and speech and appearance samples were obtained in the child's outpatient clinic room while the child was waiting to be seen by various members of the multidisciplinary craniofacial teams. Child-report measures and speech and appearance samples for children in the non-clinical group were completed in small groups (3-5) at the children's schools. Parent-report measures for the non-clinical group were sent home with the children and mailed to the researcher by the parents. Data for six non-clinical subjects were collected at the children's homes.
CHAPTER 6
RESULTS

The first section of this chapter contains descriptive statistics, which are summarized in Table 3. These are followed by gender and group comparisons, summarized in Tables 4-7. Intercorrelations of variables are presented next (Tables 8-11), and tests of the hypotheses using multiple regression complete the chapter (Tables 12-15).

Description of Sample

Distribution of Variables

Means and standard deviations of interval scale variables for each group are presented in Table 3. Scores were not normally distributed for the following variables: speech acceptability, CDI, hearing, number of hospitalizations, past reactions to medical treatment, anticipated reactions to future treatment, anxiety over upcoming procedures, and raw scores of the CBCL internalizing and externalizing scales. The remainder of the variables were normally distributed. Speech acceptability was transformed to a normal distribution using the algorithm: transformed speech = log (160-speech acceptability). The remainder of the non-normally distributed scales could not be transformed to normal distributions.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Craniofacial Group</th>
<th></th>
<th>Control Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Age in Months</td>
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<td>129.033</td>
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<td>Medical Experiences</td>
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<td></td>
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<tr>
<td>Number of Hospitalizations</td>
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<td>6.55</td>
<td>64</td>
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<tr>
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<td>Anxiety</td>
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<td>Social Characteristics</td>
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<tr>
<td>Speech</td>
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<td>CBCL Raw Externalizing</td>
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<td>CBCL Externalizing T-score</td>
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<td>49.71</td>
<td>10.94</td>
<td>64</td>
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</tbody>
</table>
Age

Mean age in years was 10.75 for the craniofacial sample ($SD = 1.75$) and 10.77 for the control sample ($SD = 1.37$). Age range was 7 years, 6 months to 13 years, 11 months.

Medical Experiences

Fifty-four percent of parents of subjects with craniofacial anomalies reported child hospitalizations within the last two years, 41 percent reported hospitalizations between birth and age two, and 5 percent reported no hospitalizations. Eleven percent of parents of control subjects reported child hospitalizations within the last two years, 22 percent reported hospitalizations between birth and age two, 65 percent reported no hospitalizations, and 2 percent did not respond. Ninety-five percent of parents of subjects with craniofacial anomalies and 57 percent of parents of control subjects reported that they expected their child to have medical or dental procedures in the near future. Past reaction to medical procedures, anticipated reaction to future medical procedures, and anxiety over upcoming procedures were rated on four point scales, with higher scores indicating better reactions and less anxiety. The average score for all three of these variables was above 3 for both groups (see Table 3), indicating that parents rated the subjects as having moderately good to good reactions and moderately low to low anxiety about upcoming procedures.

Social Characteristics

Both samples reported lower mean rates of negative peer interactions than did the groups on which the Friendship Questionnaire was developed (see Table 3). (Third and fourth grade norm group $M = 37.41$, $SD = 9.56$, $n = 94$; fifth and sixth grade norm group $M = 32.88$, $SD = 8.53$, $n = 82$.) Similarly, both groups scored in the normal range of the CBCL social competence scale.
Speech, Attractiveness and Hearing Ratings

The average interrater correlation for speech acceptability ratings for the total sample (craniofacial and non-clinical) was $r = .63$. The average intercorrelation for the craniofacial sample was $r = .65$, and it was $r = .34$ for the control group. The lower average intercorrelation for the control group was probably due to the limited variability of the scores for that group when compared with the craniofacial group. Possible scores on this measure ranged from 0-153. Speech acceptability ratings ranged from 16.0 to 143.67 for the group with craniofacial anomalies ($M = 98.88$, $SD = 30.31$). Speech acceptability ratings for the non-clinical group ranged from 77.67 to 146.33 ($M = 125.59$, $SD = 14.79$).

The mean interrater correlation for attractiveness for the total sample (craniofacial and non-clinical) was $r = .61$. This compares favorably with the weighted mean interrater correlation for attractiveness of $r = .54$ which was reported in a recent meta-analysis of attractiveness studies (Feingold, 1992). The average intercorrelation for the craniofacial sample was $r = .67$, and it was $r = .37$ for the control group. In the attractiveness as well as the speech ratings, the lower average intercorrelation for the control group was probably due to the limited variability of the scores for that group when compared with the craniofacial group. Possible scores on this measure ranged from 0-153. Attractiveness ratings ranged from 24.33 to 118.0 for the group with craniofacial anomalies ($M = 60.95$, $SD = 17.68$). Attractiveness ratings for the non-clinical group ranged from 49.67 to 125.33 ($M = 81.92$, $SD = 15.75$). Hearing level for the group with craniofacial anomalies ranged from SRT = 0 to SRT = 65. The mean SRT was 10.97 ($SD = 13.64$), which is in the normal range of hearing, and 80.33% of subjects were classified as normal hearing. All non-clinical subjects were reported to have normal hearing.
**Child Adjustment Measures**

Mean child-reported levels of depression, anxiety, and self-esteem were in the normal range for both samples (see Table 3). Mean parent-reported levels of internalizing and externalizing behavior problems were also within the normal range.

**Gender Comparisons**

Within each sample, gender comparisons were made for child characteristics, medical experiences, social characteristics, and child adjustment variables. For variables with normal distributions, t-tests were performed. Mann-Whitney U tests were performed on variables with non-normal distributions. Results are presented in Tables 4 and 5. Males in the control group scored significantly higher than females on the Negative Interactions Factor of the Friendship Questionnaire, indicating that they reported a higher level of negative peer interactions. No other gender differences were significant. The hypothesis that males would have higher externalizing behavior problems than females was not supported. Because no gender differences were detected in the main variables of interest (child characteristic and child adjustment variables), data from male and female subjects were combined in all subsequent analyses.

**Group Comparisons**

Between-group comparisons were made for the child characteristics, medical experiences, social characteristics, and child adjustment variables. For variables with normal distributions, t-tests were performed. Mann-Whitney U tests were performed on variables with non-normal distributions. Results are presented in Tables 6 and 7. The control group was rated as significantly more attractive and as having more
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**Note:** No significant differences.
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Group Comparisons of Normally Distributed Variables

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* p < .001
Table 7
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*p < .001
acceptable speech than the group with craniofacial anomalies. The group with craniofacial anomalies reported significantly more hospitalizations than the control group. Additionally, the control group scored significantly higher on the social competence scale of the CBCL. There were no group differences in scores on the child adjustment variables.

**Intercorrelations of Variables**

Pearson correlations were computed for normally distributed variables (Tables 8 and 10), and Spearman correlations were computed for non-normally distributed variables (Tables 9 and 11). Variables with relatively strong associations are reported below. A large number of correlations were computed; therefore, many of these associations may be due to chance. They are presented as an aid in interpreting the regression analyses which follow.

**Craniofacial Group**

In the group with craniofacial anomalies, more acceptable speech was associated with higher parent ratings of social competence on the CBCL ($r = -.31$). The negative $r$ value represents a positive relationship between speech quality and social competence, because the speech scores were log transformations. More attractive children rated themselves as less anxious on the RCMAS ($r = -.27$). In addition, increased hearing loss was associated with lower ratings of attractiveness ($r = -.49$).

Negative peer interactions (Negative Interactions Factor of the Friendship Questionnaire) were positively correlated with self-rated anxiety (RCMAS) ($r = .39$) and depression (DC) ($r = .42$) and negatively correlated with self-esteem (Harter) ($r = .37$). Social competence (the Social Competence subscale of the CBCL) was negatively related to self-reported anxiety (RCMAS) ($r = -.32$) and depression (DC) ($r = -.58$) and to parent-reported externalizing behavior problems (Externalizing subscale of the CBCL) ($r = -.42$). Additionally, social competence was positively associated
with self-esteem (Harter) ($r = .42$). Self-reported anxiety (RCMAS) was negatively related to self-esteem (Harter) ($r = -.44$) and positively associated with child-reported depression (DC) ($r = .61$). In addition, the child-reported anxiety (RCMAS) was negatively related to parent-reports of how well children reacted to past medical procedures ($r = -.36$) and how well the parent thought the child would react to future procedures ($r = -.41$) (Medical Experiences Questionnaire). Parent-reported child internalizing behavior problems (CBCL Internalizing Scale raw score) and externalizing behavior problems (CBCL Externalizing Scale raw score) were positively associated ($r = .62$).

On the Medical Experiences Questionnaire, parent-reported child reactions to past procedures and anticipated reactions to future procedures were positively related ($r = .69$). On the same measure, anxiety over upcoming procedures and anticipated reactions to future procedures were also positively associated ($r = .53$). In addition, reactions to past procedures and anxiety over upcoming procedures ($r = .40$) were positively associated with each other (higher scores indicated better reactions and less anxiety). Child-reported depression (CDI) was negatively associated with how well the parent thought the child would react to future medical or dental procedures (Medical Experiences Questionnaire) ($r = .40$), and recency of the latest hospitalization was positively associated with the total number of child hospitalizations ($r = .42$). The negative $r$ value indicates a positive relationship between number of hospitalizations and recency of last hospitalization because a lower number indicates a more recent hospitalization.

**Control Group**

In the control group, less acceptable speech was associated with higher anxiety ratings on the RCMAS ($r = .27$) and poorer anticipated reactions to upcoming medical procedures ($r = -.36$). Contrary to predictions, there was a strong negative association between attractiveness and social competence as measured by the CBCL ($r = -.42$). In
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addition, older age was associated with lower ratings of physical attractiveness in this group ($r = -.28$) and with higher parent-rated social competence (Social Competence subscale of the CBCL) ($r = .33$). Self-esteem (Harter) was positively related to social competence ($r = .29$) and negatively related to child-reported anxiety (RCMAS) ($r = -.50$) and depression (CDI) ($r = -.69$). Child-reported anxiety (RCMAS) and depression (CDI) were positively correlated ($r = .71$). Parent-reported child internalizing behavior problems (CBCL Internalizing Scale raw score) and externalizing behavior problems (CBCL Externalizing Scale raw score) were positively correlated ($r = .56$).

On the Medical Experiences Questionnaire, parent-reported child reactions to past procedures and anticipated reactions to future procedures ($r = .63$) were positively associated. Anxiety over upcoming procedures and anticipated reactions to future procedures ($r = .51$) were also positively associated. In addition, reactions to past procedures and anxiety over upcoming procedures ($r = .50$) were positively correlated with each other (higher scores indicated better reactions and less anxiety), and recency of the latest hospitalization was positively associated with the total number of child hospitalizations ($r = -.64$). The negative $r$ value indicates a positive relationship between number of hospitalizations and recency of last hospitalization because a lower number indicates a more recent hospitalization.

**Multiple Regression Analyses**

**Craniofacial Group**

Four stepwise multiple regressions were conducted to test the hypothesis that there would be a negative relationship between internalizing behavior problems and the child characteristics of physical attractiveness, quality of speech, and hearing level. The CDI, RCMAS, Harter General Self-Concept Scale, and raw score of the
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<td>Past Reactions</td>
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<tr>
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<td>.51</td>
<td>1.00</td>
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<tr>
<td>CDI</td>
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<td>.11</td>
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<tr>
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<td>.13</td>
<td>1.00</td>
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<td>-.12</td>
<td>-.24</td>
<td>-.26</td>
<td>.00</td>
<td>.56</td>
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Table 11 - continued

<table>
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<tr>
<th></th>
<th>Age</th>
<th>Recency</th>
<th>Child Report Negative Interactions</th>
<th>Parent Report Social</th>
<th>Speech</th>
<th>Attractiveness</th>
<th>RCMAS</th>
<th>Harter</th>
</tr>
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<tr>
<td>Number of Hospitalizations</td>
<td>-.11</td>
<td>-.64</td>
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<td>.27</td>
<td>-.26</td>
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<td>Past Reactions</td>
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<td>.04</td>
<td>-.27</td>
<td>.00</td>
<td>-.03</td>
<td>-.04</td>
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<td>-.13</td>
<td>.11</td>
<td>.19</td>
<td>.09</td>
<td>-.36</td>
<td>.12</td>
<td>.09</td>
<td>-.02</td>
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<td>Anxiety</td>
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<td>-.22</td>
<td>-.15</td>
<td>.28</td>
<td>-.29</td>
<td>-.24</td>
<td>-.24</td>
<td>.02</td>
</tr>
<tr>
<td>CDI</td>
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<td>.04</td>
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<td>-.28</td>
<td>.15</td>
<td>.17</td>
<td>.71</td>
<td>-.69</td>
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<td>.15</td>
<td>-.08</td>
<td>.32</td>
<td>-.15</td>
</tr>
<tr>
<td>Raw CBCL Externalizing</td>
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<td>.05</td>
<td>.30</td>
<td>-.04</td>
<td>.17</td>
<td>-.02</td>
<td>.11</td>
<td>-.02</td>
</tr>
</tbody>
</table>
Internalizing Scale of the CBCL were regressed on physical attractiveness, hearing loss, and the transformed speech ratings (Table 12). The transformed speech ratings entered into the equations predicting child-reported depression (CDI) and self-esteem (Harter), and physical attractiveness entered into the equation predicting child-reported anxiety (RCMAS) and self-esteem, but they did not account for a significant proportion of the variance in these child adjustment measures. No other child characteristics entered any of the regressions to predict child internalizing behavior problems in the group with craniofacial anomalies. The hypothesis that there would be a negative relationship between internalizing behavior problems and the child characteristics of physical attractiveness, quality of speech, and hearing level was not supported in this sample.

The hypothesis that the relationship between internalizing behavior problems and the child characteristics of physical attractiveness, quality of speech and hearing level would be mediated by the quality of peer interactions could not be tested because the child characteristics did not predict child internalizing behavior problems in this group. Because the social variables may also be conceptualized as outcome variables in a model of child psychosocial adjustment, the Negative Peer Interactions Scale of the Friendship Questionnaire and the Social Competence Scale of the CBCL (raw score) were regressed on the child characteristics of physical attractiveness, quality of speech, and hearing level (Table 13). Transformed speech accounted for 11.6% of the variance in social competence (p < .05). The negative beta weight indicates a positive relationship between speech quality and parent-reported social competence because the speech score was a log linear transformation. Hearing loss predicted child-reported negative peer interactions, accounting for 8.1% of the variance (p < .05).

In order to test the hypothesis that the child characteristics of physical attractiveness, hearing level, and speech quality would be negatively related to externalizing behavior problems, the Externalizing Scale of the CBCL was regressed on
Table 12  
Multiple-Regression Analyses: Child Adjustment Variables - Craniofacial Group

<table>
<thead>
<tr>
<th></th>
<th>CDI&lt;sup&gt;a&lt;/sup&gt;</th>
<th>RCMAS&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Harter&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Internalizing&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Externalizing&lt;sup&gt;e&lt;/sup&gt;</th>
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<td>$\beta$</td>
<td>$R^2$</td>
<td>$R^2$ change</td>
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<tr>
<td>Transformed Speech</td>
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<td>.058</td>
<td>.24</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Attractiveness</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.056</td>
<td>.056</td>
</tr>
<tr>
<td>Hearing Loss</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>a</sup> $n = 57$  
<sup>b</sup> $n = 57$  
<sup>c</sup> $n = 52$  
<sup>d</sup> $n = 57$  
<sup>e</sup> $n = 57$
Table 13
Multiple-Regression Analyses: Social Variables - Craniofacial Group

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>( R^2 )</td>
<td>( R^2 \text{change} )</td>
<td>( \beta )</td>
<td>Parent Reported</td>
<td>( R^2 )</td>
<td>( R^2 \text{change} )</td>
<td>( \beta )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Raw CBCL Social Competence ( b )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transformed Speech</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>.116</td>
<td>.116*</td>
<td>-.34</td>
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<tr>
<td>Attractiveness</td>
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<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hearing Loss</td>
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<td>.081*</td>
<td>.28</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

\(a_n = 57\) \hspace{1cm} \(b_n = 54\)

\(p < .05\)
physical attractiveness, hearing level, and the transformed speech scores (Table 12). None of the child characteristics entered into the equation, so the hypothesis was unsupported. The hypothesis that the relationship between externalizing behavior problems and the child characteristics of physical attractiveness, quality of speech, and hearing level would be mediated by the quality of peer interactions could not be tested because the child characteristics did not predict child externalizing behavior problems in this group.

Control Group

The interrater reliability of the speech and attractiveness ratings was low for the control group. The results of these analyses should therefore be viewed with caution, but are presented for the reader's consideration and as possible material for replication studies.

Four stepwise multiple regressions were conducted to test the hypothesis that there would be a negative relationship between internalizing behavior problems and the child characteristics of physical attractiveness, quality of speech, and hearing level. The CDI, RCMAS, Harter General Self-Concept Scale, and raw score of the Internalizing Scale of the CBCL were regressed on physical attractiveness, hearing loss, and the transformed speech ratings (Table 14). The transformed speech ratings predicted child-reported anxiety (RCMAS), accounting for 7.1 percent of the variance in scores on this measure. This relationship was significant ($p < .05$). The positive beta weight for the transformed speech scores represents a negative relationship between speech quality and anxiety, because the speech scores were log transformations. Physical attractiveness entered into the equations predicting child-reported anxiety (RCMAS) and depression (CDI), but did not account for a significant proportion of the variance in either of these child adjustment measures. No other child characteristics entered any of the regressions to predict child internalizing behavior problems.
<table>
<thead>
<tr>
<th></th>
<th>CDI&lt;sup&gt;a&lt;/sup&gt;</th>
<th>RCMAS&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Harter&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Internalizing&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Externalizing&lt;sup&gt;e&lt;/sup&gt;</th>
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<tr>
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<td>R&lt;sup&gt;2&lt;/sup&gt; change</td>
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<td>R&lt;sup&gt;2&lt;/sup&gt; change</td>
</tr>
<tr>
<td>Transformed Speech</td>
<td>.038</td>
<td>.038</td>
<td>.20</td>
<td>.071</td>
<td>.071*</td>
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<td>Attractiveness</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.105</td>
<td>.034</td>
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</table>

<sup>a</sup> n = 57  <sup>b</sup> n = 57  <sup>c</sup> n = 52  <sup>d</sup> n = 57  <sup>e</sup> n = 57

* p < .05
Baron and Kenny (1986) state that, in order to prove that one variable mediates the effects of an independent variable on the outcome variable, three regressions should be conducted: "first, regressing the mediator on the independent variable; second, regressing the dependent variable on the independent variable; and third, regression of the dependent variable on both the independent variable and on the mediator" (p. 1177). Furthermore, three conditions must be met:

First, the independent variable must affect the mediator in the first equation; second, the independent variable must be shown to affect the dependent variable in the second equation; third, the mediator must affect the dependent variable in the third equation (p.1177).

Therefore, to test the hypothesis that the relationship between child-reported anxiety (RCMAS) and quality of speech was mediated by peer interactions, the Negative Peer Interactions Scale of the Friendship Questionnaire, and the Social Competence Scale of the CBCL (raw score) were regressed on the transformed speech ratings (Table 15). The transformed speech ratings did not enter into either regression predicting negative peer interactions or social competence. The hypothesis that the relationship between anxiety (RCMAS) and the child characteristic of quality of speech would be mediated by the quality of peer interactions was therefore unsupported.

Because none of the other measures of internalizing behavior problems were predicted by the child characteristics, social characteristics could not be tested as mediators between child characteristics, and scores on those measures but were instead treated as outcome measures and regressed on the child characteristics of speech quality and physical attractiveness. Neither child characteristic entered into the equation predicting negative peer interactions. In a stepwise regression to predict social
Table 15
Multiple-Regression Analyses: Social Variables - Control Group

<table>
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<tr>
<th>Attractiveness</th>
<th>Parent Reported Raw CBCL Social Competence&lt;sup&gt;b&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>R²</td>
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<tr>
<td>Child Reported Negative Interactions&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Transformed Speech</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> n = 65  <sup>b</sup> n = 64

* p < .05  ** p < .01
competence, physical attractiveness entered first accounting for 17.5% of the variance in social competence ($p < .01$), and the transformed speech scores accounted for 5.5% of the variance ($p < .05$). The negative beta weight for the transformed speech scores represents a positive relationship between speech quality and social competence.

Contrary to expectations, the negative beta weight of physical attractiveness represents a negative association between physical attractiveness and parent-rated social competence in this sample. Because physical attractiveness was negatively correlated with age, and age was positively correlated with social competence, age was tested as a mediator of the effects of physical attractiveness on social competence. When age was regressed on physical attractiveness, physical attractiveness accounted for 6.4% of the variance ($R^2 = .064$, $\beta = -.25$, $p < .05$). Social competence was then regressed on age and physical attractiveness, with age forced into the equation first to test its effect as a mediator. Age accounted for 5.7% of the variance, which was not significant ($R^2 = .057$, $\beta = .17$, $p > .05$), while physical attractiveness continued to be a significant predictor of social competence after age was controlled (change in $R^2 = .068$, $\beta = -.27$, $p < .05$). Age was therefore not found to mediate the effects of physical attractiveness on social competence.

In order to test the hypothesis that the child characteristics of physical attractiveness, hearing level and speech quality would be negatively related to externalizing behavior problems, the Externalizing Scale of the CBCL was regressed on physical attractiveness, hearing level, and the transformed speech scores (Table 14). None of the child characteristics entered into the equation, so the hypothesis was unsupported. The hypothesis that the relationship between externalizing behavior problems and the child characteristics of physical attractiveness, quality of speech, and hearing level would be mediated by the quality of peer interactions could not be tested because the child characteristics did not predict child externalizing behavior problems in this group.
CHAPTER 7
DISCUSSION

The purpose of this study was to examine how facial attractiveness, quality of speech, and degree of hearing loss are related to the psychosocial functioning of children with craniofacial anomalies. Research in the areas of speech, attractiveness, and hearing has shown that these factors do affect the manner in which individuals are perceived by (Ashmore, Makhijani, & Longo, 1991; Lass, Ruscello, & Lakawicz, 1988; Silverman & Klees, 1989) and interact with others (Henggeler & Cooper, 1983; Lefebvre & Arndt, 1988; Rice, Sell, & Hadley, 1991), and may also affect their psychological adjustment (Cooper, 1993; Davis, Elfenbein, Shum, & Bentley, 1986; Linholm & Touliatos, 1979). It was reasoned that, since craniofacial anomalies can have adverse affects on attractiveness, speech, and hearing, children with craniofacial anomalies might be at increased risk for problems in psychological adjustment. The craniofacial literature has shown mild negative effects, primarily increased inhibition (Richman & Eliason, 1982) and decreased self-esteem (Broder & Strauss, 1989; Kapp, 1979; Kapp-Simon, 1986). There is also limited support for increased behavior problems in boys of school age (Schneiderman & Auer, 1984). The findings are not consistent, however, and few studies directly address the relationship between speech, attractiveness, or hearing to these problems. Furthermore, the three variables have not been studied concurrently to determine possible interactions. This study examined all three variables in a sample of children ages 7 years 6 months to 13 years 11 months.
In multiple regression equations, speech, attractiveness, and hearing of children with craniofacial anomalies were not found to be related to measures of internalizing behavior problems (CBCL Internalizing Scale, CDI, RCMAS) externalizing behavior problems (CBCL externalizing scale) or self-esteem (Harter Self-Perception Profile for Children). Furthermore, children with craniofacial anomalies did not differ from children without anomalies on these measures of adjustment, and both groups were well within the normal range on both measures. Contrary to expectation, this sample of 63 elementary and middle-school children with craniofacial anomalies showed no evidence of parent of child-reported adjustment problems as a group.

One possible explanation for the apparently good adjustment of these children could be that the group was only mildly affected in the areas of speech, attractiveness, and hearing. For hearing, the mean SRT was only 10.97, which is in the normal range, and 80.33% of subjects were classified as normal-hearing. This explanation is less likely, however, for the variables of speech quality and attractiveness. The group with craniofacial anomalies was rated as significantly less attractive and as having significantly less acceptable speech than the nonclinical group. Furthermore, the sample was taken from specialized, hospital-based clinics, which should have drawn patients with a wide range of severity of conditions and which would be representative of the patients normally seen in the health care system; therefore, it is unlikely that they would be unusually mildly affected. This was, however, a group which had access to comprehensive services, including treatments to improve their speech, physical appearance, and hearing. More than half had been hospitalized in the past two years, and one-quarter were in special classes for speech. It is probable that the high degree of intervention received by these children produced significant improvements in their physical appearance, speech, and hearing.
It could be argued that the results of this study were affected by the lack of high interrater reliability for the speech and attractiveness ratings. Although the reliability of the attractiveness ratings was not high, it was comparable to ratings obtained in many other studies (Feingold, 1992). As such, it may reflect the inadequacy of current methods of rating attractiveness. Alternatively, the ratings may reflect a true variability in individual perceptions of attractiveness. Although the interrater correlations were not high, the differences in means of attractiveness and speech between groups were large in relation to the variability of scores, indicating that raters were able to differentiate subject groups on the dimensions of hearing and attractiveness. If there were an association between adjustment, and speech and attractiveness in these groups, it should be expected that the groups would differ on the measures of adjustment as well as the ratings of speech and attractiveness. The groups did not differ on the adjustment measures in spite of large differences in mean ratings of speech and attractiveness.

The results of this study are not irreconcilable with the pre-existing literature. The most consistent finding has been that children with craniofacial anomalies are more inhibited than peers, but this may be described more as a "variation of normal behavior" than an indicator of psychopathology (Richman & Eliason, 1982). In contrast, the measure of internalizing used in this study (CBCL) is designed to detect clinically significant adjustment problems. Self-esteem findings have been mixed, with significant results primarily limited to the domains of social acceptance and physical appearance. Furthermore, this study used a different type of self-esteem measure than did many other studies. The Piers-Harris Children's Self-Concept Scale (Piers & Harris, 1984) and the Primary Self-Concept Inventory for Children (PSCI) (Muller & Leonetti, 1974) are two self-esteem measures which appear frequently in the literature (e.g., Arndt et al., 1986; Broder & Strauss, 1989; Kapp, 1979; Kapp-Simon, 1986; Le Febvre & Barclay, 1982). On these measures, the score for general or "total" self-esteem is the sum of the domain scores of the scales. The PSCI contains a
social-self domain which includes a peer acceptance subscale, and the Piers-Harris contains a physical appearance cluster and a popularity cluster. The global scores for both of these measures are influenced by social relationships, and the Piers-Harris is also influenced by physical appearance. In contrast, the measure of global self-esteem used in this study (the Harter) is a separate subscale that does not depend on scores in the other domains. This is important because it is possible to perceive oneself as deficient in a specific area, such as social acceptance, yet still have a general self-concept that is positive (Harter, 1982). In studies that used the PSCI and the Piers-Harris, general self-esteem scores may have been deflated by the inclusion of the physical attractiveness and social acceptance scales. It is uncertain whether the subjects in these studies were aware of deficiencies in these areas, yet still maintained generally positive self-images, or if they really did have poorer general self-esteem than normals. It is therefore difficult to compare these composite scores with global self-esteem as measured by the Harter.

Hypotheses 1 and 4 predicted that attractiveness, speech, and hearing would be associated with degree of internalizing and externalizing problems. These hypotheses were based on literature which shows that more attractive individuals are perceived more positively (Eagly, et al., 1991) and receive better social treatment (Dion & Berscheid, 1974; Efran, 1974; Vaughn & Langlois, 1983; Walster, 1966) than less attractive individuals, that poor speech quality is associated with negative perceptions (Blood & Hyman, 1977; Lass et al., 1988; Silverman & Paules, 1989) and decreased popularity ratings (Perrin, 1954; Rice, et al., 1991), and that hearing loss is associated with negative perceptions (Silverman & Klees, 1989) and difficulty with peer interactions (Compton & Niemeyer, 1994). It was assumed that the negative social consequences of unattractive appearance, poor speech, and hearing loss would result in increased psychological adjustment problems. No relationship between these variables
and parent or child report of internalizing behavior problems or externalizing behavior problems was found in the group with craniofacial anomalies.

As stated previously, the lack of association between hearing and the adjustment measures may have been attributable to the limited variability in the hearing levels of the subjects. None of the subjects were profoundly deaf, and most had normal hearing. It is possible that some of the problems that have been described in the hearing-impairment literature would have been evident if this had been a more severely affected sample. The degree of hearing loss in this sample, however, is typical for this population. Craniofacial anomalies do carry a risk of hearing impairment, but it is primarily mild disruption due to ear infections rather than profound deafness. The results of this study thus probably present an accurate picture of the effect of hearing impairment on adjustment in this population. It should also be noted that this study did not examine school performance or language development, which might have been more sensitive to lower levels of hearing loss. In addition, subjects were recruited from clinics which provided hearing screening and medical care, which may have minimized the potential damage to hearing from ear infections.

Feingold's (1992) meta-analysis of attractiveness literature may provide some insight into the lack of association between attractiveness and adjustment. He found that attractiveness ratings by others had only trivial associations (r < .10) with measures of general mental health. In contrast, self-rated attractiveness was moderately associated with general mental health (r = .24) and self-esteem (r = .27). Apparently, how others perceive an individual's appearance is less important to that person's mental health than the individual's own assessment of their physical appearance. Self-rated attractiveness was not examined in this study. If these subjects did not perceive themselves as less attractive than others, perhaps they should not be expected to demonstrate appearance-related adjustment problems. Although self-ratings of appearance were not taken, subjects did complete the physical appearance subscale of
the Harter. Post-hoc analysis reveals that the craniofacial group's mean score on this subscale ($M = .15, SD = 1.00$) did not differ from that of the non-clinical group ($M = .13, SD = .99$), $t(115) = .12, p < .90$ and that both groups scored slightly above the mean for the norm group. This suggests that the group with craniofacial anomalies may not have perceived themselves as less attractive than others, and this could account for the lack of appearance-related adjustment problems. The Harter subscale is not a self-rating of attractiveness instrument, however, and may not accurately reflect how subjects would have rated themselves on a visual analog scale. This interpretation must therefore be viewed with caution and as material for further inquiry.

Crocker and Major (1989) describe a number of "self-protective effects of stigma" that may be useful in understanding the lack of association between speech and attractiveness and self-esteem in the subjects with craniofacial anomalies in this study. They define stigmatized groups as:

members of a stigmatized or oppressed social category . . . about which others hold negative attitudes, stereotypes or beliefs, or which, on average, receive disproportionately poor interpersonal or economic outcomes relative to members of the society at large because of discrimination against members of the social category. (p. 609)

They note that individuals who are members of stigmatized groups might be expected to have poor self-esteem as a result of the attitudes and behavior of others towards them and because of diminished opportunities for success due to discrimination. Their review of the literature, however, indicates that many stigmatized groups (such as African-Americans, Hispanics, women, physically unattractive persons, facially disfigured persons, mentally retarded persons, and individuals who are physically handicapped) do not demonstrate low self-esteem. They describe three possible
self-protective properties of social stigma that may account for the intact self-esteem of members of stigmatized groups and that may be relevant to the findings of the present study.

The first protective mechanism Crocker and Major describe is "attributing negative feedback to one's group membership" (p. 612). Members of stigmatized groups are often aware of the fact that membership in their group may cause them to be the objects of prejudice or discrimination. When they receive criticism or fail to attain goals, they may assume that these outcomes were influenced by other's reactions to their membership in a stigmatized group. This can help to preserve self-esteem because negative feedback is viewed as a consequence of society's attitudes towards their group, not the result of an individual shortcoming over which they had some control. For example, if a child with a craniofacial anomaly is unpopular, he or she may attribute this to the presence of the anomaly rather than view it as an indication of being personally unlikeable, thus protecting self-esteem. In fact, Crocker and Major note that this strategy may be used even when the negative outcome is not the result of the group membership.

Another self-protective mechanism described in Crocker and Major's article is "selectively comparing their outcomes with those of members of their own group" (p. 614). As a whole, stigmatized groups may have less positive outcomes than non-stigmatized groups because of the effects of prejudice and discrimination. If members of a group that is disadvantaged compare themselves to members of an advantaged group, self-esteem may suffer because they may not compare favorably in the areas which have been affected by membership in the stigmatized group. By comparing themselves to members of the stigmatized group to which they belong, however, self-esteem may be preserved. The standard to which they compare themselves will be lower if their group has suffered in the area of comparison due to prejudice or discrimination, and they are more likely to meet or exceed the standards of
that group. Because craniofacial anomalies are relatively rare, this mechanism may not be an important one for children in this group. Many families who attend the clinics from which these subjects were obtained report little or no experience with others who have craniofacial anomalies outside of the clinic setting.

The last self-protective property of stigma described by Crocker and Major is "selectively devaluing or regarding as less important for their self-definition, those performance dimensions on which they or their group fare(s) poorly, and selectively valuing those dimensions on which they or their group excel(s)" (p. 616). This is in line with Harter's conception of self-esteem as dependent not only on how competent one perceives oneself but on how much value the person places on the competencies being measured (Harter, 1988). On the Harter Self-Perception Profile for children, global self-esteem is a separate score rather than the sum of competence domain scores. It was designed this way because Harter's theory predicts that self-perception of low competence in a particular area, such as athletic ability, will not adversely affect self-esteem if the individual does not value athletic competence. If members of stigmatized groups devalue the areas in which they are disadvantaged, acknowledging weakness in those areas should be less threatening to self-esteem. If, for example, children with poor speech associated with the presence of a cleft palate place a low value on clear speech, they will be less likely to suffer from decreased self-esteem if their own speech is unclear.

It is possible that at least two of Crocker and Major's self-protective properties of stigma may be responsible for the intact self-esteem of the group with craniofacial anomalies in this study, but these properties refer only to self-esteem. The question still remains of why these children do not demonstrate increased internalizing or externalizing problems and why previous literature provides evidence only of mild disturbance, such as increased inhibition. The most parsimonious explanation would seem to be that the properties which protect the self-esteem also serve to prevent the
development of more severe pathology. This explanation appears to be plausible, since a primary reason to believe that these children would be at risk for internalizing and externalizing problems is that their general adjustment might be adversely affected by low self-esteem due to difficulties related to their conditions. If they are able to preserve self-esteem, there is little reason to predict increased internalizing and externalizing problems.

It is also possible that other factors in the model outlined in this paper had a protective effect on the adjustment of the children in this sample that mitigated any negative effects of speech quality or attractiveness. In the category "family stresses/resources" all subjects in this study had the presumed advantage of access to a multidisciplinary craniofacial team. These teams provide a multitude of services including craniofacial surgery, orthodontic and dental care, speech and hearing treatment and intervention, nursing, pediatric care, and mental health screening and referral. In most of the previous studies, subjects also had access to some specialized care. (Because of the relative rarity of the conditions, it would be difficult to access subjects other than through these service providers). It may be that the lack of serious problems in the literature as a whole is due in part to the services that subjects have received. In the category "parental characteristics," it could be that the attitudes and behavior of the parents towards their children with anomalies helped to protect the children's self-esteem and prevent the development of adjustment problems. If parents emphasize their child's strengths and devalue areas in which the child has problems, this could certainly have a positive effect on adjustment. The presence of a warm parent-child relationship in general could also be a helpful factor. These parts of the model were not examined, so the extent to which they were influential is unknown.

There are also limitations of the measures of psychosocial adjustment utilized in this study that could have affected the ability to detect relationships of speech, attractiveness, and hearing to psychosocial adjustment. The CBCL was chosen for
this study because of its good psychometric properties (Kelley, 1985) and extensive use as a research instrument; however, it was designed to detect clinically significant psychopathology and may not be well-suited to detecting variations within the normal range (Drotar, Stein, & Perrin, 1995). This study used raw scores rather than T-scores because the test was standardized so that there is no variability in T-scores in the normal range below the 69th percentile. Achenbach (cited in Drotar et al., 1995) recommends use of raw scores to assess differences in the normal range, but the test was not designed for this purpose, so the value of this method is uncertain. Furthermore, Drotar et al. (1995) state that the Social Competence Scale does not discriminate well among children with normal to above-average social functioning, and Frankel and Myatt (1994) found that only the Social Subscale of the Social Competence Scale of the CBCL was useful in discriminating children with social interaction problems from those without such problems. In the present study, all three subscales of the Social Competence Scale were related to attractiveness in the control population, but the relationships were not in the hypothesized direction.

The Friendship Questionnaire is not a widely-used measure, so it cannot be used with the same confidence as an instrument that is supported by extensive research. In its favor, the Negative Interactions Factor of the questionnaire did correlate with teacher ratings of aggression ($r = .69$, $p < .001$), psychiatric hospital staff ratings of aggression ($r = .63$, $p < .001$), teacher ratings of withdrawal ($r = .38$, $p < .01$) and likability ($r = -.40$, $p < .01$), and psychiatric hospital staff ratings of likability ($r = -.41$, $p < .01$) in a psychiatric inpatient population (Bierman & Mc Cauley, 1987). It also discriminated rejected children from those who were neglected or popular with peers (Bierman & Mc Cauley, 1987).

The RCMAS does not discriminate well between children who are anxious versus depressed and may "be interpreted as reflecting generalized emotional distress" (Hodges, 1990). This is not a serious problem for its use in this study, however, since
the hypotheses focused on internalizing in general versus specific aspects such as anxiety or depression.

All of the measures used in this study rely on either parent or child report. If parents and children share a systematic reporting bias, such as a tendency to under-report problems, these measures may misrepresent the adjustment of these children.

Although there are limitations in the measures used in this study, the use of multiple measures and report by both parent and child should have increased the likelihood that any true association of attractiveness, speech, and hearing to internalizing behavior problems would have been detected. This was not true of externalizing behavior problems, but there is better agreement between parent and child for externalizing behavior problems than for internalizing behavior problems (Hodges, Gordon, & Lennon, cited in Hodges, 1990), so there was less need for multiple measures.

In the control group, speech was a significant predictor of self-reported anxiety (measured by the RCMAS). This is consistent with Lindholm and Touliatos's (1979) finding of increased personality problems (anxiety and withdrawal) in children receiving speech therapy versus children without speech impairment. Attractiveness was unrelated to any of the child adjustment measures, and hearing was not examined because all control subjects were reported to have normal hearing by their parents. Several questions present themselves when considering these results. Why was speech but not attractiveness related to anxiety; why was speech a factor for the control group but not the group with craniofacial anomalies; and why was speech related to anxiety but not to the other internalizing measures?

Unacceptable speech may have been more influential than unattractive appearance because it may be considered more abnormal than an unattractive appearance. None of the children in the control group had scars or facial malformations which would set them apart as different from their peers, so the attractiveness ratings
represented variations of normal appearance. In contrast, speech raters were told to consider abnormal aspects of speech, such as hypernasality and misarticulation, when making their assessments, so speech rated as "unacceptable" was likely to differ from "normal" speech on one or more of these dimensions. Because of this, children with unacceptable speech may be perceived or perceive themselves as different from their peers in a way that unattractive children do not.

The effects of speech in the control but not the group with craniofacial anomalies may be due to the self-protective effects of stigma described above. Although children with unacceptable speech in the control group may perceive themselves as different from their peers, they probably do not consider themselves to be part of a stigmatized group (none of the control children were enrolled in speech classes), and therefore are not able to benefit from the self-protective effects of belonging to a stigmatized group. In contrast, children in the group with craniofacial anomalies belong to a group where abnormal speech is common, and they may be expected to benefit from comparing themselves with other group members or from de-emphasizing the value of high quality speech.

The effect of speech on anxiety but not the CBCL internalizing scale may have been due to the fact that anxiety was self-reported, while the CBCL is a parent-report measure. It may also be that self-awareness of poor speech quality raised children's anxiety about being perceived as different, but was not significant enough to lower their general self-esteem. Alternatively, it is possible that high levels of anxiety could have affected the quality of children's speech (raising the pitch or causing it to sound less smooth). It is difficult to interpret the difference in results on the CDI and RCMAS because the RCMAS does not discriminate well between anxiety and depression (Hodges, 1990).

The "peer interactions" portion of the proposed model was addressed in hypotheses 2 and 5. It was hypothesized that any negative influence of speech,
attractiveness, or hearing on internalizing or externalizing might be partially attributable to the detrimental effects of problems in these areas on peer interactions. These hypotheses were not supported. The only significant effects of speech, attractiveness or hearing on adjustment was the effect of speech on the RCMAS in the control group. Social factors were not found to mediate this relationship, because the RCMAS did not predict either social competence or negative peer interactions. However, when social factors were examined as outcome measures, a different picture emerged. The control group scored higher than the group with craniofacial anomalies on the measure of social competence (CBCL). In the group with craniofacial anomalies, speech quality predicted social competence, and hearing loss predicted negative peer interactions. In the control group, speech and attractiveness both predicted social competence. The positive relationship between speech quality and social competence in both groups and the positive association of hearing loss and negative peer interactions in the group with craniofacial anomalies are consistent with the model. Contrary to predictions, however, physical attractiveness was negatively related to social competence. Previous studies have shown positive relationships between physical attractiveness and adult social skills (Feingold, 1992; Goldman & Lewis, 1977) and between physical attractiveness and sociometric ratings among young children (Vaughn and Langlois, 1983; Dion and Berscheid, 1974). It may be that the negative relationship found in the present study was related to distinct characteristics of this control group, the majority of whom were recruited from small religious schools, or it may be that this is simply a chance finding. Replication of this result is needed before any conclusions may be drawn.

The hypothesis that there would be a higher level of externalizing problems among males than females was not supported. There were no gender differences in externalizing problem behaviors as measured by the CBCL. This hypothesis was primarily based on a study by Schneiderman and Auer (1984) which showed increased
conduct problems in elementary school (n = 20) males versus females and increased conduct problems and socialized delinquency problems in junior high school (n = 18) males versus females on the Behavior Problem Checklist by Quay and Peterson (1979). No such differences were found in either the group with craniofacial anomalies (n = 61) or the control group (n =64 ) in the present study using the externalizing scale of the CBCL, which encompasses both conduct and delinquency problems. The Schneiderman and Auer sample reportedly scored higher in teacher-rated conduct problems than the normative group of the Behavior Problem checklist, whereas both males (externalizing scale T-score M = 48.51) and females (externalizing scale T-score M = 48.66) in the total sample of this study scored very close to the average of the norm group of the CBCL. It may be that the gender differences in the Schneiderman and Auer study were related to the higher level of behavior problems in that sample overall. Alternatively, the different findings of the two studies may be related to the measures used or to chance.

**Directions for Further Research**

This study found normal adjustment in children with craniofacial anomalies, no effects of attractiveness on child adjustment, and effects of speech and hearing on social adjustment but not on anxiety, depression or self-esteem. This is contrary to the proposed model, which predicted that physical attractiveness, speech quality, and hearing ability would be negatively associated with internalizing and externalizing problems. Since this hypothesis was not supported, it may be fruitful for future research to focus on the factors that protect children from negative psychosocial consequences.

This study's finding of normal adjustment in children with craniofacial anomalies was based on parent and child reports. The addition of teacher and peer
report measures would strengthen future studies by providing additional sources of information about the children's adjustment.

The model being examined in this paper states that family stresses and resources have an impact on child adjustment. As already noted, children in this sample had access to comprehensive services from a multi-disciplinary craniofacial team. It would be interesting to study the effects of interaction with such a team on child adjustment. Variables of interest might include differences in services provided by the teams (in multi-site studies), extent of contact with the team, distance from the treatment center, family attitudes towards the team, and team members' attitudes towards the children. Other family resources/stresses could also be examined, including financial resources and social supports.

Parental characteristics are also hypothesized to have an influence on child adjustment. Possible areas for further study include parental attitudes towards craniofacial anomalies, quality of parent-child relationship, and measures of parental stress, anxiety, and depression. Parents who are accepting of their child's condition, have a good relationship with the child, and are not psychologically distressed, may be able to convey healthy attitudes to their child that could offset other negative feedback the child receives. This remains to be tested.

Further studies need to be done in order to test whether the normal adjustment of children with craniofacial anomalies is associated with the self-protective properties of stigma described by Crocker and Major (1989). For example, the degree to which these children attribute negative feedback to the presence of their craniofacial condition has not been tested. Even if they are found to make such attributions frequently, it may be that children in general typically make impersonal attributions for negative feedback, so a comparison group would be necessary. It also remains to be tested whether children with anomalies compare themselves to other children with anomalies or to children without anomalies. Finally, if these children protect themselves by devaluing
areas in which their group does not excel and valuing positive characteristics of their group, they should demonstrate different attitudes towards the importance of attractiveness and speech quality than peers do. Furthermore, it would be fruitful to examine whether these children as a group possess specific strengths that they value more than is the case for other children. If self-protective effects of belonging to a stigmatized group are found to be important in the adjustment of children with craniofacial anomalies, it may be useful to add a cognitive strategy component as a moderating variable in the model (Figure 6). Cognitive strategy may be important both in how children are affected by self-awareness of problems in speech, attractiveness, or hearing, as well as how they react to treatment by peers.

Figure 6
Revised Model of Adjustment: Early Elementary School

Further research on this model should incorporate self-ratings of attractiveness and speech. Feingold's (1992) meta-analysis of the attractiveness literature indicates that these ratings are more likely to be associated with adjustment than ratings by others. It may be particularly interesting to examine what factors are associated with positive versus negative differences between self-ratings and ratings by others.
The results of this study provide an encouraging picture of the psychosocial adjustment of children with craniofacial anomalies. Although they were rated as less attractive and as having less acceptable speech than children without anomalies, children with craniofacial anomalies scored normally on five parent and child rated measures of psychological adjustment (CBCL internalizing scale, CBCL externalizing scale, CDI, RCMAS, Harter Self-Perception Profile for Children). This is consistent with previous literature, the majority which has found no severe adjustment problems in this group. For example, apart from some indication of increased inhibition among children with craniofacial anomalies, no evidence of psychological problems was noted in Richman and Eliason’s (1982) review of the craniofacial literature. Furthermore, although Kapp-Simon (1986) found differences in self-esteem between children with clefts and controls, only 54% of the group with clefts in that study fell into the "at risk" category for Total Self-Concept on the PSCI. Because "at risk" was defined as "falling below the 50th percentile of the original sample for Total Self-Concept," this study actually may be interpreted as providing evidence for the normal adjustment of this group. An earlier study by Kapp (1979), using the Piers-Harris Children's Self-Concept Scale, failed to find differences in Global Self-Concept between children with clefts and controls, although children with clefts did report significantly less satisfaction with physical appearance. Broder and Strauss (1989) also examined the self-concept of children with clefts, using the PSCI, and did find evidence of lower self-esteem in their sample of 20 children between the ages of 6 and 9 years. It should be noted, however, that the total self-concept score was a composite which included the social domain score, and the physical factor score. Children with clefts in this sample scored lower than controls in both of these areas, which may have had negative effects on their global self-esteem scores.
Children in the group with craniofacial anomalies also scored in the normal range on parent and child rated measures of social adjustment (Negative Interactions Factor of the Friendship Questionnaire, Social Competence Scale of the CBCL), although they did not score as well as the control group on social competence. The research that deals with social interactions of children with craniofacial anomalies tends to focus primarily on the mother-child dyad, not peer relationships, and is therefore difficult to relate to findings about peer social interactions (e.g., Allen et al., 1990; Barden et al., 1989; Clifford, 1969; Speltz et al., 1990, 1994). There is a body of research that suggests that children with anomalies are perceived by others as having more negative personality characteristics than individuals with normal faces. This has been demonstrated with individuals from ages 11-35 years making the ratings of personality characteristics (Elliot et al., 1986; Rumsey et al., 1986; Schneiderman & Harding, 1984; Tobiasen, 1987). Children under the age of 11 do not stereotype consistently by facial abnormality, but those over the age of six do make personality judgments on the basis of their own perceptions of the subjects' attractiveness (Rumsey et al., 1986; Elliot et al., 1986). The normal social adjustment ratings of children in the present study suggest that negative perceptions of individuals with craniofacial anomalies may not necessarily result in poor social interaction. It may also be that surgical repair of craniofacial anomalies of the subjects in this study corrected appearance to the extent that the effects of the anomalies on social interactions were minimized.

Although the group with craniofacial anomalies did score in the normal range on the measures of social adjustment, they did not score as well as the control group, and they also were rated less attractive than the control group. This is consistent with Feingold's (1992) meta-analysis of the attractiveness literature, which did find that physical attractiveness was positively related to social behaviors such as social skills ($r = .23$) and popularity with the opposite sex ($r = .31$).
Of the three primary variables of interest in this study, speech was most consistently found to have an effect on children's adjustment. This was true of both the group with craniofacial anomalies (in which it was associated with social competence) and the control group (in which it was associated with social competence and anxiety). Hearing loss predicted negative peer interactions in the group with craniofacial anomalies, but the only effect of attractiveness was a negative relationship to social competence in the control group, which was contrary to expectation. These results support the importance of speech in children's social interactions. They should not be taken as an indication that physical appearance and hearing of children with craniofacial anomalies can safely be neglected. The children in this study had already received extensive interventions to correct problems of appearance and hearing, without which serious adjustment problems might have arisen. Of course, this hypothesis cannot be tested, as it would be unethical to deny children treatment for this purpose. In addition, the lack of association between attractiveness and any measures of child psychological or social adjustment may be partly attributable to measurement limitations.

Attractiveness ratings were based on Polaroid pictures of the subjects, that may not have captured subtle aspects of appearance which would be detectable on a live model or in a high quality, professional photograph. A Polaroid was used rather than a conventional camera to assure that an acceptable photograph (eyes open, expression neutral) was obtained while the child was available for data collection.

Several self-protective mechanisms were described that may account for the good adjustment of children with craniofacial anomalies. These are represented as cognitive strategies in the revised model of adjustment for late-elementary school children (Figure 6). Gender was removed from the model, as no effects of gender were evident in this sample. Future research should focus on the strengths of children with craniofacial anomalies, and on the family resources, parental characteristics, and cognitive strategies which may account for their normal adjustment.
APPENDIX A
SPEECH VISUAL ANALOG SCALE

Please rate this child’s speech on the following scales.

How **acceptable** is the child’s speech?

very unacceptable...........................................................................very acceptable

How **intelligible** is the child’s speech?

very unintelligible...........................................................................very intelligible
Rater ID #: Child ID#

Please rate this child's appearance on the following scale

How attractive is the child's appearance?

very unattractive       very attractive
APPENDIX C
MEDICAL EXPERIENCES QUESTIONNAIRE*

The Medical Experiences Questionnaire

1. How many times has your child been hospitalized? _______

2. When was your child's most recent hospitalization?
   ______ less than one year ago
   ______ 1-2 years ago
   ______ more than 2 years ago, but after age one
   ______ birth to one year

3. How do you think your child has reacted in the past to dental and medical procedures?
   ______ very poor     ______ moderately poor     ______ moderately good     ______ good

4. Will your child be having more medical or dental procedures in the near future (braces, surgery, fit with a dental bridge)? Yes ______ No ______

5. How do you think your child will react to this procedure?
   ______ very poor     ______ moderately poor     ______ moderately good     ______ good
6. How would you rate your child's anxiety (fear, nervousness) about the upcoming procedure?

___ high  ___ moderately high  ___ moderately low  ___ low

*Note: Items 3, 5, and 6 from Johnson & Baldwin, 1969
REFERENCES


BIOGRAPHICAL SKETCH

Linda Williamson is originally from Saint Petersburg, Florida. She graduated magna cum laude from Stetson University, with a Bachelor of Arts in psychology, in 1987. She received a Master of Arts in clinical psychology from the University of Florida in 1991. Ms. Williamson completed a clinical internship, specializing in pediatric psychology, at the Oklahoma Health Sciences Center in 1993. She currently lives in Columbus, Georgia, with her husband and son.
I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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