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Adult Perceptions of Infant Attractiveness as a Function of Infant Characteristics

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ADULT PERCEPTIONS OF INFANT ATTRACTIVENESS AS A FUNCTION OF INFANT CHARACTERISTICS

by

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VITA

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INTRODUCTION

Researchers investigating infant-parent dyads have searched for factors contributing to some dyads being at greater than average risk for later developmental problems. Although several factors have been identified (e.g., perinatal condition, infant attractiveness), none of them, when studied singly, have strong predictability to later outcome. Sameroff and Chandler (1975) suggest a "continuum of caregiving casualty", based on a transactional model of development. In this model, the child, the caregiver, and the environment are seen as actively engaged with each other, changing and being changed by their interactions. The transactional model indicates the need for studies to examine the relationships and the interactions among risk factors as well as the uniqueness that the many factors contribute to the developing child-parent relationship (Sameroff & Seifer, 1983). There is some empirical evidence that attractiveness (or cuteness) of the premature infant is one among numerous factors that may influence the parent-infant relationship (e.g., Maier, Holmes, Slaymaker, & Reich, 1984).

Infant Attractiveness

Ethologists have suggested that specific infant physical and behavioral characteristics are releasers of

caregivers' approach and care behavior, as well as suppressors of aggressive behavior. For example, infants possessing "babyish" facial features (large eyes placed in the middle of the face, round heads and small noses, mouths and chins) are preferred by adults (Sternglanz, Gray, & Murakami, 1977). Adults rate infants with these features as more attractive and tend to look longer at them than the faces of infants not possessing these specific characteristics (Hildebrandt & Fitzgerald, 1978, 1979a, 1980). Other research further suggests that female infants tend to be rated as more attractive than male infants (Hildebrandt & Fitzgerald, 1979a) even though they do not appear to differ in facial features (Hildebrandt & Fitzgerald, 1979b). Older infants are also rated as more attractive than younger infants (Hildebrandt & Fitzgerald, 1979a). In this case, however, these increased ratings of attractiveness appear to be related to systematic changes in facial features with age (Hildebrandt & Fitzgerald, 1979b). In addition to the role of attributes over which the child has no control, there is evidence behavioral attributes can also affect ratings of attractiveness. For example, positive infant expressions (e.g., smiling, happy, cheerful) are rated as more attractive than negative expressions (e.g., crying, unhappy) (Hildebrandt, 1983; Holmes, Reich, & Lauesen, 1987; Karraker & Stern, 1984; Power, Hildebrandt, & Fitzgerald, 1982),

In addition to the impact of physical characteristics on adult perceptions of infant attractiveness, these characteristics also affect adults' expectations for the infants' behavior and development. Stephen and Langlois (1984) showed a sample of Black, Caucasian, and Mexican-American male and female adults photographs of infants (same ethnic groups as the adults) taken at three ages: newborn, three months, and nine months. The adults rated the infants on attractiveness and on behavioral and developmental traits. The findings showed that on measures of "smart", "likable", "good" and "causes parents problems", there was a positive bias for the physically attractive infants which was present across ethnic groups and ages.

In a similar study, Ritter, Langlois, and Casey (1988) investigated the relationships among infant age appearance and facial attractiveness, and adult expectations of the developmental maturity of infants differing on these dimensions. Parents and nonparents were shown pictures of six month old infants and were asked to rate the infants on attractiveness and age appearance. In addition, the adults rated the competence of the infants in the areas of communication skills, motor abilities, social skills, cognitive level, and self-help skills. Results showed that both parents and nonparents rated the unattractive infants as older than their attractive age-mates. Furthermore, the parents overestimated the developmental competence of the

unattractive infants, with unattractive females being perceived as more capable in communication and cognitive skills than the attractive females, and both unattractive female and male infants rated as more capable in motor abilities than attractive male and female infants. These results suggest that facial attractiveness and age appearance are related and serve as social cues for parent-child interactions.

Attractiveness and Prematurity

All of these data suggest that infants who do not share facial features associated with "babyishness" may be judged as less attractive and be less successful in eliciting appropriate nurturant responses from adults. This suggests that particular populations of infants who, for one reason or another, do not possess these characteristics might be at risk because they will be less successful at eliciting such nurturing responses. One such infant population may be premature infants who at birth are commonly described as looking like "little old men." In fact, Maier, Holmes, Slaymaker and Reich (1984) found that premature infants lack the "babyish" facial features found in full-term infants. This study first examined the specific facial features of young preterm infants (31-34 weeks gestational age), older preterm infants (35-37 weeks gestational age) and full-term infants (40 weeks gestational age) and then used these data to generate composite drawings

depicting these three groups of infants. These drawings were then used to elicit adults' perceptions of attractiveness. The results of this study indicated that preterm infants have significantly smaller eyes and narrower heads than full-term infants; the eyes of the preterm infants are placed proportionally higher in the face and closer to the sides of the face; and the distance between their noses and mouths is proportionally greater than for the full-terms. Maier et al., also found that college-age adults evaluated the preterm infants less positively than the full-term infants along several dimensions including attractiveness, behavioral functions (e.g., would eat well-would not eat well), and ability to elicit interactive behaviors from the adult raters.

In a subsequent study, Holmes, Reich, and Lauesen (1987) investigated whether or not these earlier differences could be attributed to the fact that at the time of the photographs the preterm infants were younger in post-conceptional age than the full-term infants. Furthermore, they examined the effects of infant facial expression on adult ratings of infants. College-age adults rated photographs (instead of composite drawings) of smiling and neutral expressions of four month old preterm and full-term infants (corrected age for the preterm infants) in terms of perceived attractiveness, behavioral competence of the infants, and behavioral inclinations toward the infants.

Findings were consistent with those of the earlier study. The full-term infants were consistently judged more positively than the preterm infants in all dimensions even though the infants were all four months old (preterm age corrected for gestational age at birth). Moreover, the smiles of the preterm infants were rated as less attractive than those of the full-term infants. Holmes and colleagues suggest that the difference in attractiveness is not a function of conceptional age per se but, instead, of being born prematurely. In addition, these findings indicate that the differences persist to at least four months of age and could continue to affect caregiver responses.

In a similar study, Frodi, Lamb, Leavitt, Donovan, Nett, and Sherry (1978) examined whether parents perceive differences in the cry and appearance of premature infants and full-term infants. In this study, parents viewed videotapes of infants who were crying or quiescent. Half of the parents saw a preterm infant and the other half a full-term infant. Sound tracks were dubbed so that half of the full-term infants and half of the preterm infants "emitted" the cry of a normal full-term infant, while the other half emitted the cry of a premature infant. Physiological measures were gathered from parents as well as ratings on their mood, perceived sex of the infant, how pleasant they perceived the infant, and how likely they were to interact with the infant. Results showed that the cry and appearance

of the premature infant were perceived as more aversive than those of the full-term infant. Moreover, the parents reported that they were less eager to interact with the premature infant, whom they rated as less pleasant. Based on these studies, it appears that all adults (including parents) perceive premature infants as less attractive and as possessing less positive attributes than full-term infants.

However, the situation may be even more complex in that mere labeling as "premature" may result in diminished positive responsiveness. For example, Stern and Hildebrandt (1986) examined parents' cognitive and behavioral reactions to infants labelled as premature. Mothers interacted with and rated 15 to 19 week old full-term infants labeled as either full-term or preterm. Infants labeled premature were rated as less cute, smaller, having finer features and were less liked than the infants labeled full-term. In addition, the infants labelled "premature" were touched less and given more immature toys to play with by mothers who interacted with them.

The results of these studies suggest that infant prematurity may affect not only adults' but also caregiver perceptions and responses and, moreover, just the label "premature" may produce this effect.

Summary

The present literature review has indicated several

important implications for the understanding of the developing parent-infant relationship. First, facial features and expressions of infants influence parental perceptions of infant attractiveness. This appears to have an impact on the interactions and the developing relationship of parent-infant dyads. Second, premature infants have been rated as less attractive and less able to elicit caregiving behaviors from adults. The transactional model would predict that the interaction of the less "babyish" facial features of premature infants with negative adult perceptions of these features would be possible factors that place these infants at risk for problems with their caregivers.

Since there are few empirical studies in this area, there remains a need for further exploration to determine if, in fact, the characteristics of the premature infant influence adult perceptions of the infant and if so, how long this influence persists.

The purpose of this study was to address these two issues. The major purpose was to examine infant characteristics and their relationship to adult perceptions of infant attractiveness. In addition, age appearance, and perceived emotional state and infant sex were also examined. While these characteristics are only some of the factors that may be influential in the premature infant-adult relationship, this study was the first longitudinal

investigation of these infant characteristics.

Adult undergraduate students were asked to rate photographs of infants on attractiveness, age appearance, emotional state, and sex of infant. The photographs were of preterm and full-term infants taken at four ages; 41-42 weeks conceptional age (C.A.), and 2 months, 4 months, and 6 months (corrected for preterm infants). Subjects were blind to the birth condition (i.e., whether preterm or full-term), sex, and age of the photographed infants. In addition, subjects were asked to complete a questionnaire which assessed attitudes toward parenting and children, and personality traits, and gathered demographic information. This questionnaire will be discussed in a future study.

Hypotheses The present study was designed: (a) to replicate findings that premature infants are perceived as less attractive than full-term infants; (b) to determine if these findings of less attractiveness decrease with infant age; (c) to determine if smiling infant faces are perceived as more attractive than infants with neutral facial expressions; (d) to determine whether this difference between smile - neutral is more marked for full-term infants; (e) to investigate whether female infants are perceived as more attractive than male infants; and (f) to examine whether attractiveness ratings increase with infant age.

METHOD

Design

This study assessed the relationship between actual and perceived infant characteristics in a 2 (infant birth condition) X 4 (infant age) X 2 (infant expression) X 2 (infant sex) mixed model design. The two levels of infant birth condition were full-term (40 weeks gestation) and preterm (35 weeks or less gestation). The four levels of infant age were 41-42 weeks conceptional age, and 2 months, 4 months and 6 months (corrected for gestational age at birth for the preterm infants). The two infant expressions were neutral and smiling.

Subjects

Subjects consisted of 250 undergraduate students (79 males, 117 females; mean age 18.62 years, age range 17 - 39; 20 Blacks, 190 Caucasians, 4 Hispanics, 21 Asians, 1 American Indian, 14 with unreported racial group) from Loyola University of Chicago completing a partial course requirement in introductory psychology. The subjects were given an explanation of the procedures to be followed, the possible benefits and the possible risks. Subject provided informed consent prior to participation.

Environment and Equipment

A classroom approximately 15 x 18 ft was utilized for

the testing procedures. Chairs with desk tops were positioned so that each subject had a clear view of a projection screen at one end of the room. A Kodak (model 760 H) slide projector was used to show subjects the infant stimuli slides.

Infant Stimuli

Stimuli consisted of 280[1] photographs (slides) of the faces of individual preterm and full-term infants. Photographs were taken with a 35mm camera in the infants' home. Although an electronic flash was used, lighting varied due to differences in natural light within the homes and the use of two different flash attachments. However, this variation was random across groups and ages. Infants were photographed in an infant seat and wearing a white t-shirt to control for any gender cues. Distance from the top of the infant seat to the camera lens was held constant at 73 cm. Multiple photographs (mean number of photographs per visit = 8) were taken of the individual infants at each age. Of these, two photographs were selected which best depicted a "neutral" face (i.e., eyes open, alert but no particular emotion present) and a "smile" (i.e., mouth in clear smile position, eyes open and "bright"). Because infants do not smile spontaneously at 41-42 weeks conceptional age, only neutral photographs were obtained at that particular visit.

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[1] Seven pictures were missing randomly across birth condition, expression and ages. Missing infant stimuli were replaced randomly from stimuli within that cell.

Therefore, of the 280 photographs, 160 showed a neutral face and 120 showed a smiling face.

All infants (both preterm and full-term) used in the photographs were born at Evanston Hospital from March 1987 to November 1987. All infants included met the following criteria: weight appropriate for gestational age at birth; stable medical condition upon discharge; Caucasian; and no facial anomalies. (See Table 1).

Preterm Group. The preterm group consisted of 20 infants (10 female, 10 male). Characteristics of this group include: gestational ages of less than 36 weeks (mean gestational age = 32.3 weeks, range = 28 to 35 weeks); birth weights less than 2501 grams (mean birth weight = 1792.1 g, range = 1085 to 2500 g); birth lengths less than 49 cm (mean birth length = 42.5 cm, range = 37 to 48 cm); and birth head circumference less than 42 cm (mean birth head circumference = 30.6 cm, range = 26 to 41 cm).

Full-term Group. The full-term group consisted of 20 infants (10 female, 10 male) with normal perinatal histories, born at 40 weeks gestation. Birth weights of the full-terms ranged between 2724 to 4554 grams with a mean of 3524.3 grams, birth lengths ranged between 49 to 56 cm with a mean of 52.3 cm, and birth head circumferences ranged between 34 to 40 cm with a mean of 35 cm.

A MANOVA was performed to assess group and sex

Table 1

Means (and Standard Deviations) of Preterm and Full-term Infants' Weights (Wt), Lengths (Lth), Head Circumferences (HC), Ear to Ear (ETE), and Back of Head to Chin (BTC) in Centimeters at the Age Levels

	Age Level				
Item	Birth	41-42 Weeks C. A. **	2 Months*	4 Months*	6 Months*
Preterm					
Wt	1807.8 (382.2)	3437.9 (556.2)	4783.8 (558.6)	6231.1 (590.7)	7593.9 (496.6)
Lth	42.6 (3.6)	51.6 (2.9)	56.1 (3.6)	62.4 (2.3)	68.1 (3.6)
HC	30.6 (3.3)	36.8 (1.9)	39.7 (1.6)	42.6 (1.3)	44.2 (1.4)
ETE		16.3 (1.3)	17.8 (1.3)	18.5 (0.9)	19.3 (0.9)
BTC		26.2 (2.7)	28.1 (1.9)	28.9 (1.7)	30.1 (1.5)
Full-term					
Wt	3535.5 (424.9)	3806.4 (478.4)	5201.9 (749.9)	6564.9 (717.6)	7637.9 (656.7)
Lth	52.0 (2.2)	53.3 (3.1)	59.0 (2.5)	64.1 (2.8)	69.1 (3.1)
HC	35.0 (1.4)	36.6 (1.3)	39.4 (1.1)	42.2 (1.1)	44.0 (1.5)
ETE		16.4 (1.1)	18.1 (0.8)	18.8 (0.9)	19.2 (0.7)
BTC		26.0 (2.6)	27.1 (1.7)	28.6 (1.9)	29.7 (0.9)

Note: * Corrected for Gestational Age at birth for Preterm Infants
** Post Conceptional Age

differences in birth weight, length, and head circumference. A significant main effect of group was found ($F(3, 29) = 46.57$, $p < .001$). The two groups differed in weight ($F(1, 31) = 146.65$, $p < .001$); length ($F(1, 31) = 81.01$, $p < .001$); and head circumference ($F(1, 31) = 25.66$, $p < .001$).[2] In addition to the weights, lengths, and head circumferences, two additional length measures, ear to ear and back of head to chin, were obtained for each infant at the subsequent ages. Due to missing data that varied across groups and ages, and in order to maximize the number of subjects within each cell, a MANOVA was conducted on the 41-42 weeks conceptional age measurements and a repeated-measures MANOVA was performed on the two, four, and six month ages measurements (corrected ages for the preterms). Both of these analyses used group and sex of infant as independent variables. The group difference found on weight, length, and head circumference at birth were not present at the subsequent ages (corrected for preterms) (See Table 1). Nor were group differences found on either the ear to ear nor the back of head to chin measurements at any of the ages. In none of the analyses were there significant main effects of sex of infant nor significant sex by group interactions.

Infant Rating Form

This form was designed to assess subjects'

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[2] Degrees of freedom reduced due to missing data for five ubjects.

perceptions of infant characteristics. Subjects were asked to rate the infants depicted in the photographs on the four following 7-point scales: "How cute is this infant?" (7 = cute, 1 = ugly); "What is the emotional state of this infant?" (7 = happy, 1 = unhappy); "What sex is this infant?" (7 = male, 1 = female)[3] and "How old is this infant?" (7 = seven months or more, 6 = six months, 5 = five months, 4 = four months, 3 = three months, 2 = two months, 1 = one month or less).

Procedure

Due to the large number of infant stimuli, It was not possible to show all stimuli to all subjects. Rather, each subject viewed only 56 stimuli. The 280 infant photographs were randomly assigned without replacement into five groups of 56 pictures so that each group had equal representation of infant sex, birth condition, age, and facial expression. As a result, each infant stimulus was viewed by an equal number of subjects.

Subjects were tested in ten groups of up to 25 students (total 250), with each group tested separately. Subjects were given individual packets containing 56 Infants Rating Forms and the adult questionnaire. Each packet and its contents were marked with individual subject

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[3] While past studies have used a forced-choice format to assess ability to guess infant gender, this study wanted to examine level of confidence in guessing infant gender, thus a 7-pt. scale was utilized.

identification numbers.

When all subjects within each group were seated and facing the projection screen, they were instructed that they would see a total of 56 different pictures of babies. For each baby, they were to record the baby's number (shown on each slide) at the top of the Infant Rating Form, and then to complete the form for that baby. For the question concerning infant sex, subjects were given the following instructions:

> Circle 5, 6, or 7 if you believe the infant is male. The higher the number you circle, the stronger your belief in the infant's "maleness." Circle 1, 2, or 3 if you believe the infant is female, with the lower the number indicating the stronger your belief in the infant's "femaleness." If you have no idea what sex the infant is, then circle 4.

The first slide was shown and when all subjects had completed that rating form, the next slide was shown. This process was repeated until all slides and rating forms were completed. The viewing and rating time varied, with the average time per slide about 30 seconds. Each group of subjects received a different random order of the infant stimuli to control for possible order effects. After all slides and rating forms were completed, subjects were asked to complete the adult questionnaire. Total testing was approximately 50 minutes. After all data were gathered, mean ratings for each item were completed for each infant.

RESULTS

As stated earlier, photographs of only the neutral facial expression were obtained when the infants were 41-42 weeks conceptional age (C.A.). Therefore, two separate repeated measures analyses of variance (ANOVAs) were performed for each of the four rating items. Degrees of freedom was reduced due to missing data that varied across groups and ages. First, a 2 (birth condition: full-term, preterm) x 2 (sex: male, female) x 2 (expression: smile, neutral) x 3 (age: 2, 4, 6 months) repeated measures ANOVA was performed to assess the effects of expression and age. This analysis, to be referred to as the "Expression Analysis," did not include data from the neonatal period (see Table 2).

Second, a 2 (birth condition: full-term, preterm) x 2 (sex: male, female) x 4 (age: 41-42 wks C.A., 2 months, 4 months, 6 months) repeated measures ANOVA was performed on data for the neutral only expression to assess the effect of age. This analysis will be referred to as the "Age Analysis" (see Table 3). In discussing the results, distinction will be made between the Expression Analysis and the Age Analysis.

While the major purpose of this study was to examine the effects of infant birth condition, sex, age and facial

Table 2

Results for Expression Repeated Measures Analyses: The Effects of Birth Condition (C), Infant Age (A), Expression (E), and Sex (S) on the Individual Items of the Questionnaire

		Rating Item			
	df	Cute	Sex	Age	Emotion
C	$F(1,32)$	4.61*	1.18	5.99*	1.13
E	$F(1,32)$	65.21***	1.30	4.04*	514.38***
S	$F(1,32)$	.09	22.26***	6.84**	2.61
A	$F(2,64)$	11.47***	1.34	51.90***	12.37***
C x E	$F(1,32)$	.00	.68	.03	.02
C x S	$F(1,32)$	2.08	2.76	.11	.42
C x A	$F(2,64)$	1.32	.58	1.20	.39
E x S	$F(1,32)$	.04	.72	.88	.78
E x A	$F(2,64)$	.07	.72	1.35	.47
A x S	$F(2,64)$	.56	.89	1.20	2.50
CxExS	$F(1,32)$	1.44	.04	.88	.44
CxExA	$F(2,64)$	.49	1.26	.50	.82
CxAxS	$F(2,64)$	.34	.05	2.41	.26
ExAxS	$F(2,64)$	1.34	2.46	1.06	.31
CxExAxS	$F(2,64)$	1.63	.91	1.17	.14

* $p < .05$
** $p < .01$
*** $p < .001$

Table 3

Results for Age Repeated Measures Analyses: The Effects of Birth Condition (C), Infant Age (A), and Sex (S) on the Individual Items of the Questionnaire

		Rating Item			
	df	Cute	Sex	Age	Emotion
C	F(1,33)	2.22	.33	2.68	.06
S	F(1,33)	.49	16.76***	5.17*	1.08
A	F(3,99)	41.40***	7.72***	96.25***	14.71***
C x S	F(1,33)	.89	.47	.06	.56
C x A	F(3,99)	1.87	.82	3.16*	3.48*
A x S	F(3,99)	.63	2.47	1.41	1.94
CxAxS	F(3,99)	.60	.43	.36	.15

* p <.05

** p <.01

*** p <.001

expression on the ratings of attractiveness, the impact of these independent variables on perceived sex, perceived age, and perceived emotion were also analyzed using the same repeated measures analyses of variance procedures.

Attractiveness

The first set of analyses used ratings of "cuteness" as the dependent variable (see Table 4). The results of these analyses showed significant main effects of birth condition, expression and age. In the Expression Analysis, full-term infants were rated as cuter than preterm infants (mean overall rating for full-term group = 4.89; mean overall rating for preterm group = 4.62, $F(1, 32) = 4.61$, $p < .05$). However, this main effect was not found to be statistically significant in the Age Analysis (mean overall rating for full-term group = 4.35; mean overall rating for preterm group = 4.14, $F(1, 33) = 2.22$, $p > .05$). The lack of consistency in these analyses is no doubt due to the finding that the preterm group was rated as cuter (though not significantly so) than the full-term group at the 41-42 wks C.A. neutral expression condition (mean rating for preterm group = 3.58; mean rating for full-term group = 3.44). The expected Birth Condition by Age interactions were not significant, (in the Expression Analysis $F(1, 32) = 1.32$, $p > .05$; and in the Age Analysis $F(3, 99) = 1.87$, $p > .05$) which indicated that the magnitude of the group differences in cuteness ratings remained consistent and did

Table 4

Means (and Standard Deviations) of Cuteness Ratings for Birth Condition, Infant Sex, Expression, and Age

	Conditions	
	Male	Female
Preterm		
Neonatal		
No Smile	3.44 (0.46)	3.70 (0.65)
2 Months		
No Smile	4.13 (0.61)	4.06 (0.62)
Smile	4.49 (0.52)	4.56 (0.68)
4 Months		
No Smile	4.53 (0.61)	4.36 (0.63)
Smile	5.01 (0.51)	4.90 (0.70)
6 Months		
No Smile	4.84 (0.45)	4.14 (0.62)
Smile	5.17 (0.32)	5.04 (0.51)
Full-term		
Neonatal		
No Smile	3.34 (0.74)	3.54 (0.51)
2 Months		
No Smile	4.46 (0.28)	4.48 (0.58)
Smile	4.84 (0.44)	5.17 (0.42)
4 Months		
No Smile	4.40 (0.52)	4.89 (0.49)
Smile	4.96 (0.48)	5.12 (0.54)
6 Months		
No Smile	4.67 (0.53)	4.96 (0.61)
Smile	5.34 (0.26)	5.30 (0.67)

Note: Higher ratings correspond to more positive evaluations

not decrease with age.

As expected, the Expression Analysis indicated that the photographs of smiling infants were rated as cuter thanphotographs of infants with a neutral expression (mean overall rating for smiling photographs = 4.99; mean overall rating for neutral photographs = 4.53, $\underline{F}(1, 32) = 65.21$, $\underline{p} < .001$). The expected Birth Condition by Expression interaction was not significant, $\underline{F}(1, 32) = 0.00$ $\underline{p} > .05$, which indicated that the preterm infants' smiles were not different in terms of perceived cuteness than full-term smiles.

In addition to the significant main effects of Birth Condition and Expression, significant main effects of Age (for the Expression Analysis, $\underline{F}(2, 64) = 11.47$, $\underline{p} < .001$; and for the Age Analysis $\underline{F}(3, 99) = 41.40$, $\underline{p} < .001$) were obtained which revealed that as age increased ratings of cuteness increased (for smiling facial expressions, the mean rating for 2 months = 4.77; mean for 4 months = 4.99; mean for 6 months = 5.21; for the Age Analysis mean rating for 41-42 wks C.A. = 3.51; mean for 2 months = 4.26; mean for 4 months = 4.53; mean for 6 months = 4.68). A priori planned comparison analyses were performed to assess the significance of pairwise differences between the ages; they revealed that although the average cuteness ratings increased with age, the magnitude of the differences was successively smaller as age increased. In the neutral only

expression condition, significance was found between the 41-42 wks C.A. and two month ratings (difference between means = .75; $F(1, 99) = 42.11$, $p < .01$) and between the two and four months ratings (difference between means = .27; $F(1, 99) = 5.59$, $p < .05$), whereas no significance was found between the 4 and 6 month ratings (difference between means = .15; $F(1, 99) = 1.62$, $p > .05$). Similarly, when the smiling and neutral facial expression data were combined in the Expression Analysis, significance was found between the 2 and 4 month ratings (difference between means = .24; $F(1, 64) = 9.63$, $p < .01$), and the 4 and 6 month ratings (difference between means = 19; $F(1, 64) = 5.59$, $p < .05$).

Finally, while female infants were expected to be rated as more attractive than male infants, the main effects of infant Sex were not significant (in the Expression Analysis, $F(1, 32) = 0.09$, $p > .05$; and in the Age Analysis $F(1, 33) = 0.49$, $p > .05$). This demonstrated that adults did not differentiate between male and female infants in terms of attractiveness. No other significant two-way or three-way interactions were obtained.

In summary, these analyses indicated that full-term infants were perceived as cuter than preterm infants at two, four, and six months of age but not at the 41-42 weeks conceptional age. In addition, in both groups, infants who were smiling were rated as cuter than when they exhibited neutral expressions. Furthermore, results indicated that

although ratings of cuteness significantly increased with age, the magnitude of the differences decreased as age increased. Finally, adults did not differentiate between the male and female infants in term of cuteness ratings.

Perceived Sex

Next, analyses of ratings of perceived sex of infants were conducted (see Table 5). Significant main effects for actual sex of infant were obtained (in the Expression Analysis, mean overall ratings for males = 5.09, mean overall ratings for females = 4.17; $F(1, 32) = 22.26$, $p < .001$; in the Age Analysis, mean overall ratings for males = 4.78; mean overall ratings for females = 4.03, $F(1, 33) = 16.76$, $p < .001$) which revealed that subjects were somewhat able to distinguish between male infants and female infants, although the differences were obviously relatively subtle. In addition, overall perceived maleness significantly increased with age (in the Age Analysis, mean rating at 41-42 wks C.A. = 3.94; mean rating for 2 months = 4.53; mean rating for 4 months = 4.53; mean rating for 6 months = 4.58, $F(3, 99) = 14.71$, $p < .001$), indicating that older infants were rated as more male. A post hoc Scheffe' analysis was performed to assess the significance of pairwise age differences. The 41-42 wks C.A. mean rating was significantly less "male" than the two month mean rating, $F(3, 99) = 14.03$, $p < .01$, while significance was not achieved between the mean ratings at two month and four

Table 5

Means (and Standard Deviations) of Sex Ratings for Birth Condition, Infant Sex, Expression, and Age

	Conditions	
	Male	Female
Preterm		
Neonatal		
No Smile	4.17 (0.82)	3.77 (0.76)
2 Months		
No Smile	4.68 (0.51)	4.38 (0.60)
Smile	4.85 (0.49)	4.49 (0.76)
4 Months		
No Smile	4.89 (0.59)	3.97 (0.80)
Smile	4.84 (0.68)	4.18 (1.12)
6 Months		
No Smile	4.79 (0.73)	4.02 (1.01)
Smile	4.86 (0.82)	4.30 (1.02)
Full-term		
Neonatal		
No Smile	4.09 (0.79)	3.72 (0.82)
2 Months		
No Smile	5.08 (0.36)	4.15 (0.85)
Smile	5.40 (0.37)	4.20 (0.94)
4 Months		
No Smile	5.67 (0.98)	4.00 (0.69)
Smile	5.41 (1.19)	4.39 (0.71)
6 Months		
No Smile	5.34 (0.85)	4.11 (0.95)
Smile	5.21 (1.09)	3.85 (0.85)

Note: Higher ratings correspond to more "maleness" evaluations

months, $F(3, 99) = .001$, $p > .05$, and between the mean ratings at four months and six months, $F(3, 99) = .12$, $p > .05$. No significant main effects of Birth Condition orExpression were obtained, nor were there any significant interactions.

In summary, these analyses indicated that adults were able to differentiate between male and female infants, although the differences were relatively subtle. In addition, older infants (independent of actual sex) were perceived as more male than younger infants. Interestingly, accuracy of sexual perceptions did not improve as the infants grew older.

Perceived Emotion

The next set of analyses examined the effects of Group, Age, Sex, and Expression on ratings of perceived infant emotional state (see Table 6). Results of both analyses revealed that age made a significant contribution to variance in perceived emotion (in the Expression analysis, $F(2, 64) = 12.37$, $p < .001$; and in the Age Analysis, $F(3, 99) = 14.71$, $p < .001$). In general, perceptions of infant happiness increased with age until four months. Post hoc Scheffe' analyses were performed to assess the significance of pairwise differences between ages. These analyses revealed that the 41-42 wks C.A. mean rating was significantly less than the two month mean rating, $F(3, 99) = 11.29$, $p < .01$, which was significantly

Table 6

Means (and Standard Deviations) of Emotional State Ratings for Birth Condition, Infant Sex, Expression, and Age

	Conditions	
	Male	Female
Preterm		
Neonatal		
No Smile	3.15 (0.46)	3.54 (0.66)
2 Months		
No Smile	3.52 (0.54)	3.44 (0.79)
Smile	5.22 (0.85)	5.12 (0.72)
4 Months		
No Smile	4.11 (0.89)	3.71 (0.66)
Smile	6.09 (0.44)	5.92 (0.73)
6 Months		
No Smile	3.99 (0.47)	3.87 (0.66)
Smile	6.11 (0.31)	6.03 (0.71)
Full-term		
Neonatal		
No Smile	2.64 (0.83)	2.87 (0.73)
2 Months		
No Smile	3.66 (0.95)	3.94 (0.55)
Smile	5.69 (0.56)	5.77 (0.58)
4 Months		
No Smile	4.50 (0.56)	3.83 (0.78)
Smile	6.34 (0.26)	5.78 (1.20)
6 Months		
No Smile	3.99 (0.64)	3.88 (0.68)
Smile	6.21 (0.52)	5.86 (0.72)

Note: Higher ratings correspond to more positive evaluations

less than the four month mean rating, $F(2, 64) = 11.29$, $p < .01$. The difference between the four and six month mean ratings failed to achieve significance. Moreover, in the the Age Analysis there was a significant interaction between Birth Condition and Age, $F(3, 99) = 3.48$, $p < .05$ (full-term mean ratings: at 41-42 wks C.A. = 2.76, at 2 months = 3.57, at 4 months = 4.10, at 6 months = 4.04; preterm mean ratings: at 41-42 wks C.A. = 3.33, at 2 months = 3.42, at 4 months = 3.86, at 6 months = 3.38). Simple effects analyses revealed that the preterm infants were rated significantly happier than the full-term infants at the 41-42 wks C.A., $F(1, 99) = 6.78$, $p < .05$. However, this was not found at the two, four, and six month ages. Instead, the full-term infants were rated as happier (although not significantly so) than the preterm infants.

In addition to the main effect of Age and the Birth Condition by Age interaction, infants with smiling expressions were rated significantly happier than the same infants with neutral facial expressions (in the Expression Analysis, mean overall rating for smiling photographs = 3.80, mean overall rating for neutral photographs = 5.87), $F(1, 32) = 514.38$, $p < .001$. The main effects of Birth Condition and Sex of infant were not significant. In addition, no other interactions were obtained.

In summary, these analyses indicated that older infants were perceived as happier than younger infants and

that smiling infants were perceived as happier than infants with neutral facial expression. Moreover, preterm infants were perceived as happier than full-term infants at the 41-42 weeks conceptional age but not at any other age.

Perceived Age

Finally, analyses of ratings of perceived age of infant were conducted (see Table 7). The results indicated that Birth Condition, Sex, Expression, and Age made significant contributions to explaining the variance in ratings of perceived age. In the Expression Analysis, full-term infants were perceived as older than preterm infants (mean overall ratings for full-term group = 3.94; mean overall ratings for preterm group = 3.71, $F(1, 31) = 5.99$, $p < .05$), even though the preterm infants were of equal post-conceptional age and of greater post-birth age. No main effect of Birth Condition was obtained in the Age Analysis. In both analyses, males were rated as older than females (in the Expression Analysis, mean ratings for males = 3.97, mean ratings for females = 3.71; $F(1, 31) = 6.84$, $p < .01$; in the Age Analysis, mean ratings for males = 3.61, mean ratings for females = 3.35, $F(1, 34) = 5.17$, $p < .05$). Photographs of smiling infants were rated as older than photographs of the same infants' neutral facial expressions (mean ratings for smiling photographs = 3.87; mean ratings for neutral photographs = 3.77, $F(1, 31) = 4.04$, $p < .05$). Similarly, perceptions of age increased as actual age increased (in the

Table 7

Means (and Standard Deviations) of Age Ratings for Birth Condition, Infant Sex, Expression, and Age

	Conditions	
	Male	Female
Preterm		
Neonatal		
No Smile	2.64 (0.63)	2.45 (0.47)
2 Months		
No Smile	3.38 (0.48)	3.20 (0.37)
Smile	3.37 (0.29)	3.23 (0.51)
4 Months		
No Smile	3.89 (0.41)	3.52 (0.29)
Smile	3.87 (0.47)	3.81 (0.33)
6 Months		
No Smile	4.21 (0.59)	3.79 (0.43)
Smile	4.29 (0.46)	4.07 (0.32)
Full-term		
Neonatal		
No Smile	2.37 (0.78)	2.45 (0.47)
2 Months		
No Smile	3.47 (0.36)	3.40 (0.33)
Smile	3.48 (0.45)	3.53 (0.43)
4 Months		
No Smile	4.36 (0.60)	3.96 (0.54)
Smile	4.29 (0.56)	4.05 (0.31)
6 Months		
No Smile	4.37 (0.36)	3.95 (0.69)
Smile	4.71 (0.43)	4.00 (0.63)

Note: Higher ratings correspond to "older" evaluations

Age Analysis, mean ratings for 41-42 wks C.A. = 2.47; mean rating for 2 months = 3.38; mean rating for 4 months = 3.97; mean rating for 6 months = 4.10; $F(3, 102) = 96.26$, $p < .001$; in the Expression Analysis, mean ratings for 2 months = 3.75; mean ratings for 4 months = 3.94; mean ratings for 6 months = 4.14; $F(2, 62) = 51.90$ $p < .001$. Post hoc Scheffe' analyses performed to assess the significance of pairwise differences between the ages revealed that subjects were able to distinguish older infants from younger infants at all ages.

While a main effect of Birth Condition was not obtained in the Age Analysis, there was a significant interaction between Birth Condition and Age, $F(3, 102) = 3.16$, $p < .05$). Simple effects analyses revealed that although perceived age increased as actual age increased for both groups of infants, this effect of actual age was significantly more marked for the full-term infants than the preterm infants. As seen in table 7, there is not a significant difference between preterms and full-terms at 41-42 wks C.A.--there is even a tendency for preterm infants to be viewed as older at this age. However, the preterm infants were viewed as progressively younger (in comparison to the full-term infants) as their actual age increased. No other significant two-way or three-way interactions were observed.

In summary, results of these analyses indicated that

full-term infants were perceived as older than preterm infants at two, four and six months of age with this group difference not being found at the 41-42 weeks conceptional age. Males were viewed as older than females, and smiling infants were perceived as older than infants with neutral facial expressions. In addition, while subjects were unable to guess the actual ages of the infants, they were able to distinguish older infants from younger infants.

DISCUSSION

The purpose of this study was to examine adults' perceptions of infant attractiveness as a function of infant birth condition, sex, emotional expression, and age. On the basis of previous research, it was anticipated that preterm infants would be viewed as less attractive than full-term infants. This study was further designed to determine whether or not these differences in attractiveness might lessen as the children grew older. It was also expected that smiling infant faces would be perceived as more attractive than infant faces with neutral expressions and that the increased attractiveness of smiling faces would be more marked for full-term than for preterm infants. In addition, older infants were expected to be rated as more attractive than younger ones and female infants were expected to be rated more positively than male infants.

As predicted from previous research (Frodi et al. 1978; Holmes et al, 1987; Stern & Hildebrandt, 1986), overall, full-term infants in this study were perceived to be more attractive (or cuter) than preterm infants, even though they were all of the same post-conceptional age when the photographs were taken. These findings provide support to the speculation made by Holmes, et al (1987) that the difference in attractiveness between newborn preterms and

newborn full-terms is not due simply to differences in post-conceptional age, but to longer lasting differences in appearance occurring as a result of being born prematurely. The differences in perceived attractiveness between preterm and full-term infants obtained in this study also cannot be attributed to differences in actual age (from birth). While it is true that the preterm infants were older (from birth), the effect of this difference should have been to minimize or reduce differences in attractiveness, since increasing age is positively related to attractiveness.

While the expected main effect of age was obtained, indicating that older infants are viewed as more attractive than younger infants, one of the surprises in this study was the absence of a significant interaction between age and birth condition. The data did not reflect a decline in the size of the difference between the two groups with increasing age, suggesting that any disadvantages to preterm infants originating from their reduced attractiveness can be expected to persist at least until six months of age. In fact, the data suggested that differences in attractiveness stemming from birth condition might even increase with age, since there were no differences in attractiveness ratings for full-term and preterm infants at the beginning (41-41 weeks post conceptional age), whereas, significant differences were obtained at each of the later ages.

The fact that differences in attractiveness ratings

were not found at 41-42 weeks conceptional age is difficult to interpret, however. The most likely explanation would focus on the differences in age from birth between the two groups. At the time the photographs were obtained, the infants in the full-term group were an average only 18 days from birth, whereas for the preterm group, an average of 72 days had elapsed since birth. This difference in time from birth until the first photograph no doubt reduced differences in attractiveness between the two groups either as a direct result of physical changes secondary to recovery from the birth experience and/or as an indirect result of compensatory effects of environmental experience in favor of the preterm infants. For example, the fact that the preterm infants had had more post-birth interactional experience with their caregivers than the full-term infants (when both infant groups were post-conceptionally 41-42 weeks of age) may have made the preterm infants' faces more animated than the full-term infants' faces. There is some support for this interpretation in the fact that the preterm infants' photographs tended to be rated as cuter and "older", and as significantly "happier" than the photographs of the full-term infants at this age. In any event, it appears that this lack of group difference in attractiveness ratings does not continue beyond the 41-42 post-conceptional age, when differences in time elapsed from birth have less relative impact. Therefore, it seems reasonable to conclude that

there is a fairly constant advantage for full-term infants in attractiveness ratings throughout the period of infancy.

In addition to the initial prediction that full-term infants would be perceived as more attractive in general than preterm infants, it was anticipated, on the basis of past research (Holmes et al, 1987) that these full-term infants would also be more effective in using facial expressions to elicit positive responses from adults. Although, overall, smiling infant faces received higher ratings of attractiveness -- they were also rated as older and happier -- than infant faces with neutral expressions (see also Hildebrandt, 1983; Holmes et al, 1987; Karraker & Stern, 1984; Power et al, 1982), the expected interaction between birth condition and group was not obtained.

The absence of the expected interaction between birth condition and facial expression indicated that although the preterm infants were rated as less attractive than the full-term infants at two, four, and six months corrected ages, overall, their smiles were as effective in eliciting positive attractiveness ratings from adults as the smiles of the full-term infants. This finding contradicts those of the Holmes et al (1987) study in which an interaction was obtained between birth condition and facial expression such that the smiles of the preterm infants of four months corrected age did not have as positive an impact on ratings of attractiveness as did the smiles of the full-term infants

of the same age.

It seems likely that the differences in results between these two studies originate from differences in the procedures whereby the two sets of photographs were obtained. In the earlier study, smiling and neutral photographs were obtained from videotapes of mother-child interaction. In that study, the photographer selected the best smile from the 12-minute interaction tape for each infant and therefore, her selection was limited by the number and quality of smiles spontaneously produced by the infants in that context. Although the infants in both groups smiled equally often, the raters of these videotapes did have difficulty in identifying whether or not particular expressions of the preterm infants were actually smiles--as seen in reduced reliability in smile ratings for preterm infants as compared to full-term infants. On the other hand, in the current study, the photographer continued to actively elicit smiles and to take photographs until she was sure she had the best possible smile for each infant. Thus, the lack of a birth condition by facial expression interaction in the current study may reflect the fact that preterm infants can produce smiles that are as effective as full-term infants, but does not address the question of how likely they are to actually do so in normal interactions with their parents or other adults.

A second surprise of the study reported here was the

failure to replicate the findings of Hildebrandt and Fitzgerald (1979a) that female infants tend to be viewed as more attractive than male infants. Indeed, the actual sex of the infants in this context -- where there were no clues to the sexual identity of the infants -- did not approach a trend on ratings of attractiveness. Actual sex did, however, have an interesting relation to perceived age: namely, males were found to be rated as older than females. Still another analysis revealed that older infants were also rated as being more "male." These findings would lead one to anticipate that since older infants are rated as more attractive than young infants and since older infants are viewed as more male, ratings of infant attractiveness might be expected to favor infants perceived as male. However, this was not the case. Simple correlations performed between the perceived infant sex and cuteness ratings at each age and facial expression revealed an overall inverse relationship, indicating that the higher the ratings of "femaleness", the cuter the infant is perceived to be (for the neutral expression at, 41-42 wks C.A., $\underline{r} = -.30$ $\underline{p}, < .05$; 2 months, $\underline{r} = -.32$ $\underline{p}, < .05$; 4 months, $\underline{r} = -.42$ $\underline{p}, < .01$; 6 months, $\underline{r} = -.21$ $\underline{p}, > .05$; for the smiling expression, at 2 months, $\underline{r} = -.45$ $\underline{p}, < .01$; 4 months, $\underline{r} = -.36$ $\underline{p}, < .01$; 6 months, $\underline{r} = -.13$ $\underline{p}, > .05$).

While these findings appear to be contradictory, the most likely explanation would focus on two factors found in

previous research: namely, the amount of the adult raters' experience with infants (Karraker, 1986), and the tendency for adults to use the cuteness of infants as a cue for infant gender (Hildebrandt & Fitzgerald, 1979a; Karraker, 1986). Karraker (1986) found that while adults in general are able to identify infant gender above the level of chance, there appears to be an effect of experience with infants on this ability such that college students, who are less likely to be parents, make an error in judging infant gender in the direction of assuming female infants to be male. Similarly, results of the present study found that although there was only a slight difference between the means of the male and female infants on ratings of perceived sex, this difference was significant, suggesting that while adults may be uncertain, they are able to distinguish between male and female infants. In addition, the finding that subjects consistently rated older infant as more male may be due to their lesser experience with infants since all subject were college students. Furthermore, the significant correlations between the ratings of perceived infant sex and ratings of cuteness is consistent with other research (Hildebrandt & Fitzgerald, 1979a; Karraker, 1986), lending support to the speculation that adults employ a physical attractiveness stereotype to infants such that cuter infants are more likely to be perceived as female.

In summary, the study just described supported the

prediction that characteristics of preterm infants may be less effective in eliciting positive responses from adults in that college students rated these infants overall as less attractive. If the parents of these infants also respond negatively to these attributes, then these particular caregiver-infant dyads could be at greater risk for continuing problems in their interactions with one another. This in turn, could have lasting effects on the infants' development as suggested by Sameroff and Chandler (1975). For example, the degree of unattractiveness of a preterm infant may influence the quality of parental interaction with the infant, which in turn may elicit a less than optimal response from the infant. If this pattern of infant-caregiver interaction continues, it could have a lasting negative impact on the development the infant-caregiver relationship and also on the infant's future relationships. More research on the effects of infant attractiveness on adults' perceptions and behavior toward infants is needed to understand the complex factors that contribute to the developing infant-parent relationship.

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APPROVAL SHEET

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The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

April 16, 1990
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