

Infant Attractiveness Predicts Maternal Behaviors and Attitudes

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The relations between infant attractiveness and maternal behavior were examined by observing mothers feeding and playing with their firstborn infants while they were still in the hospital after giving birth ($N = 144$) and again when the infants were 3 months of age ($N = 115$). The attitudes of the mothers toward their infants were also assessed. Mothers of more attractive infants were more affectionate and playful compared with mothers of less attractive infants. In contrast, the mothers of less attractive infants were more likely to be attentive to other people rather than to their infant and to engage in routine caregiving rather than affectionate behavior. The attitudes of the mothers of less attractive infants were also more negative than those of mothers of more attractive infants, but the number of differences in attitudes was not as great as the behavioral differences.

Queen Victoria, who bore nine children, once said that "an ugly baby is a very nasty object" (Fulford, 1964, p. 191). If current conventional wisdom is true, most modern-day mothers are either not as forthright as the Queen or they have considerably more positive attitudes about unattractive infants. It is commonly assumed that the attractiveness of an infant is neither evaluated nor important to parents; all offspring supposedly seem beautiful to doting new parents. The purpose of the study we report here is to examine the validity of this widely held belief by assessing the attitudes and behaviors of mothers toward their firstborn infants as a function of infant attractiveness.

There is a literature suggesting that mothers may not be as sanguine about infant appearance as conventional wisdom would have us believe. Rather, mothers may treat their infants differently on the basis of the infant's attractiveness. Experimental laboratory studies have shown that attractive compared

with unattractive children are generally treated less harshly by adults who are unrelated or unacquainted with them. Berkowitz and Frodi (1979), for example, elaborated on the seminal investigation of Dion (1974) and found that college women punished unattractive children more severely than attractive children despite identical child behavior. The female participants in this study were asked to behave as if they were the child's parent and to correct children for committing errors on a task. The children in the study were made up to appear either more or less attractive and were videotaped to provide controlled samples of child behavior and mistakes. In another type of experimental paradigm, Dion (1972) gave adult women photographs of unfamiliar attractive and unattractive children along with a description of a transgression each child had allegedly committed. The women evaluated a transgression more negatively when it was committed by an unattractive compared with an attractive child.

Although these laboratory investigations showing that attractive children receive more positive treatment than unattractive children are highly controlled and internally valid, one might question their external validity. There are, however, several studies using parents as participants that suggest that the phenomenon is not restricted to unacquainted adults observed in a laboratory situation. For example, Elder, Van Nguyen, and Caspi (1985) examined relationships between fathers and their adolescent children during the Great Depression. They found that fathers were more harsh and punitive toward their unattractive daughters than toward their attractive daughters following the loss of a job or income. Apparently, the girls' attractiveness provided some type of buffer or protection against irritable parenting.

Several studies have found that mothers of children with physical anomalies behave differently than mothers of normal comparison children. Allen, Wasserman, and Seidman (1990) found that mothers of 3-year-olds who had various types of congenital anomalies (many involving the face) were more controlling and less verbal with their children than were mothers of control children. Three studies have examined interactions between mothers and infants with both minor and major cranio-

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facial deformities. Field and Vega-Lahr (1984) videotaped 12 three-month-old infants with cleft lip and palate and 12 normal infants with their mothers. Compared with mothers of normal infants, mothers of infants with craniofacial abnormalities smiled at, vocalized to, and imitated their infants less frequently and were less responsive and contingent with them. Barden, Ford, Jensen, Rogers-Salyer, and Salyer (1989) collected self-report and behavioral observations of five mothers of infants with craniofacial abnormalities and five mothers of normal infants. Although mothers of infants with craniofacial abnormalities rated themselves as more pleased with parenting and with their infant than did mothers of normal infants, behavioral observations revealed that mothers of infants with craniofacial abnormalities actually were less positive toward their infants than mothers of normal infants on 26 of 27 possible comparisons. Epperson and Myers (1990) found an identical discrepancy between maternal attitudes and behaviors in another sample of mothers with cleft lip/palate infants. These results suggest that what mothers may say or even believe about themselves may not reflect the nature of their actual behavior.

Studies with children with congenital anomalies may or may not generalize to normal populations with a normal range of attractiveness. Two studies, however, suggest that infants within the normal range of attractiveness are treated differently by their parents. Parke and Sawin (1975) informally assessed the cuteness of newborns and noted that the mothers of these normal infants were more affectionate and maintained more eye contact toward attractive than toward unattractive infants. In a second study with a small sample, Parke (Parke, Hymel, Power, & Tinsley, 1977) found that fathers' participation in caregiving for their 3-month-olds was significantly and positively correlated with infant attractiveness assessed when the babies were newborns.

These nonexperimental studies all suggest that a child's attractiveness may indeed influence parenting attitudes and behaviors. However, in these studies, attractiveness was not formally assessed and rated (Elder et al. 1985; Parke et al., 1977; Parke & Sawin, 1975), or very small sample sizes were used (Barden et al., 1989; Epperson & Myers, 1990; Field & Vega-Lahr, 1984; Parke et al., 1977), or special rather than normal children were studied (Allen et al., 1990; Barden et al., 1989; Epperson & Myers, 1990; Field & Vega-Lahr, 1984). These characteristics weaken any conclusions to be drawn about the associations between infant attractiveness and maternal attitudes and behaviors in the general population. We therefore assessed infant attractiveness and the attitudes and behaviors of a large sample of mothers from three ethnic groups when their infants were newborns and 3 months of age.

Method

Sample

One hundred and seventy-three mothers and their firstborn infants (86 girls and 87 boys) were recruited from a city hospital serving low-income families in Austin, Texas. For representativeness and generalizability (Graham, 1992), the sample was approximately one third White, one third African American, and one third Mexican American and was recruited by a similar multiracial team of research assistants. We deter-

mined eligibility for participation from hospital medical information before contacting mothers. To be eligible, mothers had to be born in the United States or to have moved here by age 6 and speak English; have no recorded history of alcohol abuse, drug abuse, or mental illness; be in good health; and the primary physician had to permit contact with the mother. Infants were all singleton firstborns and in good health with no major birth complications. Thus, although the sample was from low-income families, it was not an "at-risk" sample of mothers and infants.

Eligible mothers were contacted by a recruiter approximately 10 hr after birth, at which time the study and its procedures were fully described. Mothers were told they would be paid \$50 if they completed all assessments. If the mother agreed to participate, she completed the consent forms and a demographic questionnaire.

The mean age of the participating mothers in this sample was 20 years; age ranged from 16 to 30 years. The majority of mothers were either unemployed or had clerical or blue-collar positions. The most common level of education was completion of high school or partial high school. Half of the mothers were residing with the baby's father when the infant was born. The mean infant gestational age at birth was 39.48 weeks. The mean first Apgar score for the infants was 8.36; the mean second Apgar score was 9.04.

Information was collected from 40 families who declined participation in the study to determine the representativeness of the participating sample. Chi-square or *t* tests were used to test for demographic differences between the decliners and the sample: No significant differences were found for family income, family composition, maternal age, occupation, or education.

Forty families who participated in the newborn assessment did not return for the 3-month measurement period. Chi-square and *t* tests revealed that those who returned did not differ significantly from those who did not return with respect to socioeconomic characteristics.

*Procedure*¹

Behavioral observations: Time 1. Observations were recorded by a multiracial team of observers. The first observation session was scheduled as soon as possible after the mother agreed to participate. The observers were intensively trained in recording molecular and precisely defined infant and maternal behaviors using a portable solid-state memory event recorder (Datamytes). Each observer was trained to a criterion reliability before data collection. The training period usually lasted 6 weeks to 2 months. All of the observers were full- or half-time paid research assistants who were on-call and were available to conduct the observations before the infant and mother were discharged. At the hospital, the observer introduced herself, reminded the mother of the observation procedure, and sat in a corner of the mother's hospital room and recorded the behavior of both the mother and infant. The observation session was preceded by a 10-min adaptation and warm-up period during which the observer "warmed up" by coding behavior and during which the mother became accustomed to the presence of the observer. The observer did not interact with the mother during the observation. The observation session lasted for 20 to 30 min and was divided into two discrete segments: feeding followed by play. The feeding and play segments were equivalent in duration. Occasionally, the two segments could not be completed in one session because of fussy or sleepy newborns. In such cases, a second observation was arranged.

The observer coded the frequency and duration of 63 maternal and 50 infant behaviors. The maternal behaviors represented the onset and termination of caregiving activities, holding patterns, stimulatory activities, play, and affectionate behavior. The infant behaviors represented

¹ Additional assessments were administered at both the newborn and 3-month measurement periods but are not relevant to this study.

Table 1
Newborn and 3-Month Maternal Behavior Factor Scales

Age of infant	Scale name	Eigenvalue	Mean reliability (intraclass r)
Newborn	Affectionate Interaction	1.94	.79
	Routine Caregiving	3.00	.84
	Attends Others	3.62	.84
3 months	Affectionate Play	2.91	.88
	Routine Caregiving	3.48	.85
	Active Play	3.42	.89

the onset and termination of physiological activity (e.g., eating, burping, spitting up), infant states (e.g., drowsy, alert, self-quieting), interaction with caregiver (e.g., looking, touching, vocalizing), and interaction with objects (e.g., looking at, touching, mouthing object). Observations were collected for 144 feed and 143 play sessions. The remainder was lost as a result of either equipment failure or observer error (e.g., dead batteries or observer failure to transmit data properly to the mainframe computer).

Approximately 25% of the play and feed observations were coded by two observers to calculate reliability. Intraclass correlations were computed between the observations of both observers (Tinsley & Weiss, 1975; Ubersax, 1987). Infrequently occurring and unreliable variables were dropped; skewed variables were transformed as appropriate. Mean reliability for the retained hospital variables was .82 (range = .61 to .97) for the maternal variables and .76 (range = .63 to .96) for the infant variables.

Behavioral observations: Time 2. The 3-month observations were recorded by the same team of observers as close as possible to the 3-month birthday of the infant (± 2 weeks). Except for location, the coding and observation procedures were identical to those used at the newborn assessment. Assessments were conducted in a rented room in the area of the city in which most participants lived. The room was furnished with comfortable chairs, sofas, and tables. This setting was chosen because it was more convenient for participants and because it was a more familiar environment than an imposing university laboratory. The setting was preferred to the participants' home because it allowed control of distracting noises, interruptions, and placement of observers. One hundred and fifteen feed observations and 114 play observations were recorded. Approximately 25% were coded by two observers to calculate reliability. The mean intraclass correlation for retained maternal variables was .85 (range = .62 to 1.0) and .82 (range = .66 to .99) for the infant variables.

Data reduction and aggregation. To reduce the probability of obtaining spurious, chance results and to increase reliability through aggregation, we reduced the number of maternal variables from the observations by conducting separate principal-components factor analyses on the combined feeding and play observations at each time period for the maternal variables (Epstein, 1979; Rushton, Brainerd, & Pressley, 1983; Wachs, 1987). Before the factor analyses were performed, correlations among the variables were examined, and whenever a correlation between variables exceeded .80, only one variable from the pair was retained for analysis. Variables with unacceptable communalities were deleted, and the resulting factors were rotated to an oblique solution.² A scree test was graphed for all factors with eigenvalues greater than one. All factors obtained before the first major break in the slope of the line were accepted (Tatsuoka, 1988). Factor-based scale scores using variables loading .35 or higher were calculated for each mother for each final factor. Scale scores were tested for skewness and were transformed as appropriate. The factor-based scales, eigenvalues, and reliabilities are shown in Table 1.

Three eligible factors of maternal behavior emerged from the hospital observations and were named Affectionate Interaction, Routine Caregiving, and Attends Others. Affectionate Interaction was composed of variables such as vocalizing positively toward the baby, holding the baby close, touching and patting the baby, and eye contact with the baby. Routine Caregiving consisted of variables such as burping, holding, wiping, cleaning, checking, adjusting, and so on. Attending Others was composed of variables such as eye contact with others and vocalizing to others with only brief, intermittent glances at the baby.

Three eligible factors of maternal behavior emerged from the 3-month observations: Affectionate Play, Active Play, and Routine Caregiving. Affectionate Play was composed of variables such as kissing and holding the baby close, vocalizing positively to the baby, showing toys, and touching and patting. Active Play consisted of variables such as rocking, bouncing, swinging, and jiggling. Routine Caregiving was similar to the same factor from the newborn assessment.

Attitude assessment. Several hours after the observation at the hospital, the recruiter made a second visit to the mother to administer a questionnaire assessing attitudes about parenting and knowledge of infant behaviors and competencies. The recruiter remained with the mother during that time to answer any questions she may have had about the questionnaire and to ensure that the mother comprehended the directions. Occasionally, the recruiter read the questionnaire to mothers with poor reading skills. The mothers completed the same questionnaire again when their infants were 3 months of age.

The Parent Attitude Questionnaire was constructed by R. D. Parke and D. B. Sawin on the basis of literature reviews and parent interviews (Parke & Sawin, 1975, 1977). Parke and Sawin administered the questionnaire to 200 parents when their infants were newborns and a second time when the infants were 3 months of age. The responses were then factor analyzed (see Parke & Sawin, 1977). We used the original Parke-Sawin factors having more than three variables; a total of five factors were analyzed.

The first Parke-Sawin factor, termed Dissatisfaction, Rejection, Hostility, consisted of items such as disappointed in baby's behavior, doesn't enjoy feeding baby, prefers not to hold baby, worries that baby is hard to calm, and feels like spanking crying baby. The reliability for this factor at the newborn (Time 1) and 3-month (Time 2) assessment for our sample was $\alpha = .65$ and $.50$, respectively. The Parke-Sawin factor termed Disappointment, Discomfort, Avoidance consisted of items such as disappointed in gender, feels silly talking to baby, and baby needs less attention ($\alpha = .69$ at Time 1 and $.41$ at Time 2). The Parke-Sawin factor labeled Infants Interfere in Parents' Lives consisted of variables such as parents have to spend too much time with baby, parents cannot do all the things they want to, and baby costs too much ($\alpha = .50$ at Time 1 and $.49$ at Time 2). The factor called Parents Should Stimulate Infants consisted of items such as parents believe infants like to look at

² An orthogonal rotation produced essentially identical results.

Table 2
Maternal Behaviors: Newborn Assessment

Behavior factor	Infant appearance	
	Attractive (n = 67)	Unattractive (n = 69)
Affectionate Interaction		
<i>M</i>	0.73	0.66
<i>SD</i>	0.19	0.19
Routine Caregiving		
<i>M</i>	0.71	0.78
<i>SD</i>	0.17	0.20
Attends Others		
<i>M</i>	0.63	0.72
<i>SD</i>	0.26	0.23

Note. Scales were skewed and were therefore (log) transformed. Values represent mean and standard deviation factor-scale scores.

faces, babies are happy when smiled at, parents should smile at babies, and it is good to cuddle babies ($\alpha = .62$ at Time 1 and $.65$ at Time 2). The factor labeled Negative Attitudes About Infants and Infant Care consisted of items such as babies are demanding, babies don't need attention, it doesn't matter if you talk to baby, there is no reason to hold baby, and it is not the father's role to take care of the infant ($\alpha = .77$ at Time 1 and $.68$ at Time 2). Although some of the reliabilities of the Parke-Sawin factors are somewhat low, they seem to be typical of reliabilities obtained with parental questionnaires (Holden & Edwards, 1989).

Infant attractiveness. Color photographs of 163 newborn infants were taken a standard distance from the infant's face and when the newborns were asleep or otherwise had a neutral facial expression. Clothing cues were identical (hospital T-shirts). The photographs were rated for attractiveness on a 1-5 Likert-type scale by a panel of undergraduate judges (54 for female infants; 40 for male infants). The reliability of the ratings as assessed by coefficient alpha was .98 for male infants and .96 for female infants.

At the 3-month assessment, 114 color photographs were taken of the full face and either left or right facial profile of the infant. Photographs were standardized with respect to size, distance, and expression. A bib was used to occlude clothing cues. The photographs of boys were rated by 67 undergraduate judges ($\alpha = .97$); girls were rated by 46 judges ($\alpha = .96$). Mean attractiveness scores were calculated for each infant at each time point.³

Results⁴

Behaviors

Because the maternal behavior factors within each age were conceptually independent and largely uncorrelated (the range of correlations was .01 to .18 with one exception: Affectionate Interaction and Attends Others were correlated, $r = -.35$, at Time 1), analyses of variance (ANOVAs) rather than multivariate analyses of variance were performed (Huberty & Morris, 1989). At each time point, the relevant mean infant attractiveness ratings (high vs. low, median split) and infant sex were between-subjects variables.

A main effect for attractiveness was obtained for all three factor-based scales at the hospital: Affectionate Interaction, $F(1, 132) = 4.35, p < .05$; Routine Caregiving, $F(1, 132) = 4.25, p < .05$; and Attends Others, $F(1, 132) = 4.19, p < .05$. Mothers of attractive infants engaged in more Affectionate Interaction with their babies than did mothers of unattractive infants. In contrast, mothers of less attractive infants engaged in more Routine Caregiving and Attended Others more than mothers of more attractive infants. Table 2 shows the means for these main effects.

Table 3
Maternal Behaviors: 3-Month Assessment

Behavior factor	Infant appearance			
	Attractive		Unattractive	
	Girls (n = 28)	Boys (n = 27)	Girls (n = 32)	Boys (n = 29)
Affectionate Play				
<i>M</i>	0.58	0.68 _a	0.64	0.57 _b
<i>SD</i>	0.22	0.19	0.19	0.23
Routine Care				
<i>M</i>	0.42	-0.11	0.20	-0.49
<i>SD</i>	1.96	2.58	2.52	2.19
Active Play				
<i>M</i>	0.76	0.76	0.72	0.79
<i>SD</i>	0.12	0.14	0.21	0.16

Note. Affectionate Play and Active Play were skewed and were therefore (log) transformed. Because Routine Care was not transformed, it has a mean of 0 and a range of -3.74 to 6.84. Means with different subscripts differ at $p < .05$. Values represent mean and standard deviation factor-scale scores.

An interaction between infant sex and attractiveness was obtained for one of the three 3-month behavior factor-based scales: Affectionate Play, $F(1, 112) = 4.84, p < .05$ (see Table 3). Post hoc contrasts of the means involved in the interaction for Affectionate Play showed that attractive boys received more Affectionate Play than unattractive boys, $t(54) = 2.02, p < .05$. The means for the attractive and unattractive girls did not differ significantly from the other means.

Following the procedures recommended by Huberty and Morris (1989) and to provide analyses parallel to those performed on the behaviors, we performed ANOVAs on the five attitude scales. Mean infant attractiveness ratings (high vs. low) at each age and infant sex were between-subjects variables.

Attitudes

From the hospital assessment, main effects for attractiveness, $F(1, 154) = 6.27, p < .05$, and sex, $F(1, 154) = 4.56, p < .05$, were obtained. These panels of judges were predominately White. To ensure that these ratings were representative of judges from the three ethnic groups in the sample (White, Mexican American, and African American), a panel of 30 undergraduates (10 of each ethnic group) also rated the photographs. The reliability of the ratings of the triethnic panel was .92 for newborns and .87 for 3-month-olds, demonstrating high reliability among judges of different ethnic and racial backgrounds.

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⁴ The degrees of freedom vary for different analyses because data were not available for all variables for every participant.

Table 4
Maternal Attitudes

Attitude factor	Infant attractiveness			
	Newborn		3 months	
	High (<i>n</i> = 81)	Low (<i>n</i> = 77)	High (<i>n</i> = 57)	Low (<i>n</i> = 61)
Infants Interfere in Parents' Lives				
<i>M</i>	2.00 _a	2.19 _b	1.89	2.03
<i>SD</i>	0.50	0.52	0.57	0.64
Parents Should Stimulate Infants				
<i>M</i>	3.28	3.27	3.45 _a	3.64 _b
<i>SD</i>	0.39	0.43	0.39	0.33
Dissatisfaction, Rejection, Hostility				
<i>M</i>	1.77	1.80	1.79	1.68
<i>SD</i>	0.49	0.43	0.45	0.38
Disappointment, Discomfort, Avoidance				
<i>M</i>	1.39	1.39	1.36	1.25
<i>SD</i>	0.45	0.50	0.49	0.32
Negative Attitudes About Infants and Infant Care				
<i>M</i>	1.65	1.68	1.54	1.47
<i>SD</i>	0.55	0.49	0.49	0.38

Note. Tabled means were derived from scores that ranged from 1 to 4 and that were computed by averaging the responses to items that comprised each factor. Within time periods and factors, means with different subscripts differ at $p < .05$.

were found for the scale describing infants as Interfering in Their Parents' Lives (see Table 4). Less attractive infants were perceived as interfering more than attractive infants. Boys were seen as interfering more ($M = 2.15$) with parents' lives than girls ($M = 2.03$). From the 3-month assessment, a main effect for attractiveness was found for the Parents Should Stimulate Infants scale, $F(1, 114) = 8.85$, $p < .01$. Mothers of unattractive infants saw more value in stimulating them than did mothers of attractive infants.

Effect Size

Effect sizes (Cohen, 1988) were calculated for all the significant behavioral and attitude factors. For the hospital assessment, the effect size for Affectionate Interaction was $d = .37$; for Routine Caregiving, $d = .38$; for Attends Others, $d = .37$; and for Infants Interfere in Parents' Lives, $d = .40$. For the 3-month assessment, the effect size for Affectionate Play was $d = .52$ and for Parents Should Stimulate Infants, $d = .53$.

Change Over Time

We conducted analyses to determine whether changes in maternal attitudes or behavior were related to changes in infant attractiveness over time. We used a regression procedure to identify infants who remained stable in attractiveness and those who changed substantially: Three-month attractiveness scores were predicted from newborn attractiveness scores, and standardized residuals were obtained (Appelbaum & McCall, 1983). The residuals represent deviations of observed 3-month attractiveness scores from their estimated values predicted from their newborn scores. To achieve approximately equivalent

group sizes, we blocked the residuals according to the degree of change, with infants who changed more than .95 standard deviations from the predicted 3-month scores defined as changers and infants who remained between $\pm .30$ standard deviations from predicted 3-month scores defined as nonchangers.

Only variables that were conceptually similar at both time points were entered into the change analysis. Across time, the maternal behavior factors of Affectionate Play (with Affectionate Interaction) and Routine Caregiving were conceptually related and were analyzed, although the correlations between the Time 1 and Time 2 assessments were quite low (.27 and .13). All of the scales representing the mothers' attitudes at the hospital assessment were identical to their corresponding attitude scale at 3 months and were therefore analyzed.

Standard scores representing maternal attitudes from Time 1 to Time 2 were the dependent variables in a repeated measures analysis with change in infant attractiveness (became less attractive, $n = 21$; stayed the same level of attractiveness, $n = 21$; became more attractive, $n = 19$) and infant sex as the between-subjects variables. One attitude scale, Infants Interfere in Their Parents' Lives, yielded a significant interaction between attractiveness change and the repeated attitude factor, $F(2, 55) = 3.95$, $p < .05$. Post hoc comparisons revealed that mothers' attitudes became more negative toward their infant if the infant became less attractive, $t(20) = -2.21$, $p < .05$ (see Table 5).

A similar analysis was conducted on the two eligible behavior factors. No significant differences emerged.

Infant Behaviors

We analyzed the infant behaviors at both time points to determine whether differences in the behaviors of attractive and

Table 5
Change Over Time

Attitude factor/infant attractiveness	Infant age	
	Newborn	3 months
Infants Interfere in Parents' Lives		
Decreased		
<i>M</i>	-0.27 ^a	0.13 ^b
<i>SD</i>	0.99	0.99
No change		
<i>M</i>	0.41	0.06
<i>SD</i>	0.74	0.87
Increased		
<i>M</i>	-0.11	-0.35
<i>SD</i>	1.24	0.79
Parents Should Stimulate Infants		
Decreased		
<i>M</i>	-0.03	0.00
<i>SD</i>	0.96	0.87
No change		
<i>M</i>	-0.09	-0.29
<i>SD</i>	0.89	1.01
Increased		
<i>M</i>	-0.24	-0.05
<i>SD</i>	0.72	1.21
Dissatisfaction, Rejection, Hostility		
Decreased		
<i>M</i>	-0.37	-0.30
<i>SD</i>	0.88	0.73
No change		
<i>M</i>	0.32	0.21
<i>SD</i>	0.73	0.96
Increased		
<i>M</i>	0.01	0.08
<i>SD</i>	1.06	1.26
Disappointment, Discomfort, Avoidance		
Decreased		
<i>M</i>	-0.40	-0.31
<i>SD</i>	0.75	0.69
No change		
<i>M</i>	0.06	0.22
<i>SD</i>	0.80	0.91
Increased		
<i>M</i>	-0.05	0.27
<i>SD</i>	1.00	1.31
Negative Attitudes About Infants and Infant Care		
Decreased		
<i>M</i>	-0.29	0.07
<i>SD</i>	1.04	0.88
No change		
<i>M</i>	0.23	-0.03
<i>SD</i>	0.97	0.98
Increased		
<i>M</i>	-0.32	-0.06
<i>SD</i>	1.18	1.14

Note. Higher scores indicate greater endorsement of the attitude or more evidence of the observed behavior. Standard scores with a mean of zero are reported. Within change groups, means with different subscripts differ at $p < .05$.

unattractive infants might account for the differences in maternal behaviors and attitudes toward them. Seventeen infant codes were reliable at the hospital assessment, and 35 were reliable at the 3-month assessment. Of these 52 variables, ANOVAs

showed that only two differences between attractive and unattractive infants emerged. Unattractive newborn infants showed nonfocused movement for longer durations than did attractive newborns, and attractive 3-month-olds were more likely to touch, cling, and hold the caregiver compared with unattractive 3-month-olds. Given the number of variables, at least two significant differences would be expected by chance alone; therefore, we attach no theoretical or interpretative significance to these differences.

Maternal attractiveness. Because maternal and infant attractiveness could be related and because the differential treatment we observed could be caused by differences in the behavior of attractive and unattractive mothers rather than to infant attractiveness, we examined maternal attractiveness as a mediating variable. Photographs were available for 123 mothers, taken at the 3-month assessment. These photos were rated for attractiveness by 83 undergraduate judges on a 1-5 Likert scale ($\alpha = .97$). Maternal and infant attractiveness were not correlated at either the newborn ($r = .14$) or 3-month ($r = -.06$) assessment periods. Furthermore, two-way ANOVAs with mother and infant attractiveness as variables showed that there were no main effects for maternal attractiveness and no significant interactions between maternal and infant attractiveness for any of the significant attitudinal or behavioral variables, indicating that differential treatment cannot be attributed to maternal attractiveness.

Father presence/absence. Because there might be systematic differences in behaviors or attitudes between mothers who were living with their infant's father and mothers who were not, we reanalyzed the behavior and attitude data including father presence/absence as a variable. Although father presence/absence did influence mothers' behaviors and attitudes toward the infants, there was no interaction with infant attractiveness. Father status did not modify any of the results reported here.

Discussion

The results of this study reveal that, like Queen Victoria, contemporary mothers respond differently to attractive and unattractive infants. The mothers in this study behaviorally endorsed Queen Victoria's negative attitude toward unattractive infants, particularly at the newborn period. When their infants were newly born, mothers of attractive infants were more affectionate compared with mothers of less attractive infants. In contrast, the mothers of unattractive infants were more likely than mothers of attractive infants to be attentive to other people rather than to their infant. They were also more likely, when attending to the infant, to engage in routine and somewhat perfunctory caregiving rather than affectionate interactions. Mothers of attractive boys showed continuity in their affectionate behavior from the newborn to the 3-month assessment period: They engaged in more affectionate play with their sons than did mothers of less attractive boys.

These findings indicating that infant attractiveness is correlated with maternal behavior are strikingly consistent with those of studies examining interactions between mothers and children with congenital anomalies, particularly craniofacial anomalies (Allen et al., 1990; Barden et al., 1989; Epperson & Myers,

1990; Field & Vega-Lahr, 1984). The data are also similar to those informally obtained by Parke (Parke et al., 1977; Parke & Sawin, 1975), who found that the behavior of both mothers and fathers was significantly related to infant attractiveness in normal infants.

The attitudes of the mothers in this study were congruent with, although not as harsh as, those of Queen Victoria. At the newborn period, mothers of unattractive infants were more likely than mothers of attractive infants to endorse the belief that their infants interfered in their lives. Such a belief is consistent with the fact that these mothers also displayed less affection and interest in their infants. Mothers of newborns did not, however, express attitudes of rejection or disappointment as a function of the infants' attractiveness, nor did they express differing views of infants in general as a function of their infants' attractiveness. When infants were 3 months old, mothers of unattractive infants, in comparison with mothers of attractive infants, believed their infants needed more stimulation, but they no longer differed from mothers of attractive infants in the belief that their unattractive infants were interfering in their lives.

Thus, although there was evidence that mothers of unattractive infants had less positive attitudes about their infants than mothers of attractive infants and there was some congruency between attitudes and behaviors, all in all, there were more significant behavioral than attitudinal differences between mothers of attractive and unattractive infants. The greater predictive proficiency of the behavioral variables may be due to the fact that the behavioral data were more reliable than the attitudinal data. However, the differential predictive ability of attitudes and behavior is strikingly consistent with the results of both Barden et al. (1989) and Epperson and Myers (1990), who also found discrepancies between reported attitudes and behavioral observations of mothers with infants with craniofacial abnormalities. Barden et al. suggested that the discrepancy between maternal attitudes and behaviors may be the result of a defensive coping process that allows mothers to focus on their more positive attitudes about their infants. Whether such a coping process represents a positive adaptation to their infants' appearance or represents a less positive splitting of attitudes and behaviors is not clear. The finding that mothers of unattractive 3-month-olds were more likely to believe that infants should be stimulated might exemplify such a maladaptive strategy of compartmentalizing attitudes and behaviors. Because many of the items comprising this attitude involve affectionate stimulation (e.g., parents should smile at and cuddle the baby), perhaps mothers of less attractive infants were more likely to express positive attitudes toward the value of affectionate stimulation as a substitute for their relative lack of actual affectionate behavior.

The attractiveness of infants significantly predicted a larger number of maternal behaviors and attitudes at the newborn than at the 3-month assessment, and it may be that infant attractiveness becomes less important in predicting maternal attitudes and behaviors over time. However, the effect size analyses revealed that the more focused effects of infant attractiveness at the 3-month assessment were larger in magnitude than were those at the newborn assessment. Using Cohen's (1988, 1992) guidelines that effect sizes of .20 can be described as small and .50 as medium, our effect sizes ranged from between small to

medium at the newborn period and medium at the 3-month period. These effect sizes compare favorably with those typically found in other areas of research (Rosenthal, 1990). Cohen (1988, 1992) suggested that effect sizes of the magnitudes found at the 3-month period are large enough to be "visible to the naked eye" (Cohen, 1992, p. 156) and effect sizes of the magnitudes found at the newborn period are nontrivial and scientifically meaningful, even if not visible to the naked eye. It will be important to study older infants and their mothers to clarify the issue of whether attractiveness becomes stronger or weaker over time in predicting maternal attitudes and behaviors.

A weakness of this study, and any study that uses naturalistic observations of behaviors, is that cause and effect cannot be determined from correlational, nonexperimental designs. We used three different strategies to help interpret the direction of effect in this study. First, by examining infant behaviors, we determined that, by and large, attractive and unattractive newborn and 3-month-old infants do not differ in behavior. Thus, it is unlikely that the association between maternal attitudes and behaviors and infant attractiveness was due to differential infant behavior rather than to infant attractiveness.⁵ Second, we examined maternal attractiveness to determine if the observed differences were a function of the mother's rather than the infant's attractiveness. There was virtually no correlation between the two indicating that the mothers' attractiveness could not account for our findings. The zero-order correlation between mother and infant attractiveness may also suggest that although specific facial features are no doubt inherited from parents, attractiveness per se probably is not. The lack of relationship between mother and infant attractiveness may account for the informal observation that siblings often show a strong family resemblance with respect to one or more specific facial features even though they may often be quite different in levels of attractiveness. Apparently, the configuration of the entire face determines attractiveness rather than specific features (also see Langlois & Roggman, 1990).

Finally, the analysis of change in maternal behavior and attitudes as a function of change in infant attractiveness over time was analogous to a natural experiment in which attractiveness was "manipulated" and corresponding changes in maternal attitudes and behaviors were observed.⁶ In this analysis, we found that infants who became less attractive had mothers whose attitudes about infants interfering in their lives became more negative. Although the other attitudinal factors were not significant in the change analysis, this Interfering in Parents' Lives attitude factor was the only attitudinal factor that significantly differentiated the attractive and unattractive infants at the newborn period in the first place. Perhaps we obtained a lack of significant

⁵ We are not suggesting here that infant behavior in general does not affect maternal behavior and attitudes. Much research demonstrates that it does. We are merely saying that, in our sample, attractive and unattractive infants did not differ in behavior and, therefore, that the differential behavior of attractive and unattractive infants cannot account for our results.

⁶ We assume that a change in maternal attitudes or behavior cannot "cause" a change in the physical appearance of infants between the age of 0 and 3 months.

differences in the behavioral factors as a function of change because of the lack of stability and relatedness in the organization of maternal behaviors from the newborn to the 3-month period. The lack of stability is not surprising in this sample of extremely young infants and young, first-time mothers; however, increased stability and organization of behavior would be expected at later time points. Examining changes in maternal behaviors and attitudes that are associated with changes in infant characteristics, in this case infant attractiveness, may be a useful approach to assist with the interpretive difficulties of the direction-of-effect problem in nonexperimental designs. Nonetheless, although we have ruled out several alternative causal hypotheses, this study remains a correlational one, and although we can say that infant attractiveness reliably predicts maternal behaviors and attitudes, we cannot say that infant attractiveness causes maternal attitudes and behaviors.

Although we have shown that attractiveness is a significant predictor of maternal behaviors and attitudes, the reader should note that we are not suggesting that the mothers in this study treated their unattractive infants badly or held negative attitudes toward them. All of the infants in this study received adequate caregiving and their mothers had positive attitudes toward them; however, attractive infants received more positive treatment and attitudes from their mothers than did unattractive infants. We do not know whether these results, obtained from a sample of low-income families, would generalize to families of other income levels, although it seems unlikely that attractiveness would have a differential impact on different socioeconomic groups. Furthermore, these findings may only generalize to firstborn infants. It is not clear whether the birth of additional children would increase or decrease the association between attractiveness and maternal behavior and attitudes. On the one hand, mothers of only one child may have little experience with the range of behavior exhibited by different infants and may therefore be more influenced by appearance. On the other hand, the addition of children to the family provides points of comparison of both behavior and appearance and thus could either increase or decrease the ability of attractiveness to predict maternal behavior and attitude.

Finally, we note that if stereotypes of attractive and unattractive people exist in the eye of the beholder, one might argue that observers could not record the behavior of mothers toward attractive and unattractive infants without bias. However, Ritter and Langlois (1988) have shown that, although global judgments about behavioral interactions are highly susceptible to biases based on attractiveness, molecular coding strategies, such as the one used in this study, effectively insulate observers from bias caused by the attractiveness of the target. We conclude, therefore, that our observations of maternal and infant behavior were not only reliable but were also accurate.

Because it is commonly assumed that appearance influences first encounters but not sustained relationships, some readers may be surprised to learn that the attractiveness of infants predicts the behavior and attitudes of their mothers. Results of other studies confirm our findings, however (Elder et al., 1985; Parke et al., 1977; Parke & Sawin, 1975) and indicate that appearance is relevant even in significant, intimate relationships. Research that examines how and why infant attractiveness pre-

dicts maternal behavior and attitudes (Barden, 1990) and that explores ways of modifying such unconscious maternal biases would make important contributions to our understanding of adult-child interaction and child development.

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