ADULT RESPONSES TO INFANT CUTENESS

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ABSTRACT

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By

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Lorenz first hypothesized that physical and behavioral characteristics of both human and nonhuman infants act as innate releasers of caregiver approach. Several studies are reviewed which indicate that adults do in fact prefer, and show a stronger positive emotional response to, pictures and drawings of babies as compared to pictures and drawings of adults. The purpose of the present study was to investigate the effects of different configurations of infant facial features, categorized according to perceived cuteness, on college students' behavior.

Forty college students from introductory psychology classes (20 males and 20 females) were tested individually. Half of the participants observed six photographs of 4-month-old infants and half observed six photographs of 8-month-old infants.

Pairs of photographs were presented via slides. During Parts 1 and 3 or the experiment, each pair consisted of two copies of the same infant. In this way, each of the six photographs was presented individually until the participant pressed a button to remove the photographs from the screen. During these presentations, recordings were made of looking time (the amount of time the participant looked at each pair before removing them from the screen), smiling (measured electromyographically

from the zygomaticus muscle of the cheek), and skin conductance responses (measured from the palm of the left hand).

During Part 2 of the experiment, the six photographs the participant had just seen during Part 1 were presented in all possible paired combinations. Paired looking time was defined as the average percent of time spent looking at each of the six photographs during this part of the experiment.

After completion of all three parts of the experiment, participants were asked to rank prints of the six photographs previously seen in their order of perceived cuteness.

A 2 x 2 x 2 (sex of participant x age of infant x cuteness ranking of photograph) multivariate analysis of variance was performed on the four dependent variables: looking time, smiling, SC, and paired looking time. Two levels of cuteness were established by considering the average value of each dependent measure for the two cutest photographs and the average value for the two least cute photographs. The only significant effect was that of cuteness. Post hoc univariate analyses revealed significant effects of cuteness for looking time and paired looking time. Photographs ranked cuter were looked at longer in all three segments of the experiment.

Looking time, smiling, and SC were further analyzed for the effects of repeated presentations (Parts 1 and 3). Looking time significantly declined from Part 1 to Part 2, and the decline was larger for the least cute photographs than for the most cute photographs. Smiling did not change from Part 1 to Part 3. The number of SCRs occurring declined from 128 during Part 1 to 57 during Part 3 (out of a total of 240 slide presentations during each part).

The observation that participants looked longer at infant photographs which they ranked higher in cuteness suggests that adults may vary their looking at real infants as a function of perceived cuteness. Of course, many cues other than facial features may contribute to the perceived cuteness of a real infant. However, if looking behavior is affected by cuteness, in whatever way cuteness is defined by the individual, it is not unreasonable to expect that this variation in adult behavior may influence the quality of adult-infant interaction. The results of the present study suggest that the infant's physical appearance and the adult's perception of cuteness be included in future studies of adult-infant interaction, particularly with respect to the organization of mutual visual regard.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Lorenz (1943; 1950) first hypothesized that physical and behavioral characteristics of both human and nonhuman infants act as sign stimuli (or innate releasing mechanisms) that elicit caregiver approach and physical contact. The term commonly used to refer to these infant characteristics, babyishness, is defined by a number of component cues including a relatively small size, a plump body with short limbs and large head, soft skin, certain behaviors such as awkward movements and crying and characteristic facial features (Hess, 1970). Prominant facial features include a short face in relation to a high and protruding forehead, large eyes placed in the middle of the face, rounded cheeks, and a small nose, mouth and chin (Bradshaw, 1969; Bradshaw & McKenzie, 1971; Gardner & Wallach, 1965). Doll manufacturers, cartoonists, and illustrators of children's books often exaggerate these features in order to create "cute" baby animals and children.

Infants whose features are more ideally "babyish" might be expected to be perceived as cuter than infants whose features are less "babyish." According to Lorenz's hypothesis, these infants should also elicit the strongest approach responses from caregivers and other adults. Although infants who are not "cute" may also elicit approach responses (for example, because they are "beautiful," or because they evoke pity), the present study is concerned only with the effects of perceived infant cuteness on adult behavior. (How individual variations in infant facial features affect adults' perceptions of cuteness is discussed in Appendix C.)

Adults' responses to pictures of babies

Studies of human adults' responses to pictures of babies and to pictures of adults indicate that women show stronger verbal preferences for pictures of babies (Fullard, Reiling, Love, & Fowler, 1975) and toddlers (Beier, Smock, Izard, & Tougas, 1957) than men do. In one study, pairs of pictures, one of an adult and one of a baby of the same species, were shown to adult men and women who were asked to judge which picture they liked more (Cann, 1953, cited in Hess, 1970). Women preferred the baby picture more often than the men did, regardless of their marital or parental status. However, men who were fathers or whose wives were pregnant preferred the baby pictures more often than other men did. In contrast, Berman (1975) found no sex difference in college students' ratings of pictures of nonhuman primate infants and adults, although, once again, infants were rated as more attractive than adults. This finding may reflect minimal differences in attitudes and experience with infants between males and females in the college environment. Children also respond positively to pictures containing infants (Bernick, 1966), and after puberty, show an increase in verbally expressed preferences for infants over adults (Fullard et al., 1975).

Pupil dilation is another possible index of preference. According to Hess (1965), pupillary dilation reflects the degree of interest or positive emotional arousal elicited by pictures. Hess and Polt (1960) used pupillary dilation to compare the responses of men and women to a picture of a baby and a picture of a woman holding a baby. It was found that women showed greater pupillary changes in response to these pictures than men did, indicating a greater preference. In a second study, Hess (1970) found that the magnitude of pupillary

dilation corresponded to the degree of babyishness conveyed by stylized drawings of human and animal faces.

It seems then, that adults prefer, and show a stronger positive emotional response to, pictures and drawings of babies as compared to pictures and drawings of adults. Moreover, it appears that these tendencies are stronger in adult females than in adult males. But do individual differences in infant facial features influence responses to infants? Evidence suggests that they do.

Two studies have employed a rating technique whereby adults were asked to judge drawings of infant faces which varied systematically in their component features. In general, one particular variation of each facial feature, such as eye position or eye size, was rated as significantly more attractive than other variations of that feature (Brooks & Hochberg, 1960; Sternglanz, Gray & Murakami, 1974). Interestingly enough, males in the Sternglanz et al. (1974) study gave significantly higher attractiveness ratings to all the pictures than females did, although the specific feature variations that resulted in the highest ratings were the same for both sexes. The amount of prior experience with children did not affect the ratings.

Studies like these are informative, but do not answer the more basic question of whether adult responses to line drawings are predictive of their responses to real infant faces. Since adults often base their impressions of other adults and children on such features as general physical attractiveness, pupil size, facial angle, iris color, and eye contact (Dion, 1974; English & Palla, 1971; Hicks, Reaney, & Hill, 1967; Jones & Moyel, 1971; Stass & Willis, 1967; Walster, Aronson, Abrahams, & Rottmann, 1966) it seems likely that adults also

will be influenced by physical features of infants. Evidence indicates that this is so.

The importance of infant physical appearance to social relations

There is some evidence that the quality of parent-infant interaction is affected by the subjectively rated cuteness of the infant; parents of cuter newborn infants engage their infants in more eye-to-eye contact, and hold and kiss their infants more than do parents of less cute infants (Parke & Sawin, 1975). However, since cuteness in this study was not objectively defined, and ratings were made by individuals other than the parent, the Parke and Sawin results must be regarded as suggestive.

Certain facial expression changes, as well as invariant physiognomic characteristics seem to be important determinants of caregiver responsiveness to infants. The smiling behavior of the infant is particularly important in maintaining caregiver proximity and positive social interaction (Bowlby, 1969; Gewirtz, 1968). Eye contact and widening of the eyes are also effective in encouraging proximity and caregiving from adults (Bennett, 1971). Stern (1974) has observed that infants influence adult behavior by initiating and terminating eye contact with them.

The purpose of the present study was to determine whether or not adults' behavior is differentially affected by the degree of cuteness perceived in photographs of infants. Although still photographs eliminate much of the variation inherent in facial expression, they provide an effective means of presenting infant facial features. The effects of facial expression are not completely eliminated so perceptions of cuteness are most likely based on the combined influence

of facial features and facial expression, as no doubt they are in everyday interactions.

The adult behavioral responses chosen for study include looking, smiling, and the skin conductance response (SCR). It was hypothesized that infant photographs ranked cuter would elicit longer looking, more smiling, and larger SCRs than infant photographs ranked less cute.

METHOD

Participants

Forty-seven college students from introductory psychology classes participated in the study. Most of the students received extra credit for their research participation. The data from seven research participants had to be discarded because of equipment problems or experimenter errors, leaving a final sample of 40 (20 men and 20 women). The average age was 20.7 years, with males significantly older than females (22.1 years and 19.3 years respectively; $t(38)=2.55$, $p < .02$). There were no differences between males and females or between participants viewing older and younger babies in the average amount of contact they currently had with infants. Thirty of the 40 participants stated that they had had regular contact with infants at some time since they entered high school. The number of participants with previous infant contact did not differ significantly for the sexes or for any of the conditions to which participants were assigned.

The only restriction placed on research participants was that they be able to see reasonably well at a distance of three feet without eye glasses. This restriction was necessary, since eye movements could not easily be observed in participants wearing glasses because of reflections from the lenses.

Stimuli

Six photographs of 4-month-old infants and six photographs of 8-month-old infants were used as stimuli. These photographs were chosen from a larger collection of infant photographs on the basis of cuteness ratings obtained in an earlier investigation (see Appendix C). Each participant observed photographs from only one age group.

Apparatus

Pairs of photographs of infants were presented via slides, rear projected on a 48.5 by 41.5 cm screen set into one wall of a sound-attenuated booth containing a comfortable arm chair. Two Kodak Carousel slide projectors placed outside the booth were regulated by Hunter timers.

During the experiment the participant's visual fixations were recorded by an observer watching corneal reflections through a .64 cm hole placed 8.16 cm below the rear projection screen. The observer pressed two silent buttons in response to the participant's eye movements, one button when the right photograph was fixated and the other button when the left photograph was fixated. Visual fixation data were recorded on the event marker channel of a Grass Model 7 polygraph located in an adjacent room. Slide changes were also recorded polygraphically as were several physiological dependent variables.

Dependent variables

Looking time. Looking time (the amount of time spent visually fixating a stimulus) has been widely used to study the responses of adults, children, infants, and animals to visual stimuli varying

on a number of dimensions (Berlyne, 1960; Fantz, 1961; Leckart & Faw, 1968). Complexity (Leckart & Bakan, 1965; Wohlwill, 1968), novelty (Berlyne, 1958), incongruity (Berlyne & Lawrence, 1964; Connolly & Harris, 1971), and verbally expressed preferences for visual stimuli (Day, 1966) have all been found to affect adults', as well as children's, looking time. When the variables determining the information value of stimuli (predominantly complexity and novelty) are equated, looking time is primarily related to the affective value of the stimulus contents (Faw & Nunnally, 1967), with positive stimuli looked at longer than neutral stimuli. Since photographs of strange infant faces are reasonably similar in their levels of complexity and novelty, adults' looking time was expected to be positively related to their attractiveness.

In addition to being related to attractiveness of visual stimuli, looking time has been suggested as an index of approach and avoidance behavior (Webb, Matheny, & Larson, 1963). Since eye movements often are not consciously controlled, they may be a more sensitive indicator of an individual's preferences than overt verbal expressions. Looking behavior also has been found to be consistent both within sessions and between sessions (7-10 weeks apart) for individual research participants (Leckart & Bakan, 1969) and therefore is a potentially useful indicator of adult preferences for photographs of infants.

Smiling. The zygomaticus muscle, which extends between the corner of the mouth and the cheekbone, is essential to the production of a smile (Webb, 1974). Changes in this and other muscles can be measured electromyographically, and even small, visually non-observable changes can be detected (Schwartz, Fair, Greenberg, Friedman, & Klerman, 1973). The frontalis muscle, which runs vertically across

the forehead, shows little change in activity when a happy facial expression is made (Schwartz et al., 1973). An increase in activity from both of these muscles indicates a general activation of facial muscles or electrical interference with the signals, whereas an increase in activity from the zygomaticus but not the frontalis indicates smiling.

Skin conductance. SCRs are often used as a measure of emotional arousal. For example, Berlyne, Craw, Salapatek, and Lewis (1963) found that the amplitude of galvanic skin responses increased with incongruity and novelty of visual displays. Larger galvanic skin responses occurred in response to photographs considered to be aversive (dead bodies) in another study (Geer & Klein, 1969). Yet another investigation (Smith & Sloboda, 1968) discovered no systematic relationship between the type of picture viewed (pleasant, unpleasant, neutral) and log conductance change scores. Since none of the photographs of infants should be considered aversive by adults, it was hypothesized that larger SCRs should occur when the cuter pictures were being viewed.

Procedure

The experimental procedure was first explained to the participant (Appendix B), questions were answered, and signatures were obtained on the standard Department of Psychology Research Consent Form (Appendix B).

The participant's left palm, left cheek and left forehead were cleaned with 70% ethanol and allowed to dry prior to electrode attachment. Two silver/silver chloride electrodes with contact areas of .78 cm^2 were then attached to the hypothenar eminence of the left hand approximately 1.5 cm apart (see Bundy & Fitzgerald, 1975).

The electrolytic medium used was a Unibase preparation (Lykken & Venables, 1971). These electrodes were used to measure SC changes.

Four Grass miniature silver electrodes (contact area = .12 cm^2) were attached to the participant's face in order to measure facial expression changes electromyographically. Beckman Offner Paste was used as the electrolyte. Two electrodes were placed side-by-side over the zygomaticus muscle and the other two electrodes were placed side-by-side over the frontalis muscle of the forehead.

Grounding was provided by a metal plate covered with Offner Paste and attached to the participant's left wrist.

After the electrodes were attached, participants were seated inside the experimental booth and asked to relax for a few minutes while electrode connections and equipment functioning were checked. When everything was in order, the instructions for Part 1 of the experiment were given via an intercom located inside the booth (see Appendix B for instructions read to the participants). When the experimenter was certain that the instructions were understood, Part 1 began.

Part 1 consisted of the presentation of a control photograph (from the appropriate age group) paired with itself followed by each of the six stimulus photographs paired with themselves. The purpose of the control photograph was to prevent large initial responses from being included in the main analysis. The participants controlled the length of time each pair was on the screen by pressing a button attached to the chair inside the booth when they were tired of looking at a particular pair. The next pair was then automatically projected after a 15 second blank slide interval (used to allow physiological responses to return to baseline).

After all six stimulus pairs were shown, Part 2 began. Participants were instructed over the intercom to simply look at the pairs of photographs during this part of the experiment. All possible pairs (30) of the six stimulus photographs were shown for 10 seconds each with a blank slide interval of 1-2 seconds between each pair.

Part 3 was the same as Part 1.

In Part 4 participants were asked to rank prints of the six photographs previously seen in their order of cuteness. Participants were asked questions about their prior experience with infants and then were debriefed. Debriefing consisted of an explanation of the experiment in more detail. Polygraph records were shown to interested participants, and those who wished to receive a copy of the general results of the experiment were asked to fill out an envelope with their name and address.

Slides within both age groups were presented in two different orders (List 1 and List 2). One order was the reversal of the other (see Appendix A, Table A1). Experimental conditions and the number of participants assigned to each are shown in Table 1. Participants were systematically assigned to a condition depending on their sex and order of testing.

Eye movements were recorded by one of five different observers. A double-observer system was used to determine inter-observer reliabilities. Two observers simultaneously recorded the looking behavior of a single participant who looked at approximately 18 pairs of slides for eight seconds each. The amount of time recorded for each side of each slide was correlated for each pair of observers. These correlations averaged .85 with a range of .69 to .94 and are consistent with general findings in this area.

Table 1

Number of Participants Assigned to Each Experimental Condition

Infant Age Group	Order of Presentation	Males	Females
4-Month	List 1	5	5
	List 2	5	5
8-Month	List 1	5	5
	List 2	5	5

Data scoring

Looking time, smiling, and SC were scored during Parts 1 and 3.

The looking time score for each slide was the total amount of time spent fixating the slide before the participant pushed the button to remove the slide from the screen.

The smiling measure consisted of the percent change in average zygomaticus EMG activity from the 5-second preslide interval to the slide-on interval, scored using the integrated signal. Segments of the integrated recording which were affected by artifacts or general facial movement were not scored. These segments were identified by visual inspection of the raw EMG signals from the zygomaticus and frontalis muslces. The last second of each slide-on interval was discarded due to equipment ertifact.

The magnitude of the first SCR beginning during the five seconds following slide onset was measured for each slide. Because of the preponderance of non-responses (scored as zero) the SCRs for each slide in Part 1 and Part 3 were combined for most analyses.

During Part 2 only paired looking time was scored. (The term "paired looking time" will be used to distinguish this variable from the looking time measured during Parts 1 and 3.) The percent of time spent looking at each slide in each pair was first calculated, and then the average percent of time spent looking at each of the six slides was determined.

RESULTS

Rank orders of the photographs (obtained during Part 4) were significantly intercorrelated ($\bar{r}$ [18]=.54, $p < .02$ for participants viewing photographs of 4-month-olds; $\bar{r}$ [18]=.47, $p < .05$ for participants viewing photographs of 8-month-olds), although there were considerable individual differences. There were 18 different orders for the 20 participants viewing photographs of 4-month-olds and 16 different orders for the 20 participants viewing photographs of 8-month-olds. The average ranks for each photograph were significantly correlated for males and females viewing photographs of 4-month-olds (r[4]=.86, $p < .05$) and for males and females viewing photographs of 8-month-olds (r[4]=.85, $p < .05$) (see Appendix A, Table A2), indicating that individual variations in rankings were not systematically related to sex of participant. Because of the variability in cuteness rankings, further analyses relate participants' responses to their own rankings of the photographs rather than the actual photographs viewed.

Single factor analyses of variance with order of presentation as the independent variable were performed for looking time, smiling, and SC. Looking time and smiling were further analyzed for interactions between time seen (Part 1 or Part 3) and order of presentation. There were no significant effects of order. Accordingly the order of stimulus presentation to which a participant was assigned was excluded from subsequent analyses.

A 2 x 2 x 2 (sex of participant x age of infant x cuteness ranking of photograph) multivariate analysis of variance was performed on the four dependent variables: looking time, smiling, SC, and paired looking time. Two levels of cuteness were established by considering the average value of each dependent measure for the two cutest photographs and the average value for the two least cute photographs. Data for Parts 1 and 3 were combined for looking time, smiling, and SC. An alpha level of .05 was distributed among the separate tests in this analysis and the multivariate analysis reported below.

The only significant multivariate F was that for cuteness ($F[4,33]=17.65$, $p < .05$, see Appendix A, Table A3). Variations in looking time, smiling, SC, and paired looking time as a function of ranked cuteness are illustrated in Figures 1 through 4. Post hoc univariate analyses revealed significant effects of cuteness for looking time ($F[1,36]=24.65$, $p < .05$) and paired looking time ($F[1,36]=41.54$, $p < .05$).

The computer program used for this analysis constructs a correlation matrix for the variables under consideration. Three significant positive correlations were found in the 28 which were calculated. Average amount of looking was correlated at $r(38)=.41$ ($p < .05$) with the difference in looking between the most cute and the least cute photographs. Similarly, average amount of smiling was correlated at $r(38)=.84$ ($p < .01$) with the difference in smiling between the most cute and the least cute photographs. Individuals who looked at the photographs longer overall showed a larger differentiation in looking between most cute and least cute photographs than individuals who looked less overall. The same type of relationship held for smiling. However, since the correlation between looking and smiling was -.19 (n.s.), the participants

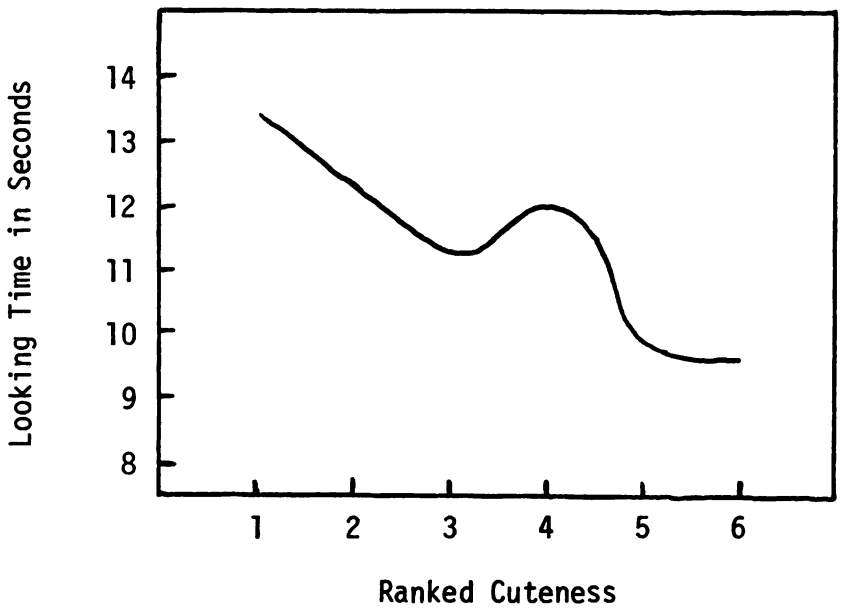

Figure 1. Time spent looking at infant photographs at each cuteness rank.

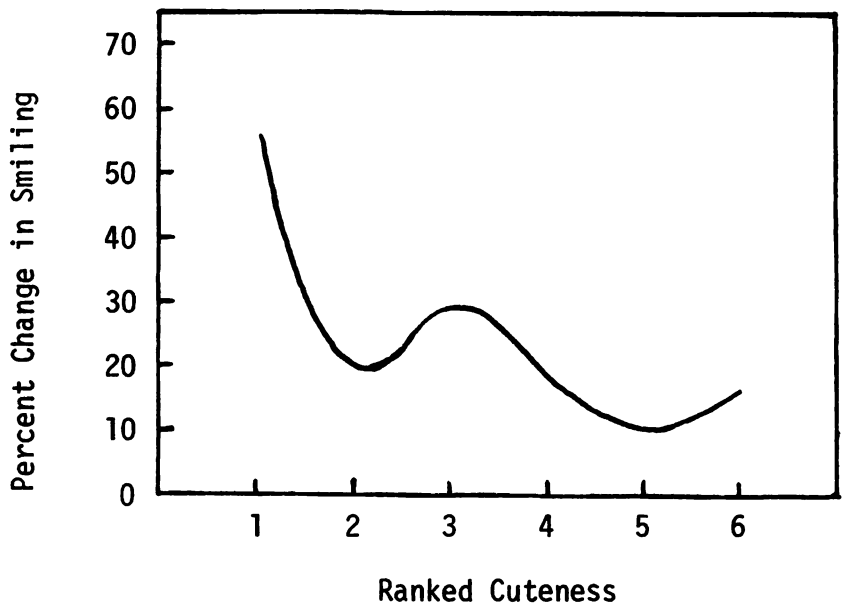

Figure 2. Percent increase in smiling during presentation of infant photographs at each cuteness rank.

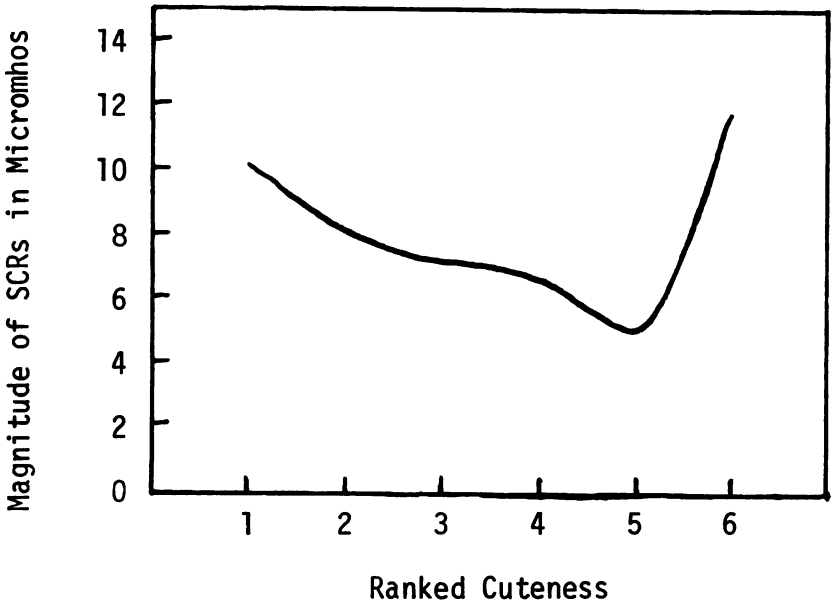

Figure 3. Magnitude of SCRs to infant photographs at each cuteness rank.

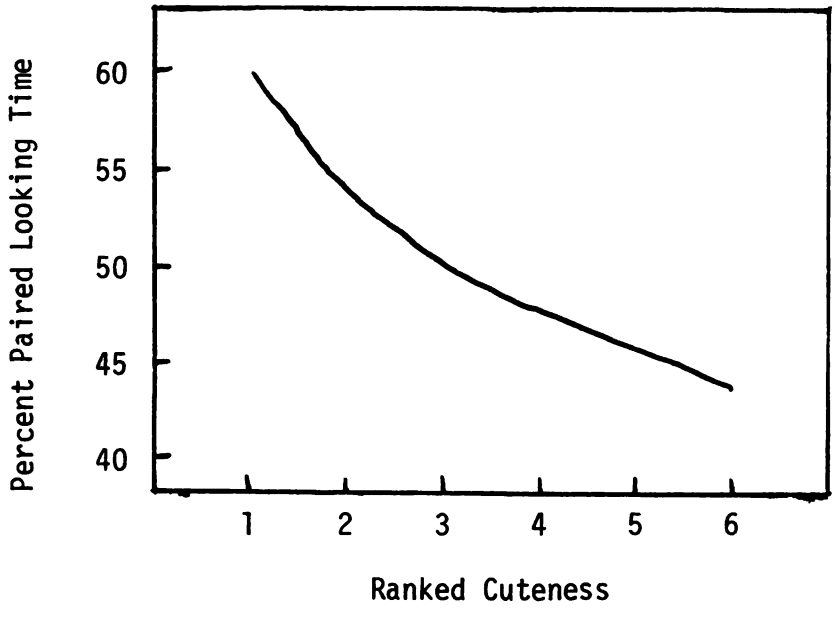

Figure 4. Average percent of paired looking time spent looking at infant photographs at each cuteness rank.

who looked for a long time were not necessarily those who smiled a great deal. The third significant correlationwas that between paired looking time and the difference in smiling between the most and least cute photographs (r [38]=.49, $p < .01$).

A 2 x 2 x 2 x 2 (sex of participant x age of infant x cuteness ranking x time seen) multivariate analysis of variance was performed on looking time and smiling to assess the effect of repeated presentations (Part 1 and Part 3). The results of this analysis are presented in Appendix A, Table A4. Significant multivariate F ratios were obtained for cuteness (F[2,35]=16.19, $p < .05$), time seen (F[2,35]=12.61, $p < .05$), and the interaction between cuteness and time seen (F[2,35]=7.99, $p < .05$). The effect of cuteness could be attributed to looking time (F[1,36]=23.32, $p < .05$), as in the first analysis. The time seen effect also was due to looking time (F[1,36]=25.92, $p < .05$). Looking time decreased from 13.9 seconds per slide during Part 1 to 8.9 seconds per slide during Part 3. The significant interaction between cuteness and time seen, again due to looking time (F[1,36]=13.82, $p < .05$), indicated that the amount of decline in looking time was dependent on cuteness level. As illustrated in Figure 5, the decline in looking was less for the cuter photographs.

Because SCRs occurred to only 38.54% (185/480) of the photograph presentations, an analysis of variance was deemed inappropriate to determine the effect of repeated presentation. There was a significant decline (z=7.22, $p < .001$) in the rate of response from Part 1 (53.33%; 128/240) to Part 3 (23.75%; 57/240).

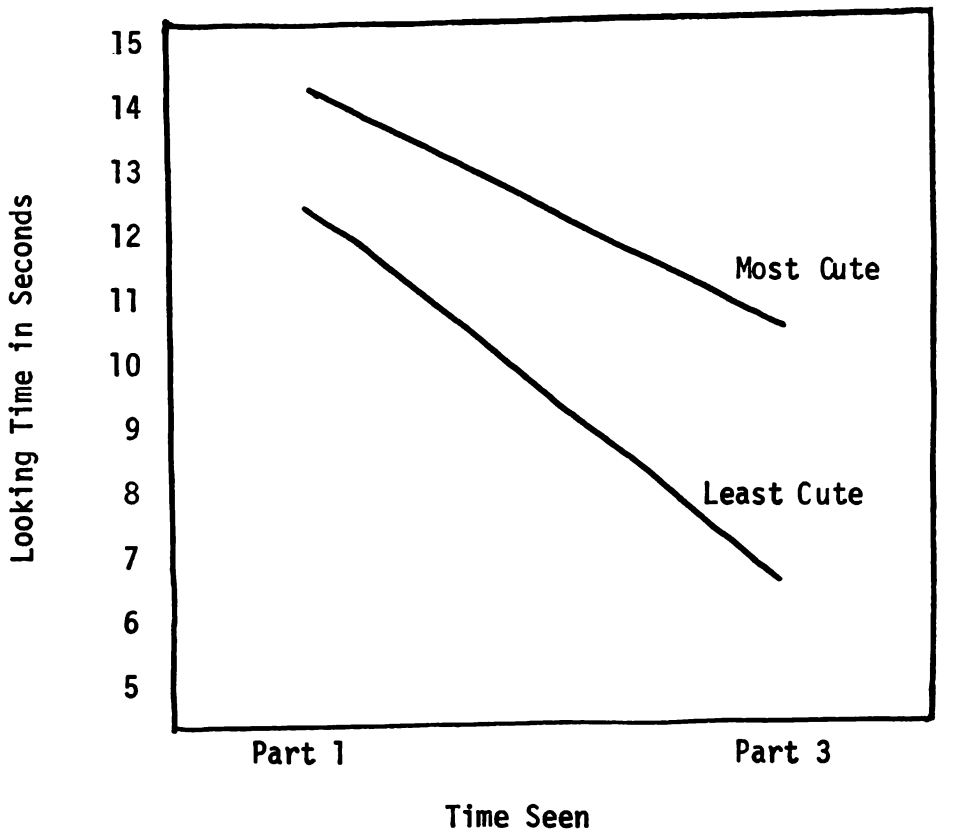

Figure 5. Interaction between cuteness ranking and time seen for looking time.

Although the purpose of the control slide was to eliminate large initial responses from being included in the main analysis, how participants responded to this slide was of interest since Berlyne (1958) has found that degree of novelty and length of looking are positively related. The control slide was seen twice, once at the beginning of Part 1 and once again at the beginning of Part 3. Based on Berlyne's findings, it was predicted that the second presentation of the control slide would elicit prolonged looking, since it would be relatively novel compared to the other pictures, each of which had been presented 11 times prior to the second presentation of the control slide.

Separate 2 x 2 x 2 (sex of participant x age of infant photograph viewed x time seen) repeated measures analyses of variance were performed for looking and smiling at the control slide. There were no significant effects or interactions for either analysis.

Wilcoxon matched pairs signed-ranks tests were then performed to determine whether or not looking and smiling at the control slide changed relative to looking and smiling at the other six slides. The basic datum for this analysis was the number of slides looked or smiled at less than the control slide during Part 1 and during Part 3. The change in rank was significant for looking time (z=3.44, $p < .001$, one-tailed test) with a larger number of slides being looked at less than the control slide during Part 3 than during Part 1. There was no significant change in rank for smiling.

A SCR to the control slide occurred for half the participants during both Part 1 and Part 3. This frequency of response was significantly higher than the frequency of response to the other six slides during Part 3 ($\chi^2[1]$=15.22, $p < .001$).

DISCUSSION

The hypothesis that college students' behavior is differentially affected by the degree of perceived cuteness of infant photographs was confirmed for looking time. Photographs ranked as cuter were looked at longer. It is possible that looking preferences were elicited by something other than perceived cuteness, and that the participants' perceptions of cuteness were directly determined by how long they looked at a particular photograph. However, this explanation seems unlikely because of the short lengths of time involved and because of the general comment by many participants that they had looked longer at the cuter babies.

Smiling increased when the photographs were on the screen (Figure 2), indicating that smiling is a likely response to a photograph of an infant. Before accepting this conclusion, however, it is necessary to determine whether or not an increase in smiling is a general response to any photograph. The amount of smiling was not significantly related to ranked cuteness of the photographs. It is possible that with a wider range of cuteness, a relationship between smiling and cuteness would be evident, although it is also possible that smiling is a general response to infants regardless of their cuteness. The high positive correlation between average amount of smiling and the difference in smiling between the most cute and least cute photographs indicates that participants who smiled a lot did discriminate between levels of cuteness in their smiling responses. A significant effect of

cuteness on smiling might be evident if only the data from participants who consistently smiled were considered. There was slightly more smiling to the cutest photograph than to the others (Figure 2). Another problem with the smiling measure can be traced to the instructions given to the participants (Appendix B). They knew their facial expressions were being monitored both electromyographically and supposedly by an experimenter's observation. They were told to try to keep their face in a natural position. Some participants may have tried harder to maintain a "straight face" than others, and the instructions in general may have eliminated much of the smiling which would have occurred naturally. Diverting the participant's attention away from his or her face may eliminate this problem. However, Schwartz et al. (1973) attached electrodes to other parts of their participants' bodies to help keep their attention away from their faces, and found no differences in pattern of responses from a condition where facial expression obviously was being monitored.

SC also was unrelated to ranked cuteness. The major problem with this measure was the marked degree of response variability. SCRs occurred to only 38.33% of the presentations of photographs, and there was a wide range in the magnitude of the responses. Apparently, watching slides of infants is not a very arousing experience, at least as reflected by SCRs.

Repeated exposure to photographs of infants produced shorter voluntary looking times and a decrease in the number of SCRs from Part 1 to Part 3. There was not, however, a decrease in looking, smiling, or the size of the SCR within Parts 1 and 3, implying that there was no rapid habituation of responses to the photographs. The control slide, which was relatively novel both times it was seen,

was responded to in the same way both times. This indicates that the observed habituation of looking and SCRs from Part 1 to Part 3 was specific to the six infant photographs each participant was exposed to and not a generalized habituation to all infant photographs. The increase in rank of the control slide for looking time supports the general observation that novel stimuli are looked at longer than are familiar stimuli.

There were no significant differences in the length of time photographs were looked at, in the amount of smiling, and in how the photographs were ranked for the two sexes. A more important consideration than sex when investigating responsiveness to infant photographs might be experience with infants. Participants in this study reported no sex differences in experience with infants.

The observation that participants looked longer at infant photographs which they ranked higher in cuteness suggests that adults may vary their looking at real infants who differ in perceived cuteness. Of course, with real infants there are many more cues than just facial features that may contribute to a perception of cuteness. But if looking behavior is affected by cuteness, however it is defined by an individual, this variation in adult behavior could affect the development of individual infants.

Eye contact between an adult and an infant contributes to the attachment process (Robson, 1967), is related to visual fixation behavior of female infants (Moss & Robson, 1968), and shows a temporal patterning very similar to that of adult verbal conversation (Jaffe, Stern, & Peery, 1973). The amount of time a mother looks at her infant has also been shown to be positively related to the infant's

total fixation time when shown a series of pictures (Noll, 1971), and the sight of an adult's eyes seems to be a "setting event" for infant conditioning (Bloom, 1974). Although Bloom (1974) found that an averted gaze was just as effective a catalyst for learning as was a direct gaze, in natural situations an adult's eyes are most likely to be visible to the infant when the adult is looking at the infant.

Stern (1974) investigated the mutual gazing patterns of mother-infant dyads in detail. He found that the infant initiates and terminates 94% of all mutual gazes, which might imply that the looking behavior of the mother is irrelevant to the patterning of eye contact. However, he also noted that when the mother was gazing at the infant, the probability that the infant would initiate a gaze was increased and the probability that the infant would terminate a gaze was decreased. So, although the infant controls the exact timing of mutual gazes, the mother's looking behavior certainly influences this timing.

Since the frequency and duration of mutual visual regard appears to be related to some aspects of infant development, and since an adult's looking at an infant seems to be influenced by how cute the infant is perceived to be, more information on how "cuteness" is defined would be enlightening. The amount of contact an adult has with other infants may determine how important perceived cuteness is to his or her behavior. Also, if repeated experience with an infant increases perceived cuteness, parents' behavior may be only minimally affected by their own infant's physical appearance. Parke and Sawin (1975) observed that parents of cuter newborn infants looked longer at their infants during the first few days of the infant's life, but whether or not this increased looking leads to an earlier or stronger than

average establishment of a pattern of mutual gaze is unknown. How the pattern of mutual visual regard develops from this point surely depends on a variety of factors. For example, both parental attitudes and sex of the infant have been shown to be relevant to the development of mutual gaze patterns (Moss & Robson, 1968). The results of the current study suggest that the physical appearance of the infant, and adults' perceptions of the infant's cuteness be included in future investigations of adult-infant relations, particularly in regard to mutual gazing behavior.

APPENDICES

APPENDIX A

APPENDIX A

SUPPLEMENTARY TABLES

Table A1

Order of Presentation of Stimuli

	Infant Age Group			
	4 Months		8 Months	
	Left Slide Tray	Right Slide Tray	Left Slide Tray	Right Slide Tray
Part 1	control	control	control	control
	14	14	8	8
	6	6	12	12
	5	5	5	5
	7	7	10	10
	12	12	18	18
	13	13	14	14
Part 2	12	7	12	8
	14	13	14	18
	7	5	8	5
	6	12	10	12
	5	14	5	14
	13	12	18	12
	6	5	10	5
	12	14	12	14
	13	6	18	10
	14	7	14	8
	5	13	5	18
	7	6	8	10
	12	5	12	5
	14	6	14	10
	7	13	8	18
	(slide trays are then changed sides for remaining 15 pairs)			
Part 3	Same as Part 1.			

Note. The order of presentation for half the participants was the reverse of that above.

Table A2

Average Rankings of Each Infant Photograph

by Male and Female Participants

Infant Age Group	Photograph	Males	Females
4 Months	13	1.8	1.8
	5	2.2	2.2
	12	3.6	2.9
	6	3.1	4.0
	14	4.5	5.3
	7	5.8	4.8
8 Months	5	1.3	2.9
	8	2.5	1.9
	10	3.1	3.3
	14	4.1	3.7
	12	4.2	3.8
	18	5.8	5.4

Table A3

Multivariate Tests of the Effects of Sex of Participant, Age of Infant in Photographs, and Cuteness Rankings of Photographs on Looking Time, Smiling, SCR, and Paired Looking Time

Source	$MS_{hypothesis}$	MS_{error}	df	F	p
Sex	---	---	4, 33	.69	.61
Age	---	---	4, 33	.50	.74
Sex x Age	---	---	4, 33	1.08	.38
Cuteness	---	---	4, 33	17.65	.0001*
Univariate Post Hoc					
Looking	376.69	15.28	1, 36	24.65	.0001*
Smiling	2.59	.73	1, 36	3.56	.07
SCR	10.00	155.91	1, 36	.06	.80
Paired Looking	5336.10	128.46	1, 36	41.54	.0001*
Sex x Cuteness	---	---	4, 33	.56	.69
Age x Cuteness	---	---	4, 33	.94	.45
Sex x Age x Cuteness	---	---	4, 33	.84	.51

*Significant at α = .05

Table A4

Multivariate Tests of the Effects of Sex of Participant, Age of Infant in Photograph, Cuteness Rankings of Photographs, and Time Seen (Part 1 or Part 3) on Looking Time and Smiling

Source	$MS_{hypothesis}$	MS_{error}	df	F	p
Sex	---	---	2, 35	.52	.60
Age	---	---	2, 35	.30	.74
Sex x Age	---	---	2, 35	1.82	.18
Cuteness	---	---	2, 35	16.19	.0001*
Univariate Post Hoc					
Looking	1452.03	62.27	1, 36	23.32	.0001*
Smiling	11.55	2.92	1, 36	3.96	.05
Sex x Cuteness	---	---	2, 35	.12	.88
Age x Cuteness	---	---	2, 35	.90	.42
Sex x Age x Cuteness	---	---	2, 35	1.39	.26
Time	---	---	2, 35	12.61	.0001*
Univariate Post Hoc					
Looking	3422.50	132.04	1, 36	25.92	.0001*
Smiling	.21	2.19	1, 36	.10	.76
Sex x Time	---	---	2, 35	2.35	.11
Age x Time	---	---	2, 35	.60	.56
Sex x Age x Time	---	---	2, 35	1.73	.19
Cuteness x Time	---	---	2, 35	7.99	.0014*
Univariate Post Hoc					
Looking	191.84	13.88	1, 36	13.82	.0007*
Smiling	1.43	1.86	1, 36	.76	.39
Sex x Cuteness x Time	---	---	2, 35	1.82	.18
Age x Cuteness x Time	---	---	2, 35	1.61	.21
Sex x Age x Cuteness x Time	---	---	2, 35	.22	.80

*Significant at $\alpha = .05$

APPENDIX B

APPENDIX B

PARTICIPANT FORMS AND INSTRUCTIONS

Instructions to Participants

We are interested in how adults respond to photographs of infants. In particular, we want to find out how pictures of different babies affect your general level of arousal (as measured by the galvanic skin response) and very small changes in facial expression (as measured by electromyography). To make these measurements I will attach two sensors to the palm of your left hand, a metal plate to your left wrist and four small sensors to your face. These sensors can pick up very small changes in skin sweating activity and muscle movement. These changes will be recorded by equipment in the next room while you look at photographs of babies.

During the experiment you will be seated inside this booth and photographs of babies will be projected from back here onto the screen in front of you. Some of the time you will be asked to control slide changes by pushing a button on the arm of the chair inside the booth; at other times the slide changes will be automatic. You will be instructed over an intercom inside the booth as to exactly what you are to do.

While you are looking at the photographs, an observer will be watching you through a small hole below the screen. He will be watching

for any noticeable changes in facial expression. You should try to keep your face relaxed and neutral during the experiment; the sensors can detect small changes which you probably won't even notice. You should also try to keep your left hand as still as possible, without being uncomfortable, to make recording skin changes easier.

If for any reason you decide not to participate in this experiment, just let one of us know and we will stop the experiment. The intercom inside the booth is connected to the next room so I will be able to hear you if you wish to stop. Do you have any questions?

Michigan State University
Department of Psychology

DEPARTMENTAL RESEARCH CONSENT FORM

1. I have freely consented to take part in a scientific study being conducted by: Katherine Hildebrandt

   under the supervision of: H. E. Fitzgerald

2. The study has been explained to me and I understand the explanation that has been given and what my participation will involve.

3. I understand that I am free to discontinue my participation in the study at any time without penalty.

4. I understand that the results of the study will be treated in strict confidence and that I will remain anonymous. Within these restrictions, results of the study will be made available to me at my request.

5. I understand that my participation in the study does not guarantee any beneficial results to me.

6. I understand that, at my request, I can receive additional explanation of the study after my participation is completed.

Signed_____

Date_____

Instructions Read to Participants During Experiment

Part 1:

During this part of the experiment you will see pairs of baby pictures; both pictures of the pair will be of the same baby. You may look at each pair as long as you'd like. When you are tired of looking at the pair you should press the button on the right side of your chair. Be sure you press the button only once. There will then be a blank slide interval of about 15 seconds followed by another pair of pictures. You should again look at the picture as long as you'd like, and press the button when you're tired of it. You should continue to do this with each pair of pictures. Do you have any questions? (Wait for response.) The first pair will come on the screen in about 15 seconds.

Part 2:

During this part of the experiment you will see a number of combinations of the pictures you just saw. Slide changes will be automatic; all you have to do is look at the pictures. About half way through the series there will be a short break for a slide change.

Part 3:

For this part you are to do the same thing you did at the beginning of the experiment; look at each pair as long as you would like, then press the button when you are tired of a particular pair.

Part 4:

The last thing I'd like you to do before getting out of the booth is to smile broadly for a few seconds. OK, thank you.

APPENDIX C

APPENDIX C

PILOT STUDY

Introduction

The purpose of the initial study was twofold: first to investigate the relationship between rated cuteness of infant photographs and physiognomic characteristics of the infants' faces, and second to obtain a set of infant photographs varying in rated cuteness for use in a subsequent study.

Previous studies of babyishness have typically employed a rating technique whereby adults are asked to judge drawings of infant faces which vary systematically in their component features. Simple drawings were rated as appearing "young" in two related studies if the eyes were high or wide, the nose short and the mouth narrow (Bradshaw, 1969; Bradshaw & McKenzie, 1971). The position of the eyes has also been found to affect ratings of cuteness, with eyes positioned slightly above the center of the face being rated cuter than eyes placed lower or higher on the face (Brooks & Hochberg, 1960). Gardner and Wallach (1965) even developed a super "babyish" profile by exaggerating real infants' facial proportions.

An extensive investigation of the relationship between infant facial features and adults' ratings of attractiveness was conducted by Sternglanz, Gray and Murakami (1974). Eye height, eye width,

eye height and width together, iris size, and vertical feature position were systematically and individually varied. In general, one particular variation of each feature was rated as significantly more attractive than other variations of that feature. A composite drawing including the most highly rated facial features resulted in a face characterized by a high forehead and large eyes. The authors concluded that Lorenz's (1943) hypothesis that certain infantile facial features are attractive to adults was supported. The present study attempted to extend these findings to photographs of real infants.

Method

Participants

Participants were 23 male and 20 female college students recruited from various sources, the majority from introductory psychology classes. The average age of the males was 21.96 years (*SD* = 4.06 years) and of the females was 20.05 years (*SD* = 1.79 years). The majority of the participants (33/43) stated that they currently had no regular contact with infants.

Stimuli

Stimuli were obtained by photographing 14 4-month-old infants ($\bar{X}$ = 19.13 weeks, *SD* = .86) and 18 8-month-old infants ($\bar{X}$ = 35.29 weeks, *SD* = 1.26). Infants were brought to the laboratory by their parents and photographed while seated in a high chair or in their parent's lap, at a time when their facial expression was judged to be relatively neutral. Each infant was photographed at least twice. Eleven photographs from each age group were chosen to serve as stimuli with photographic quality and neutrality of expression as the principle selection criteria.

Each photograph was independently rated or measured by two experimenters on each of the following characteristics: 1) sex (0 = female, 1 = male); 2) size of head (measured from the top of the head to the bottom of the chin with the projector at a set distance); 3) distance from top of head to line drawn between corners of eyes; 4) direction of gaze (0 = indirect, 1 = direct); 5) eye color (0 = brown, 1 = blue); 6) distance between inside corners of the eyes; 7) diameter of the iris (left and right averaged); 8) eye height (left and right averaged); 9) eye width (left and right averaged); 10) mouth (0 = open, 1 = closed); and 11) drooling (0 = no, 1 = yes).

Measurements 3, 6, 7, 8, and 9 were made with the photograph adjusted so that the distance from the top of the head to the chin was 192 millimeters. All of the measurements were made to the nearest millimeter; disagreements between the two experimenters were resolved by averaging the two measurements. In no case did the two experimenters disagree by more than three millimeters.

Procedure

Each participant observed 30 pairs of infant photographs for 10 seconds each. The photographs were presented via slides rear projected on a screen set into one wall of a booth containing a comfortable arm chair. Participants were instructed to decide which photograph of a pair was cuter, and then to circle LEFT or RIGHT on a prepared form, corresponding to the side on which the cuter photograph appeared.

Each participant rated pairs of photographs from one age group only. Thirty pairs were randomly chosen from the 110 pairs possible when 11 stimuli are used, with the constraint that when a pair was

selected, its left-right reversal was removed from the list. When 30 pairs were chosen, this group was designated List 1. List 2 consisted of the remaining possible pairs (left-right order again randomly determined) plus five of the pairs included in List 1. These five common pairs were included to make it possible to compare, at least in part, the pattern of preferences for participants rating List 1 and those rating List 2. The order of presentation of pairs in each list was randomized, except that the five common pairs were placed at the same points in each list (pairs 5, 6, 11, 13, and 25). See Table C1 for the number of participants assigned to each condition.

After the participant finished the ratings he or she was asked how much contact he or she currently had with infants and what aspects of the photographs were most important in helping him or her decide which photographs were cuter.

Table C1

Number of Participants Assigned to Each Condition

Infant Age Group	Order of Presentation	Males	Females
4-Month	List 1	6	5
	List 2	5	5
8-Month	List 1	6	5
	List 2	6	5

Results

Cuteness Ratings

The results of the cuteness ratings are summarized in Tables C2 and C3. Choices for each cell are expressed in proportions, since

the number of participants within each cell varied from 5 to 21. The sum of the proportions reflects the relative number of times each photograph was rated cuter than the other 10 photographs.

A one-dimensional scaling procedure was applied to both groups of data (Guilford, 1954). A chi-square test of the internal consistency of the obtained scale values was significant (χ^2 [45] = 70.73, $p < .01$ for 4-month-olds, χ^2[45] = 65.40, $p < .01$ for 8-month-olds), indicating that more than one scale is involved. Due to the manner in which these data were collected, a multidimensional scaling procedure was not feasible. Therefore, the photographs were assigned ranks based on the magnitude of the sum of proportions for each photograph, resulting in the ranks shown in Table C4. There were no significant differences between ranks obtained for males alone and ranks obtained for females alone for either group of photographs.

Table C2

Proportion of Participants Choosing Each Photograph as Cuter Than Each Other Photograph of 4-Month-Olds

Photograph Chosen as Less Cute	Photograph Chosen as Cuter										
	4	5	6	7	8	9	10	11	12	13	14
4	xxx	.50	.70	.09	.18	.62	.64	.60	.36	.73	.27
5	.50	xxx	.00	.00	.10	.20	.36	.00	.40	.20	.10
6	.30	1.00	xxx	.10	.60	.55	.73	.40	.64	.71	.27
7	.91	1.00	.90	xxx	.91	.91	.91	1.00	.82	1.00	.91
8	.20	.82	.40	.09	xxx	.45	.45	.50	.50	.70	.14
9	.38	.80	.45	.09	.55	xxx	.45	.70	.60	.60	.30
10	.36	.64	.27	.09	.55	.55	xxx	.40	.48	.73	.50
11	.40	1.00	.60	.00	.50	.30	.50	xxx	.70	.91	.36
12	.64	.60	.36	.18	.50	.40	.52	.30	xxx	.80	.20
13	.27	.80	.29	.00	.30	.40	.27	.09	.20	xxx	.18
14	.73	.90	.73	.09	.86	.70	.50	.64	.80	.82	xxx
Σ	4.69	8.06	4.70	.73	5.05	5.08	5.33	4.73	5.50	7.20	3.23

Table C3

Proportion of Participants Choosing Each Photograph as Cuter Than Each Other Photograph of 8-Month-Olds

Photograph Chosen as Less Cute	Photograph Chosen as Cuter										
	5	6	8	9	10	12	13	14	16	17	18
5	xxx	.64	.36	.00	.45	.23	.45	.00	.36	.36	.00
6	.36	xxx	.82	.05	.45	.09	.27	.09	.36	.27	.09
8	.64	.18	xxx	.18	.45	.18	.27	.27	.55	.59	.00
9	1.00	.95	.82	xxx	.64	.73	.91	.91	.82	.82	.45
10	.55	.55	.55	.36	xxx	.18	.45	.45	.55	.45	.09
12	.77	.91	.82	.27	.82	xxx	.82	.36	.55	.91	.27
13	.55	.73	.73	.09	.55	.18	xxx	.27	.68	.45	.36
14	1.00	.91	.73	.09	.55	.64	.73	xxx	.82	.91	.27
16	.64	.64	.45	.18	.45	.45	.32	.18	xxx	.45	.09
17	.64	.73	.41	.18	.55	.09	.55	.09	.55	xxx	.09
18	1.00	.91	1.00	.55	.91	.73	.64	.73	.91	.91	xxx
Σ	7.79	7.15	6.69	1.95	5.82	3.50	5.41	3.35	6.15	6.12	1.71

Table C4

Rank Order of Photographs

4-Month-Olds				8-Month-Olds			
Rank	Photo	Sex	Sum of Proportions	Rank	Photo	Sex	Sum of Proportions
1	5	M	8.06	1	5	F	7.79
2	13	M	7.20	2	6	F	7.15
3	12	F	5.50	3	8	F	6.69
4	10	M	5.33	4	16	F	6.15
5	9	F	5.08	5	17	F	6.12
6	8	M	5.05	6	10	M	5.82
7	11	F	4.73	7	13	F	5.41
8	6	M	4.70	8	12	M	3.50
9	4	F	4.69	9	14	M	3.35
10	14	F	3.23	10	9	M	1.95
11	7	M	.73	11	18	F	1.71

Binomial tests of the differences in ratings on the five common pairs between the two lists showed that there were no significant

differences for the 4-month-old lists and one significant difference for the 8-month-old lists (p = .03 for the pair including photographs 16 and 13).

Relationship Between Cuteness Ratings and Facial Features

The measurements and ratings of the facial features of the infants in the 11 photographs in each group are shown in Tables C5 and C6 with the photographs arranged in rank order.

Table C5

Measurements and Ratings of Facial Features in Photographs of 4-Month-Old Infants

Facial Feature (See Text for Descriptions)	Photograph										
	5	13	12	10	9	8	11	6	4	14	7
1	1	1	0	1	0	1	0	1	0	0	1
2	209	228	226	242	245	248	200	250	290	200	254
3	121	107	105	112	113	114	103	115	104	113	121
4	1	0	1	1	1	1	0	0	0	0	1
5	0	1	0	0	0	1	0	0	1	0	0
6	27	34	32	34	34	30	33	33	34	36	36
7	13.0	15.0	15.0	14.0	13.0	13.5	17.5	14.9	15.5	17.0	14.0
8	12.0	11.5	13.0	12.0	11.0	12.0	13.5	11.0	13.0	10.0	10.0
9	21.0	25.0	23.5	22.0	23.0	22.5	25.5	21.0	26.0	25.5	23.5
10	1	0	0	0	0	0	1	0	1	1	0
11	0	1	1	1	0	0	1	1	0	1	1

The correlations between the ranks of the photographs and their scores on the 11 facial characteristics are reported in Table C7. Only one correlation is significant, that for the distance between the inside corners of the eyes of the 4-month-olds. Photographs of 4-month-old babies with less distance between the eyes were rated cuter than those with larger distances between the eyes. Since

this is the only significant correlation, and since the correlation for the 8-month-olds is in the opposite direction, this relationship is probably a chance finding. Due to the small amount of data available and the unsystematic appearance of graphs of facial features plotted against ranks of photographs, no further attempts were made to describe the relationship between these variables. Future studies are planned to further investigate this problem.

Table C6

Measurements and Ratings of Facial Features

in Photographs of 8-Month-Old Infants

Facial Feature (See Text for Descriptions	Photograph										
	5	6	8	16	17	10	13	12	14	9	18
1	0	0	0	0	0	1	0	1	1	1	0
2	120	112	139	135	145	118	115	125	126	124	126
3	70	71	77	73	74	66	67	69	72	70	67
4	1	1	1	1	1	0	1	1	1	0	0
5	1	0	1	0	1	0	1	1	1	1	1
6	21	20	29	28	27	18	22	20	18	20	20
7	9.0	9.0	8.0	9.0	8.0	10.0	11.0	9.0	9.0	9.0	10.0
8	6.0	8.0	7.0	6.5	6.5	6.5	8.0	7.0	7.0	6.5	7.0
9	14.5	15.0	14.5	14.0	14.0	15.0	17.0	15.0	14.0	14.0	15.0
10	0	0	1	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	1	0	1

The participants' statements about which features of the photographs were most important in helping them decide which were cuter are summarized in Table C8. The number of responses elicited from participants by the three experimenters were not significantly different (t = .93, 1.34, 1.20, $p < .05$).

Table C7

Correlations Between Cuteness Rankings and Facial Features

Facial Feature	4-Month	8-Month
1	-.23	.54
2	-.03	-.03
3	.08	-.45
4	-.02	-.58
5	-.06	.39
6	.65*	-.36
7	.38	.38
8	-.49	.04
9	.28	-.07
10	.18	-.30
11	.18	.48

*$p < .05$

Table C8

Features of the Photographs Mentioned as Being Most Important When Rating Cuteness

	Number of Responses						
	4-Month-Olds			8-Month-Olds			
Feature	Males	Females	Total	Males	Females	Total	Total
Facial Expression	9	7	16	6	10	16	32
Eyes	6	8	14	10	8	18	32
Hair	4	6	10	9	3	12	22
Fatness	4	3	7	9	3	12	19
Facial Proportions	2	3	5	4	0	4	9
Ears	2	1	3	4	2	6	9
Complexion	1	1	2	0	3	3	5
Nose	0	1	1	2	1	3	4
Drooling	2	0	2	1	0	1	3
Mouth	1	1	2	1	0	1	3
Eyelashes	0	3	3	0	0	0	3
Markings on Face	0	0	0	2	1	3	3
Clothes	0	0	0	1	1	2	2
Miscellaneous	2	1	3	2	2	4	7

Choice of Photographs for Subsequent Study

Six photographs from each age group were chosen for use in the subsequent study. Choices were based on the following criteria:

1. 3 photographs with sum of proportions greater than 5.0 (chosen as cuter than the other 10 photographs more than half the time) and 3 photographs with sum of proportions less than 5.0 were chosen.
2. At least one of each sex in the 3 photographs with sum of proportions greater than 5.0 and in the 3 photographs with sum of proportions less than 5.0 were chosen.
3. Higher ranked photographs which were chosen were rated cuter than all lower ranked photographs which were chosen at least 50% of the time.

The six photographs chosen for each group and cell proportions (taken from Tables C2 and C3) are shown in Tables C9 and C10.

Table C9

Cuteness Ratings (Expressed as Proportions) of Photographs of 4-Month-Old Infants Chosen for Use in Subsequent Study

	Photograph Chosen as Cuter					
Photograph Chosen as Less Cute	5	13	12	6	14	7
5	xxx	.20	.40	.00	.10	.00
13	.80	xxx	.20	.29	.18	.00
12	.60	.80	xxx	.36	.20	.18
6	1.00	.71	.64	xxx	.27	.10
14	.90	.82	.80	.73	xxx	.09
7	1.00	1.00	.82	.90	.91	xxx

Table C10

Cuteness Ratings (Expressed as Proportions) of Photographs of 8-Month-Old Infants Chosen for Use in Subsequent Study

	Photograph Chosen as Cuter					
Photograph Chosen as Less Cute	5	8	10	12	14	18
5	xxx	.36	.45	.23	.00	.00
8	.64	xxx	.45	.18	.27	.00
10	.55	.55	xxx	.18	.45	.09
12	.77	.82	.82	xxx	.36	.27
14	1.00	.73	.55	.64	xxx	.27
18	1.00	1.00	.91	.73	.73	xxx

Discussion

Infant cuteness seems to be determined by a complex combination of many factors, including facial features, facial expression and individual differences in raters. Future studies utilizing a larger number of infant photographs and larger samples of adults are planned to attempt to determine exactly how these factors affect cuteness ratings. More sophisticated statistical techniques than those used here will be necessary.

In sum, the question of what makes a baby cute has been answered only tentatively. The next question -- Does the degree of perceived cuteness of an infant affect adult behavior? -- was investigated in a subsequent study.

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