

SEX DIFFERENCES IN INTEREST IN INFANTS ACROSS THE LIFESPAN

A Biological Adaptation for Parenting?

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This study investigated sex differences in interest in infants among children, adolescents, young adults, and older individuals. Interest in infants was assessed with responses to images depicting animal and human infants versus adults, and with verbal responses to questionnaires. Clear sex differences, irrespective of age, emerged in all visual and verbal tests, with females being more interested in infants than males. Male interest in infants remained fairly stable across the four age groups, whereas female interest in infants was highest in childhood and adolescence and declined thereafter, particularly for the responses to visual stimuli. The observed developmental changes in female interest in infants are consistent with the hypothesis that they represent a biological adaptation for parenting.

KEY WORDS: **Adaptation; Development; Interest in infants; Prenatal hormones; Sex differences; Socialization**

In both human and nonhuman primates, there is a clear sex difference in parental responsiveness, with females being more interested in infants and more involved in infant caretaking activities than males (Edwards 1993; Maccoby and Jacklin 1975; Maestripieri 1999). The extent to which this sex difference is the product of biological predispositions, socialization, or a combination of both is not well understood. In rhesus monkeys, a clear sex difference in interest in infants emerges by the end of the first

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year of life and persists through the lifespan (Lovejoy and Wallen 1988). Since there are no clear differences in maternal interactions with sons and daughters during the first year of life (Fairbanks 1996), sex differences in interest in infants in monkeys are unlikely to be the product of socialization. Rather, they probably reflect a combination of genetic predispositions and prenatal hormonal influences, similar to those underlying other sexually dimorphic behaviors such as sex, aggression, and play (Goy and Phoenix 1971). In humans, sex differences in interest in infants and infant-directed behavior are well known but, for the most part, they are believed to be the product of socialization. In other words, in most human societies, girls are encouraged to play with dolls, to take care of younger siblings, and to be sympathetic to the needs of others more than boys are (e.g., Edwards 1993). The role of prenatal hormonal influences, however, cannot be excluded because studies of children with Congenital Adrenal Hyperplasia (CAH) have shown that girls exposed to abnormally elevated levels of androgens in utero show masculinized aspects of behavior, including higher frequencies of rough-and-tumble play, lower frequencies of doll play, and different play partner preferences (Collaer and Hines 1995). Girls with CAH are also reported by their parents to have less interest in infants than their sisters (Leveroni and Berenbaum 1998).

Some sociocultural and biological theories concerning sex differences in interest in infants make different predictions as to how such differences should emerge and change across development. One version of sociocultural theories known as trait theory emphasizes the importance of early childhood socialization for the formation of stable, enduring psychological characteristics. Since nurturance and sensitivity are considered basic feminine traits (Feldman and Nash 1979a), trait theory predicts that females will increasingly display heightened interest in infants in childhood and adolescence and will maintain this predisposition into adulthood (Feldman and Nash 1979a). Males, on the other hand, will consistently exhibit less interest in infants than females at every stage of the life cycle. Social role theory maintains that socialization continues throughout the lifespan (e.g., Eagly 1987). From this perspective, if the purpose of socialization is to prepare boys and girls for their different adult roles in society, the pressure for sex role differentiation should increase as individuals approach adulthood. Thus, sex differences in interest in infants should emerge gradually in childhood, and social pressures on women should remain elevated through their reproductive and post-reproductive years since they are expected to play an important role in child caretaking, first as mothers and then as grandmothers. In this view, the direction and the magnitude of the sex difference in interest in infants observed in adulthood should match or amplify those observed in childhood. If in modern, industrialized societies the social roles of adult men and women have be-

come similar and interchangeable, then no clear sex differences in child socialization are expected either.

The primate data suggest that sex differences in interest in infants may be biologically determined and should emerge early in development because girls need the opportunity to learn good parenting skills before the onset of reproduction (e.g., Lancaster 1971). Interest in infants should remain elevated until puberty and the first reproductive event, to ensure that females will be sufficiently experienced and motivated to raise their first child successfully. After their first child, women should have enough experience to raise any subsequent children, and continued interest in all infants (as opposed to one's own infant) will no longer be crucial for offspring survival. Because males are unlikely to be the infant's primary caregivers and it is not crucial that they learn parenting skills early on, their interest in infants is expected to be low in childhood and remain low in subsequent stages.

Existing data on human sex differences in interest in infants are difficult to interpret with respect to the sociocultural or biological theories mentioned above. Most previous studies using both responses to images of infants and interaction with live babies have reported that girls are more interested in infants than boys are and that the sex difference first emerges at about 5 years of age (e.g., Berman et al. 1975, 1977, 1978, 1983; Blakemore 1981, 1990, 1991, 1998; Trotman et al. 1989). Fullard and Reiling (1976), however, reported that female preferences for infants developed in adolescence (between grades 6 and 8) whereas boys showed a smaller increase in interest in infants two years later. Studies by Feldman and Nash found no sex differences among children, a small difference among adolescents, a significant difference among high school students, and no difference among college students (Feldman et al. 1977; Feldman and Nash 1978, 1979a, 1979b; Nash and Feldman 1980). These authors also reported heightened interest in infants among new mothers compared with adult men or adult women without children, and among grandparents with infants compared with parents with adolescent children (Feldman and Nash 1978, 1979b). Goldberg, Blumberg, and Kriger (1982) report that female interest in infants increases after menarche, irrespective of age. Finally, research by Blakemore documents higher female interest in infants among both children and young adults (Blakemore 1981, 1985, 1991, 1998). Thus, although most studies have reported that young girls are more interested in infants than boys are, the findings concerning sex differences among adolescents and adults are highly inconsistent.

Part of the problem is that most studies have concentrated on specific age periods, and the findings concerning different developmental stages cannot be easily compared across studies owing to methodological differences. One exception is provided by the studies of Feldman and Nash, in

which multiple age periods were examined with similar measures. These authors explain their findings in terms of a different version of social-role theory, according to which sex differences serve a function at a time at which they are manifested. In their view, sex differences are not expected in childhood because sex roles are not meaningful to the child's major pursuits: playing, getting along with peers, and achievement in school. Sex differences should emerge in adolescence, when uncertainty about new role demands "results in a retreat to the safety of stereotypes learned long ago" (Feldman et al. 1977:675). By adulthood, "when males and females are more secure in their respective roles, there is less need to resort to stereotypic prescriptions" (1977:675). When children are born, however, and women accept traditional role responsibilities, sex-role differentiation is necessary and pragmatic. Thus women with young children are expected to show more interest in infants than men, or than women without children. By the time children are adolescents, responsivity among men and women should be comparable and differential interest in babies is no longer functional or necessary. Interest in infants should rise again when adults become grandparents, most notably among women, as individuals take new caregiving roles with their grandchildren. Although Feldman and Nash's explanations certainly fit their data, their data contradict most of the other findings in the literature, in particular with reference to the absence of sex differences in interest in infants during childhood. Furthermore, the authors tested the predictions of one theory instead of contrasting predictions from different theories. Finally, several of their reported sex differences were weak and did not reach statistical significance.

In this study we investigated human sex differences in interest in infants across the lifespan and tested the contrasting predictions concerning their developmental changes derived from sociocultural and biological theories. Similarly to some previous studies in this area, we assessed interest in infants through the responses in different visual and verbal tests. The visual tests assessed the preferences of males and females of different age groups for images depicting animal and human infants versus adults (see Berman et al. 1978; Feldman et al. 1977; Fullard and Reiling 1976). Lorenz (1943; reprinted in 1971) argued that all human beings have an evolved perceptual bias to find infantile features (e.g., round head, protruding forehead, large eyes, and round, protruding cheeks) attractive, and others have subsequently argued that such bias may be more pronounced in females than in males as an adaptation for parenting (e.g., Harlow 1971). The verbal tests assessed various aspects of interest in infants, for example, the willingness and motivation to be near them and engage in caregiving activities. Although we expected some degree of consistency across individuals in their visual and verbal responses, we hypothesized that if the biological view is correct, the sex difference in interest in infants and its ex-

pected developmental changes should be most apparent in the perceptual bias that individuals may exhibit when responding to visual stimuli.

This is consistent with an evolutionary psychological view of the human mind, in which adaptations are believed to occur at the level of psychological mechanisms rather than at the level of overt behavior (Tooby and Cosmides 1992). In this study, we used two types of visual stimuli: photos and silhouettes (drawings of face profiles) of infants and adults. Most previous studies conducted with similar procedures used only photos. We added silhouettes for two reasons: first, we wanted to use stimuli similar to those used by Lorenz to illustrate his perceptual bias hypothesis; and second, the silhouettes provide no clues about individual identity and are more likely than photos to reflect a perceptual bias toward infantile versus adult characteristics rather than beliefs and emotions associated with one's views of infants versus adults, or responses to the particular individual depicted in the photo.

METHODS

Study Participants

Study participants were 112 male and female heterosexual Americans of European descent from urban, middle-class backgrounds in Chicago and Los Angeles. Individuals from four different age groups were recruited: children (6–10 years), adolescents (11–15), young adults (19–35), and middle-aged/elderly (46–75). Table 1 shows the number and sex of individuals within each age group. In the age group of young adults, individuals were distinguished as nulliparous if they had never had children or parous if they had one or more children. Most individuals were recruited at public or private locations such as parks, restaurants, or airports. They signed age-appropriate consent forms (for minors, both the minor's and

Table 1. Classification of Study Participants by Age and Sex (young adults are also classified in relation to parity)

	N	F	M	Nulliparous		Parous	
				F	M	F	M
Children (6–10 yrs)	22	12	10				
Adolescents (11–15 yrs)	26	14	12				
Young Adults (19–35 yrs)	40	25	15	9	10	16	5
Middle-aged and elderly (46–75 yrs)	24	10	14				
Total	112	61	51				

their guardian's signatures were obtained) prior to their test and were offered \$5 as compensation for their participation. The response rate was close to 100%.

Procedure

The study participants were shown 20 pairs of images and asked which image of each pair they preferred. The two images of each pair were presented simultaneously and the study participants had about 5 seconds to express their preference. All 20 pairs of images were listed and numbered on an answer sheet, and the study participants expressed their preference by checking the box for right or left image for each pair. The first five pairs of images portrayed silhouettes (face profiles) of adult animals (rabbit, cat, dog, elephant, and bear) matched by their immature counterparts. The second set of images consisted of five silhouettes of adult humans (3 male, 2 female) matched by five silhouettes of human infants. All silhouette images were drawn by a local artist from photographs. The third set of images were five color photographs of adult animals (male lion, male orangutan, female orangutan, female gorilla, male chimpanzee) matched by their immature counterparts. The final set of images were five color photographs of adult humans (3 male, 2 female) matched by their infant counterparts. All 10 pairs of photographs included frontal shots of the face and were obtained from private collections, magazine ads, or the worldwide web. All of the photographs were enlarged or reduced so that the paired photos were similar in size. All faces had a neutral expression, and both the babies and the adults depicted in the photos were rated as very attractive by an independent observer. For all images, infant and adult stimuli were alternated on the right and left side with a balanced design.

After the visual preference test, all study participants were administered several questionnaires. Some of these questionnaires were aimed at collecting basic social and demographic information about the study participants; others were intended to assess their interest in infants. The sociodemographic questionnaires posed a number of questions about age, sexual orientation, occupation (1 = student; 2 = professional; 3 = laborer/wage earner; 4 = homemaker; 5 = retired), birth order in the family of origin, number of siblings, marital status (1 = single; 2 = single in a romantic relationship; 3 = married or living with a partner), number of own children, previous experience with infants and babysitting, and plans to have children in the future. The wording used in the questionnaires was simpler for the young age groups than for the adults, and some questions regarding demographic information were age- and sex-specific (for example, only women were asked whether they were currently pregnant, lactating, or menopausal).

Interest in infants was assessed with three main questionnaires. The first questionnaire (Interact with Baby, or IWB questionnaire) asked "If you were at a party and there was a baby in the room that you did not know, what would you most likely do?" and then listed 10 possible types of interactions with the baby (e.g., go over to see the baby at least once, ask to hold the baby, ignore the baby, actively avoid the baby). Study participants were asked to mark each of the 10 answers as true or false. Interest in infants was scored on a continuum between 0, when individuals labeled as "False" the first eight answers and "True" the last two answers, and 10 when individuals labeled as "True" the first eight questions and "False" the last two answers. The second questionnaire (Spend Time with Baby, or STWB questionnaire) consisted of a single question: "Would you rather spend 15 minutes with an adult that you found attractive or with a baby that you found adorable?" Study participants were asked to answer "adult" or "baby." In the third questionnaire (Baby Liking, or BL questionnaire), study participants were asked to check one of three statements that best described them: (1) I don't like babies; (2) I only like certain babies; (3) I like all babies. Answers were given a score of 1, 2, or 3, with 3 being associated with the highest interest in babies.

RESULTS AND DISCUSSION

Correlations between Visual and Verbal Measures

Table 2 reports the Pearson's correlation coefficients for the four types of visual stimuli and two verbal measures of preference. The STWB questionnaire requested a categorical answer and therefore is not represented. For the purpose of this and most of the following analyses, only the number of responses expressing a preference for infants or an interest in infants were used for the four types of visual stimuli and the IWB verbal response.

Table 2. Correlation Coefficients between Four Types of Visual Preferences and Two Types of Verbal Preferences

	S-A	S-H	P-A	P-H	IWB	BL
S-A	—	0.24**	0.30**	0.12	0.10	0.07
S-H	—	—	0.22*	0.36**	0.26**	0.18
P-A	—	—	—	0.33**	0.18	0.03
P-H	—	—	—	—	0.27**	0.34**
IWB	—	—	—	—	—	0.40**

S = Silhouette, A = Animal; H = Human; P = Photo

IWB = Interaction with Baby questionnaire; BL = Baby Liking questionnaire

* $p < 0.05$; ** $p < 0.01$

The five visual and verbal measures of interest in infants were all positively correlated with each other, although not all correlations were statistically significant. Specifically, the responses to the silhouettes and photos of animals or humans were all significantly positively correlated with each other, with one exception: the correlation between responses to the silhouettes of animals and the photos of humans was not significant. The two verbal measures of preference were significant positively correlated with each other and with the silhouettes and photos of humans. There were only weak positive correlations, however, between the two verbal measures of preference and the silhouettes or photos of animals. Because the two verbal measures only addressed interest in infants and did not involve a binary choice between infants and adults, the significant correlations between these measures and the responses to images of humans strongly suggest that the preferences for infant silhouettes and photos (see below) reflected true interest in infants rather just interest, or lack of interest, in adults.

Sex and Age Effects on Visual Preferences for Babies

Prior to comparing male and female responses on the visual and verbal tests, we investigated possible sex differences in demographic, social, and experiential variables that may potentially influence interest in infants. There were no significant sex differences in age (mean \pm SEM, males = 27.61 ± 2.6 ; females = 25.39 ± 2.11 ; *t*-test for unpaired samples, $t = 0.67$, *df* = 110, NS), birth order (males = 2.74 ± 0.13 ; females = 2.75 ± 0.12 ; $t = -0.08$, *df* = 110, NS), number of other children in the family of origin (males = 2.84 ± 0.16 ; females = 2.88 ± 0.18 ; $t = -0.16$, *df* = 109, NS; one missing datapoint), previous experience with babies (males = 3.31 ± 0.21 ; females = 3.77 ± 0.16 ; $t = -1.76$, *df* = 85, NS; children not included; 3 missing datapoints), or occupation (males = 2.41 ± 0.22 ; females = 2.37 ± 0.20 ; $t = 0.14$, *df* = 62, NS; children and adolescents not included). There was a significant sex difference in marital status, with females being more likely to be married or dating than males (males = 2.21 ± 0.17 ; females = 2.67 ± 0.11 ; $t = -2.41$, *df* = 61, $p < 0.05$; children and adolescents not included; one missing datapoint). There was no significant sex difference, however, in interest in or willingness to have children in the future (males = 37 out of 49; females = 50 out of 60; $\chi^2 = 1.02$, *df* = 1, NS; three missing datapoints).

Figure 1 depicts male and female preferences for baby silhouettes and photos in each of the four age groups. In general, all individuals regardless of sex and age preferred baby photos to adult photos, $t(111) = 5.05$, $p < 0.0001$. However, no such preference occurred for the silhouettes, $t(111) = 1.09$, NS. For the silhouettes, ANOVA revealed a significant main effect of sex, $F(1, 104) = 32.56$, $p < 0.0001$, with females reporting stronger preferences for babies than men but neither a main effect of age nor a significant

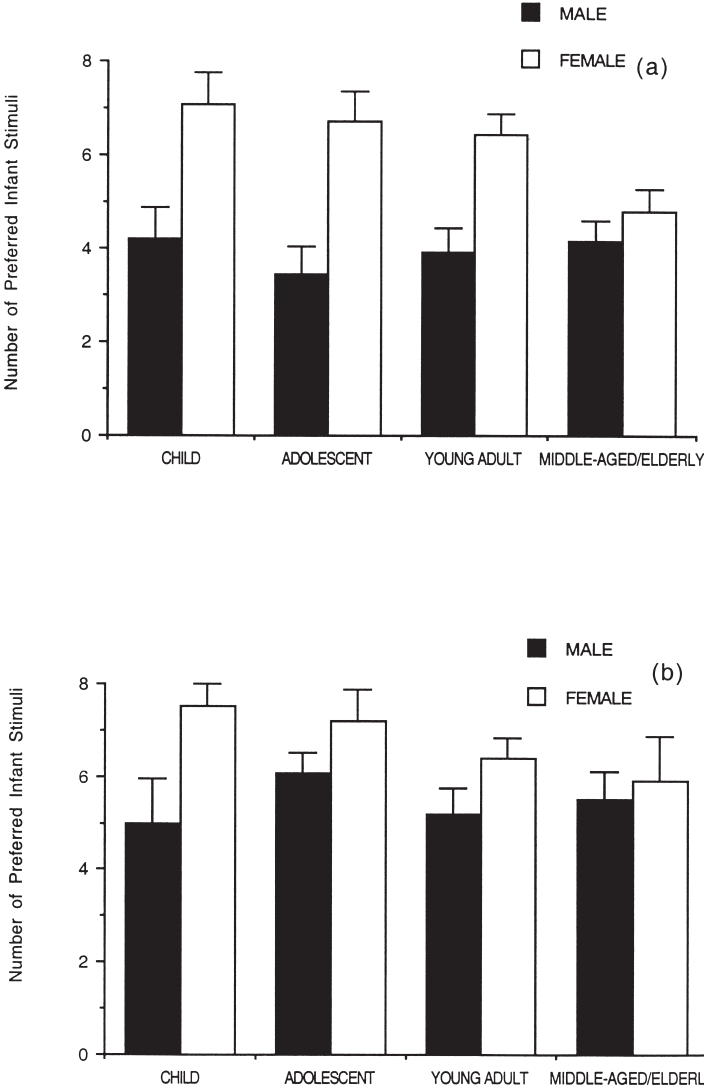


Figure 1. (a) Mean (\pm SEM) number of infant silhouettes chosen by males and females in the four age groups. (b) Mean (\pm SEM) number of infant photos chosen by males and females in the four age groups.

interaction between sex and age. The results for the photos were similar, with only a significant main effect of sex in the same direction, $F(1, 104) = 8.17, p < 0.005$. The sex differences in the attractiveness of baby versus adult images were significant for both silhouettes and photos of animals and those of humans, the magnitude of the difference being maximal for the silhouettes of humans and minimal for the photos of animals (data not shown).

The photo data support Lorenz's (1943; reprinted in 1971) hypothesis that all human beings have an evolved perceptual bias to find infantile features attractive. However, this hypothesis is not supported by the silhouette data. It may be argued that when viewing photos of infants and adults, individuals' preferences may reflect, to some extent, their previous experience with, beliefs about, and emotional responses towards infants or adults, as well as their reactions to the unique features of the individuals portrayed in the photo. The silhouettes, however, provide no clues about individual identity and are less likely than photos to trigger beliefs and emotions associated with one's views of infants or adults. Thus, it may be argued that the responses to the silhouettes reflect preferences for the perceptual characteristics of infant versus adult faces, without the confounding role of other cognitive and emotional processes. If this is the case, our data disprove Lorenz's hypothesis concerning a universal human perceptual bias toward infantile characteristics, but they are consistent with a modified version of his hypothesis, according to which female attraction to infants represents an adaptation for parenting (e.g., Harlow 1971). This hypothesis also predicts that female interest in infants should show developmental changes that are functionally related to reproduction and parenting.

When age was analyzed as a continuous variable, there was a significant negative correlation between preference for baby silhouettes and age across all females, $r = -0.33, df = 59, p < 0.01$. Thus, preferences for baby silhouettes decreased steadily as a function of female age, being maximal for children and minimal for the middle-aged/elderly (Figure 1a). This was true for both animal and human silhouettes. The correlation between preference for baby photos and female age was also negative but failed to reach statistical significance. The sex difference in childhood was mostly due to the images of humans rather than those of animals, suggesting that young girls displayed a genuine interest in the physical features of human infants rather than those of animal babies. Since choices of baby versus adult silhouettes were mutually exclusive, it is unclear whether the developmental changes observed for females reflected reduced attractiveness of baby pictures or increased attractiveness of adult pictures, or both. Correlations for males were not statistically significant.

The developmental changes in female attraction to images of infants are not consistent with the sociocultural explanations considered in this study. In fact, both trait theory and social role theory predict that female interest

in infants should remain constant or increase in adulthood. Moreover, it may be argued that sex differences in interest in infants should be even more marked in the middle-age/elderly group than in the other age groups because individuals older than 45 years were probably socialized, as children and adolescents, into more traditional sex-specific social roles than younger individuals were. Thus, the reduction in sex differences in attraction to images of infants among young adults and middle-aged individuals suggests that early socialization practices are highly ineffective or that the sex differences occurring in childhood and adolescence are not due to socialization.

Sex and Age Effects on Verbal Preferences for Babies

When answers to the IWB questionnaire were analyzed with an ANOVA, there was a significant main effect of sex, $F(1, 104) = 13.8$, $p < 0.001$, with females reporting more answers indicative of interest in infants than males but neither a significant main effect of age nor a significant interaction between sex and age (Figure 2a). In the STWB questionnaire, although both males and females generally stated that they would rather spend time with an adult than with a baby, more females expressed a preference for the baby than males did across all age groups, $\chi^2 = 11.14$, $df = 1$, $p < 0.001$ (Figure 2b). Finally, females scored significantly higher than males did in the BL test across age groups, $F(1, 104) = 6.03$, $p = 0.01$, with no main effects of age nor a significant interaction between sex and age (Figure 2c). There was no significant correlation between age and verbal preferences for infants across all females or males.

The sex difference in verbal preferences for babies is consistent with the sex difference reported for the visual measures. The strong sex difference in interest in infants among children was also apparent for the verbal measures, although there were no significant developmental trends for these measures. Interestingly, whereas middle-aged and elderly women continued to verbally express an elevated interest in infants, their answers to the questionnaires were discordant with their responses to the visual stimuli. One possible explanation for this discrepancy is that when adult and elderly women, most of whom are probably mothers or grandmothers, are directly asked about their interest in infants, they answer in conformity to the social and cultural expectations concerning their involvement in caregiving roles. When asked to provide a rapid evaluation of visual stimuli, however, their true preferences and inclinations may be more apparent.

Parity Effects

The effects of parity on visual and verbal preferences for babies versus adults were investigated only for the young adults group ($N = 40$), in which

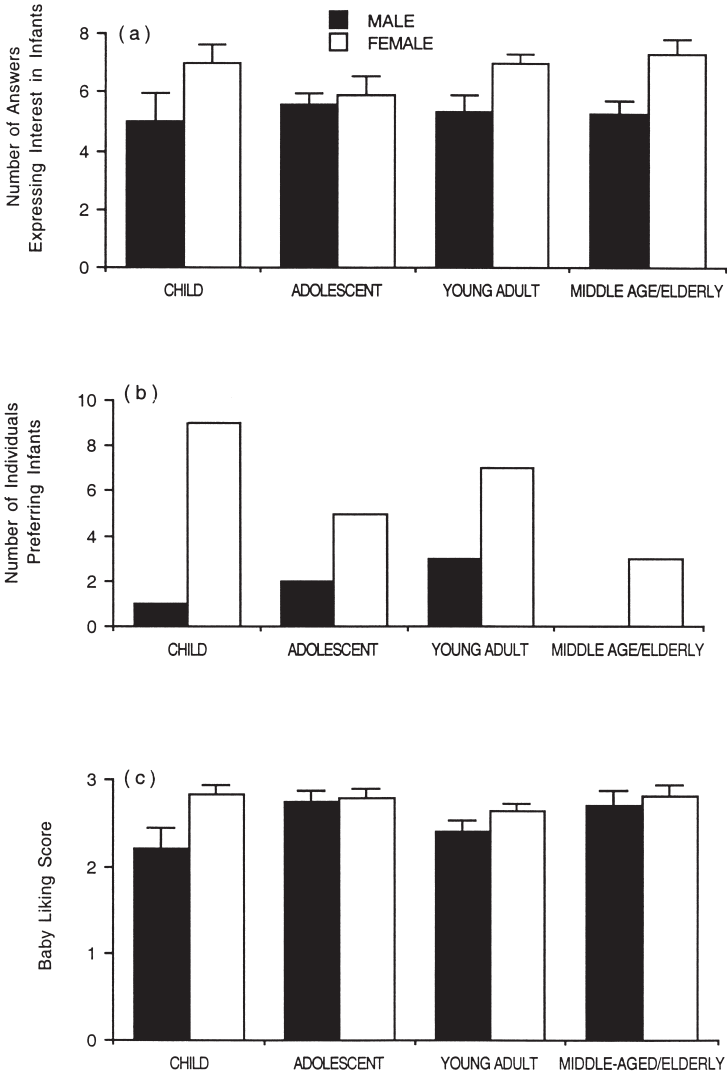


Figure 2. (a) Mean (\pm SEM) number of answers expressing interest in infants given by males and females in the IWB test in the four age groups (b) Number of males and females in the four age groups expressing a preference for spending time with a baby versus an adult in the STWB test. (c) Mean (\pm SEM) number of scores for males and females in the BL test in the four age groups.

a comparable number of individuals with and without previous children were available (see Table 1). Nulliparous and parous young adults did not differ significantly in age (nulliparous = 27.21 ± 0.65 ; parous = 29.24 ± 0.84). A two-factor ANOVA revealed no significant main effect of parity nor a significant interaction between sex and parity on preferences for infant silhouettes or photos (Figure 3a).

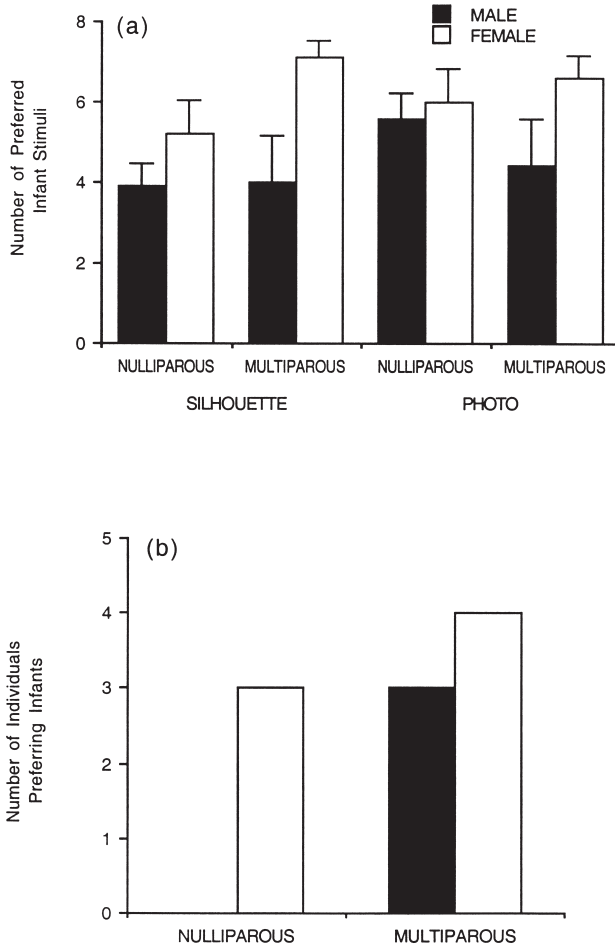


Figure 3. (a) Mean (\pm SEM) number of infant silhouettes and photos chosen by nulliparous and multiparous males in the young adults age category. (b) Number of nulliparous and multiparous males and females in the young adults age category expressing a preference for spending time with a baby versus an adult in the STWB test.

There were no significant main effects of parity nor a significant interaction between parity and sex for interest in infants as assessed with the IWB and the BL questionnaires. In the STWB test, whereas no men without children stated that they would prefer being with an infant, 3 out of 5 men with children expressed a preference for the infant ($\chi^2 = 7.5$, $df = 1$, $p < 0.01$). Both nulliparous and parous females expressed a preference for adults in this test (Figure 3b). This finding suggests that having children is more likely to affect male than female responsiveness to infants. Clearly, the influence of parity on male and female responsiveness to infants needs to be investigated with a larger sample and additional measures of responsiveness.

GENERAL DISCUSSION

When tested for visual and verbal preferences for infants versus adults, human males and females of ages ranging from 6 to 75 years showed a significant sex difference, with females showing greater preference for the infants than the males. This sex difference was stronger than that reported by most previous studies using similar or different testing procedures (e.g., Berman 1976; Berman et al. 1977, 1978; Blakemore 1985; Fullard and Reiling 1976). Furthermore, no previous study has reported a strong negative correlation between female interest in infants and age across the lifespan similar to that obtained in this study for responses to silhouettes.

The findings that female children are strongly attracted to images of babies, particularly silhouettes, and that their interest in such images declines over the course of their reproductive and post-reproductive years are consistent with the primate data and with some biological hypotheses concerning the origins of such differences. In Old World monkeys and apes, immature females are the individuals who are most interested in infants and most involved in infant handling (Maestripieri 1994). The main function of infant handling among juvenile females appears to be learning of mothering skills since females with more infant-handling experience as juveniles exhibit better parenting skills later on (Fairbanks 1990). As mentioned earlier, interest in infants by female primates is unlikely to be due to socialization and may be due to prenatal or postnatal hormonal influences (Maestripieri 2001; Maestripieri and Zehr 1998). High interest in human infants by female children and adolescents may serve the same function and be regulated by the same mechanisms as in other primates. In other words, it is possible that human females have a biologically determined perceptual bias that leads them to find infantile features attractive and that such bias is mostly expressed in their pre-reproductive years. Such perceptual bias would lead young girls to seek out interactions with

infants and allow them to gain important caretaking skills. The decline in interest in infants that occurs at later stages could be due to other neuroendocrine changes (e.g., those associated with puberty or reproduction), experience (e.g., habituation to infant stimuli), or a combination of both.

Sociocultural explanations other than those considered in this study could account for some of our findings (see Berman 1980). Moreover, interest in and interactions with infants are likely to be affected by context and experience, particularly experience that is acquired as a parent (e.g., Berman 1976; Feldman and Nash 1978). However, it must be emphasized that many previous studies failed to identify any direct influence of socialization on sex differences in interest in infants. In one of these studies, Blakemore (1990) studied interactions of 4- to 7-year-old boys and girls with their infant siblings at home. Although older girls interacted with infants more than boys did, there was no evidence that direct maternal socialization was a determinant of this difference. In a related study, Blakemore (1991) reported that adults evaluated more positively children who interacted with babies than those who did not. However, the sex of the child did not affect the parent's evaluations. Furthermore, Blakemore (1985) reported a clear sex difference in interest in infants among college students, irrespective of their traditional or feminist views of social roles. Finally, Goldberg et al. (1982) failed to find any sociocognitive explanations to account for their reported association between menarche and increased interest in infants among girls. The authors of these studies often concluded that the causes of sex differences in interest in infants and their developmental changes remained unclear.

In conclusion, findings from studies of both human and nonhuman primates suggest that prenatal and postnatal gonadal hormones should be taken into serious consideration, along with traditional social and cultural factors, as possible determinants of sex differences in interest in infants and their developmental changes. In particular, clinical human studies and experimental animal studies in which prenatal hormones are altered can shed light on some of the possible determinants of early sex differences in interest in infants. The developmental changes in interest in infants and the relative involvement of biological and experiential variables in such changes can be addressed by future experimental studies focusing on crucial transition periods such as puberty or first reproduction.

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REFERENCES

- Berman, P. W.
 1976 Social Context as a Determinant of Sex Differences in Adults' Attraction to Infants. *Developmental Psychology* 12:365–366.
 1980 Are Women More Responsive Than Men to the Young? A Review of Developmental and Situational Variables. *Psychological Bulletin* 88:668–695.
- Berman, P. W., P. Cooper, P. Mansfield, S. Shields, and J. Abplanalp
 1975 Sex Differences in Attraction to Infants: When Do They Occur? *Sex Roles* 1:311–318.
- Berman, P. W., V. Goodman, V. L. Sloan, and L. Fernander
 1978 Preference for Infants among Black and White Children: Sex and Age Differences. *Child Development* 49:917–919.
- Berman, P. W., L. D. Monda, and R. P. Myerscough
 1977 Sex Differences in Young Children's Responses to an Infant: An Observation within a Day-Care Setting. *Child Development* 48:711–715.
- Berman, P. W., V. L. Smith, and V. Goodman
 1983 Development of Sex Differences in Response to an Infant and to the Caretaker Role. *Journal of Genetic Psychology* 143:283–284.
- Blakemore, J. E. O.
 1981 Age and Sex Differences in Interaction with a Human Infant. *Child Development* 52:386–388.
 1985 Interaction with a Baby by Young Adults: A Comparison of Traditional and Feminist Men and Women. *Sex Roles* 13:405–411.
 1990 Children's Nurturant Interactions with Their Infant Siblings: An Exploration of Gender Differences and Maternal Socialization. *Sex Roles* 22:43–57.
 1991 Adults' Evaluations of Children Caring for a Baby: The Effects of Gender and Behavior. *Sex Roles* 24:541–549.
 1998 The Influence of Gender and Parental Attitudes on Preschool Children's Interest in Babies: Observations in Natural Settings. *Sex Roles* 38:73–94.
- Collaer, M. L., and M. Hines
 1995 Human Behavioral Sex Differences: A Role for Gonadal Hormones during Early Development? *Psychological Bulletin* 118:55–107.
- Eagly, A. H.
 1987 *Sex Differences in Social Behavior: A Social-Role Interpretation*. Hillsdale, New Jersey: Erlbaum.
- Edwards, C. P.
 1993 Behavioral Sex Differences in Children of Diverse Cultures: The Case of Nurturance to Infants. In *Juvenile Primates: Life History, Development, and Behavior*, M. E. Pereira and L. A. Fairbanks, eds. Pp. 327–338. New York: Oxford University Press.

Fairbanks, L. A.

1990 Reciprocal Benefits of Allomothering for Female Vervet Monkeys. *Animal Behaviour* 40:553–562.

1996 Individual Differences in Maternal Styles: Causes and Consequences for Mothers and Offspring. *Advances in the Study of Behavior* 25:579–611.

Feldman, S. S., and S. C. Nash

1978 Interest in Babies during Young Adulthood. *Child Development* 49:617–622.

1979a Changes in Responsiveness to Babies during Adolescence. *Child Development* 50:942–949.

1979b Sex Differences in Responsiveness to Babies among Mature Adults. *Developmental Psychology* 15:430–436.

Feldman, S. S., S. C. Nash, and C. Cutrona

1977 The Influence of Age and Sex on Responsiveness to Babies. *Developmental Psychology* 13:675–676.

Fullard, W., and A. M. Reiling

1976 An Investigation of Lorenz's "Babyness." *Child Development* 47:1191–1193.

Goldberg, S., S. L. Blumberg, and A. Kriger

1982 Menarche and Interest in Infants: Biological and Social Influences. *Child Development* 53:1544–1550.

Goy, R. W., and C. H. Phoenix

1971 The Effects of Testosterone Propionate Administered before Birth on the Development of Behaviour in Genetic Female Rhesus Monkeys. In *Steroid Hormones and Brain Function*, C. H. Sawyer and R. A. Gorski, eds. Pp. 193–201. Berkeley: University of California Press.

Harlow, H. F.

1971 *Learning to Love*. San Francisco: Albion.

Lancaster, J. B.

1971 Play Mothering: The Relations between Juvenile Females and Young Infants among Free-Ranging Vervet Monkeys (*Cercopithecus aethiops*). *Folia Primatologica* 15:161–182.

Leveroni, C., and S. A. Berenbaum

1998 Early Androgen Effects on Interest in Infants: Evidence from Children with Congenital Adrenal Hyperplasia. *Developmental Neuropsychology* 14:321–340.

Lorenz, K.

1971 Part and Parcel in Animal and Human Societies. In *Studies in Animal and Human Behavior*, Vol. II, by K. Lorenz. Pp. 115–195. Cambridge: Harvard University Press.

Lovejoy, J., and K. Wallen

1988 Sexually Dimorphic Behavior in Group-Housed Rhesus Monkeys (*Macaca mulatta*) at 1 Year of Age. *Psychobiology* 16:348–356.

Maccoby, E. E., and C. N. Jacklin

1975 *The Psychology of Sex Differences*. Stanford: Stanford University Press.

Maestriperieri, D.

1994 Social Structure, Infant Handling, and Mothering Styles in Group-Living Old World Monkeys. *International Journal of Primatology* 15:531–553.

- 1999 The Biology of Human Parenting: Insights from Nonhuman Primates. *Neuroscience and Biobehavioral Reviews* 23:411–422.
- 2001 Biological Bases of Maternal Attachment. *Current Directions in Psychological Science* 10:79–83.
- Maestripieri, D., and J. L. Zehr
1998 Maternal Responsiveness Increases during Pregnancy and after Estrogen Treatment in Macaques. *Hormones and Behavior* 34:223–230.
- Nash, S. C., and S. S. Feldman
1980 Responsiveness to Babies: Life-Situation-Specific Sex Differences in Adulthood. *Sex Roles* 6:751–758.
- Tooby, J., and L. Cosmides
1992 The Psychological Foundations of Culture. In *The Adapted Mind*, J. H. Barkow, L. Cosmides, and J. Tooby, eds. Pp. 19–136. New York: Oxford University Press.
- Trotman Reid, P., C. S. Tate, and P. W. Berman
1989 Preschool Children's Self-presentations in Situations with Infants: Effects of Sex and Race. *Child Development* 60:710–714.
- Wallen, K.
1996 Nature Needs Nurture: The Interaction of Hormonal and Social Influences on the Development of Behavioral Sex Differences in Rhesus Monkeys. *Hormones and Behavior* 30:364–378.