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Original Article

Motivational value and salience of images of infants

Nora E. Charles [a,*], Gerianne M. Alexander [b], Janet Saenz [b]

[a] Department of Psychiatry, The University of Texas Health Science Center at San Antonio, San Antonio, TX 78229-3900
[b] Department of Psychology, Texas A&M University, College Station, TX

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ABSTRACT

Researchers have typically reported relatively greater preferences for infants among females than among males, though this varies somewhat across samples and age groups. The mechanism by which this sex difference occurs is not well understood and many studies rely on participants' self-reported preferences rather than measuring motivated behavior or patterns of visual attention directly. The present research consists of two independent studies investigating attention to infants. The aim of these studies was to extend research on the characteristics associated with interest in infants by measuring motivation to view infant faces (Study 1) and visual attention to infants in a complex visual scene (Study 2). In Study 1, participants controlled the length of viewing time for different images. Women demonstrated motivation to extend viewing of infants. Men showed the opposite pattern, working to decrease the length of time they viewed infants. In Study 2, participants were shown complex scenes that contained infants. Patterns of visual attention were measured using eye-tracking technology. Infants did not receive a particularly high proportion of fixations from either sex. However, there were relationships between gender-linked traits, such as digit ratio and self-reported interest in infants, and the percentage of fixations on infants. Additionally, participants who reported being in a romantic relationship demonstrated greater interest in infants. This suggests the long-reported sex difference in interest in infants may relate more to current life circumstances and gender linked traits than an overwhelming tendency among all members of a sex.

1. Introduction

In humans and other primates, infants typically have more interactions with females than with males. Females tend to be more involved in infant care and are generally more interested in infants than are males (Maestripieri, 1999; Best & Williams, 2001). A sex difference in interest in infants among humans is typically evident in early childhood (Berman, 1980; Blakemore, 1981; Berman, Smith, & Goodman, 1983). However, findings concerning adolescents and adults have been more mixed regarding the size of this sex difference and whether it generalizes to all samples (Feldman & Nash, 1978, 1979a, 1979b; Maestripieri & Pelka, 2002).

Several explanations for a broad sex difference in interest in infants have been proposed. Theories range from the effects of gender-related socialization to evolved adaptations that increased reproductive success in our ancestors. From the social role perspective, women are expected to be more caring and nurturing than men are (Bem, 1974; Skitka & Maslach, 1996) and they are more likely to experience pressure from society to act maternally (Eagly, 1985). An individual's gender role orientation may also influence within-sex variability in interest in infants. It has been suggested that broad gender phenotypes may influence the expression of a variety of behaviors that typically differ between the sexes (Lippa, 2005), and gender role orientation has been associated with visual attention to gender-linked images, particularly among men (Alexander & Charles, 2009).

Other researchers have noted that women's greater interest in infants may reflect an evolved tendency that is reproductively advantageous. There is evidence that attentional bias toward infant faces is specific to human infants and not other infant animals (Brosch, Sander, & Scherer, 2007). Primate studies suggest early interest in infants among females confers a reproductive advantage because the increased interactions with infants improve females' parenting skills (Fairbanks, 1990). Another explanation is that an interest in all infants among females of a species is advantageous because greater responsivity to infants leads to better infant care (Silk, 1999). Additionally, interest in infants may reflect a reproductive strategy that is more common among women due to the greater reproductive advantage it gives them. Men and women have a limited amount of energy that can be devoted to reproduction and each sex can maximize their success by allocating their reproductive effort differently (Simpson & Gangestad, 2001). Men maximize their reproductive fitness by devoting more energy to mating than to investing in infants. Women, who cannot afford to divert their energy from parenting because they are limited to roughly one child per year

* Corresponding author. Department of Psychiatry, The University of Texas Health Science Center at San Antonio, NRLC MC 7793, San Antonio, TX 78229-3900, USA. Tel.: +1 210 567 2778; fax: +1 210 567 2748.
E-mail address: charlesn@uthscsa.edu (N.E. Charles).

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no matter how many men they copulate with, maximize their reproductive fitness by investing heavily in a fewer number of offspring (Daly & Wilson, 1987).

Other biological factors, such as sex hormone action, may be another mechanism by which genetic sex influences attention to infants. Second to fourth digit ratio (2D:4D) is a putative marker of prenatal androgen action that is sexually dimorphic but shows considerable within-sex variability (Manning, 2002), and may be better conceptualized as gender-linked rather than biological sex-linked. This measure has been associated with gender-linked traits (Lippa, 2005), including reproductively-relevant variables, such as mating strategy (Clark, 2004; Putz, Gaulin, Sporter, & McBurney, 2004). It is possible that more male-typical (higher testosterone) or more female-typical (lower testosterone) prenatal environments exert an influence on the development of other aspects of reproduction as well, such as interest in infants.

Evolved predispositions and hormonally-influenced tendencies may affect attention to infants by causing women to experience infant stimuli differently than men do. Increasing research on the neurobiology of reward indicates brain systems underlying the desirability of a reward (i.e., "wanting") are distinct from those underlying the subjective emotional experience of that reward (i.e., "liking") (Berridge & Robinson, 2003). Some research suggests self-reported preference ("liking") of infants is present in both sexes but more pronounced in girls and women (Maestripieri & Pelka, 2002). However, there is little research on willingness to expend effort to engage with infant stimuli ("wanting"). Prior research on the incentive value of sex-linked stimuli has focused on effort expended to view attractive adult faces (e.g., Levy et al., 2008), but a similar sex difference in incentive value may account for the observed sex difference in interest in infants (Maestripieri, 1999; Best & Williams, 2001). One recent study examined this possibility but found no sex difference in the effort expended to view infant faces (Parsons, Young, Kumari, Stein, & Kringelbach, 2011). However, participants in that research viewed infant faces for the default amount of time specified in the program, on average, rather than increasing their viewing of certain images, and the number of responses made by participants was not reported. Therefore, additional research measuring the number of responses a participant is willing to make to view an infant (a measure of "wanting") is necessary to study the incentive value of infant faces.

To address gaps in the literature related to the characteristics and conditions associated with interest in infants, this research consists of two studies focused on the incentive value of and visual preference for infants. The aim of these studies was to extend research on sex differences in interest in infants by measuring the number of key presses to extend the viewing time of infant faces (Study 1) and by measuring visual attention to infants when viewing a complex scene (Study 2). The sexes will be compared on their self-reported interest in infants (i.e., "liking"), as well as their willingness to expend effort to view infants (i.e., "wanting") in Study 1. The results of Study 2 will then extend that research by presenting participants with more complex scenes, rather than single images, and assessing patterns of visual attention. The contribution of individual differences in gender-linked behavior, including gender role orientation, will be considered in both studies, as these differences may relate to within-sex differences in interest in infants. It was hypothesized 1) that women would have a higher average number of key presses to extend viewing of infants in Study 1 than would men; 2) that women would extend viewing time for infants in Study 1 significantly more than for stimuli that is visually similar; 3) that women, relative to men, would attend more to infants when viewing complex scenes in Study 2; and 4) that more feminine gender role orientation and more self-reported interest in infants would relate to increased "wanting" of infants in Study 1 and increased visual attention to infants in Study 2.

2. Methods

2.1. Participants

One-hundred and eleven participants (67 men, 44 women), were recruited through the Psychology Subject Pool at a major Southwestern U.S. university. Participants were all over 18 years of age and were compensated with partial credit toward their Introductory Psychology course requirements. The Institutional Review Board at the university approved informed consent and data collection procedures.

2.2. Measures

2.2.1. Demographics

Participants indicated their sex, ethnicity, and date of birth.

2.2.2. Digit Ratio

The ratio of the 2nd to 4th digits (2D:4D ratio), a putative marker of prenatal hormone action (Manning, 2002), was included to investigate whether previously reported findings indicating a role for prenatal androgens in the development of sex differences in human behavior (for review, see Lippa, 2005) can be extended to interest in infants. Digit ratio is sexually dimorphic, with lower 2D:4D ratios associated with a more male-typical prenatal hormone environment (Manning, 2002). Each participant's right hand was photocopied and their 2nd and 4th digits were measured in millimeters using a digital caliper from the basal crease to the tip of the finger. Previous research has shown differences in 2D:4D ratio depending on whether the left or right hand was measured (Honekopp & Watson, 2010), so the right hand was chosen for all participants in order to be consistent.

2.2.3. Interest in Infants

Interest in infants was assessed with a questionnaire based on previous methods (Maestripieri & Pelka, 2002). The questionnaire asks "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?" Seven different types of interactions are then listed (e.g., ask to hold the baby, ignore the baby) and participants mark the likelihood of their engaging in that activity on a Likert scale ranging from 1 "not at all likely" to 6 "very likely". The items indicating avoidance of the infant are reverse-coded and the numbers indicated on the Likert scales are summed, with higher scores indicating greater interest in infants.

Interest in infants was also assessed using two additional items, also based on previous research (Maestripieri & Pelka, 2002): "Would you rather spend 15 min with an adult that you found attractive or with a baby that you found adorable?" with participants responding on a Likert scale ranging from 1 "strongly prefer baby" to 7 "strongly prefer adult" and "Which of these items best describes you?" with participants circling (1) I don't like babies; (2) I only like certain babies; (3) I like all babies. Lower scores on the first item and higher scores on the second item indicate greater liking of infants.

2.2.4. Gender Role Behavior

Two measures assessed gender role orientation. The Bem Sex Role Inventory (BSRI; Bem, 1974) is a 60-item measure that assesses masculinity and femininity as two separate dimensions. Responses are given on a 7-point Likert scale, ranging from 1 "not at all characteristic of me" to 7 "very characteristic of me." Scores are obtained by determining each participant's total score on the masculinity and femininity scales, where higher scores indicate greater identification with the items on that scale.

The Preschool Activities Inventory (PSAI; Golombok & Rust, 1993) consists of 24 items that measure how frequently the participant played with certain toys (e.g., guns), engaged in specific activities (e.g., "playing house"), and displayed various characteristics (e.g.,