



Cradling side preference is associated with lateralized processing of baby facial expressions in females

Harriet J. Huggenberger^{a,*}, Susanne E. Suter^a, Ester Reijnen^a, Hartmut Schachinger^{a,b}

^a University of Basel, Basel, Switzerland

^b University of Trier, Trier, Germany

ARTICLE INFO

Article history:

Accepted 22 December 2008

Available online 14 February 2009

Keywords:

Left cradling

Baby face expression

Lateralization

Signal detection

Response bias

Emotional processes

ABSTRACT

Women's cradling side preference has been related to contralateral hemispheric specialization of processing emotional signals; but not of processing baby's facial expression. Therefore, 46 nulliparous female volunteers were characterized as left or non-left holders (HG) during a doll holding task. During a signal detection task they were then asked to detect the emotional baby faces in a series of baby portraits with neutral and emotional facial expressions, presented either to the left or the right visual field (VFP). ANOVA revealed a significant HG \times VFP interaction on response bias data ($p < .05$). Response bias was lowest when emotional baby faces were presented in the visual field of cradling side preference, suggesting that women's cradling side preference may have evolved to save cognitive resources during monitoring emotional baby face signals.

© 2008 Elsevier Inc. All rights reserved.

1. Introduction

The vast majority of women (60–80%) prefer to cradle a baby on the left side of their body (Bogren, 1984; Harris, Spradlin, & Almerigi, 2006; Lucas, Turnbull, & Kaplan-Solms, 1993; Manning & Chamberlain, 1991). This behavior cannot be fully explained by handedness (Harris, Almerigi, Carbary, & Fogel, 2001; Saling & Bonert, 1983). Left-side preference has been found in female preschoolers (De Château & Andersson, 1976; Saling & Bonert, 1983) and in never-pregnant adult females (Saling & Tyson, 1981), and is thus neither due to maternity nor previous experience with children, although it might be enhanced by these factors. Left holding preference is present when actually holding a baby or a doll, and also during imagining of holding a baby (Harris, Almerigi, & Kirsch, 2000) or a kitten (Almerigi & Harris, 2002). The left cradling preference was present in every culture investigated (Harris et al., 2006; Lockard, Daley, & Gunderson, 1979; Saling & Cooke, 1984). Left cradling preference has also been found in monkeys (for an overview see Hopkins, 2004; Tomaszycski, Cline, Griffin, Maestripieri, & Hopkins, 1998), and great apes (Manning & Chamberlain, 1990). Studies of historical human trans-generational family picture sets indicated baby holding similarities within female relatives (Manning, 1991; Manning & Denman, 1994), suggesting that the development of cradling side preferences may rely on a biological basis and provide evolutionary advantages.

Holding the baby is everyday activity in a caregivers' life, not only for the need to transport them, but also for various other reasons, such as monitoring, communicating, and regulating their emotional state. The interaction between caregiver and child consists of reciprocal signals, such as touches, sounds and vocals, as well as facial expressions. These signals can elicit caregiver behavior (Spangler, Geserick, & von Wahlert, 2005), which is influenced by individual experience and intuition about the baby's needs (Papousek & Papousek, 1995). Neutral state information indicates that the baby may feel safe, and no urgent response is necessary. The caregiver's perceptual sensitivity in distinguishing between the baby expressing emotional vs. neutral state signals, as well as responding to them appropriately and promptly, may be considered an important prerequisite for the establishment of a 'secure' bonding (Ainsworth, Blehar, Water, & Wall, 1978; De Wolff & van Ijzendoorn, 1997). This corresponds to the finding that the mother's sensitivity in perceiving the infant's emotional state predicts mother-child interactions (Donovan, Leavitt, Taylor, & Broder, 2007), and that the mother's appropriate response to baby signals determines mother-child attachment (Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996), which is known to influence child development (Sroufe, 2005). Thus, mechanisms supporting the caregiver's optimal recognition of affective child signals may be beneficial for future child development.

From an evolutionary viewpoint it seems evident that the integration of spatial and functional relations between central nervous system structures offers some adaptive potential to optimize efficacy of operating neural networks. As such, a right hemisphere specialization with respect to the processing of emotional stimuli was

* Corresponding author. Address: Institute of Psychology, University of Basel, Birmannsgasse 8, 4009 Basel, Switzerland. Fax: +41 61 2670259.

E-mail address: h.huggenberger@unibas.ch (H.J. Huggenberger).

suggested (Basu & Mandal, 2004; Borod et al., 1998; Burton & Levy, 1989; Duda & Brown, 1984), particularly relevant during the processing of emotional faces (Best, Womer, & Queen, 1994; Buchtel, 2001). Because the right hemisphere receives the visual input directly from the (contralateral) left perceptual field, right brain damaged patients are expected to show impaired visual perception of emotional stimuli presented in the left visual field (Borod et al., 1998; Buchtel, 2001), but other theories may offer explanations for this finding, too.

When caregivers hold the baby on the left side of their body, the baby's face lies in their left visual field. Thus, visual information originating from the baby will be first transmitted to the right hemisphere. A right hemispheric specialization may thus facilitate the monitoring of the child's emotional state (Manning & Chamberlain, 1991; Vauclair & Donnot, 2005) and improve mother-child communication (Sieratzki & Woll, 2002). Several previous studies (Bourne & Todd, 2004; Donnot & Vauclair, 2007; Harris et al., 2001; Lucas et al., 1993; Vauclair & Donnot, 2005) investigated the association between holding preference and left/right hemispheric processing advantage for emotional faces by presenting chimeric adult faces. Chimeric faces are produced by combination of one half of a neutral face with the other half of a happy face of the same portrayed person. Participants see two faces, one with the happy half on the left side, one with the happy half on the right side. They have to choose the face that looks happier to them. Individuals with a typical right hemisphere advantage choose that face more often when the happy half of the face is in their left visual field. Most of these studies found a right hemispheric processing advantage in women holding the doll on the left side (left holders), and no clear hemispheric advantage in non-left holders (Bourne & Todd, 2004; Harris et al., 2001; Vauclair & Donnot, 2005). However, there are also studies, which did not find an association between holding side and hemispheric processing advantage (Donnot & Vauclair, 2007; Lucas et al., 1993).

The present literature on cradling preference and hemispheric advantage is characterized by some limitations. First, the use of adult face stimuli may be inappropriate and baby faces would be more authentic. Functional imaging studies support this view. Studies have shown that stimulation with child faces produces different activation patterns of brain regions than stimulation with adult faces (Leibenluft, Gobbin, Harrison, & Haxby, 2004), especially of those brain areas being associated with attention and processing of empathy. Second, cradling behavior has not yet been investigated with respect to the recognition of negative facial expressions. This is noteworthy, since a right hemisphere advantage for processing baby faces was observed for negative facial expressions, only (Best et al., 1994). Third, cradling side preference studies have not considered response accuracy, response bias and reaction time data concerning the detection of emotional faces (Bourne & Todd, 2004; Harris et al., 2001; Lucas et al., 1993; Vauclair & Donnot, 2005), but these measures may represent crucial factors during mother-child interaction.

The aim of this study was to determine whether women who prefer to hold a doll on the left side of their body recognize emotional face expressions better when baby face portraits are presented in their left visual field, and whether non-left holders show the opposite pattern. We hypothesized that such an association would be identifiable as a significant two-way interaction of the between subject factor 'holding group' and within subject factor 'visual field of presentation'. Further, processing differences of positive and negative face expressions would be seen as a three-way interaction of the former and the within subject factor 'emotional baby face expression' (positive vs. negative).

2. Method

2.1. Participants

Forty-six female students of the Institute for Psychology, University of Basel, were recruited. Their mean age was 22.2 years ($SD = 3.5$). No participant was aware of having experienced a pregnancy. The participants were informed that the study purpose was to explore bonding between mother and child. Procedures were Review Board approved and participants signed a written informed consent.

2.2. Preparatory work to establish the baby picture set

Face portraits of 28 babies were acquired in the local obstetric hospital, during expression of positive, negative or neutral mood states. Emotional expressions were then rated in an internet-based (web application eRes (Schmutz, 2004)) online-study of 219 women (Age: $M = 27.6$, $SD = 8.6$). They were instructed to rate the emotion expressed by the baby as negative (1), neutral (2), or positive (3), and also to rate the arousal state of the baby on a 5-point scale, ranging from 1 (*not aroused*) to 5 (*maximally aroused*). The four best discriminating portraits of each emotion category were chosen. Emotion expression ratings among the 219 subjects for the four chosen portraits (mean (SD)) were as follows: negative: 1.05 (0.24); neutral: 2.00 (0.49); positive: 3.00 (0.48); arousal ratings were: negative: 3.57 (1.06); positive: 4.29 (0.64); neutral: 2.15 (1.11). Eighty percent of all portraits were from male babies, the age range of the presented babies was between 2 and 8 months.

2.3. Doll holding task

Each subject entered the experimental room individually and sat on a chair 1.6 m in front of a table, where a life-like sized (53 cm), weight adjusted (3.5 kg) and nicely dressed (red-white sleepers, red pullover and socks, white baby cap) doll (nursing training instrument, Medela Company, Switzerland) was lying in a dorsal position on a pillow with its feet pointing towards the participants. Two observers were placed behind the table. One observer gave standardized instructions according to a stop watch. The total procedure consisted of five identical doll holding trials. The observer started the trial with the following instruction: "Imagine, that the doll in front of you is a six-week old girl named Anna. Please, pick her up, return to your chair and sit down comfortably". Participants sat down with the doll, while both observers noted their holding behavior. After 45 s participants were told to return the doll on the table. Then the next trial started. Both observers rated the participants' holding behavior during each trial based on the position of the doll's head in relation to the participant's midline according to the following scale: 1 (right side holding), 2 (initially right, but then changing to midline or left holding), 3 (midline holding), 4 (initially left, but then changing to midline or right holding), and 5 (left side holding). At the end of the holding observations handedness was assessed by the Edinburgh Handedness Inventory (Oldfield, 1971) translated into German. There was a high Interclass Correlation ($ICC(46) > .998$) for the obtained holding scores of both observers. Two groups were built according to trial-by-trial holding scores averaged between both observers. When participants held the doll on the left side during every trial they were allocated to the left holding group. The other participants showed right or midline holding or changed holding side within a trial. These participants were allocated to the group of non-left holders.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات