

## Infant holding side biases displayed by fathers in maternity hospitals

Céline Scola<sup>a</sup> and Jacques Vauclair<sup>a,b\*</sup>

<sup>a</sup>University of Provence, Center of Research in the Psychology of Cognition, Language & Emotion, Aix-en-Provence, France; <sup>b</sup>Institut Universitaire de France

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Women and mothers prefer to hold infants and young children on the left side of their bodies. However, previous data reported in the literature for men and fathers have yielded inconclusive results in this regard. The aim of the present study was to (1) look for a left-side holding bias in 94 new fathers studied in 3 maternity hospitals, and (2) investigate any recorded bias in relation to a number of variables (e.g. handedness and hemisphere specialisation in the perception of facial emotions) and the varying effects of the latter on populations of mothers and unselected participants. The results showed that a significant percentage (65%) of fathers preferred to hold their newborn infants on the left side. This holding bias in fathers was governed by neither the couple's number of children, nor handedness, nor hemispheric specialisation in emotion perception.

**Keywords:** infant holding biases; fatherhood; laterality; perception of emotions; newborn

### Introduction

Since Salk conducted his ground-breaking research (1960), several studies have tended to confirm the virtually universal nature of a left holding bias for infants. They have reported this bias in (1) different populations of women, both mothers and non-mothers (e.g. Bourne & Todd, 2004; Vauclair & Donnot, 2005; Vauclair & Scola, 2008), (2) different cultures (e.g. Brüser, 1981), (3) non-human primates (Manning & Chamberlain, 1990), (4) different periods of history (e.g. Harris, 2007) and (5) girls as young as 4 years (e.g. Saling & Bonnert, 1983). Despite this virtual universality, the results in the literature are far from unanimous when it comes to the existence of a holding bias in men, whether they are fathers or non-fathers. The present study therefore set out to look for a direct measure of holding bias for the very first time in new fathers in maternity hospitals in the days following the birth of their children.

### *Differences in the way men and women hold young children*

Other authors have reported three different findings concerning the presence or absence of a holding bias in men.

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\*Corresponding author. Email: Jacques.Vauclair@univ-provence.fr

First of all, some authors have failed to find any left-side preference in men (whether or not they are fathers) for holding infants. When, for example, Rheingold and Keene (1965) and Brüser (1981) studied the way that children are carried in the street in different cultures, they observed a left bias in mothers but not in fathers. These authors attributed this behaviour to the fact that mothers are more used to holding newborns. They understand their cries – and their crying – better and are more successful at soothing them. As infant holding is also a predominant activity for women, they become able to do it with their non-dominant hand. For men, however, it remains a less habitual and therefore non-automated activity, and they therefore use their dominant hand. Accordingly, the majority of fathers hold infants on the right side of their bodies. Turnbull and Lucas (1991) found that only 46% of non-fathers preferentially held a doll on the left side of their body, thus confirming the absence of a bias in men when it comes to infant holding. For these authors, it was not so much gender as the degree of experience that influenced infant holding biases.

Second, for De Château (1983), men start holding infants on the left when they become fathers. De Château observed four groups of participants: new mothers, new fathers, fathers of older children and men who were not fathers. De Château reported a left-side bias in all four groups, although this bias was significantly smaller for the men who had no children. He concluded that men only hold infants on their left side when they become fathers.

Third, some authors have found a left-side holding bias in men regardless of whether or not they are fathers, similar to that observed in women. Harris and Fitzgerald (1985) analysed 164 photos of women and 52 photos of men. In 63% of the pictures in both sets, the newborn was held on the left side. For their part, Harris, Almerigi, and Kirsch (2000) studied holding bias by administering a test of imagination to 165 male students and 389 female students. They reported a significant left holding bias in both right-handed men and right-handed women, with no significant difference between the two. Lastly, Harris, Spradlin, and Almerigi (2006) undertook a photographic study of parents with their newborn infants ( $N=359$  photos; 288 mothers and 71 fathers). These authors noted that the fathers held their children on their left side just as much (67%) as the mothers did (63%).

### ***Explaining the holding bias***

Several hypotheses have been put forward to explain the left holding bias, including (1) the role of heartbeat; (2) the holder's handedness, and (3) hemispheric specialisation in emotion processing (see Donnot & Vauclair, 2005, for a review).

Salk (1960) attributed the left holding bias to the soothing role of the heartbeat on the newborn. His argument went that a mother holds her child on her left side so that the latter will be better able to perceive the soothing sound of her heartbeat. This hypothesis was subsequently abandoned, despite researchers' difficulty in convincingly refuting it (Donnot & Vauclair, 2005).

The next hypothesis to emerge used handedness to explain the left holding bias from a behavioural perspective. The theory was that holding a child on her left side leaves the mother's dominant hand free (the right hand in 90% of cases; Annett, 1985). Although many studies (e.g. Harris et al., 2000; Manning & Chamberlain, 1991) have shown that handedness has no significant effect on holding bias, (1) these studies have frequently been carried out in populations of non-parents and (2) left-handers have frequently been found to be less prone to hold infants on their left side.

Donnot (2007) recently demonstrated that handedness does not exert any significant influence on female students, although it does appear to do so on a population of mothers. For their part, Harris et al. (2000) found that men displayed the same preference as women for holding a newborn on their left side, but only in a group of right-handers. Left-handers did not display any left bias. The question therefore arises whether handedness influences the left holding bias of new fathers, as it does in mothers, or whether it has no effect at all, as in the case of female students.

Lastly, the main hypothesis that is put forward today to explain holding bias is that emotions are processed differently by the cerebral hemispheres. The right hemisphere is known to play a particularly important role in perceiving and expressing emotional information (e.g. Bryden & Levy, 1983). Therefore, this could explain the left-sided bias, insofar as the right hemisphere regulates emotional exchanges between parent and child. A number of studies (e.g. Bourne & Todd, 2004; Vauclair & Donnot, 2005) have shown that hemispheric specialisation in the perception of emotions influences holding biases. The left bias would appear to stem from the enhanced perception of emotions in the left visual or auditory field, i.e. under the control of the right hemisphere. However, it seems that (1) most of these studies have investigated populations of non-parents (i.e. male and female students) and (2) results only show a link between emotion perception and holding bias in participants who perceive emotions better in the left field. Those who perceive emotions better in the right field do not display a holding bias. Donnot and Vauclair (2007), together with Vauclair and Scola (2009), failed to identify any significant link between emotion perception and holding bias in a population of mothers shortly after delivery. It is therefore legitimate to ask whether hemispheric specialisation in the perception of emotions influences the left holding bias of new fathers, as it does in male and female students, or not at all, as in the case of mothers.

To sum up, all the available research leads us to believe that men with no children or no experience are more likely to hold children in an undifferentiated position, as opposed to fathers or men with experience. For this latter group, infant holding is a more usual and ingrained activity and who are therefore more likely to hold children on their left side. This has led some authors (e.g. Turnbull & Lucas, 1991) to suggest that the contradictory findings reported in the literature may be explained by the father's degree of experience or the number of children he has, although there have been no studies as yet to test this hypothesis. Lastly, handedness and hemispheric specialisation in emotion perception may have differing effects, according to whether the population is made up of parents or non-parents.

The present study was designed to find out whether new fathers tested in maternity hospitals would display a left-side preference when holding their infants. The possible influence on holding bias of handedness and enhanced perception of emotions in the left visual field was also assessed. This investigation was performed in order to find out whether these two factors affect fathers in the same way as they affect populations of mothers or female students. Lastly, holding biases were analysed according to whether the participants were first-time fathers or not.

## **Method**

A sample of 94 new fathers was studied in 3 maternity hospitals in the Aix-Marseille region, within 4 days of the birth of their child. The protocol included holding observation, a handedness questionnaire and a computerised chimeric faces test. This

research was conducted in accordance with APA ethical standards in the treatment of the study sample.

### ***Holding observation***

Holding was measured by one direct observation. The fathers who did not know the purpose of the study were instructed as follows: 'Imagine that your child is feeling distressed and starts to cry. Please take him/her in your arms as you would do ordinarily to soothe him/her'. A score of -1 was assigned if the infant was held on the left side and a score of +1 if it was held on the right side.

### ***Handedness questionnaire***

Handedness questionnaires provide a means of determining whether the people questioned are more or less right-handed, left-handed or ambidextrous. The test administered in the present study was the Edinburgh Handedness Inventory (Oldfield, 1971).

### ***Chimeric faces test***

The chimeric faces test, devised by Harris, Almerigi, Carbary, and Fogel (2001), is used to study the visual asymmetries of the emotions. This test consists of the presentation of faces made up of two hemifaces, each displaying a different expression (smiling and neutral). Its purpose is to detect the person's dominant visual field in the recognition of facial emotions. Each of the 10 plates presented to participants featured two faces shown one above the other on the same vertical axis. For example, if the top face (A) matched a right smiling hemiface with a left neutral hemiface, the bottom face (B) was a mirror image, with the smiling hemiface on the left and the neutral one on the right. The test was presented on the 15-inch screen of a laptop computer, which displayed a new plate every 4 s. Half the plates featured the right smiling hemiface in the top face and half the right smiling hemiface in the bottom face. The participants were asked to say which face seemed the 'happiest': A or B.

### ***Statistical method***

The statistical analysis of the data was performed using SPSS software. A chi-square test was applied to test for the distribution of the participants in the groups, especially for the holding bias, and the effect of the number of children on this bias. A binomial regression analysis was used to assess the link between the laterality and visual perception of emotions (CFT) variables and the left holding bias.

## **Results**

### ***Characteristics of the study population***

The 94 participants were aged between 20 and 58 years (mean = 32.53 years). At the time of the tests, the newborns were aged between 1 and 7 days (mean = 2.53). The main characteristics of the population were as follows: (a) 50% of the participants were first-time fathers; (b) 43% of the newborns were girls; and (c) 15.6% ( $N=15$ ) of

the fathers were left-handed (see below for further details), reflecting the average percentage of left-handers in the general population (Annet, 1985).

### ***Holding bias***

A significant general left holding bias was observed ( $\chi^2(1)=8.34$ ;  $p=.004$ ), with 65% ( $N=61$ ) of fathers holding their newborn infants on the left side and 35% ( $N=33$ ) of fathers holding them on the right side.

### ***Number of children and holding bias***

Fifty percent of the participants were first-time fathers. These fathers displayed the same bias (64%) as those who had two or more children (66%); see Table 1 ( $\chi^2(1)=.829$ ;  $p=.9$ ).

### ***Handedness and holding bias***

The sample included 84.1% right-handed fathers and 15.9% left-handed fathers. Although the percentages (Table 2) appear to indicate that the right-handers held their children more often on the left than the left-handers, while the left-handers held their infants in a slightly more undifferentiated manner than the right-handers, handedness had no significant effect on holding side ( $z(94)=-0.861$ ;  $p=.389$ ). Left-handers and right-handers therefore held their newborn infants in a very similar way, i.e. mostly on the left.

### ***Visual perception of emotions and holding bias***

The results showed that 67% of fathers preferentially perceived emotions in their left visual field, as opposed to 33% who perceived them in their right visual field. In other words, fathers processed emotions significantly better in their right hemisphere, i.e. via their left visual field ( $\chi^2(1)=10.89$ ;  $p=.001$ ). Fathers who perceived emotions better in their left visual field displayed the same distribution in terms of holding bias as those who perceived them better in their right visual field (Table 3). Emotion perception therefore had no significant effect on holding bias ( $z(94)=-0.524$ ;  $p=.60$ ).

Table 1. Frequency and percentage of left vs. right holding according to number of children.

	Left holding	Right holding
First-time fathers	64% ( $N=30$ )	36% ( $N=17$ )
Second- or third-time fathers	66% ( $N=31$ )	34% ( $N=16$ )

Table 2. Frequency and percentage of left vs. right holding according to handedness.

	Left holding	Right holding
Left-handers	53% ( $N=8$ )	47% ( $N=7$ )
Right-handers	67% ( $N=53$ )	33% ( $N=26$ )

Table 3. Frequency and percentage of left vs. right holding according to emotion perception.

	Left holding	Right holding
Predominance of left visual field	65% ( <i>N</i> =41)	35% ( <i>N</i> =22)
Predominance of right visual field	67% ( <i>N</i> =20)	33% ( <i>N</i> =11)

Whether they displayed left or right laterality in the perception of emotions, fathers held their newborn infants in virtually the same way, i.e. mainly on the left.

## Discussion

New fathers prefer to hold their newborn infants on their left side to soothe them. This bias is linked to neither handedness, nor asymmetry in emotion perception, nor parental experience (number of children). The relationship that is forged between father and child may therefore take precedence over motor and/or cerebral variables. In this respect, the results of the present study are in line with findings for mothers observed following delivery (Donnot & Vauclair, 2007; Vauclair & Scola, 2008).

The results of the present study confirm the presence of a left holding bias in new fathers. As such, they shed light on the whole area of research on 'cradling' in fathers and account for the contradictory results reported in previous studies (e.g. De Château, 1983; Harris et al., 2006). Our results also confirm the virtual universality of this holding bias (e.g. Harris, 2007), given that the presence of a holding bias in new fathers had never previously been recorded using direct observation. Furthermore, they highlight the fact that a father's previous experience with children (measured by the number of offspring) has no effect on holding bias. Here, once more, this factor had never previously been investigated in fathers, and our results underscore the absence of the effect of primiparity that has been demonstrated in new mothers (e.g. Donnot & Vauclair, 2007; Vauclair & Scola, 2008) using the same methodology as that used in the present study.

Handedness, too, has no significant effect on infant holding preferences. None the less, it should be noted that the left-handed fathers in our study were less prone to hold their children on the left side (53%) than their right-handed counterparts (67%). Opinions differ in the literature as to the effect of handedness on holding bias. Donnot (2007), for instance, found that maternal handedness affects holding bias, whereas no such effect was observed in a population of female students.

The lateralised perception of emotions does not appear to be linked to fathers' holding bias, contrary to findings for unselected populations (Vauclair & Donnot, 2005). These results are consistent with those that have been reported in studies of mother-child dyads (e.g. Vauclair & Scola, 2009).

It may well be that for fathers, just as it is within mother-child dyads, the special parent-child relationship takes precedence over other factors, such as hemispheric specialisation, with the father displaying a high level of adaptation to his child when taking the latter in his arms. The holding of an infant by its parent cannot be compared to situations where persons imagine holding a child or students are observed cradling dolls. The most recent studies of mother-child dyads have shown that the presence of affective symptoms may influence holding bias. Vauclair and Scola (2008) found that mothers who held their infants on the right side displayed more affective symptoms (anxiety and depression) than mothers who held them on the left side. Further studies

are now needed to explore how holding bias may be influenced by the nature of the relationship between parent and child. In addition, our findings have some practical consequences. If depressive or anxious mothers generally hold their newborn in the right side, the staff concerned with early childhood well-being could thus easily identify these mothers and be more vigilant, more attentive and if necessary might propose a psychological follow-up to these mothers. However, it remains to be verified in further studies if affective symptoms can also affect the holding side of the fathers.

The present study of fathers in ecological conditions now needs to be followed up in order to identify the precise role of the father–child relationship in determining holding bias. It would also be worthwhile recording the holding bias of a parallel population of non-fathers in order to compare any left holding bias and the respective roles of the laterality and hemispheric specialisation variables. Lastly, a study of left-handed men could be designed to compare and contrast fathers and non-fathers.

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