LEBS
Vol. 15 No. 2 (2024) 52–59
Letters on Evolutionary Behavioral Science

Child Care and Disease Avoidance: Exploring Motivational Systems Trade-Offs

Erik Gustafsson[1,2*]

[1] Université de Franche Comté, INSPE, MSHE (UAR 3124), 1 Rue Charles Nodier, 25000, Besançon, France

[2] University of Portsmouth, Winston Churchill Ave, Southsea, Portsmouth PO1 2UP, UK

[*]Author for correspondence (erik.gustafsson@univ-fcomte.fr)

Individuals responsible for child care are consistently exposed to children's excretion pathogens, yet they must still take care of their children, especially when the children are infected. Our objective was to investigate whether exposure to infected infants would negatively impact people's emotions towards cute babies, and vice-versa. Moreover, as cooperative breeding is a hallmark of our species, we also explored whether this response would differ between child carers and non-child carers. In two studies, 128 participants rated how much disgust they felt (disgust score) when watching 10 pictures of infected babies after viewing cute babies or furniture pictures (study1) and how much tenderness they felt (tenderness score) when watching 10 pictures of cute babies after viewing infected babies or furniture pictures (study 2). Priming participants with pictures of cute babies did not significantly impact their disgust response towards infected children. In contrast, priming with infected babies led to a reduction in tenderness felt towards cute babies, but only for non-carers. This result is consistent with the possibility that child carers desensitize themselves through exposure or that people less prone to disgust when exposed to pathogens related to caregiving situations invest more in child care.

Keywords
motivational system, child care, disease avoidance, behavioral immune system, parenting

Introduction

In recent decades, authors have expanded upon the fundamental-motives framework, initiated by the famous Maslow's pyramid of needs (Maslow, 1943) by incorporating evolutionary perspectives (Cook et al., 2021; Kenrick et al., 2010). This approach suggests we developed motivational systems guiding attention to survival and reproduction-related stimuli (Schaller, 2018; Tooby et al., 2008). These systems can serve roles such as mate acquisition, disease avoidance, and child care (Kenrick et al., 2010; Ko et al., 2020).

The disease avoidance system has especially garnered attention through a set of adaptations known as the behavioral immune system (van Leeuwen & Petersen, 2018). Its most common characteristic is the emotion of disgust. Interestingly, this disgust response can still be modulated by the context. For instance, bodily fluids of strangers are often deemed more disgusting than those of close relatives (Curtis et al., 2004). In parallel, recent studies highlighted that the kin care system is reported as the most important motivational drive across all studied cultures, with tenderness as its signature emotion (Kalawski, 2010; Ko et al., 2020; Pick et al., 2022).

An important aspect of this fundamental-motives framework is the necessary trade-off existing between motivational systems. For example, activating the parental care system can reduce mating motivation, and vice versa (Beall & Schaller, 2019; Rilling et al., 2024). Similarly, Fleischman and colleagues (2015) highlighted how sexual arousal may lead towards situations at risk of disease transmission , conflicting with disgust, which deters us from such risks. Accordingly, their study showed that exposure to disgusting images reduced sexual arousal compared to controls.

Although previous studies have examined trade-offs between mate-seeking and disease avoidance, as well as between disease avoidance and child care, interactions between parental care and disease avoidance are less studied. The caregiving hypothesis suggests that disgusting tasks related to caring (e.g., changing diaper, cleaning child vomit and mucus), may be perceived as less repulsive by child carers. Using a series of questionnaires, Prokop and Fančovičová (2016) found that mothers exhibited lower disgust sensitivity than non-mothers towards pathogens, possibly due to their caregiving responsibilities. This finding contrasts with the hypothesis that mothers should avoid contamination to protect their offspring (Schaller, 2020).

Child carers are regularly exposed to children's pathogens, particularly when children are infected (Schaller, 2018). Studies indicate that having children raises the risk of contracting infections (Forbes et al., 2021; Grant et al., 2022; Monto & Ross, 1977; Sacri et al., 2014). Thus, trade-offs between parental care and disease avoidance motivational systems may become necessary.

To make the matter more complex, in addition to differences between males and females optimal strategies for reproduction, a consensus is emerging regarding the role of cooperative breeding in human evolution (Burkart et al., 2009; Kramer, 2010; Tomasello, 2020). However, the psychological correlates of cooperative breeding remain underexplored, and inter-individual differences in willingness and abilities to care for babies are not fully understood (Neel et al., 2016). Variations in our disease avoidance and child care motivational systems may

doi: 10.5178/lebs.2024.122
Received 07 August 2024.
Accepted 15 November 2024.
Published online 27 December 2024.

contribute to these differences, as children visible signs of infection (such as mucus, cough, or spots) may evoke negative attitudes in some people (Shimizu et al., 2022). Consequently, one might anticipate a negative correlation between parental care and disgust responses, either because individuals less prone to disgust are more willing to care for infected children, or because caring for children desensitize the disgust response.

To examine the relationship between disease avoidance and parenting motivational systems, we primed participants with pictures, following previous studies (Beall & Schaller, 2019; Rilling et al., 2024). These studies found that even transient pictures can activate specific motivational systems. For instance, the child care system can be temporarily activated by infant pictures (Eibach & Mock, 2011; Gilead & Liberman, 2014; Glocker et al., 2009; Sherman et al., 2009), while the disease avoidance motivational system can be triggered by imaged of infected individuals (Fleischman et al., 2015).

Studies 1 and 2 tested whether activating one motivational system inhibits the other, as suggested by the disease avoidance/child care trade-off hypothesis. In Study 1, we predict that activating the parenting system will inhibit the disease avoidance system, and in Study 2, that activating the disease avoidance system will temporarily inhibit the child care system. Alongside these experiments, we also used correlational methods on our dataset to explore relationships between disgust propensity and sensitivity with various forms of parental care and tenderness drives in our dataset.

Methods

Participants

Based on an alpha of .05, power analyses for study 1 and study 2 indicated a sample size of 128, for a two-way independent groups ANCOVA design, with an effect size *f* estimates of 0.25 at a power of .80. These estimates were based on a moderate effect size varying from 0.08 to 0.3, obtained in previous studies investigating main effects of diverse pictures on parental care and disgust (Beall & Schaller, 2019; Fleischman et al., 2015; Lee et al., 2014; Stevenson et al., 2011). Moreover, since a size effect as low as 0.25 was relevant, 128 participants were considered a conservative estimate to detect a statistically significant result.

Participants were 2 × 128 British citizens (128 men, 127 women, 1 prefer not to say; Age = 39.8 years [*SD* = 13.6]) recruited from Prolific (https://www.prolific.com), an online platform often used for psychological research. Participants included 94 child-carers (43 men, 51 women; Age = 30.2 years [*SD* = 11.1]), 162 non-carers (85 men, 76 women, 1 prefer not to say; Age = 40.2 years [*SD* = 14.9]). The question used to categorize between child-carers and non-carers was "Do you take care of babies or young children on a daily basis?". As children can vary in term of autonomy and personality, we leave it up to the participants to interpret these terms.

Material

(a) Disgust Propensity and Sensitivity Scale - Revised (DPSS-R)

Participants completed 16 items from the revised Disgust Propensity and Sensitivity Scale (Fergus & Valentiner, 2009). Six of these items assessed disgust Propensity (DPSS-P; e.g., how easily one is disgusted; sample item: "I avoid disgusting things"); six additional items assessed disgust Sensitivity (DPSS-S; e.g., how bothered one is by their disgust; sample item: "It scares me when I feel nauseous"). Participants responded to these items by indicating their agreement on a 5-point rating scale (1 = Strongly disagree; 5 = Strongly agree). We computed sum responses to each of the two sets of items, in order to create the indices of DPSS-P and DPSS-S, and a global index of disgust Reactions (DPSS-R = DPSS-P + DPSS-S).

(b) Parental Care And Tenderness scale (PCAT)

Participants also completed the 25-item PCAT questionnaire (Buckels et al., 2015). The PCAT questionnaire includes ten items describing scenarios involving babies. Participants responded by rating how much tenderness they feel in response to each scenario (1 = No tenderness at all; 5 = A lot of tenderness).

In accordance with past research on the PCAT questionnaire (Buckels et al., 2015), we computed five different subscale scores, each of which was calculated as the mean response across five items. These subscales can be summarized as follows: (a) Tenderness aroused in situations involving generally positive stimuli (Tenderness-Positive; e.g., "A newborn baby curls its hand around your finger"); (b) tenderness aroused in situations involving negative stimuli (Tenderness-Negative; e.g., "You hear a child crying loudly on an airplane"); (c) liking of children (Liking; e.g., "I think that kids are annoying" [reverse-scored]; (d) caring responses toward children (Caring; e.g., "When I see infants, I want to hold them"); and (e) protective responses regarding children (Protection; e.g., "I would hurt anyone who was a threat to a child").

(c) Tenderness and disgust inducing stimuli

The stimuli intended to elicit tenderness, disgust, and neutral emotions were respectively photographs of cute babies, infected babies, and furniture. They were taken from royalty-free databanks (http://www.istockphoto.com/). The pictures of cute and infected babies were of different infants aged from 6 months to 3 years.

Four raters (two men and two women) rated an initial set of 60 pictures regarding disgust and tenderness. We kept the top ten pictures in each category.

Procedure

In both studies, after giving consent, all participants completed the PCAT, and DPSS-R questionnaires as well as demographic details, including their child caring status (i.e. whether or not they take care of infant or young children on a daily basis). The questionnaires were set on Qualtrics (https://www.qualtrics.com) and hosted on Prolific (https://www.prolific.com).

After completing the questionnaires, participants were divided randomly in two groups: One group was presented with a slideshow of 10 pictures of cute human babies (study 1) or infected human babies (study 2) and the second group was set as the control group and was presented with 10 pictures of furniture.

After the slideshow, the participants viewed 10 pictures of infected babies (study 1) or 10 pictures of cute babies (study 2) for 8 seconds per picture. Participants were

asked to "rate the extent to which you experience disgust (in study 1) or tenderness (in study 2) while viewing the photograph of this child." Participants provided ratings using a 0–100 sliding scale (0 = Not at all; 100 = Very much). For study 1, we calculated a disgust score for each individual corresponding to the overall mean rating of disgust pictures. For study 2, we calculated a tenderness score for each individual corresponding to the overall mean rating of cute pictures.

As a manipulation check, at the end of the study, participants were presented with the slideshow of children/furniture that they saw at the beginning of the study. After viewing this, they were asked to "rate how much you experienced each of the following emotions while looking at the slideshow" on a 6-point scale (1= Not at all; 6= Very much). The emotions were tenderness, happiness, fear, disgust, sadness, surprise, and anger.

Analyses

For each study, one ANCOVA was conducted: (Experimental condition) x (child caring status) x (gender).

In study 1, the dependent variable being based on the rating of disgust experience (disgust score) when viewing disgust pictures, we used the global score on the Disgust Propensity and Sensitivity Scale-Revised (DPSS-R) as a covariate.

In study 2, the dependent variable being based on the rating of tenderness experience when viewing cute pictures (tenderness score), we used the Tenderness-positive subscale of the parental care and tenderness scale (PCAT) as a covariate.

On our final dataset, we explored correlations between individual differences in disgust propensity and sensitivity and the diverse forms of parental care and tenderness drives identified in the PCAT (Caring, Liking, Protection, Tenderness-Positive, and Tenderness-Negative).

Results

First, in both studies, pictures of cute babies elicited tenderness and happiness significantly more than other emotions ($F = 90.06$, $p < .001$, $\eta_p^2 = 0.417$; see Table 1 for post-hoc analyses).

In the same vein, the pictures of infected children elicited disgust significantly more than other emotions ($F = 19.69$, $p < .001$, $\eta_p^2 = 0.134$; see Table 2 for post-hoc analyses).

Study 1: Does the temporary activation of parental care motivational system inhibit the activation of the disease-avoidance motivational system?

We conducted a 2 (Experimental condition) x 2 (child caring status) x 2 (gender) ANCOVA. The dependent variable was the rating of disgust experience when viewing infected babies pictures, and we used the global score on the DPSS-R as a covariate.

There were no significant interactions between conditions, child caring status, and gender (Table 3). Disgust experience was not significantly different between genders and between participants exposed to pictures of cute babies compared to participants exposed to furniture. Interestingly, regardless their gender or their experimental condition, child carers ($M = 48.23$, $SD = 25.95$) showed a lower disgust experience towards pictures of infected children compared to non-carers ($M = 66.96$, $SD = 27.16$; $F(1,123) = 4.775$, $p = .031$, $\eta^2 = 0.039$).

Considering this last result, a closer look at the DPSS-R questionnaire revealed that accordingly compared to non-carers, child carers had a lower disgust propensity (Mean of child carers = 16.16, $SD = 3.82$; Mean of non-carers = 18.42, $SD = 3.93$; $t = 3.119$; $p = .002$), disgust sensitivity (Mean of child carers = 11.71, $SD = 3.68$; Mean of non-carers = 14.06, $SD = 4.26$; $t = 3.110$; $p = .002$) and global disgust response (Mean of child carers = 27.86, *SD*

Table 1. Comparisons of emotions felt when exposed to pictures of cute babies.

	Mean Difference	*SE*	*t*	*p*
Tenderness				
Happiness	−0.189	0.141	−1.339	1.000
Fear	1.898	0.141	13.441	< .001
Disgust	1.677	0.141	11.879	< .001
Sadness	1.921	0.141	13.608	< .001
Surprise	1.449	0.141	10.262	< .001
Anger	2.063	0.141	14.612	< .001
Happiness				
Fear	2.087	0.141	14.779	< .001
Disgust	1.866	0.141	13.218	< .001
Sadness	2.110	0.141	14.947	< .001
Surprise	1.638	0.141	11.600	< .001
Anger	2.252	0.141	15.951	< .001
Fear				
Disgust	−0.220	0.141	−1.562	1.000
Sadness	0.024	0.141	0.167	1.000
Surprise	−0.449	0.141	−3.179	0.032
Anger	−0.165	0.141	1.171	1.000
Disgust				
Sadness	0.244	0.141	1.729	1.000
Surprise	−0.228	0.141	−1.617	1.000
Anger	0.386	0.141	2.733	0.135
Sadness				
Surprise	−0.472	0.141	−3.346	0.018
Anger	0.142	0.141	1.004	1.000
Surprise				
Anger	0.614	0.141	4.350	< .001

Table 2. Comparisons of emotions felt when exposed to pictures of infected babies.

	Mean Difference	*SE*	*t*	*p*
Disgust				
Happiness	0.539	0.145	3.719	0.005
Tenderness	0.852	0.145	5.875	< .001
Surprise	0.930	0.145	6.414	< .001
Sadness	1.000	0.145	6.899	< .001
Fear	1.227	0.145	8.462	< .001
Anger	1.352	0.145	9.325	< .001
Happiness				
Tenderness	0.313	0.145	2.156	0.659
Surprise	0.391	0.145	2.695	0.151
Sadness	0.461	0.145	3.180	0.032
Fear	0.687	0.145	4.743	< .001
Anger	0.813	0.145	5.606	< .001
Tenderness				
Surprise	0.078	0.145	0.539	1.000
Sadness	0.148	0.145	1.024	1.000
Fear	0.375	0.145	2.587	0.207
Anger	0.500	0.145	3.450	0.012
Surprise				
Sadness	0.070	0.145	0.485	1.000
Fear	0.297	0.145	2.048	0.859
Anger	0.422	0.145	2.911	0.078
Sadness				
Fear	0.227	0.145	1.563	1.000
Anger	0.352	0.145	2.425	0.326
Fear				
Anger	0.125	0.145	0.862	1.000

= 5.98; Mean of non-carers = 32.48, *SD* = 7.24; *t* = 3.627; *p* < .001).

Table 3. Factorial Analysis of Variance for the Disgust score.

	df1	*df2*	*F*	*p*	η^2_p
Child caring status	1	118	4.775	0.031	0.039
Condition	1	118	0.186	0.667	0.002
Gender	1	118	1.205	0.275	0.010
Child caring status x gender	1	118	0.071	0.790	< .001
Condition x gender	1	118	0.125	0.724	0.001
Child caring status x Condition	1	118	0.069	0.794	< .001
Child caring status x Condition x gender	1	118	0.131	0.718	0.001
DPSS-R-Total	1	118	17.971	< .001	0.132

Study 2: Does the temporary activation of disease avoidance motivational system inhibit the activation of the parental care motivational system?

We conducted another 2 (Experimental condition) x 2 (child caring status) x 2 (gender) ANCOVA. The dependent variable was the rating of tenderness experience when viewing cute babies pictures, and we used the Tenderness-positive subscale of the PCAT as a covariate.

The only significant interaction was between the child caring status and the experimental condition ($F(1,123)$ = 8.73, p = .004, η^2 = 0.068; Figure 1). Exposure to pictures of infected babies decreased perceived tenderness only in non-carers. Simple main effects tests indicated that tenderness scores were significantly higher for child carers than non-carers in the disgust condition (p = .009). There was no significant difference between the tenderness score of child carers and non-carers in the furniture condition (p = .404).

Regarding main effects, we observed no significant effect of child caring status and condition (Table 4). Women tended to show higher tenderness score (M = 71.29, SD = 19.45) than men (M = 67.33, SD = 21.41, $F(1,123)$ = 3.853, p = .052, η^2 = 0.031) regardless their child caring status or their experimental condition. A closer look at the PCAT questionnaire revealed that accordingly compared to men, women showed significantly higher scores for PCAT-Caring (Mean of women = 3.56, SD = 0.9; Mean of men = 3.01, SD = 0.81; t = 3.651; p < .001), PCAT-Tenderness positive score (Mean of women = 4.26, SD = 0.964; Mean of men = 3.81, SD = 0.74; t = 3.647; p < .001), and PCAT- Tenderness positive score (Mean of women = 3.01, SD = 0.77; Mean of men = 2.58, SD = 0.85; t = 3.01; p = .003). For the other PCAT dimensions, women also showed higher scores than men, approaching significance (PCAT-Liking: Mean of women = 3.73, SD = 0.8; Mean of men = 3.44, SD = 0.89; t = 1.944; p = .054; PCAT-Protection: Mean of women = 3.96, SD = 0.63; Mean of men = 3.74, SD = 0.75; t = 1.743; p = .082).

Table 4. Factorial Analysis of Variance for the Tenderness score.

	df1	*df2*	*F*	*p*	η^2_p
Child caring status	1	119	1.554	0.215	0.013
Condition	1	119	0.441	0.508	0.004
Gender	1	119	3.853	0.052	0.031
Child caring status x gender	1	119	0.210	0.648	0.002
Condition x gender	1	119	1.206	0.274	0.010
Child caring status x Condition	1	119	8.725	0.004	0.068
Child caring status x Condition x gender	1	119	0.133	0.716	0.001
PCAT-TendernessPos	1	119	100.743	< .001	0.458

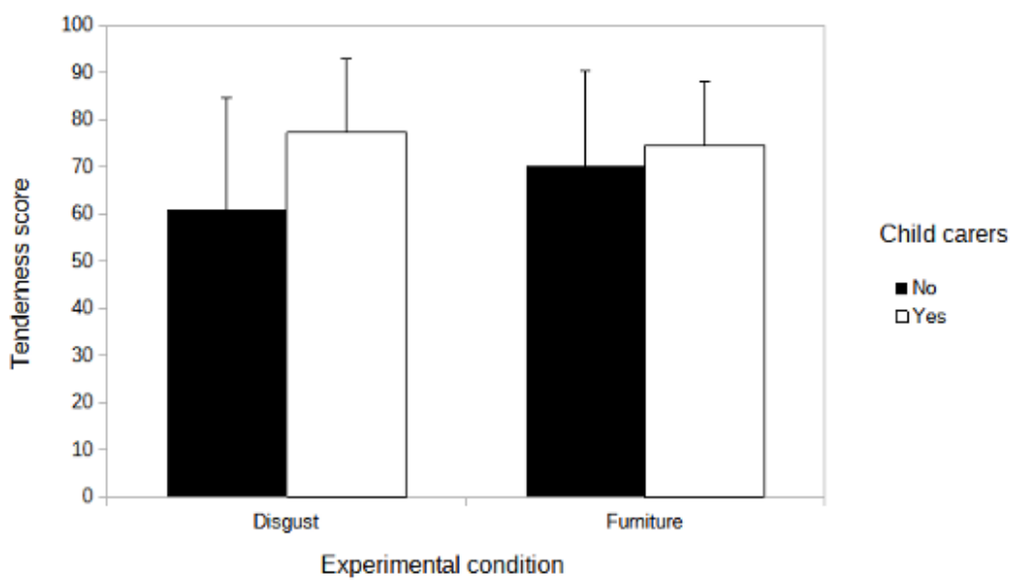

Figure 1. Mean tenderness score (± SD) according to experimental condition and child caring status speakers' position.

Table 5. Correlations between the DPSS-R and PCAT total and subtotal scores.

Variable	1	2	3	4	5	6	7	8	9
DPSS-R-Total	–								
DPSS-Propensity	0.848***	–							
DPSS-Sensitivity	0.882***	0.497***	–						
PACT Total	−0.096	−0.092	−0.076	–					
Caring PACT Subtotal	0.043	0.012	0.060	0.834***	–				
Liking PACT Subtotal	−0.339***	−0.285***	−0.301***	0.711***	0.536***	–			
Protection PACT Subtotal	0.156*	0.143*	0.128*	0.611***	0.387***	0.173***	–		
Tenderness positive PACT Subtotal	0.009	−0.005	0.019	0.854***	0.712***	0.475***	0.421***	–	
Tenderness negative PACT Subtotal	−0.052	−0.086	−0.009	0.784***	0.522***	0.460***	0.355***	0.550***	–

Note: $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Interestingly, looking at our manipulation check, we noticed that non-carers experienced more disgust (M = 2.97, SD = 1.99) compared to child-carers (M = 2.28, SD = 1,78; t = 2.032, p = .044). However, child carers did not differ from others in their disgust propensity (Mean of child carers = 17.67, SD = 3.79; Mean of non-carers = 17.78, SD = 3.35; t = −0.177; p = .860) and disgust sensitivity (Mean of child carers = 13.28, SD = 4.14; Mean of non-carers = 14.00, SD = 4.37; t = 0.939; p = .349), and global disgust response (Mean of child carers = 30.94, SD = 6.72; Mean of non-carers = 31.78, SD = 6.75; t = 0.689; p = .492).

What aspects of disgust response correlate with what aspects of tenderness?

Disgust propensity (DPSS-P) score correlated negatively with the liking babies PCAT sub-scale (r = −.285, p < .001) and positively with the protection PCAT subscale (r = .143, p = .023). Similar results were found for disgust sensitivity which also correlated negatively with the liking babies sub-scale (r = −.301, p < .001) and positively with the protection subscale (r = .128, p = .040; see Table 5).

Discussion

We hypothesized that activating the parenting system could inhibit the disease avoidance system and vice versa. As expected, temporarily activating the disease avoidance system with pictures of infected babies reduced tenderness towards cute babies, but only in those not accustomed to child care. However, activating the parental care system with pictures of cute babies did not affect participants' disgust response towards infected children.

Child carers were globally less sensitive to pictures of infected babies in our first study. Accordingly, our correlations between the DPSS-R and the PCAT subscales revealed that individuals with lower disgust propensity and sensitivity reported higher liking of babies.

Given the difference in exposure to infected babies between child carers and non-carers, it's unclear whether lower disgust in carers results from exposure or if those less sensitive to disgust are naturally inclined to care for babies. A twin study suggests a genetic basis for disgust sensitivity (Sherlock et al., 2016), implying that disgust propensity might influence our inclination for child caring. However, this study didn't isolate caregiving-related stimuli, so experience could still play a significant role in responses to such stimuli, even if genetics generally influence disgust sensitivity.

An intriguing result was the positive correlation between disgust propensity and sensitivity and the child protection subscale (Table 5), which is related to aggressiveness towards child molesters. This contrasts with the literature linking disgust sensitivity to less aggression (Molho et al., 2017; Pond Jr. et al., 2012). However, these studies focused on moral violations involving adults. Our results suggest that the relationship between anger and disgust might differ when children are involved. As cooperative breeders, humans may share an innate drive for child protection triggering both disgust and anger. Other studies are in line with such idea of a unique nature of the child-caring domain, showing lower disgust responses to caregiving-related pathogens (Ksiazkiewicz & Friesen, 2020; Prokop & Fančovičová, 2016).

From an evolutionary perspective, reduced disgust in caregiving contexts could be adaptive for those caring for infected children. Nevertheless, if the hypothesis of a unique nature of the child-caring domain proves to be correct, this doesn't imply that child carers won't be careful with external pathogens in order to avoid contaminating vulnerable children under their care (Cheon & Esposito, 2020; Eibach & Mock, 2011; Gilead &

Liberman, 2014; Hofer et al., 2018; Salas-Rodríguez et al., 2023). For non-carers' higher sensitivity to child infection signals and reduced cuteness response may be adaptive for self-protection against potential contamination.

Finally, in line with previous studies (Buckels et al., 2015; Piazza et al., 2018; Williams & Morris, 1996), women showed higher tenderness scores than men regardless of the experimental condition or their child care status. This was not the case for their disgust response, suggesting that their higher reports of tenderness in the PCAT questionnaire and during the experiments may reflect more than just biological predispositions.

This study has limitations. First, we used pictures which, as basic static stimuli, may have elicited low levels of motivational change. Also, participants completed a questionnaire about babies before the manipulation, potentially priming them to think of babies, even in the control condition. This being said, finding significant results despite these limitations may actually suggest greater motivational changes in more ecologically valid situations.

The precise mechanisms underlying differences between child-carers and non-carers warrant further investigation. From an evolutionary perspective, researchers invoked the possible coexistence of equally adaptive, yet distinct, behavioral strategies underpinned by genetic polymorphisms, or continua of psychological mechanisms, with no universal optimum (Buss & Greiling, 1999; Nettle, 2006). Future studies could confirm existing alternative adaptive strategies in the child-caring domain and explore the unique trade-offs associated with our cooperative breeding history. Additionally, it may be worthwhile to develop a measure of cooperative breeding levels to distinguish between single parents who bear the full cost of care, nuclear families, and other degrees and forms of cooperative breeding. Finally, although this study included stimuli and questionnaires specific to parenting and child care, future research could also examine the influence of participants' experiences with caregiving in general—such as caring for the elderly or nursing sick adults—and how independent these experiences might be from those related to child care.

Acknowledgments

I am highly grateful to Tahera Begum for helping with the selection of pictures and the design of the study. We also thank anonymous reviewers for their helpful comments.

Author contribution

EG developed the study concept and design, collected and analyzed data and wrote the manuscript.

Ethical statement

All procedures are in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the local ethics committee (University of Portsmouth, Science and Health Faculty Ethics Committee: SHFEC 2022-029).

Data accessibility & program code

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study, and we follow JARS (Appelbaum et al., 2018). All data, analysis code, and research materials are available at https://osf.io/2drz6/. This study's design and its analysis were not pre-registered.

References

Appelbaum, M., Cooper, H., Kline, R. B., Mayo-Wilson, E., Nezu, A. M., & Rao, S. M. (2018). Journal article reporting standards for quantitative research in psychology : The APA Publications and Communications Board task force report. *The American Psychologist*, *73*(1), 3–25. https://doi.org/10.1037/amp0000191

Beall, A. T., & Schaller, M. (2019). Evolution, motivation, and the mating/parenting trade-off. *Self and Identity*, *18*(1), 39–59. https://doi.org/10.1080/15298868.2017.1356366

Buckels, E. E., Beall, A. T., Hofer, M. K., Lin, E. Y., Zhou, Z., & Schaller, M. (2015). Individual differences in activation of the parental care motivational system : Assessment, prediction, and implications. *Journal of Personality and Social Psychology*, *108*(3), 497–514. https://doi.org/10.1037/pspp0000023

Burkart, J. M., Hrdy, S. B., & Van Schaik, C. P. (2009). Cooperative breeding and human cognitive evolution. *Evolutionary Anthropology: Issues, News, and Reviews*, *18*(5), 175–186. https://doi.org/10.1002/evan.20222

Buss, D. M., & Greiling, H. (1999). Adaptive individual differences. *Journal of Personality*, *67*(2), 209–243. https://doi.org/10.1111/1467-6494.00053

Cheon, B., & Esposito, G. (2020). Brief exposure to infants activates social and intergroup vigilance. *Behavioral Sciences*, *10*(4), Article 72. https://doi.org/10.3390/bs10040072

Cook, C. L., Krems, J. A., & Kenrick, D. T. (2021). Fundamental motives illuminate a broad range of individual and cultural variations in thought and behavior. *Current Directions in Psychological Science*, *30*(3), 242–250. https://doi.org/10.1177/0963721421996690

Curtis, V., Aunger, R., & Rabie, T. (2004). Evidence that disgust evolved to protect from risk of disease. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, *271*(4, Suppl.), S131–S133. https://doi.org/10.1098/rsbl.2003.0144

Eibach, R. P., & Mock, S. E. (2011). The vigilant parent : Parental role salience affects parents' risk perceptions, risk-aversion, and trust in strangers. *Journal of Experimental Social Psychology*, *47*(3), 694–697. https://doi.org/10.1016/j.jesp.2010.12.009

Fergus, T. A., & Valentiner, D. P. (2009). The Disgust Propensity and Sensitivity Scale-Revised : An examination of a reduced-item version. *Journal of Anxiety Disorders*, *23*(5), 703–710. https://doi.org/10.1016/j.janxdis.2009.02.009

Fleischman, D. S., Hamilton, L. D., Fessler, D. M. T., & Meston, C. M. (2015). Disgust versus lust: Exploring the interactions of disgust and fear with sexual arousal in women. *PLOS ONE*, *10*(6), Article e0118151. https://doi.org/10.1371/journal.pone.0118151

Forbes, H., Morton, C. E., Bacon, S., McDonald, H. I., Minassian, C., Brown, J. P., Rentsch, C. T., Mathur,

R., Schultze, A., DeVito, N. J., MacKenna, B., Hulme, W. J., Croker, R., Walker, A. J., Williamson, E. J., Bates, C., Mehrkar, A., Curtis, H. J., Evans, D., … Tomlinson, L. A. (2021). Association between living with children and outcomes from covid-19 : OpenSAFELY cohort study of 12 million adults in England. *BMJ*, *372*, Article n628. https://doi.org/10.1136/bmj.n628

Gilead, M., & Liberman, N. (2014). We take care of our own: Caregiving salience increases out-group bias in response to out-group threat. *Psychological Science*, *25*(7), 1380–1387. https://doi.org/10.1177/0956797614531439

Glocker, M. L., Langleben, D. D., Ruparel, K., Loughead, J. W., Gur, R. C., & Sachser, N. (2009). Baby schema in infant faces induces cuteness perception and motivation for caretaking in adults. *Ethology*, *115*(3), 257–263. https://doi.org/10.1111/j.1439-0310.2008.01603.x

Grant, R., Charmet, T., Schaeffer, L., Galmiche, S., Madec, Y., Platen, C. V., Chény, O., Omar, F., David, C., Rogoff, A., Paireau, J., Cauchemez, S., Carrat, F., Septfons, A., Levy-Bruhl, D., Mailles, A., & Fontanet, A. (2022). Impact of SARS-CoV-2 Delta variant on incubation, transmission settings and vaccine effectiveness: Results from a nationwide case-control study in France. *The Lancet Regional Health – Europe*, *13*, Article 100278. https://doi.org/10.1016/j.lanepe.2021.100278

Hofer, M. K., Buckels, E. E., White, C. J. M., Beall, A. T., & Schaller, M. (2018). Individual differences in activation of the parental care motivational system: An empirical distinction between protection and nurturance. *Social Psychological and Personality Science*, *9*(8), 907–916. https://doi.org/10.1177/1948550617728994

Kalawski, J. P. (2010). Is tenderness a basic emotion? *Motivation and Emotion*, *34*(2), 158–167. https://doi.org/10.1007/s11031-010-9164-y

Kenrick, D. T., Neuberg, S. L., Griskevicius, V., Becker, D. V., & Schaller, M. (2010). Goal-driven cognition and functional behavior: the fundamental-motives framework. *Current Directions in Psychological Science*, *19*(1), 63–67. https://doi.org/10.1177/0963721409359281

Ko, A., Pick, C. M., Kwon, J. Y., Barlev, M., Krems, J. A., Varnum, M. E. W., Neel, R., Peysha, M., Boonyasiriwat, W., Brandstätter, E., Crispim, A. C., Cruz, J. E., David, D., David, O. A., de Felipe, R. P., Fetvadjiev, V. H., Fischer, R., Galdi, S., Galindo, O., … Kenrick, D. T. (2020). Family matters: Rethinking the psychology of human social motivation. *Perspectives on Psychological Science*, *15*(1), 173–201. https://doi.org/10.1177/1745691619872986

Kramer, K. L. (2010). Cooperative breeding and its significance to the demographic success of humans. *Annual Review of Anthropology*, *39*, 417–436. https://doi.org/10.1146/annurev.anthro.012809.105054

Ksiazkiewicz, A., & Friesen, A. (2020). Slimy worms or sticky kids : How caregiving tasks and gender identity attenuate disgust response. *Politics and the Life Sciences*, *39*(2), 167–186. https://doi.org/10.1017/pls.2020.21

Lee, E. M., Ambler, J. K., & Sagarin, B. J. (2014). Effects of subjective sexual arousal on sexual, pathogen, and moral disgust sensitivity in women and men. *Archives of Sexual Behavior*, *43*(6), 1115–1121. https://doi.org/10.1007/s10508-014-0271-9

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, *50*(4), 370–396. https://doi.org/10.1037/h0054346

Molho, C., Tybur, J. M., Güler, E., Balliet, D., & Hofmann, W. (2017). Disgust and anger relate to different aggressive responses to moral violations. *Psychological Science*, *28*(5), 609–619. https://doi.org/10.1177/0956797617692000

Monto, A. S., & Ross, H. (1977). Acute respiratory illness in the community: Effect of family composition, smoking, and chronic symptoms. *Journal of Epidemiology & Community Health*, *31*(2), 101–108. https://doi.org/10.1136/jech.31.2.101

Neel, R., Kenrick, D. T., White, A. E., & Neuberg, S. L. (2016). Individual differences in fundamental social motives. *Journal of Personality and Social Psychology*, *110*(6), 887–907. https://doi.org/10.1037/pspp0000068

Nettle, D. (2006). The evolution of personality variation in humans and other animals. *American Psychologist*, *61*(6), 622–631. https://doi.org/10.1037/0003-066X.61.6.622

Piazza, J., McLatchie, N., & Olesen, C. (2018). Are baby animals less appetizing? Tenderness toward baby animals and appetite for meat. *Anthrozoös*, *31*(3), 319–335. https://doi.org/10.1080/08927936.2018.1455456

Pick, C. M., Ko, A., Wormley, A. S., Wiezel, A., Kenrick, D. T., Al-Shawaf, L., Barry, O., Bereby-Meyer, Y., Boonyasiriwat, W., Brandstätter, E., Crispim, A. C., Cruz, J. E., David, D., David, O. A., Defelipe, R. P., Elmas, P., Espinosa, A., Fernandez, A. M., Fetvadjiev, V. H., … Varnum, M. E. W. (2022). Family still matters: Human social motivation across 42 countries during a global pandemic. *Evolution and Human Behavior*, *43*(6), 527–535. https://doi.org/10.1016/j.evolhumbehav.2022.09.003

Pond Jr., R. S., DeWall, C. N., Lambert, N. M., Deckman, T., Bonser, I. M., & Fincham, F. D. (2012). Repulsed by violence : Disgust sensitivity buffers trait, behavioral, and daily aggression. *Journal of Personality and Social Psychology*, *102*(1), 175–188. https://doi.org/10.1037/a0024296

Prokop, P., & Fančovičová, J. (2016). Mothers are less disgust sensitive than childless females. *Personality and Individual Differences*, *96*, 65–69. https://doi.org/10.1016/j.paid.2016.02.064

Rilling, J. K., Gallagher, P., & Lee, M. (2024). Mating-related stimuli induce rapid shifts in fathers' assessments of infants. *Evolution and Human Behavior*, *45*(1), 13–19. https://doi.org/10.1016/j.evolhumbehav.2023.06.006

Sacri, A. S., De Serres, G., Quach, C., Boulianne, N., Valiquette, L., & Skowronski, D. M. (2014). Transmission of acute gastroenteritis and respiratory illness from children to parents *The Pediatric Infectious Disease Journal*, *33*(6), 583–588. https://doi.org/10.1097/INF.0000000000000220

Salas-Rodríguez, J., Gómez-Jacinto, L., Hombrados-Mendieta, I., Del Pino-Brunet, N., & Basto-Pereira, M. (2023). Motivated to compete but not to care : The fundamental social motives of risk-taking behaviors. *Personality and Individual Differences*, *205*, Article 112093. https://doi.org/10.1016/j.paid.2023.112093

Schaller, M. (2018). The parental care motivational system and why it matters (for everyone). *Current Directions*

in Psychological Science, *27*(5), 295–301. https://doi.org/10.1177/0963721418767873

Schaller, M. (2020). Evolutionary psychology meets socio-ecological psychology : The motivational psychologies of disease-avoidance and parental care. *Current Opinion in Psychology*, *32*, 6–11. https://doi.org/10.1016/j.copsyc.2019.06.020

Sherlock, J. M., Zietsch, B. P., Tybur, J. M., & Jern, P. (2016). The quantitative genetics of disgust sensitivity. *Emotion*, *16*(1), 43–51. https://doi.org/10.1037/emo0000101

Sherman, G., Haidt, J., & Coan, J. (2009). Viewing Cute Images Increases Behavioral Carefulness. *Emotion*, *9*(2), 282–286. https://doi.org/10.1037/a0014904

Shimizu, Y., Hashimoto, T., & Karasawa, K. (2022). Relationship between disease avoidance and attitudes toward older people. *Advances in Gerontology*, *12*(3), 242–246. https://doi.org/10.1134/S2079057022030110

Stevenson, R. J., Case, T. I., & Oaten, M. J. (2011). Effect of self-reported sexual arousal on responses to sex-related and non-sex-related disgust cues. *Archives of Sexual Behavior*, *40*(1), 79–85. https://doi.org/10.1007/s10508-009-9529-z

Tomasello, M. (2020). The adaptive origins of uniquely human sociality. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *375*(1803), Article 20190493. https://doi.org/10.1098/rstb.2019.0493

Tooby, J., Cosmides, L., Sell, A., Lieberman, D., & Sznycer, D. (2008). Internal regulatory variables and the design of human motivation: A computational and evolutionary approach. In A. J. Elliot (Ed.), *Handbook of approach and avoidance motivation* (pp. 251–271). Taylor & Francis.

van Leeuwen, F., & Petersen, M. B. (2018). The behavioral immune system is designed to avoid infected individuals, not outgroups. *Evolution and Human Behavior*, *39*(2), 226–234. https://doi.org/10.1016/j.evolhumbehav.2017.12.003

Williams, D. G., & Morris, G. H. (1996). Crying, weeping or tearfulness in British and Israeli adults. *British Journal of Psychology*, *87*(3), 479–505. https://doi.org/10.1111/j.2044-8295.1996.tb02603.x