Appetite 85 (2015) 30–35

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Research report

Mating strategy, disgust, and food neophobia

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ARTICLE INFO

Article history:
Received 19 July 2014
Received in revised form 26 October 2014
Accepted 30 October 2014
Available online 5 November 2014

Keywords:
Food neophobia
Disgust
Mating strategy
Evolutionary psychology
Food selection
Food preferences

ABSTRACT

Food neophobia and disgust are commonly thought to be linked, but this hypothesis is typically implicitly assumed rather than directly tested. Evidence for the connection has been based on conceptually and empirically unsound measures of disgust, unpublished research, and indirect findings. This study ($N = 283$) provides the first direct evidence of a relationship between trait-level food neophobia and trait-level pathogen disgust. Unexpectedly, we also found that food neophobia varies as a function of *sexual* disgust and is linked to mating strategy. Using an evolutionary framework, we propose a novel hypothesis that may account for these previously undiscovered findings: the food neophilia as mating display hypothesis. Our discussion centers on future research directions for discriminatively testing this novel hypothesis.

Introduction

Food neophobia – an aversion toward novel or unfamiliar foods – is a psychological and behavioral tendency that protects organisms from ingesting toxins and other pathogens. Species with specialized diets restricted to a few specific food sources (e.g. koalas, vampire bats) generally do not exhibit food neophobia, whereas species with broad and varied diets do (e.g., Ratcliffe, Fenton, & Galef, 2003; Rozin, 1976).

Rats, for example, tend to be markedly neophobic. They only ingest small portions of novel foods. In the absence of adverse consequences, they may eat the food again in the future, but if they fall ill, they avoid ingesting it again (Rozin, 1976). They avoid eating more than one unfamiliar food at once, and if they fall ill after eating both an unfamiliar food and a familiar food, they assiduously avoid the novel food in the future (Rozin, 1976).

Such patterns of food neophobia have evolved in a diverse array of taxa with generalist diets, including birds (Greenberg, 1983), rodents (e.g., Barnett, 1958; Mitchell, 1976; Wong & McBride, 1993), pigs (Oostindjer, Muñoz, Van den Brand, Kemp, & Bolhuis, 2011), monkeys (Visalberghi & Addessi, 2000), and chimpanzees (Visalberghi, Myowa Yamakoshi, Hirata, & Matsuzawa, 2002). Like these other omnivorous species, humans are reluctant to ingest unknown food items (Birch, 1999; Cashdan, 1998; Pliner & Hobden, 1992). Among humans, food neophobia is especially strong in response to animal products compared to non-animal products (Martins, Pelchat, & Pliner, 1997; Pliner, 1994; Pliner & Pelchat, 1991) – a psychological design feature that may have evolved in humans as a result of the greater pathogenic threat posed by meat and animal products relative to non-animal products (Fessler, 2002; Fessler & Navarrete, 2003; Rozin, 2003).

The emotion of disgust, typically conceptualized as an evolved defense against pathogens and parasites, is an obvious candidate as a motivator of behavioral food avoidance (Curtis, Aunger, & Rabie, 2004; Haidt, McCauley, & Rozin, 1994; Tybur, Lieberman, Kurzban, & Descioli, 2013). Indeed, several researchers have proposed a link between disgust and food neophobia (e.g. Martins & Pliner, 2006; Nordin, Broman, Garvill, & Nyroos, 2004; Pliner & Pelchat, 1991; Pliner & Salvy, 2006). Surprisingly, however, few studies on food neophobia have actually measured its relationship to disgust, and none has directly investigated the hypothesis that individual differences in disgust are associated with individual differences in food neophobia. In their comprehensive review, Pliner and Salvy (2006) discuss the commonly assumed connection between disgust and neophobia, but the evidence adduced is typically unpublished (e.g., p. 76) or indirect (e.g., p. 79). Direct evidence of a connection between disgust and food neophobia, especially between trait-level disgust and neophobia, is lacking.

This empirical gap is exacerbated by the fact that the sparse research that does exist has been based on Haidt et al.'s (1994) original Disgust Scale (e.g., Björklund & Hursti, 2004; Nordin et al., 2004). The original Disgust Scale, while of great historical value in spurring empirical research, is psychometrically unsound, exhibiting an

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http://dx.doi.org/10.1016/j.appet.2014.10.029
0195-6663/

unstable factor structure and unsatisfactory reliability (Haidt et al., 1994; Olatunji, Sawchuk, de Jong, & Lohr, 2007).

To address this problem and fill the extant gap in the neophobia literature, we tested the relationship between individual differences in trait-level disgust and food neophobia. Our goal was to use conceptually and psychometrically sound measures to directly test the relationship between food neophobia and disgust, a connection whose veracity is typically assumed rather than explicitly examined.

We also included *mating strategy* (Buss & Schmitt, 1993; Penke & Asendorpf, 2008) in our investigation because recent evidence demonstrates that mating strategy is a strong predictor of sexual disgust (Al-Shawaf, Lewis, & Buss, in press). If (a) disgust is related to food neophobia, and (b) mating strategy is related to disgust, then the present investigation raises the possibility of a heretofore undiscovered relationship between mating strategy and food neophobia. Such a finding would be unexpected and – unlike the link between disgust and food neophobia – neither intuitive nor suggested in any previous work.

Method

Participants and procedure

Two hundred and three women and eighty men (M_{age} = 18.89 years, SD_{age} = 2.81, age range = 18–50) were recruited from the psychology subject pool at The University of Texas at Austin. Participants arrived at the laboratory, provided informed consent to participate in the study, and were escorted by a researcher to a private room where they completed an online survey hosted by Qualtrics. Participants received partial course credit for their participation and were debriefed upon completing the study.

Measures

Disgust

The original Disgust Scale has become less current with the development of new, more psychometrically sound disgust measures (Olatunji et al., 2007; Tybur et al., 2013). Olatunji and colleagues advanced disgust research by developing an improved Revised Disgust Scale (2007), but subsequent work has revealed that this too suffers from conceptual and statistical limitations (Al-Shawaf & Lewis, 2013). The revised disgust scale proposes three facets of disgust: *core disgust*, *contamination-based disgust,* and *animal-reminder disgust*. The first two factors do not show sufficient evidence of conceptual or statistical distinctiveness (Al-Shawaf & Lewis, 2013; Tybur, Lieberman, & Griskevicius, 2009), and the third factor, *animal-reminder disgust*, is conceptually implausible from an evolutionary perspective (Al-Shawaf & Lewis, 2013; Fessler & Navarrete, 2005) – a view endorsed by nearly all disgust researchers (e.g., Chapman, Kim, Susskind, & Anderson, 2009; Curtis et al., 2004; Haidt et al., 1994; Tybur et al., 2013).

The recently-developed Three Domain Disgust Scale (TDDS), on the other hand, assesses three different kinds of disgust: *pathogen*, *sexual*, and *moral* disgust (Tybur et al., 2009). There is compelling empirical evidence of the existence and distinctness of these three different types of disgust: the different cues that evoke them, the distinct cognitive mechanisms underlying them, the different behaviors they motivate, and their unique profiles of correlations with other psychological variables (Tybur et al., 2009, 2013).

The TDDS consists of 21 items that ask participants to rate how disgusting they find a variety of potentially repellent situations on a 7-point Likert-type scale (0 = not at all disgusting, 6 = extremely disgusting). The TDDS includes three seven-item subscales, one for each of the distinct forms of disgust. Sample items from the *pathogen disgust* subscale include "Seeing some mold on old leftovers in your refrigerator" and "Seeing a cockroach run across the floor." Sample items from the *sexual disgust* subscale include "A stranger of the opposite sex intentionally rubbing your thigh in an elevator" and "Performing oral sex." Sample items from the *moral disgust* subscale include "A student cheating to get good grades" and "Intentionally lying during a business transaction."

We measured all three forms of disgust to contrast two competing hypotheses: (1) the possibility that the proposed link between disgust and food neophobia is specific to the pathogen domain, and (2) the possibility that food neophobia is related to other facets of disgust as well. *Prima facie* reasoning suggests a connection specifically between pathogen disgust and food neophobia, but as a first exploratory investigation into the relationship between food neophobia and disgust, we used all three subscales of the TDDS.

Food neophobia

We measured food neophobia with the Food Neophobia Scale (FNS; Pliner & Hobden, 1992). The FNS is a robust, psychometrically validated, and widely used measure of individuals' willingness to try novel and unfamiliar foods (e.g., Knaapila et al., 2011; Olabi, Najm, Baghdadi, & Morton, 2009; Pliner & Hobden, 1992). The FNS instructs participants to rate their level of agreement with 10 statements such as "I don't trust new foods" and "I am constantly sampling new and different foods" (reverse scored) on a 7-point Likert scale (1 = disagree strongly; 7 = agree strongly). Scale items are composited to form a trait-level food neophobia score.

Mating strategy

We operationalized mating strategy with the Revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008). The SOI-R is a nine-item measure of an individual's cognitive, behavioral, and attitudinal disposition toward uncommitted sexual relations. Sample items include "With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?" and "I can imagine myself being comfortable and enjoying 'casual' sex with different partners." Inventory items are summed to form a composite SOI-R score, with higher scores reflecting a stronger proclivity for short-term mating.

Results

Disgust and food neophobia

To test the central hypothesis that individual differences in trait-level disgust are linked to food neophobia, we first conducted Pearson product-moment correlations between participants' FNS scores and their levels of pathogen, sexual, and moral disgust.

As predicted, food neophobia was positively correlated with pathogen disgust, $r(272) = .23$, $p < .001$. This pattern was significant among women, $r(195) = .24$, $p < .001$. Among men, this relationship was in the same direction, but did not reach statistical significance, $r(75) = .17$, *ns.* Also consistent with expectations, moral disgust was unrelated to food neophobia $r(272) = .07$, *ns* [men: $r(75) = -.08$, *ns*; women: $r(195) = .11$, *ns*] (Table 1). However, we uncovered an unexpected relationship between participants' food neophobia and their *sexual* disgust, $r(273) = .24$, $p < .001$ [women: $r(194) = .21$, $p < .01$; men: $r(77) = .28$, $p < .05$].

To ensure that the observed relationships between food neophobia and sexual disgust were not merely byproducts of the link between neophobia and pathogen disgust, we conducted partial correlations between food neophobia and each of these two disgust subscales while controlling for the other. Among both men and women, sexual disgust exhibited an independent link to food neophobia while controlling for pathogen disgust [men: $r(74) = .23$, $p < .05$; women: $r(192) = .153$, $p < .05$]. Among women, pathogen