



“If I feel disgusted, I must be getting ill”: Emotional reasoning in the context of contamination fear



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ABSTRACT

Patients suffering from anxiety disorders have been shown to infer danger on the basis of their anxiety responses “*if I feel anxious, there must be danger.*” This tendency logically hampers the identification of false alarms and may thus act in a way to confirm the a priori threat value of the feared stimuli/situations. Since disgust is assumed to play a critical role in the persistence of contamination fears in OCD, the question rises whether individuals suffering from fear of contamination perhaps similarly infer danger on the basis of their disgust response: “*If I feel disgusted, it must be contagious.*” Therefore, this study tested whether indeed disgust-based reasoning might be involved in fear of contamination. On the basis of the contamination fear subscale of the Padua Inventory (PI), we selected a group of participants scoring higher than the established clinical range ($n = 31, PI > 13$) and a group of participants low ($n = 27, PI < 5$) in contamination fear. Each participant was presented with a series of 2 times 4 types of scripts that systematically varied in the absence/presence of objective threat of contamination and the absence/presence of the actor’s disgust response. Following each script, participants rated their perceived threat of contamination/illness. In line with the hypothesis that disgust-based reasoning might be involved in fear of contamination, specifically high contamination fearful individuals inferred risk of becoming ill on the basis of experienced disgust (in addition to objective threat), as was evidenced by a significant Group (high vs. low) \times Threat (yes vs. no) \times Disgust response (yes vs. no) interaction. This finding might not only help to explain the persistence of contamination fears, but also provides some fresh clues to improve currently available treatment options.

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Concerns about contamination represent one of the primary symptoms of obsessive-compulsive disorder (OCD, McKay et al., 2004). A striking feature of patients suffering from fear of contamination is their persistence in avoiding physical contact with particular classes of stimuli (e.g., door knobs, toilet seats) in the absence of objective threat. Several mechanisms have been proposed to explain these apparently irrational and potentially highly invalidating behaviours. Current cognitive conceptualisations of contamination fear emphasise the importance of illness/contamination related catastrophic beliefs (Riggs & Foa, 2007). To explain the persistence of these dysfunctional anxious appraisals, it has been proposed that perhaps also emotional reasoning might be involved in contamination fear (Arntz, Rauner, & van den Hout, 1995). This idea was inspired by previous studies demonstrating that patients with a variety of anxiety disorders tend to infer danger on the basis of their

emotional response in danger-relevant situations even in the absence of objective threats. A series of studies showed that anxiety-disordered patients use an “if I feel anxious there must be danger” heuristic (e.g., Arntz et al., 1995). Such tendency to infer danger on the basis of their fear response logically hampers the identification of false alarms and may thus act in a way to confirm the a priori threat value of the feared stimuli/situations.

Thus far most studies on this reasoning fallacy focussed on anxiety responses and post-traumatic stress disorder related intrusions (e.g., Arntz et al., 1995; Engelhard, van den Hout, Arntz, & McNally, 2002; Engelhard, Macklin, McNally, van den Hout, & Arntz, 2001). However, similar patterns of emotional reasoning may be elicited by the experience of disgust: “If I feel disgusted it must be contagious”; or “If I feel disgusted this behaviour must be morally unacceptable” (cf. de Jong & Peters, 2009; Rachman, 2004). The proposed evolutionary role of disgust as disease-avoidance emotion (e.g., Oaten, Stevenson, & Case, 2009) points to its potential importance within the context of OCD. In line with this, several correlational studies showed that there is a link between disgust propensity and contamination fear (e.g., McKay & Moretz,

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2009; Olatunji, Sawchuk, Lohr, & de Jong, 2004). Based on this prior work, we propose that disgust-elicited emotional reasoning might well be involved in the persistence of OCD symptoms. Following earlier attempts at testing disgust-related information-processing abnormalities in contamination fear (cf. Armstrong et al., 2009), the major aim of the present study was to explore whether indeed this type of reasoning bias might be involved in fear of contamination.

Disgust-based emotional reasoning was conceptualized as a general overestimation of danger, an enhanced risk of becoming contaminated, and a higher subjective probability of being inflicted by disease. In this way, we were able to test whether the emotion of disgust would mimic anxiety in eliciting a general overestimation of impending (unspecified) danger (e.g., Arntz et al., 1995). Further, whether this (evolved) function of disgust as a disease-threat signal would lead to a more specific but not necessarily harmful consequence of enhancing the risk of contamination, or whether disgust would most specifically be focused on catastrophic outcomes by overestimating the risk of contracting a contagious illness.

First, we tested this hypothesis in an analogue sample. Based on their scores on the contamination-fear subscale of the Padua Inventory (PI; Van Oppen, Hoekstra, & Emmelkamp, 1995), we selected high and low contamination fear groups and presented participants with a series of scripts systematically varying in the absence/presence of objective threat of contamination and the absence/presence of the actor's disgust response (e.g., Arntz et al., 1995). Following each script, participants rated their levels of perceived danger, threat of contamination, and the risk of becoming ill. By systematically varying the absence/presence of the actor's disgust response, this design allowed us to test whether participants infer risk of contamination on the basis of disgust responses (in addition to objective threats) and to test the hypothesis that such disgust-based reasoning would be especially pronounced in high contamination fearful individuals.

Method

Participants

Participants ($N = 164$ [all Caucasian]; mean age = 22.62, $SD = 7.12$) were recruited via an online system through which first-year psychology students could participate for course credits, or via social media such as Facebook. The majority of participants were female (70%) which reflects the gender distribution of the undergraduate psychology student population at our university. Based on scores of the PI, groups scoring high and low on contamination fear were selected by taking participants from the highest- ($PI > 13$; $n = 33$) and lowest-quartile range ($PI < 5$; $n = 33$). The PI scores of the high group were within the range of PI scores of OCD patients reported in earlier studies by Van Oppen et al. (1995; $M = 13$) and Burns, Formea, Sternberger, and Lee (1996; $M = 14$).

Materials

Online rating task

The rating task was generated using Qualtrics Labs, Inc. software, version 12. 018 of the Qualtrics Research Suite Copyright© 2005, which specializes in the construction of online questionnaires. This method meant that participants could complete the task from their own pc at home at a self-selected time. We constructed the task along the lines of Arntz et al. (1995). The current task consisted of a series of scripts describing everyday contamination-relevant scenarios, each followed by a number of 100 mm visual analogue scales (VAS). Half of these scripts consisted of scenarios high in objective threat of contamination and half of the scripts were low in objective threat of contamination. For each type of script, half of the

scenarios indicated that the actor experienced a disgust response, whereas in the other half this type of response information was omitted. There were 8 different scenarios for each type of script (8 scenarios \times 2 absence/presence contamination threat \times 2 absence/presence disgust response) resulting in 32 scripts. To construct a fully balanced design, these 32 scripts were distributed over 4 versions of the task. Each version consisted of 8 unique thematic scenarios (e.g., someone entering a public shower, someone buying fish at the fish market). Hence there were always two times four scenarios reflecting a particular combination of response and threat information. All scripts were shown on separate screens, and randomly ordered, with the exception of the first script which was always without a disgust response and low in threat of contamination. Randomization was repeated for each individual participant. Each script was followed by 6 Visual Analogue Scales (VASs) on which they could rate the event on various aspects. Three VASs were used as the dependent variables: danger, risk of contamination, and risk of becoming ill and ranged from 0 = *no danger at all* to 100 = *very dangerous*, 0 = *absolutely no risk of contamination* to 100 = *very high risk of contamination*, and 0 = *absolutely no risk of becoming ill* to 100 = *very high risk of becoming ill*. The other VASs were used as filler items to render the aim of the study less obvious. The following sample items illustrate the four possible conditions:

The low objective threat/no disgust response condition (translation of original scenario in Dutch):

"You parked your car on the second floor of a car park. You walk down via the stairwell, but half way down, you drop your parking ticket. You pick up the ticket and continue on your way to go shopping for a couple of hours."

The low objective threat/disgust response condition:

"You park your car on the second floor of a car park. You walk down via the stairwell, but half way down, you drop your parking ticket. While you pick up your ticket, you feel disgusted."

The high objective threat/no disgust response condition:

"You park your car on the second floor of a car park. When you walk down via the stairwell, you detect a strong smell of urine and notice the building has not been cleaned for a while. Half way down, you suddenly drop your parking ticket. You pick up the ticket and continue on your way to go shopping for a couple of hours."

The high objective threat/disgust response condition:

"You park your car on the second floor of a car park. When you walk down via the stairwell, you detect a strong smell of urine and notice the building has not been cleaned for a while. Half way down, you suddenly drop your parking ticket. While you pick up your ticket, you feel disgusted."

Padua Inventory

Dutch translation of the Contamination fear subscale of the Padua Inventory (PI; Burns et al., 1996; Van Oppen et al., 1995) was used to measure contamination fear. The subscale consists of 10 items which are scored on a 5-point Likert-type scale ranging from 0 (*not at all*) to 4 (*very much*). The PI demonstrated adequate internal consistency in the present study ($\alpha = .87$).

Data reduction and statistical analyses

As a first manipulation check, the thematic stories (e.g., public shower, fish market) within the low objective threat/no disgust response script condition were compared between the four versions of the task (each containing 2 thematic stories for this

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