Journal of Anxiety Disorders 25 (2011) 28–35

Contents lists available at ScienceDirect

Journal of Anxiety Disorders

# Unique affective and cognitive processes in contamination appraisals: Implications for contamination fear

Josh M. Cisler[a,b,*], Thomas G. Adams[a], Robert E. Brady[a], Ana J. Bridges[a], Jeffrey M. Lohr[a], Bunmi O. Olatunji[c]

[a] University of Arkansas, United States
[b] University of Arkansas for Medical Sciences, Brain Imaging Research Center, United States
[c] Vanderbilt University, United States

ARTICLE INFO

*Article history:*
Received 6 April 2010
Received in revised form 7 July 2010
Accepted 9 July 2010

*Keywords:*
Contamination fear
Obsessive–compulsive disorder
Disgust
Attention

ABSTRACT

A large body of evidence suggests an important role of disgust in contamination fear (CF). A separate line of research implicates various cognitive mechanisms in contamination fear, including obsessive beliefs, memory biases, and delayed attentional disengagement from threat. This study is an initial attempt to integrate these two lines of research and examines whether disgust and delayed attention disengagement from threat explain unique or overlapping processes within CF. Non-clinical undergraduate students ($N = 108$) completed a spatial cueing task, which provided measures of delayed disengagement from frightening and disgusting cues, and a self-report measure of disgust propensity (DP). Participants also completed a chain of contagion task, in which they provided contamination appraisals of an object as a function of degrees of removal from an initial contaminant. Results demonstrated that DP predicted greater initial contamination appraisals, but a sharper decline in estimations across further degrees of removal from the contaminant. Delayed disengagement from disgust cues uniquely predicted sustained elevations in contamination estimations across further degrees of removal from the contaminant. These results suggest that DP and delayed disengagement from disgust cues explain unique and complimentary processes in contamination appraisals, which suggests the utility of incorporating the disparate affective and cognitive lines of research on CF.



Contamination fear (CF) refers to "an intense and persisting feeling of having been polluted, dirtied, or infected, or endangered as a result of contact, direct or indirect, with an item/place/person perceived to be soiled, impure, dirty, infectious, or harmful" (Rachman, 2006, p. 9). CF is most obviously linked with obsessive–compulsive disorder (OCD), where obsessions are related to germs, disease, and/or general uncleanliness, and compulsions are typically related to washing rituals (Rachman, 2004, 2006). CF may also be relevant for understanding other disorders, such as sexual assault-related posttraumatic stress disorder (Herba & Rachman, 2007) and health anxiety (Olatunji, 2009).

Research investigating the mechanisms relevant for understanding heightened CF generally falls into two conceptually distinct areas. On the one hand, much research has been focused on the role of disgust in CF (Cisler, Olatunji, & Lohr, 2009a; Woody & Teachman, 2000). Disgust is a basic emotion theorized to motivate the avoidance of contact with, and ingestion of, noxious substances (Oaten, Stevenson, & Case, 2009; Rozin & Fallon, 1987). Evidence supporting an important role of disgust in CF comes from studies demonstrating (1) positive correlations between self-report measures of disgust and contamination fear (Moretz & Mckay, 2008; Olatunji, Sawchuk, Lohr, & de Jong, 2004; Olatunji, Williams, et al., 2007), (2) increases in disgust propensity (DP) prospectively predict increase in CF (David et al., 2009; Olatunji, 2010), (3) greater avoidance and self-reported disgust during exposure to disgust-related objects among individuals with heightened CF (Deacon & Olatunji, 2007; Olatunji, Lohr, Sawchuk, & Tolin, 2007; Tsao & McKay, 2004), and (4) greater anterior insula activation, a neural region implicated in disgust processing, during exposure to disorder-relevant stimuli and disgust stimuli among individuals with contamination-related OCD (Lawrence et al., 2007; Phillips et al., 2000; Shapira et al., 2003). Further, research has consistently demonstrated that the relationship between disgust and contamination fear remains when controlling for general negative affectivity or trait anxiety (Moretz & Mckay, 2008; Olatunji, Williams, et al., 2007; Tsao & McKay, 2004). This body of research provides strong evidence for a role of disgust in CF.

* Corresponding author at: 216 Memorial Hall, Department of Psychology, University of Arkansas, Fayetteville, AR 72701, United States.
*E-mail addresses:* jcisler@uark.edu, josh.cisler@gmail.com (J.M. Cisler).

0887-6185/$ – see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.janxdis.2010.07.002

On the other hand, much research has also focused on the role of various cognitive mechanisms in CF. One line of research in this regard has been research investigating obsessive beliefs in OCD, which refer to beliefs about the importance of controlling thoughts, perfectionism, intolerance of uncertainty, and overestimation of threat (OCCWG, 1997; Obsessive Compulsive Cognitions Working Groups [OCCGW], 1997, 2005; Rachman, 1997). This research suggests that overestimation of threat is strongly linked with contamination-related OCD (Tolin, Woods, & Abramowitz, 2003; Tolin, Brady, & Hannan, 2008). Another line of research suggests memory biases in CF. For example, Radomsky and Rachman (1999) found that individuals with contamination-related OCD were better able to remember which neutral objects had been touched with a contaminated object compared to a control group. Another line of research suggests attentional biases towards threat in CF (Armstrong & Olatunji, 2010; Foa, Ilai, McCarthy, & Shoyer, 1993; Najmi & Amir, 2010), with particular evidence for difficulty disengaging attention from threat cues (Cisler & Olatunji, 2010). These lines of research provide support for the importance of several cognitive mechanisms in understanding CF, though it is important to note that the degree to which these different cognitive mechanisms are distinct versus overlapping has yet to be elucidated.

It seems important and timely to begin to integrate these disparate lines of research into coherent explanations of CF. One relevant question in this pursuit is the degree to which affective (i.e., disgust) mechanisms and cognitive mechanisms explain unique versus overlapping processes in CF. One hypothesis regarding this question is that the relative primacy of the affective and cognitive mechanisms might differ depending on the characteristics of the stimulus. The laboratory-based studies discussed above employed objects and situations that are considered normative disgust elicitors with more apparent probability for contagion, such as bedpans and soiled tissues. Given that these objects are normative disgust elicitors with apparent contagion probability, it would be expected that individual differences in disgust propensity mediate reactions towards them (e.g., Rozin, Haidt, & McCauley, 1999). Normative disgust elicitors, however, are not the only types of objects that elicit marked disturbance among individuals with contamination-based OCD; instead, a much broader range of objects and situations elicit strong reactions from these individuals, such as touching stairway handrails, elevator buttons, door handles, money, and public telephones. In contrast to normative disgust elicitors, these objects and situations do not have obvious contamination-related properties and it seems unlikely that individual differences in disgust will explain a majority of the variance in marked disturbance towards these items. Rather, it may be the case that cognitive mechanisms, such as threat overestimation or difficulty disengaging attention from threat, explain the majority of variance towards these types of objects. While it is acknowledged that a strict dissociation between cognitive and affective processes does not seem tenable (e.g., they likely operate in tandem to mediate reactions towards any type of object), the relative importance of the affective or cognitive mechanisms may differ as a function of the type of object. This analysis makes two testable predictions: disgust may be more important in mediating reactions towards objects with more apparent and direct contagion properties (e.g., normative disgust elicitors), whereas the cognitive mechanisms implicated in CF may be more important in mediating reactions towards objects that have only indirect and distal contagion probability (e.g., elevator buttons may only become contaminated if someone sick sneezes on them).

The goal of the present study was to provide an initial test of these hypothesized unique roles of disgust and cognitive processes in CF. DP was chosen as the specific affective mechanism to investigate, given the wealth of previous research linking heightened DP with CF (Moretz & Mckay, 2008; Olatunji et al., 2004; Olatunji et al., 2006; Olatunji, Williams, et al., 2007). Difficulty disengaging attention from threat cues was chosen as the specific cognitive mechanism to investigate, given the growing body of research linking delayed attentional disengagement from threat cues with CF (Armstrong & Olatunji, 2010; Cisler & Olatunji, 2010). Further, difficulty disengaging attention may map directly onto the hypothesized process, such that an individual with contamination-based OCD may fixate on an elevator button, for example, because of difficulty removing (i.e., disengaging) attention from the alleged danger cue. As such, difficulty disengaging attention from threat seems a promising initial cognitive mechanism with which to test the hypothesized model.

One challenge to investigating the unique contributions of DP and delayed attentional disengagement is using a measure of CF sensitive enough to reflect variations in both candidate mechanisms. One viable measure is the chain of contagion task (Tolin, Worhunsky, & Maltby, 2004). In Tolin and colleagues' task, participants identified the most contaminated object in the building and rated how contaminated it was from 0 to 100%. The experimenter then rubbed a new pencil on the object, and the participant rated how contaminated the pencil was from 0 to 100%. The experimenter then rubbed another new pencil on the previous pencil, and the participant rated how contaminated the new pencil was from 0 to 100%. This process was repeated for 12 pencils; i.e., 12 degrees of removal from the initial contaminant. Tolin and colleagues found that individuals with contamination-related OCD demonstrated greater initial elevations as well as greater sustained elevations across the pencils relative to other anxiety disorder and non-anxious control groups. This methodology is useful for testing the hypothesized unique roles of affective and cognitive mechanisms because it systematically manipulates the contagion properties of the stimulus. That is, pencils 1 and 2, for example, have more direct contact with the contaminant and it might be expected that DP predicts contamination appraisals of these pencils. By contrast, pencils 11 and 12, for example, have only distal and indirect contact with the initial contaminant and difficulty disengaging attention from the initial threat cue might predict contamination appraisals of these objects. Accordingly, Tolin et al.'s (2004) chain of contagion task appears to be a viable means of testing whether the affective and cognitive mechanisms differentially explain variance in contamination appraisals of objects as a function of degrees of removal from the initial contaminant.

The present study tested the hypothesized roles of unique affective and cognitive mechanisms in CF by examining whether DP and delayed disengagement from threat predicted unique sources of variance in the chain of contagion task (Tolin et al., 2004). We hypothesized that DP would explain variance in pencils with more direct contact with the initial contaminant, but be less relevant for explaining variance in pencils with only indirect contact with the initial contaminant. By contrast, we predicted that delayed disengagement from threat would explain variance in pencils with only distal and indirect contact with the initial contaminant. Our previous study (Cisler & Olatunji, 2010) found delayed disengagement from both fear and disgust cues among high CF individuals at 500 ms, but not 100 ms, stimulus presentation. Both fear and disgust cues were used in the present study to examine whether relations with the chain of contagion task were specific to either delayed disengagement from disgust or fear stimuli. Stimulus duration was also manipulated to be either 100 or 500 ms. Manipulating stimulus duration differentiates early versus late stages of information processing, which provides a test of whether relations with the chain of contagion task are specific to early versus late processing biases.