



Disgust mediates the relation between attentional shifting and contamination aversion

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ABSTRACT

Background and objectives: Aversion of contaminants is important for several psychiatric disorders, particularly contamination-based obsessive-compulsive disorder (OCD). Recent theoretical models have proposed that the ability to control one's attention, especially when processing affectively laden information, is important in the etiology of pathological anxiety. The present study tested the relations between attentional control, affective arousal, and behavioral approach toward contaminants (contamination aversion).

Methods: Thirty-three non-selected (undergraduate university students) participants completed a measure of trait attentional control and three behavioral approach tasks, which measured emotional reactivity and approach toward contaminants.

Results: Preliminary analyses showed that poorer attentional control and greater affective arousal predicted less behavioral approach toward contaminants. Modeling of direct and indirect relations showed that poor attentional shifting ability and greater subjective disgust were related to less behavioral approach. Moreover, disgust fully mediated the relation between attentional shifting and behavioral approach.

Limitations: The present study used a convenience sample, which is not representative of the general population or individuals with OCD; therefore, research using clinical samples is necessary before making clinical interpretations. Moreover, the present study utilized subjective measures of attentional control and affective arousal. The use of objective measures of attention and affective arousal would provide a more valid test of the role of attentional control in contamination aversion.

Conclusions: These findings suggest that attentional shifting abilities may serve as a vulnerability to affective arousal/regulation and behavioral avoidance of contaminants, but the latter relation only operated indirectly via disgust. These findings have clear implications for the etiology of contamination-related OCD.

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1. Introductions

Attentional control – the general ability to exert executive control over one's attentional systems (Derryberry & Reed, 2002) – has been shown to influence affective arousal and regulation (Bush, Luu, & Posner, 2000; Posner, Rothbart, Sheese, & Tang, 2007; Rothbart & Rueda, 2005; White, Helfinstein, Reeb-Sutherland, Degnan, & Fox, 2009). For example, poor attentional control is associated with increased emotional arousal to stressors (Rothbart, Posner, & Boylan, 1990; Rothbart, Ziaie, & O'Boyle, 1992) and decreased abilities to down-regulate affective arousal (Morales, Mundy, Crowson, Neal, & Delgado, 2005; Posner & Rothbart, 1998). Research has also shown that, among highly anxious

children, attentional focus (i.e., the ability to concentrate and focus attention on one task) and attentional shifting (i.e., the ability to engage in dual tasks and shift attention from one task to another) predicted severity of trait anxiety above and beyond neuroticism (Muris, de Jong, & Engelen, 2004). Peers and Lawrence (2009) showed that adult participants with poor attentional control were more distracted by threatening stimuli than participants with good attentional control, an effect that is thought to underlie pathological anxiety. Similarly, two studies have shown that poor attentional control was associated with greater biases toward threatening information, but only among highly anxious individuals (Derryberry & Reed, 2002; Reinholdt-Dunne, Mogg, & Bradley, 2009). Individuals diagnosed with generalized anxiety disorder also show generally impaired attention control when compared to non-anxious controls (Armstrong, Zald, & Olatunji, 2011). This study also showed an indirect association between attentional control and worry via trait anxiety.

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Several studies have shown that individuals with obsessive-compulsive disorder (OCD) may have impaired attentional control capacities. One study (Armstrong et al., 2011) has shown that individuals diagnosed with OCD scored lower on the Attentional Control Scale (Derryberry & Reed, 2002) than non-anxious controls. Numerous studies have also reported deficits in various components of attention among individuals with OCD, including: 1) impaired sustained attention (Gambini, Abbruzzese, & Scarone, 1993; Kim, Park, Shin, & Kwon, 2002; Morein-Zamir et al., 2010); 2) over-focused attention toward irrelevant stimuli (e.g., distractibility; Nelson, Early, & Haller, 1993); and 3) delayed attention disengagement from neutral stimuli (Schmidtke, Schorb, Winkelmann, & Hohagen, 1998). One study showed that negatively valenced stimuli interfered with attentional control more for high contamination fearful than low contamination fearful participants (Najmi, Hindash, & Amir, 2010). This finding is consistent with a large body of research suggesting that contamination-related OCD is associated with impaired attention when processing threatening information (Summerfeldt & Ender, 1998).

Biased attention in contamination-related OCD has been shown using several different methodologies (Foa, Ilai, McCarthy, & Shoyer, 1993; Foa & McNally, 1986; Lavy, van Oppen, & van den Hout, 1994; Tata, Leibowitz, Prunty, & Cameron, 1996). Eye tracking research has shown that high contamination fearful participants fixated on contamination-relevant stimuli more frequently compared to low contamination fearful participants (Armstrong, Sarawgi, & Olatunji, 2012). Armstrong, Olatunji, Sarawgi, and Simmons (2010) also showed that high contamination fearful participants maintained attention toward threatening faces for a longer duration than low contamination fearful participants. Lastly, Cisler and Olatunji (2010) used a modified Spatial Cueing Task (Posner, 1980) to show that high contamination fearful participants have difficulty disengaging attention away from fearful and disgusting pictures relative to low contamination fearful participants. In summary, research suggests that the attention of contamination fearful individuals is biased toward threatening stimuli, which may be caused by difficulty shifting attention away from threatening stimuli or failure to inhibit allocation of attention toward arousing stimuli. This is an important distinction given that recent research has shown that difficulty disengaging attention from disgusting stimuli is highly predictive of inflated contamination appraisals (Cisler et al., 2011) and frequency of saccadic fixations toward threatening information is predictive of behavioral avoidance of contaminants (Armstrong et al., 2012).

It is widely known that negative affective arousal motivates escape and avoidance behaviors (see Gray & McNaughton, 1996). What is less understood is how attentional control is related to affective arousal and subsequent behavioral responding, especially within the context of contamination aversion or contamination-related OCD. In accordance with the extant literature, one would expect that individual differences in attentional control are predictive of behavioral avoidance, but mostly as a consequence of emotional arousal. Individuals with poorer attentional control should be more vulnerable to initial affective arousal, which, in turn, would output increased escape and avoidance. More importantly, individuals with poor attentional control may have greater difficulty shifting their attention away from emotionally arousing stimuli. This may potentiate or maintain emotional arousal, which, in turn, would also result in increased escape and avoidance (White et al., 2009). The present study will experimentally test how attentional control effects emotional arousal and behavioral symptoms associated with contamination-related OCD.

Components of trait attentional control abilities (attentional focus and attentional shifting) will be measured and participants will complete three contamination-relevant behavioral approach

tasks (BATs). Prior to completing any BATs, but after entering the experimental corridor and seeing the BAT stimuli, all participants will provide subjective ratings of disgust and anxiety. This temporal sequence will allow for testing of direct and indirect effects of attentional control on behavioral approach, via affective arousal.

It is predicted that the effects of attentional control on behavioral approach toward contaminants will be mediated by pre-BAT negative affectivity (i.e., those with poor attentional control abilities will report greater pre-BAT disgust and anxiety, which will result in reduced behavioral approach). Based on research showing that attention disengagement underlies attentional biases in contamination-related OCD (Cisler & Olatunji, 2010), it is predicted that the effects of attentional control will be restricted to attentional shifting. A large body of research has shown that disgust is a primary affective mechanism underlying pathological behaviors associated with contamination aversion and contamination-based OCD (see Olatunji, Cisler, McKay, & Phillips, 2010; Olatunji, Lohr, Sawchuk, & Tolin, 2007). Therefore, it is predicted that the mediating effect of negative affectivity will be restricted to pre-BAT disgust. In summary, it is predicted that individuals with poor attentional shifting abilities will react with and maintain greater levels of disgust during the BATs, largely as a consequence of their inability to shift attention. This increased disgust will, in turn, motivate avoidance of contaminants (i.e., decrease approach).

2. Method

2.1. Participants

Thirty-three non-selected participants were recruited from undergraduate psychology courses at a large southern university. A majority of participants were female (67.9%) and Caucasian (92.9%). The average participant age was 19.27 (range = 18–28). We chose to utilize a convenience sample for several reasons. First, the use of clinical samples often restricts measurement variance (e.g., individuals with OCD would complete very few BAT steps; Najmi, Tobin, & Amir, 2010), which limits the ability to detect effects without large samples. Second, the constructs of interest are normally distributed among the general population and therefore, modeling of relations between these constructs should not require a clinical sample. Moreover, the use of analog samples is common in the building of theoretical models of pathological processes, especially when one is concerned with basic processes and not clinical status (Borkovec & Rachman, 1979).

2.2. Procedures

All participants completed an institutionally approved informed consent prior to beginning the experimental procedures. Participants first entered the experimental corridor that contained the BAT materials and then provided subjective ratings of disgust and anxiety. Participants then completed a series of three contamination-relevant BATs. Participants then completed self-report questionnaires, were debriefed, and then excused from the study. All participants were awarded class credit in exchange for their participation.

2.3. Materials

2.3.1. Revised attentional control scale (ACS-R; Ólafsson et al., 2011)

Revised attentional control scale (ACS-R; Ólafsson et al., 2011) is a 19-item measure of attentional control abilities. Participants are presented with items that were designed to reflect good (7-items) and bad (12-items) examples of attentional control and are asked to rate the degree to which each item relates to them, ranging from 1

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