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# Examination of the decline in fear and disgust during exposure to threat-relevant stimuli in blood–injection–injury phobia

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**Abstract**

In the present study, participants ($N = 22$) displaying marked fear of blood–injection–injury (BII) stimuli were provided 30 min of in vivo exposure to threat-relevant stimuli, during which time their fear and disgust levels were repeatedly assessed. Growth curve analyses were then conducted to examine the decay slopes in both fear and disgust and their relationship. Results indicated that exposure led to significant declines in fear and disgust across trials. However, the decay slope observed for fear was significantly greater than that for disgust. Further analyses revealed that the decline in fear across trials remained significant after accounting for the changes in disgust. However, the effect of trial on disgust was no longer significant after controlling for the reduction in fear. Global disgust sensitivity levels prior to exposure did not moderate the level of fear activation or fear reduction during exposure. BII-specific digust sensitivity was also not associated with intial levels of fear. However, levels of BII-specific disgust sensitivity were independently negatively associated with fear decline. Theoretical and clinical implications of the findings are discussed.


*Keywords:* Blood–injection–injury phobia; Exposure; Disgust sensitivity; Disgust; Fear

Blood–injection–injury (BII) phobia is a disorder that is characterized by extreme fear of blood, receiving injections, and bodily injuries that affects approximately 3.0% of the general population (Fredrikson, Annas, Fischer, & Wik, 1996). Although BII phobia is traditionally

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associated with fear and anxiety, recent studies suggest that the propensity to experience disgust may also serve as a risk or maintaining factor for BII phobia (e.g., de Jong & Merckelbach, 1998; Olatunji, Lohr, Sawchuk, & Westendorf, 2005; Page, 2003). Indeed a number of studies have shown that measures of disgust sensitivity are positively associated with indices of BII phobia (e.g., Kleinknecht, Kleinknecht, & Thorndike, 1997; Muris, Merckelbach, Schmidt, & Tierney, 1999). Descriptive studies have also shown that BII phobics report greater disgust towards stimuli related to blood, mutilation, and surgeries, as well as a disgust reactions towards a broader range of stimuli unrelated to phobic concerns, including foul odors, rotting foods, small animals, and bodily products (Sawchuk, Lohr, Tolin, Lee, & Kleinknecht, 2000; Sawchuk, Lohr, Westendorf, Meunier, & Tolin, 2002; Tolin, Lohr, Sawchuk, & Lee, 1997). Moreover, experimental studies have also shown that high blood fearful individuals demonstrate stronger disgust conditioning relative to low fearful individuals (Schienle, Stark, & Vaitl, 2001). Sawchuk, Lohr, Lee, and Tolin (1999) also found that BII phobic participants were more likely to complete general disgust-related word stems than were non-phobic participants, suggesting an implicit memory bias towards disgust.

A primary appraisal process associated with disgust is the belief that disgust-elicitors have contamination properties and physical contact with such properties may result in disease (Olatunji, Sawchuk, Lohr, & de Jong, 2004; Rozin & Fallon, 1987). This line of thought was the impetus for initial research examining the role of disgust in small animal fears, particularly spider phobia (cf. Woody & Teachman, 2000). Studies along these lines have shown that disgust is a stronger predictor of spider avoidance than fear and anxiety (e.g., Woody, McLean, & Klassen, 2005). Physiological data have also shown that spider fearful individuals respond with greater disgust-specific rather than fear-specific facial EMG activity than non-fearful individuals when exposed to spiders (de Jong, Peters, & Vanderhallen, 2002). These findings are consistent with a disease-avoidance model suggesting that phobic responses to small animals (i.e., spiders) are largely attributable to concerns of contamination and disease that are mediated by disgust (Matchett & Davey, 1991). Concerns of disease acquisition may also partially explain the relation between disgust and BII phobia. More specifically, disgust responding to BII stimuli among phobic individuals may involve unwanted physical contact with stimuli (i.e., hypodermic needle) considered to be a potential contaminant (Page, 1994). Thus, behavioral avoidance in BII phobia may be motivated by concerns over infection and disease acquisition rather then simply a fear-based function of perceived threat (Olatunji, Lohr et al., 2005; Sawchuk et al., 2000).

Although multiple studies implicate disgust in BII phobia (Koch, O'Neill, Sawchuk, & Connolly, 2002; Olatunji & Sawchuk, 2005), very little is known of the role of disgust in the treatment of BII phobia. Experimental psychopathology research has shown that disgust is readily acquired and not easily extinguished (Baeyens, Crombez, van den Bergh, & Eelen, 1988; Rozin, 1986; Rozin & Fallon, 1987), thus the potential role of disgust in BII phobia does raise the question as to whether interventions that effectively reduce pathological fear (i.e., repeated exposure) also reduce disgust. Some studies have begun to address this question in regards to spider phobia and preliminary evidence seems to suggest that exposure-based treatment lead to reductions in fear and disgust appraisals of spiders (de Jong, Andrea, & Muris, 1997; Merckelbach, de Jong, Arntz, & Schouten, 1993; Smits, Telch, & Randall, 2002). However, in a study examining the pattern of decline in fear and disgust during exposure-based treatment of spider phobia, Smits et al. (2002) found that the decay slope for fear was significantly greater than that for disgust. This finding suggests that while there is a decline in fear and disgust during exposure, extinction of disgust appears to occur at a slower rate in spider phobics. Smits et al. also found that the reduction in disgust during treatment remained significant even after controlling