Blood-injection-injury (BII) phobia is characterized by a persistent, excessive, and irrational fear at the sight or anticipation of blood, wounds, syringes, injuries, mutilation, and similar stimuli (DSM-IV, American Psychiatric Association, 2000; Marks, 1988). BII phobia has a lifetime prevalence rate of 3.5% and an early age of onset at around 5.5 years (DSM-IV, American Psychiatric Association, 2000). It is also the second most common specific phobia for which people seek treatment (Kleinke, & Thorndike, 1990). BII phobia may also be chronic in the absence of treatment (Marks, 1988). In severe cases, phobic individuals may delay or even avoid seeking necessary medical care despite negative health consequences (Kleinke, & Lenz, 1989; Page, 1998).

BII phobia is unique from other phobic disorders in that approximately 75–80% of those affected have a distinct fainting response (or vasovagal syncope) during exposure to phobic-relevant stimuli (Kleinke, & Lenz, 1989; Meade, France, & Peterson, 1996; Olatunji, Connolly, & David, 2008; Page, 1994) which may be partially genetic (Page & Martin, 1998). Several studies have attempted to delineate the physiological profile of this unique fainting response in BII phobia. Such research suggests that fainting in BII phobia is marked by a diphasic response that involves two successive responses with opposing directions of activity (Graham, Kabler, & Lunsford, 1961). The initial phase of this diphasic response is characterized by an increase in sympathetic nervous system activity (i.e., increased heart rate), which has been attributed to the experience of fear and anxiety (e.g., Curtis & Thyer, 1983). The fainting response is observed during the second phase where a surge in parasympathetic nervous system activity occurs, leading to a rapid decrease in blood pressure (Page, 2003).

Additionally, several studies attempting to delineate the emotional correlates of BII phobia are beginning to shed light on the basic mechanisms behind this unique fainting response. Kleinke, Kleinke, and Thorndike (1997) found that highly fearful individuals report the greatest likelihood of fainting during exposure to BII-related stimuli. Although BII stimuli produce a reliable fear response for phobic individuals (Kleinke, 1987, 1988), they have also been shown to elicit disgust reactions (Olatunji, Lohr, Sawchuk, & Westendorf, 2005; Page, 2003). For example, related research has found that while BII phobics respond with both fear and disgust when exposed to images of threat-relevant stimuli, disgust is the dominant emotional response (Sawchuk, Lohr, Westendorf, Menuier, & Tolin, 2002; Tolin, Lohr, Sawchuk, & Lee, 1997). Furthermore, individuals with BII phobia, compared to controls, often present with a markedly heightened ‘disgust sensitivity’, the propensity towards experiencing disgust (Olatunji, Arrindell, & Lohr, 2005; Olatunji, Lohr, Smits, Sawchuk, & Patten, 2009). Given that the experience of disgust is often characterized by parasympathetic activity (Levenson, 1992), one hypothesis is that the activation of the parasympathetic system that is
responsible for the unique fainting response in BII phobia may be attributed to disgust (Page, 1994).

Although there are intuitive reasons for implicating disgust in the fainting response in BII phobia, empirical evidence supporting this observation has been mixed. For example, Hepburn and Page (1999) found that exposure to disgust-evoking images increased symptoms of faintness to BII-related stimuli. Page (2003) has also shown that highly disgust sensitive individuals reported more symptoms of faintness during exposure to blood and injection stimuli compared to participants low in disgust sensitivity. However, other research has failed to find evidence for increased parasympathetic activation among those with BII phobia or even an association between disgust levels and parasympathetic activation, suggesting that disgust sensitivity may not directly explain the fainting response (Gerlach et al., 2006). Furthermore, descriptive research has shown that disgust sensitivity does not contribute unique variance to the prediction of BII-related fainting symptoms above the variance accounted for by fear and anxiety levels (Olatunji et al., 2006). These findings suggest that the disgust-BII-faint relationships may be illusory and perhaps mediated by the covariation of disgust with fear and anxiety (Kleinknecht et al., 1997).

These conflicting findings about the causal role of disgust in BII-related fainting highlight the need for additional research. To date, this research question has largely been addressed with questionnaires that examine the relationship between disgust and fainting among blood donors, where fainting is often problematic (France, France, Roussos, & Ditto, 2004; France, Rader, & Watanbe, Tu, & Nass, 1999). Therefore, the present study further examines the relationship between disgust and fainting symptoms among injection-fearful and nonfearful blood donors. Consistent with prior research (Olatunji et al., 2006), it was predicted that disgust levels would be associated with fainting responses during blood donation among injection-fearful and nonfearful donors. However, the relationship between disgust levels and fainting responses during blood donation was predicted to be accounted for by anxiety levels among injection-fearful, but not nonfearful, donors. These findings were hypothesized to be specific to fainting responses, not simply a generalized unpleasant reaction to blood donation.

1. Methods

1.1. Participants

Participants were recruited from community blood drives between February and July 2008. A total of 446 individuals volunteered to participate in the present study. There were 285 females (63.9%) and 161 males (36.1%) with a joint mean age of 35.67 years. The injection-fearful group consisted of 108 individuals (77 females (71.3%) and 31 males (28.7%) with a joint mean age of 30.41 (SD = 12.25)). The nonfearful group consisted of 338 individuals (208 females (61.5%) and 130 males (38.5%) with a joint mean age of 37.35 (SD = 14.19)). As shown in Table 1, injection-fearful (range = 18–80; SD = 14.05). Participants endorsing “yes” to the question: “Do you get nervous or afraid when receiving blood draws or injections?” were classified as injection-fearful and those who responded “no” were classified as nonfearful.

2. Results

2.1. Participant characteristics

The injection-fearful group consisted of 108 individuals [77 females (71.3%) and 31 males (28.7%) with a joint mean age of 30.41 (SD = 12.25)]. The nonfearful group consisted of 338 individuals [208 females (61.5%) and 130 males (38.5%) with a joint mean age of 37.35 (SD = 14.19)]. As shown in Table 1, injection-fearful

<table>
<thead>
<tr>
<th>Question/measure</th>
<th>All participants</th>
<th>Nonfearful</th>
<th>Injection-fearful</th>
<th>t</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>.74 (.85)</td>
<td>.47 (.64)</td>
<td>1.58 (.89)</td>
<td>14.39*</td>
<td>1.43</td>
</tr>
<tr>
<td>Disgust</td>
<td>.20 (.54)</td>
<td>.10 (.38)</td>
<td>.50 (.80)</td>
<td>7.01*</td>
<td>.64</td>
</tr>
<tr>
<td>Unpleasantness</td>
<td>10.12 (20.48)</td>
<td>7.18 (18.00)</td>
<td>18.69 (24.59)</td>
<td>4.77*</td>
<td>.53</td>
</tr>
<tr>
<td>BDRI</td>
<td>2.92 (6.55)</td>
<td>2.17 (5.31)</td>
<td>5.08 (7.76)</td>
<td>3.73*</td>
<td>.42</td>
</tr>
</tbody>
</table>

Note. BDRI: Blood Donation Reactions Inventory. Cohen’s d was calculated as the difference between the mean scores in each group divided by the pooled standard deviation.
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