Shorter communication

Disgust sensitivity, trait anxiety and anxiety disorders symptoms in normal children

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Abstract

There is evidence to suggest that disgust sensitivity plays a role in the development of small animal fears and phobias. Recently, Phillips, Senior, Fahy, and David (1998) [Phillips, M. L., Senior, C., Fahy, T., & David, A. S. (1998). Disgust: the forgotten emotion of psychiatry. British Journal of Psychiatry, 172, 373–375.] suggested that disgust sensitivity is also involved in various other anxiety-based symptoms (e.g. obsessive–compulsive complaints, social phobia). The present study sought to test this suggestion in a large sample of normal school children (N = 189). Children completed a measure of disgust sensitivity, the trait anxiety version of the Spielberger State-Trait Anxiety Inventory for Children and the Screen for Child Anxiety Related Emotional Disorders, an instrument that measures DSM-defined anxiety disorders symptoms. Disgust sensitivity was indeed found to be correlated with a broad range of anxiety disorders symptoms. However, results also indicated that these correlations were predominantly carried by trait anxiety. That is, when controlling for levels of trait anxiety, only specific phobia symptoms (including animal phobia, blood–injection–injury phobia and situational–environmental phobia) and separation anxiety disorder symptoms were significantly related to disgust sensitivity, although correlations were rather modest. Taken together, these findings cast doubts on the claim that disgust sensitivity is an unique and independent factor that contributes to a broad range of anxiety disorders. © 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Disgust sensitivity; Trait anxiety; Anxiety disorders symptoms; Children

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1. Introduction

There is good evidence that disgust sensitivity is involved in the genesis of specific phobias, in particular small animal phobias. For example, Matchett and Davey (1991) noted a positive association between measures of disgust sensitivity and scores on the animal phobia items of the Fear Survey Schedule. This finding has been replicated in a number of other studies (Merckelbach, De Jong, Arntz, & Schouten, 1993; Armfield & Mattiske, 1996; Mulkens, De Jong, & Merckelbach, 1996). Interestingly, Davey, Forster, and Mayhew (1993) not only found a significant correlation between parents’ and offspring’s disgust scores, but also demonstrated that parental disgust sensitivity is a good predictor of offspring’s animal fear. Evidence for an antecedent role of disgust in the development of small animal fears comes from a study by Webb and Davey (1992). These authors exposed normal subjects to disgust eliciting film fragments and then examined whether this manipulation resulted in an increased fear of small animals, which turned out to be the case.

So far, only one study has looked at the connection between disgust sensitivity and animal phobia in children. In that study, De Jong, Andrea, and Muris (1997) assessed fear of spiders, disgust sensitivity and spiders’ disgust-evoking status in spider phobic girls who applied for treatment, in non-phobic girls and in the parents of both groups of children. Phobic girls were tested twice, i.e. before and after behavioural treatment. Results showed that, compared to control girls, spider phobic girls displayed higher levels of disgust sensitivity and considered spiders per se as more disgusting. Furthermore, after treatment, the reduction in spider fear was paralleled by a decline of spiders’ disgust-evoking status. These findings accord well with the results of studies relying on adult samples in that they support the idea that disgust sensitivity is involved in animal phobias.

Several authors (e.g. Davey, 1994; Merckelbach, De Jong, Muris & Van den Hout, 1996; Muris & Merckelbach, 1999) have assumed that the contribution of disgust to fears and phobias is fairly specific, i.e. would be restricted to small animal fears and phobias and, possibly, blood–injury–illness fears (e.g. Page, 1994; Tolin, Lohr, Sawchuk & Lee, 1997; De Jong & Merckelbach, 1998). Thus, in terms of the Taylor (1998) model, disgust would represent a specific trait. However, Phillips, Senior, Fahy, and David (1998) recently speculated that disgust would underlie a broad range of anxiety-based symptoms. They suggested that apart from its connection to small animal and blood–injection–injury fears, disgust sensitivity might be associated with obsessive–compulsive disorder (OCD) given the fact that obsessional thoughts about dirt and contamination frequently occur in OCD patients (Rachman & Hodgson, 1980). Furthermore, Phillips et al. (1998) assume that there exists a relationship between disgust and social phobia. This connection would be primarily based on self-directed disgust and, in its wake, shame. These characteristics would promote thoughts of being rejected and humiliated in public. In addition, it is also conceivable that disgust sensitivity is accompanied by fear of physical contact with unfamiliar people, which, again, could enhance social fear. Finally, Phillips et al. (1998) hypothesize that disgust might be involved in certain types of situational phobias. For example, it seems plausible to assume that subjects with high levels of disgust sensitivity prefer their own clean home rather than potentially dirty public places and this may give rise to agoraphobic avoidance (see also Muris et al., submitted for publication).
To summarize, then, Phillips et al. (1998) assume that disgust sensitivity acts as a higher order trait, i.e. a trait that contributes to a wide range of anxiety-based symptoms. However, as pointed out by Craske (1997) and Taylor (1998), there are other well-established higher order traits, namely neuroticism, negative affectivity, and trait anxiety. These concepts overlap considerably (e.g. Craske, 1997) and so the question arises to what extent disgust sensitivity can be separated from these general and highly overlapping traits. There is some evidence to suggest that disgust sensitivity is, indeed, associated with neuroticism (Haidt, McCauley, & Rozin, 1994), but studies that systematically address this issue are lacking. The current study examined whether disgust sensitivity is related to a wide variety of anxiety symptoms and whether such relations are independent of the influence of trait anxiety. Note that trait anxiety is considered to be a general vulnerability factor for anxiety symptoms (Eysenck, 1992) and that there is good evidence to show that trait anxiety is closely related to neuroticism and negative affectivity (Watson & Clark, 1984). Thus, in the present study, 189 normal school children completed a measure of disgust sensitivity as well as the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997; Muris, Merckelbach, Schmidt & Mayer, 1999), a questionnaire measuring symptoms of anxiety disorders that, according to the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 1994), may occur in children. Children also completed the trait anxiety scale of the State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973). The current study relied on a child sample as anxiety symptoms are relatively common among children (Bell-Dolan, Last & Strauss, 1990; Muris, Merckelbach, Mayer & Prins, in press). Furthermore, to date, only one study has examined the connection between disgust sensitivity and anxiety and phobic symptoms in a child population (cf. supra). The major aim of the present study was to test the hypothesis that disgust sensitivity is substantially related to anxiety disorder symptoms, in particular symptoms of obsessive–compulsive disorder, social phobia and the three types of specific phobia (i.e. animal phobia, blood–injection–injury phobia and situational–environmental phobia) even when controlling for levels of trait anxiety.

2. Method

2.1. Children

Parents of 219 primary school children were approached and asked whether they gave permission for their child to participate in the study. Written informed consent was obtained for 191 children (i.e. >85%). These children completed the disgust sensitivity measure, the SCARED and the trait version of the STAIC in their classrooms. The teacher and a research assistant were present in order to answer questions and to provide information if necessary. Children received a small present in return for their participation.

The data of 2 children had to be excluded due to missing data, leaving 189 children (92 boys and 97 girls) in the final sample. The mean age of these children was 9.67 years (S.D. = 1.31, range 8–13 years).
2.2. Questionnaires

Disgust sensitivity was assessed with a simplified version of the Rozin, Fallon, and Mandell (1984) questionnaire. This questionnaire consists of 18 items on which children had to indicate how disgusting they would find it to eat a number of ‘contaminated’ items. Illustrative examples are “How disgusting would you find it to eat your favorite soup from a soup bowl, after it had been stirred by a thoroughly washed fly swatter?”, “How disgusting would you find it to drink your favorite lemonade, when a non-toxic leaf from a houseplant falls into your glass and goes to the bottom?”, and “How disgusting would you find it to eat your favorite cookie, after a bite had been taken by a waiter in a restaurant?”. Each item is rated on a 5-point scale (anchors: 1 = not at all disgusting and 5 = very much disgusting). Scores on separate items are summed to yield a total disgust score ranging from 18 to 90, with higher scores reflecting higher levels of disgust sensitivity.

The SCARED contains 66 items measuring symptoms of DSM-IV defined anxiety disorders. More specifically, SCARED items address circumspect symptoms of generalized anxiety disorder (13 items; e.g. “I worry about things working out for me”), separation anxiety disorder (12 items; e.g. “I don’t like being away from my family”), social phobia (4 items; e.g. “I don’t like to be with people I don’t know”), panic disorder (13 items; e.g. “When frightened, my heart beats fast”), obsessive–compulsive disorder (9 items; e.g. “I have thoughts that frighten me”), animal phobia (3 items; e.g. “I am afraid of an animal that is not really dangerous”), blood–injection–injury phobia (7 items; e.g. “I am afraid to go to the dentist”) and situational–environmental phobia (5 items; e.g. “I am scared to fly in an airplane”). Children have to indicate how frequently they experience each symptom on a 3-point scale: 0 = almost never, 1 = sometimes, 2 = often. SCARED total anxiety and subscale scores can be obtained by summing across relevant items.

The trait anxiety version of the STAIC is a 20-item scale measuring chronic and global indications of anxiety by asking the child to indicate the frequency with which he/she experiences anxiety symptoms (e.g. “I worry too much”, “I feel troubled”; 1 = almost never, 2 = sometimes, 3 = often). A total trait anxiety score can be computed by summing scores for the 20 items.

3. Results

3.1. General statistics

Before addressing the main results, some remarks about the general statistics of the dependent measures are in order (see Table 1). To begin with, all questionnaires had satisfactory internal consistency. That is, Cronbach’s alpha was 0.91 for disgust sensitivity, 0.91 for the STAIC, 0.95 for the total SCARED and ranged between 0.68 (situational–environmental phobia) and 0.86 (animal phobia) for separate SCARED subscales. Second, significant gender differences were found for disgust sensitivity ($t(187) = 3.22, P < 0.005$), STAIC trait anxiety ($t(187) = 2.92, P < 0.005$), SCARED total score ($t(187) = 2.73, P < 0.01$),
SCARED panic disorder \( (t(187) = 2.96, P < 0.005) \), SCARED generalized anxiety disorder \( (t(187) = 2.02, P < 0.05) \), SCARED separation anxiety disorder \( (t(187) = 2.74, P < 0.01) \), SCARED animal phobia \( (t(187) = 3.96, P < 0.001) \), SCARED blood–injection–injury phobia \( (t(187) = 2.22, P < 0.05) \) and SCARED situational–environmental phobia \( (t(187) = 2.27, P < 0.05) \). As can be seen in Table 1, girls consistently exhibited higher scores on these measures than boys. Third and finally, no significant association between age and any of the other measures was found (all \( r \)'s < 0.10, \( P > 0.10) \).

3.2. Correlation between trait anxiety and disgust sensitivity

There were positive, but moderate correlations between trait anxiety and disgust sensitivity: \( r = 0.35, P < 0.001 \) for the total sample, \( r = 0.26, P < 0.05 \) for boys and \( r = 0.37, P < 0.001 \) for girls.

3.3. Correlations between disgust sensitivity and anxiety disorders symptoms

Pearson product-moment correlations were computed between disgust sensitivity and SCARED anxiety disorders symptoms. The results are shown in the left panel of Table 2. As can be seen, significant correlations emerged between disgust sensitivity and all SCARED subscales. However, it should be emphasized that these correlations were rather moderate, i.e. \( r \)'s varied between 0.21, \( P < 0.005 \) (traumatic stress disorder) and 0.38, \( P < 0.001 \) (total score).
Furthermore, in girls, disgust sensitivity was more convincingly associated with anxiety disorders symptoms than in boys.

3.4. Correlations between disgust sensitivity and anxiety disorders symptoms while controlling for levels of trait anxiety

The right panel of Table 2 displays Pearson correlations between trait anxiety and anxiety disorders symptoms. As can be seen, these correlations were substantial, varying between 0.34, \( P < 0.001 \) (animal phobia) and 0.83, \( P < 0.001 \) (total score).

Partial correlations between disgust sensitivity and anxiety disorder symptoms while controlling for levels of trait anxiety are shown in the left panel of Table 3. The major conclusion that can be drawn from this analysis is that correlations between disgust sensitivity and anxiety symptoms were reduced and often disappeared when the influence of trait anxiety was cancelled out. Only the three types of specific phobia and separation anxiety disorder remained significantly related to disgust sensitivity, although these correlations were small. Partial correlations between trait anxiety and anxiety disorders symptoms while controlling for levels of disgust sensitivity are shown in the right panel of Table 3. As can be seen, these correlations remained substantial.

<table>
<thead>
<tr>
<th></th>
<th>Correlation with disgust sensitivity</th>
<th>Correlation with trait anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total</td>
<td>boys</td>
</tr>
<tr>
<td><strong>Trait anxiety</strong></td>
<td>0.35**</td>
<td>0.26*</td>
</tr>
<tr>
<td><strong>SCARED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total score</td>
<td>0.38**</td>
<td>0.27*</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>0.33**</td>
<td>0.20</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>0.25**</td>
<td>0.16</td>
</tr>
<tr>
<td>Social phobia</td>
<td>0.27**</td>
<td>0.14</td>
</tr>
<tr>
<td>Separation anxiety disorder</td>
<td>0.37**</td>
<td>0.33**</td>
</tr>
<tr>
<td>Obsessive–compulsive disorder</td>
<td>0.30**</td>
<td>0.21*</td>
</tr>
<tr>
<td>Traumatic stress disorder</td>
<td>0.21**</td>
<td>0.01</td>
</tr>
<tr>
<td>Specific phobia: animal type</td>
<td>0.26*</td>
<td>0.23*</td>
</tr>
<tr>
<td>Specific phobia: blood–injection–injury type</td>
<td>0.31**</td>
<td>0.28**</td>
</tr>
<tr>
<td>Specific phobia: situational–environmental type</td>
<td>0.34**</td>
<td>0.20</td>
</tr>
</tbody>
</table>

* \( P < 0.05 \).
** \( P < 0.01 \).
4. Discussion

The purpose of the present study was to explore the relationships between disgust sensitivity, trait anxiety and anxiety disorder symptoms in a group of normal school children. The main results can be summarized as follows. First, in accordance with the suggestion of Phillips et al. (1998) disgust sensitivity was found to be positively related to a broad spectrum of anxiety disorders symptoms. Second, there was a positive correlation between disgust sensitivity and trait anxiety. Third, the correlations between disgust sensitivity and anxiety disorders symptoms often disappeared when controlling for levels of trait anxiety.

Phillips et al. (1998) have proposed that the basic emotion of disgust plays a central role in a range of anxiety disorders and even in other psychiatric phenomena including depression, body dysmorphic disorder and sexual dysfunctions. At first sight, the present data seem to support this proposition. That is to say, disgust sensitivity was found to be correlated to a variety of anxiety disorders symptoms. This was not only evident for the anxiety disorders emphasized by Phillips et al. (1998; i.e. social phobia, obsessive–compulsive-disorder and the three types of specific phobias), but also for other types of anxiety complaints that are tapped by the SCARED (i.e. panic disorder, generalized anxiety disorder and traumatic stress disorder). However, controlling for levels of trait anxiety reduced most of these correlations to practically zero. Under this condition, only the three specific phobia types and separation anxiety disorder remained significantly connected with disgust sensitivity, but these correlations were all rather

Table 3
Partial correlations between disgust sensitivity/trait anxiety, on the one hand, and SCARED anxiety disorders symptoms, on the other hand, while holding trait anxiety (left panel) or disgust (right panel) constant, for the total sample (N = 189) and for boys (n = 92) and girls (n = 97), separately. SCARED=Screen for Child Anxiety Related Emotional Disorders

<table>
<thead>
<tr>
<th>SCARED</th>
<th>Correlation with disgust sensitivity while holding trait anxiety constant</th>
<th>Correlation with trait anxiety while holding disgust sensitivity constant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total  boys  girls</td>
<td>total  boys  girls</td>
</tr>
<tr>
<td>Total score</td>
<td>0.16*  0.10  0.21*</td>
<td>0.83**  0.81**  0.84**</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>0.10  0.04  0.14</td>
<td>0.72**  0.65**  0.75**</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>−0.08 −0.10 −0.04</td>
<td>0.83**  0.83**  0.83**</td>
</tr>
<tr>
<td>Social phobia</td>
<td>0.11  0.04  0.19</td>
<td>0.45**  0.41**  0.47**</td>
</tr>
<tr>
<td>Separation anxiety disorder</td>
<td>0.16*  0.21*  0.11</td>
<td>0.75**  0.74**  0.75**</td>
</tr>
<tr>
<td>Obsessive–compulsive disorder</td>
<td>0.08  0.06  0.17</td>
<td>0.64**  0.63**  0.67**</td>
</tr>
<tr>
<td>Traumatic stress disorder</td>
<td>−0.04 −0.10  0.10</td>
<td>0.66**  0.66**  0.66**</td>
</tr>
<tr>
<td>Specific phobia: animal type</td>
<td>0.14* 0.16  0.08</td>
<td>0.34**  0.25**  0.36**</td>
</tr>
<tr>
<td>Specific phobia: blood–injection–injury type</td>
<td>0.14*  0.19  0.08</td>
<td>0.53**  0.44**  0.60**</td>
</tr>
<tr>
<td>Specific phobia: situational–environmental type</td>
<td>0.18* 0.08  0.26*</td>
<td>0.51**  0.49**  0.50**</td>
</tr>
</tbody>
</table>

* P < 0.05.
** P < 0.01.
low (i.e., $r$'s < 0.20). One could speculate that controlling for trait anxiety led to reduced correlations between disgust sensitivity and SCARED subscales due to a shared item content between the trait anxiety measure and SCARED subscales. Note, however, that this line of reasoning is not very convincing. Inspection of the SCARED subscale items reveals that most of them address fairly specific anxiety symptoms rather than the global complaints that are listed in the trait anxiety measure. The only SCARED subscale that bears some resemblance to trait anxiety is the generalized anxiety disorder scale. Thus, shared item content does not offer a full account for our findings.

There are two findings that deserve some further comment. To begin with, previous studies have provided firm support for the suggestion that disgust sensitivity plays a role in animal phobias. In the current study, the correlation between disgust sensitivity and animal phobias was only 0.26, $P < 0.001$, and 0.14, $P < 0.05$ when controlling for trait anxiety. These small correlations are probably due to the fact that the items of SCARED animal phobia scale are not detailed enough. More specifically, items such as “I am afraid of an animal that is not really dangerous”, “I am so scared of a harmless animal that I do not dare to touch it” and “I am afraid of an animal that most children do not fear” may refer to a variety of animals. Davey (1992) has pointed out that disgust sensitivity is particularly relevant for fear reactions to animals that are known to carry a disease (e.g. rats), animals associated with dirty places (e.g. spiders) or animals that have physical characteristics which resemble natural disgust stimuli like mucus (e.g. snakes). Thus, according to Davey (1992), disgust plays no role in other types of animal phobias, e.g. dog phobia. Second, the association between disgust sensitivity and separation anxiety disorder symptoms was not anticipated. Perhaps, children with high levels of disgust sensitivity prefer to stay at home with their parents instead of confronting unknown, potentially contaminated places.

The current findings do not support an interpretation of disgust sensitivity in terms of a higher order factor that affects a wide range of anxiety symptoms independent of neuroticism or trait anxiety. Rather our results indicate that the contribution of disgust sensitivity to most anxiety symptoms originates from trait anxiety, i.e. the tendency to react with negative affectivity to a broad range of stimuli (e.g. Watson & Clark, 1984). An exception to this rule are the specific phobia symptoms and separation anxiety. Here, disgust sensitivity may, indeed, act as a vulnerability factor that is independent of trait anxiety. Taken together, our findings cast doubts on the claim that disgust sensitivity operates as a causal antecedent in a broad range of anxiety disorders.

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References


