

Disgust propensity and disgust sensitivity: separate constructs that are differentially related to specific fears.

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Disgust propensity and disgust sensitivity: Separate constructs that are differentially related to specific fears

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Abstract

Studies concentrating on interindividual differences in experiencing disgust have indicated that disgust propensity is associated with certain disorders, such as fear of blood and fear of spiders (de Jong & Merckelbach, 1998). However, current indices of disgust propensity suffer from conceptual overlap with other measures of psychopathology.

Moreover, in addition to high levels of disgust propensity, a relatively negative appreciation of experiencing the emotion of disgust (disgust sensitivity) may also be critically involved in psychopathology. To address these issues, the Disgust Propensity and Sensitivity Scale (DPSS) was devised (Cavanagh & Davey, 2000). This study examined its psychometric qualities. Students ($N = 967$) completed the DPSS, the Disgust Questionnaire (DQ), the Disgust Scale (DS), the Blood-Injury Phobia Questionnaire (BIQ), and the Fear of Spiders Questionnaire (FSQ). The DPSS meaningfully differentiated between disgust propensity and sensitivity. These factors were differentially related to blood and spider fear. The present findings sustain the importance of differentiating between individual differences in disgust propensity and sensitivity as factors

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that may be independently involved in psychopathology. The DPSS appears a valuable addition to the arsenal of indices presently available in disgust research.

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Keywords: Disgust; Scale development; Fear of blood; Fear of spiders

1. Introduction

There is increasing attention for the potential role of disgust propensity (defined as a general tendency to respond with the emotion of disgust to any given situation) in psychopathology. Using instruments like the Disgust and Contamination Sensitivity Questionnaire (DQ; Rozin, Fallon, & Mandell, 1984), and the Disgust Scale (DS; Haidt, McCauley, & Rozin, 1994), inflated levels of disgust propensity were found in spider fearful individuals (Sawchuk, Lohr, Tolin, Lee, & Kleinknecht, 2000; Tolin, Lohr, Sawchuk, & Lee, 1997), in blood-fearful individuals (de Jong & Merckelbach, 1998; Sawchuk, Lohr, Westendorf, Meunier, & Tolin, 2002; Schienle, Stark, Walter, & Vaitl, 2003), and in patients with obsessive–compulsive disorder (Muris et al., 2000; Schienle et al., 2003).

In support of their validity, these self-report measures correspond well with actual disgust-induced avoidance behavior in behavioral experiments (Klieger & Siejak, 1997; Rozin, Haidt, McCauley, Dunlop, & Ashmore, 1999). However, two major drawbacks can be noted. First, they measure disgust for specific elicitors. Hence, inflated correlations may arise between disgust propensity and psychopathology due to items that enquire about similar objects in both questionnaires (Thorpe & Salkovskis, 1998). For an adequate examination of the relationship between disgust propensity and psychopathology, an instrument that does not suffer from such confounding would be helpful.

Second, the instruments all enquire to what extent people are disgusted by certain stimuli, but not whether they appraise these experiences more negatively. Thus, they measure propensity, but not sensitivity. Yet, for the development of psychopathology, it may not only be relevant how easily people are disgusted (propensity), but also how unpleasant the experience of disgust is to the individual (sensitivity). Anxiety research revealed that anxiety sensitivity interacts with anxiety expectancies to predict fear behavior (Reiss, 1991; Taylor, 1993). In a similar vein, disgust propensity and sensitivity may interact and predict disgust-related psychopathological complaints. Consequently, an instrument measuring both factors would provide a valuable addition to presently available instruments.

Based on these considerations, the Disgust Propensity and Sensitivity Scale (DPSS) was designed in an attempt to cover disgust propensity and sensitivity (Cavanagh & Davey, 2000), and to measure these characteristics irrespective of particular elicitors (avoiding conceptual overlap with measures of psychopathology). The major goal of this study is to establish its psychometric properties (i.e., factor structure, reliability, convergent validity) and to explore whether propensity and sensitivity may be differentially involved in fear of spiders and fear of blood.

Additionally, fainting is a specific symptom of blood phobia. As disgust appears predominantly involved in blood phobia (Page, 1994, 2003), this may explain why blood fearful individuals faint, while people with other types of specific fears do not. Therefore, it will be examined whether people with a fainting history for blood-injection-injury (BII) stimuli endorse the DPSS differently than non-fainters.

2. Methods

2.1. Participants

Students at two Dutch universities participated in this study. They were recruited from Maastricht University ($n = 535$; 443 women, 92 men) and the University of Groningen ($n = 432$; 316 women, 116 men), at the faculties of Psychology and Medicine. Mean age was 20.4 years ($SD = 2.4$; range: 17–39 years).

2.2. Materials

2.2.1. *Disgust Propensity and Sensitivity Scale (DPSS; Cavanagh & Davey, 2000)*

The DPSS measures disgust propensity and sensitivity.¹ Participants are instructed to read 32 posits and mark the answer which is most appropriate to them. The posits concern the frequency of experiencing certain (bodily) symptoms, and their emotional impact, and have to be rated on a scale from 1 (=‘never’) to 5 (=‘always’; range: 32–160) (see Table 1 for the complete DPSS). Previous research found the DPSS internally consistent, with alpha coefficients of .89 (Propensity) and .87 (Sensitivity) (Cavanagh & Davey, 2000).

2.2.2. *Disgust Scale (DS; Haidt et al., 1994)*

This 32-item questionnaire measures disgust propensity across eight domains: Body-Envelope Violations, Animals, Bodily Products, Hygiene, Sex, Food, Death and Sympathetic Magic. Each domain consists of two true/false type questions, and two items using a scale from 0 (=‘not disgusting at all’) to 2 (=‘extremely disgusting’). A total score (range: 0–32) and subscale scores can be calculated. Although alphas for the subscales are poor (.34–.64; Haidt et al., 1994), alpha is high for the total score (.84; Haidt et al., 1994).

2.2.3. *The Disgust and Contamination Sensitivity Questionnaire (DQ; Rozin et al., 1984)*

This 24-item questionnaire measures the tendency to reject desirable food items, based on their degree of contamination with disgusting stimuli. Participants rate on a scale from 1–9 (1 = ‘not at all’, 9 = ‘very much’) whether they would like to eat a food item after contamination (range 24–216). Its reliability is good (alpha = .72–.86, Davey, 1994; .80, Mulkens, de Jong, & Merckelbach, 1996).

2.2.4. *Fear of Spiders Questionnaire (FSQ)*

This questionnaire examines fear of spiders. Participants rate 18 items on spider fear on a scale from 0 (=‘strongly disagree’) to 7 (=‘strongly agree’; range: 0–126). Internal consistency is good (.92; Szymanski & O’Donohue, 1995).

¹ The following items were originally assigned to Propensity (1, 2, 7, 12, 13, 14, 18, 20, 22, 23, 26, 28, 31) and Sensitivity (3, 4, 5, 6, 8, 9, 10, 11, 15, 16, 17, 19, 21, 24, 25, 27, 29, 30, 32).

2.2.5. *Blood-Injury Phobia Questionnaire (BIQ)*

This 20-item questionnaire consists of two separate 10-item subscales, BIQ-Fear and BIQ-Fainting. On BIQ-Fear, participants rate on a scale from 0 (=‘no fear’) to 4 (=‘maximal fear’; range = 0–40) their fear of 10 BII-stimuli. It appears internally consistent (.82–.87; Merckelbach, Muris, de Jong, & de Jongh, 1999). On BIQ-Fainting, participants rate on a scale from 0 (=‘never’) to 2 (=‘often’; range: 0–20) if they have ever fainted in the presence of these BII-stimuli. Internal consistency is satisfactory (.73–.78; Merckelbach et al., 1999).

2.3. *Procedure*

Three consecutive years, a large sample of students at Maastricht University completed a series of questionnaires. The third time, a parallel study was conducted in Groningen. Administration in Maastricht took place in groups (max. 25 participants) in a conference room. In Groningen, questionnaires were completed in a lecture theatre setting. Participants were recruited via posters and advertisements at the University buildings. They completed Dutch versions of the DPSS, DS, DQ, FSQ, and BIQ. Previous studies indicate that psychometric properties of these translated versions are acceptable (de Jong & Merckelbach, 1998; Muris et al., 2000). Participants were informed that via a lottery, ten people could win 50€. Sixty randomly selected individuals from the last Maastricht study completed the DPSS again after two months. This sample comprised of 9 men, and 51 women. Mean age was 21.6 years ($SD = 2.9$; range: 18–39 years).

3. Results

3.1. *Data reduction and analysis*

The data from these studies was pooled into one large sample. Using the Statistical Package for Social Sciences (SPSS), missing values were estimated using regression analyses following recommendations of Schafer and Graham (2002). Only complete questionnaires were included in this analysis ($n = 967$). The dataset was then randomly divided into two separate sets. One set ($n = 487$) was used for exploratory factor analysis, while on the other dataset ($n = 480$) a confirmatory factor analysis was performed. Exploratory factor analysis was used to guide selection of items into two homogenous subscales, equal in length (eight items). Confirmatory factor analysis was used to determine whether these two subscales could be confirmed in an independent sample. For establishing convergent validity, correlations between the DPSS, DS and DQ were studied in the entire dataset. Regression analyses examined whether scores on DPSS-subcales are predictive of scores on the BIQ-Fear/FSQ. Finally, test–retest reliability was examined.

3.2. *Construction of subscales*

Cavanagh and Davey (2000) originally proposed that the DPSS measures two constructs,¹ therefore, a forced two-factor exploratory factor analysis using principal component analysis with Oblimin rotation was performed. Based on the eigenvalues (which had to be larger than one for a

factor to be considered a separate factor) and the scree-plot, these two factors were established, accounting for 35.6% of total variance. These factors correlated moderately (.54). Table 1 shows that most items loaded on one of these factors. Next, two homogenous subscales of equal length were constructed. Following the recommendations by Clark and Watson (1995), selection of items

Table 1
Factor loadings and eigenvalues for the complete DPSS

Item	Description	Propensity	Sensitivity
<i>Included items</i>			
26	I screw up my face in disgust	.71	–.22
20	Disgusting things make my stomach turn	.68	.11
14	I experience disgust	.66	–.06
28	I find something disgusting	.65	–.09
12	I feel repulsed	.64	–.06
31	When I experience disgust, it is an intense feeling	.52	.22
1	I become disgusted more easily than other people	.49	–.06
2	I avoid disgusting things	.45	–.05
30	It scares me when I feel faint	–.02	.68
19	It scares me when I feel nauseous	.10	.68
11	When I feel disgusted, I worry that I might pass out	.04	.62
15	I think feeling disgust is bad for me	–.01	.57
5	I think disgusting items could cause me illness/infection	.01	.53
17	I worry that I might swallow a disgusting thing	.07	.50
32	It embarrasses me when I feel disgusted	.06	.50
8	When I notice that I feel nauseous, I worry about vomiting	.25	.34
<i>Excluded items</i>			
22	When I am disgusted, my stomach turns	.65	.11
18	Disgusting things make my skin crawl	.49	.19
13	When I am disgusted, I feel nauseous	.48	.26
21	When I am disgusted, I feel sweaty	.45	.28
25	I find it easy to ignore feelings of disgust	.44	.14
27	I cannot think clearly when I am disgusted	.39	.26
24	Rancid smells distress me.	.37	.14
29	I worry that I might harm myself trying to avoid something which disgusts me	–.15	.67
3	When I feel disgusted, my bodily sensations frighten me	.02	.65
16	It scares me when I vomit	.01	.64
10	When I am disgusted I feel like I might be contaminated	–.07	.62
9	It scares me when I salivate excessively	.01	.57
6	Disgust can really take me over	.25	.38
4	When I am disgusted, I feel faint	.31	.35
7	I am comfortable handling things others find disgusting	.27	–.05
23	When I feel disgusted, it passes quickly	.21	.23
Eigenvalues		9.6	1.8

Note: Items loaded on a factor if their loading was >.30.

occurred on both theory- and data-driven considerations. Subscales were designed to measure constructs propensity and sensitivity broadly, so, not merely items with highest loadings were eligible for selection. Table 1 displays which items were included in the subscales.

3.3. Confirmatory factor analysis

First, polychoric correlation matrices were obtained by PRELIS. Using LISREL 8.54 (Jöreskog & Sörbom, 2002), the two subscales were examined with confirmatory factor analysis using weighted least-squares estimation. Latent variables were free to correlate. Secondary loadings of items were not permitted. Additionally, item residuals were allowed to correlate only if items belonged to identical subscales. Next, model fit was examined using absolute and incremental fit indices. Both are equally important in evaluating model fit (Kline, 1998). The chi-square test (χ^2/df) is an absolute fit index. Generally, a ratio below 3 is considered good. Here, the ratio is 2.7, indicating that the model has a good fit.

For incremental fit indices, cut-off criteria for good fit as recommended by Hu and Bentler (1999) were used: (1) Comparative Fit Index (CFI) > .95, (2) Tucker–Lewis Index (TLI) > .95, Root Mean Square Error of Approximation (RMSEA) < .06. According to these criteria, the model consisting of the two subscales has a reasonable fit (see Table 2). Furthermore, the latent factor correlation was high (.78), but did significantly differ from 1 (95% Confidence Interval: .72–.84).

To test whether the two-subscales structure has additional value compared to a one-factor model, an additional confirmatory factor analysis was conducted (see Table 2). For this one-factor model, all 16 items were regarded as one large factor. To examine which model fits the data best, a likelihood ratio test was performed, in which the difference in chi-square values of the models was compared. The two-subscales model fitted significantly better than the one-factor model ($p < .001$). Further, the Expected Cross-Validation Index (ECVI) provides a descriptive evaluation of competing models. For the ECVI, the model with the lowest value fits best. Table 2 depicts that the ECVI was lowest for the two-subscales model, indicating that this model fits best.

3.4. Reliability analysis

For the DPSS-subscales, Cronbach's alphas were adequate to good (all > .71; see Table 3). Test–retest reliability was examined using Intra-Class Correlation Coefficients (ICC), and was

Table 2
Goodness of Fit indices for all factor models

	χ^2	df	χ^2/df	CFI	TLI	RMSEA	ECVI
One factor	345.35	103	3.35	.88	.86	.070	0.86
Two factors	278.93	102	2.74	.91	.89	.060	0.72

Note: CFI = Comparative Fit Index, TLI = Tucker–Lewis Index, RMSEA = Root Mean Square Error of Approximation, ECVI = Expected Cross-Validation Index.

Table 3
Correlation matrix for DPSS and Propensity indices

	DPSS Propensity	DPSS Sensitivity	DQ	DS
DPSS Propensity	$\alpha = .78$			
DPSS Sensitivity	.59**	.77		
DQ	-.21**	-.16**	.72	
DS	.37**	.29**	-.37**	.94
Valid <i>N</i>				963

On the diagonal axis, Cronbach alphas are presented.

** Significant at $p < .01$.

good for both Propensity (.69) and Sensitivity (.77). For the DQ, Cronbach alpha was good (.72). Alphas were poor for the DS-subscales (all $< .43$). Therefore, only DS total scores were used for further analyses (alpha = .68). For the BIQ and FSQ, alphas were good: .83 (BIQ-Fear), .81 (BIQ-Faint), .82 (BIQ total score) and .97 (FSQ total scores).

3.5. Validity

Table 3 shows that the DPSS correlated moderately with DQ and DS. As expected, the highest correlations were observed between DPSS-Propensity and the other propensity measures (DS/DQ).

3.6. Correlations with psychopathology

Table 4 shows the DPSS correlated moderately with BIQ-Fear. A low correlation was found between DQ and BIQ-Fear, while the correlation between DS and BIQ-Fear was moderate. Correlations of DPSS, DQ, and DS with the FSQ were all comparable. To prevent artificially inflated correlations between DS and BIQ-Fear/FSQ, a DS total score without subscales Animals, Death and Body-Envelope Violations was used. Additionally, a separate DS total score containing only these subscales was also calculated. Table 4 displays that correlations between the fear

Table 4
Correlations between disgust indices and fear questionnaires

	FSQ	BIQ Fear
DPSS Propensity	.20**	.35**
DPSS Sensitivity	.16**	.35**
DQ	-.24**	-.26**
DS total	.17**	.42**
Overlap	.21**	.48**
No overlap	.10**	.26**
Valid <i>N</i>		967

** Significant at $p < .01$.

Table 5
 Partial correlations, controlling for DQ and DS

	Propensity	Sensitivity
FSQ	.13**	.10**
BIQ Fear	.23**	.26**

** Significant at $p < .01$.

questionnaires and the DS containing overlapping items are indeed more pronounced compared to the DS without those subscales.

To correct correlations between DPSS and FSQ/BIQ for variance already explained by the DQ and DS, partial correlations were calculated. Table 5 depicts that this leads to slightly lower, yet still significant correlations between DPSS and BIQ-Fear/FSQ. Thus, the DPSS has additional independent predictive value compared to the DS and DQ.

3.7. Contribution to psychopathology

Regression analyses were used to examine whether propensity and sensitivity contribute independently to the variance in fear of blood and fear of spiders. Scores on the FSQ and BIQ were used as dependent variables, whereas scores on DPSS subscales were included as predictor variables. Of the variance in FSQ scores, only 4% was accounted for by the DPSS ($R = .20$, $R^2 = .04$; $F(2,966) = 20.71$; $p < .01$). FSQ scores were predicted significantly by Propensity ($\beta = .16$; $t = 4.09$; $p < .01$) but not by Sensitivity ($\beta = .06$; $t = 1.62$; $p = .10$). A total of 16% of the variance of BIQ-Fear scores was accounted for by the DPSS ($R = .39$, $R^2 = .16$; $F(2,962) = 88.39$; $p < .01$). Scores on BIQ-Fear were significantly predicted by both Propensity ($\beta = .22$; $t = 6.00$; $p < .01$) and Sensitivity ($\beta = .22$; $t = 6.04$; $p < .01$).

Next, it was examined if people with a fainting history endorsed the DPSS differently compared to non-fainters. Based on the scores on BIQ-Fainting, the dataset was divided into two groups: people who never fainted ($N = 797$), and people who have fainted at least once in response to blood-injection stimuli ($N = 164$). A 2 (Propensity, Sensitivity) by 2 (fainters, non-fainters) ANOVA was performed. Between-groups factor Fainting history was significant [$F(1,959) = 9.55$; $p < .01$], thus, fainters scored significantly higher on the DPSS compared to non-fainters. The interaction term DPSS-subscale * Fainting history was not significant [$F(1,959) = .45$; $p = .50$], so the overall response pattern did not differ for fainters and non-fainters. Subsequently, a series of contrast-specific one-way ANOVAs revealed that fainters scored significantly higher on propensity [$F(1,960) = 4.86$; $p = .03$] and sensitivity [$F(1,960) = 11.86$; $p < .01$] than non-fainters.

4. Discussion

The main findings are: (i) supporting its content validity, exploratory factor analysis revealed that the DPSS consists of two factors: propensity, and sensitivity, (ii) confirmatory factor analysis

confirmed this two-factor model in an independent dataset; (iii) the DPSS subscales have high internal consistency and acceptable test–retest reliability; (iv) correlations between DPSS and other disgust indices (DS, DQ) were moderate, but comparable to correlations between DS and DQ; (v) disgust propensity and sensitivity correlated in the expected direction with spider and blood fear; (vi) these correlations remain when correcting for variance already explained by DS and DQ; (vii) disgust propensity was a significant predictor of spider fear, whereas both disgust propensity and sensitivity were significant predictors of fear of blood; (viii) participants with a fainting history for BII-stimuli endorsed the DPSS more strongly than those without.

Supporting content validity of the DPSS, exploratory factor analysis revealed that the DPSS meaningfully differentiated between disgust propensity (the tendency to react with the emotion of disgust) and disgust sensitivity (the tendency to experience disgust as something ‘horrid’). Moreover, confirmatory factor analysis confirmed the two subscales in an independent sample and showed it fitted the data significantly better than a one-factor solution.

Further, the DPSS correlated moderately with other disgust propensity questionnaires (DS, DQ). The propensity measures (DPSS-Propensity, DS, DQ) correlated low to moderate, suggesting that each measures different aspects of disgust propensity. These findings are similar to previously reported correlations between DS and DQ ($r = -.33$; de Jong, Peters, & Vanderhallen, 2002; $r = -.54$; de Jong & Merckelbach, 1998), and are in accordance with studies showing that whilst the DQ refers to core disgust (de Jong & Merckelbach, 1998), the DS taps into several disgust domains (Haidt et al., 1994). Additionally, these findings support the idea that DPSS-Propensity measures domain-independent disgust experiences.

Correlations between disgust questionnaires (DPSS, DS, DQ) and measures of psychopathology (FSQ, BIQ) were similar to earlier studies on the relationship between disgust propensity and spider fear (e.g., DQ and Spider Phobia Questionnaire (SPQ): $r = -.35$, de Jong, Andrea, & Muris, 1997; $r = -.27$, de Jong & Merckelbach, 1998; DS and SPQ: $r = .18$, Sawchuk et al., 2000) or between disgust propensity and fear of BII-stimuli (DQ and five Fear Survey Schedule items: $r = .33$, Matchett & Davey, 1991; DS and BIQ: $r = .42$; de Jong & Merckelbach, 1998; DS and Injection Phobia Scale-Anxiety: $r = .32$, Sawchuk et al., 2000). In line with previous research (de Jong & Merckelbach, 1998), the FSQ displayed the strongest association with the DQ (measuring core disgust), whereas the BIQ was more strongly associated with the DS (measuring core and animal-reminder disgust). Compared to spider fear, fear of blood (BIQ) was relatively strongly associated with disgust propensity (DS, DQ). These findings confirm studies that found disgust to be more strongly involved in blood phobia than in spider phobia (Sawchuk et al., 2000; Sawchuk et al., 2002; Tolin et al., 1997).

For the DPSS, the same pattern of results was observed. Both subscales correlated more strongly with BIQ-Fear, yet comparably to the DQ with the FSQ. The finding that the correlation between disgust propensity and indices of psychopathology still holds when a questionnaire is used that does not refer to specific disgust elicitors is an important finding, because it indicates that the previously observed relationship between disgust propensity and psychopathology is not merely an artefact of conceptual overlap between questionnaires (e.g., Thorpe & Salkovskis, 1998).

Interestingly, the DPSS-subcales appear differently associated with psychopathology: Fear of spiders was most strongly associated with propensity, whereas fear of blood was related to both propensity and sensitivity. Therefore, the interplay between disgust propensity and sensitivity may differ across disorders. For example, although spider phobics consider spiders disgusting, feelings of fear tend to predominate (Sawchuk et al., 2000; Sawchuk et al., 2002; Tolin et al., 1997). If fear is the dominant response, then high levels of disgust sensitivity may not be critically involved. In blood phobia, however, disgust appears the dominant emotion (Page, 1994, 2003; Tolin et al., 1997). Accordingly, high levels of disgust sensitivity are likely to play a more prominent role in fear of blood, since disgust sensitivity determines to what extent confrontation with BII-stimuli is being experienced as unpleasant.

Additionally, BII-fearful individuals are characterised by a unique symptom, the vasovagal syncope. Previous work indicates that disgust may be involved in BII-related fainting (Page, 1994, 2003). In accordance with this idea, people with a fainting history for BII-stimuli displayed significantly elevated levels of both disgust propensity and sensitivity, compared to non-fainters in the present study.

Several points should be addressed in future research. First, it seems warranted to establish validity of the DPSS in terms of predictive validity for individuals' actual behavioral tendency to avoid disgusting objects. To corroborate the relevance of differentiating between sensitivity and propensity, it would be important to explore the differential predictive validity of these factors. Second, divergent validity should be examined. For example, it would be recommendable to determine if the DPSS differs from related indices, such as the Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986). Third, test–retest reliability was lower than expected. One testable explanation may be that the time interval between measurements was quite long (two months). Further, although confirmatory factor analysis revealed that the two-factor structure was superior to the one-factor model, correlations between propensity and sensitivity were high. More studies are needed to establish if propensity and sensitivity are indeed to be regarded as separate traits. Additionally, the majority of participants in this study were women. Therefore, it remains to be determined whether psychometric properties of the DPSS are similar in samples in which the numbers of men and women are balanced. Finally, although the present study indicates that disgust propensity and sensitivity are differentially related to fear of spiders and fear of blood, it needs to be examined further whether these findings are similar when a treatment-seeking sample is used.

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Appendix. The Disgust Propensity and Sensitivity Scale – Revised (DPSS-R)

Instructions: this questionnaire consists of 16 statements about disgust. Please read each statement and think how often it is true for you, then place a ‘x’ in the box that is closest to this.

		Never	Rarely	Some times	Often	Always
1	I avoid disgusting things.					
2	When I feel disgusted, I worry that I might pass out.					
3	It scares me when I feel nauseous.					
4	I think disgusting items could cause me illness / infection.					
5	I feel repulsed.					
6	Disgusting things make my stomach turn.					
7	I screw up my face in disgust.					
8	When I notice that I feel nauseous, I worry about vomiting					
9	When I experience disgust, it is an intense feeling.					
10	I experience disgust.					
11	It scares me when I feel faint.					
12	I become disgusted more easily than other people.					
13	I worry that I might swallow a disgusting thing.					
14	I find something disgusting.					
15	It embarrasses me when I feel disgusted.					
16	I think feeling disgust is bad for me.					

Thank you for your time in completing this questionnaire!

Scoring key: Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Always = 5.

Disgust Propensity: sum of items 1, 5, 6, 7, 9, 10, 12, 14.

Disgust Sensitivity: sum of items 2, 3, 4, 8, 11, 13, 15, 16.

References

- Cavanagh, K., & Davey, G. C. L. (2000). The development of a measure of individual differences in disgust. Paper presented to the British Psychological Society, Winchester, UK.
- Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7, 309–319.

- Davey, G. C. L. (1994). Self-reported fears to common indigenous animals in an adult UK population: The role of disgust sensitivity. *British Journal of Psychology*, *85*, 541–544.
- de Jong, P., Andrea, H., & Muris, P. (1997). Spider phobia in children: Disgust and fear before and after treatment. *Behaviour Research and Therapy*, *35*, 559–562.
- de Jong, P., & Merckelbach, H. (1998). Blood-injection-injury phobia and fear of spiders: Domain specific individual differences in disgust sensitivity. *Personality and Individual Differences*, *24*, 153–158.
- de Jong, P. J., Peters, M. L., & Vanderhallen, I. (2002). Disgust and disgust sensitivity in spider phobia: Facial EMG in response to spider and oral disgust imagery. *Journal of Anxiety Disorders*, *16*, 477–493.
- Haidt, J., McCauley, C., & Rozin, P. (1994). Individual differences in sensitivity to disgust: A scale sampling seven domains of disgust elicitors. *Personality and Individual Differences*, *16*, 701–713.
- Hu, L.-T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.
- Jöreskog, K. G., & Sörbom, D. (2002). *LISREL 8. 54*. Chicago, Scientific Software International, Inc.
- Klieger, D. M., & Siejak, K. K. (1997). Disgust as the source of false positive effects in the measurement of ophidiophobia. *Journal of Psychology*, *131*, 371–382.
- Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: Guilford.
- Matchett, G., & Davey, G. C. L. (1991). A test of disease-avoidance model of animal phobias. *Behaviour Research and Therapy*, *29*, 91–94.
- Merckelbach, H., Muris, P., de Jong, P. J., & de Jongh, A. (1999). Disgust sensitivity, blood-injection-injury fear, and dental anxiety. *Clinical Psychology and Psychotherapy*, *6*, 279–285.
- Mulkens, S. A. N., de Jong, P. J., & Merckelbach, H. (1996). Disgust and spider phobia. *Journal of Abnormal Psychology*, *105*, 464–468.
- Muris, P., Merckelbach, H., Nederkoorn, S., Rassin, E., Candel, I., & Horselenberg, R. (2000). Disgust and psychopathological symptoms in a nonclinical sample. *Personality and Individual Differences*, *29*, 1163–1167.
- Page, A. C. (1994). Blood-injury phobia. *Clinical Psychology Review*, *14*, 443–461.
- Page, A. C. (2003). The role of faintness elicited by blood and injection stimuli. *Journal of Anxiety Disorders*, *17*, 45–58.
- Reiss, S. (1991). Expectancy theory of fear, anxiety and panic. *Clinical Psychology Review*, *11*, 141–153.
- Reiss, S., Peterson, R. A., Gursky, D. M., & McNally, R. J. (1986). Anxiety sensitivity, anxiety frequency, and the prediction of fearfulness. *Behaviour Research and Therapy*, *24*, 1–8.
- Rozin, P., Fallon, A. E., & Mandell, R. (1984). Family resemblance in attitudes to food. *Developmental Psychology*, *20*, 309–314.
- Rozin, P., Haidt, J., McCauley, C., Dunlop, L., & Ashmore, M. (1999). Individual differences in disgust sensitivity: Comparisons and evaluations of paper-and-pencil versus behavioral measures. *Journal of Research in Personality*, *33*, 330–351.
- Sawchuk, C. N., Lohr, J. M., Tolin, D. F., Lee, T. C., & Kleinknecht, R. A. (2000). Disgust sensitivity and contamination fears in spider and blood-injection-injury phobias. *Behaviour Research and Therapy*, *38*, 753–762.
- Sawchuk, C. N., Lohr, J. M., Westendorf, D. H., Meunier, S. A., & Tolin, D. F. (2002). Emotional responding to fearful and disgusting stimuli in specific phobia. *Behaviour Research and Therapy*, *40*, 1031–1046.
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*, 147–177.
- Schienle, A., Stark, R., Walter, B., & Vaitl, D. (2003). The connection between disgust sensitivity and blood-related fears, faintness symptoms and obsessive-compulsiveness in a non-clinical sample. *Anxiety, Stress and Coping*, *16*, 185–193.
- Szymanski, J., & O'Donohue, W. (1995). Fear of spiders questionnaire. *Journal of Behavior Therapy and Experimental Psychiatry*, *26*, 31–34.
- Taylor, S. (1993). The structure of fundamental fears. *Journal of Behavior Therapy and Experimental Psychiatry*, *24*, 289–299.
- Thorpe, S. J., & Salkovskis, P. M. (1998). Studies on the role of disgust in the acquisition and maintenance of specific phobias. *Behaviour Research and Therapy*, *36*, 877–893.
- Tolin, D. F., Lohr, J. M., Sawchuk, C. N., & Lee, T. C. (1997). Disgust and disgust sensitivity in blood-injection-injury and spider phobia. *Behaviour Research and Therapy*, *35*, 949–953.