The Disgust Scale-R: A valid and reliable index to investigate separate disgust domains?

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A B S T R A C T

The Disgust Scale (DS; Haidt, McCauley, & Rozin, 1994) is the most widely used instrument for assessing disgust propensity (i.e., individual tendency to experience disgust). Yet, psychometric evaluations of the DS are scarce while the literature shows that the reliability of its subscales are unacceptably low. Recently, it was suggested to reduce the number of subscales (Olatunji, Sawchuk, de Jong, & Lohr, 2007a). This study is a first exploration of this reduced three-factor solution in an independent sample. In study I, we examined whether a three-factor solution improves psychometric properties of the DS. Students from Maastricht University (N = 535) and the University of Groningen (N = 432) completed the DS. In study II, the DS was revised by dropping redundant items and revising its scoring format. The DS-R was administered to students from the University of Groningen (N = 472) and Ghent University (N = 41) to study its psychometric properties. The revisions improved the psychometric features of the DS, and showed that the DS-R is a valid and reliable index to establish core disgust, animal-reminder disgust, and contamination.

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1. Introduction

Disgust propensity is defined as the individual tendency to experience disgust. Research showed that enhanced disgust propensity is associated with various psychopathological conditions (Olatunji & Sawchuk, 2005). It has been argued that high levels of disgust propensity enlarge the probability of specific stimuli to acquire a disgust-evoking status (van Overveld, de Jong, & Peters, 2010). Hence, disgust propensity is assumed to be particularly important to the etiology of psychopathological conditions in which disgust is somehow involved. Accordingly, previous research showed that enhanced disgust propensity is involved in spider phobia (Matchett & Davey, 1991), blood phobia (de Jong & Merckelbach, 1998), obsessive compulsive disorder (Mancini, Gragnani, & D'Olimpio, 2001; Olatunji, Williams, Lohr, & Sawchuk, 2005), and sexual dysfunctions (de Jong, van Overveld, Weijmar-Schultz, Peters, & Buwalda, 2009).

Although several disgust types have been identified in the literature, only two are well-examined: core and animal-reminder disgust (AR; Rozin, Haidt, & McCauley, 2000). Core disgust involves disgust at the prospect of oral incorporation of disgusting stimuli (e.g., rotting foods), whereas AR-disgust involves an aversion towards stimuli that remind humans of their animal nature (Rozin & Fallon, 1987). These two disgust types can be empirically established and may be related differentially to psychopathology (de Jong & Merckelbach, 1998).

However, current indices generally do not measure these latent concepts (core/AR-disgust) but rather measure disgust propensity for specific disgust stimuli. The Disgust Scale (DS; Haidt et al., 1994) is the most widely used instrument on disgust propensity. Yet, despite its widespread use, psychometric evaluations are scarce. This is particularly troublesome, as studies consistently report that although internal consistency for the total index is good (α = .84; Haidt et al., 1994; .74; Olatunji, Smits, Connolly, Willems, & Lohr, 2007b), its subscales demonstrate low to moderate reliability (α's = .34–.64; Haidt et al., 1994; .40–.68; Olatunji et al., 2005). Further, the DS measures disgust for specific elicitors but not explicitly core or AR-disgust. Thus, internal consistency may be improved by creating subscales covering larger disgust domains (core/AR).

A first exploration provided preliminary support. Earlier work investigated correlations between the DS and blood phobia symptoms (Olatunji, Sawchuk, de Jong, & Lohr, 2006). The DS-items were reallocated in subscales measuring core and AR-disgust. Structural equation modeling showed domain-specific correlations between these subscales and blood phobia symptoms. Moreover, the two-factor model fitted the data well (Olatunji et al., 2006).

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Recently, Olatunji and Sawchuk et al. (2007a) examined the DS and suggested several adjustments. First, seven items were removed due to redundancy. Second, confirmatory factor analyses demonstrated that, compared to a one- or two-factor model, a three-factor solution (Core, AR, Contamination) had superior fit. Contamination can be defined as an individual's fear of contagion with disgusting stimuli. Contamination potency, the ability to contaminate a non-disgusting object with disgust-inducing qualities, is an important feature of disgust stimuli, particularly for psychopathology (e.g., de Jong & Muris, 2002).

The aim of the present studies was to determine whether psychometric properties of the DS would improve following a revision in accordance with earlier recommendations (Olatunji & Sawchuk et al., 2007a; Olatunji et al., 2007c). In the first study, we investigated whether assigning DS-items into the three proposed subscales in line with the three-factor model (Core/AR/Contamination) fitted the data better than the original or a two-factor solution (Core/AR). In the second study, the DS was fully revised in accordance with Olatunji's suggestions, and its psychometric properties were explored using confirmatory factor analyses. Content validity was examined by means of correlations with other disgust propensity indices.

2. Study I

2.1. Methods

2.1.1. Participants

Students from the schools of Psychology, Health Sciences, and Medicine at Maastricht University ($N = 535$; 443 women) and the University of Groningen ($N = 432$; 316 women) were recruited. Their mean age was 20.4 years ($SD = 2.4$; range: 17–39 years).

2.2. Materials

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

The DS measures individuals' disgust propensity across eight domains: Animals, Bodily Products, Body-Envelope Violations, Death, Food, Hygiene, Sex, and Sympathetic Magic. On the first part, participants indicate whether sixteen statements apply to them on a dichotomous scale (0 = 'no', 1 = 'yes'). On the second part, participants rate) how disgusted they are when confronted with several stimuli on a three-points Likert-scale (0 = 'not disgusting at all', .5 = 'slightly disgusting', 1 = 'very disgusting'). A total score (range: 0–32) and eight subscales (range: 0–4) can be calculated. Recent work suggested to shorten the DS to 25 items with three subscales. Thus, we recalculated the total score of the original 32-item DS to form the 25-item DS-A (DS-Adapted) with subscales Core, AR, and Contamination.

2.3. Procedure

For three consecutive years, students from Maastricht University participated in a questionnaire study. During the third administration, a similar study was performed at the University of Groningen. In Maastricht, groups (max. 25 participants per group) completed the DS in a conference room. In Groningen, participants completed the DS in a lecture theatre setting. All completed the Dutch version of the DS. Its psychometric features are comparable to the English version (e.g., Olatunji et al., 2009). Participants were recruited via advertisements in university papers and posters throughout the university buildings. On behalf of another study (van Overveld, de Jong, Peters, Cavanagh, & Davey, 2006), several questionnaires on emotions, trait disgust and psychopathology

were administered. Participants were informed that they could win 50 euro through a lottery.

2.4. Data analysis

The data were pooled into one sample. Regression analyses computed missing values using the Statistical Package for Social Sciences (SPSS; version 12.0.1). Overall, less than 1% missing data were observed. First, descriptives of all questionnaires were calculated for the entire research population ($N = 967$). Hereto, the 25 DS-A items were used to comprise the subscales from the two- and three-subscale solutions proposed by Olatunji et al. (2007c). Additionally, a version of the DS was calculated where the 25 DS-A items were assigned to their original subscales. So, compared to the original 32-item version, the Sex-subscale was deleted and subscales Food, Body and Envelope Violations contained one item less.

Second, confirmatory factor analyses (CFA) determined whether the three-factor model fitted significantly better than a one-, two- or seven factor model, and whether the DS-A models demonstrated good model fit. In accordance with Olatunji et al. (2007c), in the two-factor model, the Core-disgust factor comprised the items from subscales Food, Animal, Body Products, Hygien, and Magic, the AR-disgust factor consisted of items from Envelope and Death. In the three-factor model, Contamination comprised five items (9, 11, 24, 28, 29 of the Dutch DS) which were omitted from the Core Disgust factor. Polychoric correlation matrices and asymptotic covariance matrices were obtained by PRELIS. Using LISREL 8.54 (Jöreskog & Sörbom, 2002), confirmatory factor analyses were performed with the Weighted Least-Squares estimation due to the discrete scoring format of the first part of the DS-A. Latent variables were free to correlate. Secondary loadings of items were not permitted.

3. Results

3.1. Descriptives

Table 1 summarizes the descriptive statistics of all questionnaires. Internal consistency was acceptable for the DS-A total score ($\alpha = .70$), but low for all subscales.

Table 1
Summary of means, standard deviations and reliability coefficients for all disgust indices.

	Mean	SD	Range	Cronbach's alpha
DS-A total	17.57	4.77	3–32	.70
DS-A-Ani	3.72	1.26	0–4	.30
DS-A-Food	2.24	1.13	0–4	.14
DS-A-Body	2.15	1.03	0–4	.31
DS-A-Hyg	2.36	1.08	0–4	.21
DS-A-Env	2.75	.91	0–4	.12
DS-A-Death	2.59	1.53	0–4	.43
DS-A-Magic	1.76	1.10	0–4	.28
DS-A two subscales				
DS-A-Core	11.56	3.40	1–22	.61
DS-A-AR	6.01	2.18	0–11	.52
DS-A three subscales				
DS-A-Core	10.12	2.90	0–18	.59
DS-A-AR	6.01	2.18	0–11	.52
DS-A-Cont	1.44	1.17	0–7	.27

SD, Standard Deviation; DES, Disgust Emotion Scale; DQ, Disgust Questionnaire; DS-A, Disgust Scale-Adapted; Ani, Animals; Body, Body Products; Hyg, Hygiene; Env, Body-Envelope Violations; Magic, Sympathetic magic; Cont, Contamination.