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Revisiting the factor structure of the 12-item Disgust Propensity and Sensitivity Scale – Revised: Evidence for a third component

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ABSTRACT

The 12-item Disgust Propensity and Sensitivity Scale – Revised (DPSS-12) is widely used to assess the tendency for an individual to respond with disgust (i.e., disgust propensity) and how bothered an individual is by the experience of disgust (i.e., disgust sensitivity). However, heterogeneous items included in the DPSS-12 call into question the adequacy of its two-factor structure. The current study examined the factor structure of the DPSS-12 using two large, nonclinical student samples. Exploratory factor analyses revealed three lower order factors: (1) disgust propensity, (2) disgust sensitivity, and (3) self-focused/ruminative disgust. Confirmatory factor analyses supported the three-factor solution and demonstrated that the model fit better than a unidimensional or two-factor model. Further, a modified two-factor model that excluded the third factor provided a better fit than the original two-factor model. Additionally, the third domain explained a significant portion of the total variance, and evidenced a distinctive pattern of association with relevant constructs including obsessional symptoms. These data suggest the need to refine our knowledge about the latent structure of disgust reflected by this measure.

1. Introduction

Disgust is a basic emotion that has received considerable research attention. Rozin, Haidt, and McCauley (2000) maintain that there are four specific domains in disgust: (1) core (i.e., a reactive sense of aversion to contamination threat), (2) animal-reminder (i.e., aversion towards reminders of animalistic qualities), (3) interpersonal (i.e., contact with individuals who are contaminated with disease or misfortune), and (4) socio-moral (i.e., reaction to violations that an individual is morally "sick" or "twisted"). Core and animal-reminder domains are thought to protect individuals from disease (Oaten, Stevenson, & Case, 2009) whereas interpersonal and socio-moral domains may protect and preserve social order (Rozin et al., 2000).

Several questionnaires have been developed to assess disgust. Such measures vary widely in contextual mode and domain, and include content which spans animal-reminder cues, sexual activity, hygiene, and death, among other materials. Importantly, these measures tend to mix different facets of disgust together (Olatunji & Cisler, 2009; Olatunji, Tart, Ciesielski, McGrath, & Smits, 2011), including disgust sensitivity (DS; how bothered an individual is by the experience of disgust) and disgust propensity (DP; how readily or easily a person responds with disgust). Thus, the Disgust Propensity and Sensitivity Scale (DPSS; Cavanagh & Davey, 2000) was created to assess disgust irrespective of specific materials or elicitors (i.e., *not limited* to domains such as food aversion or hygiene) and to differentiate between DS and DP.

The original DPSS consists of 32 items used to assess DS and DP with 16-items per factor. The scale yielded good psychometric properties including good internal consistency for the total scale and its subscales (Cavanagh & Davey, 2000). Subsequent factor analyses have resulted in two abbreviated versions of the original scale. van Overveld, de Jong, Peters, Cavanagh, & Davey, 2006 proposed a 16-item version with two eight-item subscales for DS and DP. Next, Olatunji, Cisler, Deacon, Connolly, and Lohr (2007) conducted exploratory analyses and found that four items did not load properly onto either factor. Fergus and Valentiner (2009) then replicated the findings that the 12-item structure is the most parsimonious and psychometrically sound version of the measure. The 12-item DPSS is its latest version, and has been developed and validated using non-clinical student samples.

Nevertheless, important questions remain regarding the content validity and factor structure of the DPSS-12. Inspection of item content calls into question the homogeneity of the DS subscale. Of the six DS items, four items reflect heightened gastrointestinal and vasovagal concerns related to disgust, whereas two items reflect a self-evaluative component (i.e., Item 11. "It *embarrasses me* when I

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feel disgusted" and Item 12. "I *think* feeling disgust *is bad for me*"). Considering the heterogeneity in DS and its inclusion of low face-valid items, it is important to examine whether the proposed latent factor structure of DS vs. DP would be replicated in a large sample using exploratory factor analysis without constraint on the number of factors examined. Factor analytic studies often demonstrate different structures according to the nature of study samples. Thus, it is important to examine whether the proposed DPSS factor structure in non-clinical samples would be replicated using clinical samples with relevant psychiatric conditions (e.g., obsessive–compulsive disorder, disgust-elevated specific phobia). However, as previous examinations of the DPSS have exclusively relied on non-clinical samples in continuing revision of the instrument, it is important to first demonstrate reliable and replicable latent factor structures among non-clinical individuals.

Therefore, the current study sought to examine the psychometric properties of the DPSS-12 in a large, nonclinical sample. The primary goal of the first study was to conduct an exploratory examination of the measure's factor structure. In a second study, the psychometric properties of the measure were further evaluated using confirmatory factor analysis (CFA) of the DPSS-12 latent structure. Correlational analyses were also conducted to examine convergent and divergent validity.

2. Study 1

2.1. Methods

2.1.1. Participants

The study sample consisted of 396 students from a large southeastern university who completed questionnaires in exchange for partial course credit. The mean age of the sample was 19.78 years (SD = 4.82). The sample was 72% female, and represented the following ethnicities: Caucasian (66.7%), African-American (13.9%), Hispanic (13.6%) Asian or Pacific Islander (2.8%), and 'other' (3.0%).

2.1.2. Measures and procedure

Informed consent was obtained upon participants' arrival to the lab. Participants completed a battery of questionnaires on a computer, as part of a larger study assessing factors related to anxiety. The DPSS-12 was administered as the main measure of interest.

2.2. Results

2.2.1. Reliability and item-level analysis

The sample had a mean total score of 16.73 (SD = 6.65, ranging from 1 to 39) on the DPSS-12. Females (M = 17.71, SD = 6.65) evidenced significantly higher total scores than males (M = 14.23, SD = 6.00). Females were also higher in both DP (M = 10.67, SD = 3.46) and DS (M = 7.04, SD = 4.19) than males [DP: (M = 9.12, SD = 3.49), DS: M = 5.12, SD = 3.45)].

Cronbach's alpha estimate for DS was .77, with an average inter-item correlation of .37 (range = .21–.65). Based on the criterion of .30 as an acceptable corrected item-total correlation (Nunnally & Bernstein, 1994), all six items on the DS factor performed adequately. Reliability for DP was also acceptable (Cronbach's alpha = .77) and the average inter-item correlation was .36 (range = .18–.49). All corrected inter-total correlations for this subscale were acceptable and above .30.

2.2.2. Exploratory factor analysis on the 12 DPSS Items

The current study utilized three different criteria for determining an appropriate factor structure: (1) eigenvalues (greater than one), (2) shape of the screen plot, and (3) parallel analysis (i.e., comparison of real data with random simulated eigenvalues).

Following the process described by Kline (1994), principal components analysis (PCA) was used to examine the factor structure of the DPSS-12. Factors were rotated using oblique Direct Oblimin rotation (delta = 0), because resulting sub-factors of this scale were expected to be significantly inter-correlated. The final number of factors was based on the number of eigenvalues greater than one and shape of the scree plot (Cattell, 1978). Because we sought to obtain a simple factor structure, we employed the criterion of greater than .35 as demonstration of salient loading. EFA yielded three factors with eigenvalues greater than 1.0, and the scree plot indicated a three-factor structure as the most optimal solution per the shape of the sharp curve. PCA satisfied the first two criteria for determining an appropriate factor structure. Supplementary Material Table 1 displays the correlations among the three factors in addition to eigenvalues, loadings, and percentage of variance for the rotated factors. The factors were inter-correlated in the range of .28 – .53 (all ps < .001).

We additionally utilized parallel analysis, whereby a random set of observations and variables is selected from a real data set and then subjected to factor analysis (Gorsuch, 1993). To identify the number of factors, we generated a scree plot based on real DPSS-12 data eigenvalues superimposed on mean eigenvalues from 20 randomly simulated data sets (as suggested by Levine & Rabinowitz, 2007; Mansbach-Kleinfeld, Apter, Farbstein, Levine, & Ponizovsky, 2010). Per Fig. 1, the eigenvalues of the first three dimensions of the DPSS-12 exceeded those from random eigenvalues generated from the simulated data sets. These results further support the three-factor solution for the DPSS-12.

The three-factor solution accounted for 59.20% of the DPSS-12 variance. Supplementary Material Table 1 shows that the first factor accounted for the largest portion of the variance in item scores (36.89%), and the second and third factors contributed to the explained variance (12.10% and 10.25%, respectively). Factor I contained six items and all of the items on this factor concern the *tendency towards the experience of disgust* (e.g., "I experience disgust"). This factor was labeled "disgust propensity" (DP) and was commensurate with previous DPSS versions. Factor II contained four items, and reflected *emotional sensitivity towards somatic aspects of disgust* (e.g., "It scares me when I feel nauseous"). This factor was labeled "disgust sensitivity" (DS) and its items are classified on the DS subscale in earlier DPSS versions. Factor III contained two items with distinctively high factor loadings (=.86). This factor was labeled "self-focused/ruminative disgust" (SFR) because the items indicated *negative appraisals of oneself in response to*

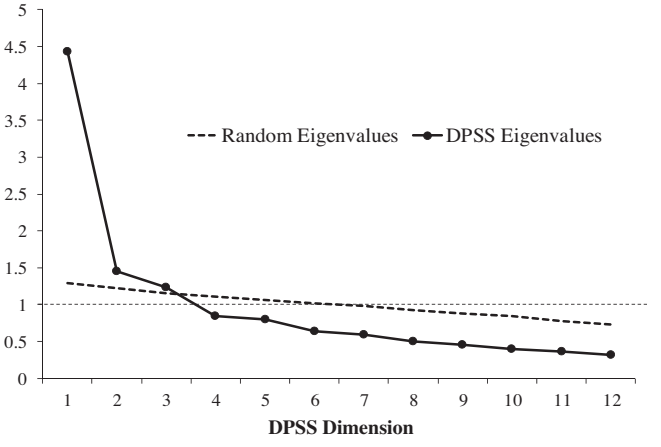

Fig. 1. The eigenvalues of the DPSS-12 data plotted against 20 simulated random eigenvalues.