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Abstract

Latinas/os have been underrepresented in research investigating the role of disgust propensity in phobias. The current study was the first to examine associations between disgust propensity and Blood-Injection-Injury (BII) phobia, when acculturation was controlled for, in Latina/o Americans (*n*=376). A structural model was developed with a BII fear latent variable consisting of fears of injection, blood, and sharp objects (causing injuries). The disgust propensity latent variable was formed with three domains of core, animal reminder, and contamination disgust elicitors. In the model, disgust propensity predicted BII fear when controlling for acculturation. A series of measurement and structural invariance tests demonstrated that the model was invariant between males and females. The current findings supported the hypothesis that disgust plays a role in BII fear symptoms similarly in Latinas and Latinos. The findings are expected to improve our understanding of mechanisms and treatment approaches for BII phobia symptoms in this underserved cultural group.

Keywords: BII phobia, disgust, Latinas/os, acculturation, gender invariance

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Disgust results from perceptions of threat of contamination or disease transmission (Rozin & Fallon, 1987). A three-dimensional model of disgust, containing core, animal-reminder, and contamination dimensions has been identified (Olatunji et al., 2007) and confirmed (Olatunji et al., 2009). Higher disgust propensity is associated with elevated Blood Injection Injury (BII) fear in White American and European samples (Bianchi & Carter, 2012; Olatunji, Haidt, McKay & David, 2008; van Overveld, de Jong, & Peters, 2011).

The results of the few cross-cultural studies on disgust and phobic fear are mixed. With US and Dutch samples, Sawchuk et al. (2006) reported differential relationships between specific disgust domains and contamination fear, whereas Olatunji et al. (2006) reported a model of disgust and BII fear that fit for both samples. Hirai and Vernon (2011) reported gender and cultural differences on levels of BII fear and disgust propensity. The role of disgust propensity in BII fear among Latinos is unknown.

The increasing number of Latinos in the U.S. (U.S. Census Bureau, 2010) underscores the importance of investigating phobia models to enhance our understanding of mechanisms and treatment approaches for Latinos. Preliminary evidence suggests that the choice of disgust components (BII-relevant or BII-irrelevant) in exposure-based interventions for BII phobia influence outcomes (Hirai et al., 2008; Olatunji et al., 2012). Thus, an examination of disgust components in Latinos' BII fear is an essential first step in refining treatments for this growing population.

The role of gender in phobic fear and disgust relationships is also unknown among Latino/as. White American and European women generally report higher phobic fear and disgust propensity than men (Olatunji et al., 2008; van Overveld et al., 2011). Kleinknecht et al. (1997) found differential disgust-BII model fit between males and females for an American student sample. However, Hirai and Vernon (2011) found that an Asian American sample showed no gender differences on animal disgust, contamination disgust, and BII phobia dimensions. Culture and acculturation levels need to be taken into account to understand gender effects in models of disgust propensity and BII fear.

The current study developed and tested a model of disgust propensity and BII fear, controlling for acculturation, in a Latina/o sample. It was hypothesized that disgust propensity would contribute to levels of BII fear, when controlling for acculturation, and that the model would equally fit males and females.

Method

Participants

Participants were 376 Latino undergraduate students from a university psychology subject pool in Texas. The sample was fluent in English, 63% female, and aged early twenties (M_{females}=21.9; M_{males}=23.2). Use of student participants allowed for direct comparison with past studies (e.g., Hirai & Vernon, 2011; Olatunji, Haidt, et al., 2008).

Measures

A demographic information questionnaire asked participants' age, sex, and ethnicity.

The Disgust Scale-Revised (DS-R; Olatunji et al., 2007) includes 25 items forming the core, animal-reminder, and contamination domains, which are rated on a 5-point scale.

The Medical Fear Survey (MFS; Kleinknecht et al., 1996) includes 50 BII phobia items rated on a 5-point scale. The current study used the injections, blood, and sharp subscales. Two subscales were excluded due to content: the examination subscale includes illness phobia symptom items rather than BII symptoms and the mutilation subscale overlaps DS-R content.

The Dominant Society Immersion (SMAS-DSI) subscale of the Stephenson Multigroup Acculturation Scale (SMAS; Stephenson, 2000) includes 15 items rated on a 4-point scale. The current sample's mean score was 3.55, which Stephenson (2000) suggests reflects second generation acculturation levels.

Procedure

This study was part of a larger online assessment of anxiety symptoms. Questionnaires were presented in Qualtrics. The study was approved by the university institutional review board and participants provided online consent.

Data Analysis

Preliminary analyses included descriptive statistics, within-gender group correlations, and t-tests comparing the genders. The measurement model of disgust propensity and BII fear is shown in Figure 1. The structural model, in which the disgust propensity latent variable was the predictor, the BII latent variable was the criterion, and acculturation was controlled for, is presented in Figure 2. A series of invariance tests were performed to examine gender invariance on the measurement model and then on the structural model. Analyses were performed utilizing Mplus 6.11 (Muthén & Muthén, 2007). Hu and Bentler's (1999) cutoff scores were applied to evaluate model fit.

Results

Table 1 presents preliminary analysis results. Generally, disgust subscales were more highly correlated with each other than with BII phobia subscales and vice versa, suggesting disgust propensity and BII fear are separate constructs. Females scored significantly higher than males on all measures.

Gender invariance test results on the measurement model are presented in Table 2. The measurement model fit for both male and female data. Metric invariance was found, suggesting equal factor loadings between men and women. The structural model (Figure 2) was tested. The results in Table 2 suggest: 1) equal effects of disgust propensity and acculturation on BII fear; 2) equal variances of disgust propensity and acculturation; 3) an equal correlation between disgust propensity and acculturation; and 4) equal error variance of BII fear across gender. Gender had no moderating effect on the relationships among disgust propensity, BII fear, and acculturation.

The parameter estimates and the standard errors for the final model are in Table 3. Standardized disturbance variance for BII fear was 0.686, which indicates that disgust propensity and acculturation together accounted for 31.4% of the variance in BII fear. The standardized regression coefficient for disgust was 0.535. That is, when the effect of acculturation was statistically controlled, one SD difference in the disgust variable was associated with more than half a SD difference in BII fear. The smaller magnitude of the standardized coefficient (-0.154) for acculturation indicates that its effect on BII fear was weaker than that of disgust.

Discussion

The full structural equation model showed that not only was the effect of disgust propensity and acculturation on BII fear invariant for both genders, but also the variability of disgust propensity, acculturation and BII fear as well as the correlation between disgust propensity and acculturation were gender invariant. Disgust propensity and acculturation together accounted for a good proportion of the variance in BII fear. Importantly disgust propensity was a powerful predictor of BII fear after controlling for acculturation. Overall, this model suggests that high disgust propensity may predispose individuals to BII phobia and, among Latinos, this may be consistent between males and females.

These results are in contrast to Kleinknecht et al.'s (1997) reports of gender variance in disgust-BII model fit among a culturally undifferentiated American student sample, suggesting the necessity of cross-cultural model testing. The current study examined a Latino student sample, whereas Kleinknecht et al.'s (1997) sample was likely comprised of largely non-Latino White students. Measure selection also differed: The current study formed latent variables with selected MFS subscales and the revised DS to minimize content overlap between the BII fear and disgust propensity constructs, whereas Kleinknecht et al. (1997) applied the full MFS, the original DS, another disgust scale, and fainting symptoms to form their model. Therefore, these models shared some variables and included unique variables. Sparse research investigating gender invariance for models of disgust propensity and BII phobia makes it impossible to draw overarching conclusions about the moderating role of gender in such models. More gender invariance tests of disgust-phobia models in Latino cultural groups is needed.

In the current sample, females reported significantly higher BII fear and disgust propensity than males, consistent with previous findings from predominantly White American and European samples (Olatunji et al., 2008; van Overveld et al., 2011). This cross-cultural gender difference is consistent with assertions that women's higher disgust propensity evolved to minimize fetal contamination (Fessler, Pillsworth, & Flamson, 2004). Gender differences in disgust and fear found across studies might also be due to Latino males' gender role beliefs (Arciniega, Anderson, Tovar-Blank, & Tracey, 2008), which may contribute to restricted emotionality and reported low levels of fear and disgust compared to Latina females. Along with the previous results, the current results further confirm the importance of applying gender-specific norms when evaluating disgust and BII symptoms. Establishing gender-specific and culturally-specific norms will facilitate efforts to identify those who need clinical attention.

The importance of understanding BII and related symptoms in student samples is underscored by findings that 8-16% of college students report significant blood-injection fear (Seim & Spates, 2010). Similar future research will need to examine clinical populations. Ancestral origin was not obtained in the current study, although participants in the current location are most likely of Mexican descent. Future research should examine the current model in diverse Latino and other cultural groups and examine participants' ancestral country of origin.

In summary, the current study was the first to examine a model of the role of disgust propensity in BII fear in a Latino sample, a historically underrepresented cultural group in research. This study suggests important refinements to theoretical models of the relationship between disgust propensity and BII fear when considering the influence of gender, culture, and acculturation.

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Table 1. Correlations and t-tests

	1	2	3	4	5	6	7	Male (n=139) M	Male (n=139) SD	Female (n=237) M	Female (n=237) SD	t
1.MFS-Injections		.79**	.65**	.35**	.40**	.35**	-.20**	5.9	7.08	7.6	7.68	-2.23*
2.MFS-Blood	.78**		.65**	.30**	.36**	.31**	-.19**	2.8	5.42	4.4	6.96	-2.42*
3.MFS-Sharp	.72**	.68**		.31**	.29**	.30**	-.19**	3.5	5.04	6.7	6.99	-4.70**
4.DSR-Core	.45**	.39**	.38**		.71**	.61**	-.04	1.7	0.73	2.4	0.71	-9.26**
5.DSR-Animal	.59**	.50**	.52**	.76**		.55**	-.03	1.6	0.83	2.2	0.88	-6.76**
6.DSR-Contamination	.46**	.40**	.44**	.71**	.68**		-.04	1.3	0.87	1.6	0.84	-3.95*
7.SMAS-Acculturation	-.06	-.05	-.06	.02	.01	.05		53.2	5.52	53.3	5.58	-0.03

Note. MFS=Medical Fear Survey; DSR=Disgust Scale Revised; SMAS=Stephenson Multigroup Acculturation Scale Correlation coefficients above the diagonal are for females. Correlation coefficients below the diagonal are for males. $^{*}p<.05$, $^{**}p<.01$.

Table 2. Invariance Tests Results for the Disgust-Phobia Measurement Model and for the Full Disgust-Phobia-Acculturation Model

							χ^2 difference test		
Invariance	MLM χ^2	*df*	SCF	CFI	RMSEA [90% CI]	SRMR	Scaled $\Delta\chi^2$	Δdf	*p*
<u>Measurement Model</u>									
Configural	23.084	16	1.088	0.992	0.049 [0.000, 0.089]	0.027			
Metric	26.158	20	1.259	0.993	0.040 [0.000, 0.079]	0.038	1.582	4	0.81
Metric & Equal Factor Variances	30.323	22	1.268	0.990	0.045 [0.000, 0.081]	0.081	3.067	2	0.22
<u>Full Model</u>									
Metric	28.896	28	1.192	0.999	0.013 [0.000, 0.058]	0.051			
Metric and Equal Factor Variances	32.611	31	1.226	0.998	0.017 [0.000, 0.058]	0.072	2.407	3	0.492
Full Structural	36.985	34	1.243	0.997	0.022 [0.000, 0.059]	0.074	3.083	3	0.378

Note. MLM=Satorra-Bentler's Maximum Likelihood Mean; SCF=Scaling Correction Factor; CFI=Comparative Fit Index; RMSEA=Root Mean Squared Error of Approximation; CI=Confidence Interval; SRMR=Standardized Root Mean Squared Residual.

Table 3. Parameter Estimates for the Full Structure Invariance Model

	Female			Male		
Parameter	Unstand.	S.E.	Stand.	Unstand.	S.E.	Stand.
			Equality-constrained estimates			
Factor loadings (Pattern Coefficients)						
MFS → Injection	1.00[a]	-	0.911	1.00[a]	-	0.914
MFS → Sharp	0.675	0.063	0.688	0.675	0.063	0.836
MFS → Blood	0.803	0.055	0.839	0.803	0.055	0.895
DSR → Core	1.00[a]	-	0.858	1.00[a]	-	0.858
DSR → Animal	1.169	0.061	0.817	1.169	0.061	0.881
DSR → Contamination	1.029	0.063	0.726	1.029	0.063	0.762
Exogenous variances and covariance						
DSR	0.376	0.037	1.00	0.376	0.037	1.00
SMAS	30.771	2.811	1.00	30.771	2.811	1.00
DSR↔SMAS	-0.081	0.180	-0.024	-0.081	0.180	-0.024
Regression weights						
MFS on DSR	5.924	0.729	0.535	5.924	0.729	0.535
MFS on SMAS	-0.189	0.060	-0.154	-0.189	0.060	-0.154
Disturbance variance						
MFS	31.635	4.543	0.686	31.635	4.543	0.686
			Unconstrained estimates			
Error variances						
Injection	9.463	2.857	0.170	9.114	3.061	0.165
Sharp	23.394	3.085	0.527	9.047	1.885	0.301
Blood	12.511	2.583	0.296	7.357	2.282	0.198
Core	0.135	0.021	0.264	0.135	0.031	0.265
Animal	0.256	0.033	0.333	0.149	0.032	0.225
Contamination	0.356	0.035	0.472	0.288	0.038	0.419

Note. [a] Parameters fixed to 1 for identification, MFS=Medical Fear Survey; DSR=Disgust Scale Revised; SMAS=Stephenson Multigroup Acculturation Scale. All parameter estimates are statistically significant with $p<.01$ except DSR↔SMAS ($p=.65$).

Figure 1: Disgust-Phobia Measurement Model

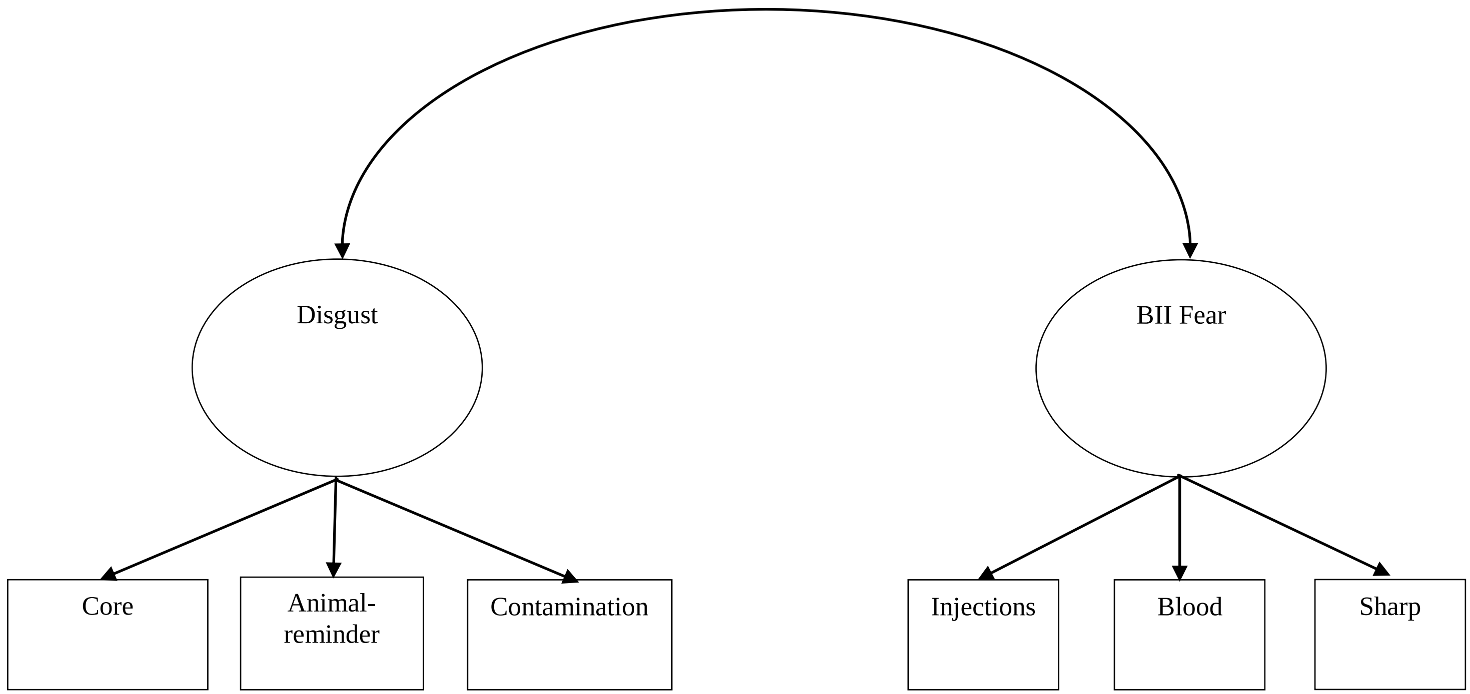

Figure 2: Full Structural Model