

Research Article

BEYOND ANXIOUS PREDISPOSITION: DO PADECER DE NERVIOS AND ATAQUE DE NERVIOS ADD INCREMENTAL VALIDITY TO PREDICTIONS OF CURRENT DISTRESS AMONG MEXICAN MOTHERS?

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Background: *Nervios (PNRV) and ataque de nervios (ATQ) are culture-bound syndromes with overlapping symptoms of anxiety, depression, and dissociation, shown to have inconsistent associations to psychiatric disorder. Few studies test the basic assumption that PNRV and ATQ are uniformly linked to distress outcomes across Latina/o immigrant groups. This study examined: (a) the extent to which acculturative stress, Latino/US American acculturation, and anxious predisposition were associated with lifetime history of ATQ and PNRV, and (b) the extent to which ATQ and PNRV add incremental validity in explaining acculturative stress and psychological distress beyond measures of anxious predisposition. Method: Participants (n = 82) included Mexican mothers who completed surveys on acculturation, trait anxiety, anxiety sensitivity, lifetime ATQ/PNRV, psychological distress, and acculturative stress. Results: Lifetime PNRV, but not lifetime ATQ, was significantly predictive of psychological distress. PNRV was also linked to trait anxiety. Psychometric measures of anxious predisposition (trait anxiety and anxiety sensitivity) were more robust predictors of distress outcomes than lifetime history of ATQ/PNRV. Conclusions: Inquiry into lifetime history of nervios may be a useful point of entry in talking to Mexican immigrant mothers about stress and distress. However, standard tools for assessing anxiety sensitivity and trait anxiety appear most useful in identifying and explaining the presence of psychological distress. Further research is needed to determine the cross-cultural relevance of trait anxiety and anxiety sensitivity, and its implications for the development of anxiety treatments that are effective across cultures. Depression and Anxiety 29:23–31, 2012. © 2011 Wiley-Liss, Inc.*

Key words: *anxiety sensitivity; culture-bound syndrome; nervios; Latinos; clinical utility*

INTRODUCTION

Three decades of empirical advances in the cross-cultural study of psychopathology catalyzed inclusion of Appendix I in DSM-IV.^{1,2} Appendix I provides an outline for cultural formulation and a glossary of

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culture-bound syndromes. Its inclusion in psychiatry's textbook of nosology represented formal recognition of the notion that cultural context could modulate the phenomenology and assessment of psychopathology.^[2] Over 40% of the culture-bound syndromes listed in *Appendix I* explicitly refer to an overlap with anxiety pathology, and much research has focused on the links between these syndromes and DSM's anxiety disorders. Proponents of a culturally informed psychiatric nosology have called for fuller integration of *experience-near* concepts such as culture-bound syndromes within DSM-V and subsequent editions,^[3] but an empirical framework to guide integration of these culturally embedded psychological phenomena with information from conventional diagnostic instruments still does not exist. This study is one of the first to examine the clinical validity and utility of assessing lifetime history of *nervios* and *ataque de nervios*, (two culture-bound syndromes prevalent among Latina/os and included in the DSM-IV), among a community sample of Mexicans, relative to assessments utilizing Western measures of anxious predisposition.

The DSM-IV Glossary of Culture-Bound Syndromes defines *nervios* and *ataque de nervios* as idioms of distress with overlapping symptoms of anxiety, depression, and dissociation, used throughout Latin America and the Caribbean.^[1,4] Idioms of distress reflect a broad range of expressions of negative feeling states commonly endorsed among members of a specific community.^[5] *Nervios* ("nerves") refer to a chronic, generalized sense of psychological distress;^[6–8] variants of the term are used across cultural groups.^[9] *Padecer de nervios* (*PNRV*) is the state of suffering from *nervios*. Between 15.5 and 62.5% of Latina/os from Central America, Mexico, the Caribbean, and the United States endorse a lifetime history of *nervios* with variations in rates by geographic region.^[6,10–21] Across communities, *nervios* is described as an "emotional problem"^[20] occurring in the context of an interpersonal incident or physical condition, often accompanied by distressing negative emotions, associated behavioral changes, and co-occurring depressive symptoms.^[6,22–24] Women report a higher prevalence than men,^[10,13,25] and a history of *nervios* predicts higher odds for lifetime affective and anxiety disorders.^[13]

In contrast, *ataque de nervios* ("attack of nerves"; *ATQ*) involves typical and atypical panic symptoms such as loss of control, crying, rage, aggressiveness, amnesia, and ensuing sense of relief.^[26,27] In the United States, lifetime history of *ATQ* is endorsed most frequently among Puerto Ricans (15%), followed by Mexicans (9.6%), and Cubans (9%),^[28] with comparable rates observed among island Puerto Ricans.^[25,29] Among clinical samples, prevalence rates can be as high as 70%.^[30,31] Endorsement of *ATQ* is higher among women, and those who are highly acculturated to US American life ways, widowed/separated/divorced,^[28] of low educational attainment, or over age 45.^[25] Despite evidence that degree of acculturation to Latino

ways of life may be the most significant indicator of a tendency to present and experience distress in culturally consonant terms, the association between level of acculturation and *ATQ* history has been inconsistent.^[32,33]

Similar to *nervios*, reports of *ATQ* are associated with lifetime mood, anxiety, and substance use disorders, clinical severity, psychiatric hospitalizations, use of primary medical and tertiary mental health services, and noncriterion PTSD symptoms.^[25,28,34] Unlike *nervios*, frequent *ATQs* are also linked to dissociative symptoms,^[35] childhood trauma,^[36] dissociative predisposition,^[37] unexplained neurological symptoms, and panic disorder.^[38]

Most of the literature on *ATQ* has focused on understanding its relationship to panic attacks and anxiety sensitivity. Findings indicate that *ATQs* are not culturally sanctioned panic attacks as originally postulated.^[30] Key defining features of *ATQs* include the presence of an identifiable trigger, aggression, dissociative symptoms, suicidality, absence of avoidant behavior, and prolonged symptom development, which contrasts with the acute progression of symptoms present in DSM-defined panic attacks.^[27,31,32,39,40] However, there is evidence of an association between *ATQ* and anxiety sensitivity. Latina/o community participants with history of *ATQ* are similar to those with elevated anxiety sensitivity and no history of *ATQ* in measures of anxiety and psychopathology.^[32] Among clinical samples, anxiety sensitivity and dissociative predisposition are significant predictors of *ATQ* severity; but only anxiety sensitivity predicts past-month *ATQ*.^[41,42] Fear of negative emotions (e.g., anger and anxiety) and fear of physiological symptoms, as captured by a measure of anxiety sensitivity, are strong predictors of *ATQ* severity. Though there are contradictory data,^[33] the emerging evidence supports the proposal that the fear of arousal symptoms associated with high anxiety sensitivity generates a heightened secondary fear response when an *ataque* occurs, escalating fear in a positive feedback loop, and creating a self-perpetuating fear cycle.^[42]

In sum, the relationship between lifetime or current *ATQ/PNRV* and psychiatric disorder and/or distress is not one-to-one.^[13,28] *ATQ* is not isomorphic to panic attacks or anxiety sensitivity, and level of acculturation is not a consistent predictor of *ATQ*. However, most of the extant literature has focused on *ATQ* among Puerto Ricans. There is evidence that cultural "idioms of distress" may be used differently across cultures.^[5,9] Mexicans compose the largest ethnic group within the Latina/o population in the United States,^[43] but it is not yet known whether *ATQ/PNRV* carry similar clinical value in Mexican compared to Puerto Rican populations, and whether the association between acculturation, anxious predisposition, distress, *ATQ*, and *PNRV* are similarly patterned in these communities. Answering calls to investigate culture-bound syndromes on their own terms,^[44] this study examined: (a) the

extent to which acculturative stress, Mexican/US American acculturation, and anxious predisposition were associated with lifetime history of *ATQ* and *PNRV*, and (b) the extent to which *ATQ* and *PNRV* add incremental validity in explaining acculturative stress and psychological distress beyond anxious predisposition. These data are among the first to examine *ATQ* and *PNRV* in a Mexican sample, examining links to acculturation, acculturative stress, and anxious predisposition as measured with Western instruments. Herein, *psychological* acculturation refers to the behavioral, attitudinal, identity, linguistic, and value changes that occur in an individual as the result of long-term contact with people sharing initially unfamiliar cultural practices.^[45-50] The related term “acculturative stress” refers to the broad negative cognitive, behavioral, and emotional changes that are due to and sustained by immigration-related stressors.^[51,52] We tested three hypotheses:

1. Mexican acculturation, acculturative stress, anxiety sensitivity, and trait anxiety would be associated with increased odds for lifetime *ATQ/PNRV* after adjusting for age and English proficiency.
2. Lifetime *ATQ* would add incremental validity in predicting past-week psychological distress beyond trait anxiety and anxiety sensitivity.
3. Lifetime *ATQ/PNRV* would be more robust predictors than anxiety sensitivity and trait anxiety of past 3-month acculturative stress.

The theoretical foundation for these hypotheses posits that attention to cultural “idioms of distress” may be critical to a proper understanding of the clinical complaints and types of distress that Latina/os report

in US American mental health clinics. For example, cultural idioms may be used systematically to signal individual level psychiatric vulnerabilities (e.g., anxious predisposition) that generate distress (e.g., acculturative stress) and motivate help-seeking. Perceived stress may also increase the frequency and severity of these idiomatic experiences. Thus, a deeper understanding of these interactions may be essential to shaping more effective treatments for this large and growing segment of the US population.

MATERIALS AND METHODS

PARTICIPANTS

Ninety-nine Mexican adult mothers of infant, preschool, or elementary school age children were recruited. Eighty-two provided complete data and were included in final analyses. The mean age was approximately 30 years (Table 1). Approximately 88% had an eighth grade educational level, and over 90% were married. The majority (98.7%) self-identified as first-generation or foreign-born. All were enrolled in a family English literacy program in a Midwestern city, and were recruited from five sites serving predominantly Mexican (migrant or immigrant) families. All signed informed consent (approved by university and literacy program IRBs).

MEASURES

A dichotomous survey assessed whether participants endorsed lifetime history of *ATQ* or *PNRV*. Respondents were asked: (1) have you ever had an *ataque de nervios*? and (2) have you ever suffered from *nervios*? There are no official diagnostic criteria for these constructs, and our goal was to capture self-identified use of the cultural idioms, as a potential expression of mental distress or disorder. Data from a small subset of participants ($n = 22$) endorsing lifetime history of *ATQ* or *PNRV* verified that these survey items captured participants

TABLE 1. Background variables for entire sample and data cohorts

Variable	Overall sample $N = 82,$ $M (SD)$ or $N (%)$	Cohort 1 $n = 48,$ $M (SD)$ or $N (%)$	Cohort 2 $n = 34,$ $M (SD)$ or $N (%)$	$t (df)$ or $\chi^2 (df)$
<i>Demographics</i>				
Age	29.88 (5.59)	28.50 (5.21)	31.82 (5.60)	-2.76 (80)**
English proficiency (BEST score)	59.08 (12.65)	56.44 (11.94)	62.81 (12.85)	-2.30 (80)*
<i>History of Ataques</i>				
No	48 (58.5)	28 (58.3)	20 (58.8)	0.002 (1)
Yes	34 (41.5)	20 (41.7)	14 (41.2)	
<i>History of Padeecer de Nervios</i>				
No	34 (41.5)	17 (35.4)	17 (50.0)	1.74 (1)
Yes	48 (58.5)	31 (64.6)	17 (50.0)	
<i>Distress/Stress</i>				
Psychological distress (BSI)	0.80 (0.57)	0.82 (0.58)	0.79 (0.55)	0.29 (80)
Acculturative stress (HSI)	11.56 (2.57)	11.33 (2.48)	11.89 (2.70)	-0.96 (80)
<i>Anxiety</i>				
Anxiety sensitivity (ASI)	17.20 (11.07)	15.77 (10.93)	19.21 (11.12)	-1.39 (80)
Trait anxiety (STAIY-2)	41.44 (10.07)	41 (9.46)	42.06 (11.00)	-0.47 (80)
<i>Acculturation</i>				
US American (ARSMA AOS)	2.08 (0.48)	2.13 (0.52)	2.01 (0.41)	1.13 (80)
Mexican (ARSMA MOS)	4.26 (0.41)	4.34 (0.32)	4.15 (0.49)	2.16 (80)*

* $P < .05$; ** $P < .01$; *** $P < .001$.

with significant typical and atypical panic symptom burdens ($M = 8.46$; $SD = 3.58$) and significant rates of lifetime (54.54%) and past-month (31.82%) mood or anxiety disorders as diagnosed by the SCID.^[53]

The Acculturation Rating Scale for Mexican Americans-Revised (ARSMA-II) was used to assess acculturation status.^[45] This multidimensional scale assesses extent of involvement in Mexican and “Anglo” culture, providing independent subscales for Mexican Orientation (MOS), and Anglo Orientation (AOS). In this sample, Cronbach’s α coefficients indicated good internal consistency for the AOS subscale ($\alpha = .81$) and adequate consistency for MOS subscale ($\alpha = .67$). The Basic English Skills Test was used to measure English proficiency.^[54] Scaled scores yield English as a Second Language education and functioning levels. Testing occurred within 2 months of study participation. The Spanish Version of the Brief Symptom Inventory (BSI)^[55,56] was administered to assess psychological distress. The BSI includes 53 items about past-week distress.^[57,58] Its Global Severity Index provides a composite measure of psychological distress. The BSI displayed good internal consistency in this sample ($\alpha = .97$). The Immigrant Version of the Hispanic Stress Inventory (HSI)^[59] was used to measure acculturative stress. This instrument measures distress/worry associated with interpersonal, economic, and immigration conflict in the past 3 months. Our Cronbach’s α coefficient ($\alpha = .92$) indicated good internal consistency. The acculturative stress composite variable was divided by 10 so as to facilitate meaningful interpretation of unit increment changes in the outcome variable. Anxiety sensitivity was measured with the Anxiety Sensitivity Index (ASI),^[60,61] which taps the extent to which a person finds anxiety-related sensations to be frightening or catastrophic.^[60–62] Good internal consistency was observed ($\alpha = .82$). Trait anxiety was measured with the trait scale of the State/Trait Anxiety Inventory (STAI T-Anxiety),^[63,64] which assessed proneness to anxiety and tendency to appraise stressful situations as threatening. The STAI-T exhibited good internal consistency ($\alpha = .79$).

PROCEDURE

Participants were recruited through flyers and in-person efforts. Participation was voluntary and confidential. After consenting, interested mothers completed the survey battery in Spanish. All instruments were previously translated and validated in Spanish-speaking Latina/o communities.^[65–68] Participants received \$10 for their time and were given a list of local mental health resources. Data for 53 participants were collected between November 2007 and May 2008 from two sites serving immigrant and migrant mothers of preschool children (Cohort 1). An additional 46 participants were recruited in May and June 2009 from three additional sites serving immigrant mothers with elementary school-age children (Cohort 2).

RESULTS

DESCRIPTIVE STATISTICS

Thirty-four participants endorsed lifetime *ATQ*, whereas 48 endorsed lifetime *PNRV* (Table 1). Participants in Cohort 1 were younger, with lower English proficiency scores and higher Mexican acculturation relative to participants in Cohort 2. These differences were expected because we recruited mothers of preschool children for Cohort 1, who were likely to be younger and more recent immigrants than those recruited for Cohort 2 who were mothers of elementary school age children. Participants had High Beginning English proficiency, which indicates they could understand, speak, read, and write common words, phrases, and sentences. Participants were high in psychological distress, scoring in the 90th percentile of the normative adult female population on the BSI distress scale. They scored in the nonclinical range for trait anxiety and anxiety sensitivity. Mean ASI scores were similar to those reported in normative populations in Spain and Puerto Rico,^[32,69] as well as those observed among English speaking normal controls.^[62]

MISSING DATA

Data were incomplete for 24% of initially enrolled participants, equally distributed across study variables with the exception of English proficiency. We used regression estimates to impute missing English Proficiency scores ($n = 10$). Sensitivity analyses were conducted to determine whether deletion of this variable would yield significant changes in regression estimates compared to inclusion as an imputed variable. The regression estimates did not change, so the imputed variable was used. There were no significant differences found between included ($n = 82$) and excluded participants ($n = 17$).

BIVARIATE ANALYSES

Pearson product–correlation analyses (Table 2) and bivariate logistic/linear regression analyses were conducted as an initial step. Odds for self-reported lifetime

TABLE 2. Intercorrelations between primary predictor, demographic, and dependent variables ($N = 82$)

	1	2	3	4	5	6	7	8	9	10
1. Age	1.00									
2. History of ATQ	−0.14	1.00								
3. History of PNRV	−0.13	0.36**	1.00							
4. Psychological distress	−0.05	0.16	0.39**	1.00						
5. Acculturative stress	0.13	0.14	0.23*	0.55**	1.00					
6. US American acculturation	0.12	0.04	0.05	−0.06	0.18	1.00				
7. Mexican acculturation	−0.06	0.16	0.05	−0.05	0.07	0.15	1.00			
8. Anxiety sensitivity	0.11	0.07	0.09	0.54**	0.50**	0.14	−0.08	1.00		
9. Trait anxiety	0.00	0.19	0.30**	0.67**	0.45**	0.00	−0.16	0.40**	1.00	
10. English proficiency	0.23*	0.04	−0.03	−0.05	−0.03	0.09	−0.11	0.04	0.12	1.00

Note: * $P < .05$; ** $P < .01$; *** $P < .001$.

TABLE 3. Summary of logistic regression analyses for variables associated with culture-bound syndromes

Step/variable	Ataque de Nervios				Padeecer de Nervios			
	Model 4a		Model 5a		Model 4b		Model 5b	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Constant	0.00 [†]		0.00 [†]		0.03		0.07	
1. Age	0.94	(0.86, 1.03)	0.95	(0.86, 1.04)	0.95	(0.87, 1.04)	0.96	(0.88, 1.06)
1. English proficiency	1.02	(0.98, 1.06)	1.02	(0.98, 1.06)	1.00	(0.96, 1.04)	0.99	(0.95, 1.03)
2. Acculturative stress	1.06	(0.85, 1.33)	1.02	(0.81, 1.29)	1.16	(0.90, 1.50)	1.14	(0.88, 1.47)
3. US American acculturation	1.13	(0.41, 3.17)	1.07	(0.36, 3.17)	1.21	(0.41, 3.52)	1.34	(0.41, 4.39)
3. Mexican American acculturation	3.04 [†]	(0.81, 11.39)	2.7	(0.73, 9.98)	1.40	(0.42, 4.65)	1.00	(0.28, 3.57)
4. Anxiety sensitivity	1.00	(0.95, 1.05)	1.00	(0.95, 1.06)	0.98	(0.93, 1.03)	0.98	(0.93, 1.04)
4. Trait anxiety	1.04	(0.99, 1.10)	1.02	(0.97, 1.09)	1.07*	(1.01, 1.13)	1.07 [†]	(1.00, 1.13)
5. Positive history of PNRV			4.02*	(1.37, 11.81)			–	–
5. Negative history of PNRV			REF	REF			–	–
5. Positive history of ATQ							4.31**	(1.44, 12.90)
5. Negative history of ATQ							REF	REF
χ^2 (df, df)	8.74 (1, 7)		15.61 (1, 8)*		11.96 (1, 7)		19.41 (1, 8)*	
N	82		82		82		82	
Nagerlkerke R^2	0.14		0.23		0.18		0.28	
–2 Log likelihood	102.54		95.66**		99.32*		91.87**	

[†] $P < .10$; * $P < .05$; ** $P < .01$; *** $P < .001$. Hosmer and Lemeshow goodness of fit test indicated good fit for all models. PNRV, *padeecer de nervios*; ATQ, *ataque de nervios*.

ATQ were higher among those with positive histories of PNRV (Odds Ratio (OR) = 4.96; 95% Confidence Interval (CI) = (1.81, 13.59); $P < .01$). Odds for lifetime PNRV were higher among those with psychological distress (OR = 6.14; 95% CI = 2.07, 18.16; $P < .001$), acculturative stress (OR = 1.23; 95% CI = 1.00, 1.50; $P < .05$), and trait anxiety (OR = 1.07; 95% CI = 1.02, 1.12; $P < .01$). Current acculturative stress was related to lifetime ATQ ($\beta = .21$, $P < .05$), anxiety sensitivity ($\beta = .45$, $P < .001$), and trait anxiety ($\beta = .48$, $P < .001$). Current psychological distress was related to lifetime PNRV ($\beta = .36$, $P < .001$), current acculturative stress ($\beta = .49$, $P < .001$), anxiety sensitivity ($\beta = .51$, $P < .001$), and trait anxiety ($\beta = .68$, $P < .001$).

ARE ATQ/PNRV ASSOCIATED WITH ACCULTURATIVE STRESS, ACCULTURATION, AND ANXIETY?

To examine whether acculturative stress, acculturation, and anxiety resulted in increased odds of lifetime ATQ/PNRV after controlling for age and English proficiency, two sets of hierarchical logistic regressions were conducted with lifetime ATQ or PNRV as the outcomes. Predictors were entered in five blocks (Table 3). Based on “initial step” analyses, psychological distress was excluded due to high correlation with trait anxiety and evidence of multicollinearity.^[70]

The variables in Model 5a (Table 3)¹ explained 23% of the variance in lifetime ATQ. As in the unadjusted

¹Only the significant hierarchical regression models will be included in Tables 3–5.

model, positive history of PNRV resulted in threefold increase in lifetime ATQ relative to those with negative history of PNRV. Lifetime PNRV uniquely accounted for 9% of the variance. Similarly, the variables in Model 5b explained 28% of the variance in lifetime PNRV. As in the first set of analyses, lifetime ATQ was related to higher odds for lifetime PNRV relative to those with unremarkable lifetime ATQ; lifetime ATQ was responsible for the majority of the variance that explained lifetime PNRV ($R^2 = 10\%$). Trait anxiety was significant in predicting lifetime PNRV in Model 4b and marginally significant in Model 5b when lifetime ATQ was included. Mexican acculturation and acculturative stress were not related to lifetime ATQ or PNRV.

IS CURRENT PSYCHOLOGICAL DISTRESS PREDICTED BY ATQ /PNRV?

Hierarchical linear regression was used to examine the extent to which lifetime ATQ/PNRV were unique predictors of past-week psychological distress adjusting for age, English proficiency, and anxiety. Mexican and US American acculturation subscales were excluded because they were not statistically related to psychological distress at the bivariate level. The predictors were entered in five blocks (Table 4). The variables in the fifth model explained 62% of the variance in psychological distress. Acculturative stress ($\beta = .19$, $P < .05$), anxiety sensitivity ($\beta = .28$, $P < .01$), and trait anxiety ($\beta = .43$, $P < .001$) all significantly predicted psychological distress when age and English proficiency were held constant. Positive history of PNRV

TABLE 4. Summary of linear regression analyses for variables predicting psychological distress

Step/variable	Model 3		Model 4		Model 5	
	B (SE B)	β	B (SE B)	β	B (SE B)	β
Constant	-.57 (.34)		-.58 (.34)		-.64 (.33)	
1. Age	-.01 (.01)	-0.09	-.01 (.01)	-0.09	-.01 (.01)	-0.07
1. English proficiency (BEST)	-.00 (.00)	-0.09	-.00 (.00)	-0.09	-.00 (.00)	-0.08
2. Acculturative stress	.05 (.02)	0.21*	.05 (.02)	0.21*	.04 (.02)	0.19*
3. Anxiety sensitivity	.01 (.01)	.26**	.01 (.01)	.26**	.01 (.00)	.28**
3. Trait anxiety	.03 (.01)	.48***	.03 (.01)	.47***	.02 (.01)	.43***
4. Positive history of Ataques			.01 (.02)	0.02	-.01 (.02)	-0.04
5. Positive history of Nervios					.06 (.02)	.20*
F (df1, df2)	21.42 (5, 76)***		17.63 (6, 75)***		16.99 (7, 74)***	
N	82		82		82	
R ²	0.59		0.59		0.62	
ΔR^2	.17***		0.00		.03*	

* $P < .05$; ** $P < .01$; *** $P < .001$.

TABLE 5. Summary of linear regression analyses for variables predicting acculturative stress

Step/variable	Model 1		Model 2		Model 3		Model 4	
	B (SE B)	β	B (SE B)	β	B (SE B)	β	B (SE B)	β
Constant	10.39 (1.86)***		9.20 (1.64)***		6.48 (1.78)***		5.96 (1.82)	
1. Age	.07 (.05)	0.15	.04 (.05)	0.10	.05 (.04)	0.12	.06 (.05)	0.14
1. English proficiency (BEST)	-.01 (.02)	-0.07	-.02 (.02)	-0.08	-.02 (.02)	-0.11	-.02 (.02)	-0.11
2. Anxiety sensitivity			.11 (.02)	0.50***	.08 (.02)	.36***	.08 (.02)	.36***
3. Trait anxiety					.08 (.03)	.32**	.07 (.03)	.28**
4. Positive history of Ataques							.06 (.13)	0.05
4. Positive history of Nervios							.14 (.13)	0.11
F (df1, df2)	0.85 (2, 79)		9.10 (3, 78)***		10.11 (4, 77)***		7.02 (6, 75)***	
N	82		82		82		82	
R ²	0.02		0.26		0.34		0.36	
ΔR^2			.24***		.09**		.02	

† $P < .10$; * $P < .05$; ** $P < .01$; *** $P < .001$.

($\beta = .20$, $P < .05$) added a small but significant amount of additional predictive power, accounting for an additional 3% of the variance in psychological distress, beyond that explained by the other variables.

IS CURRENT ACCULTURATIVE STRESS PREDICTED BY ATQ/PNRV?

Hierarchical linear regression was used to examine whether lifetime *ATQ/PNRV* was predictive of 3-month acculturative stress after controlling for age, English proficiency, and anxiety. The predictors were entered in four blocks (Table 5). Acculturation subscales were excluded because they were not statistically associated with acculturative stress at the bivariate level. Variables in the third model accounted for 34% of the variance. Anxiety sensitivity ($\beta = .36$, $P < .001$) and trait anxiety ($\beta = .32$, $P < .01$) were predictive of acculturative stress. Anxiety sensitivity ($R^2 = 24\%$) followed by trait anxiety ($R^2 = 9\%$) accounted

for the majority of the variance in acculturative stress. Any effect of lifetime *ATQ* on acculturative stress disappeared when anxious predisposition was considered in the full model.

DISCUSSION

Herein, we examined whether lifetime history of culturally sanctioned idioms of distress, *ATQ* and *PNRV*, provided more robust predictors of distress outcomes in a Mexican immigrant population than psychometrically derived Western measures of anxious predisposition. Surprisingly, they did not – Western instruments measuring ASI and trait anxiety (STAI-T) provided stronger predictors of psychological distress and acculturative stress than endorsed history of the culturally bound “anxiety” syndromes. However, *ATQ/PNRV* did have differential associations to distress in this community, with *PNRV* providing some predictive power.

Across unadjusted and adjusted models, lifetime *ATQ* was largely associated with lifetime *PNRV*. Despite the interrelatedness, there were points of distinction. For example, lifetime *PNRV* emerged as a significant and consistent predictor of psychological distress, but lifetime *ATQ* did not. Lifetime *PNRV* was also associated with trait anxiety in unadjusted models and marginally so in adjusted models. Thus, it is possible that the relationship between *ATQ* and *PNRV* may be similar to the relationship between *state* level anxiety/negative affect and *trait* level neuroticism/negative emotionality. Neuroticism is a trait that is associated with general distress vulnerability and a tendency to experience negative affect.^[71] Endorsement of *nervios* in a Mexican immigrant population may reflect a related type of general distress vulnerability. Endorsing a history of *ataques* may reflect vulnerability to a more specific and temporary state of behavioral disruption that is less associated with general stress and distress. However, the data tentatively suggest that if seeking to detect a general predisposition to distress among Mexican mothers, whether acute or chronic, a measure of lifetime *PNRV* would be more useful than a measure of lifetime *ATQ*.

Disconfirming our hypotheses, measures of anxious predisposition were more consistent and robust predictors of distress outcomes in comparison to history of *ATQ/PNRV*. This result converges with previous research noting an association between anxious predisposition, psychopathology, and stress among Latina/os.^[32,65] Anxiety sensitivity was a more robust predictor of acculturative stress than trait anxiety. Perhaps anxiety sensitivity and acculturative stress both tap the latent constructs of fear of uncertainty and lack of control typically discussed in models of normative and pathological worry, and intolerance of negative affect/emotion described in distress models.^[71,72] It is also possible that stressful contexts associated with the acculturation process may engender distress, which is then amplified by anxiety sensitivity, creating a positive feedback loop and escalating cycle. Anxiety sensitivity may be an important risk factor in the mental health of immigrants that warrants greater attention.

Our hypothesis that acculturation and English proficiency would be significant predictors of distress and lifetime *ATQ/PNRV* was also not supported. Our ability to detect statistically meaningful associations may have been undermined by low variability in acculturation status, use of a community rather than clinical sample,^[33] measurement concerns,^[73] and emphasis on actual rather than *perceived* English proficiency.^[74]

This study had several limitations. Participants came from a small convenience sample of community respondents with restricted ranges in acculturation levels. Findings may have differed with a randomly selected sample. Results may also differ in a clinical sample, where rates of psychiatric disorders and distress are likely to be higher. Results have limited generalizability to other Latina/o ethnic groups with a

wider range in acculturation status. The measure of *ATQ* and *PNRV* probed lifetime experience, not current or past-month; while other study variables involved current status. Results may have differed if recent experience of *ATQ/PNRV* (e.g., past-month, past 6 months) was examined due to temporal ordering effects. Lifetime *ATQ/PNRV* was assessed with a dichotomous survey, which could be vulnerable to reporting biases or unreliability. Furthermore, our measure of *ATQ/PNRV* did not assess for lifetime or current severity, despite research evidence to support a relationship between *ATQ* severity and anxiety sensitivity.^[41] More extensive quantitative and qualitative data on the meaning and function of *ATQ/PNRV* in Mexican communities is needed to create greater confidence in the inferences made about the relationships between the culture-bound syndromes, acculturation, anxious predisposition, and psychopathology. Finally, we did not explore contextual factors that might influence mental health status, such as socioeconomic position, available social supports, perceived discrimination, and physical health.^[75,76] Despite these limitations, this study tentatively suggests that the relative clinical utility and validity of assessing lifetime history of *ATQ* and *PNRV* may vary across diverse Latina/o ethnic groups.

CONCLUSION

Our results suggest that asking about lifetime history of *nervios* (not lifetime *ATQ*) might be a useful point of entry in talking to Mexican immigrant mothers about stress and distress, because it seems to be a meaningful “idiom of distress”—a culturally sanctioned way to discuss affliction that might reflect vulnerability to distress and emotional or behavioral dysfunction. However, anxious predisposition, as measured by standard and widely used psychometric instruments of anxiety sensitivity and trait anxiety, was the most consistent predictor of acculturative stress and psychological distress in this exploratory study. Thus, the constructs of anxiety sensitivity and trait anxiety may capture an important component of distress vulnerability that is applicable across cultures. Contrary to our expectations, these results suggest that Western approaches to treatment for anxiety sensitivity and high trait anxiety may be relevant to reducing distress vulnerability in this population. Further research is needed to determine the cross-cultural relevance of Western clinical approaches to anxious predisposition among Mexican immigrant *clinical* samples, and to develop empirically informed diagnostic assessments that integrate culture-bound syndromes and Western measures of psychopathology.

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REFERENCES

- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Arlington, VA: American Psychiatric Publishing, Inc; 1994.
- López SR, Guarnaccia PJJ. Cultural psychopathology: uncovering the social world of mental illness. *Annu Rev Psychol* 2000;51: 571–598.
- Lewis-Fernández R, Hinton DE, Laria AJ, et al. Culture and the anxiety disorders: recommendations for DSM-V. *Depress Anxiety* 2010;27:212–229.
- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. Fourth Edition- Text Revision ed. Arlington, VA: American Psychiatric Publishing; 2000.
- Nichter M. Idioms of distress revisited. *Cult Med Psychiatry* 2010;34:401–416.
- Baer RD, Weller SC, de Alba Garcia JG, et al. A cross-cultural approach to the study of the folk illness nervios. *Cult Med Psychiatry* 2003;27:315–337.
- Guarnaccia PJ, Good BJ, Kleinman A. A critical review of epidemiological studies of Puerto Rican mental health. *Am J Psychiatry* 1990;147:1449–1456.
- Low SM. Embodied metaphors: nerves as lived experience. In: Csordas TJ, editor. *Embodiment and Experience. The Existential Ground of Culture and Self*. Great Britain: Cambridge University Press; 1994:139–162.
- Davis DL, Low SM, editors. *Gender, Health, and Illness: The Case of Nerves*. New York: Hemisphere; 1989.
- Low SM. Gender, emotion, and nervios in urban Guatemala. In: Davis DL, Low SM, editors. *Gender, Health, and Illness: The Case of Nerves*. New York: New York: Hemisphere; 1989.
- Bayles BP, Katerndahl DA. Culture-bound syndromes in Hispanic primary care patients. *Int J Psychiatry Med* 2009;39: 15–31.
- Hill CE, Cottrell L. Traditional mental disorders in a developing West Indian community in Costa Rica. *Anthropol Q* 1986;59: 1–14.
- de Snyder VNS, Diaz-Perez MDJ, Ojeda VD. The prevalence of nervios and associated symptomatology among inhabitants of Mexican rural communities. *Cult Med Psychiatry* 2000;24: 453–470.
- Barnett EA. Notes on nervios: a disorder of menopause. In: Davis DL, Low SM, editors. *Gender, Health, and Illness: The Case of NERVES*. New York: Hemisphere; 1989:67–77.
- Barlett PF, Low SM. Nervios in rural Costa Rica. *Med Anthropol* 1980;4:523–564.
- Finerman R. The burden of responsibility: duty, depression, and nervios. In: Davis DL, Low SM, editors. *Andean Ecuador, in Gender, Health, and Illness: The Case of Nerves*. New York: Hemisphere; 1989:49–65.
- Guarnaccia PJ, Farias P. The social meanings of nervios: a case study of a Central American woman. *Soc Sci Med* 1988;26: 1223–1231.
- Guarnaccia PJ, Lewis-Fernández R, Marano MR. Toward a puerto rican popular nosology: nervios and ataque de nervios. *Cult Med Psychiatry* 2003;27:339–366.
- Kay M, Portillo C. Nervios and dysphoria in Mexican American widows. In: Davis DL, Low SM, editors. *Gender, Health, and Illness: The Case of Nerves*. New York: Hemisphere; 1989; 181–201.
- Newton F. The Mexican American emic system of mental illness: An exploratory study. In: Casa JM, Keefe SE, editors. *Family and Mental Health in the Mexican American Community*. Los Angeles: Spanish Speaking Mental Health Center; 1978:69–90.
- Low SM. The meaning of nervios: a sociocultural analysis of symptom presentation in San Jose, Costa Rica. *Med Psychiatry* 1981;5:25–47.
- Cabassa LJ, Hansen MC, Palinkas LA, Elle K. Azúcar y nervios: explanatory models and treatment experiences of Hispanics with diabetes and depression. *Soc Sci Med* 2008;66:2413–2424.
- Weller SC, Baer RD, de Alba Garcia JG, Rocha ALS. Susto and nervios: expressions for stress and depression. *Cult Med Psychiatry* 2008;32:406–420.
- England M, Mysyk A, Gallegos JAA. An examination of nervios among Mexican seasonal farm workers. *Nurs Inq* 2007;14:189–201.
- Guarnaccia PJ, Canino G, Rubio-Stipec M, Bravo M. The prevalence of ataques de nervios in the Puerto Rico Disaster study: the role of culture in psychiatric epidemiology. *J Nerv Ment Dis* 1993;181:157–165.
- Guarnaccia PJ, DeLaCanela V, Carrillo E. The multiple meanings of ataques de nervios in the Latino community. *Med Anthropol* 1989;11:47–62.
- Lewis-Fernández R, Guarnaccia PJ, Martínez IE, et al. Comparative phenomenology of ataques de nervios, panic attacks, and panic disorder. *Cult Med Psychiatry* 2002;26:199–223.
- Guarnaccia PJ, Lewis-Fernández R, Pincay IM, et al. Ataque de nervios as a marker of social and psychiatric vulnerability: results from the NLAAS. *Int J Soc Psychiatry* 2010;56:298–309.
- Guarnaccia PJ, Rubio-Stipec M, Canino G. Ataques de nervios in the Puerto Rican Diagnostic Interview Schedule: the impact of cultural categories on psychiatric epidemiology. *Cult Med Psychiatry* 1989;13:275–295.
- Liebowitz MR, Salmán E, Jusino CM, Garfinkel R. Ataque de nervios and panic disorder. *Am J Psychiatry* 1994;151:871–875.
- Salmán E, Liebowitz MR, Guarnaccia PJ, et al. Subtypes of ataques de nervios: the influence of coexisting psychiatric diagnosis. *Cult Med Psychiatry* 1998;22:231–244.
- Cintrón JA, Carter MM, Sbrocco T. Ataques de nervios in relation to anxiety sensitivity among island Puerto Ricans. *Cult Med Psychiatry* 2005;29:415–431.
- Keough ME, Timpano KR, Schmidt NB. Ataques de nervios: culturally bound and distinct from panic attacks? *Depress Anxiety* 2009;26:16–21.
- Norris FH, Perilla JL, Ibañez GE, Murphy AD. A qualitative analysis of posttraumatic stress among Mexican victims of disaster. *J Trauma Stress* 2001;14:741–756.
- Lewis-Fernández R, Garrido-Castillo P, Bennisar MC, et al. Dissociation, childhood trauma, and ataque de nervios among Puerto Rican psychiatric outpatients. *Am J Psychiatry* 2002;159: 1603–1605.

36. Schechter DS, Marshall R, Salmán E, et al. Ataque de nervios and history of childhood trauma. *J Trauma Stress* 2000;13: 529–534.
37. Lewis-Fernández R, Gorritz M, Raggio GA, et al. Association of trauma-related disorders and dissociation with four idioms of distress among Latino psychiatric outpatients. *Cult Med Psychiatry* 2010;34:219–243.
38. Interian A, Guarnaccia PJ, Vega WA, et al. The relationship between ataque de nervios and unexplained neurological symptoms: a preliminary analysis. *J Nerv Ment Dis* 2005;193: 32–39.
39. Lewis-Fernández R, Guarnaccia PJ, Martinez IE, et al. Comparative phenomenology of ataque de nervios, panic attacks, and panic disorder. In: Hinton DE, Good BJ, editors. *Culture and Panic Disorder*. Stanford, CA: Stanford; 2009:135–156.
40. San Miguel VEF, Guarnaccia PJ, ShROUT PE, et al. A quantitative analysis of ataque de nervios in puerto rico: further examination of a cultural syndrome. *Hispanic J Behav Sci* 2006;28:313–330.
41. Hinton DE, Chong R, Pollack MH, Barlow DH, McNally RJ. Ataque de nervios: relationship to anxiety sensitivity and dissociation predisposition. *Depress Anxiety* 2008;25:489–495.
42. Hinton DE, Lewis-Fernández R, Pollack MH. A model of the generation of ataque de nervios: the role of fear of negative affect and fear of arousal symptoms. *CNS Neurosci Ther* 2009;15: 264–275.
43. U.S. Census Bureau. *The Hispanic Population in the United States: March 2002*. U.S. Washington, DC: Census Bureau; 2002.
44. Guarnaccia PJ, Rogler LH. Research on culture-bound syndromes: new directions. *Am J Psychiatry* 1999;156:1322–1327.
45. Cuéllar I, Arnold B, Maldonado R. Acculturation rating scale for Mexican Americans-II: a revision of the original ARSMA scale. *Hispanic J Behav Sci* 1995;17:275–304.
46. Berry JW. Acculturation as varieties of adaptation. In: Padilla A, editor. *Acculturation: Theory, Models and Some New Findings*. Boulder, CO: Westview Press; 1980:9–26.
47. Berry JW, Sam D. Acculturation and adaptation. In: Berry JW, Segall MH, Kagitcibasi C, editors. *Handbook of Cross-Cultural Psychology: Social Behavior and Applications*. Boston: Ally & Bacon; 1997:291–326.
48. Graves TD. Acculturation, access, and alcohol in a tri-ethnic community. *Am Anthropol* 1967;69:306–321.
49. Rogler LH, Cortes DE, Malgady RG. Acculturation and mental health status among Hispanics: convergence and new directions for research. *Am Psychol* 1991;46:585–597.
50. Santiago-Rivera AL, Arredondo P, Gallardo-Cooper M. *Counseling Latinos and La Familia: A Practical Guide*. Thousand Oaks, CA: Sage; 2002.
51. Berry JW, Annis RC. Acculturative stress: the role of ecology, culture and differentiation. *J Cross Cult Psychol* 1974;5:382–406.
52. Berry JW. Immigration, acculturation, and adaptation. *Appl Psychol* 1997;46:5–34.
53. Spitzer RL, Williams JB, Gibbon M, First MB. The structured clinical interview for DSM-III—R (SCID): I. history, rationale, and description. *Arch Gen Psychiatry* 1992;49:624–629.
54. Texas Adult Education Agency. 2009. *State assessment and goal setting/attainment policy for adult education*, Texas: Texas Adult Education Agency.
55. Acosta FX, Nguyen LH, Yamamoto J. Using the Brief Symptom Inventory to profile monolingual Spanish-speaking psychiatric outpatients. *J Clin Psychol* 1994;50:723–726.
56. Ruipérez MA, Ibáñez MI, Lorente E, Moro M, Ortet G. Psychometric properties of the Spanish version of the BSI: contributions to the relationship between personality and psychopathology. *Eur J Psychol Assess* 2001;17:241–250.
57. Derogatis LR. *Brief Symptom Inventory: Administration, Scoring, and Procedures Manual*. Minneapolis, MN: NCS Pearson; 1993.
58. Derogatis LR, Melisarantos N. The brief symptom inventory: an introductory report. *Psychol Med* 1983;13:596–605.
59. Cervantes RC, Padilla A, Salgado de Snyder N. The Hispanic Stress Inventory: a culturally relevant approach to psychosocial assessment. *Psychol Assess* 1991;3:438–447.
60. Peterson RA, Reiss S. *Anxiety Sensitivity Index*. 2nd ed. Worthington, OH: International Diagnostic Systems; 1992.
61. Reiss S, Peterson RA, Gursky DM, McNally RJ. Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. *Behav Res Ther* 1986;24:1–8.
62. Reiss S, Peterson RA, Taylor SN, Weems CF. *Anxiety Sensitivity Index Consolidated User Manual: ASI, ASI-3, and CASI*. Worthington, OH: IDS Publishing; 2008.
63. Spielberger CD, Gorsuch RL, Lushene RE. *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Publishing; 1970.
64. Spielberger CD, Gorsuch RL, Lushene RE, Jacobs GB. *State Trait Inventory for Adults: Sampler Set, Manual, Test, Scoring Key*. Redwood City, CA: Mind Garden; 1983.
65. Sandin B, Chorot P, McNally R. Validation of the Spanish version of the Anxiety Sensitivity Index in a clinical sample. *Behav Res Ther* 1996;34:283–290.
66. Cintrón JA, Carter MM, Suchday S, Sbrocco T, Gray J. Factor structure and construct validity of the Anxiety Sensitivity Index among island Puerto Ricans. *J Anxiety Disord* 2005;19:51–68.
67. Spielberger CD, Gonzalez-Reigosa F, Martinez-Urrutia A, Natalicio L, Natalicio DS. Development of the Spanish edition of the state-trait anxiety inventory. *Interam J Psychol* 1971;5: 145–158.
68. Virella B, Arbona C, Novy DM. Psychometric properties and factor structure of the Spanish version of the state-trait anxiety inventory. *J Pers Assess* 1994;63:401–412.
69. Sandin B, Chorot P, McNally RJ. Anxiety sensitivity index: normative data and its differentiation from trait anxiety. *Behav Res Ther* 2001;39:213–219.
70. Leech NL, Barrett K, Morgan G. *SPSS for Intermediate Statistics: Use and Interpretation*. Mahwah, NJ: Lawrence Erlbaum; 2005.
71. Naragon-Gainey K. Meta-analysis of the relations of anxiety sensitivity to the depressive and anxiety disorders. *Psychol Bull* 2010;136:128–150.
72. McLean PD, Woody SR. *Anxiety Disorders in Adults: An Evidence-Based Approach to Psychological Treatment*. New York, NY: Oxford University Press; 2001.
73. Zane N, Mak W, Chun KM, Balls Organista P, Marín G. Major approaches to the measurement of acculturation among ethnic minority populations: a content analysis and an alternative empirical strategy. In: Chun KM, Balls Organista P, Marín G, editors. *Acculturation: Advances in Theory, Measurement, and Applied Research*. Washington, DC: American Psychological Association; 2003:39–60.
74. Gee GC, Ryan A, Laflamme DJ, Holt J. Self-reported discrimination and mental health status among african descendants, mexican americans, and other latinos in the New Hampshire REACH 2010 initiative: the added dimension of immigration. *Am J Public Health* 2006;96:1821–1828.
75. Dawson BA, Panchanadeswaran S. Discrimination and acculturative stress among first-generation Dominicans. *Hispanic J Behav Sci* 2010;32:216–231.
76. Williams DR, Mohammed S. Poverty, migration, and health. In: Lin AC, Harris DR, editors. *The Colors of Poverty*. New York, NY: Russell Sage Foundation; 2008:135–169.