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# Acculturation and Peritraumatic Dissociation in Young Adult Latino Survivors of Community Violence

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This study examined the relationship between acculturation and peritraumatic dissociation in a sample of 304 physically injured Latino survivors of community violence. Item response theory analyses were conducted to document the measurement equivalence of English- and Spanish-language versions of a scale measuring peritraumatic dissociation. After establishing equivalence, structural equation modeling was used to determine the impact of acculturation on peritraumatic dissociation after controlling for other relevant covariates, including assault characteristics, intoxication before the assault, and trauma exposure history. Acculturation emerged as a significant and negative predictor of dissociation, so that high levels of acculturation were associated with low levels of peritraumatic dissociation. These findings offer a counterinstance to the emerging consensus that retention of Latin American cultural traditions serves to promote mental health.

Spurred in large part by the recent influx of immigrants from Latin America, particularly from Mexico, much interest has been directed at understanding the mental health of Latino Americans. Research from several large, population-based epidemiologic studies has revealed that immigrant Latin Americans suffer from fewer mental health problems than do their U.S.-born counterparts (e.g., Burnam, Hough, Karno, Escobar, & Telles, 1987; Shrout et al., 1992; Vega et al., 1998). Similar research suggests an increased prevalence of psychiatric and substance abuse problems associated with Anglo acculturation (Amaro, Whitaker, Coffman, & Heeren, 1990; Caetano, 1987; Ortega, Rosenheck, Alegria, & Desai, 2000). For a concise review of key research studies on immigration, acculturation, and Latino mental health, see Escobar, Hoyos, and Gara (2000). These results, which hold for diverse outcomes ranging from prevalence of mood disorders to substance use disorders, offer an important counterpoint to initial expectations that immigrants would exhibit poorer mental health by dint of the social disadvantages and immense hurdles that must be confronted in a new society. Indeed, some researchers have quite naturally begun to interpret these data as evidence of a general negative effect of acculturation on mental health (e.g., Escobar, 1998).

Despite this seeming convergence of findings, it may be premature to draw broad conclusions about the negative impact of

acculturation. A newly emerging line of research suggests, for example, that persons of Latin American descent may be at greater risk than their non-Latino Caucasian counterparts of developing posttraumatic stress disorder (PTSD; Frueh, Brady, & de Arellano, 1998; Hough, Canino, Abueg, & Gusman, 1996; Ortega & Rosenheck, 2000; Ruef, Litz, & Schlenger, 2000). For example, Ortega and Rosenheck have reported that U.S. Vietnam veterans of Latino ancestry exhibit higher levels of PTSD symptoms than do their non-Latino Caucasian counterparts. Although more research is needed, if this pattern holds, then it raises the possibility that a monolithic view of benefits conferred by cultural traditionalism may be somewhat simplistic.

Perhaps, as an alternative framework, one might speculate that aspects of Latin American culture may protect against certain illnesses whereas other features may place persons at greater risk. One desirable feature of this rival hypothesis is that it might serve to shift the focus away from simply documenting differential prevalence rates of various illnesses and toward an understanding of the actual mechanisms by which cultural forces operate to influence health. Specifically, what cultural factors, if any, might operate to increase the risk of developing mental illness for Latinos in America? Even more pointedly, does any evidence exist to suggest that cultural factors may promote a susceptibility to PTSD?

At least some evidence indicates that Latin Americans may be more likely than other groups to experience dissociation in response to stressful events. In particular, both ethnographic and clinical findings reveal that cultural factors may play a role in the manifestation and severity of dissociative phenomena (Guarnaccia, Rivera, Franco, & Neighbors, 1996; Lewis-Fernandez, 1994; Lopez & Guarnaccia, 2000). Specifically, this research has examined the culture-bound syndrome of *ataques de nervios*, a culturally sanctioned response to acute stressful events that is common among Latinos from the Caribbean but is also found among other Latino populations. As described by Lewis-Fernandez (1994), *ataques de nervios* are precipitated by a range of stressors, including physical trauma. Whereas dissociation is not the sole feature of

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ataques de nervios, dissociation is nonetheless a prominent component (Guarnaccia et al., 1996; Lewis-Fernandez, 1994). Although the limited available epidemiologic data suggest that ataques are more common among females and persons with little formal education, this research also indicates that ataques do occur in males. Drawing on this literature, Hough et al. (1996) have recently posited that trauma survivors of Latino origin may be more likely than persons of non-Latino ancestry to experience trauma-related dissociative experiences. Hough et al. were, of course, referring only to static ethnic differences between groups.

There is, as yet, no empirical data to indicate that Anglo acculturation decreases one's likelihood of experiencing dissociative experiences. Lewis-Fernandez (1994) has speculated, however, that dissociation may be inhibited as a function of acculturation to Western ideas, positing that the acceptability of dissociation as a culturally sanctioned expression of distress is highly vulnerable to sociocultural and sex role changes that would follow from migration. Thus, the link between Latin American culture and dissociation may be crucial to understanding possible ethnocultural factors underlying differences in vulnerability to PTSD.

There is growing recognition that dissociative experiences that take place during a traumatic event appear to foreshadow subsequent maladaptation to psychological trauma (van der Kolk & van der Hart, 1989). So-called peritraumatic dissociation has been linked to heightened risk of PTSD or increased PTSD symptom severity in various traumatized samples, including combat veterans (Marmar et al., 1994; O'Toole, Marshall, Schureck, & Dobson; 1999; Tichenor, Marmar, Weiss, Metzler, & Ronfeldt, 1996), natural disaster survivors (Koopman, Classen, & Spiegel, 1994), emergency services personnel (Marmar, Weiss, Metzler, Ronfeldt, & Foreman, 1996), victims of motor vehicle crashes (Ursano et al., 1999), and physical trauma survivors (Michaels et al., 1999; Shalev, Peri, Canetti, & Schreiber, 1996). For example, in their study of 51 persons hospitalized for injuries stemming from physical trauma, Shalev et al. (1996) have reported that peritraumatic dissociation was independently associated with the subsequent severity of symptoms of PTSD ( $\beta = .49$ ) even after adjusting for other predictors.

Although continued controversy exists as to etiological processes and theoretical mechanisms underlying dissociation (for discussion, see Bowers, 1994; Erdelyi, 1994; Frankel, 1990; Nemiah, 1991), the phenomenology of dissociation is a topic about which there is greater agreement. Spiegel and Cardena (1991) have offered a heuristic description of dissociation as constituting "a structured separation of mental processes (e.g., thoughts, emotions, conation, memory, and identity) that are ordinarily integrated" (p. 366). Core symptoms of dissociation recognized as occurring peritraumatically include amnesia, depersonalization, and derealization. Whereas *amnesia* refers to the absence of memories for a specific time period, *depersonalization* reflects a sense of detachment from oneself. Depersonalization may be manifested, for example, by out-of-body experiences, altered pain perception, or a sense of disconnectedness from oneself. Finally, *derealization* refers to the sense that one's surroundings are unreal or distorted. Derealization might express itself, for example, as a distorted sense of the passage of time.

To this point, most research has focused on peritraumatic dissociative phenomena in the dominant Anglo American culture. As yet, no empirical research has examined the relationship between

acculturation and dissociation. Moreover, only a single study has addressed whether peritraumatic dissociative experiences vary as a function of Latino versus non-Latino ethnicity. In this research, Zatzick, Marmar, Weiss, and Metzler (1994) observed no differences in Latino and non-Latino Caucasian Vietnam veterans with respect to either general dissociative tendencies or peritraumatic dissociation, as measured by an early version of the Peritraumatic Dissociative Experiences Questionnaire (PDEQ; Marmar et al., 1994). Whereas African American veterans were found to have experienced higher levels of both dissociative tendencies and peritraumatic dissociation than were either Hispanic or non-Hispanic Caucasian veterans, these differences were eliminated after adjusting for the higher levels of combat exposure experienced by African Americans.

At first glance, the findings of Zatzick et al. (1994) would appear to run counter to the hypothesis that cultural factors influence the relationship between trauma exposure and peritraumatic dissociation. Nonetheless, additional research is needed for at least two reasons. First, Zatzick et al. relied on respondents' recall of dissociative experiences in response to traumatic events that had taken place years previously. Recent research has suggested, however, that retrospective recall of exposure to even objective trauma-related events (e.g., seeing others killed) may be malleable and vulnerable to distortion (King, Erickson, Huang, Sharkansky, & Wolfe, 2000; Southwick, Morgan, Nicolaou, & Charney, 1997), raising the possibility that recollections of more subjective perceptual phenomena like transient dissociative experiences may be at least equally problematic. To address this concern, studies are needed that incorporate an assessment of peritraumatic dissociation that is administered closer in time to the traumatic event.

Moreover, insofar as Zatzick et al. (1994) studied U.S. military veterans, the vast majority of whom were English speakers, it seems reasonable to assume that the sample was relatively homogeneous with respect to acculturation despite their differing ancestral backgrounds. Thus, Zatzick et al.'s findings are actually silent as to the association between acculturation and peritraumatic dissociation. Efforts to understand whether a relationship exists between Anglo acculturation and the tendency to dissociate during traumatic experiences would be informed by studies that focused on variability of acculturation within an entirely Latino sample. Persons of Latino ancestry with differing levels of acculturation might be identified by reference to country of birth, years of residence in the United States, facility with the English language, or self-appraised acculturation. To maximize the likely inclusion of persons representing a broad range of acculturation within a group of Latinos, it would, of course, be essential to administer a measure of trauma-related dissociation, such as the PDEQ, to Spanish- as well as English-speaking trauma survivors.

The purpose of this study was to examine the relationship between acculturation and peritraumatic dissociative experiences in a sample of Latino heritage survivors of community violence. Two lines of evidence were developed. First, using data derived from a sample of young adult assault survivors, we sought to determine whether the construct of peritraumatic dissociation, as measured by the PDEQ, could be interpreted unambiguously whether administered in English- or Spanish-language versions of the instrument. Second, after establishing the equivalence of English and Spanish versions of the PDEQ, we tested the hypothesis that level of acculturation would be negatively associated with

peritraumatic dissociation after adjusting for mechanism of injury, injury severity, history of exposure to trauma, and self-reported intoxication immediately before the assault. Some empirical research has suggested that injury severity is associated with greater peritraumatic dissociation (Griffin et al., 1997). Similarly, Marmar, Weiss, and Metzler (1997) suggested that prior trauma exposure might be a risk factor for subsequent peritraumatic dissociation. Self-reported intoxication was included because inebriation might influence dissociation and because trauma survivors are known to have high rates of intoxication at admission (Soderstrom et al., 1997), a finding that is particularly true of young Latinos (Rivara et al., 1993).

## Method

### Participants

Data were collected as part of a larger study of the mental health consequences of exposure to community violence. A subset of 304 Latino-ancestry participants was selected from a total sample of 413 persons recruited from among those admitted to a large Level I trauma facility in Los Angeles for treatment of physical injuries stemming from community violence. Latino heritage was assessed using a single question, "what would you say is your *main* racial or ethnic group?" Participants were provided with seven response options, including "White or Caucasian, but not Latino or Hispanic" and "Black or African-American, but not Latino or Hispanic." Respondents were classified as Latino if they endorsed Option 1, that is, "Latino or Hispanic." For the present purposes, non-Latino Caucasians, Asians, and Blacks of non-Latino descent were omitted from the analytic sample ( $n = 109$ ).

Between October 1998 and June 2000, the research staff attempted to screen for eligibility all consecutively hospitalized persons between 18 and 35 years of age who were hospitalized for treatment of blunt or penetrating injury trauma. Persons eligible for the study had sustained an injury inflicted by a person other than a family member or a former intimate sexual partner in the context of community violence. Persons whose injuries stemmed from motor vehicle crashes, accidents, domestic violence, and other incidents not attributable to community violence were ineligible. Participants were required to communicate fluently in either English or Spanish. Participants were not approached to complete a short interview to screen for eligibility until they were judged medically capable of being interviewed, as determined by discussions with medical staff. Multiple attempts were made to monitor, screen, and interview persons who either were not initially available or appeared to be cognitively impaired or insufficiently alert.<sup>1</sup>

Of 653 persons screened, 423 were eligible for the study. Of these, 413 (98%) completed an interview. Two eligible persons declined to participate, and 5 participants chose to terminate the interview before completion. Two hundred and thirty persons were determined to be ineligible for the study. An additional 584 persons could not be screened for eligibility. The primary reason for failure to screen was discharge before an approach could be made. Finally, 55 persons chose not to participate in a screening interview. In all, approximately 60% of age-eligible persons were screened.

All participants completed a face-to-face structured interview conducted by trained lay interviewers within several days of hospital admission ( $M = 11.28$  days,  $SD = 16.28$  days). For the purposes of the current study, participants with impaired cognition at admission, as evidenced by Glasgow Coma Scale (GCS) scores obtained from medical records (Teasdale & Jennett, 1974) of less than 14 (range = 3–15) were also excluded from the analytic sample. The latter exclusion criterion was invoked to eliminate participants whose dissociative experiences might have been due to injury-related cognitive impairment.<sup>2</sup>

The majority of respondents were male (95%). Participants averaged 24.3 years of age ( $SD = 5.60$ ). Sixty-four percent of participants had

not completed high school or its equivalent; 36% had completed high school, and less than 1% had attended some college. With respect to income, 36% reported receiving less than \$500 of pretax income in the 30 days before their assault; 26% had received between \$500 and \$1,000; 18% reported receiving between \$1,000 and \$1,500, and the remainder reported having received more than \$1,500. Sixty-one percent of the sample had never been married; 32% were either married or cohabiting, and 7% were separated or divorced. Fifty-nine percent had sustained injuries stemming from gunshots, whereas the remaining 41% had received injuries from other penetrating or blunt objects.

Fifty-six percent of participants reported having been born in the United States; all other participants were from Latin American countries. Latino participants, whether born in the United States or elsewhere, were also asked to indicate the region or country, other than the United States, with which they most identified. Seventy-seven percent reported that they identified most with Mexico; 16% with Central America; 4% with Puerto Rico or Cuba; and 3% with South America. Inasmuch as few participants identified with countries other than Mexico, there were insufficient cases to support subgroup analyses in which country of origin or identification was examined separately.

### Interview

Sixty-six percent of the sample completed an English-language version of the instrument, whereas the remainder were administered a Spanish version. The interviewer, in consultation with each respondent, determined the choice of English or Spanish administration. The decision was based on the language with which a given respondent was most facile. The interviews took approximately 45 to 60 min to complete and covered a broad range of topics. The Spanish version of the instrument was developed using the double-translation procedures described by Brislin (1970). This process involved a series of successive translations to arrive at items that had the same meaning in English and Spanish. A bilingual translator first translated each scale from English to Spanish, whereupon a second bilingual translator translated the scale back into English. Discrepancies or changes in meaning were reconciled by the two translators in collaboration with other bilingual translation team members who were not directly involved in either of the initial translations. No single translator was involved in more than one sequence of translations.

### Measures

For the current purposes, self-reported analytic variables were limited to scales measuring peritraumatic dissociation, acculturation, drug or alcohol intoxication immediately before the assault, lifetime trauma exposure as well as individual items assessing Latino ancestry, mechanism of injury (gunshot vs. other), location of the injury (head, face, or neck injury vs. another location), and perceived duration of the attack (expressed in

<sup>1</sup> Interviewers were not trained to administer a formal mental status examination to screen for cognitive eligibility. Nonetheless, the eligibility screener and survey afforded interviewers the opportunity to observe respondents' answers to a range of questions. These included questions that could be independently verified by the interviewer, using hospital records. Although we acknowledge that this process is not a substitute for a mental status examination, it did enable interviewers to make judgments about respondent lucidity. Interviewers were trained to recognize some signs of compromised mental acuity and to postpone contact to a latter date in instances in which they judged that the validity of a completed interview would be compromised.

<sup>2</sup> Eighteen persons with a GCS of 14 were included in the analyses. A sensitivity analysis in which these participants were removed from the analytic sample did not alter the pattern of results.

seconds). For analytic purposes, the latter variable was log transformed due to considerable skewness.

Objective injury severity was indexed by Injury Severity Scores (ISS; Association for the Advancement of Automotive Medicine, 1990) obtained from medical records. The ISS scoring system incorporates information concerning both the site and extent of injuries into a single score ranging from 1 to 75, with higher scores reflecting lower probability of injury survival (i.e., death). The mean ISS score for the sample was 8.71 ( $SD = 7.34$ ). A score of 9 is considered to be of mild to moderate severity, despite the fact that all injuries were significant enough to require hospitalization and a surgical procedure. Because the distribution of ISS scores was positively skewed, we used a four-category transformation of the variable in our analyses: ISS scores of 1 in Category 1 (27%), scores of 2 through 9 in Category 2 (32%), scores of 10 through 15 in Category 3 (23%), and scores greater than 15 in Category 4 (18%).

*Peritraumatic dissociation.* Peritraumatic dissociation was assessed using the self-administered version of the PDEQ (Marmar et al., 1997). Each PDEQ item consists of a statement reflecting the experience of a dissociative phenomenon. Answers to each statement are provided using a 5-point scale reflecting the extent to which each dissociative phenomenon has been experienced during or immediately after trauma exposure, ranging from 1 (*not at all true*), to 5 (*extremely true*). For the current analyses, we used a 7-item subset of the original 10-item PDEQ.

On the basis of pilot testing of the instrument in this population, minor modifications were made. One item (i.e., "I felt as though things that were actually happening to others were happening to me—like I was being trapped when I really wasn't") was not administered to the sample because it lacked applicability to survivors of community violence (see also Shalev et al., 1996). A second PDEQ item was excluded because confirmatory factor analysis revealed the item to have poor psychometric properties. A third item was dropped because its residual error term was too highly correlated with the residual of another item, thus violating the basic item response theory assumption of scale homogeneity. Finally, on the basis of pilot testing, the wording of other items was simplified slightly to make the items more understandable to a less educated sample. For example, the original item, "What was happening seemed unreal to me, like I was in a dream or watching a movie or a play," was modified to read, "What was happening didn't seem real, like I was in a dream or watching a movie." As a set, these seven PDEQ items were found to form a single, internally consistent scale whose constituent items provided estimates of peritraumatic dissociation across the range of symptom severity experienced in the complete English-speaking sample that included non-Latinos as well as Latinos (Marshall, Orlando, Jaycox, Foy, & Belzberg, 2001).

*Drug and alcohol intoxication.* Self-assessed drug and alcohol intoxication during the 2-hr period immediately preceding the attack was assessed by four questions (i.e., two items for alcohol use and two for other substance use). Using two 4-point scales ranging from 1 (*not at all under the influence*) to 4 (*very much under the influence*), respondents indicated the degree to which they were under the influence of alcohol or other drugs. Respondents also indicated the extent to which they believed that their judgment, thinking, or impairment was impaired (messed up) because of alcohol (or other drugs), using two 4-point scales ranging from 1 (*not at all impaired*) to 4 (*very much impaired [messed up]*). Means for alcohol and other substance intoxication were 1.60 ( $SD = 0.89$ ) and 1.25 ( $SD = 0.66$ ), respectively. Internal consistency reliability estimates for the two 2-item scales were .89 for alcohol and .87 for other substances.

*Violence exposure.* Lifetime exposure to community violence, as well as other traumatogenic events, was assessed using a checklist modeled after the Survey of Children's Exposure to Community Violence (Richters & Saltzman, 1990). Fifty-three items assessed personal exposure, witnessing violence, and having violence occur to someone close to the respondent. To assess aggregate life exposure, a single index was created by summing across positively endorsed items ( $M = 5.47$ ,  $SD = 3.04$ ).

*Acculturation.* Level of acculturation was assessed using 5 items drawn from the Short Acculturation Scale for Hispanics (SASH-Y; Barona & Miller, 1994). The 12-item SASH-Y scale is based on the widely used Short Acculturation Scale for Hispanics (Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987). The 5 selected items were identified by Barona and Miller (1994) as among the best markers of acculturation, as measured by the full instrument. These items measure preferences for the use of Spanish or English in various situations or settings (e.g., "In which languages do you usually think?"). Responses to each item were provided on a 5-point scale, reflecting frequency of use of English and Spanish languages, ranging from 1 (*only Spanish*) to 5 (*only English*).<sup>3</sup>

### Data Analysis

*Overview.* Data analyses were conducted in two phases. In the first phase, item response theory (IRT) models were estimated using the Multilog program (Thissen, 1991) to evaluate the equivalence of English and Spanish versions of the PDEQ. In the second phase, we used structural equation modeling, as implemented by the Mplus program (Muthen & Muthen, 1998), to examine the association between acculturation and peritraumatic dissociation while simultaneously examining the impact of other potential covariates of interest.

*Item response theory.* IRT comprises a family of modeling techniques designed to characterize the relationship between individuals' item responses and their standing on an underlying construct of interest (van der Linden & Hambleton, 1997). The item characteristic curve, or trace line, is at the core of IRT and is most commonly defined as a logistic function. Depending on the model chosen, a number of parameters are estimated for each item of the scale to define the shape of the function. The result is a set of continuous trace lines that describe the probability of endorsing each response category of an item given the scale value of the latent construct being measured. Scores on this continuum are calibrated to have a mean of zero and a standard deviation of 1.0.

The item parameters resulting from an IRT calibration provide diagnostic information about the performance of the individual items as well as the measure as a whole. IRT procedures can also be used to determine whether multiple groups differ with respect to item functioning after controlling for overall differences in the measured construct, with between-groups differences in response curves providing evidence of so-called differential item functioning (DIF; Thissen, Steinberg, & Wainer, 1993).

For the current analyses, Samejima's (1996) graded model was used. Within this application, the graded response model estimates a slope parameter ( $a$ ) and four location parameters ( $b$ ) for each dissociation item. The magnitude of the slope parameter reflects the degree to which the item is related to the underlying construct being measured. The location parameters reflect the spacing of the item responses along the latent construct continuum. For an extended discussion of IRT with respect to these data, see Marshall et al. (2001); a more general discussion can be found in Hambleton and Swaminathan (1995).

<sup>3</sup> Contending that the meaning of acculturation is not well understood, some researchers have advocated use of objective proxy measures of acculturation such as language preference, place of birth, and years in the United States rather than measures of acculturation per se (Escobar & Vega, 2000). Our reliance on an acculturation index comprising language use and preference items is quite standard and yielded results that were highly consistent with possible proxy measures. For example, mean acculturation scores for Latinos who completed the interview in English ( $M = 3.98$ ,  $SD = 0.66$ ) were significantly greater than scores of individuals who completed the interview in Spanish ( $M = 1.73$ ,  $SD = 0.69$ ),  $t = 25.62$ ,  $p < .001$ . Acculturation was also highly correlated with an index derived by dividing total years of U.S. residence by age of respondent ( $r = .82$ ,  $p < .001$ ).

Table 1  
*Chi-Square Tests of DIF and Final Item Parameter Estimates for the Seven PDEQ Items*

Abbreviated item content	DIF value	<i>a</i>	<i>b</i> <sub>1</sub>	<i>b</i> <sub>2</sub>	<i>b</i> <sub>3</sub>	<i>b</i> <sub>4</sub>
1. Blanked out	12.2	1.08	-1.25	-0.85	0.33	1.87
2. Slow motion	3.7	1.37	-0.71	-0.24	0.47	2.09
3. Didn't seem real	Anchor	1.35	-0.28	0.16	1.10	2.12
4. Felt disconnected	8.9	0.73	-0.87	-0.13	1.10	3.21
5. Didn't notice things	Anchor	1.38	-0.08	0.33	1.03	2.39
6. Felt confused	8.8	0.66	-1.88	-0.78	0.56	3.04
7. Unsure of time or place	7.2	1.51	0.04	0.40	0.81	1.87

*Note.* DIF = differential item functioning; PDEQ = Peritraumatic Dissociative Experiences Questionnaire; *a* = item slopes; *b* = item location parameters. Each chi-square difference test is based on 5 degrees of freedom.

A given item can exhibit DIF with respect to the slope parameter, indicating that the relationship between the item and the underlying construct is stronger in one group than in another. DIF can also be manifested with respect to location parameters, demonstrating that the difficulty of the item varies as a function of group membership. Items are tested for DIF within this framework by first identifying one or more *anchor* items (i.e., items that do not exhibit DIF), as distinguished from those items suspected of having DIF (i.e., the studied items).

Logistic discriminant function analyses were used (Miller & Spray, 1993; Swaminathan & Rogers, 1990) before conducting IRT analyses to identify anchor items. These anchor items were then used to provide a stable baseline against which to test the equivalence of the other items (i.e., study items) and to establish the group mean difference. Using discriminant function analyses, group membership was predicted from the total score on the scale, the score on the item, and the interaction between the total score and the item score. Changes in relative fit based on the inclusion of the item effect and the interaction effect reflected the extent to which a given item performed differently from the overall scale with respect to group membership (Miller & Spray, 1993). Items whose main effect or interaction effect resulted in significant changes in fit were flagged as having potential DIF and were designated as study items.

To implement DIF analysis within Multilog (Thissen, 1991), data are arranged so that each studied item is represented as two separate items, one item containing missing values for the focal group and the other containing missing values for the reference group. In this instance, English speakers were established as the reference group against which to compare Spanish-speaking respondents. The change in model fit (as measured by  $-2 \times \log$  likelihood) between a model in which the parameters of the studied item were allowed to differ between the groups and a model in which these parameters were constrained to be equivalent was distributed as a chi-square with degrees of freedom equal to the number of item parameters (in this case,  $df = 5$ ). Thus, a chi-square difference test could be used to evaluate the degree of DIF in each of the studied items (Thissen et al., 1993). In all DIF analyses, we used a *p* value of .01, as recommended by Teresi, Kleinman, and Ocepek-Welikson (2000).

*Structural equation modeling.* Structural equation modeling was used to determine the relationship between acculturation and peritraumatic dissociation. Within structural equation modeling, hypotheses are translated into a series of regression equations that can be solved simultaneously to generate an estimated covariance matrix. By means of various goodness-of-fit indices, including the Tucker-Lewis index (TLI; Tucker & Lewis, 1973), the comparative fit index (CFI; Bentler, 1988), and the root-mean-squared error of approximation (RMSEA; Browne & Cudeck, 1993), the estimated matrix can be evaluated against the observed sample matrix to determine whether the hypothesized model is an acceptable representation of the data. In general, incremental fit indices (i.e., TLI, CFI) above .90 signify good model fit. RMSEA values lower than .08 signify acceptable model fit, with values lower than .05 indicative of good model fit (Browne & Cudeck, 1993).

## Results

On the basis of results of the preliminary discriminant function analyses, Items 3 and 5 (see Table 1) were selected as anchor items. The remaining five items were identified as possible DIF items to be tested within the IRT framework. Using Samejima's (1996) graded response model, each study item was examined for DIF across the two language groups. As an initial point of reference, a baseline model was constructed in which a single set of anchor item parameters was estimated for the entire sample and item parameters for the study items were separately estimated for each group. As noted earlier, in these models, overall mean dissociation scores for the Spanish-speaking group were estimated relative to the English-speaking group. The latter was set to 0 to identify the scale. Standard deviations of both groups were set to 1.0.

A series of five separate IRT model comparisons were conducted to evaluate cross-group equivalence. Each model evaluated the impact of imposing cross-group equality constraints on parallel items and estimating model fit relative to the baseline model. Invariance across groups (absence of DIF) for each study item was established if the change in the chi-square fit statistic of the constrained model relative to the baseline model was not significant ( $\alpha = .01$ ) given the change in degrees of freedom (5).

Results of the DIF analyses for each study item are shown in Table 1 along with the final item parameter estimates. None of the study items exhibited significant DIF, indicating that combining responses from the English- and Spanish-language versions of this scale was appropriate. A final IRT model produced common item parameters for the two groups (shown in Table 1) while estimating a separate group mean for the Spanish speakers. On the basis of this model, the group mean for the Spanish speakers was 0.40 relative to an English group mean of 0.00 ( $SE = 0.15$ ,  $z = 2.67$ ,  $p < .01$ ).

The preceding IRT analyses established the equivalence of the seven PDEQ items across Spanish and English versions of the instrument. The next analyses used structural equation modeling to examine the association of acculturation and peritraumatic dissociation while simultaneously adjusting for other possible covariates. The structural model included four latent constructs (drug intoxication, alcohol intoxication, acculturation, and peritraumatic dissociation). The model also incorporated four single-item indexes reflecting degree of lifetime violence exposure, attack duration, mechanism of injury, and injury severity. Separate alcohol

Table 2  
Descriptive Statistics for Variables Included in Structural Modeling Analyses

Item	M	SD
Abbreviated PDEQ item content		
1. Blanked out (Parcel 3)	2.50	1.43
2. Slow motion (Parcel 2)	2.65	1.44
3. Didn't seem real (Parcel 3)	3.12	1.40
4. Felt disconnected (Parcel 3)	2.40	1.42
5. Didn't notice things (Parcel 1)	2.98	1.39
6. Felt confused (Parcel 1)	2.83	1.42
7. Unsure of time or place (Parcel 2)	2.41	1.53
Acculturation items		
1. Language read and spoken (Parcel 3)	2.91	1.19
2. Language thought in (Parcel 2)	3.04	1.48
3. Language spoken with friends (Parcel 1)	3.13	1.48
4. Language watched on TV (Parcel 3)	3.57	1.32
5. Language listened to on radio (Parcel 2)	3.48	1.43
Alcohol items		
1. Under the influence	1.69	1.00
2. Impaired	1.51	0.89
Drug items		
1. Under the influence	1.30	0.74
2. Impaired	1.19	0.59
Violent exposure	5.47	3.04
Duration of attack (log seconds)	1.84	0.86
Injury severity (four category)	2.32	1.06
Proportion shot	0.59	0.49

Note. PDEQ = Posttraumatic Dissociative Experiences Questionnaire.

and drug intoxication latent variables were defined by the two indicators described previously.

To reduce the number of model parameters to be estimated and to create more stable model estimates, the latent constructs of acculturation and peritraumatic dissociation were operationalized using item parcels rather than individual items as indicators (Cattell & Burdsal, 1975; Mathieu & Farr, 1991). Specifically, three

item parcels were created for each construct. The observed items were combined according to their item-total correlations, so that the first parcel was the mean of the item with the highest item-total correlation and the item with the lowest item-total correlation. The next parcel consisted of the next highest and next lowest, and so on. Table 2 contains means and standard deviations for all variables used in the structural model and also identifies the constituents of each item parcel.

To identify the model, four loadings (one associated with each of the four latent constructs) were fixed to unity. Acculturation, drug and alcohol intoxication, lifetime violence exposure, injury severity, duration of attack, and mechanism of injury were included as direct predictors of dissociation, and the mediating effects of drug and alcohol intoxication on the association between acculturation and dissociation were also estimated. In addition, correlations among independent as well as mediating variables were estimated.

This model, shown in Figure 1, proved to be a good fit to the data,  $\chi^2(53, N = 287) = 105.20, p < .001$ ; TLI = .95; CFI = .97; RMSEA = .06). Although not shown, all measurement model factor loadings were strong, positive, and statistically significant. For ease of interpretation, only correlations and structural coefficients achieving significance at  $p < .05$  are shown in Figure 1. As predicted, after we controlled for all direct effects as well as the indirect effect involving intoxication at the time of the event, acculturation proved to be a significant independent predictor of peritraumatic dissociation so that lower levels of acculturation were associated with more pronounced dissociative symptoms. Highly acculturated persons were more likely to have had greater lifetime exposure to violence and were more likely to be intoxicated with drugs before the attack, yet acculturation was not predictive of alcohol intoxication. Perhaps more important, neither intoxication nor history of violence exposure predicted dissociation. With respect to the three attack characteristics, only degree of trauma exposure, as indexed by injury severity, emerged as a

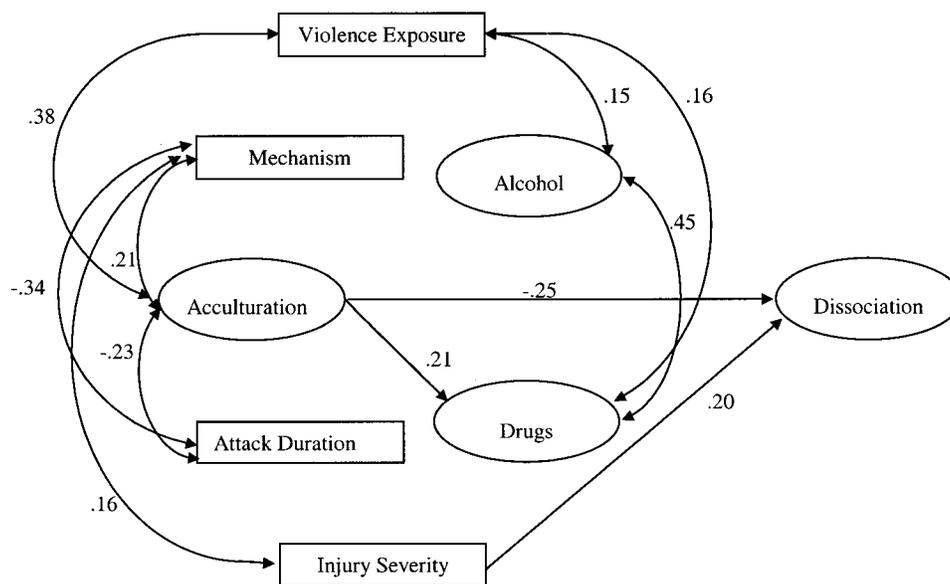


Figure 1. Structural representation of the association between acculturation and dissociation.

significant predictor of dissociation. In particular, greater trauma exposure was associated with higher levels of dissociation.

### Discussion

This study used a combination of IRT and structural equation modeling analyses to examine the relationship between level of acculturation and severity of peritraumatic dissociation in a sample of young Latino survivors of community violence. The research is unique in several respects. First, to our knowledge, it constitutes the first study of the association between acculturation and peritraumatic dissociation. In addition, the analytic sample consisted solely of persons of Latino ancestry, albeit from different countries of origin, thus controlling for the possible confounding influence of ethnicity and permitting stronger inferences about the link between acculturation and dissociation. Moreover, the research interview was administered in either English or Spanish, thereby enabling the study of persons with highly varying levels of acculturation. In addition, despite isolated calls for application of IRT methods to the assessment of psychological trauma (Weathers, Keane, King, & King, 1997), our study is one of the first to apply this analytic strategy in this area.

The current research had two primary objectives. The first aim was to determine whether the construct of peritraumatic dissociation, as measured by a seven-item self-report version of the PDEQ (Marshall et al., 2001), had essentially the same meaning whether administered in English- or Spanish-language versions. Results of IRT analyses provided empirical demonstration of the essential equivalence of the two versions. The PDEQ appears to be a meaningful measure of dissociation for both language groups as reflected by the final item parameter estimates based on the entire sample. These estimates indicate that the items are reasonable markers of dissociation, with five of the seven slope parameters exceeding 1.0 and location parameters representing a range of values of the construct.

The second objective of this study was to assess the degree to which peritraumatic dissociation would vary as a function of level of Anglo acculturation in persons of Latino ancestry. In particular, using structural equation modeling, we examined the hypothesis that acculturation would be inversely associated with peritraumatic dissociative experiences. In other words, higher levels of acculturation were expected to be associated with lower levels of dissociation. Results were consistent with this hypothesis. That is, level of acculturation was significantly, albeit modestly, predictive of degree of peritraumatic dissociation even after controlling for other important potential correlates of dissociation, including injury severity, injury mechanism, duration of the attack, lifetime exposure to violence, and drug and alcohol intoxication during the 2-hr period immediately before the assault. Indeed, of all other constructs included in the model, only injury severity emerged as a significant and independent predictor of peritraumatic dissociation.

Although a growing consensus holds that retention of Latin American cultural traditions or values promotes mental health, these findings suggest that the influence of acculturation on mental health may be more complicated. In particular, Anglo acculturation may actually confer special resilience in the face of certain pathogenic events. These results suggest that less acculturated persons of Latino ancestry are more likely than their more acculturated counterparts to report experiencing dissociative reactions

during a traumatic event. These findings hold true even after adjusting for other possible influences on dissociation, including characteristics of the assault, intoxication preceding the assault, and prior exposure to trauma. Insofar as peritraumatic dissociation has been linked to greater likelihood of emergence of symptoms of PTSD after trauma (e.g., Marmar et al., 1994; Michaels et al., 1999; Shalev et al., 1996), these results provide a unique frame of reference from which to understand previous findings suggesting greater vulnerability of Latinos to the development of PTSD.

These data are consistent with the hypothesis that the tendency to dissociate during trauma exposure dissipates with the adoption of Anglo traditions or ideology. They are silent, of course, as to the specific mechanisms by which Anglo acculturation might diminish dissociation. Indeed, the very nature and meaning of acculturation are poorly understood (Escobar & Vega, 2000). Dissociation in response to trauma is likely to be a complex process with multiple determinants. Additional research is required to elucidate the extent to which acculturative differences in peritraumatic dissociation are precipitated by conscious or unconscious processes (Bowers, 1994), active or passive mechanisms (Erdelyi, 1994), changes in attention to somatic sensations (Spiegel & Vermuten, 1994), states of mind that are more receptive to alterations in conscious awareness (Lewis-Fernandez, 1994), differences in the meaning or perception of experiences (Kirmayer, 1994), or still other mechanisms.

Such research should also take into account current understanding of the complex interconnectedness of cognitive, physiologic, and emotional processes (Cacioppo & Gardner, 1999). Although peritraumatic dissociation is operationalized in a manner that emphasizes its cognitive aspects, there is growing awareness of the importance of other co-occurring peritraumatic responses, including emotional and physiological reactions. For example, in their study of nearly 1,000 college students, Bernat, Ronfeldt, Calhoun, and Arias (1998) reported that peritraumatic emotional responses, physiological reactivity, and dissociative experiences each emerged as independent predictors of PTSD symptoms. Insofar as our research did not assess peritraumatic responses other than dissociation, future research is required to determine the associations among acculturation and a broader range of peritraumatic physiological, emotional, and cognitive reactions.

Other limitations of the current study must be borne in mind when interpreting our findings. First, this research focused on male survivors of community violence. Although our research expands on groundbreaking research examining ethnic differences in peritraumatic dissociation in male military veterans (Zatzick et al., 1994), additional research is needed to determine the degree to which these findings generalize to female survivors of community violence as well as to survivors of other traumatic experiences. A related concern is the generalizability of these results to other Latino heritage survivors of trauma inasmuch as our sample was drawn from a medical center that predominantly served Mexican Americans of quite modest socioeconomic and educational backgrounds. Thus, future studies of a broader range of Latino heritage trauma survivors, drawn from other regions and varying with respect to socioeconomic and educational status, are clearly needed.

Moreover, although our research has used an index of acculturation and thus could be viewed as constituting an improvement over studies that focus simply on ethnic background, more recent

conceptualizations of acculturation view the construct as bidimensional, allowing for separate assessment of the degree to which individuals are acculturated to each of two distinct cultures (e.g., Ryder, Alden, & Paulhus, 2000; Stephenson, 2000). Future research conducted from this bidimensional perspective might facilitate enhanced understanding of the link between acculturation and dissociation. Also, our reliance on self-report, rather than objective, indexes of intoxication immediately before the assault constitutes an additional limitation. A different pattern of findings might have emerged with respect to intoxication, had an objective index been used. Finally, the current study relied on a relatively small sample size, especially when compared with IRT applications in educational assessment. Thus, our conclusions about equivalence of Spanish and English versions of the PDEQ should be tempered by the realization that power to detect differences is somewhat limited. At the same time, our sample size allowed us sufficient power to detect moderate degrees of differential item functioning, without overidentification of DIF.

In conclusion, despite resurgent interest in the construct of dissociation in general, and peritraumatic dissociation in particular, little research has examined the impact of cultural influences on peritraumatic dissociation. The results of this study demonstrate that cultural factors may play an important role in shaping responses to traumatic stress exposure while suggesting that the relationship between Anglo acculturation and mental health may be more nuanced than previously believed.

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