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# Placing Age Differences in Cultural Context: A Comparison of the Effects of Age on PTSD After Disasters in the United States, Mexico, and Poland

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*Criterion symptoms of posttraumatic stress disorder (PTSD) were measured 6–12 months after Hurricane Andrew in the United States (non-Hispanic n = 270), Hurricane Paulina in Mexico (n = 200), and the 1997 flood in Poland (n = 285), using English, Spanish, and Polish versions of the Revised Civilian Mississippi Scale. The samples ranged in age from 18 to 88. Linear and quadratic effects of age were tested by using hierarchical multiple regression, with the effects of gender, trauma, and education controlled. Among Americans, age had a curvilinear relation with PTSD such that middle-aged respondents were most distressed. Among Mexicans, age had a linear and negative relation with PTSD such that younger people were most distressed. Among Poles, age had a linear and positive relation with PTSD such that older people were most distressed. Thus, there was no one consistent effect of age; rather, it depended upon the social, economic, cultural, and historical context of the disaster-stricken setting.*

**KEY WORDS:** disaster; PTSD; cross-cultural research.

Previous research on the psychological consequences of natural disasters has produced an array of findings, as evidenced by rates of posttraumatic stress disorder (PTSD) that have been as low as 2% and as high as 67% in the aftermath of these events (Wang *et al.*, 2000). Findings regarding how age influences these outcomes have been likewise inconsistent. Some studies indicate no age-related differences in the effects of natural disasters (Goenjian *et al.*, 1994; Miller *et al.*, 1981; Ollendick and Hoffman, 1982). Other studies suggest that older adults are less likely than their younger counterparts to develop posttrauma sequelae (Bell *et al.*, 1978; Bolin and Klenow, 1983; Bromet and Schulberg, 1986; Green *et al.*, 1990; Huerta and Horton, 1978). Still other studies indicate that increased age may serve as a risk factor for postdisaster distress (Ticehurst *et al.*, 1996). Disaster studies that have distinguished middle-aged adults from older and younger adults have often shown this

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group to be most adversely affected (e.g., Gleser *et al.*, 1981; Phifer, 1990; Price, 1978; Shore *et al.*, 1986; Thompson *et al.*, 1993).

The source of these inconsistencies is not well understood. They may arise in part from differences across studies in data collection and assessment procedures. Falk *et al.* (1994) noted that these discrepancies might be a result of the research being conducted by different disciplines, using different assessment strategies and instruments, with a lack of regard for prior-established methodologies and findings. Additional methodological factors, such as the time of assessment, may also help explain these inconsistent results. Some longitudinal studies have found that PTSD prevalence rates were similar for younger and older victims of disaster shortly after the event, but that symptoms were more likely to have diminished for older adults at the later study assessments (Bolin and Klenow, 1988; Kato *et al.*, 1996). Hence, it may be that following disasters, people of different ages recover at different rates.

Another possible explanation is that age may be differentially related to coping resources, past experiences, and other stressors across the various populations that have been studied. For example, age is one of many variables that influence disaster victims' receipt of social support (Kaniasty and Norris, 1995; Kilijanek and Drabek, 1979). Some evidence also suggests that previous exposure to disasters may help older adults to cope with subsequent disasters (Norris and Murrell, 1988); such prior experiences would be expected to vary across the settings studied. Thompson *et al.* (1993) found that disproportionate exposure to chronic stressors (e.g., parenting stress, filial stress, occupational stress) best explained their findings that middle-aged persons were most vulnerable to the adverse psychological effects of natural disasters.

Another source of the inconsistencies may be whether or not the effects of gender were controlled when age differences were assessed. Female gender has usually been found to be associated with increased prevalence of PTSD both in general population samples and in studies specific to disaster (for a review, see Norris *et al.*, in press). Because many epidemiological studies exclude older adults, little is known about whether these gender differences continue into late life. In fact, Norris *et al.* found that sex differences in the current prevalence of PTSD were lowest for older adults, indicating that disparate rates may dissipate with age.

Moreover, a serious limitation to conclusions that can be drawn from this body of research has been the disproportionate representation of developed countries in the database. Most disasters occur in developing and non-Western countries, but very little of the research has been done in this regard (Green, 1996). Although there has been some research looking at the interaction of culture and gender in the development of PTSD symptoms (Norris *et al.*, 2001), there has been no research, to our knowledge, that has examined whether culture and age interact to influence posttraumatic stress. There are many reasons to anticipate that the effects of age could, in fact, vary across cultural context. Life experiences would be expected to vary across cohorts from different cultures and nations. Inherent in these experiences might be more or less previous trauma, different histories, and different worldviews. The degree to which older adults are revered or respected in their societies and integrated into their families and communities varies cross-culturally, as well. Different economic systems and climates produce different levels of economic security in late life and different levels of burden and responsibility in early adulthood. If so, culture would be expected to influence the relative vulnerabilities of differently aged groups.

In summary, to date, there have been no studies that have examined the combined impact of age, gender, and culture on the prevalence and presentation of PTSD symptoms following disasters. This study examined the impact of three different natural disasters on samples from the United States, Mexico, and Poland. All three of the disasters were similarly devastating to the communities involved. Hurricane Andrew struck South Miami and Homestead, Florida, in August 1992, Hurricane Paulina struck Acapulco, Mexico, and surrounding areas in October 1997, and the 1997 flood inundated large areas of southwestern Poland in July 1997. We interviewed 270 non-Hispanic American victims of Hurricane Andrew, 200 Mexican victims of Hurricane Paulina, and 285 victims of the 1997 Poland flood from 6 months to 1 year postevent. The primary questions of interest were these: (1) overall, is age a risk or protective factor? and (2) does age interact with culture or gender or both to influence symptoms of PTSD?

## METHOD

### Sample and Sampling Procedures

#### *American Sample*

In January 1993, our research team visited Dade County (South Miami) and selected the neighborhoods to be included in the study. A publication of the *Miami Herald* that listed neighborhoods according to proportion of homes damaged and property value was extremely helpful in terms of finding areas with different levels of damage and socioeconomic status. During February and March, 1993, six months after Hurricane Andrew, 404 adults were interviewed in their homes. Only one interview was allowed per household. A purposive rather than random sampling strategy was used to include in the sample comparable numbers of Latinos ($n = 134$), non-Hispanic Blacks ($n = 135$), and non-Hispanic Whites ($n = 135$) and to keep the age and sex distributions of the three ethnic groups comparable. For the purposes of the present analysis, Latinos were excluded because 79% of them had immigrated to the United States from elsewhere, primarily Cuba. All of the non-Hispanic participants had been born in the United States; they ranged in age from 18 to 88 (see Table I).

#### *Mexican Sample*

A similar strategy was used to obtain a sample of victims of Hurricane Paulina. The research team visited Acapulco on two occasions before beginning the fieldwork and selected the areas to be included in the study. Local people directed us to the residential areas where damage was most extensive. In March 1998, six months after Hurricane Paulina, 200 residents of stricken *colonias* in Acapulco Bay were interviewed in their homes by students in psychology or anthropology at the National University in Mexico City who stayed in the area during the fieldwork period. Here, also, a purposive rather than random sampling strategy was used to include in the study approximately equal numbers of men and women and younger, middle-aged, and older adults. All participants were born in Mexico and were Spanish-speaking. The sample ranged in age from 18 to 81.

**Table I.** Descriptive Statistics, Mean (*SD*)

| | American sample | | | | Mexican sample | | | | Polish sample | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Younger ($n = 89$) | Middle-aged ($n = 82$) | Older ($n = 96$) | Total ($n = 267$) | Younger ($n = 85$) | Middle-aged ($n = 64$) | Older ($n = 49$) | Total ($n = 198$) | Younger ($n = 84$) | Middle-aged ($n = 127$) | Older ($n = 73$) | Total ($n = 284$) |
| Age (in years) | 30.1 (5.7) | 47.9 (5.9) | 70.3 (7.3) | 50.0 (18.0)[a] | 29.6 (6.4) | 48.3 (6.2) | 68.6 (5.8) | 45.3 (16.8) | 29.1 (6.7) | 48.4 (5.5) | 67.2 (5.4) | 47.5 (15.4) |
| Female (%) | 59.6 | 58.5 | 33.3 | 49.8 | 45.9 | 42.2 | 46.9 | 44.9 | 67.9 | 64.6 | 57.5 | 63.7 |
| Education (in years) | 12.9 (1.8) | 12.7 (2.8) | 12.5 (7.7) | 12.7 (5.0)[a,b] | 9.2 (4.4)[c,d] | 5.6 (4.8)[d] | 2.1 (3.2) | 6.3 (5.1)[b] | 12.1 (2.4)[d] | 12.1 (2.9)[d] | 10.0 (4.2) | 11.5 (3.2) |
| Trauma exposure | 1.25 (0.63)[d] | 1.10 (0.76)[d] | 0.80 (0.69) | 1.04 (0.72)[a,b] | 1.54 (0.63)[c] | 1.11 (0.67) | 1.31 (0.71) | 1.34 (0.69)[b] | 0.64 (0.69) | 0.88 (0.76) | 0.90 (0.71) | 0.82 (0.73) |
| PTSD symptoms | 6.53 (3.38)[d] | 6.56 (3.83)[d] | 4.80 (3.75) | 5.92 (3.74)[a,b] | 7.75 (4.13) | 7.05 (3.91) | 6.90 (3.43) | 7.31 (3.89) | 6.67 (3.87)[c,d] | 8.38 (4.24) | 9.44 (4.02) | 8.14 (4.20) |
| Intrusion symptoms | 2.07 (1.67)[d] | 2.12 (1.78)[d] | 1.36 (1.54) | 1.83 (1.69)[a,b] | 2.81 (1.80) | 2.63 (1.81) | 2.27 (1.72) | 2.62 (1.79)[b] | 2.82 (1.91)[c,d] | 3.48 (1.74) | 3.63 (1.66) | 3.32 (1.80) |
| Avoidance symptoms | 1.69 (1.16) | 1.74 (1.11)[d] | 1.29 (1.34) | 1.56 (1.23)[a,b] | 2.15 (1.47) | 1.81 (1.28) | 2.18 (1.29) | 2.05 (1.37)[b] | 2.00 (1.39)[c,d] | 2.52 (1.55)[d] | 3.14 (1.42) | 2.52 (1.52) |
| Arousal symptoms | 2.78 (1.34)[d] | 2.70 (1.64)[d] | 2.15 (1.38) | 2.52 (1.47) | 2.79 (1.51) | 2.61 (1.52) | 2.45 (1.29) | 2.65 (1.46)[b] | 1.85 (1.28)[c,d] | 2.38 (1.49) | 2.67 (1.44) | 2.30 (1.45) |

*Note.* *n*s represent the number of participants included in the regression analyses rather than the total *n* interviewed. This difference is due to missing data.
[a]Across-samples post hoc test (Tukey HSD): Significantly different from the Mexican sample at alpha level of .05.
[b]Across-samples post hoc test (Tukey HSD): Significantly different from the Polish sample at alpha level of .05.
[c]Within-sample post hoc test (Tukey HSD): Significantly different from the middle-aged group at alpha level of .05.
[d]Within-sample post hoc test (Tukey HSD): Significantly different from the older group at alpha level of .05.

### *Polish Sample*

In this study as well, areas to be included were selected purposively rather than randomly. In the city of Opole, we selected apartment buildings that still showed signs of flood damage at the time of the investigators' initial visit in January 1998; different floors were sampled to increase variability in severity of exposure. To provide additional variability in experience, several nearby villages were also included in the sampling frame. In July–August 1998, one year after the flood, 285 adults were interviewed in their homes by two students from the University of Opole and the second author. Respondents within selected neighborhoods and villages were invited to participate mainly because of their availability for an interview at the time the study was conducted. All except 3 participants were born in Poland. The sample ranged in age from 18 to 87.

## Measures

### *Symptoms*

To assess symptoms of posttraumatic stress, the 30-item Revised Civilian Mississippi Scale (RCMS; Norris and Perilla, 1996) was utilized. All items are scored on the same 5-point scale: 1 = *not true*, 2 = *slightly true*, 3 = *somewhat true*, 4 = *very true*, and 5 = *extremely true*. The scale was translated into Spanish by using back-translation and centering (Brislin *et al.*, 1973) and then tested for linguistic equivalence in a pilot study (Norris and Perilla, 1996). The total RCMS English version had an alpha of .82, the Spanish version had an alpha of .88, and a 1-week test-retest correlation between the two versions of .84. The scale was subsequently translated into Polish by the second author, who is a native speaker, and reviewed for equivalence of meaning by colleagues from the Department of Psychology at the Opole University. The 30-item scale achieved alphas of .88–.94 in the samples studied here.

The conceptual equivalence of the RCMS was assessed using confirmatory factor analyses. After noncriterion symptoms, such as guilt and suicidality, were eliminated from the scale, a four-factor measurement model fit the data of the U.S. non-Hispanic sample and the Mexican sample equally well (Norris *et al.*, in press). The four factors of Intrusion (Criterion B), Avoidance (C1), Numbing (C2), and Arousal (D) correlated significantly and equivalently with severity of trauma in each sample. In a subsequent analysis, this same model also fit the data of the Polish sample.

Preliminary analyses also revealed, however, that the samples differed in item variances and suggested that Mexicans and Poles often gave more extreme responses (*extremely true*) when a symptom was experienced, whereas Americans usually gave more moderate responses (*somewhat true*). To correct for this potential bias, we dichotomized each item so that *not* and *slightly true* responses received scores of 0 and *somewhat*, *very*, and *extremely true* received scores of 1 (thus equal weight). The RCMS measures 15 of the 17 criterion symptoms, including 5 Criterion B symptoms (B1 recurrent recollections, B2 distressing dreams, B3 reexperiencing, B4 distress at cues, B5 physiological reactivity), 5 Criterion C symptoms (C2 avoiding reminders, C3 inability to recall aspects of event, C4 diminished interest, C5 estrangement, C6 restricted affect), and 5 Criterion D symptoms (D1 difficulty sleeping, D2 irritability or anger, D3 difficulty concentrating, D4 hypervigilance,

D5 exaggerated startle). Continuous scores were provided by counting the number of criterion symptoms experienced in and across these domains.

Although the clinical validity of the RCMS has not been fully established, some relevant data were collected as part of an epidemiologic study of mental health conducted in Mexico in 1999. In this study, 1,289 randomly selected adults were administered selected modules of the Composite International Diagnostic Interview (CIDI, Version 2.1) developed by the World Health Organization (1993). The CIDI follows the *Diagnostic and Statistical Manual of Mental Disorders* (4th edn.; *DSM-IV*; American Psychiatric Association, 1994) structure closely and includes measures of Criteria A2 (subjective trauma), E (duration), and F (functional impairment) as well as symptom criteria (B, C, and D). Persons ($n = 125$) who reported some distress within the past 6 months on the CIDI PTSD module were also administered the RCMS. When the 15 RCMS symptoms were dichotomized (as described above) and counted according to *DSM-IV* criteria (1+B, 3+C, 2+D), this measure yielded the same diagnosis as the CIDI 84% of the time. In this subsample of 125, the total PTSD prevalence was 23.2% according to the RCMS and 24.8% according to the CIDI. Given that the RCMS was not intended for use in clinical settings, this amount of agreement is sufficient to suggest that the scale is valid as a measure of posttraumatic stress.

### *Exposure*

To represent severity of exposure, an ordinal measure of trauma, 0 = *neither injury nor life threat* (*low*); 1 = *either injury or life threat* (*moderate*), and 2 = *both injury and life threat* (*high*) was included. Life threat was assessed by a single question, "Did you ever feel like your life was in danger during the incident?" Injury was assessed by two questions, one assessing whether the respondent personally had been injured, the other assessing whether another member of the household had.

## Analysis Strategy

The data were analyzed by using hierarchical multiple regression. We first conducted the analysis, using the total number of criterion symptoms as the dependent variable. To examine whether the main findings held across the various criteria for PTSD, we then repeated the analysis for subscales representing the number of Criterion B (intrusion), Criterion C (avoidance/numbing), and Criterion D (arousal) symptoms. We did not adjust the alpha for multiple tests because we viewed these latter analyses as supplementary to the primary tests for the total scale. In addition, we occasionally described interactions from the supplementary analyses that approached significance because they supported or augmented interpretation of the primary analysis. It is typical in regression analyses for interaction terms to explain relatively little variance (Aiken and West, 1991).

# RESULTS

## Descriptive Statistics

Table I shows the gender distribution and means for education, severity of trauma, and symptom measures by age and country. The American sample was significantly older

than the Mexican sample. The Polish sample had a higher percentage of women than did the American and Mexican samples. The American sample was more highly educated than the Polish sample, which was more educated than the Mexican sample. The Mexican sample was more highly exposed to trauma than was the American sample, which was more highly exposed than was the Polish sample. The Polish sample was generally more symptomatic than the Mexican sample, which was generally more symptomatic than the American sample. An exception to this rule was Arousal; on this scale, the Polish sample was the least symptomatic.

Table I also shows means by age groups within each country. In the United States, older respondents (those aged 60+) were significantly less symptomatic than younger (18–39) respondents; whereas in Poland, the reverse was true. Typically, the means of middle-aged (40–59) respondents were equivalent to the means of younger respondents in the United States and to the means of older respondents in Poland. In Mexico, there were no significant age differences. It should be kept in mind that these means are not adjusted for differences between groups in percent female, education, or severity of exposure.

## Within-Country Analyses

First, the regression analyses were conducted within each country separately (see Table II). Gender (0 = *male*, 1 = *female*), education (in years), and severity of trauma were entered in the first step. Age was entered in the second step. Interaction terms representing the joint effects of age with gender and trauma were entered in the third step. These terms were scored as the products of the mean deviations of the component measures and, thus, are approximately independent of the main effects. The quadratic term for age, $\text{Age}^2$, was entered in the fourth step. Because this was scored as the square of the mean deviation, middle-aged respondents have lower scores than do either younger or older respondents. Interaction terms representing the joint effects of $\text{Age}^2$ with gender and trauma were entered in the fifth and final step.

### *American Sample*

*Predicting the Total Number of Criterion PTSD Symptoms.* The five sets of predictor variables together accounted for 24% of the variance in PTSD symptoms, $F(9, 257) = 9.20$, $p < .001$, $R = .49$, adjusted $R^2 = .22$. The first set of variables accounted for 19% of the variance in symptoms, $F(3, 263) = 20.76$, $p < .001$. Women exhibited significantly more symptoms than did men, $t = 3.37$, $p < .001$, and victims who experienced injuries and/or life threat experienced more criterion symptoms than did those who were less severely exposed, $t = 6.53$, $p < .001$. Age was entered alone in the second step and predicted 1% of the variance, $F(1, 262) = 3.69$, $p = .06$. Symptoms decreased as age increased. The interactions of gender and trauma with the linear age term, entered in Step 3, explained no additional variance, $F(2, 260) < 1.00$, $R^2\Delta = .003$. The quadratic term of age, entered in Step 4, accounted for 2.4% of the variance, $F(1, 259) = 7.97$, $p < .01$. Middle-aged respondents (those who had a lower score on the variable, $\text{Age}^2$) exhibited more symptoms than did either younger or older respondents (those who had higher scores on the variable, $\text{Age}^2$). In the final step, the interactions of gender and trauma with the quadratic age term

**Table II.** Predicting the Number of Criterion PTSD Symptoms: Standardized Betas From Within-Country Regression Analyses

| | American sample | | | | Mexican sample | | | | Polish sample | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | B | C | D | Total | B | C | D | Total | B | C | D |
| Set 1 | | | | | | | | | | | | |
| Gender | .19*** | .20*** | .09 | .18** | .24*** | .20** | .23*** | .18** | .27*** | .33*** | .19*** | .17** |
| Education | −.06 | −.07 | −.11† | .01 | −.13* | −.08 | −.15* | −.12† | −.21*** | −.13** | −.23*** | −.19*** |
| Trauma | .37*** | .35*** | .23*** | .34*** | .35*** | .33*** | .29*** | .26*** | .34*** | .36*** | .28*** | .23*** |
| Set 2 | | | | | | | | | | | | |
| Age | −.11† | −.09 | −.13* | −.07 | −.17* | −.15† | −.05 | −.22** | .18*** | .13* | .20*** | .15** |
| Set 3 | | | | | | | | | | | | |
| Age × Gender | .02 | .00 | .02 | .02 | −.04 | −.05 | −.01 | −.03 | −.07 | −.05 | −.08 | −.04 |
| Age × Trauma | −.05 | −.06 | −.03 | −.04 | −.11 | −.08 | −.09 | −.10 | −.04 | −.09† | .02 | −.02 |
| Set 4 | | | | | | | | | | | | |
| $Age^2$ | −.16** | −.15* | −.14 | −.12* | −.01 | −.09 | .10 | −.02 | −.11† | −.12* | −.10† | −.06 |
| Set 5 | | | | | | | | | | | | |
| $Age^2$ × Gender | −.08 | −.10 | −.02 | −.06 | .12 | .14 | .06 | .09 | −.18* | −.16* | −.11 | −.21** |
| $Age^2$ × Trauma | −.16* | −.15† | −.12 | −.14 | −.09 | −.14 | .04 | −.10 | .08 | .09 | .04 | .09 |

*Note*. Betas are values obtained upon entry.
†$p = .10$. *$p = .05$. **$p = .01$. ***$p = .001$.

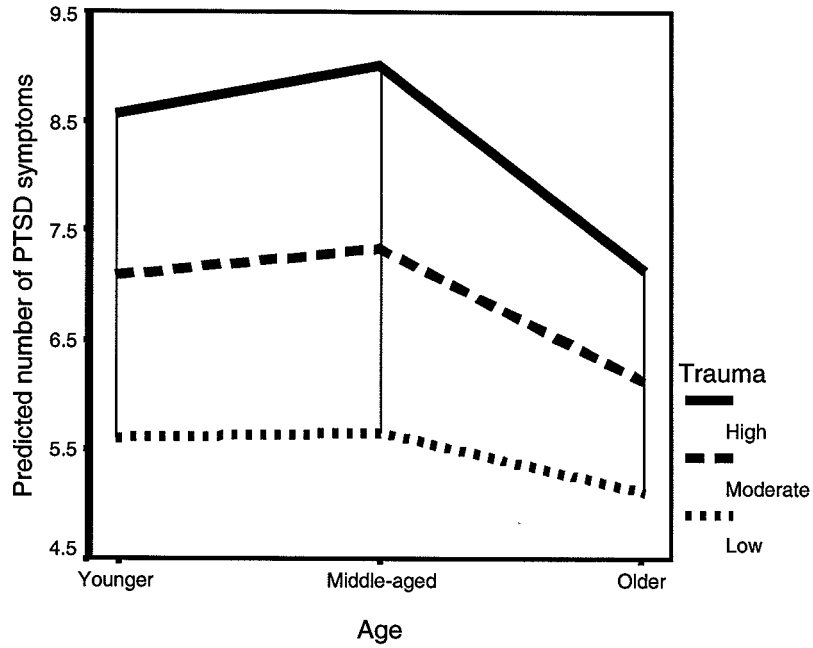


**Fig. 1.** Interaction of age and severity of trauma in the American sample. Values on the dependent variable were predicted from the nonstandardized coefficients for Age, Age$^2$, Age × Trauma, and Age$^2$ × Trauma and the sample's mean age (50) and points one *SD* below (32) and one *SD* (68) above the mean. The strength of the quadratic effect increases as severity of trauma increases.

were entered into the equation and accounted for 1.5% of the variance, $F(2, 257) = 2.48$, $p = .09$. The interaction between the age-quadratic term and trauma was responsible for that effect, $t = -1.98$, $p < .05$. The pattern of this interaction, depicted in Fig. 1, indicated that the quadratic (inverted-U) function of age became more pronounced as the severity of trauma increased. When severity of trauma was low, the age groups varied little in the number of criterion symptoms. When the severity of trauma was high, middle-aged adults were more symptomatic than younger adults who were more symptomatic than older adults.

*Predicting Criterion B (Intrusion) Symptoms.* The entire regression equation explained 23% of the variance in the number of Criterion B symptoms, $F(9, 257) = 8.42$, $p < .001$, $R = .48$, adjusted $R^2 = .20$. Gender, education, and severity of trauma together accounted for 18% of the variance, $F(3, 263) = 19.65$, $p < .001$. Women and more severely exposed respondents reported more symptoms than did men and less severely exposed respondents, $t = 3.56$, $p < .001$, and $t = 6.15$, $p < .001$, respectively. Age did not explain variance in intrusion, $F(1, 262) = 2.32$, $R^2\Delta = .007$. Nor did the interactions of gender and trauma with age (linear) explain variance in intrusion, $F(2, 260) < 1.00$, $R^2\Delta = .003$. In contrast, the quadratic term of age accounted for 2% of the variance, $F(1, 259) = 6.54$, $p < .03$. Again, middle-aged respondents reported more symptoms than did younger or older respondents. The interactions of gender and trauma with Age$^2$ explained an additional 1.5% of the variance, which approached but did not meet statistical significance, $F(2, 257) = 2.42$,

$p = .09$. Again, it was the interaction of trauma and Age$^2$ that accounted for this trend, $t = -1.81$, $p = .07$. The form of this interaction was similar to that shown in Fig. 1.

*Predicting Criterion C (Avoidance/Numbing) Symptoms.* The five sets of predictors accounted for 12% of the variance in Criterion C symptoms, $F(9, 257) = 3.87$, $p < .001$, $R = .35$, adjusted $R^2 = .09$. The first set explained 8% of the variance, $F(3, 263) = 7.44$, $p < .001$; only trauma was significantly associated with avoidance/numbing, $t = 3.87$, $p < .001$. Age was inversely related to symptoms and explained an additional 1.5% of the variance, $F(1, 262) = 4.33$, $p < .05$. The age interactions did not contribute significantly, $F(2, 260) < 1.00$, $R^2\Delta = .001$. Age$^2$ explained 2% of the variance, as middle-aged respondents again reported more symptoms than did younger or older respondents, $F(1, 259) = 5.24$, $p < .03$, $R^2\Delta = .018$. The Age$^2$ interactions explained no additional variance, $F(2, 257) < 1.00$, $R^2\Delta = .007$.

*Predicting Criterion D (Arousal) Symptoms.* The predictor variables jointly explained 19% of the variance in Criterion D symptoms, $F(9, 257) = 6.74$, $p < .001$, $R = .44$, adjusted $R^2 = .16$. Gender, education, and trauma accounted for 16% of the variance, $F(3, 263) = 16.73$, $p < .001$. Women and more severely exposed persons reported greater arousal than did men and less severely exposed persons, $t = 3.09$, $p < .005$, and $t = 5.91$, $p < .001$, respectively. Neither age, $F(1, 262) = 1.51$, $R^2\Delta = .005$, nor the age interactions, $F(2, 260) < 1.00$, $R^2\Delta = .002$, explained variance in arousal. The quadratic term explained 1.4% of the variance, $F(1, 259) = 4.33$, $p < .05$; as before, middle-aged respondents reported the most symptoms. The Age$^2$ interactions made no additional contribution, $F(2, 257) = 1.69$, $R^2\Delta = .011$.

### *Mexican Sample*

*Predicting the Total Number of Criterion PTSD Symptoms.* The five sets of predictor variables together accounted for 28% of the variance in PTSD symptoms, $F(9, 188) = 7.93$, $p < .001$, $R = .53$, adjusted $R^2 = .24$. Gender, education, and disaster trauma explained 24% of the variance in symptoms, $F(3, 194) = 19.96$, $p < .001$. Women exhibited more symptoms than did men, $t = 3.72$, $p < .001$ (see Table II), more severely exposed persons reported more symptoms than did less severely exposed persons, $t = 5.51$, $p < .001$, and respondents with fewer years of formal education reported more symptoms than did respondents with more education, $t = -2.09$, $p < .05$. Age predicted an additional 2% of the variance in PTSD symptoms, $F(1, 193) = 4.57$, $p < .05$; symptoms decreased as age increased, $t = -2.14$, $p < .05$. The variance explained by the interactions between gender and trauma and age (linear) did not reach statistical significance, $F(2, 191) = 1.84$, $R^2\Delta = .014$. Nor was additional variance explained by Age$^2$, $F(1, 190) < 1.00$; $R^2\Delta = .00$, or the interactions involving the age-quadratic term, $F(2, 188) < 1.00$, $R^2\Delta = .007$.

*Predicting Criterion B Symptoms.* The equation accounted for 23% of the variance in Criterion B symptoms, $F(9, 188) = 6.08$, $p < .001$, $R = .48$, adjusted $R^2 = .19$. Respondents' gender, education, and trauma explained 18% of the variance in intrusion symptoms, $F(3, 194) = 14.34$, $p < .001$. Women and more severely exposed victims were more likely to exhibit intrusion symptoms than did others, $t = 3.00$, $p < .005$, and $t = 4.97$, $p < .001$, respectively. Age accounted for 1.4% of the variance, which approached but did not reach statistical significance, $F(1, 193) = 3.24$, $p = .07$; the higher the age, the lower the intrusion. No significant contributions were made by the interactions of gender and trauma with

age, $F(2, 190) = 1.32$, $R^2\Delta = .011$, the age-quadratic term, $F(1, 190) = 1.57$, $R^2\Delta = .006$, or the interactions of gender and trauma with Age$^2$, $F(2, 188) = 1.56$, $R^2\Delta = .013$.

*Predicting Criterion C Symptoms.* The five sets of predictors together explained 21% of the variance in Criterion C symptoms, $F(9, 188) = 5.57$, $p < .001$, $R = .46$, adjusted $R^2 = .17$. The first set explained 19% of the variance, $F(3, 194) = 15.14$, $p < .001$. Avoidance/numbing symptoms were higher among women, $t = 3.47$, $p < .005$; more severely exposed persons, $t = 4.41$, $p < .001$; and less educated persons, $t = -2.21$, $p < .03$. None of the four remaining sets of predictors made significant contributions: for age, $F(1, 193) < 1.00$, $R^2\Delta = .002$; for the age interactions, $F(2, 191) < 1.00$, $R^2\Delta = .008$; for Age$^2$, $F(1, 190) = 2.18$, $R^2\Delta = .009$; and for the Age$^2$ interactions, $F(2, 188) < 1.00$, $R^2\Delta = .002$.

*Predicting Criterion D Symptoms.* The equation accounted for 19% of the variance in the Criterion D symptoms, $F(9, 188) = 4.76$, $p < .001$, $R = .43$, adjusted $R^2 = .15$. Gender, education, and trauma accounted for 14% of the variance in the arousal symptoms, $F(3, 194) = 10.21$, $p < .001$, because of the effects of gender, $t = 2.59$, $p < .03$, and severity of trauma, $t = 3.90$, $p < .001$. Age explained an additional 3% of the variance in Criterion D symptoms, $F(1, 193) = 7.16$, $p < .01$, again revealing that older Mexicans exhibited fewer symptoms of arousal than did their younger counterparts. Contributions of the three remaining sets of predictors were negligible: for the age interactions, $F(2, 191) = 1.36$, $R^2\Delta = .012$; for Age$^2$, $F(1, 190) < 1.00$, $R^2\Delta = .000$; and for the Age$^2$ interactions, $F(2, 188) < 1.00$, $R^2\Delta = .006$.

### *Polish Sample*

*Predicting the Total Number of Criterion PTSD Symptoms.* The five sets of predictor variables together accounted for 36% of the variance in PTSD symptoms, $F(9, 274) = 16.86$, $p < .001$, $R = .60$, adjusted $R^2 = .34$. The first set of predictors explained 30% of the variance, $F(3, 280) = 39.21$, $p < .001$. Women exhibited significantly more symptoms than did men, $t = 5.22$, $p < .001$. Symptoms increased as trauma increased, $t = 6.51$, $p < .001$, and as education decreased, $t = -3.98$, $p < .001$.

Age, entered in the second step, predicted an additional 3% of variance in PTSD symptoms, $F(1, 279) = 12.05$, $p < .001$. In contrast to the results for the American and Mexican samples, the coefficient for age was positive, indicating that older Poles were more symptomatic than their younger counterparts. The set of interactions of gender and trauma with age, entered in the third step, did not make an additional contribution, $F(2, 277) = 1.39$, $R^2\Delta = .007$. The age-quadratic term, entered in the fourth step, explained approximately 1% additional variance in symptoms, $F(1, 276) = 3.79$, $p = .05$, and showed a relation similar to that observed in the United States. However, this quadratic function of age was qualified when the Age$^2$ interactions were entered in the fifth and final step, $F(2, 274) = 3.34$, $p < .05$, $R^2\Delta = .016$. It was the interaction between gender and Age$^2$ that accounted for this finding, $t = -2.55$, $p < .03$. The pattern of this interaction was such that the curvilinear function of age in relation to PSTD symptoms was present only among women. Among men, the association between age and symptoms was linear and positive.

*Predicting Criterion B Symptoms.* The equation accounted for 37% of the variance in the Criterion B symptoms, $F(9, 274) = 17.98$, $p < .001$, $R = .61$, adjusted $R^2 = .35$. Gender, education, and severity of trauma combined to explain 32% of the variance,

$F(3, 280) = 44.02$, $p < .001$. Women, $t = 6.48$, $p < .001$, victims with greater trauma, $t = 7.08$, $p < .001$, and persons with fewer years of education, $t = -2.64$, $p < .01$, were more likely to exhibit intrusion symptoms. Age explained an additional 1.5% of the variance, $F(1, 279) = 6.22$, $p < .03$. Older respondents reported greater levels of intrusion than did younger respondents. The contribution of the set of age interactions was not statistically significant, $F(2, 277) = 2.47$, $p < .10$, $R^2\Delta = .012$. The quadratic term of age accounted for an additional 1.2% of the variance in Criterion B symptoms, $F(1, 276) = 4.95$, $p < .03$. As in the U.S. and Mexican samples, the negative sign for the age-quadratic term again suggested that middle-aged respondents reported more symptoms than did the respondents who were younger or older. Again, this main effect was qualified by a significant $\text{Age}^2 \times$ Gender interaction, $t = -2.28$, $p < .03$. As shown in Fig. 2, the curvilinear function of age in predicting symptoms was found only among women.

*Predicting Criterion C Symptoms.* The five sets of predictors explained 27% of the variance in the Criterion C symptoms, $F(9, 274) = 11.40$, $p < .001$, $R = .52$, adjusted $R^2 = .25$. The first set explained 22% of the variance, $F(3, 280) = 25.82$, $p < .001$. Greater levels of avoidance and numbing were associated with female gender, $t = 3.48$, $p < .001$, more exposure to the flood's trauma, $t = 5.14$, $p < .001$, and lower educational status, $t = -4.16$, $p < .001$. Age explained 4% additional variance, $F(1, 279) = 13.81$, $p < .001$; symptoms increased as age increased. No additional contributions were made by the age interactions, $F(2, 277) = 1.12$, $R^2\Delta = .006$, $\text{Age}^2$, $F(2, 276) = 2.72$, $R^2\Delta = .007$, or the $\text{Age}^2$ interactions, $F(2, 274) = 1.07$, $R^2\Delta = .006$.

*Predicting Criterion D Symptoms.* The equation accounted for 21% of the variance in Criterion D symptoms, $F(9, 274) = 7.92$, $p < .001$, $R = .45$, adjusted $R^2 = .18$. Gender, education, and severity of trauma together explained 16% of the variance, $F(3, 280) = 17.75$, $p < .001$. Effects were comparable to those described previously: for gender, $t = 3.08$, $p < .005$; for education, $t = -3.40$, $p < .005$; and for trauma, $t = 4.15$, $p < .001$. Age accounted for an additional 2% of the variance in arousal, $F(1, 279) = 6.86$, $p < .01$. Arousal increased as age increased. Neither the age interactions, $F(2, 277) < 1.00$, $R^2\Delta = .003$, nor the quadratic age term, $F(1, 276) < 1.00$, $R^2\Delta = .003$, made significant contributions. The $\text{Age}^2$ interactions, however, accounted for an additional 2% of the variance, $F(2, 274) = 3.62$, $p < .03$. Once again, only the interaction with gender was statistically significant, $t = -2.67$, $p < .01$. Among women, age had a curvilinear association with symptoms, whereas among men, the effect of age was linear.

## Across-Country Analyses

To test for interactions between age and country, analyses were conducted using the data from all three countries (see Table III). In these regressions, predictor variables were entered in three sets. The first set was composed of gender, education, severity of trauma, age, $\text{Age}^2$, and two orthogonal contrast codes that represented country. These contrast codes were scored and interpreted according to procedures outlined by Aiken and West (1991). The first code contrasted the United States (coded 2) with the two other countries (each coded $-1$), and the second code contrasted Mexico (coded $-1$) and Poland (coded 1). American respondents received scores of 0 (the mean) on the second contrast code. The second set of predictors was composed of 12 two-way interaction terms. Eight of the terms involved age effects: age and $\text{Age}^2$ with gender, trauma, and each country contrast code. To

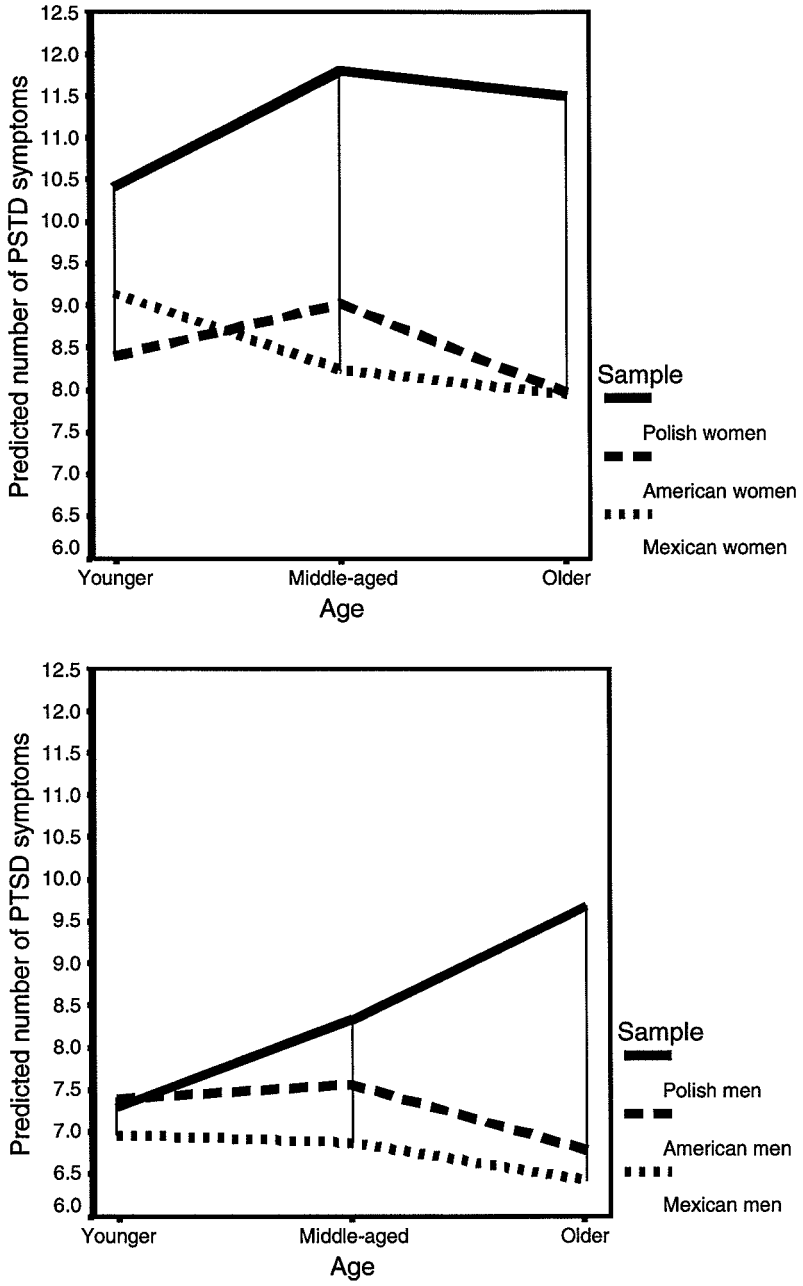


**Fig. 2.** Interaction of age, gender, and country in the combined sample. Values on the dependent variable were predicted from the nonstandardized coefficients for Age, Age$^2$, gender, the two country contrast codes, and the relevant interaction terms for points representing the combined sample's mean age (48), one *SD* below the mean (31), and one *SD* (65) above the mean. Among Americans, age had a curvilinear relation with PTSD such that middle-aged respondents were most distressed. Among Mexicans, age had a linear and negative relation with PTSD such that younger people were most distressed. Among Poles, age had a linear and positive relation with PTSD such that older people were most distressed. Among Poles, there was a gender difference, in that men exhibited only a linear trend and women exhibited both linear and quadratic trends (middle-aged and older adults both more highly affected than younger adults).

**Table III.** Predicting the Number of Criterion PTSD Symptoms: Betas From Across-Country Regression Analyses

| | Total | B | C | D |
|---|---|---|---|---|
| Set 1 | | | | |
| Gender | .23*** | .23*** | .17*** | .18*** |
| Education | −.15*** | −.11** | −.16*** | −.10* |
| Trauma | .36*** | .34*** | .28*** | .29*** |
| Age | .02 | .01 | .05 | −.00 |
| Age$^2$ | −.10** | −.12*** | −.05 | −.08* |
| U.S. vs. Mexico, Poland | −.13*** | −.22*** | −.17*** | .08* |
| Mexico vs. Poland | .20*** | .25*** | .24*** | .00 |
| Set 2[a] | | | | |
| Age × U.S. vs. Mexico, Poland | −.06† | | −.09* | |
| Age × Mexico vs. Poland | .12*** | −.08* | .11** | .11** |
| Age × Trauma | | −.06† | | |
| Age$^2$ × U.S. vs. Mexico, Poland | −.09† | | −.11* | −.09† |
| Age$^2$ × Mexico vs. Poland | | | −.08† | |
| Gender × U.S. vs. Mexico, Poland | −.07* | −.05† | −.09** | |
| Gender × Mexico vs. Poland | | .06† | | |
| Set 3[b] | | | | |
| Age$^2$ × Mexico vs. Poland × Gender | −.09* | −.09* | | −.09† |

*Note.* Betas are the values obtained upon entry.
[a]Two-way interactions that achieved the alpha level of .10 or less.
[b]Three-way interactions that achieved the alpha level of .10 or less.
†$p = .10$. *$p = .05$. **$p = .01$. ***$p = .001$.

control for the effects of gender and trauma, four of the terms represented the interactions of gender and trauma with each country contrast code. The third and final set of predictors was composed of three-way interactions between age or Age$^2$, gender, and one of the two contrast codes.

### *Predicting the Total Number of Criterion PTSD Symptoms*

The entire regression equation consisting of 23 predictor variables explained 33% of the variance in PTSD symptoms, $F(23, 725) = 15.32$, $p < .001$, $R = .57$, adjusted $R^2 = .31$. Together, the "main effects" accounted for 29% of the variance, $F(7, 741) = 42.77$, $p < .001$. Higher symptoms were associated with female gender, $t = 7.12$, $p < .001$; more severe trauma, $t = 10.97$, $p < .001$; and less education, $t = -3.88$, $p < .001$. The effect of the age-quadratic term, but not its linear term, was also significant, $t = -3.12$, $p < .005$, in the direction indicating that middle-aged respondents exhibited more symptoms. The effects of the contrast codes that represented country were also significant: Overall, after controlling for gender, trauma, education, and age, the American sample reported fewer symptoms than did the Mexican and Polish samples, $t = -3.86$, $p < .001$; and the Polish sample reported more symptoms than did the Mexican sample, $t = 5.42$, $p < .001$.

The 12 two-way interaction terms explained an additional 3.4% of the variance in PTSD symptoms, $F(12, 729) = 3.03$, $p < .001$. Four interactions appeared to be predictive of symptoms, and three of them involved age. Age interacted with the term contrasting Mexicans with Poles, $t = 3.36$, $p < .005$. The interaction of age with the contrast between

the American sample and the two other samples approached the alpha level of .05, $t = -1.83$, $p = .07$. Also approaching statistical significance was the interaction of Age$^2$ with the contrast between the American sample and the two other samples, $t = -1.88$, $p = .06$. These three interactions can be interpreted together. Poles of all ages reported more symptoms than did Americans and Mexicans, and that difference was most pronounced for older adults. Among Poles, age had a linear and positive relation with PTSD such that older people were most distressed. Among Americans, age had a curvilinear relation with PTSD such that middle-aged respondents were most distressed. Among Mexicans, age had a linear and negative relation with PTSD such that younger people were most distressed. The fourth interaction predictive of symptoms involved respondents' gender and the contrast comparing Americans with Mexicans and Poles, $t = -2.01$, $p < .05$. The difference between men and women was least pronounced in the American sample.

As a set, the four three-way interactions did not explain a significant amount of variance, $F(4, 725) = 1.46$, $R^2\Delta = .005$. However, the interaction of gender, Age$^2$, and the contrast between Mexicans and Poles was statistically significant, $t = -2.13$, $p < .05$. As shown in Fig. 2, this three-way interaction resulted mainly because of the differential function of age in predicting the symptoms for Polish males and females. Age had a clearly positive linear relation with PTSD for Polish men but a curvilinear relation with PTSD for Polish women. Mexican men and women both showed a negative linear relation.

### *Predicting Criterion B Symptoms*

All predictors together explained 36% of the variance in Criterion B symptoms, $F(23, 725) = 17.84$, $p < .001$, $R = .60$, adjusted $R^2 = .34$. The main effects accounted for 33% of the variance, $F(7, 741) = 52.56$, $p < .001$. Female gender, $t = 7.39$, $p < .001$; more trauma, $t = 10.70$, $p < .001$; less education, $t = -3.06$, $p < .005$; and middle age, $t = -3.73$, $p < .001$, were associated with greater intrusion. The American sample experienced less intrusion than did the Mexican and Polish samples, $t = -6.63$, $p < .001$, and the Polish sample experienced more intrusion than did the Mexican sample, $t = 6.98$, $p < .001$. The two-way interactions accounted for 2.5% of the variance in intrusion symptoms, $F(12, 729) = 2.35$, $p < .01$. Only one interaction was statically significant at the alpha level of .05. Age interacted with the term contrasting Mexicans with Poles, $t = 2.42$, $p < .03$. Among Poles, intrusion levels increased with age, whereas among Mexicans, intrusion levels decreased with age. Among Americans, intrusion levels did not vary with age.

The three-way interactions together did not explain significant variance in intrusions, $F(4, 725) = 1.34$, $R^2\Delta = .005$. However, the three-way interaction between gender, Age$^2$, and the contrast between Mexicans and Poles was significant, $t = -2.04$, $p < .05$, and its pattern was consistent with that described for the total number of PTSD symptoms.

### *Predicting Criterion C Symptoms*

The equation explained 27% of the variance in Criterion C symptoms, $F(23, 725) = 11.56$, $p < .001$, $R = .52$, adjusted $R^2 = .25$. The main effects accounted for 23% of the variance, $F(7, 741) = 30.97$, $p < .001$. Gender, $t = 5.02$, $p < .001$; trauma, $t = 8.06$, $p < .001$; and education, $t = -4.18$, $p < .001$, were predictive of avoidance/numbing symptoms, but age was not. American respondents exhibited fewer symptoms than did

Mexican and Polish respondents, $t = -4.65$, $p < .001$. Once more, Poles were more symptomatic than Mexicans, $t = 6.35$, $p < .001$. The two-way interactions explained 4% of the variance in avoidance and numbing symptoms, $F(12, 729) = 3.19$, $p < .001$. Age interacted both with the contrast between the American sample and the two other samples, $t = -2.52$, $p < .03$, and with the contrast between Mexicans and Poles, $t = 3.03$, $p < .005$. Age$^2$ also interacted with the contrast between the American sample and the two other samples, $t = -2.19$, $p < .03$. The interaction of Age$^2$ and the contrast between Mexicans and Poles approached significance, $t = -1.72$, $p = .09$. Among Americans, the level of Criterion C symptoms was lowest in the oldest group; younger and middle-aged adults did not differ. Among Mexicans, symptoms varied little with age, but there was a slight decrease between younger adulthood and middle age, followed by a slight increase thereafter. Among Poles, symptoms increased linearly as age increased. Gender significantly interacted with the contrast comparing Americans with Mexicans and Poles, $t = -2.66$, $p < .01$, in a pattern comparable to that found when the total number of PTSD symptoms was the dependent variable. The three-way interactions explained no additional variance in Criterion C symptoms, $F(4, 725) < 1$, $R^2\Delta = .003$.

### *Predicting Criterion D Symptoms*

The predictor variables jointly explained 19% of the variance in Criterion D symptoms, $F(23, 725) = 7.28$, $p < .001$, $R = .43$, adjusted $R^2 = .16$. The main effects accounted for 16% of the variance, $F(7, 741) = 19.58$, $p < .001$. Women, $t = 5.06$, $p < .001$; victims exposed to more trauma, $t = 8.23$, $p < .001$; persons with less education, $t = -2.47$, $p < .03$; and middle-aged adults, $t = -2.19$, $p < .05$, reported greater arousal. In contrast to the findings with the other outcome variables, the American sample exhibited more arousal than did the two other samples, $t = 2.05$, $p < .05$, which did not differ from one another. The two-way interactions accounted for 3% of the variance in arousal symptoms, $F(12, 729) = 2.00$, $p < .03$. Age interacted with the contrast between Mexicans and Poles, $t = 2.95$, $p < .005$. The relation between age and symptoms was again positive among Poles and negative among Mexicans. Arousal did not vary with age among Americans. The interaction of Age$^2$ with the contrast between Americans and others approached significance, $t = -1.75$, $p = .08$. The form was the same as described for the total number of symptoms. The contribution of the four three-way interactions entered together was not significant, $F(4, 725) = 1.00$, $R^2\Delta = .005$. However, the three-way interaction between gender, Age$^2$, and the contrast between Mexicans and Poles approached significance, $t = -1.81$, $p = .07$, also in a manner consistent with that described for the total number of PTSD symptoms.

## DISCUSSION

All three disasters examined here had serious consequences for mental health, regardless of survivors' age, gender, education, culture, and even severity of trauma. On average, these survivors experienced seven criterion symptoms, including three intrusion symptoms (Criterion B), two avoidance/numbing symptoms (Criterion C), and two arousal symptoms (Criterion D). This profile is only one avoidance symptom short of one that would meet

all symptom criteria for PTSD. Individual differences in the extent of suffering need to be interpreted in light of this collectively experienced distress.

All of the specific factors included in our analyses influenced the extent of distress to a greater or lesser degree. Severity of trauma was the most important predictor in all samples. This was true even though all respondents, including those with low scores on this measure, were exposed to disaster and typically experienced heavy material losses and social disruption. Nonetheless, the likelihood of developing symptoms of PTSD increased strongly as trauma increased. Persons who experienced neither injury nor life threat averaged five criterion symptoms, persons with one of these stressors averaged seven, and persons who experienced both of these major stressors averaged nine. The pivotal role of trauma in the development of PTSD has been observed in a number of other disaster studies (e.g., Gleser *et al.*, 1981; Thompson *et al.*, 1993). This may seem obvious, but it is nonetheless critical to minimize people's exposure to trauma. Disasters may not be preventable, but injuries and threats to life are.

Next to trauma, gender was the most important factor in predicting symptom outcomes. Regardless of country and consistent with most previous reports (Norris *et al.*, in press), women exhibited more symptoms of PTSD than did men. Here, women averaged eight criterion symptoms, whereas men averaged six. The effects of gender were greater in Mexico and Poland than in the United States but present in all samples. Hence, accounting for the effects of gender is a prerequisite for examining the effects of other variables, including age, in the aftermath of disasters. Surprisingly few studies have considered the joint effects of gender and age, an omission in the literature we sought to address.

Education was inversely related to symptoms. Across these samples, participants who lacked a high school education averaged eight criterion symptoms, whereas better educated participants averaged six. The importance of education as a protective factor has been long established in the stress literature (e.g., Kessler, 1982) because it is a proxy measure of social class and access to resources. The effect of education was strongest in Poland and Mexico, settings where the distribution of aid was thought to be less equitable and efficient than that in the United States.

Of the three samples studied, the Polish sample was the most severely distressed. Poles averaged eight criterion symptoms, Mexicans seven, and Americans six. In other studies, Poles have been found to score higher than Americans, as well as some other Europeans, on measures of distress, such as depression and hopelessness (Czapiński, 1992), suggesting that the norms for mental health may be different in Poland. It has been suggested that Polish cultural scripts sanction acceptance and expression of negative feelings, and it appears that Poles are not reluctant to share their distress (Doliński, 1996; Wierzbicka, 1994). In contrast, American culture encourages self-control, discourages expression of negative affect, and leads Americans to understate distress. Mexicans may fall somewhere in between these two modes of expression. Kleinman (1988; see also Ortega and Rosenheck, 2000) argued that, within the United States, persons of Hispanic descent are less hesitant to acknowledge symptoms than are persons of African and Anglo descent, because the latter are more likely to believe that symptoms reflect personal weakness rather than external burden. However, our findings cannot be totally attributed to these cultural scripts. In anticipation of these cultural propensities, we equated *somewhat*, *very*, and *extremely true* responses to scale items; between-country differences emerged nonetheless. Undoubtedly, the ecological contexts of these events played a substantial role. Although their economies are developing,

Mexico and Poland remain much poorer countries than the United States. They have fewer resources to devote to disaster relief and are less equipped to distribute the available resources equitably.

As for age, the predominant trend in the combined sample was curvilinear or quadratic. Both younger and older adults averaged seven criterion symptoms, whereas middle-aged adults averaged eight. Because the effects of age varied markedly across countries, however, such summary statements obscure rather than clarify the role of age in disaster recovery. The curvilinear function of age was most pronounced in the American sample. The finding that disaster-related symptoms peaked in middle age is in accord with a number of previous studies. Thompson *et al.* (1993) examined four different perspectives that might account for this pattern and concluded that the *burden perspective* best explained their results that middle-aged adults were most affected by Hurricane Hugo. From a burden perspective, middle-aged persons would be expected to be unduly distressed because they have a disproportionate share of familial and societal responsibilities. Their findings and ours concur with Price's earlier speculation that middle-aged adults typically have many responsibilities even before a disaster strikes and, thus, may feel overwhelmed and overburdened by the influx of additional obligations (Price, 1978).

In Mexico, on the other hand, the effect of age was linear in the direction indicating greater distress among younger adults. Anthropological research suggests that this finding may actually be quite consistent with the burden perspective discussed above. There is little question that position in the domestic life cycle is an important factor in determining the levels of stress and economic well-being for the Mexican family (Kuznets, 1976; Murphy and Selby, 1985; Murphy and Stepick, 1991). This is particularly true for households living at or below the poverty level. The middle class in Mexico enjoys long-term economic prospects that follow a pattern similar to that found in developed countries; that is, there are relatively high levels of economic stress during the middle stages of the domestic cycle as children come of age and require more and more expenditures (Kuznets, 1976; Murphy and Selby, 1985). Traditionally, among the Mexican poor, the model is quite different because they experience a relatively flat income stream over the course of the domestic cycle, and adults take on economic responsibilities for both their own children and their families of origin quite early in life. The problems for families grew in the 1990s as jobs became scarcer, wages fell, and prices rose. Today, young adults are facing pressures their parents never had (Gonzalez de la Rocha, 1988). Older adults, on the other hand, have passed through the trough of economic and domestic pressure. They own their homes and have modest pensions and generally are more content with their state of being than their children are.

A still different pattern emerged in Poland. In this case, the effect of age was also linear but in the direction indicating greater distress among older adults. This finding is consistent with recent studies predicting psychological well-being among Poles. In these studies, older people consistently have been found to have more depression and less life satisfaction than do younger people (Czapiński and Panek, 2000). Interestingly, this effect has emerged in the past decade since the political and economic transformation of Poland into a democratic society and market economy in 1989. It has been speculated that older adults are less well equipped to face the challenges of these changes because they learned very well how to cope with an idiosyncratic system that no longer exists (Czapiński, 1994). In contrast to previous writings on the "inoculation hypothesis" where prior experiences are thought to enhance the coping abilities of older people (Norris and Murrell, 1988), in this case, the

older generation's knowledge and skills do not transfer and may, in fact, be an obstacle to coping with a new set of demands and rules. In keeping with the burden perspective, it might be said that older Poles have been disproportionately burdened by change. Moreover, this disaster was one more disappointment for lives that have witnessed World War II and Nazi occupation, failure of communist ideals, political oppression, collapses of the Polish economy, and, most recently, a promise of better conditions that has not yet materialized. Our data also indicated the presence of a quadratic age trend in Poland, but only among women. This effect, although significant, was weak compared to the predominant linear trend.

The tests of the Age × Country interactions confirmed that these within-country age effects did differ significantly across countries. Thus, despite the complexity of our analyses, our conclusion is simple: there is no one effect of age; rather, the relative vulnerabilities of younger, middle-aged, and older adults depend upon the social, economic, cultural, and historical context of the disaster-stricken setting.

Before closing, a few limitations of our study must be acknowledged. The design was cross-sectional, the samples were not precisely representative, the measures were self-report and administered by lay interviewers, the postdisaster intervals were not exactly the same, and culture, event, and resources were confounded in our research. On the other hand, we trust that it is recognized that cross-cultural disaster studies are quite difficult to do (see Green, 1996, for an excellent discussion), and this study, to our knowledge, is the first to compare age effects across three distinct cultural contexts. Also, these disasters had a number of similarities. They all caused substantial injury and threat to life, as well as catastrophic levels of property damage. In each location, indigenous interviewers approached people in their current dwellings and interviewed them, using approximately the same standardized instrument. We gave considerable attention to establishing the linguistic and semantic equivalence of our measure of posttraumatic stress. We used an analytic approach that allowed us to control statistically for differences among age groups in severity of trauma and education. In each location, we used a sampling strategy that provided a good balance of people of different ages and walks of life. Although this strategy did not provide scientifically representative samples of the geographic areas, it did allow us to focus similarly on the most impacted neighborhoods and to create sex and age distributions that were approximately the same in each cultural group. This strategy sacrificed some external validity but increased the internal validity of these comparisons.

These data indicate that clinicians should be cautious in making clinical decisions that are based on gross generalizations (from previous studies and anecdotal evidence) that place older adults in the most or least vulnerable position in terms of acquiring PTSD symptoms. Because many factors impact symptom presentation, sweeping statements and stereotypes may lead to inaccurate assessment. It must also be remembered that a diagnosis of PTSD requires functional impairment as well as the presence of symptoms. Although the former can never be assumed to be synonymous with the latter, this may be especially true in the context of cultures that encourage expression of distress. Pathologizing what may be a normal response to extreme stress is inappropriate. Psychoeducational approaches that provide communities with information about normal versus severe or prolonged psychological reactions are needed to help victims in the recovery process. At a minimum, such approaches could normalize survivors' symptoms to reduce feelings of estrangement, increase social support, and identify persons who may need ongoing mental health services.

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