

Cumulative Adversity and Posttraumatic Stress Disorder: Evidence From a Diverse Community Sample of Young Adults

Donald A. Lloyd, PhD, and R. Jay Turner, PhD
Florida State University

The authors hypothesized that a history of adversities, whether they were objectively traumatic or not, predicts risk for 1st onset of PTSD. Survival analysis in a community sample of 1,803 young adults revealed that risk is associated with retrospectively reported adverse experiences that occurred in years prior to the focal traumatic event. Analyses control for clustering of events proximal to onset. Implications for etiology and preventive intervention are noted.

The primary determinant of posttraumatic stress disorder (PTSD) has been conceptualized in circular fashion. As O'Brien (1998) has noted, "At first glance there seems little point in studying the [etiology of post-traumatic illnesses]. The very definition includes the cause" (p. 83). The diagnosis requires exposure to a traumatic event such as combat, rape, natural disaster, witnessed violence, or sexual abuse. It is the event that is the focus of the distressing reexperiences and the intense feelings of fear, horror, or helplessness that characterize PTSD.

Despite the defined causal centrality of traumatic stress, the fact that only a minority of those who encounter such events experience the disorder underlines the importance of identifying other factors of risk significance. Paradoxically, acceptance of the prime etiologic significance of a stressful event presumed to be traumatic in nature has not been accompanied by a wider consideration of the stress hypothesis. This article addresses the question of the extent to which prior stressful experiences, whether or not they officially qualify as traumatic, increase the risk that a subsequent traumatic experience will result in PTSD. Stated most generally, the hypothesis is that social stress plays a causal role in PTSD that goes well beyond the focal traumatic experience. One or

both of two mechanisms may be involved in the hypothesized linkage between prior stressors and risk for PTSD. The impact of a severe event may be amplified in the presence of high levels of previous stress exposure, as has been suggested in relation to other forms of social stress (Brown & Harris, 1978; Paykel, 1978), or previous adversities may erode one's ability to cope with subsequent traumatic events.

Background

Evidence accumulated over the past 50 years has demonstrated an unequivocal link between social stress and a variety of health outcomes, including psychological distress and disorder (Holmes & Masuda, 1974; Holmes & Rahe, 1967; Rabkin & Struening, 1976; Thoits, 1983). Yet in more than 2 decades since PTSD was included in the diagnostic nomenclature, little consideration has been given to the role and significance of stress, other than that embodied in the focal event. Although the possibility that other events qualifying as traumas may be relevant for the disorder has received some attention (Breslau, Chilcoat, Kessler, & Davis, 1999; Nishith, Mechanic, & Resick, 2000), the etiologic role of prior stress in general has not so far been examined.

Accounts of inner city crime, suburban shootings, domestic violence, earthquakes, floods, child abuse, auto accidents, robbery, rape, and civil strife are commonplace in contemporary news. Using the fairly restricted definition of traumatic stress set forth in the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.; *DSM-III-R*; American Psychiatric Association [APA], 1987), studies suggested that a large proportion of young adults are exposed to at least one such life adversity. Breslau, Davis, Andreski, and Peterson (1991) reported an exposure rate of 39% in a

Donald A. Lloyd, PhD, and R. Jay Turner, PhD, Center for Demography and Population Health and Department of Sociology, Florida State University.

This work was supported by Grant 5 R01 DA10772 from the National Institute on Drug Abuse to R. Jay Turner. We thank the participants who made this study possible.

For reprints and correspondence: Donald A. Lloyd, PhD, Center for Demography and Population Health, Florida State University, Tallahassee, Florida 32306-2240. E-mail: dlloyd@fsu.edu

community sample aged 21–30 years. Studies by Bernat, Ronfeldt, Calhoun, and Arias (1998) and Norris (1992) of slightly older young-adult samples observed substantially higher rates of 67%. A similar lifetime rate of exposure was found for the population aged 15–54 years in the National Comorbidity Survey (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). A peak level of lifetime exposure of 71.6% among the middle aged (40–59 years), with a slight drop to 68.8% in the 60 years and older age category, has been reported by Norris (1992). Using a relatively comprehensive list of 19 traumatic events conforming to the expanded definition in *DSM-IV*, Breslau et al. (1998) observed a lifetime prevalence of exposure of 89.6%. If we assume that retrospective measures of the occurrence of at least one traumatic event are reasonably accurate, these figures indicate that exposure to such events is very common in the population and reasonably common even at early stages of the life course (Turner & Lloyd, 1995).

Conceptualization of what constitutes a traumatic event has varied over time. When the disorder was first included in *DSM-III*, the criteria (APA, 1980) specified “a recognizable stressor that would evoke significant symptoms of distress in almost everyone” (p. 238). *DSM-III-R* (APA, 1987) added that the event be “outside the range of usual human experience” (p. 250). The current version, *DSM-IV* (APA, 1994), no longer requires that the event be unusual per se, but it must involve “actual or threatened death or serious injury, or a threat to the physical integrity of self or others” (p. 427). In addition, the event must provoke a response involving “intense fear, helplessness, or horror” (p. 427). Throughout this evolution, the conception of traumatic stress has continued to refer to a qualitatively distinct class within the stress universe (Wheaton, 1994).

Studies consistently find that a far greater proportion of the population is exposed to a traumatic event than suffers from the associated disorder. Between 9% and 12% of young adults who were exposed to at least one traumatic event currently meet criteria for PTSD (Bernat et al., 1998; Norris, 1992). The lifetime rate of PTSD in the corresponding group is reported at 23.6% (Breslau et al., 1991). Thus, it appears that most individuals encounter at least one traumatic experience by the end of their 30s, approximately one quarter of whom suffer PTSD as a consequence.

The central question is why some exposed individuals develop PTSD, whereas others do not. Yehuda (1999) has argued that even genetic and biological explanations for differential vulnerability to PTSD must recognize the influence of environmental factors. One

line of inquiry has focused on variations in the nature of events defined as traumatic. Breslau et al. (1998) found that assaultive violence was more likely to result in PTSD than was the unexpected death of a loved one. Because unexpected deaths are a much more common experience, they are linked with a larger number of cases of PTSD. However, given exposure, the risk for PTSD is much higher in the case of assaultive violence. In their study of adolescents, Cuffe et al. (1998) found rape/sexual abuse to be the strongest predictor of PTSD, followed by witnessing an accident/medical emergency, then life-threatening crime. Similarly, Kessler et al. (1999) have reported differential risk across types of trauma, with rape, childhood physical abuse, and childhood neglect being much more likely to eventuate in PTSD than are other forms of trauma.

Other explanations for variations in the occurrence of PTSD following traumatic exposure have focused on individual differences in vulnerability. A recent review by Bowman (1999) argued that variation in risk for PTSD is more closely linked to personality and attitudinal vulnerability factors and pre-event experiences than to qualities of the traumatic events themselves. However, the pre-event experiences considered were limited to preexisting psychiatric illnesses. No evidence appears to be available on the significance of prior cumulative exposure to social stress. Breslau, Davis, Andreski, Peterson, and Schultz (1997) attributed the greater rate of PTSD among women compared with men to qualitative, though not quantitative, differences in exposure to traumatic stress and to differences in vulnerability due to preexisting psychiatric illnesses.

Recent research shows that prior exposure to traumas as defined above significantly increases the probability that a given trauma will result in PTSD (Andrews, Brewin, Rose, & Kirk, 2000; Bremner, Southwick, Johnson, & Yehuda, 1993; Breslau et al., 1999; Nishith et al., 2000). Turner and Lloyd (1995) showed that cumulative stress is a significant risk factor for psychological distress and disorders, but that study did not include PTSD. A handful of studies have reported that more general life stress *following* the occurrence of a major traumatic event such as combat or a natural disaster increases the level of PTSD symptoms (Epstein, Fullerton, & Ursano, 1998; Green & Berlin, 1987; Koopman, Classen, & Spiegel, 1994). Similarly, the cumulative level of exposure to life crises, in addition to recent stress, has been assessed in relation to the presence and severity of current PTSD among Holocaust survivors (Yehuda et al., 1995). But evidence on the significance of

nontraumatic adversities for the initial onset of PTSD does not appear to be available.

As previously noted, prior studies on the relevance for PTSD onset of exposure to stressors other than the focal event have considered only events that qualify as traumatic according to some version of the *DSM* (Bremner et al., 1993; Breslau et al., 1999; Bromet, Sonnega, & Kessler, 1998; Resnick, Kilpatrick, Danski, Saunders, & Best, 1993). In our view, such research has only partially addressed the question of the role and significance of prior social stress. This view is in accord with those of Shalev (1996), who has challenged the assumption that traumatic stressors form a distinct class of experience. He argued that the APA definition confounds the event with the individual's psychological response to the event and criticizes the notion that events as disparate as a car crash and the Holocaust can be regarded as conceptually similar.

In these analyses, we set aside the *DSM* distinction between traumatic and nontraumatic stressors, referring to them collectively as life adversities. We examine whether one's level of prior exposure to life adversities conditions the risk that subsequent exposure to trauma will eventuate in PTSD. We assess exposure to a broader array of life adversities than has

previously been considered and test our hypothesis in a representative community sample of young adults, because the relatively short period of recall presumably reduces problems associated with retrospective data.

Method

Sample

The sample consists of 1,803 young adults who are a representative subset of 7,386 former Miami-Dade public school students who participated in an earlier three-wave investigation (Vega & Gil, 1998). The sampling design yielded nearly equal proportions of Cuban, non-Cuban Hispanic, African American, and non-Hispanic White participants. All of the 410 girls and 1,273 of the boys from that sample were selected for follow-up. Because only a small number of girls had been included in the parent study, the sample was supplemented by 888 additional girls, randomly selected from the 6th–7th grade class rosters of the schools originally studied. Participants ranged in age from 18 to 23 (92% were 19–21) at the time of follow-up interviews, which were conducted between 1998 and 2000. Figure 1 summarizes the process of sample formation and reports follow-up success rates.

We are in agreement with the growing consensus in the field that race is more a social than a biological categorization that is akin to ethnic status (Williams, 1997). That there

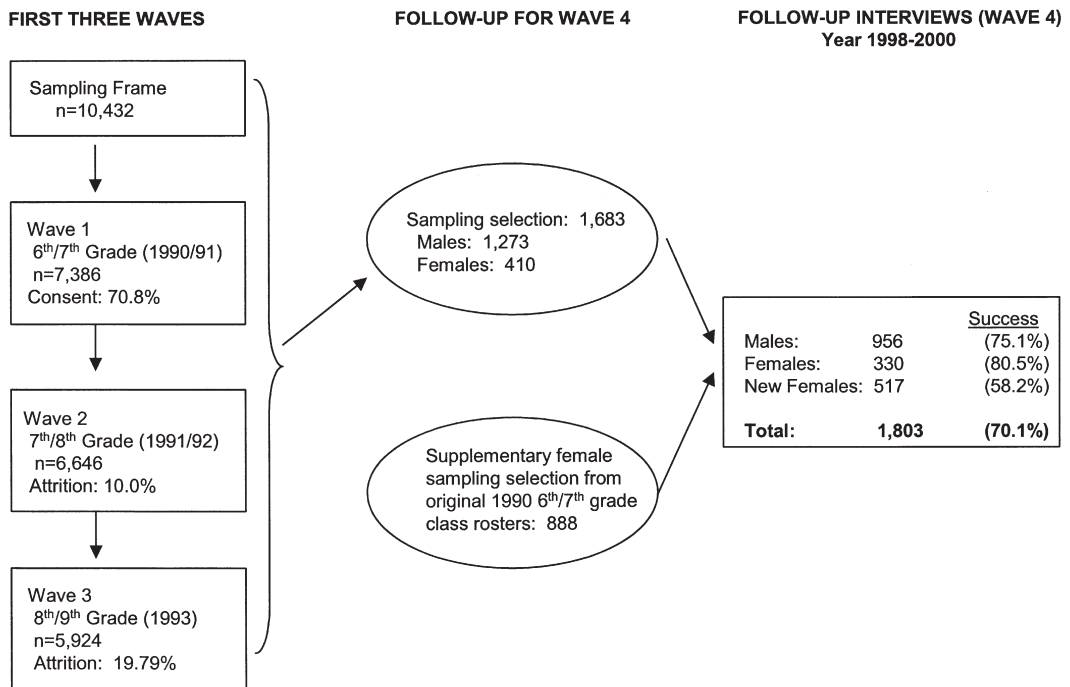


Figure 1. Sampling framework.

are important cultural variations within ethnic statuses also seems obvious. In an effort to minimize the effects of such variations on results, we have distinguished Cubans from other Hispanics and limited inclusion within this latter category to Hispanics from countries in the Caribbean basin. For the same reason, Haitians and other Caribbean Blacks were excluded from the African American subsample.

A total of 80 participants were excluded from the present analyses because of one or more data problems: Seventeen were of an ethnicity other than the four target groups, 13 were missing diagnostic data, 41 had an indeterminate PTSD onset age, 7 were missing socioeconomic data, and 2 had delayed onset of PTSD, which could produce overestimation of the effect of prior adversities. Our statistical results reflect poststratification weighting that adjusts the sample distributions of gender and ethnicity to conform to those of Miami-Dade County for the corresponding age group.

Measures

Data on the lifetime occurrence of adversities and PTSD were obtained through computer-assisted personal interviews. The present study used a substantially more comprehensive list of events than has previously been employed. Many studies examine the psychiatric consequences of a single traumatic experience, such as criminal victimization (Andrews et al., 2000), sexual assault (Nishith et al., 2000), disaster (Epstein et al., 1998), or combat exposure (Bremner et al., 1993). Larger scale representative community surveys typically cover a larger number of lifetime traumatic events; the National Comorbidity Survey asked about 12 (Kessler, Sonnega, et al., 1995), and the Detroit Area Survey 19 (Breslau et al., 1998). We employed a list of 41 adverse life experiences that were selected for their apparent relevance to a young and diverse urban population.

These experiences can be grouped under five headings. *Major life events* consist of 9 items that may be conceptualized as major but not violent stressors, such as parental divorce or failing a grade in school. *Life traumas* involve force or violence. The 13 questions under this heading include events such as rape, physical and emotional abuse, and being injured with a weapon. The third type of adversity is labeled *witnessed violence*. These items represent presence in dangerous or upsetting situations; the 6 questions in this category include seeing someone killed and witnessing serious physical or emotional abuse. Five questions are grouped under *traumatic news*. As recognized in *DSM-IV*, information about bad events even though one was not present, such as hearing of a friend's suicide, can be quite traumatic. The final category, *death events*, consists of 8 questions about whether relatives or close friends had died.

Participants were asked whether each event occurred. If it had, they were questioned on the number of times it happened and how old they were at the first and last occurrences. The measures of adversity within and across the five categories are a simple count of how many different events

had occurred. Multiple occurrences of the same event are not added to the count.

Diagnostic assessment of PTSD was based on the instrument employed in the National Comorbidity Survey (Kessler, Sonnega, et al., 1995), as modified by that research team to address *DSM-IV* criteria. Evidence in support of the validity of the National Comorbidity Survey instrument from a small validation study indicates good measurement properties, although it somewhat underdiagnosed PTSD compared with the results from a structured clinical interview (Kessler, Sonnega, et al., 1995).

We modified the PTSD module slightly in an effort to minimize false negatives. Following the set of questions about the occurrence of major and potentially traumatic events, respondents were asked to identify the worst event. Focusing on that event, they answered the usual series of questions reflecting the *DSM-IV* diagnostic criteria for PTSD. If there were too few positive responses in relation to that event to qualify for the diagnosis, respondents were asked to carefully review a printed list of qualifying symptoms and indicate whether they had ever had any of those experiences or feelings. "Yes" responses led to the identification of the event involved and a repetition of the PTSD symptom questions. We believe that this method represents an advance over the strategy of questioning respondents with respect to the two or three worst events, which assumes that other events never eventuate in PTSD.

Ethnicity was measured by respondents' self-reported ethnic group identification. Socioeconomic level was represented by a composite of the educational attainment, occupational prestige level, and household income of the youth's primary income-earning parent while he or she was in high school. Occupational information on the majority of respondents' parents was obtained directly from a parent, and the youth's report was used for the remainder. Parents' educational level was scored on a 5-point scale where 1 = less than high school, 2 = high school graduate, 3 = some post-secondary education, 4 = bachelor's degree, and 5 = graduate degree. Occupational prestige was coded with the Hollingshead (1957) index, which ranges from 1 = major professional to 7 = unskilled laborer. Family income was reported only in the parent interviews. As a result, no income information was obtained for approximately 40% of the sample. Income level was scored on an 11-point scale. The Hollingshead measure was reverse coded, and the three scores standardized. The sum of these scores divided by the number of components forms an equally weighted composite socioeconomic status score. The two-component and three-component measures are very highly correlated ($r = .97$).

As in most prior studies, these interview data are retrospective. It is understood that the validity of such reports is uncertain at best and that opinions of their usefulness vary widely. It should be noted, however, that much of the information we have on age cohort differences in substance and psychiatric disorders (e.g., Robins & Regier, 1991; Warner, Kessler, Hughes, Anthony, & Nelson, 1995), on lifetime comorbidity within and across these domains (Kessler,

Crum, Warner, & Nelson, 1997), on the social consequences of early onset psychiatric disorders (e.g., Kessler, Berglund, Foster, Saunders, Stang, & Walters, 1997; Kessler, Foster, Saunders, & Stang, 1995; Kessler, Walters, & Forthofer, 1998; Turnbull, George, Landerman, Swartz, & Blazer, 1990), and on the risk significance of early traumas for psychiatric and substance disorders (Kessler, Gillis-Light, Magee, Kendler, & Eaves, 1997; Turner & Lloyd, 1995) is based on retrospective reports obtained in various studies. The potential significance of such relationships and the need to better understand their correctness and meanings emphasizes the importance of maximizing the accuracy of the retrospective reports involved. Specifically, the central need is to effectively order within the life course the first onset of disorders and the occurrence of major and potentially traumatic life events.

In the present study, reported events and the onset of PTSD symptoms have been set in time with maximum care. Our interviewing process incorporated a locally constructed life calendar, fashioned after the work of Freedman, Thornton, Camburn, Alwin, and Young-DeMarco (1988). This tool is designed to clarify memory and enhance accurate recall. Prior to the start of the structured interview, participants engaged in a process of describing divisions in their lives in terms of three dimensions: where they lived; landmark events such as birth of a sibling, getting a driver's license, or leaving school; and names of teachers or best friends. Our experience suggests that this calendar provides an organizing framework that materially enhances the accuracy with which the temporal location and sequence of particular life circumstances and events can be recalled. During the course of the interview, reported adversities and the onset of PTSD were carefully located in time relative to these dimensions, to other adversities, and to episodes of other psychiatric disorders. This procedure and the fact that the recall period for this population was relatively short argue for the reliability of the data employed in our analyses.

Statistical Analysis

Our multivariate analysis uses discrete-time event history regression, a form of survival analysis suitable for social survey data (Allison, 1984; Singer & Willett, 1993). We use only data covering the time an individual is at risk for a first onset of PTSD. That includes the entire period of observation for those to whom an episode had never occurred, referred to as "right censored" observations. The total time at risk is divided into discrete periods. In the present analysis, data for the earliest 5 years are collapsed into a single period because there is inadequate variation for analysis within the earliest individual years. The remaining information is grouped into 17 one-year intervals representing ages 6 to 22. Survival time to the onset of PTSD among the 157 individuals who met the criteria for a lifetime diagnosis, and the entire time at risk among 1,566 right-censored subjects, is thus divided into a total of 26,702 person periods.

We refer to each year of age for which the conditional hazard of onset is estimated as an *index period*. The models distinguish adversities that are relatively proximal and distal with respect to this period. Proximal adversities are counts of events that occurred in the index period; this score does not include the focal event among those who met criteria for PTSD. We define distal adversities as the count of events that occurred during any period before the index period. The effect of time is controlled in the model to rule out potentially spurious association between the cumulating event exposure score and the risk of disorder onset attributable solely to their mutual increase with time. The coefficients for distal and proximal adversities each reflect the association of their respective scores with the conditional hazard of first PTSD onset at the age represented by a given index period, with the other factors in the model held constant.

The issue of central concern is whether higher lifetime exposure to adversity increases the risk that a subsequent stressor will result in PTSD. The analytic distinction between distal and proximal events permits an effective test of this hypothesis. Because the proximal adversities variable indexes the number of events experienced within the year of PTSD onset, it reflects the effects of event clustering. This allows assessment of the significance of prior (distal) adversities with proximal stressors and, hence, event clustering controlled. Our analysis thus evaluates the *independent* contribution of prior life adversities to PTSD onset risk.

Results

Lifetime prevalence rates for specific adversities vary from less than half of 1% for the death of one's own child to 47% for having witnessed a serious accident or disaster and for parental divorce. The modal number of experienced adversities is five, whereas the median number is seven. Only 8 respondents reported no exposure to any stressor in our inventory.

Within a survival analysis framework, we first examined the individual association of each of the 41 adversities with risk for initial onset of PTSD. This analysis ignores events that occurred at any age later than the age of PTSD onset and allows the estimation of odds ratios (ORs) adjusted for the effects of gender, ethnicity, and socioeconomic level. All tests were conducted at $\alpha = .05$, two-tailed.

Of the nine major life events, seven significantly predicted PTSD. The exceptions (having lived in an orphanage, group, or foster home and having had a child who died or was taken away at birth) were also the least prevalent events. The significant ORs vary somewhat in magnitude—from 1.7 for having failed a grade in school, parental unemployment, having been forced to live apart from parents, and parental divorce to 2.3 for being kicked out of the house and abandonment by a parent.

Table 1
Lifetime Prevalence of PTSD and Exposure to Adversities by Type Among Community-Dwelling Young Adults

Variable	Lifetime PTSD (%)	Group mean adversity counts					Total count
		Major life events	Life traumas	Witnessed violence	Traumatic news	Death events	
Male	7.6	1.69	1.88	2.25	1.78	1.00	8.60
Female	15.5	1.96	1.67	1.52	1.72	1.15	7.92
<i>p</i>	<.01	<.001	<.001	<.001	.339	<.001	<.01
Non-Hispanic White	9.7	1.46	1.92	1.54	1.58	1.04	7.54
Cuban	8.6	1.65	1.62	1.57	1.48	0.98	7.30
Non-Cuban Hispanic	12.4	1.89	1.65	1.70	1.60	0.96	7.80
African American	15.2	2.21	1.76	2.64	2.29	1.32	10.22
<i>p</i>	<.01	<.001	.056	<.001	<.001	<.001	<.001
Socioeconomic level							
Lowest quartile	13.9	2.11	1.79	1.99	1.78	1.07	8.75
Second quartile	14.8	1.96	1.78	2.11	1.83	1.13	8.80
Third quartile	8.5	1.86	1.73	1.88	1.76	1.04	8.28
Highest quartile	8.7	1.37	1.57	1.53	1.62	1.06	7.16
<i>p</i>	<.01	<.001	.203	<.001	.154	.516	<.001
Total	11.5	1.83	1.72	1.88	1.75	1.08	8.25
(SD)		(1.46)	(1.73)	(1.71)	(1.38)	(0.85)	(4.87)

Note. $N = 1,783$. Data reflect the application of poststratification weights to match the sample distribution to the population. $N = 1,774$ for the socioeconomic and PTSD distributions. Significance values for rate differences are from chi-square tests, and mean adversity count differences were tested with one-way analysis of variance. PTSD = posttraumatic stress disorder.

All but 2 of the 13 adversities under life traumas are associated with the onset of PTSD. The exceptions are having lost one's home because of a natural disaster and physical abuse by a parent. Adversities in this category most strongly related to PTSD include physical abuse by a spouse or partner (OR = 8.9), rape (OR = 6.7), other physical abuse (OR = 4.3), and having been shot or injured with a weapon (OR = 4.2). Six of the remaining 7 significant predictors have ORs greater than 2.

We asked six questions about witnessing violence, all of which were found to be significantly associated with PTSD. Four of the five traumatic news items were significantly associated with PTSD.

For the final category of life adversities, respondents were asked, "Has anyone close to you ever died?" There were eight categories of relationship to answer. The death of a spouse/boyfriend/girlfriend, a very close friend, and another loved one are significantly associated with PTSD, whereas no reliable association was detected with the deaths of a mother, father, sibling, child, or grandparent. Despite an extremely low prevalence, the OR for PTSD associated with death of a spouse/boyfriend/girlfriend was greatest, at 7.8.

The distributions of lifetime occurrence of PTSD and of cumulative lifetime adversity across gender, ethnicity, and socioeconomic level are presented in

Table 1. Significant differences in both rates of PTSD and total count of adversities are observed across categories of each social status variable. In the case of ethnicity, differences in total adversity correspond precisely with variations in risk for PTSD. The same can be said in the case of socioeconomic status when the upper half of the distribution is compared with the lower half. The results for gender are a clear exception to this pattern, with boys experiencing the highest level of total adversity and the lowest risk for PTSD.

Levels of exposure to four of the five subtypes of adversity vary significantly by gender. Boys report higher levels of life traumas and witnessed violence, whereas girls are exposed to more major life events and death events. Four of the five types are significantly associated with ethnicity; African Americans report the greatest level of exposure to major life events, witnessed violence, traumatic news, and death events. Only major life events and witnessed violence are significantly associated with socioeconomic level. Although not monotonic, the stress scores tend to be inversely correlated with this social status dimension.

The results of event history regression of PTSD onset on the cumulative adversity measures are shown in Table 2. The betas are logistic regression coefficients, the antilogs of which provide ORs, adjusted for the effects of other predictors in the model.

Table 2
Cumulative Adversities as Predictors of PTSD Onset in 26,702 Person Years Among 1,723 Community-Dwelling Young Adults

Variable	Model 1 b	Model 2 b	Model 3 b
Sociodemographic characteristics			
Above socioeconomic median	-.453**	-.375*	-.395*
Non-Hispanic White	-.214	.023	.039
Cuban	-.485*	-.308	-.280
Non-Cuban Hispanic	-.298	-.140	-.094
Female	.695***	.760***	.850***
Distal adversities			
Major life events		.261***	.231***
Life traumas		.031	.018
Witnessed violence		.181*	.145*
Traumatic news		.033	.037
Deaths		-.146	-.095
Proximal adversities			
Major life events			.415*
Life traumas			.766***
Witnessed violence			.365**
Traumatic news			.186
Deaths			.674***
Intercept	-2.198	-2.349	-5.409**
-2 log likelihood	1,840.955	1,802.970	1,696.724

Note. Results shown are from discrete-time event history analysis. Time of first onset of PTSD is estimated with binary logistic regression in person-period data. Survival time among the 157 respondents who met lifetime diagnosis for PTSD, and the entire time at risk among 1,566 right-censored subjects, is divided into a total of 26,702 1-year intervals. *Distal adversities* are counts of events reported as occurring during any period earlier than the index period. *Proximal adversities* are counts of events in the index period, excluding the focal event among those with PTSD. The effect of time, modeled as a cubic function, is controlled. The reference category for ethnicity is African American. Socioeconomic level is dichotomized at the median. PTSD = posttraumatic stress disorder.

* $p < .05$. ** $p < .01$. *** $p < .001$.

The African American group is the reference category for considering the effects of ethnicity. Thus, each coefficient represents a difference in PTSD onset risk between the ethnic group shown and African Americans. On the basis of the socioeconomic distribution of lifetime PTSD observed in Table 1, socioeconomic level is dichotomized at the median for this analysis.

Model 1 shows risk of onset differences by socioeconomic level, ethnicity, and gender. There is a significant PTSD risk difference between Cubans and the African American reference group, with the other social statuses controlled. As demonstrated in Table 1, girls are at significantly greater risk, and high socioeconomic status is associated with lower risk. Our test of the proportional hazards assumption (not shown) suggested no difference in these effects over time.

“Distal adversities,” as described above, are counts of events reported as occurring during any period earlier than the index period. The estimated effects of distal adversities represent the change in the average

conditional hazard of PTSD onset over time associated with the experience of each adversity. Model 2 shows that two types of earlier adversities, major life events and witnessed violence, predict the onset of PTSD in the ensuing year or later. When prior cumulative adversities are included in the model, the Cuban versus African American contrast drops from significance, and the coefficients for other ethnic differences are dramatically reduced. However, holding exposure to these early adversities constant was of minimal explanatory utility for either gender or socioeconomic status contrasts.

“Proximal adversities”—the counts of events in the index period that exclude the focal event among those with PTSD—are added in Model 3, where four of the five types are significantly associated with the onset of PTSD. Only the traumatic news category has no net relationship.

With proximal adversities in the model, the effect of distal adversities is interpreted as an independent

effect, with potential “clustering” controlled. The two significant prior adversity score coefficients show negligible change when current stress is taken into account—they remain significant predictors of subsequent first onset of PTSD. Associations with both gender and socioeconomic level remain clearly observable.

Discussion

Previous research had demonstrated that traumatic experience beyond the focal event increases risk for the onset of PTSD (Breslau et al., 1999; Resnick et al., 1993). The results reported here confirm those findings while expanding the range of stressors to be considered as potentially relevant to variations in risk. The 41 events assessed included many that clearly fall outside the criteria for traumatic experience even in *DSM-IV*, the most liberal version. A substantial majority of the adversities we measured are found to be significantly associated with PTSD with temporal order, gender, ethnicity, and socioeconomic level controlled. With death events, most of which were normative in nature, set aside, 28 of the remaining 33 proved significant.

These results are consistent with the hypothesis that the role of stress in the development of PTSD extends well beyond that of a single intensely violent or distressing event of the sort defined in the *DSM*. The finding that such diverse events predict PTSD appears contrary to the prevailing belief that only certain kinds of stressors matter for the disorder. However, because the individual adversities we found to be predictive of PTSD might or might not represent its focal event, at least two interpretations should be considered. The most apparent is that substantially more diverse events are focal candidates for PTSD than has been assumed. Whether this is so or not, some of the events significantly associated with PTSD may simply constitute markers of social contexts or personal histories that are characterized by multiple other adversities that include the focal event and represent, as has been shown, an additional source of risk.

The results on the social distribution of PTSD and of cumulative stress exposure reported in Table 1 are largely, but not completely, consistent with our general stress hypothesis. The gender difference in risk for PTSD was the opposite of the observed difference in cumulative stress exposure. But fully concordant results were obtained within the two status categories that most clearly index differences in social advantage and disadvantage. As Williams, Spencer, and Jackson (1999, p. 71) have noted, there is increasing

consensus that race is not a measure of biological distinctiveness but a gross indicator of distinctive social and individual histories. The corollaries and consequences of being African American undoubtedly include elevated exposure to a variety of social stressors, as the results in Table 1 confirm. Much the same can be said with respect to the corollaries and consequences of the social disadvantage implied by low socioeconomic status. Thus, disadvantaged status is associated with both significantly elevated risk for the experience of multiple adversities and greater risk for PTSD.

Our most specific test of the stress hypothesis was made with multivariate survival analysis. This demonstrated that both distal and proximal events aside from the focal event make significant independent contributions to the prediction of PTSD (though in this analysis we could not ensure that every proximal event preceded the onset of disorder). Evidence presented of the effects of distal and objectively nonviolent categories of adversity clearly indicates that events that few would define as either immediate or traumatic are nevertheless of significance for risk. The finding that the relationships between earlier adversities and the onset of PTSD hold when contemporaneous exposure to adversities is controlled bolsters this conclusion. These results collectively indicate that taking into account a broader range of adverse experiences than has been customary, even when they are relatively distant, contributes to the explanation of individual differences in the risk for PTSD.

Our findings show that the accumulation of objectively nonviolent experiences such as parental divorce and failing a grade in school, along with witnessing violence, represent significant distal predictors of PTSD. Among proximal adversities, those designated as life traumas and death events have the strongest impact. We interpret this to mean that prior adversities matter whether or not they are recent and whether they appear to be traumatic or relatively mundane in nature. These findings, from a representative community-based sample that is independent of treatment status, may inform clinical judgment from the perspective of evidence-based practice. They point, for example, toward a need to identify those with significant histories of cumulative adversity as preventive intervention targets. Second, they raise the hypothesis that prior social stress exposure may be a source of variation in the course and outcome of the disorder.

The evidence of the causal relevance for PTSD of lifetime exposure to social stress may also inform current etiological assumptions. It is clear from the results that the role of stress goes beyond the focal

traumatic event and appears to go beyond events that meet the *DSM-IV* definition of traumatic. We conclude that one factor that distinguishes those who develop PTSD following a traumatic event from those who do not is the person's history of exposure to prior adversities. Our survival analysis demonstrated clear effects of prior cumulative exposure to social stress on risk for subsequent PTSD onset with the effects of event clustering around the focal event controlled.

Our analyses employed a measure of lifetime adversity that is more comprehensive than has previously been tested—a measure that included many items that would not be judged as traumatic events by *DSM* standards. It is number of prior major adversities, whether or not they are “traumatic” in nature, that is associated with substantial increases in risk of PTSD onset in subsequent years.

Survival analysis enables a dynamic approach to the research question. Despite the well-known shortcomings of retrospective data, methods were used in this study to carefully determine the relative temporal location of adverse experiences and the manifestation of PTSD symptoms, set within the context of one's family history, school transitions, and other landmark life circumstances. When viewed within a survival analysis framework, this permits greater certainty about the direction of effects.

We judge our finding of these effects to be conservative. Despite the relatively comprehensive structure of our cumulative exposure index, it cannot be assured that it captures the full extent of variability in this dimension. The strength of employing a fixed list of items is that event counts are less influenced by a respondent's attributions for distress. Its weakness is that we can never know whether the scope of included events is adequate. We estimated cumulative exposure to adversities by counting only the first occurrence of each event. Though we asked respondents how many times each endorsed event had occurred, the count has uncertain meaning. Although often the response was “once” or “twice,” often it was “dozens” or “hundreds of times.” We chose to use the simple, more conservative, count score.

In this context, it must be acknowledged that the finding of no significant association between reporting physical abuse by a parent (on its own) and PTSD risk seems counterintuitive. We interpret this result as meaning that positive responses represented a wide variety of actual experiences; some were undoubtedly cases of what one would objectively define as physical abuse, but we assume that a significant proportion reflected complaints about relatively benign discipli-

nary practice by parents. In addition, it is not certain whether findings from this young adult sample will generalize to older populations.

The limitations of this investigation also include those that characterize all prior studies that have derived PTSD diagnoses from a single structured interview that does not involve clinical judgment. Because the data were obtained at one point in time, lifetime estimates of both exposure to adversity and the occurrence of PTSD rely entirely on recall. Although the young age of this cohort and the careful employment of the life calendar strategy presumably minimize such problems, they remain of some concern. The hypotheses investigated in this report would be more compellingly supported if the same data were prospectively gathered. However, there seems little prospect of a community-based study that will gather such data prospectively on a sufficiently large sample and over a long enough period to assess the central hypothesis examined here.

References

- Allison, P. D. (1984). *Event history analysis: Regression for longitudinal event data* (Sage University Paper series on Quantitative Applications in the Social Sciences, 07-046). Beverly Hills, CA: Sage.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Andrews, B., Brewin, C. R., Rose, S., & Kirk, M. (2000). Predicting PTSD symptoms in victims of violent crime: The role of shame, anger, and childhood abuse. *Journal of Abnormal Psychology, 109*, 69–73.
- Bernat, J. A., Ronfeldt, H. M., Calhoun, K. S., & Arias, I. (1998). Prevalence of traumatic events and peritraumatic predictors of posttraumatic stress symptoms in a nonclinical sample of college students. *Journal of Traumatic Stress, 11*, 645–664.
- Bowman, M. L. (1999). Individual differences in posttraumatic distress: Problems with the *DSM-IV* model. *Canadian Journal of Psychiatry, 44*, 21–33.
- Bremner, J. D., Southwick, S. M., Johnson, D. R., & Yehuda, R. (1993). Childhood physical abuse and combat-related posttraumatic stress disorder in Vietnam veterans. *American Journal of Psychiatry, 150*, 235–239.
- Breslau, N., Chilcoat, H. D., Kessler, R. C., & Davis, G. C. (1999). Previous exposure to trauma and PTSD effects of subsequent trauma: results from the Detroit Area Survey of Trauma. *American Journal of Psychiatry, 156*, 902–907.

- Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. L. (1991). Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry*, *48*, 216–222.
- Breslau, N., Davis, G. C., Andreski, P., Peterson, E. L., & Schultz, L. R. (1997). Sex differences in posttraumatic stress disorder. *Archives of General Psychiatry*, *54*, 1044–1048.
- Breslau, N., Kessler, R. C., Chilcoat, H. D., Schultz, L. R., Davis, G. C., & Andreski, P. (1998). Trauma and posttraumatic stress disorder in the community: The 1996 Detroit Area Survey of Trauma. *Archives of General Psychiatry*, *55*, 626–632.
- Bromet, E., Sonnega, A., & Kessler, R. C. (1998). Risk factors for *DSM-III-R* posttraumatic stress disorder: Findings from the National Comorbidity Survey. *American Journal of Epidemiology*, *147*, 353–361.
- Brown, G. W., & Harris, T. (1978). *Social origins of depression*. New York: Free Press.
- Cuffe, S. P., Addy, C. L., Garrison, C. Z., Waller, J. L., Jackson, K. L., McKeown, R. E., & Chilappagari, S. (1998). Prevalence of PTSD in a community sample of older adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *37*, 147–154.
- Epstein, R. S., Fullerton, C. S., & Ursano, R. J. (1998). Posttraumatic stress disorder following an air disaster: A prospective study. *American Journal of Psychiatry*, *155*, 934–938.
- Freedman, D., Thornton, A., Camburn, D., Alwin, D., & Young-DeMarco, L. (1988). The life history calendar: A technique for collecting retrospective data. In C. C. Clogg (Ed.), *Sociological methodology* (pp. 37–68). Ann Arbor: Institute for Social Research, University of Michigan.
- Green, M. A., & Berlin, M. A. (1987). Five psychosocial variables related to the existence of post-traumatic stress disorder symptoms. *Journal of Clinical Psychology*, *43*, 643–649.
- Hollingshead, A. B. (1957). *Two factor index of social position*. New Haven, CT: Author.
- Holmes, T. H., & Masuda, M. (1974). Life change and illness susceptibility. In B. S. Dohrenwend & B. P. Dohrenwend (Eds.), *Stressful life events: Their nature and effects* (pp. 45–72). New York: Wiley.
- Holmes, T. H., & Rahe, R. H. (1967). The Social Readjustment Rating Scale. *Journal of Psychosomatic Research*, *11*, 213–218.
- Kessler, R. C., Berglund, P. A., Foster, C. L., Saunders, W. B., Stang, P. E., & Walters, E. E. (1997). The social consequences of psychiatric disorders, II: Teenage parenthood. *American Journal of Psychiatry*, *154*, 1405–1411.
- Kessler, R. C., Crum, R. M., Warner, L. A., & Nelson, C. B. (1997). Lifetime co-occurrence of *DSM-III-R* alcohol abuse and dependence with other psychiatric disorders in the National Comorbidity Survey. *Archives of General Psychiatry*, *54*, 313–321.
- Kessler, R. C., Foster, C. L., Saunders, W. B., & Stang, P. E. (1995). Social consequences of psychiatric disorders, I: Educational attainment. *American Journal of Psychiatry*, *152*, 1026–1032.
- Kessler, R. C., Gillis-Light, J., Magee, W. J., Kendler, K. S., & Eaves, L. J. (1997). Childhood adversity and adult psychopathology. In I. H. Gotlib & B. Wheaton (Eds.), *Stress and adversity over the life course: Trajectories and turning points* (pp. 29–49). Cambridge, England: Cambridge University Press.
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*, *52*, 1048–1060.
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., Nelson, C. B., & Breslau, N. (1999). Epidemiological risk factors for trauma and PTSD. In R. Yehuda (Ed.), *Risk factors for posttraumatic stress disorder* (pp. 23–59). Washington, DC: American Psychiatric Press.
- Kessler, R. C., Walters, E. E., & Forthofer, M. S. (1998). The social consequences of psychiatric disorders, III: Probability of marital stability. *American Journal of Psychiatry*, *155*, 1092–1096.
- Koopman, C., Classen, C., & Spiegel, D. A. (1994). Predictors of posttraumatic stress symptoms among survivors of the Oakland/Berkeley, Calif., firestorm. *American Journal of Psychiatry*, *151*, 888–894.
- Nishith, P., Mechanic, M. B., & Resick, P. A. (2000). Prior interpersonal trauma: The contribution to current PTSD symptoms in female rape victims. *Journal of Abnormal Psychology*, *109*, 20–25.
- Norris, F. H. (1992). Epidemiology of trauma: Frequency and impact of different potentially traumatic events on different demographic groups. *Journal of Consulting and Clinical Psychology*, *60*, 409–418.
- O'Brien, L. S. (1998). *Traumatic events and mental health*. Cambridge, England: Cambridge University Press.
- Paykel, E. S. (1978). Contribution of life events to causation of psychiatric illness. *Psychological Medicine*, *8*, 245–253.
- Rabkin, J. G., & Struening, E. L. (1976). Life events, stress and illness. *Science*, *194*, 1013–1020.
- Resnick, H. S., Kilpatrick, D. G., Danski, B. S., Saunders, B. E., & Best, C. L. (1993). Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology*, *61*, 984–991.
- Robins, L. N., & Regier, D. A. (1991). *Psychiatric disorders in America: The Epidemiologic Catchment Area Study*. New York: Free Press.
- Shalev, A. Y. (1996). Stress versus traumatic stress: From acute homeostatic reactions to chronic psychopathology. In B. A. van der Kolk, A. C. McFarlane, & L. Weisaeth (Eds.), *Traumatic stress: The effects of overwhelming experience on mind, body, and society* (pp. 77–101). New York: Guilford Press.
- Singer, J. D., & Willett, J. B. (1993). It's about time: Using discrete-time survival analysis to study duration and timing of events. *Journal of Educational Statistics*, *18*, 155–195.
- Thoits, P. A. (1983). Dimensions of life events that influence psychological distress: An evaluation and synthesis of the literature. In H. B. Kaplan (Ed.), *Psychosocial stress: Trends in theory and research* (pp. 33–101). New York: Academic Press.

- Turnbull, J. E., George, L. K., Landerman, R., Swartz, M. S., & Blazer, D. G. (1990). Social outcomes related to age of onset among psychiatric disorders. *Journal of Consulting and Clinical Psychology, 58*, 832–839.
- Turner, R. J., & Gil, A. G. (2002). Psychiatric and substance disorders in South Florida. *Archives of General Psychiatry, 59*, 43–50.
- Turner, R. J., & Lloyd, D. A. (1995). Lifetime traumas and mental health: The significance of cumulative adversity. *Journal of Health and Social Behavior, 36*, 360–376.
- Vega, W. A., & Gil, A. G. (1998). *Drug use and ethnicity in early adolescence*. New York: Plenum Press.
- Warner, L. A., Kessler, R. C., Hughes, M., Anthony, J. C., & Nelson, C. B. (1995). Prevalence and correlates of drug use and dependence in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 219–229.
- Wheaton, B. (1994). Sampling the stress universe. In W. R. Avison & I. H. Gotlib (Eds.), *Stress and mental health: Contemporary issues and prospects for the future* (pp. 77–104). New York: Plenum Press.
- Williams, D. R. (1997). Race and health: Basic questions, emerging directions. *Annals of Epidemiology, 7*, 322–333.
- Williams, D. R., Spencer, M. J., & Jackson, J. (1999). Race, stress, and physical health: The role of group identity. In R. J. Contrada & R. D. Ashmore (Eds.), *Self and identity: Fundamental issues* (pp. 71–100). New York: Oxford University Press.
- Yehuda, R. (1999). Biological factors associated with susceptibility to posttraumatic stress disorder. *Canadian Journal of Psychiatry, 44*, 34–39.
- Yehuda, R., Kahana, B., Schmeidler, J., Southwick, S. M., Wilson, S., & Giller, E. L. (1995). Impact of cumulative lifetime trauma and recent stress on current posttraumatic stress disorder symptoms in Holocaust survivors. *American Journal of Psychiatry, 152*, 1815–1818.

Received June 4, 2001

Revision received October 28, 2002

Accepted February 25, 2003 ■