ORIGINAL ARTICLES: VARIOUS TOPICS

Trauma Exposure and Posttraumatic Stress Disorder: A Study of Youths in Urban America

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ABSTRACT   *We estimate the cumulative occurrence of traumatic events and posttraumatic stress disorder (PTSD), using* Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) *criteria, in a high-risk sample of young people in urban United States. The epidemiological sample (n=2,311) was recruited in 1985–1986 at entry into first grade of a public school system of a large mid-Atlantic city. Participants were interviewed about history of trauma and PTSD in 2000–2002 when their mean age was 21 years (n=1,698). We found that the lifetime occurrence of assaultive violence was 62.6% in males and 33.7% in females. The risk of assaultive violence in males (but not females) varied by childhood area of residence within the city; the occurrence of other traumas did not vary by area of childhood residence. Females had a higher risk of PTSD than males following assaultive violence (odds ratio=4.0, 95% confidence interval 2.0–8.3), but not following other traumas. A comparison of the results from this largely inner-city sample with the results from a recent study of a largely suburban sample in another region of the United States in which the same criteria and measures of trauma and PTSD were used suggested the possibility that males' risk for assaultive violence and females' risk for PTSD following exposure to assaultive violence might vary by characteristics of the social environment.*

KEYWORDS   *Assaultive violence, Urban youths, PTSD.*

In the background of this study is the consistent finding that a majority of residents in US communities have experienced one or more traumatic events that meet the stressor criterion for posttraumatic stress disorder (PTSD), as defined in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*).[1–6] Estimates vary with changes in the definition of qualifying stressors in successive *DSM* editions and with variations in the methods used to elicit history of traumatic experiences.[7] Estimates of the lifetime occurrence of PTSD have been relatively stable across studies.[5,7–9] A consistent finding across studies was a sex-related pattern showing (1) a higher occurrence of exposure to PTSD-level stressors in males and (2) a higher conditional probability of PTSD in exposed females.[4–11]

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In a previous report from our PTSD research group,[4] we presented estimates of exposure to traumatic events and PTSD in a community sample assessed in 1996 using the *DSM-IV* criteria.[3] The sample was drawn from the Detroit primary metropolitan statistical area, a six-county area containing more than 4 million people, 77% residing in suburban communities surrounding the city of Detroit.[4] The results revealed an interesting sex difference in the occurrence of trauma and PTSD, with variation across classes of traumas.

Specifically, we found that males' greater risk of experiencing traumatic events is true for assaultive violence, serious accidents, and witnessing violence, but not for disaster, sudden unexpected death of a loved one, or learning about various traumas to a loved one. With respect to females' greater risk of developing PTSD, we found that females had a greater risk for PTSD following assaultive violence, but not following other classes of trauma.[10] The excess occurrence of rape and other sexual assault among females (relative to males) did not account for females' excess risk for PTSD associated with assaultive violence as a composite category.

Similar patterns can be observed in other studies (e.g., Refs. 5, 6, 11). Further, in southeast Michigan, people of African heritage constituted the disadvantaged racial minority and had a higher risk of assaultive violence, as did residents of the inner city when compared to residents of the suburbs. Place of residence (urban vs. suburban) and racial minority status were highly confounded in that study because of the racial distribution of the population of the area. Consequently, urban residence could not be disentangled from racial minority status with respect to the risk of exposure to assaultive violence and the risk of PTSD.

In this study of a different epidemiological sample, we focused on traumatic events and PTSD among young people who had grown up in a large mid-Atlantic city in the United States. Although the sample was initially selected to represent neighborhoods of various socioeconomic and racial compositions, all were within an urban (as opposed to suburban) area. The purpose of this first report from this new study is to describe the cumulative occurrence of exposure to trauma and PTSD in this young urban cohort. A comparison of the results with the results from the 1996 Detroit Area Survey of a largely suburban sample in which the same measures were used might suggest aspects of exposure and PTSD that vary or remain constant across disparate social environments.

MATERIALS AND METHODS

Sample

Participants were two first-grade cohorts of students in 19 primary schools selected from a public school system of a large mid-Atlantic city of the United States (n = 2,311) The first cohort began school in the 1985–1986 academic year, and in 1986–1987, the second cohort started school.[12–14] The 19 schools were located in five prespecified urban areas, with residents ranging from very poor to low middle class and varying numbers of African American and non-Hispanic whites. The five different urban areas within the school district were selected with the involvement of the city planning department to represent between-area variation in ethnicity, type of housing, income, and other US Census characteristics.

Each area included three to four public elementary schools. All entering first graders in these schools were recruited. A central computerized school database

provided information on each child's sex, birth date, address, eligibility for subsidized school lunch, and race/ethnicity. Children were assessed from the first through the eighth grade. City public school records confirmed that 72.5% were registered as attending grade 9 of the city schools, and 68.3% attended grade 10.

Between 2000 and 2002, the original sample was traced and rerecruited. National Death Index searches through 2002 revealed that 32 persons (1.5%) of the initial sample had died. Nearly 75% of the surviving members of the cohort were interviewed (n = 1,698), including 154 participants located in incarceration facilities. Approximately 6% (n = 142) refused to be interviewed, and another 6% (n = 133) were traced, but could not be interviewed. We were unable to locate 312 persons (14% of those presumed to be alive). According to ZIP code information at the time of telephone interviews, conducted 1 year earlier with 88% of the cohort members who participated in this study, 80.3% resided within the city. Institutional review boards approved study protocols. Signed consent was obtained from parents for their child's participation in childhood and from each participant in young adulthood.

Table 1 describes the sample characteristics at first grade and at the follow-up assessment in young adulthood. After the exclusion of 32 decedents, attrition was slightly higher in males and in nonminority members, but did not vary by year of first grade entry or eligibility for subsidized lunch. Mean age at follow-up was 21 years. Age range was 19–24 years, but only a handful were older than 23 years.

The racial and economic composition of the five areas of childhood residence, as reported in the 1990 US Census,[15] is displayed in Table 2. Areas 2 and 3 were largely populated by African Americans, with high proportions of households with children under 18 years falling below the poverty line. Areas 1, 4, and 5 were better off economically (e.g., with lower percentage of households on public assistance or below the poverty level), but differed in racial composition.

TABLE 1. Sample characteristics at baseline and at follow-up: Data from 1,698 participants originally recruited in 1985/1986 at the time of entry into first-grade classrooms of an urban mid-Atlantic public school system and followed-up in 2000–2002

	Baseline (age 6 years) (n = 2,311), %	Follow-up (age 20–22 years) (n = 1,698), %
Sex:		
Females	50.2	53.2
Race:		
African Americans	65.5	71.0
First-grade lunch:		
Receiving free lunch	47.2	48.9
Urban area:		
1	15.2	12.7
2	22.4	23.3
3	23.8	26.8
4	21.0	21.9
5	17.6	15.3

TABLE 2. Characteristics of childhood area of residence (1990 US Census)

	Area 1, %	Area 2, %	Area 3, %	Area 4, %	Area 5, %
African Americans	4.7	71.2	92.7	66.9	14.7
Households on public assistance	9.4	32.4	30.3	8.0	5.3
Households below poverty	14.4	44.1	32.9	9.2	6.8
Households with children younger than 18 years old below poverty	17.7	55.8	41.0	10.0	8.1

Assessment of Traumatic Events and Posttraumatic Stress Disorder

The PTSD module was embedded within the face-to-face interview. Trained interviewers, blind to prior assessments, started each session with an approach designed to promote trust and rapport and to answer respondents' questions about the protocol, after which signed informed consent was obtained. The interview focused on the life history, health, and behavior of the young adult from first grade entry to the time of the assessment, with adapted life chart methods used to anchor important life events and to promote recall.[16,17]

The section on traumatic events was developed in the 1996 Detroit Area Survey.[4] It begins with a list of 18 events that operationalize the *DSM-IV* stressor criterion, the entire list of events used in the previous study except for combat experiences, which were unlikely to have been experienced by this young cohort. For each event in the list, respondents were asked if they had ever experienced an event of that type. An endorsement of an event type was followed by questions about the number of times it had occurred and the age of the respondent at each time. In cases with more than one traumatic event, a list of all the events reported by the respondent was read back by the interviewer, and the respondent was asked to identify the one event that was the "most stressful to you" (the worst). PTSD was evaluated for that event using the PTSD section of version 2.1 of the World Health Organization Composite International Diagnostic Interview.[18] A validation study found good agreement between this interview's diagnosis of PTSD and independent clinical reinterviews.[19]

Data Analysis

Data are presented on 18 individual types of traumatic events and four composite groups (see Table 3). Direct personal traumas were divided into two groups, separating events that involved intentional violence, referred to as *assaultive violence*, from other types of directly experienced traumas, referred to as *other injury* or *shocking experience*. The third group covers traumas involving *learning about traumatic events experienced by others*. The single event type *learning about the sudden unexpected death* of a family member or a close friend was separated from the third group.[4]

Because the assessment of PTSD focused on the trauma selected by the respondents as the worst, we evaluated the extent to which respondents' selection of trauma types as the worst departed from expected values, if all trauma types had equal prior probabilities of selection, using a Monte Carlo method (randomization test).[20] A rate distribution of each of the 18 traumas was generated in 500 computer sampling iterations drawn from the total pool of traumas reported by the sample, one per respondent with one or more trauma. The expected rate of an event type was

TABLE 3. Cumulative exposure to *DSM-IV* traumatic events by sex (odds ratios in footnote): Data from 1,698 participants originally recruited in 1985/1986 at the time of entry into first-grade classrooms of an urban mid-Atlantic public school system and followed-up in 2000–2002

	Total (n = 1,698), (n) %	Male (n = 794), (n) %	Female (n = 904) (n) %	Wald χ^2 (P)
Assaultive violence	**(802) 47.2**	**(497) 62.6**	**(305) 33.7**	**137.1 (<.0001)**
Rape	(95) 5.6	(9) 1.1	(86) 9.5	39.3 (<.0001)
Held captive/tortured/kidnapped	(35) 2.1	(19) 2.4	(16) 1.8	0.8 (.37)
Shot/stabbed	(241) 14.2	(195) 24.6	(46) 5.1	109.5 (<.0001)
Sexual assault other than rape	(109) 6.4	(18) 2.3	(91) 10.1	36.3 (<.0001)
Mugged/threatened with weapon	(609) 35.9	(437) 55.0	(172) 19.0	223.5 (<.0001)
Badly beaten	(172) 10.1	(118) 14.9	(54) 6.0	34.7 (<.0001)
Other injury or shocking event	**(869) 51.2**	**(487) 61.3**	**(382) 42.3**	**60.8 (<.0001)**
Serious car accident	(239) 14.1	(145) 18.3	(94) 10.4	21.1 (<.0001)
Other serious accident	(113) 6.7	(84) 10.6	(29) 3.2	33.3 (<.0001)
Natural disaster	(146) 8.6	(79) 9.9	(67) 7.4	3.5 (.06)
Life-threatening illness	(49) 2.9	(23) 2.9	(26) 2.9	0.0003 (.99)
Child's life-threatening illness	(26) 1.5	(3) 0.4	(23) 2.5	9.8 (.002)
Witnessed killing/serious injury	(610) 35.9	(382) 48.1	(228) 25.2	95.9 (<.0001)
Discovering a dead body	(128) 7.5	(74) 9.3	(54) 6.0	6.8 (.01)
Learning of traumas to close friend/ relative	**(866) 51.0**	**(411) 51.8**	**(455) 50.3**	**0.3 (.56)**
Close friend/relative raped/sexually assaulted	(521) 30.7	(222) 28.0	(299) 33.1	5.2 (.02)
Close friend/relative attacked	(409) 24.1	(240) 30.2	(169) 18.7	30.6 (<.0001)
Close friend/relative car accident	(358) 21.1	(179) 22.5	(179) 19.8	2.1 (.14)
Close friend/relative other accident	(146) 8.6	(79) 9.9	(67) 7.4	3.4 (.07)
Learning about unexpected death	**(881) 51.9**	**(431) 54.3**	**(450) 49.8**	**3.4 (.06)**
Any event	**(1,401) 82.5**	**(692) 87.2**	**(709) 78.4**	**21.9 (<.0001)**

Composite categories in which event types are grouped are highlighted in bold.

Male to female odds ratios: Assaultive violence = 3.3 (95% confidence interval [CI] 2.7–4.0); other injury or shocking event = 2.2 (95% CI 1.8–2.6); learning of traumas to close friend/relative = 1.1 (95% CI 0.9–1.3); learning about unexpected death = 1.2 (95% CI 1.0–1.4); any event = 1.9 (95% CI 1.4–2.4).

estimated by the median value from all 500 iterations. The *P* value is the percentile of the observed rate that an event type was selected as the worst relative to the median rate from the Monte Carlo procedure.

Based on respondents' reports of their lifetime history of events, we estimated the *rates of exposure* by chronological age using life table methods.[21] This is the "attack rate" at each age based on all respondents, including persons with prior exposures.[4] We used a series of analyses to estimate the association between occurrence of categories of trauma and membership in subgroups of the population. A similar set of analyses estimated the conditional risk of *DSM-IV* PTSD (lifetime) following exposure. Odds ratios for exposure and for PTSD following exposure by sex were estimated for the composite categories of events. In additional analyses, we estimated these associations and conditional risks taking into account the sampling design, which was based on clustering of students within schools. A variant of the Huber-White sandwich estimator of

variance was used to obtain robust standard errors and variance estimates.[22] Odds ratios (and confidence intervals) generated in these last analyses did not alter the estimates.

RESULTS

Cumulative Exposure to *DSM-IV* Traumatic Events

The vast majority of the sample (82.5%) had experienced one or more traumatic events up to the time of the interview. The single most commonly experienced event type was learning about sudden unexpected death of a close friend/relative (51.9%) (Table 3). The most frequent cause of sudden unexpected death of a loved one was homicide or murder: 26.1% of the sample experienced the sudden unexpected death of a close friend/relative by homicide or murder (not displayed in table). The category of assaultive violence was experienced by 47.2% of the sample, and the most common event type involving assaultive violence was having been mugged, held-up, or threatened with a weapon, which was experienced by 35.9% of the sample (Table 3).

Exposure to one or more traumatic events was higher in males than females, 87.2% versus 78.4% (*P* < .0001) (Table 3). The overall excess of males' exposure reflected males' higher cumulative incidence of the two composite categories of personally experienced events, assaultive violence (odds ratio [OR]=3.3, 95% confidence interval [CI] 2.7–4.0) and other injury or shocking event (OR=2.2, 95% CI 1.8–2.6). Odds ratios based on the clustered design of the data were 3.3 (95% CI 2.8–3.9) and 2.2 (95% CI 1.8–2.6). Among event types grouped under assaultive violence, rape and other sexual assault were more common in females, whereas other events were more common in males. The cumulative incidence of events in the composite categories of learning of trauma to close friend/relative and 'learning about sudden unexpected death of a loved one did not vary between the sexes (Table 3). This pattern of sex differences was observed in both African American youths and whites. In addition, African American males had a somewhat higher cumulative incidence of assaultive violence than white males (65.5% vs. 56.1%, respectively; *P*=.01); in females, there was no race difference in assaultive violence (33.2% in African Americans vs. 35.2% in whites; *P*=.57).

The Burden of Exposure to *DSM-IV* Traumatic Events

Of those who experienced any traumatic event, 15.8% were exposed to a single trauma, 12.4% were exposed to two, 11.9% to three, and 59.9% to four or more. The total number of *DSM-IV* traumatic events experienced in lifetime in this sample of young adults was 8,156, which yielded a mean of 4.8 per respondent. Mean number of traumas was considerably higher in males than females, 6.1 vs. 3.7, respectively (*t*=10.59, *P* ≤ .0001).

A higher proportion of males' burden of traumas was in the two personally experienced composite categories, 57.9% versus 44.3% of females' burden (Table 4). Of all assaultive violence experienced by males, 82.3% involved weapons (the combined figures of mugged, held-up, threatened with a weapon, and shot/stabbed). The corresponding proportion in females was 42.7%. Rape and other sexual assault constituted 8.6% of all the traumatic events experienced by females and 1.0% of all males' events. The pattern of sex differences in the distribution of traumas was the same in African Americans and whites.

TABLE 4.   Distribution of total burden of traumatic events across event types: Data from 1,698 participants originally recruited in 1985/1986 at the time of entry into first-grade classrooms of an urban mid-Atlantic public school system and followed up in 2000–2002

	Total events (n = 8,156), %	Male (n = 4,833), %	Female (n = 3,323), %
Assaultive violence	**25.8**	**28.7**	**21.9**
Rape	1.7	0.3	3.8
Held captive/tortured/kidnapped	0.6	0.5	0.8
Shot/stabbed	4.4	6.2	1.8
Sexual assault other than rape	2.3	0.7	4.8
Mugged/threatened with weapon	13.4	17.4	7.6
Badly beaten	3.4	3.6	3.1
Other injury or shocking event	**26.4**	**29.2**	**22.4**
Serious car accident	3.8	4.1	3.5
Other serious accident	1.8	2.3	1.1
Natural disaster	2.4	2.3	2.6
Life-threatening illness	0.7	0.5	0.9
Child's life-threatening illness	0.3	0.1	0.7
Witnessed killing/serious injury	15.4	17.8	11.8
Discovering a dead body	2.0	2.1	1.8
Learning of traumas to close friend/relative	**27.3**	**24.3**	**31.7**
Close friend/relative raped/sexually assaulted	10.1	7.4	14.1
Close friend/relative seriously attacked	8.7	8.9	8.3
Close friend/relative car accident	5.8	5.2	6.7
Close friend/relative other accident	2.7	2.8	2.6
Learning about unexpected death	**20.4**	**17.8**	**24.2**

Composite categories in which event types are grouped are highlighted in bold.

χ^2 for distribution of four composite event categories by sex = 149.21, df = 3, $P < .0001$.

Age-Specific Rates of Exposure to Traumatic Events

Figure 1 depicts the occurrence rates of exposure to trauma up to age 22–23 years (only nine respondents were older). The occurrence rate of the four event categories began to rise after age 15 years and peaked at age 16–17 years for assaultive violence and other injury or shock and at age 18–19 years for learning about trauma to and sudden unexpected death of a close friend/relative. The rate of assaultive violence dropped precipitously after age 17 years, and at age 20–21 years the rate returned to the level observed in early adolescence before it began to rise. The rates of other event categories showed a more gradual decline from their peak period.

A comparison of age-specific occurrence rates in males and females (not displayed), revealed stark sex differences in assaultive violence after 12–13 years of age. Although females' and males' rates peaked at 16–17 years of age, at that age females' rate was less than half the rate of males, 5–6% versus 15–16%.

Selection of Trauma Type as the Worst

Table 5 presents comparisons of the actual (observed) distribution of the worst events and the expected distribution if all trauma types had equal prior selection probability. Differences were evaluated for standard significance using α corrected for multiple comparisons.[23] The category of learning about sudden
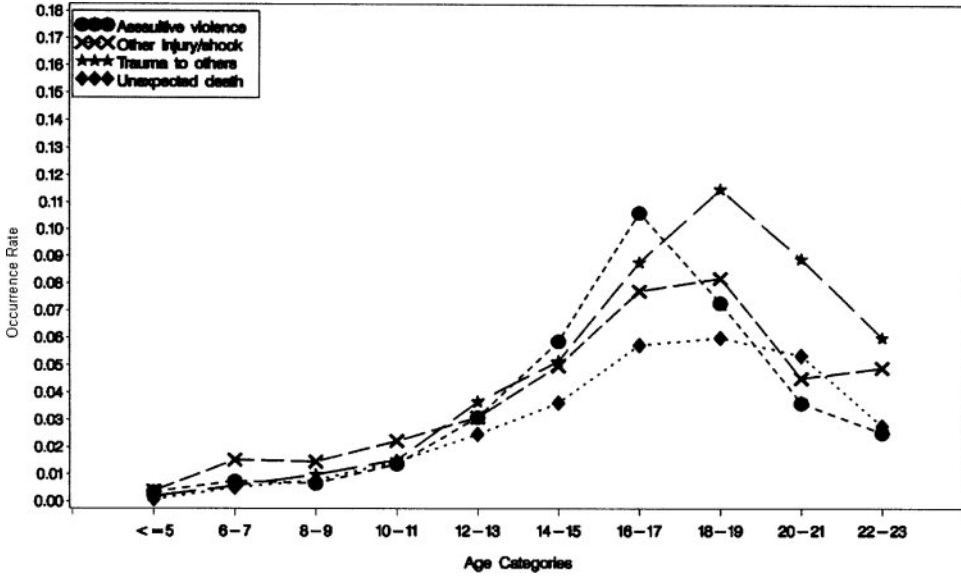
FIGURE 1. Occurrence rates of exposure to trauma. Data from 1,698 participants originally recruited in 1985/1986 at the time of entry into first-grade classrooms of an urban mid-Atlantic public school system and followed-up in 2000–2002.

unexpected death of a close friend/relative was overselected by the respondents as the worst event they had ever experienced (compared to expected values) at the expense of learning about traumas to a close friend/relative and, secondarily, other injury or shocking event, which were selected less frequently than expected (all $P < .05$). This pattern—the overselection of learning about sudden unexpected death—characterized both males and females (Table 5). Assaultive violence was overselected by females, but underselected by males. Further analysis showed that these patterns of sex differences characterized both African heritage youths and whites.

Exposure Across Childhood Areas of Residence, Race, and Subsidized School Lunch

We present in Table 6 sex-specific cumulative incidence of exposure across the five childhood areas of residence, subsidized lunch status, and race. With one exception—assaultive violence among males—cumulative occurrence of exposure to the composite categories of event type varied little across areas, between African Americans and whites, and between those who were and those who were not eligible for subsidized school lunch.

Cumulative occurrence of assaultive violence among males varied significantly across subgroups. Subsidized school lunch status and African heritage of male respondents were associated with a higher risk of exposure to assaultive violence: Odds ratio for subsidized school lunch=1.6 (95% CI 1.2–2.1) and for race=1.5 (95% CI 1.1–2.0). This was not true for other categories of traumatic events (all $P > .05$). In contrast with the results in males, childhood area of residence, eligibility for subsidized school lunch, and African heritage were unrelated to the risk of females' exposure to assaultive violence (Table 6).

TABLE 5. Selection of the worst events: comparison of actual (observed) with expected values: Data from 1,698 participants originally recruited in 1985/1986 at the time of entry into first-grade classrooms of an urban mid-Atlantic public school system and followed-up in 2000–2002

	All (n = 1,389)			Male (n = 685)			Female (n = 704)		
	Observed, %	Expected, %	P	Observed, %	Expected, %	P	Observed, %	Expected, %	P
Assaultive violence	**21.8**	**23.3**	**.080**	**22.6**	**29.4**	**<.001***	**21.0**	**17.7**	**<.001***
Rape	2.7	1.7	.002*	0.2	0.2	.628	5.3	3.3	<.001*
Held captive/tortured/kidnapped	0.7	0.3	.002*	0.9	0.3	.018	0.6	0.3	.278
Shot/stabbed	4.6	3.5	.008	7.7	5.7	.012	1.6	1.4	.726
Sexual assault other than rape	2.7	2.0	.008	0.9	0.4	.166	4.6	3.4	.050
Mugged/threatened with weapon	8.9	13.3	<.001*	11.1	19.4	<.001*	6.7	7.3	.310
Badly beaten	2.2	2.5	.272	1.9	3.2	.010	2.4	1.8	.182
Other injury or shocking event	**20.6**	**24.6**	**<.001***	**22.2**	**27.6**	**<.001***	**19.2**	**21.8**	**.040***
Serious car accident	3.6	3.8	.518	3.8	4.1	.480	3.4	3.6	.698
Other serious accident	1.2	1.4	.520	1.9	1.9	.806	0.6	0.7	.300
Natural disaster	1.4	2.6	<.001*	1.2	2.3	.008	1.7	3.0	<.001*
Life-threatening illness	0.9	0.9	.954	1.2	0.7	.242	0.7	1.0	.156
Child's life-threatening illness	1.4	0.7	<.001*	0.2	0.2	.394	2.6	1.3	<.001*
Witnessed killing/serious injury	10.7	13.4	<.001*	12.8	16.4	.004	8.7	10.3	.044
Discovering a dead body	1.4	1.8	.078	1.2	1.8	.090	1.6	1.8	.280
Learning of traumas to close friend/relative	**17.1**	**26.2**	**<.001***	**15.8**	**21.6**	**<.001***	**18.5**	**30.5**	**<.001***
Close friend/relative raped/sexually assaulted	6.7	10.6	<.001*	5.3	7.2	.010	8.1	13.8	<.001*
Close friend/relative seriously attacked	3.7	6.9	<.001*	4.4	7.2	<.001*	3.1	6.6	<.001*
Close friend/relative car accident	5.0	6.4	<.001*	5.1	5.4	.598	4.8	7.6	<.001*
Close friend/relative other accident	1.7	2.2	.130	1.0	1.9	.058	2.4	2.4	.830
Learning about unexpected death	**40.4**	**25.8**	**<.001***	**39.4**	**21.3**	**<.001***	**41.3**	**30.1**	**<.001***

Composite categories in which event types are grouped are highlighted in bold. Results from Monte-Carlo tests.

*Statistically significant at α corrected for multiple comparisons.

TABLE 6. Cumulative occurrence of exposure by childhood area, subsidized lunch status, and race: Data from 1,698 participants originally recruited in 1985/1986 at the time of entry into first-grade classrooms of an urban mid-Atlantic public school system and followed-up in 2000–2002

	Assaultive violence		Other injury or shocking event		Learning of traumas to close friend/ relative		Learning about unexpected death	
	%	Wald χ^2 (P)	%	Wald χ^2 (P)	%	Wald χ^2 (P)	%	Wald χ^2 (P)
Males (n = 794)								
Area								
1	59.5	10.4 (.03)*	58.6	3.0 (.56)	50.4	3.7 (.45)	48.6	6.0 (.20)
2	70.6		61.0		52.5		55.4	
3	64.2		64.7		46.6		59.3	
4	61.1		63.4		55.4		56.0	
5	53.2		56.4		54.8		47.6	
Lunch								
Free/reduced	67.3	9.1 (.003)	63.2	1.4 (0.24)	49.7	1.7 (0.19)	56.3	1.6 (.21)
Paid	56.9		59.1		54.3		51.8	
Race								
African-American	65.5	6.4 (.01)	62.6	1.2 (.28)	51.1	0.3 (.57)	58.0	9.9 (.002)
White	56.1		58.5		53.2		45.9	
Females (n = 904)								
Area								
1	32.7	0.3 (.99)	44.2	0.8 (.93)	55.8	5.2 (.27)	50.0	2.0 (.73)
2	34.7		41.6		47.5		50.2	
3	33.1		43.8		47.8		52.6	
4	33.2		41.3		49.0		45.9	
5	34.6		39.8		57.1		48.9	
Lunch								
Free/reduced	32.2	1.1 (.30)	40.7	0.9 (.34)	48.4	1.5 (.22)	49.4	0.01 (.91)
Paid	35.5		43.8		52.5		49.8	
Race								
African-American	33.2	0.3 (.57)	42.4	0.01 (.92)	47.9	5.8 (.02)	50.9	1.2 (.27)
White	35.2		42.0		56.8		46.8	

*Areas 2 and 3 were higher than area 5 (used as reference) at $P < .05$

Conditional Probability of Posttraumatic Stress Disorder Across Event Types

Of the total sample of 1,698 young people, 121 (7.1%) met criteria for *DSM-IV* PTSD in lifetime, 50 (6.3%) of males and 71 (7.9%) of females. Estimates of the conditional probability of PTSD (i.e., percentage of exposed persons who met PTSD criteria) appear in Table 7. The highest probability of PTSD was associated with assaultive violence, 15.1%, whereas the lowest probability was associated with learning about trauma to a loved one, 2.9%. The overall conditional probability of PTSD from any trauma was 8.8%.

With one notable exception, the conditional risk of PTSD associated with the four composite categories did not vary between males and females (Table 7). The exception was assaultive violence, which was associated with a significantly higher PTSD risk in females than males, 23.5% versus 7.1%, respectively ($P<.0001$). Odds

TABLE 7. Conditional probability of posttraumatic stress disorder (PTSD) across event types by sex (odds ratios in footnote): Data from 1,698 participants originally recruited in 1985/1986 at the time of entry into first-grade classrooms of an urban mid-Atlantic public school system and followed-up in 2000–2002

	Total		Male		Female			
	(n)	% PTSD	(n)	% PTSD	(n)	% PTSD	Wald χ^2	(P)*
Assaultive violence	**(304)**	**15.1**	**(155)**	**7.1**	**(149)**	**23.5**	**14.3**	**(.0002)**
Rape	(39)	46.2	(1)	100.0	(38)	44.7		(.46)
Held captive/tortured/ kidnapped	(10)	20.0	(6)	0.0	(4)	50.7		(.13)
Shot/stabbed	(64)	9.4	(53)	9.4	(11)	9.1		(1.00)
Sexual assault other than rape	(38)	29.0	(6)	50.4	(32)	25.0		(.33)
Mugged/threatened with weapon	(123)	4.1	(76)	2.6	(47)	6.4		(.37)
Badly beaten	(30)	13.3	(13)	0.0	(17)	23.5		(.11)
Other injury or shocking event	**(287)**	**6.6**	**(152)**	**7.9**	**(135)**	**5.2**	**0.8**	**(.36)**
Serious car accident	(50)	10.0	(26)	7.7	(24)	12.5		(.66)
Other serious accident	(17)	5.9	(13)	7.7	(4)	0.0		(1.00)
Natural disaster	(20)	0.0	(8)	0.0	(12)	0.0		
Life-threatening illness	(13)	23.1	(8)	37.5	(5)	0.0		(.23)
Child's life-threatening illness	(19)	5.3	(1)	0.0	(18)	5.6		(1.00)
Witnessed killing/serious injury	(149)	5.4	(88)	6.8	(61)	3.3		(.47)
Discovering a dead body	(19)	5.3	(8)	0.0	(11)	9.1		(1.00)
Learning of traumas to close friend/relative	**(238)**	**2.9**	**(108)**	**2.8**	**(130)**	**3.1**	**0.02**	**(.89)**
Close friend/relative raped	(93)	3.2	(36)	5.6	(57)	1.8		(.56)
Close friend/relative seriously attacked	(52)	1.9	(30)	3.3	(22)	0.0		(1.00)
Close friend/relative car accident	(69)	1.4	(35)	0.0	(34)	2.9		(.49)
Close friend/relative other accident	(24)	8.3	(7)	0.0	(17)	11.8		(1.00)
Learning about unexpected death	**(543)**	**9.0**	**(260)**	**9.2**	**(283)**	**8.8**	**0.03**	**(.87)**
Any event	**(1,372)**	**8.8**	**(675)**	**7.4**	**(697)**	**10.2**	**3.3**	**(.07)**

Composite categories in which event types are grouped are highlighted in bold.

Female-to-male odds ratios: Assaultive violence 4.0 (95% confidence interval 2.0–8.3); other injury 0.6 (95% confidence interval 0.2–1.7); learning about others 1.1 (95% confidence interval 0.2–5.1); unexpected death 1.0 (95% confidence interval 0.5–1.7); any event 1.4 (95% confidence interval 1.0–2.1).

*P for individual event types from Fisher's exact test.

ratio of females versus males was 4.0 (95% CI 2.0–8.3). Odds ratio based on clustered sampling design was 4.0 (95% CI 1.8–8.8). No significant race differences were detected, and the pattern of sex differences in the PTSD risk across event categories did not differ between the races (i.e., there were no race-by-sex interactions). Odds ratio for PTSD associated with assaultive violence in females versus males in whites was 3.3 (95% CI 1.1–10.1), and in African Americans was 4.4 (95% CI 1.7–11.5). The PTSD risk associated with assaultive violence as a composite category after excluding rape and other sexual assault, which occurred more frequently in females, was 12.7% in females and 4.7% in males (OR=2.9, 95% CI 1.1–8.0; P=.04).

The conditional risk of PTSD associated with *any event* was similar between the sexes, 10.2% in females versus 7.4% in males (OR=1.4, 95% CI 1.0–2.1; P = .07). Odds ratio based on school-clustered sampling design was 1.4 (95% CI 1.0–2.6; P=.04). The conditional risk for PTSD associated with any event did not vary by race, across childhood area of residence, or by eligibility for subsidized school lunch.

DISCUSSION

The key findings of this study of young adults from a large mid-Atlantic city in the United States are as follows.

1. A high proportion of males, 62.6%, had experienced one or more events involving assaultive violence; 55% had been mugged/threatened with a weapon, and 24.6% had been shot/stabbed.
2. Childhood areas of residence that varied in their socioeconomic and ethnic composition showed differences in males' risk for assaultive violence.
3. Males and females overselected learning about sudden, unexpected death of a close friend or relative as the worst event they had ever experienced compared to the expected value if all event types had equal prior selection probability.
4. The overall conditional risk of PTSD was 8.8%; the PTSD risk following assaultive violence was the highest (15.1%).
5. Females' conditional risk of PTSD following exposure to assaultive violence was higher than that of males; females' risk of PTSD did not exceed that of males following other event categories.
6. The conditional risk of PTSD and females' excess PTSD risk following assaultive violence did not vary by race, childhood economic status, or childhood area of residence.

A comparison of these results with the results of our 1996 Detroit Area Survey,[4] in which the same *DSM-IV* definition of traumatic events and PTSD and the same measurement procedures were employed, is of interest. Such a comparison might suggest insights into how an urban, inner-city population might vary from a suburban, middle-class population with respect to exposure to trauma and PTSD. Inferences from a comparison of the two studies are made in the context of several limitations. The two studies represent different regions of the United States. They also represent different age ranges of the population of the respective regions. The Detroit area sample encompassed a wide age range, 18–45 years, whereas the age of this sample ranged from 20 to 23 years. The two studies also varied in their sampling schemes: the Detroit Area Survey used a random-digit dialing probability sample of a defined geographic area, whereas this study used all entering students of 19 schools from prespecified areas of a city's public school system; the selection of schools was not random.

Despite these limitations, we wish to focus on the following contrast: The Detroit area sample was primarily (77%) suburban whites, whereas the sample of this study, both the African Americans and whites, attended a single public school system, and the majority of them continued to live within the city up to age 19–20 years. To our knowledge, there are no other epidemiological surveys with which this study can be directly compared. Two other studies[6,24] that used the *DSM-IV* PTSD definition adopted the trauma list from the National Comorbidity Survey, which was based on the narrower stressor criterion in *DSM-III-R*.[25]

We found that a higher proportion of this mid-Atlantic urban sample of young adults had experienced one or more events that involved assaultive violence compared with the sample of the Detroit Area Survey, which was largely suburban (see also Refs. 26 and 27 for risk factors for crime victimization). An interesting finding is that the difference was specific to males: 62.6% (95% CI 59.2–65.9) of males in this sample versus 43.3% (95% CI 40.0–46.6) of males in the Detroit area sample. The specific event types involving assaultive violence that were experienced more frequently by males in this urban sample versus the Detroit area sample were shot or stabbed (24.6% vs. 8.2%) and mugged, held-up, or threatened with a weapon (55.0% vs. 34.0%). In females, the cumulative occurrence of assaultive violence did not vary between the two studies: In each study, approximately one third of females experienced events in this category. Further, females' cumulative occurrence of rape and of other sexual assault was similar in the two populations[10]; similar estimates were reported in the National Comorbidity Survey.[5]

In this sample of young adults, we observed no more than a modest association of being African American with exposure to traumatic experiences. Specifically, we found a small racial difference in exposure to assaultive violence in males and no difference in exposure to any trauma category in females. Furthermore, the marked sex differences in personally experienced traumatic events were nearly uniform between the two race/ethnic groups.

The finding that learning about sudden, unexpected death of a loved one was grossly overselected as the worst (most stressful) event, compared to the expected value, is consistent with the results from the 1996 Detroit Area Survey.[28] It might have been assumed that the category of events involving assaultive violence would be the one overselected as the worst because such events tend to be threatening to one's life and physical integrity. However, the results from both studies did not bear this out. In each of the studies, assaultive violence was slightly underselected by males and slightly overselected by females. Further research of this pattern, including examination of methods of inquiry about the respondents' worst event, is warranted.

Overall, the conditional risk of *DSM-IV* PTSD associated with the worst event in this study was lower than the risk associated with the worst event in the 1996 Detroit Area Survey, 8.8% vs. 13.6%, respectively. Noteworthy is the females' lower conditional risk of PTSD in this study than in the Detroit Area Survey, 10.2% (95% CI 7.9–12.4) versus 17.7% (95% CI 14.8–20.6), respectively. As in the previous study, females' risk of PTSD associated with assaultive violence was considerably higher than their PTSD risk associated with other trauma categories, whereas males' risk for PTSD varied little across trauma categories. In statistical terms, we found the same interaction of sex by category of trauma as we observed in the Detroit Area Survey.[10] However, females' *absolute* conditional risk of PTSD associated with assaultive violence in this study was lower than in the previous study, 23.5% (95% CI 16.9–33.1) versus 35.7% (95% CI 24.7–46.7), respectively.

The similarity in the findings of the two studies, conducted on sociodemographically disparate populations in different regions of the United States, can be summarized as follows: In both studies, males were at higher risk for exposure to personally experienced trauma, primarily assaultive violence, and females were at greater risk for PTSD following assaultive violence, although the extent of the sex gap in males' exposure and in females' PTSD response to assaultive violence differed. Despite the overall lower conditional risk of PTSD in this study, the same rank order was observed across event categories with respect to the risk for PTSD.

The results of both epidemiological studies underscore the generalization that only a small minority of community residents who have experienced traumatic events meet the *DSM-IV* criteria for PTSD. Even among victims of assaultive violence—a trauma category associated with the highest PTSD risk—the vast majority do not develop PTSD. This consistent finding across epidemiological studies emphasizes the need for investigations of early factors that render some persons susceptible to the PTSD effects of trauma. Future analyses from this nonconcurrent prospective study will examine potential childhood antecedents of exposure to traumatic events and PTSD.

We also identified important differences in the findings of the two studies. First, differences in social environment, primarily the distinction between urban (in this study) and nonurban (i.e., majority suburban; in the 1996 Detroit Area Survey), appear to matter most for males' risk of exposure to assaultive violence. Second, the overall sex differential in the conditional probability of PTSD (from any trauma), observed in the Detroit Area Survey, was weaker in this mid-Atlantic sample, chiefly because of the smaller sex gap in the PTSD risk following assaultive violence in this study relative to the previous study. These findings, taken together, suggest that males' increased risk for assaultive violence experienced by persons who have grown up in an urban, largely inner-city, environment does not appear to be associated with a similar increase in females' risk for assaultive violence. Further, in an urban area, where assaultive violence is highly prevalent, females are not more, and might even be less, susceptible to PTSD when they are exposed to violence. The generalizability of these observed commonalities and differences deserves systematic research in other communities, with stressors and PTSD definitions and measurement held constant.

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