

## War Experiences and War-related Distress in Bosnia and Herzegovina Eight Years after War

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**Aim** To examine the relationship between war experiences and war-related distress in Bosnia and Herzegovina.

**Methods** The survey was performed in the late 2003 on a representative sample of 3313 respondents. The face-to-face interviews included 15 items on war-related distress and 24 items on war experiences. From these items we developed the War-related Distress Scale, the Direct War Experiences Scale, and the Indirect War Experiences Scale. Regression analysis was used to examine the relationship between war-related distress symptoms and war experiences variables, controlling for a range of other variables.

**Results** Almost half of the respondents did not report any war-related distress symptoms, while about 13% reported 7 or more symptoms. Direct war experiences had a significant effect on war-related distress even eight years after the war, while indirect war experiences showed no significant effect on war-related distress. We found that marital status weakly decreased war-related distress, while household size increased it.

**Conclusion** Direct war experiences seem to have a long-lasting traumatic effect on a substantial number of residents of Bosnia and Herzegovina.

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Bosnia and Herzegovina is a multi-ethnic state with Bosniacs (40%), Serbs (33%), and Croats (20%) as the largest ethnic groups. Their separate ethnic identities partly stem from different religious affiliations. Bosniacs belong to the Islamic, Croats to the Roman Catholic, and Serbs to the Orthodox tradition. The Bosnian war (1992-1995) was one of the most devastating wars in Europe since World War II. The most recent figures indicate that about 100 000 out of a population of 4.4 million were killed and at least as many were injured (1,2).

Thousands were killed in many massacres throughout Bosnia. The worst one took place in Srebrenica where as many as

8000 Bosniac men and boys were killed by Serbian forces. This massacre was later described as genocide by the International Criminal Tribunal for Yugoslavia (ICTY) in The Hague (3,4). More than two million people were driven away from their homes in the process of ethnic cleansing. According to the World Bank estimates, about 60% of all houses in Bosnia and Herzegovina, half of the schools, and a third of the hospitals were damaged or destroyed (5). War of such an intensity can leave no inhabitants untouched, though some were harmed far more than others (6,7).

Such traumatic, often life-threatening events have been reported to be the main factor predicting posttraumatic stress disorder (PTSD) (8-11). Research has also shown that the effects of war experiences may be present many years after the exposure to traumatic events (12-15). We will use the concept of war-related distress since our instrument measures war-related symptoms.

Our main explanatory variables are based on reported war experiences. In addition, there are many factors that may affect war-related distress, such as social support as well as control variables, including sex, age, education, socio-economic status, and ethnicity.

A number of studies showed that multiple exposures to traumatic events or cumulative traumas were associated with higher levels of psychological problems (16-21).

Studies among Cambodian and Bosnian refugees have shown that the exposure to a variety of adverse events was associated with an increasing risk of PTSD (11,22). Similar findings were obtained among asylum seekers (23) and refugees from diverse cultural backgrounds (24).

Some studies have shown that experiencing direct war violence is a stronger predictor of war-related distress than indirect war experiences (25,26). Another study found, howev-

er, high rates of war-related distress despite different degrees of direct exposure (27). We will argue that the distinction between direct and indirect war experiences influences the seriousness of the war distress. Our questionnaire included questions on events the respondents experienced directly, ie, witnessed personally, or that happened to their family or in their community; as well as questions on events the respondents experienced indirectly, ie, about which they were told, but did not personally witness.

Lack of social support may have a negative impact on physical and psychological health, while availability of social support may have a positive impact (28-31). So far, only a few studies have examined the relationship between social support and mental health in social systems which have experienced serious traumatic events (26). Although there are several components of social support (28), we focused on social support from close family relations, which is why we examined respondents' marital status and number of household members.

Earlier research has identified a range of risk factors for developing posttraumatic stress symptoms, such as female sex (20,26,32,33), age (34,35), socioeconomic status (26,36), level of education (26,33,35), and urban residence (26). To estimate the effects of war experiences on war-related distress we controlled for several socio-demographic variables. In addition, we also controlled for belonging to different ethnic groups (Bosniacs, Croats, and Serbs) and ethnic heterogeneous neighborhoods. The aim of this study was to examine whether war experiences have an effect on war-related distress even eight years after the end of the Bosnian war; whether direct war experiences have a stronger effect on war-related distress than indirect war experiences; and whether social support, such as marital status and household size buffers war-related distress.

## Participants and methods

### Study sample

The data source is the South-East European Social Survey Project (SEESSP), which took place in the period between December 2003 and January 2004 and covered most of the former Yugoslavia, with a total of 21 000 respondents. The SEESSP surveys measured socio-demographic and attitudinal variables, from ethnic relations to gender roles. The fieldwork for the survey was conducted by private survey organization PULS.

The survey in Bosnia and Herzegovina had an aim to provide the samples of the three main ethnic groups, which were large enough to allow ethnic group comparisons with a minimum of sampling errors. For this reason, three separate samples were chosen as follows: one from the Federation municipalities with predominantly Bosniac population, one from the Federation municipalities with predominantly Croat population, and one from the Republic of Srpska. Also, a sample from the municipality of Brčko was chosen. The predominantly Croat municipalities were oversampled relative to their share in the population, to yield estimates for Croats with smaller standard errors. Bosniac, and to a lesser extent Serb municipalities, were relatively under-sampled. As a result, the ethnic composition of our sample differs from the 1991 Census in which there were 43% of Bosniacs, 17% of Croats, and 43% of Serbs (Table 1). It also differs from more current estimates from the Central Intelligence Agency World Factbook for the year 2000, which state that there are 48% of Bosniacs, 14% of Croats, and 37% of Serbs (37).

When these samples are combined and properly weighted, we may obtain correct estimates of the national composition of the country as a whole. However, without a post-war census and with ambiguities in the defini-

**Table 1.** Characteristics of the respondents in the net sample

Characteristic	No. (%)
Geographical stratification: <sup>*</sup>	
Bosniac municipalities	1300 (39)
Croat municipalities	1000 (30)
Republic of Srpska	1013 (31)
Place of residence: <sup>†</sup>	
large city – 100 000 or more inhabitants	587 (18)
big town – 10 000 or more inhabitants	904 (28)
small town/village inhabitants	1793 (55)
Ethnicity:	
Bosniac	1304 (39)
Croat	831 (25)
Serb	1022 (31)
other	156 (5)
Sex:	
male	1515 (46)
female	1798 (54)
Age group (years):	
18-29	1066 (32)
30-49	1242 (38)
50-86	997 (30)
Marital status:	
single	1068 (33)
married	1807 (55)
divorced	106 (3)
widowed	303 (9)
Household size:	
1	320 (10)
2-3	1372 (42)
4 or more	1573 (48)
Education level: <sup>‡</sup>	
primary	656 (20)
vocational	882 (27)
secondary	1180 (36)
tertiary	595 (18)
Social class: <sup>§</sup>	
service	572 (18)
routine non-manual	322 (10)
skilled workers	847 (27)
unskilled workers	382 (12)
no class	1025 (33)
Net monthly household income (KM): <sup>  </sup>	
up to 500	1147 (35)
501 to 1500	1274 (38)
1501 and more	193 (6)
do not know/no income	699 (21)

<sup>\*</sup>Bosniac municipalities: Banovići, Bihać, Bosanska Krupa, Breza, Bugojno, Bužim, Cazin, Čelić, Centar Sarajevo, Doboj istok, Donji Vakuf, Fojnica, Goražde, Gornji Vakuf-Uskopje, Gradačac, Gračanica, Hadžići, Iliđa, Ilijaš, Jablanica, Kakanj, Kalesija, Kladanj, Ključ, Konjic, Lukavac, Maglaj, Mostar-Bosniac, Novi Grad Sarajevo, Novo Sarajevo, Novi Travnik, Olovo, Sanski Most, Sapna, Srebrenik, Stari Grad Sarajevo, Tešanj, Travnik, Tuzla, Vareš, Velika Kladuša, Visoko, Vitez, Vogošća, Zavidovići, Zenica, Živinice; Croat municipalities: Busovača, Čapljina, Čitluk, Dobretići, Domaljevac-Šamac, Drvar, Glamoč, Grude, Jajce, Kiseljak, Kreševo, Livno, Ljubuški, Mostar-Croat, Neum, Odžak, Orašje, Posušje, Prozor-Rama, Široki Brijeg, Stolac, Tomislavgrad, Usora, Žepče; Republic of Srpska municipalities: Banja Luka, Bijeljina, Bileća, Bosanski Brod (Srpski brod), Bratunac, Čajniče, Čelinac, Derventa, Doboj, Foča (Srbijne), Gacko, Gradiška, Istočna Ilidža (Srpska Ilidža), Knežev, Kotor Varoš, Kozarska Dubica, Laktaši, Lopare, Modriča, Mrkonjić-Grad, Nevesinje, Novi Grad, Novo Goražde (Srpsko Goražde), Osmaci, Pale, Petrovo, Prijedor, Prnjavor, Rogatica, Samac, Šekovići, Šipovo, Sokolac, Srbac, Srebrenica, Lukavica (Srpsko Novo Sarajevo), Teslić, Trebinje, Ugljevik, Višegrad, Vlasenica, Zvornik;

Brčko (neither in the Federation nor in the Republika Srpska).

<sup>†</sup>Place of living is based on the question about the population density of the place where the respondents were living at the time of the interview. The original 8 categories on the card shown to the respondents were collapsed into the 3 categories shown in the table.

<sup>‡</sup>Educational level is a collapsed version of 14 categories on the card shown to the respondents.

<sup>§</sup>Social class is constructed from a classification of respondent's main occupation based on the present or former occupation. The original 17 categories were collapsed into a set of four classes to simulate the Erikson and Goldthorpe class schema (41) In addition, the fifth "class" consists of respondents with no class assigned, ie, persons that had never had an occupation or who did not answer the question.

<sup>||</sup>Net monthly household income is collapsed from 28 categories on a card of income intervals shown to the respondents.

tion of residence, such estimates, especially for municipalities, are imprecise and subject to debate. In these analyses, we used combined samples without weights. We did this to improve the standard errors for ethnic Croats and to keep our tests of significance as accurate as possible. Since we used multivariate models in which ethnic group was a control variable, the ethnic composition of the sample does not directly bias the effects of other variables.

All of the large and medium sized Bosniac, Croat, and Serb municipalities were included, as well as a random sample of smaller municipalities, making it a total of 114 municipalities from all cantons (including Brčko). This sample of municipalities was drawn up by two of the largest survey sampling organizations in Bosnia and Herzegovina, Mareco Index Bosnia and PULS. Within the selected municipalities, households were selected proportional to the estimated municipality size, so the unweighted sample is representative of the distribution of persons across municipalities within each of the three major sample regions.

The geographical starting points were chosen by the survey agency on the basis of maps of the settlements (divided into urban and rural areas), and clusters of eight respondents were interviewed for each starting point. A single respondent from each household was interviewed, with households selected as approximately every fourth household in a specified walking pattern beginning with the starting point. Within households, the respondent was selected from household members aged 18-90, using the "nearest birthday" method. After the initial survey analyses, it was estimated that local minorities within municipalities predominantly inhabited by one ethnic group (for example, Bosniacs within predominantly Croat municipalities) were underrepresented. However, there are relatively few

such persons. To correct for this, small supplemental samples were taken from residential enclaves of such minorities.

In the absence of a complete population register or a post-war census, this is the best sample method possible, used in the best available large representative social surveys for Bosnia and Herzegovina. Migration, emigration, mortality, and fertility have clearly changed the demographic structure since the last, 1991 census. Even the basic demographic distributions are not precisely known, particularly for geographical areas within the country. Thus, we cannot compare our sample by education or profession with other estimates for 2003-2004, based on substantially larger samples and better sampling methods. According to United Nations Population Division estimates of the overall age and sex distribution for persons in the age range 20-89 in Bosnia and Herzegovina for 2005, there were 48% of men and 52% of women, compared with 46% of men and 54% of women in our unweighted sample. United Nations estimated (38) that the percentage of population in the age groups 20-34, 35-59, and 60-89 was 30%, 45%, and 25%, respectively, while according to our estimates there were more young people and fewer old people (Table 1). In our analyses, we controlled for age and sex. Re-weighting to match the UN estimates did not substantially change our estimates and decreased the accuracy of our significance tests.

Respondents were told that participation was voluntary and provided verbal informed consent. The overall refusal rate was approximately 30%. The face-to-face interviews were conducted by survey organization employees. The names and addresses of the respondents, as well as the original questionnaire, were strictly confidential. We were concerned that some questions were somewhat "disturbing," but according to pre-tests the respondents did

not find this to be a problem. Moreover, they reported that they appreciated being able to report what they had witnessed.

### The War-related Distress Scale

We employed the War-related Distress Scale consisting of 15 dichotomous items, already used in a survey in Croatia in 1996 (26). The sequence of identically formatted questions was preceded by a brief introduction (Table 2). The items are presented in the order they were posed to the respondents, with "Yes" and "No" as response categories. The percentages of respondents who reported the various types of war-related distress symptoms are shown in the "Yes" column.

To check whether the 15 items form a one-dimensional War-related Distress Scale with desirable psychometric properties, we used the Mokken scaling model (39) as implemented in the computer program Mokken Scaling Program version 5 for Windows (40). A Loewinger's coefficient H of 0.55 indicates a strong Mokken scale. This means that the re-

sponse to the items displays a cumulative pattern. The reliability, as measured by  $\rho$  in the Mokken scaling model, is 0.92. The War-related Distress Scale was computed as the sum of valid answers, 0 or 1, for the 15 items. Respondents with less than 13 valid answers were set to a missing value for the scale and excluded from the analyses involving the War-related Distress Scale. The distribution of the scale showed a strong clustering at the lower end. The skewness of the scale led us to the question whether it was suitable to apply ordinary least squares regression analysis. Rather than abolishing our intent to use this technique, we decided to supplement it by dichotomizing the scale based on the threshold of seven or more reported war-related distress symptoms. About 13% of the respondents exceeded this threshold.

### The war experiences scales

The war experiences section in the interview included 24 identically formatted questions in two blocks, which were the basis for deriving

Table 2. War-related distress in Bosnia and Herzegovina in 2003-2004, percentages; n=3313 for percentages, n=2893 for the Mokken scaling analysis

War-related distress items*	No. (%) of total sample			H <sub>i</sub> †
	yes	no	don't know/ no answer	
1. Recurrent and bothersome thoughts or memories about a traumatic war-related event?	1030 (31)	2167 (65)	116 (4)	0.62
2. Recurrent distressing dreams about a traumatic war-related event?	685 (21)	2502 (76)	126 (4)	0.54
3. Recurrent sense of reliving past war-related distress in the present, such as flashbacks?	537 (16)	2621 (79)	155 (5)	0.51
4. Persistent intense emotional or physical distress at exposure to cues that symbolize or resemble an aspect of war-related distress (within you or outside)?	451 (14)	2708 (82)	154 (5)	0.57
5. Persistent avoidance behaviors, thoughts, or feelings related to war-related distress, such as avoiding certain conversations, ideas, or activities that arouse painful memories?	541 (16)	2612 (79)	160 (5)	0.50
6. Persistent loss of memory for important parts of a war-related distress?	303 (9)	2856 (86)	154 (5)	0.50
7. Markedly diminished interest or participation in usual activities?	287 (9)	2879 (87)	147 (4)	0.59
8. Persistent feelings of being detached or estranged from others such as family members with whom you have felt close?	275 (8)	2905 (88)	133 (4)	0.59
9. Persistent reductions in the ability to feel your emotions or feelings of emotional numbness?	404 (12)	2759 (83)	150 (5)	0.53
10. A persistent sense of a foreshortened future?	1119 (34)	2047 (62)	147 (4)	0.58
11. Persistent difficulty falling or staying asleep?	493 (15)	2691 (81)	129 (4)	0.50
12. Persistent irritability or outbursts of anger?	444 (13)	2740 (83)	129 (4)	0.54
13. Diminished ability to concentrate?	563 (17)	2610 (79)	140 (4)	0.55
14. Being easily startled or panicked frequently?	603 (18)	2572 (78)	138 (4)	0.54
15. Significant impairment in social, occupational, or other important areas of functioning (as a result of emotional distress)?	288 (9)	2851 (86)	174 (5)	0.60
Scalability, H				0.55
Reliability, $\rho$				0.92

\*Introduction to war-related distress questions: "Now we want to ask you some questions about your thoughts and feelings, some maybe due to the war, others about your feelings in general. We appreciate that these are private feelings. But, we definitely will not reveal anything about your answers personally. You will see that it should be interesting and important to know how many people feel the kinds of feelings and thoughts that you do. Or how many do not. There are no "right" or "wrong" answers; we only want to find out how many people have these kinds of feelings or experiences."

†H<sub>i</sub> – Loewinger's H, the measure of scalability in the Mokken Scaling Program. The coefficient is computed for each item (H<sub>i</sub>) and for the total scale (H);  $\rho$  – the measure of reliability in the Mokken scaling model.

our scales. The first block, with 13 questions, dealt with personal, direct experiences of violence. The second block, with 11 questions, dealt with indirect experiences of violence, ie, those that happened to the family and friends of the respondent and in the respondent's community.

We argued that direct war experiences may have a more powerful effect than indirect war experiences. Initial analyses supported this by indicating that the two blocks of items tap different dimensions. Therefore, we decided to search for scales among the items within each block by means of the Mokken Scaling Program (Table 3). There were 13 questions on direct experiences. Only one of them, the item 13 "You having to leave the country" did not scale. The remaining items formed a strong

Mokken scale, indicated by a scalability coefficient of 0.49 and a reliability coefficient of 0.86. Looking at individual items, the  $H_i$  showed more variation than for the War-related Distress Scale. The poorest item in terms of the scalability was the item 12: "being forced to leave one's home" with  $H_{12} = 0.31$ , just above the minimum inclusion criteria of 0.30 (Table 3).

Questions on indirect exposure to violence were analyzed in the same manner as the questions on direct exposure. The outcome of the scaling analysis was even better; the overall H was 0.56 and the reliability was 0.88. The individual items showed better scalability than in the previous analysis, the lowest coefficient was  $H_{13} = 0.45$ , and no items had to be rejected.

**Table 3.** War experiences in Bosnia and Herzegovina, in retrospect from the interviews in 2003-2004, percentages; n = 3313 for percentages, n = 2848 for the Mokken scaling analysis

	No. (%) of total sample			$H_i^\dagger$
	yes	no	don't know/ no answer	
<b>Direct war experiences of*</b>				
1. Shooting (even if no one was hurt).	2649 (80)	584 (18)	80 (2)	0.77
2. Artillery bombardment (even if no one was hurt).	2445 (74)	781 (24)	87 (3)	0.71
3. Bombing from airplanes or missiles (even if no one was hurt).	1932 (58)	1276 (39)	105 (3)	0.47
4. Attacks with knives or clubs.	667 (20)	2523 (76)	123 (4)	0.36
5. Your family or friends being seriously wounded.	1334 (40)	1866 (56)	113 (3)	0.48
6. Other people, not family or friends, being seriously wounded.	1581 (48)	1620 (49)	112 (3)	0.55
7. Persons being raped.	245 (7)	2920 (88)	148 (4)	0.46
8. Family members or friends being killed or taken away and never seen again.	767 (23)	2411 (73)	135 (4)	0.47
9. Other persons being killed.	1186 (36)	2005 (61)	122 (4)	0.52
10. The destruction of your home, farm, or business.	969 (29)	2239 (68)	105 (3)	0.45
11. Being captured and held prisoner by enemy forces.	277 (8)	2932 (88)	104 (3)	0.49
12. Being forced to leave your home and move to another part of the country.	918 (28)	2306 (70)	89 (3)	0.31
13. Having to leave the country and live in a country abroad as a refugee.	514 (16)	2707 (82)	92 (3)	0.15
Scalability, H				0.49
Reliability, $\rho$				0.86
<b>Indirect war experiences of†</b>				
1. Shooting (even if no one was hurt).	2936 (89)	264 (8)	113 (3)	0.82
2. Artillery bombardment (even if no one was hurt).	2783 (84)	410 (12)	120 (4)	0.69
3. Bombing from airplanes or missiles (even if no one was hurt).	2318 (70)	844 (25)	151 (5)	0.45
4. Attacks with knives or clubs.	1304 (39)	1803 (54)	206 (6)	0.52
5. Seriously wounding.	2089 (63)	1076 (32)	148 (4)	0.50
6. Being killed	2003 (60)	1168 (35)	142 (4)	0.52
7. Being raped.	519 (16)	2539 (77)	255 (8)	0.70
8. Being captured and held prisoner by enemy forces.	1466 (44)	1670 (50)	177 (5)	0.61
9. Homes, farms, or businesses being destroyed.	2254 (68)	917 (28)	142 (4)	0.58
10. Being forced to leave homes and move to another part of the country.	2293 (69)	882 (27)	138 (4)	0.55
11. Being forced to leave the country and live in a foreign country as refugees.	1903 (57)	1247 (38)	163 (5)	0.53
Scalability, H				0.56
Reliability, $\rho$				0.88

\*Introduction to the questions on direct war experiences: "The next set of questions is about things you yourself experienced directly. During the period of war, from 1992 to 1995, which of the following things did you actually personally directly see or witness with your own eyes and ears, directed at you, your family, or community?"

Note that question 13 was excluded from the scale because of an H-value below 0.30.

$H_i^\dagger$  - Loevinger's H, the measure of scalability in the Mokken Scaling Program. The coefficient is computed for each item ( $H_i$ ) and for the total scale (H).  $\rho$ : the measure of reliability in the Mokken scaling model.

†Introduction to the questions on indirect war experiences: "During the war, which of the following things happened to any members of your family or friends as victims, even if they happened when they were away from you, and you did not personally see it happening while it was going on?"

These scaling analyses were the basis for constructing two summated scales for direct and indirect war experiences. The Direct War Experiences Scale had an almost normally shaped distribution, whereas the Indirect War Experiences Scale was left skewed, with higher percentages toward the high end of the scale. The two scales were positively correlated as expected ( $r = 0.57$ ).

#### **Other variables**

In addition to the two war experiences scales, the following explanatory variables or controls were included in the regression analyses: sex, age in years, age squared, four categories of ethnicity with Bosniacs as the reference category, indicator of ethnic heterogeneity, town or city location, years of education, indicators of social class, income, marital status, and the natural logarithm of household size.

The ethnic heterogeneity indicator assesses the ethnic heterogeneity of the neighborhood where the respondent had lived before the war. The value of "1" stands for a neighborhood with many members of different nationalities, and "0" for the remaining answers (some, a few, none). The town/city indicator is a collapsed version of the question about the population density of the place of residence (Table 1). The value of "1" stands for those who live in a town or city with a population of 10 000 or more, while "0" stands for those who live in smaller towns or villages. The respondents were asked two questions about education. In Table 1, results from the question on educational levels are presented, but the measure in the regression analyses are based on the other question about the total years of education ranging from 0 to 23.

Social class was defined as respondent's present or former occupation. The original 17 categories were collapsed into a set of 4 classes according to Erikson and Goldthorpe class schema (41). In addition, the fifth "class" con-

sisted of respondents who have never had an occupation or who did not answer the question. The 5-category version is found in Table 1, but in the regression analysis, we only included a dummy variable distinguishing between the service class (value "1") and other class locations (value "0"). The dummy variable, where "1" stands for respondents living in a low income household and "0" for others, is based on the net monthly household income. Low monthly income is defined as an income of maximum KM 400. The dummy variable that distinguishes between the married and others was based on a question about marital status, reported in detail in Table 1.

#### **Results**

The most frequent symptoms of distress were "A persistent sense of foreshortened future" (34%) and "Recurrent and bothersome thoughts or memories about a traumatic war related event" (31%) (Table 2).

In the first block of experience section, 80% of respondents reported that they had experienced shooting, and almost as many had experienced artillery bombardment. Around one in three persons reported to have experienced people being killed in the war and 7% had experienced or witnessed rape. Around 8% were captured and held prisoners by enemy forces. The percentages in the second block are generally much higher, but the possibilities for exaggeration or distortion of the actual events are greater for indirect experiences (eg, being told about an event through a long chain of persons) (Table 3).

In two multiple regression analyses, the relationship between the War-related Distress Scale and the war experience variables was examined, controlling for a range of other variables (Table 4). The multiple correlation coefficient ( $R^2$ ) indicated that more than 20% of the variance in the War-related Distress Scale

**Table 4.** Ordinary least squares regression analysis of the War-Related Distress Scale and binary regression analysis of the threshold defined by 7 or more war experiences, n = 2371\*

Variables	Ordinary regression analysis			Binary regression analysis OR (95% CI)
	B	S.e.	P	
Regression constant	-0.755	0.670	0.260	–
Female†	0.599	0.135	0.000	1.472 (1.115-1.943)
Age in years	0.043	0.027	0.114	1.039 (0.983-1.097)
Age squared	0.000	0.000	0.591	1.000 (0.999-1.000)
Ethnicity:				
Bosniac (ref. category)	0.000	–	–	(1.000-)
Croat	-0.737	0.177	0.000	0.520 (0.349-0.774)
Serb	-0.259	0.160	0.106	0.831 (0.612-1.128)
other	-0.073	0.338	0.828	1.573 (0.847-2.921)
Ethnic heterogeneity‡	-0.374	0.145	0.010	0.776 (0.584-1.031)
Town, city >10,000§	0.211	0.148	0.155	1.104 (0.822-1.482)
Years of education¶	-0.093	0.025	0.000	0.947 (0.905-0.992)
Service class¶	0.174	0.188	0.356	0.885 (0.596-1.313)
Low monthly household income**	0.738	0.166	0.000	1.489 (1.101-2.014)
Married††	-0.318	0.161	0.049	0.876 (0.637-1.205)
Natural log of household size‡‡	0.631	0.157	0.000	1.525 (1.115-2.087)
Direct War Experiences Scale§§	0.467	0.028	0.000	1.452 (1.364-1.545)
Indirect War Experiences Scale¶¶	-0.016	0.026	0.533	0.965 (0.907-1.026)
R <sup>2</sup> , Nagelkerke pseudo R <sup>2</sup> for binary regression analysis¶¶¶	0.217			0.243
-2*Log likelihood***	–			1522.1

\*The dependent variable in the ordinary regression analysis is the War-Related Distress Scale with scores ranging from 0 to 15. The dependent variable in the binary regression analysis takes the value of "1" if the respondents score 7 or higher on the War-Related Distress Scale, and "0" for respondents with lower scores. B – ordinary (unstandardized) regression coefficient; S.e. – the standard error of B; P – probability value of the t ratio for B; OR – odds ratio; CI – confidence interval.

†Female is a dummy variable that takes the value of "1" for women and "0" for men.

‡The ethnic heterogeneity indicator is based on a question about the neighborhood of the respondent before the war. It takes the value of 1 for those who lived in the neighborhood with many people of different nationalities, and 0 for the remaining answers (some, a few, none).

§The town/city dummy variable takes the value of "1" if the respondent at the time of the interview lived in a town or city with a population of 10 000 or more. Respondents living in smaller towns and villages are given the value of "0" on the dummy variable.

¶The respondents were asked questions about the highest level of education completed and the years of education. In the regression analysis, years of education is used as a continuous variable.

¶¶This variable takes the value of "1" for respondents whose present or former main occupation is classified in the service class according to the Erikson and Goldthorpe class schema. The remaining respondents are given the value of "0". A more complete version of the variable is presented in Table 1.

\*\*The dummy variable takes the value of "1" for respondents belonging to a household with a monthly income of at most 400 KM, and "0" for others. A more detailed version of this variable is presented in Table 1.

††The dummy variable that takes the value of "1" for married persons, and "0" for others is based on a question about marital status more fully reported in Table 1.

‡‡The variable is the natural logarithm (base = e) of household size.

§§The scale of direct war experiences was developed in the Methods section. It has scores ranging from 0 to 12.

¶¶The scale of indirect war experiences was developed in the Methods section. It has scores ranging from 0 to 11.

¶¶¶R<sup>2</sup> – In ordinary regression analysis, the multiple correlation coefficient shows the proportion of the variance in the dependent variable that is explained by the explanatory variables in the model. In binary regression analysis, the R<sup>2</sup> cannot be defined because the estimation method is based on maximum likelihood estimation. The Nagelkerke pseudo R<sup>2</sup> is based on the proportional improvement in the -2 log likelihood statistic of the final model compared to a model without explanatory variables.

\*\*\*-2 log likelihood is the fit measure in the maximum likelihood estimation procedure used in the binary (logistic) regression analysis.

was explained by the ordinary least squares regression model, whereas the Nagelkerke pseudo R-square was 0.24 in the binary (logistic) regression analysis. Women reported significantly more war-related distress than men (B = 0.60, P < 0.001), and the odds for reporting a high level of war-related distress was almost 50% higher for women than for men. Both analyses showed a weakly positive, but not significant relationship between age and war-related distress.

The results for the ethnic categories were interpreted as differences from the reference category, the Bosniacs. All regression coefficients for ethnicity were negative, indicating

that Croats and Serbs scored lower than Bosniacs on the War-related Distress Scale, even after controlling for the measures of war experiences. For Serbs and Others, the differences are, however, not significant. The binary regression analysis gave similar results. The Croats were the only ethnic group that reported significantly lower levels of war-related distress than the Bosniacs. Looking at the zero-order relationship, the Bosniacs' mean War-related Distress Scale score was twice higher than that of the Croats, and the odds of reporting high War-related Distress Scale scores were almost 50% lower for Croats than for the Bosniacs. The main reason for this are much high-

er scores of the Bosniacs than the other ethnic groups on the two war experiences scales. For direct war experiences the mean score for Croats was 3.7, compared with 5.3 for the Bosniacs ( $P < 0.001$ ). This could be explained by the fact that the Bosniacs were the victims of war in Bosnia and Herzegovina to a larger extent than other nationalities.

The indicator of ethnic heterogeneity of neighborhoods before the war showed a negative and significant coefficient in the regression analysis. This shows that having lived in ethnically heterogeneous neighborhoods may reduce the war-related distress. The binary regression analysis showed a similar tendency, but the effect was not significant. Living at present in an urban setting seems to be irrelevant to experiencing war-related distress.

Among the socioeconomic indicators, social class was not found to have any effect when controlling for the two other socioeconomic indicators in any of the analyses. Both education level and low income are related to war-related distress. Ten years of education decreased the war-related distress score for about 1 point. Persons with low reported income had 0.6 point higher war-related distress score than others. Both these coefficients were significant beyond any conventional level. The binary regression analysis showed quite similar results.

Married persons scored slightly lower than the unmarried on the War-related Distress Scale, but this effect did not show up in the binary regression analysis. Household size was positively and significantly related to war-related distress in both analyses.

Our main explanatory variables were the two scales of direct and indirect war experiences. Only direct experiences seem to be important for war-related distress. One point increase in the Direct War Experiences Scale raised the War-related Distress Scale score by just below 0.5 points, which means that the

maximum effect, contrasting those with no exposure to violence with those maximum exposed, is more than 5 points. Indirect exposure to violence had no effect at all on war-related distress ( $B = -0.02$ ,  $P < 0.600$ ). In the binary regression analysis, the model predicted that one extra point on the direct war experience scale would increase the odds on having seven or more symptoms with 45%. Those with the maximum score on the Direct War Experiences Scale were expected to have more than 80 times higher odds of having 7 or more traumas than those scoring zero on the Direct War Experience Scale.

## Discussion

On average, the respondents reported 2.4 of the 15 possible war-related distress symptoms. About 13% exceeded the threshold of seven or more symptoms, while almost half of the respondents did not report any war-related distress symptoms. Although war-related distress is known to diminish as a function of time (29), there are still a substantial number of people in Bosnia and Herzegovina who suffer from various degrees of war-related distress.

Our first hypothesis, that war experiences have an effect on war-related distress even eight years after the end of the war, was clearly supported by our study. This finding is consistent with other studies (13-15).

Our second hypothesis, that direct war experiences have a stronger effect on war-related distress than indirect war experiences, was also supported. In fact, indirect war-experiences showed no effect on war-related distress at all. This is consistent with a study in Croatia (26). Also, a cross-sectional survey on 1358 war survivors who had experienced at least one war-related stressor (combat, torture, internal displacement, refugee experience, siege, and/or aerial bombardment) showed findings consistent with ours (25). The study included four

sites in the former Yugoslavia: Belgrade in Serbia, Rijeka in Croatia, Sarajevo in Bosnia and Herzegovina, and Banja Luka in the Republic of Srpska, Bosnia and Herzegovina. Control groups at two study sites, with no direct exposure to war-related distress (Banja Luka and Rijeka), were matched with survivors on sex, age, and education. They found that survivors had higher rates of war-related distress, compared with the controls. Fear of threat to safety and loss of control over life appeared to be the most important mediating factors in war-related distress.

According to our third hypothesis, social support would buffer war-related distress. A large review indicates that social support from friends, family members, community, and spiritual leaders, provides protection against adverse psychological outcomes in civil wars (29). In the Croatian study, social support was reported to affect war-related distress, although not all forms of social support turned out to be beneficial for mental health (26). People with close personal relationships were no better off than others. On the other hand, frequent participation in social activities was beneficial for reducing distress, showing the strength of weak ties (42).

Our study showed a weak support for the first indicator; married persons scored slightly lower than unmarried on the War-related Distress Scale. For the second indicator of social support, the results were contradictory to our expectations; household size was positively and significantly related to war-related distress. Both these findings are consistent with the Croatian study. Their interpretation of the latter finding is that large households, instead of being a source of support, may be a burden in the economic sense or just by overcrowding the dwelling. Further more, the larger the household, the greater the chances that persons close to you have been hurt in the war. Other aspects of social support, such as partic-

ipation in social activities, were not included in our study.

Comparing studies on war experiences and war-related distress is problematic due to differences in sample designs, main variables, time since the traumatic events, and different war circumstances. Different methods of data collection, such as use of interviews instead of questionnaires, may also make the comparison problematic. For instance, higher rates of PTSD among war veterans have been found if structured clinical interviews rather than self-report measures were utilized (43). Since our study is based on a survey and not on clinical interviews, we cannot exclude the possibility that the respondents have underreported their war-related distress experiences and thus contributed to an underestimation of war-related distress.

Another inevitable methodological shortcoming of our study is the cross-sectional design with retrospective information on war experiences from about eight years after the war. Recall and subjectivity bias increase with the lapse of time between the event and the time of measurement.

Furthermore, our study shares the weakness of most of the studies by not covering important control variables about the respondents' earlier history, such as childhood experiences and mental health. Earlier research has, however, shown that factors related to traumatic events and environmental conditions after the events (level of social support, presence of life stressors) emerged as stronger predictors of PTSD development than did pre-trauma factors (44). There may also be unobserved post-war factors that may have influenced the responses on the war-related distress.

The main strength of our study is the unique representative sample of more than 3000 respondents in Bosnia and Herzegovina, which allows statistical generalizations to the population. In this sense, our study is superior

to the studies based on small samples or samples from particular areas which cannot make such generalizations.

According to our findings, more than a half of the people in Bosnia and Herzegovina still suffer from various degrees of war-related distress, and quite a few reported many symptoms (7 or more, 13%; 10 or more, 6%). Such a high number of symptoms may indicate the presence of PTSD, which requires psychological/psychiatric treatment and follow-up for many years to come.

Our study shows that there is still a need for psychological, medical, and social follow-up services for the war victims and their families. It is worth noticing, however, that almost a half of the respondents did not report any war-related distress symptoms, which shows the resilience of the population. Thus, future research should investigate why some victims seem to overcome war-related distress, whereas in others the symptoms persist over many years.

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