



## Explaining the frequency of alcohol consumption in a conflict zone: Jews and Palestinians in Israel



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### HIGHLIGHTS

- Terrorism exposure was positively related to depressive symptoms.
- Depressive symptoms mediated the effect of terrorism exposure on alcohol use.
- Depressive symptoms mediated the effect of gender and ethnicity on alcohol use.
- Higher levels of PTSD symptoms were associated with less frequent alcohol use.

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### ABSTRACT

Experiencing stress and exposure to terrorism may have an adverse effect on health risk behaviors. Few studies have examined alcohol use among adults living in Israel under chronic, stressful terrorism-related conditions. In this study, we examined the relationships of demographics, past stressful events, and terrorism exposure to the frequency of alcohol use and the mediating roles of depressive and post-traumatic stress disorder (PTSD) symptoms. We used three waves of data from a 2007–2008 nationally representative sample of Jewish and Palestinian adults in Israel. We assessed past stressful events, in addition to direct and indirect exposures to terrorism. Results indicated that past stressful events and exposure to terrorism were not directly associated with alcohol use, but were indirectly associated and mediated by depressive and PTSD symptomatology. Mental health symptoms were differentially associated with alcohol use. More frequent drinking was mediated by higher levels of depression, including for women and Palestinians; however, PTSD symptom severity was related to less frequent drinking. Mental health may play a prominent role in the frequency of alcohol use among adults exposed to terrorism in Israel. Alcohol use, as a coping mechanism, may differ by demographic characteristics (gender and ethnicity) and psychological symptomatology for adults living in a conflict zone in Israel.

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### 1. Introduction

Living in a conflict zone and being directly and indirectly exposed to ongoing conflict can have detrimental effects on mental health (Canetti, Hall, Rapaport, & Wayne, 2013; Gelkopf, Solomon, Berger, & Bleich, 2008; Soskolne, Baras, Palti, & Epstein, 1996), physical health (Palmieri, Chipman, Canetti, Johnson, & Hobfoll, 2010; Soskolne et al., 1996), and health behaviors (Ben-Zur & Zeidner, 2009; Soskolne et al., 1996). Populations that live under the conditions of ongoing conflict

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may experience chronic stress from repeated overt and imperceptible exposures, which can lead to increased vulnerability for developing unhealthy risk behaviors (Soskolne et al., 1996).

The Israeli and Palestinian populations in Israel contend with the impact of ongoing political violence and are continuously exposed to terrorism. For example, in 2007, during the 2007–2008 study period, there was a total of 2946 terrorist attacks (Israeli Security Agency, 2007), of which 1263 were rocket launches and 1511 were mortar attacks — an increase from 55 mortar attacks in the previous year in 2006 (Israeli Security Agency, 2010a, 2010b). While the mental health consequences (e.g., depression and post-traumatic stress disorder (PTSD)) of exposure to ongoing conflict has been examined among adult populations in Israel and the Middle East (Canetti et al., 2010; Hobfoll, Hall, & Canetti, 2012; Hobfoll et al., 2008), few studies have examined the relationship between exposure to terrorism and alcohol consumption in the context of mental health symptom severity (Kane et al., 2014). Research indicates that both Israeli and Palestinian women (Gelkopf et al., 2008; Hobfoll et al., 2012; Kaplan et al., 2010; Somer, Maguen, Or-Chen, & Litz, 2009) and Palestinians, regardless of gender, (Canetti et al., 2010; Gelkopf et al., 2008; Hobfoll et al., 2008; Somer et al., 2009) who have experienced terrorism-related events in Israel endorsed higher levels of depressive and PTSD symptoms compared to men and Jews, respectively, and in the general population (Kaplan et al., 2010; Somer et al., 2009). One study found increased risk for alcohol use disorders among the general, civilian adult population in Israel following exposure to ongoing terrorism (Bleich, Gelkopf, Melamed, & Solomon, 2005).

The social and health consequences of increased alcohol use can include injury, violence, pregnancy-related risks, as well as long-term health consequences — liver and heart diseases (Centers for Disease Control and Prevention, 2014). Several demographic and social factors have been linked to alcohol use among Palestinians and Jews in Israel. Neumark, Rahav, and Jaffe (2003) reported correlations between alcohol consumption and various socio-economic status factors, indicating that more years of education were associated with less alcohol use and lower occupational status was correlated with more alcohol use among Jews; these socio-demographic relationships were more varied among the sample of Palestinians in this study. In addition, gender and ethnicity were associated with drinking in Israel. Based on data from the National Israeli Health Interview Survey (Israel Center for Disease Control Ministry of Health, 2012), drinking rates were higher in men and Jews relative to women and Palestinians, respectively (men: 69.6% for Jews, 31.1% for Palestinians; and women: 34.4% for Jews, 10.9% for Palestinians). Individuals who immigrated to Israel from the former Soviet Union (FSU) were identified as a high risk group for increased alcohol use and related problems (Schiff, Rahav, & Teichman, 2005). Additionally, increased religiosity was shown to be protective against alcohol use among Jewish and Palestinian adults (Neumark, Rahav, Teichman, & Hasin, 2001).

Despite the recognition of terrorism's impact on citizens' mental health in Israel (Hobfoll, Canetti-Nisim, & Johnson, 2006), few studies have examined exposure to terrorist attacks as a potential contributor to alcohol behaviors in Israel. Recent studies of drinking and terrorism exposure have been conducted in Israeli adolescents (Schiff, 2006; Schiff, Zweig, Benbenishty, & Hasin, 2007; Schiff et al., 2006), U.S. citizens after 9/11 (Richman, Cloninger, & Rospenda, 2008), and among veterans returning from war (Benyamini & Solomon, 2005). There is consistent evidence for a short term increase in alcohol consumption following terrorism exposure as found in a review of U.S. studies (Keyes, Hatzenbuehler, & Hasin, 2011). Few studies have examined alcohol use as a primary outcome, rather than assessing alcohol consumption as one of a number of coping responses grouped within a coping behavior measure or as a disorder. Alcohol consumption was previously identified as a coping mechanism for managing mental health outcomes following exposure to terrorist attacks (Bleich, Gelkopf, & Solomon, 2003; Bleich et al., 2005), or as an effect modifier when examining the relationship between social support and

depression (Kane et al., 2014). This current study investigates the frequency of alcohol use as a primary behavioral outcome directly and indirectly via mental health symptoms among adults exposed to terrorism.

Hence, the objective of the present study was to identify factors associated with the frequency of alcohol use in adults living in Israel. In addition to terrorism exposure, we evaluated several other factors, including demographic characteristics, past stressful life events, and depressive and PTSD symptoms, to give context to the experience of living under the constant threat of terrorism-related violence. We hypothesized that experiences of terrorism and other stressful life events would be associated with greater frequency of alcohol use, and demographic characteristics, such as gender and ethnicity, would be associated with drinking frequency, with women and Palestinians having a decreased frequency of alcohol use than men and Jews, respectively. We also expected that higher levels of depressive and PTSD symptoms would mediate these factors in predicting greater drinking frequency. Thus, we hypothesized that the associations of demographics, past stressful events, and terrorism exposure on the frequency of alcohol use would be mediated by higher levels of depressive and PTSD symptoms in the midst of ongoing conflict (Canetti et al., 2010; Hobfoll et al., 2006; Palmieri, Canetti-Nisim, Galea, Johnson, & Hobfoll, 2008). To our knowledge, scant evidence exists exploring these relationships among a nationally representative sample of Israeli adults.

## 2. Material and methods

Data originated from a survey of Israeli adults with the overall goal of determining the effects of terrorism and political violence on both Jews and Palestinian citizens of Israel (henceforth: 'Palestinians') (Canetti et al., 2013; Hobfoll et al., 2009). Participants were recruited via a random selection of contact numbers from the national telephone company database, which included 98% of all numbers in Israel, while stratifying by gender for consistency with census data and other socio-demographic variables (geographic region, religiosity, and income) to strive for a nationally representative sample of Israeli adults (aged 18–65 years) (Palmieri et al., 2008, 2010). The study sample's demographics were generally similar to the Israeli population; e.g., women in the sample: 52.4% versus 50.6% nationally; however, the percentage of Jews in the sample (84.2%) was somewhat higher than the general population (75.6%) (State of Israel, 2008). Trained interviewers utilized a structured telephone survey as well as consistent protocol to interview participants in their native language (i.e., Hebrew, Arabic, and Russian); interviewers were native speakers in these languages and they utilized a questionnaire that was translated and back translated from Hebrew into Arabic and Russian (Hobfoll et al., 2009). A 68% response rate of eligible respondents was observed (Kane et al., 2014). In the current study, we examined longitudinal data from 3 survey waves with pertinent data on the primary study measures (described below). Data consisted of Wave 1 (W1;  $n = 1622$ ), administered May to July, 2007; Wave 2 (W2;  $n = 1292$ ) conducted November 2007 to January, 2008; and Wave 3 (W3;  $n = 1178$ ) October to November, 2008. The institutional review boards (IRB) of Kent State University, Rush University Medical Center, and the University of Haifa approved the study. The current analysis received exempt status from the University of Texas Health Science Center at Houston IRB.

### 2.1. Measures

#### 2.1.1. Wave 1 variables

**2.1.1.1. Demographics.** Descriptive characteristics, gleaned from participants' responses to the structured interview, included gender, ethnicity (Jew/Palestinian), education (less than high school, high school, more than high school/ post-secondary, and college graduate or beyond), and age (5 categories: 18–29; 30–39; 40–49; 50–59; and 60 or older).

Respondents were also classified based on self-report religiosity categories: secular, traditional, religious, or ultra-religious (Hobfoll et al., 2009). Immigration to Israel (after 1989) from the FSU was a dichotomous variable (no/yes).

**2.1.1.2. Past stressful life events (no/yes).** Past stressful life events were based on respondents indicating that they experienced at least one of the following stressful events (unrelated to exposure to terrorism) in the past 12 months: “a serious illness or injury diagnosed or worsen”; “you or anyone in your household unemployed for longer than 3 months”; “serious financial problems”; “someone close to you die”; and “family or relationship problems” (Hall et al., 2010; Holmes & Rahe, 1967). These events, selected from the Social Readjustment Rating Scale, covered a wide spectrum of events which are stress related (Holmes & Rahe, 1967). Cronbach alpha was not computed since each item is discrete (Hall et al., 2010); thus a dichotomous approach was taken for analyses.

**2.1.1.3. Exposure to terrorism.** Terrorism exposure was based on survey questions developed by Bleich et al. (2003) to assess exposure to terrorist or rocket attacks in Israel. Three questions were adapted from Bleich et al.'s (2003) questionnaire and have been used consistently in our studies (Canetti et al., 2010; Hobfoll et al., 2009; Palmieri et al., 2010). *Direct exposure:* 1) experiencing the death of a family member or close friend; 2) experiencing an injury of self, a family member, or close friend; and *Indirect exposure:* 3) witnessing violence at a site where there were injuries or fatalities. For analysis, responses were combined into the following four groups for a potential dose–response between exposure to terror and health behaviors and outcomes: 0 (no exposure), 1 (single exposure), 2 (double exposure), 3 (triple exposure). Internal reliability has not been calculated since each question/ exposure is discrete and is not necessarily expected to predict other exposures (Hobfoll et al., 2009; Palmieri et al., 2010). In the current sample, PTSD symptom scores were higher for participants reporting exposure on individual exposure items compared to those with no exposure (i.e., death: no  $M = 5.91$ ,  $SD = 7.29$  and yes  $M = 7.36$ ,  $SD = 8.55$ ,  $t(1250) = -2.35$ ,  $p = .019$ ; injury: no  $M = 5.93$ ,  $SD = 7.23$  and yes  $M = 7.59$ ,  $SD = 9.31$ ,  $t(1249) = -2.35$ ,  $p = .019$ ; witnessing: no  $M = 5.75$ ,  $SD = 7.20$  and yes  $M = 7.18$ ,  $SD = 8.16$ ,  $t(1250) = -2.98$ ,  $p = .003$ ).

## 2.1.2. Wave 2 mediators

**2.1.2.1. Depressive symptoms.** The Patient Health Questionnaire (PHQ-9) includes nine items (each scaled from ‘not at all’ to ‘all the time’) assessing individual depressive symptoms over the last 2 weeks (Cronbach's alpha = 0.79) (Kroenke, Spitzer, & Williams, 2001; Palmieri et al., 2010). Level of depression was calculated as the mean of item scores, which was transformed using a square root function to adjust for moderate skew.

**2.1.2.2. Posttraumatic stress disorder (PTSD) symptoms.** The PTSD Symptom Scale (PSS-1), a 17-item assessment of posttraumatic symptoms (e.g., experiencing, avoidance, and hyper-arousal) experienced after a traumatic event (Foa, Riggs, Dancu, & Rothbaum, 1993), was adapted for terrorism exposure. Each item (4-point scale; ranges 0 ‘not at all’ to 3 ‘5 or more times a week’ or ‘very much’ or ‘almost always’) measures the frequency or severity of experienced symptoms in the past month (Cronbach's alpha = 0.88) (Palmieri et al., 2010). A total sum score for PTSD symptoms was computed for each respondent. Moderate skew for PTSD symptoms was addressed by using a square root transformation. Higher total scores suggest a greater probability of endorsing a PTSD diagnosis (Foa et al., 1993).

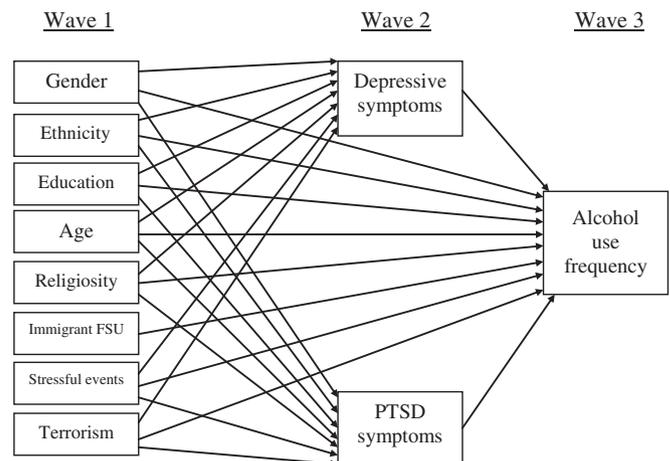
## 2.1.3. Wave 3 outcome

**2.1.3.1. Frequency of alcohol use.** Alcohol use was assessed via a self-report question adapted from the Behavioral Risk Factor Surveillance System telephone survey (Centers for Disease Control, 2007). Study participants were asked how often they consumed alcohol, such as beer, wine, or liquor in the past 6 months. Respondents' frequency of alcohol use was reported on a 4-point scale, i.e., 0 = not at all, 1 = rarely, 2 = at least once a week, and 3 = every day.

## 2.2. Data analysis

All preliminary analyses were conducted using SPSS version 21. Bivariate tests were Spearman's rank correlations. A path analysis model (Fig. 1) was tested using Mplus version 7 (Muthén & Muthén, 2009). W1 religiosity was a dichotomous variable in the model; religious and ultra-religious (1) categories were compared with secular and traditional (0). W2 depressive and PTSD symptoms were modeled as continuous variables and W3 alcohol use frequency as an ordered categorical variable. The model was fit using the robust weighted least square with mean and variance adjusted (WLSMV) estimator, which handles missing data by weighting participants based on the amount of data and the probability of responding. Variances were included to represent all uncertainties associated with the model and W1 predictor variables were correlated with each other, as were W2 mediator variables. Model fit was assessed using the model  $\chi^2$  statistic ( $\chi^2 M$ ), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). A non-significant  $\chi^2 M$ , CFI value > .95 and RMSEA value < .05 indicated a well-fitting model (Byrne, 2001).

We used a probability value of <.05 in determining statistical significance for all tests. Our path analysis tested: (1) the direct effects of W1 predictor variables (demographics, past stressful events, and exposure to terrorism) to depressive and PTSD symptoms measured at W2; (2) the direct effects of W1 variables and W2 mediators to W3 alcohol use; and (3) the indirect effects between W1 predictor variables and W3 alcohol use through W2 depressive and PTSD symptoms. Direct effects and indirect effects, respectively defined here, are the association of one variable with another in the model and the association of one variable with another mediated through a third variable. Total effects are the sum of the direct effect and indirect effects. Indirect effects were estimated using the bias-corrected bootstrap approach.



**Fig. 1.** Path model for predicting frequency of alcohol use from predictor and mediating variables. Notes. FSU = former Soviet Union; correlations between Wave 1 variables and between Wave 2 mediators are not shown to simplify the model presentation; and model statistics:  $N = 1622$ ;  $\chi^2 M = 2.610$ ,  $df = 2$ ;  $p = .271$ ; CFI = .999; and RMSEA = .014.

### 2.3. Attrition analysis

This analysis used multivariate logistic regression to identify predictors of attrition at W2 and W3. The analysis included all variables in the path model (Fig. 1) with the exception of W2 depressive symptoms, W2 PTSD symptoms, and W3 drinking frequency in predicting W2 attrition as well as W3 drinking frequency in predicting W3 attrition. Wave 2 results showed that experiencing one or more stressful events ( $b = -.306, SE = .150, p = .041$ ) was associated with attrition. At W3, younger age predicted attrition ( $b = -.175, SE = .064, p = .006$ ), and men ( $b = -.397, SE = .189, p = .029$ ) and Palestinians ( $b = .725, SE = .233, p = .002$ ) were less likely than women and Jews (respectively) to complete the survey.

## 3. Results

### 3.1. Sample description

Table 1 includes the distribution of all variables tested in the path model. The sample was primarily Jewish (84.2%), slightly more than half (52.4%) were women, and, on average, participants were 44.8 years ( $SD = 16.3$ ) of age. Most respondents reported completing high school or having more than a high school education, and identified their level of religiosity as secular or traditional. Slightly less than a fifth of the sample identified themselves as immigrants from the FSU. In addition, when respondents were asked about stressful events or

**Table 1**  
Descriptive characteristics for the study sample ( $N = 1622$ ), Waves 1–3 2007–2008.

	<i>n</i>	% or <i>M</i> ( <i>SD</i> )
<i>Predictors (Wave 1)</i>		
Gender		
Men	772	47.6
Women	850	52.4
Ethnicity		
Jewish	1365	84.2
Palestinian	257	15.8
Education		
Less than high school	184	11.4
High school	536	33.1
More than high school/postsecondary	402	24.8
College graduate or beyond	498	30.7
Age (years)		
18–29	343	21.2
30–39	295	18.2
40–49	308	19.0
50–59	331	20.5
60 or older	341	21.1
Religiosity		
Secular	719	45.3
Traditional	545	34.4
Religious	214	13.5
Ultra-religious	108	6.8
Immigrant from FSU (% yes)	281	17.3
Past stressful events (% yes)	459	28.3
Exposure to terrorism		
0 events	1007	62.1
1 event	462	28.5
2 events	128	7.9
3 events	25	1.5
<i>Mediators (Wave 2)</i>		
Depressive Sx.	1292	0.43 (.51)
PTSD Sx.	1253	6.12 (7.49)
<i>Outcome (Wave 3)</i>		
Frequency of alcohol use		
Not at all	649	53.8
Rarely	300	24.9
Once a week	226	18.7
Everyday	31	2.6

Notes. Statistics are percent (%) or mean and standard deviation, *M* (*SD*); FSU = former Soviet Union; and Sx. = symptoms.

terrorism experiences, 28% reported having one or more stressful events in the past year and over a third of the sample (38%) experienced events of terrorism directly and/or indirectly (Table 1). On average at W2, respondents reported low levels of depressive and PTSD symptoms. Additionally, in W3, 46% of respondents reported drinking alcohol; most drank rarely or once a week.

### 3.2. Bivariate analyses

Bivariate findings indicated that most of the W1 variables were associated with W2 depressive and PTSD symptoms and W3 alcohol use frequency (Table 2). In associations with W2 depressive symptoms, most W1 variables were significant and positive ( $p < .05, .01, \text{ or } .001$ ), with the exception of age, FSU immigrant status, and terrorism exposure (all non-significant). Level of education was negatively correlated with depressive symptoms ( $p < .001$ ). Similarly, W1 variables were significantly correlated with PTSD symptoms ( $p < .05, .01, \text{ or } .001$ ), except age and immigrant status. Again, education was the only variable that was negatively correlated with PTSD symptoms ( $p < .001$ ). With W3 alcohol use, being a woman, being Palestinian, increased levels of religiosity, and greater PTSD symptom severity were significantly correlated with less frequent alcohol use ( $p < .001$ ). Moreover, higher levels of education and FSU immigrant status were associated with more frequent alcohol use ( $p < .01 \text{ and } .001$ , respectively).

### 3.3. Model testing

#### 3.3.1. Predicting depressive and PTSD symptoms

Table 3 presents the unstandardized and standardized effects of the estimated paths for W1 demographics, past stressful events, and terrorism exposure to W2 depressive and PTSD symptoms. Being a woman, a Palestinian, and having one or more past stressful events or exposures to terrorism predicted increased depressive and PTSD symptom levels ( $p < .01 \text{ or } .001$ ). A higher level of education predicted lower depressive and PTSD symptoms ( $p < .001$ ). For depression only, being religious or ultra-religious predicted lower levels of symptoms ( $p < .05$ ), and for PTSD only, older age predicted higher levels of symptoms ( $p < .01$ ). Relative to other variables and based on standardized effects, being Palestinian and level of education had stronger relationships with depressive symptoms. Level of education relative to other variables similarly had a stronger relationship with PTSD symptoms, while the strength of the relationships between PTSD symptoms and being a woman, a Palestinian, and having exposure to terrorism were somewhat similar.

#### 3.3.2. Predicting alcohol use frequency (direct, indirect and total effects)

Table 4 presents the associated effects (unstandardized and standardized) of W1 demographics, past stressful events, and terrorism exposure and W2 depressive and PTSD symptoms to W3 alcohol use. The direct effect column indicates that being an immigrant from the FSU and having increased depressive symptoms predicted more frequent alcohol use ( $p < .01$ ), while being a woman, a Palestinian, and having a higher level of PTSD symptoms were associated with less frequent alcohol use ( $p < .001 \text{ or } p < .05$ ). Direct effects for alcohol use from level of education, age, religiosity, past stressful events, and exposure to terrorism were non-significant.

Table 4 also presents indirect effects mediated through W2 depressive or PTSD symptom levels to W3 alcohol use, as well as total effects. Indirect relationships through depressive symptoms for women, Palestinians, having one or more past stressful event, and exposure to terrorism predicted more frequent alcohol use ( $p < .01 \text{ and } .05$ ), while higher levels of education and being religious or ultra-religious predicted less frequent alcohol use. Indirect effects through PTSD symptoms, with the exception of level of education, predicted less frequent alcohol use, including for women, Palestinians, past stressful events, and terrorism exposure ( $p < .05$ ). Both direct and indirect effects for

**Table 2**  
Correlation coefficients between modeled W1, W2, and W3 variables.

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. W1 women	–										
2. W1 Palestinian	–.006	–									
3. W1 education	.022	–.232***	–								
4. W1 age	–.038	–.203***	.055*	–							
5. W1 religiosity	.077**	.244***	–.236***	–.118***	–						
6. W1 immigrant from FSU	.002	–.199***	.278***	.108***	–.295***	–					
7. W1 past stressful events	.080**	.032	.050*	.074**	–.015	.063*	–				
8. W1 terrorism exposure	–.105***	–.097***	.035	–.017	.025	.010	.043	–			
9. W2 depressive Sx.	.089**	.198***	–.200***	–.049	.057*	.004	.112***	.022	–		
10. W2 PTSD Sx.	.132***	.165***	–.214***	.041	.086**	–.028	.126***	.098***	.589***	–	
11. W3 alcohol use frequency	–.152***	–.232***	.093**	.028	–.164***	.196***	–.004	.004	–.017	–.095**	–

Notes. Statistics are Spearman's rank correlations; FSU = former Soviet Union; and Sx. = symptoms.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

women and Palestinians were significant in predicting alcohol use, indicating that depressive and PTSD symptoms partially mediated the effects of these variables. The effects of education, past stressful events, and terrorism exposure were fully mediated by depressive and PTSD symptoms, while the effect of being religious or ultra-religious was fully mediated by depressive symptoms.

Standardized direct and total effects showed that, relative to other variables, being Palestinian and a woman had the strongest negative relationships with the frequency of alcohol use, while being an immigrant from the FSU and higher levels of depressive symptoms had the strongest positive relationships. Standardized indirect relationships through depressive symptoms were the strongest in predicting alcohol use frequency for Palestinians and education, while through PTSD symptoms were the strongest for education, women, and Palestinians.

#### 4. Discussion

Few studies to date have examined alcohol consumption among adults living in a conflict zone in general and Israel specifically. In the current study we aimed to explore the effects of exposure to terrorism on the frequency of alcohol use. Past stressful events, demographic characteristics, and depressive and PTSD symptoms were also assessed to provide further context to the experience of living under the threat of terrorism. We observed that exposure to terrorism and past stressful events were positively related to depressive and PTSD symptoms, but not directly related to increased alcohol use frequency. Depressive symptoms had direct and mediating effects for increased frequency of drinking. PTSD symptom level was also a significant direct predictor and mediator in the sample, but its effect was negatively associated with alcohol use. The effect of depressive symptoms in increasing the

frequency of alcohol use was relatively stronger than the effect of PTSD symptoms in decreasing the frequency of alcohol use.

We did not find a direct relationship between exposure to terrorism or past stressful events and alcohol use frequency as hypothesized. We did find direct mental health effects. Our findings revealed that those who were exposed to terrorism and other stressful events were more likely to report depressive and PTSD symptoms. Similar to another study, terrorism exposure had a significant effect on mental health, but not on drinking (Bleich et al., 2003). This Bleich et al. study also found that drinking was used infrequently as a coping strategy among Israeli adults exposed to terrorism. Instead, Israelis more commonly solicited social support and searched the news media for where to find family and friends as coping strategies. It is, therefore, possible that social support (Kane et al., 2014) and resiliency factors (Kimhi & Shamai, 2004) played a role in buffering the impact of ongoing conflict on drinking. Alternatively, exposure to terrorism could be related to heavier or more excessive quantities of drinking rather than drinking frequency. We may not have found a direct relationship between terrorism exposure and alcohol use because few Israelis in our population sample drank at the everyday level.

Current study findings revealed that depressive symptoms were a key mediator in predicting drinking frequency. Depressive symptoms mediated the relationships between multiple variables and more frequent alcohol use. For example, exposure to terrorism and experiencing past stressful events were positively associated with the level of depressive symptoms, which in turn was associated with more frequent alcohol use. Additionally, lower education and being secular or traditional were indirectly associated with increased alcohol use frequency through depressive symptoms. Schiff et al. (2007), in a survey of Israeli youth, found that exposure to terrorism was linked to a higher probability of alcohol intake (including binge drinking) while controlling

**Table 3**  
Path coefficients for direct effects from predictors (W1) to mediators (W2) in the path model.

Predictors (W1)	Depressive Sx.		PTSD Sx.	
	<i>b</i> (SE)	$\beta$	<i>b</i> (SE)	$\beta$
Gender (women)	0.077 (0.023)**	0.092	0.470 (0.086)***	0.150
Ethnicity (Palestinian)	0.209 (0.037)***	0.183	0.681 (0.123)***	0.159
Education	–0.068 (0.012)***	–0.167	–0.313 (0.045)***	–0.204
Age	–0.004 (0.008)	–0.013	0.084 (0.030)**	0.078
Religiosity (religious/ultra-religious)	–0.069 (.031)*	–0.066	–0.152 (0.108)	–0.039
Immigrant from FSU	–	–	–	–
Past stressful events	0.087 (0.025)***	0.094	0.350 (0.093)***	0.101
Terrorism exposure	0.039 (0.015)**	0.066	0.300 (0.055)***	0.136

Notes. FSU = former Soviet Union; Sx. = symptoms; *b* = unstandardized coefficients; SE = standard errors;  $\beta$  = standardized coefficients; and – non-estimated path.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

**Table 4**  
Path coefficients for direct, specific indirect<sup>†</sup> and total effects to W3 alcohol use frequency in the path model.

	Direct effect		Indirect effect via depressive Sx.		Indirect effect via PTSD Sx.		Total effect	
	<i>b</i> (SE)	$\beta$	<i>b</i> (SE)	$\beta$	<i>b</i> (SE)	$\beta$	<i>b</i> (SE)	$\beta$
<i>Predictors (W1)</i>								
Gender (women)	−0.375 (0.064)***	−0.187	0.022 (0.01)**	0.011	−0.025 (0.014)*	−0.013	−0.378 (0.063)***	−0.189
Ethnicity (Palestinian)	−1.012 (0.159)***	−0.369	0.060 (0.024)**	0.022	−0.037 (0.019)*	−0.013	−0.989 (0.156)***	−0.361
Education	−0.029 (0.039)	−0.029	−0.020 (0.008)**	−0.020	0.017 (0.009)*	0.017	−0.031 (0.039)	−0.032
Age	−0.037 (0.024)	−0.053	−0.001 (0.003)	−0.002	−0.005 (0.003)	−0.007	−0.042 (0.024)	−0.061
Religiosity (religious/ultra-religious)	0.015 (.113)	0.006	−0.020 (0.012)*	−0.008	0.008 (0.008)	0.003	0.003 (0.113)	0.001
Immigrant FSU	0.544 (0.170)**	0.206	–	–	–	–	0.544 (0.170)**	0.206
Past stressful events	0.041 (0.07)	0.019	0.025 (0.012)**	0.011	−0.019 (0.011)*	−0.009	0.047 (0.070)	0.021
Terrorism exposure	−0.073 (0.047)	−0.052	0.011 (0.006)*	0.008	−0.016 (0.009)*	−0.011	−0.078 (0.046)	−0.055
<i>Mediators (W2)</i>								
W2 depressive Sx.	0.287 (0.095)**	0.120	–	–	–	–	0.287 (0.095)**	0.120
W2 PTSD Sx.	−0.054 (0.025)*	−0.084	–	–	–	–	−0.054 (0.025)*	−0.084

Notes. FSU = former Soviet Union; Sx. = symptoms; *b* = unstandardized coefficients; SE = standard errors;  $\beta$  = standardized coefficients and – non-estimated path.

<sup>†</sup> Specific indirect effects estimated using the bias-corrected bootstrap method and significance based on 95% and 99% confidence intervals.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

for depression and PTSD, but did not assess these disorders as mediators between alcohol use and other predictive variables.

Being a woman and Palestinian were also associated with higher depressive symptom severity, and higher depressive symptom severity with more alcohol use. Both were positive mediation effects; however, these effects were inconsistent with the negative direct effects to alcohol use frequency for these variables. The indirect effects via depressive symptoms may point to more complex associations between women or Palestinians and drinking frequency than what would be expected from the bivariate correlations (Shrout & Bolger, 2002). Negative direct effects to alcohol use for women and Palestinians likely reflect other mediators that were not tested in our model, including cultural traditions other than religion. Neumark et al. (2001), for example, reported that differences in drinking remained between men and women and Jews and Palestinians after accounting for differences in religiosity and socio-economic factors.

Consistent with previous studies (Canetti et al., 2010; Johnson et al., 2009), it was not surprising to find that women and Palestinians were more vulnerable to exhibiting depressive symptoms when compared to men and Jewish adults, and that the relationship between being Palestinian and depressive symptoms was the strongest relative to other significant variables. For women and Palestinians in Israel, exposure to prolonged conflict may exacerbate the psychological stress associated with terrorism exposure (Gelkopf et al., 2008; Somer et al., 2009). Likewise, the finding that lower levels of education had stronger relationships with depressive symptoms, as well as PTSD symptoms, compared to other variables would be expected (Farhood, Dimassi, & Strauss, 2013; Khamis, 2014; Palmieri et al., 2008). Thus, our findings identify increased depression as one mechanism to greater alcohol use in these demographic groups. Similarly, Salguero, Fernandez-Berrocal, Iruarrizaga, Cano-Vindel, and Galea (2011) in a review of U.S. and international studies found that women are more likely to develop a major depressive disorder following terrorist attacks.

The inverse relationship between PTSD symptom severity and drinking was unexpected, and contradicted another study of Israelis exposed to conflict by Bleich et al., finding that alcohol use increases in the presence of PTSD symptoms (Bleich et al., 2003, 2005). This different finding might be because few studies have simultaneously examined depressive and PTSD symptoms in association with terrorism exposure and drinking. To the best of our knowledge, depressive and PTSD symptoms have not been examined jointly for predicting alcohol use among Israeli adults in this context. Alcohol use may also function differently in Israel. Drinking appears to be a social activity, rather than a solitary one (Bloomfield, Stockwell, Gmel, & Rehn, 2003). Drinking in Israelis may not function as a coping mechanism in the same way as in the U.S.

(Bleich et al., 2003; Dickstein et al., 2012), and may also differ by mental health factors (Bleich, Gelkopf, Melamed, & Solomon, 2006; Kane et al., 2014). In other societies, individuals experiencing stressful past or terrorist events were found to drink more alcohol, including in U.S. studies of the effects of September 11th (Richman et al., 2008) and the effects of war on returning veterans (Benyamini & Solomon, 2005). Regardless, general drinking situations in Israel may not apply to all subgroups of the population. For example, Schiff et al. (2005) observed that immigrants from the FSU were at increased risk for alcohol consumption compared to other Israeli citizens and perceived alcohol consumption as more socially acceptable (Shmulewitz et al., 2012). In contrast, Muslim Palestinians with higher degrees of religiosity are less likely to consume alcohol due to the Koran's prohibition of alcohol (Amundsen, 2012).

Current findings should be interpreted in the context of the study's limitations. Most notably, while we were able to determine drinking frequency, we were unable to assess quantity; this is an inherent limitation of the dataset. Thus, we were unable to detect excessive or binge drinking and pathological dependency on alcohol. Since we were not able to evaluate the quantity of alcohol consumed, this might help to explain why divergent effects of depressive and PTSD symptoms on alcohol frequency were found in this study sample. Furthermore, in Israel, alcohol consumption tends to be greater among Jews, while alcohol use is less customary among Palestinians (Israel Center for Disease Control Ministry of Health, 2012; Neumark et al., 2001); so with the higher representation of Jews in the study sample, it is possible that the frequency of alcohol consumption could be related to this overrepresentation.

In addition, as in other survey studies, the PTSD and depressive symptoms variables were assessed via self-report rather than formal diagnosis by a clinician (Chipman, Palmieri, Canetti, Johnson, & Hobfoll, 2011; Heath, Hall, Russ, Canetti, & Hobfoll, 2012). Also, the clinical significance of our findings related to the PTSD and depressive symptoms is unclear, as the indirect effects through these symptom variables were not large. Further, while we assessed the number of exposures to terrorism, there may have been additional stressors and traumatic events that the measure did not take into account. We could not determine an individual's proximity to the reported terrorist attacks. This might be of importance since Hasin, Keyes, Hatzenbuehler, Aharonovich, and Alderson (2007) observed that closer physical proximity to terrorist events was associated with a greater risk of subsequent alcohol consumption in the U.S. Furthermore, we did not stratify our analysis by ethnicity (i.e., Palestinians and Jews) due to the relatively small number of Palestinians in our sample; however, we estimated the relationship of ethnicity to depressive and PTSD symptoms and to

alcohol use frequency and described the associations for being Palestinian, relative to being Jewish, with other variables in the model. Finally, study results are more likely to be influenced by those participants retained in the study throughout all study waves; therefore, findings might not be as generalizable to the groups that dropped out.

Nonetheless, the present study has notable strengths. The study question is novel among this population-based sample, and the survey design and sample size enable the modeling of mediated relationships in predicting alcohol use in three time-ordered waves. Moreover, we were able to account for the experience of past stressful events in analyses, and were able to measure exposure to terrorism both directly (e.g., bodily injury) and indirectly (e.g., witnessing terrorism-related injuries and fatalities).

In sum, using nationally representative data of Israeli adults, we found that exposure to terrorism and stressful events were not directly related to more frequent alcohol use, but were mediated through increased levels of depressive symptoms. In addition, in Israel, alcohol use appears to be a social endeavor rather than a coping mechanism triggered in response to traumatic stress and exposure to ongoing conflict. Depressive symptoms mediated the association with more frequent alcohol use for some demographic groups in Israel, including Palestinians and women, as well as individuals with lower education and religiosity. Further research is warranted in Israel and other countries in the Middle East with communal societies to untangle the direct and indirect effects of exposure to ongoing conflict on alcohol use, while utilizing cohorts that measure not only alcohol frequency, but also quantity and excessive drinking (e.g., binge drinking).

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#### Contributors

All authors contributed significantly to this study to justify authorship. Z Massey and KG Chartier led the writing, contributed to the interpretation of the findings as well as to the study design and conception. KG Chartier and M Stebbins conducted the statistical analysis, contributed to the interpretation of the findings and study design/conception; and M Stebbins also significantly contributed to the writing. In addition, D Canetti, SE Hobfoll, and BJ Hall secured funding and/or obtained the data for the original study. They also contributed to the study design and interpretation of the findings, and provided critical revisions and editing. K Shoval contributed significantly to the study design and conception, interpretation of findings, writing, and also provided critical revisions.

#### Conflict of interest

The authors have no conflict of interest to report.

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