

# Exposure to Terrorism and Israeli Youths' Psychological Distress and Alcohol Use: An Exploratory Study

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*This study examined the associations between physical and psychological proximity to terrorist attacks and post-traumatic symptoms (PTS), depressive symptoms, and alcohol use among Israeli youth. Self-administered questionnaires were completed under anonymous conditions by 1,150 high and junior high school students (51.3% boys and 48.7% girls) in a town in the Tel Aviv metropolitan area. Standardized, validated scales were used to measure psychological symptoms and alcohol use. High levels of exposure to terrorism were reported. Physical and psychological proximity to terrorist attacks were associated with more PTS symptoms and alcohol consumption. Physical proximity was also associated with symptoms of depression. The implications of terror-associated early drinking for later alcohol problems should be explored. (Am J Addict 2006;15:220–226)*

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Israeli children have been exposed to political violence, including wars and terrorist attacks, since Israel's inception in 1948.<sup>1</sup> However, since 2000, the frequency and severity of these attacks substantially increased. From September 2000 until mid-July 2004, 879 terrorist attacks occurred within the "green line" (original Israeli borders since 1948) areas, killing 972 persons and injuring an additional 6,499. Among those injured or killed, a significant number were children and adolescents.<sup>2</sup> The number of attacks among a relatively small population, about 6.6 million,<sup>3</sup> has exposed a high proportion of Israeli citizens to this real and ongoing threat.

It is widely assumed that exposure to disasters in general—and war and terrorism in particular—takes a

heavy toll on children's and adolescents' mental health.<sup>4,5</sup> However, the small number of empirical studies (especially on ongoing exposure to political violence) and their varied methodology leave open many questions about psychological distress symptoms and risk behavior following terror attacks for youths.<sup>6–8</sup>

Studies conducted in the United States following the 1993 World Trade Center bombing,<sup>9</sup> the 1995 Oklahoma City bombing,<sup>10,11</sup> and the September 11, 2001 attack<sup>12,13</sup> reveal that children and adolescents are at high risk for psychological harm following terrorist acts. This includes high levels of post-traumatic stress symptoms, depression, and anxiety disorders.<sup>14</sup> In addition, being in the area of a terrorist attack and knowing someone who was hurt in the attack are associated with higher level of stress- and trauma-related symptoms.<sup>14</sup> One of the largest studies conducted in the United States on children and adolescents exposed to terrorism was of a representative sample of students in New York public schools<sup>6</sup> following the September 11 terror attack. The findings revealed that children in New York City had higher than expected rates of post-traumatic stress disorder (PTSD), major depression, and various anxiety disorders. In addition, personal exposure to the event (eg, fleeing the disaster site) or knowing someone who was personally exposed (eg, a family member killed or injured) were identified as risk factors associated with psychological distress.

Previous studies conducted in Israel before the Al Akza uprising<sup>8,15,16</sup> used a small sample size and measured only psychological distress. The only extensive study on the psychological impact of current terrorism in Israel is focused on adults.<sup>17</sup> In this study, the level of exposure to terrorist attacks and the prevalence of post-traumatic stress disorder were studied in a

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representative sample of 512 adult Israeli residents. Findings revealed that 22.1% reported a friend or family member who was wounded or killed in an attack, and 15.3% reported that they knew someone who survived an attack uninjured. In addition, more than 67% reported at least one trauma- or stress-related symptom for at least one month, with a mean of four symptoms reported per person. The relationship of overall alcohol or drug use to terror exposure was not analyzed.

Although early onset drinking is a risk factor for later alcohol dependence,<sup>18,19</sup> no U.S. or Israeli study has examined the association between terrorism exposure and youth alcohol or substance use.<sup>7,20</sup> To begin to address this important question, the current study focused on physical and psychological proximity to acts of terrorism in relation to alcohol use and PTSD and depressive symptoms among high school and secondary school students. The current study is the first large-scale study of its kind involving a community sample of adolescents in Israel.

## METHODS

### Participants

Participants were 1150 students (51.3% boys and 48.7% girls) at three high schools and three junior high schools (grades 7–10, ages 12–15) in Herzeliya, a town in the greater Tel Aviv metropolitan area with a population of about 83,000. Herzeliya was directly affected by one act of terrorism a year before our study took place when a fourteen-year-old girl was killed and fifteen others injured in a fast food restaurant in the center of the town. In addition, Herzeliya is near the town of Netanya, the site of several suicide bombings since 2001, and also Tel Aviv, which attracts adolescent visitors for frequent shopping and leisure activities. Through this, Herzeliya's youths have been exposed to numerous additional suicide bombings that occurred in Tel Aviv, including one in a disco in 2001, where 21 young people were killed and an additional 120 were injured.<sup>21</sup>

Herzeliya is a socio-economically heterogeneous town. According to the Israeli Central Bureau of Statistics,<sup>3</sup> 34.6% earn less than the minimum national wage (compared to 44.2% in Jerusalem and 36.3% in Tel Aviv), while 15.6% of its earners earn twice the national average (compared with 7.7% in Jerusalem and 13.0% in Tel Aviv). In this town, about 7,600 students study in four high schools and seven secondary schools,<sup>22</sup> where the schools' populations reflect the heterogeneity of the area. Most students in our sample (87.7%) were born in Israel, while the rest were born elsewhere and immigrated to Israel when very young.

Data were collected from students in three of seven junior high schools and three of four high schools in Herzeliya in June 2003. The schools that did not participate include students with similar characteristics to those

at the participating schools. In the participating schools, 1707 students were listed, and on the days of data collection, 1212 were present in class (at the end of the school year, when this rate of absenteeism is not uncommon in these grades). All students present were approached; approximately 5% refused to participate, resulting in a total response rate of 67.4% (1150 participants) (see Table 1).

## Measures

### Proximity to the Terrorism Attacks

A common way to conceptualize exposure to terrorism is to distinguish between physical and psychological

**TABLE 1.** Sample characteristics and rates of proximity to terrorist attacks: PTSD, depressive symptoms, and alcohol use by gender

Variables	Males ( <i>n</i> = 560) %	Females ( <i>n</i> = 590) %	Total sample (1150) %
Grade			
Seven	23.2	27.9	25.6
Eight	20.7	16.5	18.5
Nine	16.5	16.8	16.7
Ten	39.6	38.8	39.2
Proximity to terrorist attack			
Physical proximity ( <i>n</i> = 1064)	32.3	38.8	35.6
Psychological proximity ( <i>n</i> = 1055)	37.4	42.6	40.1
PTSD			
Intrusive symptoms (at least one symptom)	56.9	68.3	62.6
Mean (SD)	1.65 (.59)	1.86 (.67)	1.76 (.64)
Avoidance (at least three symptoms)	35.6	38.5	37.1
Mean (SD)	1.90 (.64)	2.01 (.63)	1.95 (.64)
Total scale mean (SD)	1.77 (.54)	1.93 (.55)	1.85 (.55)
Depressive symptoms			
Mean (SD)	8.09 (5.35)	8.85 (4.86)	8.48 (5.12)
Alcohol consumption over the last year			
0 times	24.4	35.8	30.2
1–2 times	27.4	29.1	28.3
3–5 times	15.4	15.3	15.4
6–9 times	9.5	7.5	8.5
10–19 times	7.5	4.4	5.9
20–29 times	3.4	2.4	2.9
At least thirty times	12.4	5.5	8.8

proximity. Being in the area of a terrorist attack is characterized as physical proximity, while knowing someone who was hurt (ie, killed or injured) in an attack is characterized as psychological proximity.<sup>23,24</sup> Consequently, two questions were asked; one assessing *physical* proximity (“In the past two years, have you been in the area when one of the terrorist acts occurred?”), the second assessing *psychological* proximity (“Do you know anyone who was hurt in one of the terrorist acts over the past two years?”).

### *PTSD Symptoms*

These were measured by the Impact of Event Scale (IES),<sup>25,26</sup> a fifteen-item self-report measure with two PTSD symptom clusters: intrusion (eight items), and avoidance (seven items). The IES assesses the frequency of intrusive and avoidance phenomena associated with particular events. For this study, we asked the adolescents to consider the recent terror attacks in Israel. Sample items include “you thought about the recent terror attacks in Israel when you did not mean to” (intrusive), and “you felt as if the terror attacks haven’t happened or were not real” (avoidance). Participants were asked to rate the frequency of the occurrence of the symptoms in the past seven days on a scale ranging from 1 (not at all) to 4 (often). The IES has been used in many studies<sup>11,27,28</sup> of disaster and terrorism and has high construct as well as clinical validity.<sup>29</sup> Separate scores for intrusive thoughts and avoidance and a total score were computed, counting as positive all symptoms occurring at least sometimes.

### *Depression*

Symptoms of depression were assessed using the Birleson<sup>30</sup> Depression Self-Rating Scale (DSRS). It consists of eighteen items on a three-point scale, ranging from 0 (mostly) to 2 (never) that measure mood, physiological, and somatic complaints and cognitive aspects of depression. This scale has demonstrated good construct validity in English<sup>30</sup> and Hebrew<sup>31</sup> and has been used in studies in many countries.<sup>32–34</sup> The score was determined by summing the eighteen items.

### *Alcohol Consumption*

Items were modeled on questions from the U.S. Monitoring the Future yearly national youth survey.<sup>35,36</sup> These questions have good reliability in Israel<sup>37</sup> and are widely used there.<sup>38,39</sup> Separate questions covered wine (excluding wine that was part of religious observance), beer, and hard liquor within the last twelve months. Respondents were asked to indicate on a scale ranging from 1 (never) to 7 (thirty times or more) the number of times they drank beer, wine, or spirits during the reference period (eg, “How many times did you drink beer during the last twelve months?”). A composite scale based on the maximum consumption of the three alcohol beverages was created.

### *Background Variables*

These variables included gender, grade (a general proxy for age), and place of birth (Israel, elsewhere).

### **Data Collection**

The regular classroom teacher distributed the questionnaires to students on the day of data collection. The questionnaires were then self-administered. The confidentiality and the anonymity of the students’ responses were explained and strictly observed to improve the validity of the responses. Students were told that their participation in the study was completely voluntary and that there would not be any consequences for non-participation. One student in each class collected the questionnaires and put them immediately into a sealed envelope. A research assistant collected the sealed envelopes from each school.

### **Data Analysis**

Separate linear regression models were run for PTSD symptoms, depressive symptoms, and alcohol consumption. Regression models included gender and grade as control variables. These variables were controlled because earlier studies found that when exposed to trauma, girls show higher levels of PTSD and depressive symptoms than boys.<sup>10,40–43</sup> Child’s age was also found to play a role in symptoms associated with trauma and disasters, although the direction of the correlation was less clear.<sup>12,43–45</sup> Alcohol consumption in general is higher among boys and increases in later adolescence.<sup>46–48</sup> Consistent with these studies, higher PTSD and depressive symptoms and lower rates of alcohol consumption were found among girls. In addition, age was significantly associated with alcohol use ( $r = .26, p < .01$ ) and to a lesser degree with depression ( $r = .12, p < .01$ ) and PTSD symptoms ( $r = .08, p < .01$ ). Therefore, control for confounding due to these characteristics was warranted. Place of birth was not included due to the near-zero correlations for PTSD symptoms and both depressive symptoms and alcohol consumption at the bivariate level.

Eighty-six students skipped the question on physical proximity and 95 students skipped the question on psychological proximity. They were excluded from the respective analyses.

## **RESULTS**

### **Rates of Exposure, PTSD, Symptoms of Depression and Alcohol Use**

As shown in Table 1, one-third of the students reported being in the area when one or more of terrorist attacks occurred. This high rate may reflect the physical proximity to Netanya and Tel Aviv, where many terror acts occurred in the few years preceding the study, including those in which young adolescents were killed or injured. More than one-third (40.1%) reported knowing

**TABLE 2.** Linear regression for PTSD symptoms, controlling for background variables

Independent variables	$\beta$	SE	$t$	$p$
Total PTSD symptom scale*				
Physical proximity	.14	.04	4.34	.001
Psychological proximity	.08	.04	2.44	.05
Gender (boy)	-.13	.03	-4.32	.001
Grade	.08	.01	2.59	.05
PTSD: intrusive symptoms†				
Physical proximity	.14	.04	4.56	.001
Psychological proximity	.11	.04	3.49	.01
Gender (boy)	-.14	.04	-4.50	.001
Grade	.07	.02	2.40	.05
PTSD: avoidance symptoms‡				
Physical proximity	.09	.04	2.90	.01
Psychological proximity	.01	.04	.32	NS
Gender (boy)	-.08	.04	-2.54	.05
Grade	.06	.02	1.97	.05

\* $N = 1029$ ,  $R^2 = .06$ ,  $F(4,1025) = 15.87$ ,  $p < .0001$ .

† $N = 1029$ ,  $R^2 = .07$ ,  $F(4,1025) = 19.30$ ,  $p < .0001$ .

‡ $N = 1026$ ,  $R^2 = .02$ ,  $F(4,1022) = 5.33$ ,  $p < .001$ .

someone who was hurt in one of the terrorists' attacks. More than 60% (62.6%) reported one or more intrusive post-trauma symptoms in the previous week. More than one-third (37.1%) reported at least three avoidance symptoms. Girls showed higher levels of intrusive symptoms ( $t(1051) = 5.38$ ,  $p < .001$ ), avoidance ( $t(1052) = 2.72$ ,  $p < .01$ ), total symptoms ( $t(1052) = 4.82$ ,  $p < .001$ ), and depressive symptoms ( $t(1101) = 2.47$ ,  $p < .05$ ).

Concerning alcohol use, 15.4% reported alcohol consumption three to five times over the past twelve months, and 11.7% (15.8% of the boys and 7.9% of the girls) reported alcohol consumption at least twenty times over the past twelve months (see Table 1). This rate is lower than in the United States but consistent with earlier studies conducted in Israel.<sup>49</sup> Boys reported higher levels of alcohol consumption than girls ( $t(1143) = 5.88$ ,  $p < .001$ ).

### Terror Exposure and PTSD Symptoms

The results of the linear regression examining the relationship of terror exposure to outcomes are shown in Table 2. As shown, physical proximity to a terrorist

**TABLE 3.** Linear regression for depressive symptoms, controlling for background variables

Independent variables	$\beta$	SE	$T$	$p$
Physical proximity	.12	.33	3.87	.001
Psychological proximity	.00	.33	-.10	NS
Gender (boy)	-.08	.31	-2.75	.01
Grade	.13	.13	4.06	.001

$N = 1032$ ,  $R^2 = .04$ ,  $F(4,1028) = 10.56$ ,  $p < .0001$ .

**TABLE 4.** Linear regression for alcohol use, controlling for background variables

Independent variables	$\beta$	SE	$T$	$p$
Physical proximity	.07	.12	2.43	.05
Psychological proximity	.09	.12	2.81	.01
Gender (boy)	.18	.11	5.97	.001
Grade	.25	.05	8.24	.001

$N = 1036$ ,  $R^2 = .12$ ,  $F(4,1032) = 34.36$ ,  $p < .0001$ .

attack was significantly associated with symptoms of PTSD in general, with intrusive and avoidance symptoms controlling for gender and grade. Psychological proximity was significantly associated with youth reports of intrusive thoughts and the overall PTSD score, but not of avoidance symptoms.

### Depressive Symptoms

Results of the linear regression model for terror exposure and depression symptoms are shown in Table 3. Physical proximity to a terrorist attack was significantly associated with depression symptoms controlling for gender and grade. In contrast, psychological proximity was not significantly associated with depression symptoms.

### Alcohol Consumption

Alcohol and PTSD symptoms were not correlated in this study ( $r = .01$ ). Only a weak correlation was found between alcohol consumption and symptoms of depression ( $r = .11$ ,  $p < .001$ ). We examined two separate linear regression models for terror exposure and alcohol use. Both included physical and psychological proximity as independent variables and gender and age as control variables. However, the second model also controlled for PTSD and depressive symptoms. Results are shown in Table 4 and Table 5. Both models show that physical and psychological proximity to a terrorist attack were significantly associated with alcohol consumption, even when PTSD and depressive symptoms are controlled.

**TABLE 5.** Linear regression for alcohol use, controlling for PTSD and symptoms of depression and background variables

Independent variables	$\beta$	SE	$T$	$p$
Physical proximity	.06	.12	2.04	.05
Psychological proximity	.09	.12	2.95	.01
PTSD symptoms	-.02	.10	-.80	NS
Depressive symptoms	.09	.01	2.85	.01
Gender (boy)	.18	.11	5.88	.001
Grade	.24	.05	8.04	.001

$N = 1022$ ,  $R^2 = .13$ ,  $F(6,1016) = 24.69$ ,  $p < .0001$ .

## DISCUSSION

The present study examined the prevalence of physical and psychological proximity to acts of terrorism and their psychological and behavioral consequences involving a large sample of adolescents in Israel. Results show high rates of physical and psychological proximity to terrorist attacks among the youths. The high rates of physical exposure may reflect the general way the question was phrased, high exposure among youths in comparison with younger children (as was found previously in war situations<sup>50</sup> and terrorism<sup>51</sup>), and the actual number of attacks in the areas surrounding Herzeliya in which youths were killed and injured.

Being in the area when a terrorist attack occurred was associated with higher reports of PTSD, depressive symptoms, and alcohol consumption. Knowing someone who was hurt in the attacks was associated with alcohol consumption and higher rates of general and intrusive post-traumatic symptoms but not with symptoms of avoidance or depression. This is consistent with studies showing that PTSD symptoms and depression are widespread psychological consequences of exposure to terrorism or political violence<sup>4,6,16</sup> and not limited to those actually injured.<sup>52,53</sup> The high rates of psychological distress among those not directly affected support the accumulative life events model,<sup>54,55</sup> suggesting that repeated exposure to violence, including political violence, increases child and youth susceptibility to psychological distress. For example, among children in Sarajevo, Bosnia, during the 1994 siege, PTSD symptoms were associated with cumulative exposures to both violent (eg, witnessing shooting, rapes) and nonviolent (eg, relocation, having no food) traumatic events.<sup>56</sup> Thus, the repeated physical and psychological proximity to terrorist attacks over the past three years has probably had accumulative effects on Israeli children's and youths' psychological distress.

An important and rarely studied finding is the significant associations between physical or psychological exposure to terrorism and alcohol consumption. This holds true even when PTSD and depressive symptoms were controlled. An increase in alcohol use as a means of managing stress or coping with the trauma of war has been long found among adults.<sup>20,57-60</sup> However, the possibility of alcohol consumption as a means of reducing anxiety among youths exposed to war or terrorism has only recently been considered<sup>4</sup> and never previously demonstrated empirically. Given the increase in risk for later alcohol dependence posed by early drinking onset,<sup>18,19</sup> it is critical to address this aspect of youth response to terrorism and trauma in further studies.

The consequences of physical versus psychological proximity to terrorist attacks were similar for PTSD symptoms (except for avoidance symptoms) and alcohol consumption but differed for depressive symptoms: while physical proximity was associated with higher symptoms

of depression, psychological proximity was not associated with depressive symptoms. The similarities were expected based on previous studies.<sup>61</sup> The differences that emerged in our study may reflect a stronger need to avoid and repress memories and thoughts of the terrorist attacks when physically exposed than when knowing people who were hurt in the attacks. This and other explanations need further examination in future studies.

## Limitations

The results of the present study must be interpreted in light of its limitations. First, the study included only one town. Therefore, we cannot state that our sample was nationally representative, although the large sample enabled us to conduct multivariate analysis of several important outcomes. Second, while a 67% response rate is common in Israel at the end of the academic year when the reasons for skipping class are likely to be random,<sup>51,62</sup> we cannot rule out the possibility that students who skipped class had higher levels of psychopathology or alcohol use. However, this would only have led to positively biased findings if those who were out were also less likely to be exposed to terrorism, an unlikely possibility. Third, the cross-sectional design does not allow direct tests of causality. Fourth, the question used for physical proximity was broadly phrased. Our data collection staff suggests that students interpreted this as either being present at the event or hearing the bomb, seeing ambulances crossing, and/or feeling the atmosphere of chaos created by the attack. Nevertheless, future studies would benefit from measures based on more items, including items that define more precisely the closeness of the physical proximity. Finally, similar to many other studies,<sup>40,63</sup> a PTSD scale was used that does not establish diagnosis. While this can be seen as a limitation in determining clinical significance, sub-threshold symptom levels were recently shown to have considerable clinical meaning for functioning and longitudinal course.<sup>64</sup>

## CONCLUSION

The present study shows that exposure to terrorism takes a heavy toll on Israeli youth, especially on those who report physical and psychological proximity to acts of terrorism. They also show that the negative consequences of terrorism go beyond PTSD symptoms and psychological distress. Youths who were physically and psychologically exposed to terrorism also consumed more alcohol than those who were not exposed. Thus, alcohol consumption may be a more common consequence of exposure to terrorism among youths than previously considered. Given the risk for later alcohol problems posed by early drinking<sup>19,65</sup> and the recent increases in substance use generally in Israel,<sup>66</sup> the implications of terror-associated early drinking for later alcohol problems in

Israel should be explored. In addition, in other countries with higher general rates of alcohol and drug use, the occurrence and subsequent consequences of early terror-associated drinking (as well as use of other substances) appears to be an important topic for further study among youths.

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