

PREVALENCE OF POST TRAUMATIC STRESS AND EMOTIONAL AND BEHAVIORAL PROBLEMS AMONG ISRAELI ADOLESCENTS EXPOSED TO ONGOING TERRORISM

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ABSTRACT

Given that to date relatively little research has been carried out into the effects of ongoing terrorist attacks with the emphasis on adolescents in urban areas, this study set out to investigate a wide range of self-reported emotional and behavioral outcomes among adolescents facing ongoing terrorism in both urban and rural locations in Israel.

913 adolescents aged twelve to eighteen years from four different locations in Israel who were exposed in different ways to terrorist attacks

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over a period of three years against the backdrop of ongoing terror are investigated to identify the prevalence of Post Traumatic Stress (PTS) and related mental health problems by self-report measures, including Achenbach's Youth Self-Report, the Brief Symptoms Inventory and a specially designed questionnaire covering Post Traumatic Stress and exposure to terror data.

Around 90% of the adolescents experience mild to severe PTS, one fifth reported borderline or clinical emotional and behavioral problems, and one third reported mental health difficulties. Students from different locations revealed different levels of PTS and other psychological problems. Analysis according to level of exposure revealed that it was not always those whose exposure was the most objectively severe who exhibited the most symptoms.

Future research should highlight the unique characteristics of ongoing exposure to terrorism, such as the cumulative effects of exposure and risk of exposure, in order to shed light on their contribution to mental health outcomes.

INTRODUCTION

Since the start of the al-Aqsa Intifada in late September 2000, during approximately five years, Israeli society has been confronted with a wave of terrorist attacks, including, among others, drive-by shootings, break-ins and suicide bombings. By September 2003, when the present study was conducted, numerous children and adolescents had witnessed such attacks directly or indirectly, raising questions about the psychological impact of these potentially traumatic experiences. Although the mental health outcomes of exposure to terror have been increasingly studied in recent years, several areas still call for further investigation. Firstly, the majority of the studies that have been published to date involve single attack events. Given that the number of countries facing an ongoing risk of terrorist attacks is increasing worldwide, more research is needed on this aspect. Secondly, most studies have focused on victims in urban areas, so there is a need for further research into terror-related outcomes in the populations of less urbanized and more remote areas. Thirdly, research should focus especially on youth given the relative vulnerability of youngsters and the potential implications for transition into adulthood. Taking into account these different needs, this study aims to investigate the psychological impact of ongoing exposure to terrorist attacks on Israeli adolescents in terms of posttraumatic stress and emotional and behavioral outcomes. We will first give an overview of the current research base regarding prevalence and other factors connected with mental health outcomes for

adolescents exposed to terror and then draw a number of conclusions for the present study.

PREVALENCE OF POST TRAUMATIC STRESS (PTS) AND MENTAL HEALTH PROBLEMS AFTER TERRORIST ATTACKS

The research conducted to date has shown that individuals who are exposed to terror tend to be especially vulnerable to developing Post Traumatic Stress Symptoms or Post Traumatic Stress Disorder (PTSS/D). Depending on the study context and populations, prevalence rates for posttraumatic stress have been found to range from 4% to 55% (Trappler and Friedman, 1996; Joshi and O'Donnell, 2003; Solomon, Laufer, Lavi 2005). Additionally, persons exposed to terrorist attacks may experience a wide variety of adverse mental health problems, including somatic complaints (21%-33%), depression (8%-16%), agoraphobia (15%), anxiety (10%-12%), conduct disorder (12%), separation anxiety (12%), functional impairment (10%), panic attacks (9%), or substance abuse (5%) (Hoven, Duarte, Lucas, Mandell, Wu and Rosen, 2002; Hoven, Duarte, Ping, Erickson, Musa and Mandell, 2004; Pat Horenczyk, 2005; Pat Horenczyk and Doppelt, 2005). Most studies have found that these adverse mental health outcomes persist for at least several months or even increase. For example, mild to severe levels of Conduct Disorder were found in 39%, and internalizing problems were reported in three-quarters of a sample of New York public school children (grades 4-12) six months after the September 11 attacks (Hoven et al., 2005).

Single versus Ongoing Exposure to Terror

Studies from the broader field of ongoing exposure to extended periods of armed conflict and war report mental health problems such as PTSD, somatization, depressive symptoms, fears, hypervigilance, impaired concentration, and social difficulties as a result of these types of situations (Muldoon and Cairns 1999; Thabet, Abed and Vostanis, 2004; Thabet and Vostanis, 2005). Given these mental health risks, it should be noted that the implications of ongoing exposure to terror may conceivably differ from those to single attacks in several ways. For one thing, being exposed to a large number of attacks may potentially have cumulative negative effects on a person's mental

health. Additionally, repeated exposure to terrorist attacks may also impact a person's risk perception and therefore affect psychological outcomes. Finally, when outcomes are analyzed after a single attack the time of investigation along with the distance in time from the attacks are known and similar for all subjects. In contrast, in the context of ongoing terror the distance in time from exposure to attacks may vary between study participants, thus possibly impacting differently on the reported outcomes. However, it should be noted that most research up to date on the prevalence of terror-related PTSS/D and psychological difficulties mainly stem from studies involving one-time exposure to a single event, as is the case with the 1998 Oklahoma bombing and the bombing of the American Embassy in Kenya or the September 11 attacks (e.g. Hoven et al., 2002; Hoven et al., 2004; Pfefferbaum Nixon, Krug, Tivis, Moore, Brown, Pynoos, Foy and Gurwitsch, 1999; Pfefferbaum, Nixon, Tucker, Tivis, Moore, Gurwitsch, Pynoos and Geis, 1999; Pfefferbaum, North, Doughty, Gurwitsch, Fullerton and Kyula 2003).

In contrast, only a limited number of studies have investigated mental health outcomes after multiple attacks or an ongoing exposure risk. These include mainly a number of recent Israeli studies that have been prompted by the ongoing Israeli-Palestinian conflict (Cohen and Eid, 2007; Pat-Horenczyk 2005; Schiff, Benbenisty, McKay, DeVoe and Liu, 2006; Solomon and Lavi, 2005; Zeidner, 2005). Moreover, research in the context of ongoing terrorism has typically focused on a more limited scope of outcomes compared with single-attack studies. More specifically, young Israelis who are exposed to ongoing terrorism have been found primarily to exhibit PTSS/D (6%-45%), risk-taking behaviors and functional impairment (20%), as well as depression (10%-16%) and somatization (21%-33%) (Pat Horenczyk, 2005; Solomon, Laufer and Lavi, 2005).

Types of Populations Investigated

Most of the research conducted to date has involved urban populations, including, for example, New York City, Oklahoma City, and youngsters in Nairobi in the aftermath of *single attacks* (Hoven et al., 2002; Hoven et al., 2004; Pfefferbaum et al., 1999; Pfefferbaum et al., 1999; Pfefferbaum et al., 2003) or urban youth from main Israeli cities in the context of ongoing terrorism. In the case of the West Bank or Gaza Strip Settlements, findings suggest that those who live in the Settlements are highly exposed to terror-related events and exhibit more symptoms of psychopathology (Pat Horenczyk and Dopplet 2005; Solomon, Laufer and Lavi, 2005; Schiff et al., 2006). We therefore believe it is important to

investigate adolescents from different regions, including rural districts, in conjunction with the related levels of exposure to shed more light on the role of these demographic characteristics as regards relative vulnerabilities or resiliencies to mental health difficulties in the context of ongoing terror risks.

Gender and Age as Mediating Factors

As can be deduced from the above discussion, the prevalence rates of terror-related PTSS/D and other psychological difficulties in adolescents that have been documented to date tend to vary widely, spurring research into potential moderating or mediating factors. Gender and age have been most frequently investigated in this context.

As regards gender, most studies find that girls report more PTSD, stress-related symptoms and internalizing difficulties and that boys report more externalizing problems, consistent with general developmental psychopathology literature (Celestin-Westreich and Celestin, 2005; Hoven et al., 2002; Hoven et al., 2004; Pat Horenczyk, 2003; Pfefferbaum et al., 1999; Pfefferbaum, Nixon, Tivis, Doughty, Pynoos, Gurwitch and Foy, 2001; Pfefferbaum et al., 2003;). Furthermore, age has been found to exert a moderating influence on the extent of stress reactions and negative symptoms following single or ongoing terror experiences. More specifically, younger children appear to exhibit more severe symptoms of psychopathology than older youths, a finding that has been linked to developmental limits in cognitive-emotional abilities to cope with adverse experiences at younger ages (Hoven et al., 2002; Hoven et al., 2004; Pat Horenczyk, 2005).

Implications for Our Present Research, Aims and Hypotheses

Given the relative dearth of studies pertaining to psychological outcomes in adolescents after multiple attacks or the ongoing risk of terrorism, there is a need for in-depth investigation of the prevalence of different types of emotional and behavioral problems in this context. Since most of the studies to date have involved mainly single attacks and urban populations, the present study aims to investigate the prevalence of posttraumatic stress along with related emotional and behavioral outcomes among Israeli adolescents living in both rural and urban areas in the context of ongoing terrorism. We formulated the following primary research questions and hypotheses:

1. To what extent do Israeli adolescents exposed to ongoing terrorist attacks report PTSS/D and emotional and behavioral problems? Based on the literature, we can expect prevalence estimates of 4%-42% for PTSS/D, 21%-33% for somatic complaints, and 10%-16% for depression (Pat Horenczyk and Doppelt, 2005; Pat Horenczyk, 2005; Solomon, Laufer and Lavi, 2005).
2. To what extent do Israeli adolescents from different areas reveal different mental health outcomes? Given that location and level of exposure tend to be interrelated, we expect youngsters living in more exposed city districts to show higher levels of Post Traumatic Stress and emotional and behavioral problems compared to youth from more rural and less exposed areas such as the south of Israel.

Furthermore, based on the research literature we expect gender and age to moderate the mental health outcomes of exposed youths.

1. Thus, girls can be expected to exhibit more PTSS/D and internalizing symptoms compared to boys, who for their part might be expected to report more externalizing problems (e.g. Hoven et al., 2002; Pefferbaum et al., 1999).
2. Early adolescents can also be expected to display more PTSS/D and emotional and behavioral problems compared to older teens (e.g. Hoven et al., 2002; Pat Horenczyk, 2005).

METHOD

Population Sample

This study comprised a sample of 913 Israeli adolescents aged between 12 and 18 years. No other inclusion or exclusion criteria were used apart from age and availability at the time of testing. The demographic characteristics of the participants are shown in table 1.

Students attending four different schools (junior and senior high schools) in four locations in Israel were chosen to represent different types of populations (urban vs. rural) as well as different levels of exposure. Three of the schools (Central Israel, Southern Israel, and Jordan Valley) belong to the same educational sub-system (Ha Agaf L'chinuch Hityashvuti - Department of Rural Education), which is the only education authority that has schools dotted

throughout Israel. Most of the schools in this system are located in suburbs or in rural areas, with students living in kibbutzim¹, moshavim², or small towns. The Jerusalem school, for its part, serves different neighborhoods of Jerusalem and nearby small towns. All the participating schools are “open access” establishments (no selective admission procedures). In the Jordan Valley School, the entire age-relevant population took part in the study. For the other schools, the participating classes were those whose timetable meant that they were available at the time of the study. As shown in Table 1, subjects were distributed quite evenly as regards gender and age across schools/locations.

Table 1. Demographic Characteristics of Populations

Characteristic	No.	%
Age of participants, mean (SD) [range years]	14.45 (1.27) [12-18]	
Gender		
Girls	462	50.6
Boys	447	49
Grade level		
8 th grade	335	36.7
9 th grade	302	33.1
11 th grade	276	30.2
Age group		
Youngest 12-13.5	305	33.4
Middle 14-15.5	349	38.2
Oldest 16-18	255	27.9
Schools		
Central Israel	250	27.4
Jordan Valley	183	20
Southern Israel	226	24.8
Jerusalem	254	27.8
Socio Economic Status		
Low	242	26.1
Average	487	52.5
High	116	12.5

¹ Kibbutz: Collective farm or settlement in Israel.

² Moshav: A cooperative settlement of small individual farms in Israel.

Measures

Adolescents filled out a standardized self-report battery comprising a demographic inventory designed for this study; an extensive, multi-section 'Exposure to Terror and Post Traumatic Stress' (EPTS) Questionnaire designed specifically for the purpose of this study and outcome measures - the Achenbach Youth Self-Report (YSR, Hebrew version) and Brief Symptom Inventory (BSI) of Derogatis.

The demographic inventory included questions regarding age, class, school, gender, place of living, and parental work.

"*Exposure to Terror and Post Traumatic Stress*" (EPTS) questionnaire assess multiple aspects of subjects' level of exposure (part 1), along with self-reported Post Traumatic Stress symptoms (part 2). To investigate the present hypotheses, the items regarding direct physical exposure and indirect exposure (through relationship with a victim) were combined to form a 'Global Objective Exposure Index', which showed satisfactory internal consistency ($\alpha=0.76$). The items for assessing Post Traumatic Stress consisted of a rewording of the DSM IV criteria for PTSD into a yes/no question format. This PTSS/D scale thus included sixteen items with satisfactory Cronbach alpha reliability ($\alpha=0.74$). The EPTS questionnaire was administered to a small sample of young people ($n=10$) prior to the research to ensure that the items were clear and could be easily understood.

Achenbach Youth Self-Report for ages 11-18 (Hebrew version) (Thomas M. Achenbach and Leslie A. Rescorla 2001) measures a broad range of behavioral and emotional problems through 112 items yielding a total problem score along with two broad-band scales (internalizing and externalizing), eight subscales and six DSM scales. The YSR form has been shown to have good internal consistency, test-retest reliability (0.87) and content validity (Achenbach and Rescorla 2001). Cronbach alpha of the different scales in the present study ranged from 0.65 to 0.91.

Brief Symptom Inventory (BSI) (Leonard R. Derogatis 1993) is a 53-item scale on 5 Likert points that measures nine dimensions of psychological and psychiatric problems, summarized in a "Global Severity Index" (GSI). Due to restrictions imposed by the Israeli Ministry of Education, five items of this questionnaire had to be omitted (namely, "Thoughts of ending your life", "Spells of terror or panic", "Feelings that you are watched or talked about by others", "The idea that someone else can control your thoughts", and "The idea that you should be punished for your sins"). Given that the manual states that omitting up to 25% (≤ 13 for the GSI and ≤ 1 for the subscales) does not affect the reliability of the scales, only the "Psychotics" subscale needed to be omitted due to too few

remaining items. The BSI has good internal consistency for the GSI (0.90) and its subscales (0.68-0.91) (Derogatis, 1993). The questionnaire was translated into Hebrew and back-translated into English to guarantee accuracy. Cronbach alpha of the different scales in the present study ranged from --- to 0.93.

Procedures

In the course of conducting this study, we adhered to all the ethical procedures demanded by the Israeli Ministry of Education. The proposal and questionnaires were sent to the office of the “Central Scientist” and were reviewed both by the ‘Central Scientist’ and by the ‘Counseling and Psychological Services’ of the Ministry of Education. After receiving their approval, permission to enter schools was received by each participating principal confirming that they had met all the conditions imposed by the Ministry of Education.

Data were gathered during the month of September 2003. The self-report questionnaires were filled out anonymously during regular class periods. The time of completion varied according to age, ranging from around twenty-five to forty-five minutes. Subjects were informed that the researcher was interested in their experiences as a result of the ongoing terrorist attacks.

The researcher informed the students that participation was voluntary and that if they felt uneasy or uncomfortable at any time during the administration of the questionnaire, they were free to terminate their participation. Few (twenty students, or less than 2%) chose not to participate and stopped before completing the questionnaire. Many participants expressed enthusiasm while completing the questionnaires and said they were glad to have an opportunity to share their experiences.

Data Analysis

Firstly, the frequencies and percentages of the demographic characteristics of the sample were explored. Secondly, One Way ANOVA was performed to highlight differences in objective levels of exposure according to the location of the participating schools. Finally, differences in mental health outcome scales across location / level of exposure, gender and, age, were tested by means of T tests (gender) and One way ANOVA (school/location, and age). Statistical analyses were conducted with the statistical software SPSS Version 12, with the accepted p level set at $\alpha < 0.05$.

RESULTS

Overall, two-thirds of the adolescents reported some level of objective exposure to terrorist attacks, either by being physically exposed to an attack or by knowing someone who had been hurt in an attack. Among these, approximately one-tenth reported having been physically exposed to more than one attack, and approximately one-third of the adolescents reported knowing more than one person who had been hurt. Furthermore, findings show that even those who had never been personally exposed to an attack and/or did not know anyone who had been hurt had nonetheless experienced some kind of exposure through the media or through ‘near-miss’ experiences (e.g. missed the bus that later exploded; left the scene just before an attack occurred, etc.).

Prevalence of Posttraumatic Stress and Mental Health Problems

As shown in *Table 2a*, only less than one-tenth of the youth surveyed showed no Post Traumatic Stress symptoms. In contrast, a large majority of adolescents (over 75%) experienced mild to severe posttraumatic stress. It is noteworthy that although 40% of the sample population reported no ‘objective exposure’, of this group only 14% reported no symptoms of PTSS. Overall, up to one-fifth of the adolescents reported total, internalizing and/or externalizing problems within the borderline or clinical range compared to Israeli Achenbach YSR norms (*Table 2b*). Clinically significant internalizing problems mainly consisted of withdrawn depressed and somatic symptoms, along with DSM-IV concordant affective problems and dysthymia. A noticeable 10% of the adolescents also expressed significant externalizing problems, especially oppositional-defiant, rule-breaking and aggressive behavior. Furthermore, approximately one third of the adolescent sample reported overall mental health difficulties above Israeli norms as measured by the Global Severity Index of the Brief Symptom Inventory (*Table 2c*).

Table 2a. Prevalence of PTSS/D symptoms among Israeli Adolescents

No. of PTSS/D Symptoms	% of Population
No symptoms = 0 symptoms	9.3
Mild = 1-5 symptoms	61.8
Medium = 6-10 symptoms	25.5
Severe = 11-14 symptoms	3.6

Table 2b. Prevalence of Emotional and Behavior Problems among Israeli Adolescents according to Achenbach YSR

Achenbach Scale	% of Borderline and within Clinical Range
Total Problems	19.4
Externalizing	22.3
Internalizing	18.9
Anxiety Depressed	7.6
Withdrawn Depressed	9.0
Somatic Problems	8.9
Social Problems	5.9
Thought Problems	7.7
Attention Problems	7.8
Rule Break	10.4
Aggressive Behavior	10.2
DSM Affective Problems	9.9
DSM Anxiety Problems	4.9
DSM Somatic Problems	7.9
DSM ADHD	5.8
DSM Oppositional Defiant	15.4
DSM Conduct Problems	8.3

Table 2c. Prevalence of Mental Health Problems among Israeli Adolescents according to Brief Symptom Inventory

BSI SCALE	% above Mean Norms
Global Severity Index	27.2
Somatization	27.2
Obsessive Compulsive	27.5
Interpersonal Sensitivity	29.8
Depression	21.9
Anxiety	18.1
Hostility	32.6
Phobic Anxiety	48.2
Paranoid Ideation	24.9

More specifically, around half of the adolescents exhibited above-mean levels of phobic anxiety, such as avoidance or fear of open spaces, of being on the street

and of traveling on buses. In addition, around one third of the adolescents express above-mean levels of hostile feelings.

Differences in Mental Health Outcomes According to Level and Area of Exposure

Given that location and level of exposure tend to be interrelated, it was first verified whether the urban versus rural locations had experienced different levels of objective exposure (cf. procedure) (Table 3). Significant differences between the different locations were indeed found on our Global Objective Exposure Index, with Southern Israeli adolescents representing the lowest levels and the Jerusalem adolescents the highest levels of Objective Exposure, compared to students from the 'Central Israel' and 'Jordan Valley' schools. These results allowed us to group the participating adolescents into three categories, i.e. 'Rural/Low' (Southern Israel), 'Rural/Intermediate' (Jordan Valley and Central Israel) and 'City/High' (Jerusalem) areas respectively with corresponding levels of objective exposure.

Subsequent analyses generally revealed an anticipated pattern of 'Rural/Least exposed' adolescents reporting least Post Traumatic Stress, although this difference reached statistical significance only between 'Intermediate' and 'Low/Rural' adolescents (Table 4).

Table 3. Differences in Objective Exposure among the Different Schools

SCHOOLS	Objective Exposure Index
Central Israel	M=1.40 SD=1.70
Jordan Valley	M=1.50 SD=1.98
Jerusalem	M=2.04 SD=2.53
Southern Israel	M=0.30 SD=0.65
F value	35.522
Sig. Level	0.000**

While the pattern of rural/least exposed adolescents presenting least overall, emotional, behavioral, and mental health problems tends to remain consistent for

the other outcome measures (YSR and BSI), counterintuitive findings came forward for the other groups. Thus, 'Intermediate' adolescents repeatedly report significantly higher levels of adverse mental health outcomes compared to the 'High exposure/City area' adolescents (Table 4).

Table 4. Prevalence of Mental Health and Behavioral Outcomes According to Schools

Outcome Scales	Center Israel	Jordan Valley	South Israel	Jerusalem	F value	Sig. Level
PTSS/D					4.47	0.004*
M	4.46	4.25	3.52	4.19		
SD	3.03	2.88	2.72	2.99		
Achenbach						
Total					3.55	0.014*
M	39.5	40.45	35.76	35.83		
SD	18.96	20.082	18.292	19.38		
Internalizing					4.65	0.003*
M	11.56	11.51	9.65	9.82		
SD	7.697	7.912	6.68	6.83		
Externalizing					1.86	0.134
M	11.22	12.61	11.36	12.13		
SD	6.26	7.42	6.92	7.51		
Anxiety Depressed					2.51	0.053
M	4.88	4.82	4.16	4.22		
SD	3.87	3.87	3.27	3.47		
Withdrawn Depressed					5.05	0.002*
M	3.41	3.65	2.85	2.96		
SD	2.46	2.72	2.25	2.34		
Somatic Complaints					3.01	0.029*
M	3.27	3.03	2.64	2.64		
SD	2.99	3.03	2.54	2.56		
Social Problems					5.72	0.001**
M	3.29	3.01	2.58	2.46		
SD	2.50	2.66	2.35	2.48		
Thought Problems					4.97	0.002*
M	4.52	4.53	4.04	3.53		
SD	3.40	3.59	3.11	2.92		
Attention Problems					4.73	0.003*
M	5.18	5.07	4.55	4.29		
SD	3.15	2.93	2.86	2.98		

Table 4. (Continued)

Outcome Scales	Center Israel	Jordan Valley	South Israel	Jerusalem	F value	Sig. Level
Rule Breaking M SD	4.22 2.932	5.10 3.813	3.93 3.328	4.82 3.657	5.27	0.001**
Aggressive Behavior M SD	7.00 4.17	7.51 4.49	7.43 4.43	7.31 4.67	0.56	0.635
DSM Affective Problems M SD	4.49 3.47	4.56 3.46	3.91 2.87	3.84 3.13	2.88	0.035*
DSM Anxiety Problems M SD	2.46 2.05	2.52 1.81	2.33 1.86	2.47 2.06	0.34	0.793
DSM Somatic Problems M SD	1.73 2.01	1.69 2.11	1.40 1.73	1.47 1.78	1.62	0.182
DSM Attention Deficit Hyperactivity Problems M SD	4.20 2.71	3.99 2.52	3.85 2.61	3.50 2.59	3.01	0.029*
DSM Oppositional Defiant Problems M SD	3.26 1.93	3.74 1.94	3.54 1.89	3.43 1.86	2.30	0.075
DSM Conduct Problems M SD	3.26 2.72	3.90 3.30	3.13 3.19	3.89 3.55	3.46	0.016*
BSI						
GSI M SD	0.63 0.57	0.70 0.67	0.53 0.55	0.62 0.59	2.70	0.045*
Somatization M SD	0.36 0.59	0.47 0.70	0.35 0.55	0.58 0.03	1.51	0.209
Obsessive Compulsive M SD	0.69 0.70	0.76 0.77	0.56 0.66	0.64 0.69	2.68	0.045*
Interpersonal Sensitivity M SD	0.83 0.76	0.93 0.90	0.66 0.74	0.74 0.78	4.02	0.007*

Outcome Scales	Center Israel	Jordan Valley	South Israel	Jerusalem	F value	Sig. Level
Depression					3.70	0.011*
M	0.56	0.67	0.42	0.49		
SD	0.75	0.94	0.73	0.75		
Anxiety					2.59	0.051
M	0.74	0.73	0.57	0.72		
SD	0.76	0.81	0.65	0.76		
Hostility					0.78	0.501
M	0.72	0.81	0.72	0.79		
SD	0.75	0.81	0.76	0.80		
Phobic Anxiety					3.06	0.027*
M	0.77	0.68	0.58	0.77		
SD	0.79	0.80	0.72	0.85		
Paranoid Ideation					2.64	0.048*
M	0.64	0.81	0.62	0.74		
SD	0.71	0.85	0.76	0.77		

*p<.001. **p<.05.

Table 5. Gender Differences on Outcome Scales- Achenbach, BSI, PTSD

Scales	Mean (SD)	t (df)	Sig.
PTSS/D	Males: 3.30 (2.60) Females: 4.90 (3.00)	-8.99 (891.552)	0.000**
Achenbach			
Total	Males: 36.31 (18.69) Females: 39.23 (19.67)	-2.28 (901)	0.023*
Internalizing	Males: 8.79 (6.32) Females: 12.38 (7.77)	-7.63 (876.649)	0.000**
Externalizing	Males: 12.59 (7.53) Females: 11.04 (6.45)	3.32 (869.388)	0.001**
Anxiety Depressed	Males: 3.49 (2.97) Females: 5.50 (3.94)	-8.68 (852.648)	0.000**
Withdrawn Depressed	Males: 3.04 (2.42) Females: 3.36 (2.46)	-1.99 (901)	0.047*
Somatic Complaints	Males: 2.26 (2.41) Females: 3.52 (2.99)	-6.96 (874.894)	0.000**
Social Problems	Males: 2.84 (2.52) Females: 2.83 (2.52)	0.02 (901)	0.977
Thought Problems	Males: 4.02 (3.11) Females: 4.25 (3.42)	-1.04 (901)	0.296
Attention Problems	Males: 4.59 (3.00) Females: 4.92 (3.01)	-1.60 (901)	0.109

Table 5. (Continued)

Scales	Mean (SD)	t (df)	Sig.
Rule Breaking	Males: 5.28 (3.57) Females: 3.74 (3.16)	6.86 (878.843)	0.000**
Aggressive Behavior	Males: 7.31 (4.78) Females: 7.30 (4.09)	0.03 (869.056)	0.969
DSM Affective Problems	Males: 3.66 (2.86) Females: 4.69 (3.52)	-4.60 (826.279)	0.000**
DSM Anxiety Problems	Males: 1.97 (1.76) Females: 2.92 (2.04)	-7.40 (868.576)	0.000**
DSM Somatic Problems	Males: 1.19 (1.70) Females: 1.95 (2.03)	-6.12 (883.482)	0.000**
DSM Attention Deficit Hyperactivity Problems	Males: 3.78 (2.66) Females: 3.99 (2.60)	-1.13 (874)	0.256
DSM Oppositional defiant	Males: 3.46 (1.98) Females: 3.50 (1.85)	-0.35 (878)	0.722
DSM Conduct Problems	Males: 4.34 (3.56) Female: 2.80 (2.65)	7.14 (768.861)	0.000**
BSI			
GSI	Males: 0.48 (0.51) Females: 0.75 (0.65)	-6.83 (823.963)	0.000**
Somatization	Males: 0.28 (0.51) Females: 0.50 (0.67)	-5.49 (813.217)	0.000**
Obsessive Compulsive	Males: 0.51 (0.60) Females: 0.80 (0.77)	-6.15 (821.349)	0.000**
Interpersonal Sensitivity	Males: 0.62 (0.69) Females: 0.96 (0.86)	-6.38 (823.881)	0.000**
Depression	Males: 0.40 (0.64) Females: 0.67 (0.90)	-5.01 (783.018)	0.000**
Anxiety	Males: 0.51 (0.61) Females: 0.87 (0.82)	-7.18 (805.434)	0.000**
Hostility	Males: 0.67 (0.75) Females: 0.85 (0.81)	-3.31 (853)	0.001**
Phobic Anxiety	Males: 0.51 (0.68) Females: 0.91 (0.85)	-7.57 (820.993)	0.000**
Paranoid Ideation	Males: 0.62 (0.73) Females: 0.77 (0.81)	-2.68 (853)	0.007*

* p<.001.

**p<.05.

Differences in Mental Health Outcomes According to Gender and Age

Differences in gender were found to be as expected, with girls reporting significantly more Post Traumatic Stress, overall mental health problems, and internalizing problems than boys, who displayed more externalizing difficulties (cf. YSR and BSI).

In contrast, age differences were less prevalent, and when they did occur they followed a less expected pattern (Table 6). Grouping the population into “youngest” (8th grade, ages 12-13.5), “middle” (9th grade, ages 14-15.5) and “oldest” adolescents (11th grade, ages 16-18), no significant age differences were found for Post Traumatic Stress and Achenbach overall, internalizing, and externalizing scales. Remarkably, however, for those scales showing significant differences (YSR Withdrawn/Depressed, DSM-Affective and ‘Rule-Breaking’ problems, along with the Global Severity Index and the BSI subscales), older adolescents were found to have experienced more severe problems than younger ones, contrary to the literature findings.

Table 6. Differences on Outcome Scales- Achenbach, BSI and PTSD According to Age

Outcome Scales	Group 1 12-13.5	Group 2 14-15.5	Group 3 16-18	F value	Sig. Level
PTSS/D				.426	0.653
M	4.01	4.14	4.23		
SD	2.98	2.87	2.94		
Achenbach					
Total				1.89	0.151
M	36.87	37.21	39.81		
SD	19.79	18.50	19.39		
Internalizing				2.75	0.064
M	10.44	10.13	11.51		
SD	7.17	7.00	7.82		
Externalizing				2.14	0.118
M	11.16	11.96	12.36		
SD	7.17	7.24	6.50		
Anxiety Depressed				2.81	0.060
M	4.35	4.33	4.98		
SD	3.48	3.41	4.05		

Table 6. (Continued)

Outcome Scales	Group 1 12-13.5	Group 2 14-15.5	Group 3 16-18	F value	Sig. Level
Withdrawn Depressed M SD	3.14 2.35	3.01 2.30	3.55 2.71	3.71	0.025*
Somatic Complaints M SD	2.96 2.87	2.79 2.73	2.98 2.76	0.46	0.630
Social Problems M SD	2.93 2.57	2.72 2.38	2.87 2.63	0.61	0.539
Thought Problems M SD	4.12 3.51	3.88 2.87	4.51 3.43	2.75	0.064
Attention Problems M SD	4.67 3.03	4.72 2.95	4.95 3.05	0.67	0.511
Rule Breaking M SD	3.97 3.31	4.45 3.55	5.19 3.35	8.69	0.000**
Aggressive Behavior M SD	7.19 4.60	7.51 4.46	7.17 4.19	0.58	0.556
DSM Affective Problems M SD	3.81 2.99	4.09 3.14	4.75 3.59	5.73	0.003*
DSM Anxiety Problems M SD	2.33 1.88	2.41 1.81	2.66 2.22	2.02	0.132
DSM Somatic Problems M SD	1.75 2.06	1.50 1.83	1.46 1.80	1.96	0.141
DSM Attention Deficit Hyperactivity Problems M SD	3.89 2.68	3.97 2.58	3.78 2.61	0.36	0.695
DSM Oppositional defiant M SD	3.41 1.96	3.52 1.90	3.50 1.85	0.29	0.742
DSM Conduct Problems M SD	3.60 3.48	3.56 3.32	3.43 2.70	0.19	0.825

Outcome Scales	Group 1 12-13.5	Group 2 14-15.5	Group 3 16-18	F value	Sig. Level
BSI					
GSI				5.10	0.006*
M	0.55	0.61	0.71		
SD	0.57	0.58	0.64		
Somatization				1.53	0.217
M	0.36	0.38	0.45		
SD	0.57	0.60	0.65		
Obsessive Compulsive				3.95	0.020*
M	0.58	0.66	0.76		
SD	0.67	0.69	0.76		
Interpersonal Sensitivity				10.02	0.000**
M	.66	.77	.96		
SD	.74	.78	.84		
Depression				6.36	0.002*
M	0.43	0.50	0.67		
SD	0.73	0.77	0.87		
Anxiety				2.70	0.067
M	0.64	0.67	0.78		
SD	0.74	0.70	0.81		
Hostility				1.74	0.175
M	0.69	0.79	0.80		
SD	0.79	0.77	0.78		
Phobic Anxiety				0.74	0.474
M	0.66	0.72	0.75		
SD	0.82	0.79	0.76		
Paranoid Ideation				3.38	0.034*
M	0.61	0.70	0.79		
SD	0.71	0.77	0.83		

*p<.001.

**p<.05.

DISCUSSION

Prevalence of Post Traumatic Stress and Emotional and Behavioral Problems

The literature on young people who are exposed to traumatic events in general reveals a wide range of Post Traumatic Stress symptoms, with prevalence rates of 95%. Research specifically related to the effects of terror attacks on adolescents indicates prevalence rates ranging from 4% to 53% after single

attacks and from 4% to 42% in the context of ongoing terrorism. This variability may be explained by sample and methodological differences, for example as regards the investigated traumatic events, the time between the event and the research assessment, as well as the operationalization of psychological outcomes (Saigh, Yasik et al., 1999; Hoven et al., 2002; Pfefferbaum et al., 2000; Laufer and Solomon, 2003; Pat Horenczyk and Dopplet, 2005; Solomon, Laufer and Lavi, 2005). Our findings confirm that Post Traumatic Stress is a major mental health outcome after ongoing exposure to terror, with 90% of the investigated adolescents reporting some level of posttraumatic stress and up to one third experiencing symptoms suggestive of a Post Traumatic Stress Disorder, despite the fact that over one third of the sample report no 'objective exposure' through direct personal experience or through relatives. Furthermore, the levels of overall mental health, emotional, and behavioral problems reported by the adolescents in our sample mostly exceeded those expected in a general epidemiological sample, with more than one fifth of these youth experiencing some form of clinically significant problem. Thus, as postulated, facing the *a priori* stressful task of living in a context of ongoing (risk of) terrorist attacks makes adolescents more prone to an increase in adverse mental health outcomes. It is important to recognize that these comprise not only PTSD and internalizing, affective difficulties. Indeed, the amount of externalizing problems such as oppositional, rule-breaking and aggressive behavior patterns and feelings of hostility documented in this study draws attention to the potential social implications regarding adolescents' (lack of) cognitive, emotional, and behavioral adjustments when entering adult life in an already complex society (Muldoon and Cairns, 1999; Zilber, Auerbach and Lemer, 1999).

Interestingly, however, our findings also suggest that such mental health vulnerabilities in the context of ongoing risks of terrorist attacks tend to adopt a non-uniform pattern. Thus, while only around one-tenth of the investigated adolescents did not report experiencing any posttraumatic stress, this percentage is noteworthy in its own right as regards the resiliencies that may develop when facing ongoing risks of terrorist attacks. In the same line of thought, our sample displays lower levels of mental health problems compared to those found in young people following the September 11 attacks or in other studies of ongoing terrorism. For example, the present sample appears to comprise fewer youths who suffer from severe depression and somatic complaints compared to Pat Horenczyk's studies (Pat-Horenczyk, 2005). While the use of different measurements across studies limits the possibility of drawing solid conclusions in this regard, the relatively lower levels of depression and somatization may be attributable to habituation and adaptation to a "chronic situation" of terrorist

attacks, given that our study was conducted more than a year after Pat Horenczyk's.

Differences According to Types of Population as Regards Location and Exposure Level

We also sought to explore to what extent young people from different locations in Israel might experience different mental health outcomes. Previous Israeli studies in the context of ongoing terrorism focused mainly on urban populations (Pat-Horenczyk and Dopplet, 2005; Solomon, Laufer and Lavi, 2005; Schiff et al., 2006), or in the Jewish settlements in the West Bank or the Gaza Strip which tend to be characterized by a strong ideological component (Pat-Horenczyk, 2005; Solomon, Laufer and Lavi, 2005). In contrast, the participants in the present study came from families who live in small and remote towns or settlements, with the exception of the Jerusalem school. Also, while the investigated 'Jordan Valley' school is the only one located outside the "Green Line"³, in contrast to the West Bank or Gaza Strip settlements, families who live there tend not to be characterized by a strong ideology. Rather, their main goal appears to be to achieve a "better quality of life". Our findings reveal that rural youth from Southern Israel experience the least Post Traumatic Stress and the fewest mental health difficulties, which we might have expected given that they also faced fewer terrorist attacks. Counterintuitively, however, adolescents living in the 'Jordan Valley' or in 'Central Israel' appear to experience *more* psychological distress than those from the most exposed Jerusalem area, indicating that objective levels of exposure do not in themselves explain all mental health outcomes.

When we interpret these results in terms of location, it becomes clear that the relationship between exposure to terror and mental health outcomes is also mediated by subjective aspects, for example, the choice of living location. Thus, families from the 'Jordan Valley' or 'Central Israel' areas may have been looking for a rural-type "quality of life", which is possibly indicative of individuals characterized by a specific type of response toward overall societal stresses as well as specific terror-related stresses. In short, it may be that this sub-population's choice of living location already reflects a subjective vulnerability or

³ Green lines: This was the demarcation between the 1967 borders of Israel and the West Bank territories captured in the Six-Day War.

receptivity to societal / terror-related stress and that they therefore experience more mental health symptoms compared to more exposed populations.

These results may also be interpreted in terms of differences in available societal responses according to level of exposure. Thus, the young people in Jerusalem, who, as is known, face the highest risk of terrorist attacks, may have benefited more from preventive programs and mental health interventions, which may have increased their resilience to (higher) objective exposure to terrorist attacks. Another interpretation might be that this highly exposed group experienced defensive responses which may be reflected in fewer symptoms.

Taken together, these findings underscore the importance of considering multiple levels of interpretation when analyzing the relative impact of exposure to terrorism on adolescents' mental health outcomes. Consistent with a developmental psychopathology approach to understanding vulnerability versus resiliency sources at individual, family and societal levels, both objective and subjective risks of exposure will need to be addressed in further research, in relation to protective dynamics such as intervention programs or families' attempts to deal with adverse experiences (Celestin and Celestin-Westreich, 2006; Pfefferbaum et al., 2002; Pfefferbaum et al., 2003; Laufer and Solomon 2003).

Gender and Age as Mediating Factors

As regards gender, our findings are in line with the developmental psychopathology literature in that girls tend to respond to stressful situations predominantly by internalizing and boys by externalizing problems (Pfefferbaum et al., 1999; Pfefferbaum et al., 2001; Pfefferbaum et al., 2003; Hoven et al., 2002; Hoven et al. 2004; Pat-Horenczyk, 2003). A methodological note deserves to be made here. The choice of measurements in effect helps determine the focus of observed outcomes. For example, the BSI comes forward as predominantly highlighting a range of internalizing 'female'-type symptoms. Given the significant proportion of externalizing problems in the mental health difficulties observed in the course of our study, a balanced choice of measures is recommended to assess accurately the full scope of mental health outcomes experienced by adolescents exposed to terrorism.

Interestingly, our findings concerning the role of age tend to differ from previous studies, most of which found that younger adolescents display more psychological distress in the context of both single and multiple terrorist attacks (Hoven et al., 2002; Hoven et al., 2004; Pat Horenczyk, 2005). In contrast, when significant differences were found in the present research internalizing/somatizing

difficulties were more severe in older adolescents. The timing of our study in relation to the age range may provide at least a partial explanation for these results. Bearing in mind that this study was conducted three years after the start of the Intifada, the older adolescents in our study were old enough to have been more exposed to terrorist events, for example by being more likely to have wandered around malls and used public transportation more than the younger adolescents investigated (Pat Horenczyk et al. 2006). Thus, increasing age corresponds in our sample to increasing objective exposure to risks as well as an increased subjective perception of risks over the years, which might account for the higher levels of certain adverse emotional, cognitive, or behavioral responses to such risks. Consequently, the potential impact of age in the context of ongoing terror appears to require modulated conceptualization. Thus, while children's abilities to regulate cognitive, emotional, and behavioral responses may increase over time, thereby strengthening their capacity to deal effectively with terror-related stresses, in this specific context an age increase may also imply an increased objective and perceived risk of exposure to terror and thereby lead to more psychological distress or vulnerabilities (Braun-Lewensohn, Celestin-Westreich, Verte, Celestin, Ponjaert-Kristoffersen, in press).

Study Limitations

When considering the interpretation options with regard to our findings, a number of study limitations should be taken into account. For example, since all the data are retrospective and based on self-reports, the extent to which statements made by adolescents concerning stress and mental health difficulties correspond to external observations and/or clinical assessments remains to be investigated. Measuring adolescents' psychological outcomes from multiple perspectives is thus needed to assess their full implications, for example as regards levels of functional impairment. Also, it should be noted that a degree of participation bias could not be avoided in our sample, given that a number of adolescents did not complete the testing procedure. While these accounted for a small proportion (less than two percent) of the sample, they may represent a "significant few" for whom the questionnaires posed an emotional threat. In addition, since we have no base rate information, notably regarding the rates of PTSS/D or other mental health problems prior to the study period, we cannot with any certainty ascribe the observed mental health outcomes solely to the impact of terrorism. As mentioned above, a comprehensive developmental psychopathology perspective on adolescents' sources of vulnerability and resiliency in the context of ongoing risks

of terrorism must take into account multiple-entry factors at individual, family, and contextual levels. Another study limitation is the inherent connectedness of location and level of exposure, which limits the attribution of explanations to one or other factor. In future analyses, an approach that takes into account multiple components of exposure may shed more light on this question. Finally, while the study sample is relatively large and was chosen to represent different segments of the Israeli adolescent population in terms of location, age range, and levels of exposure, the generalization of our findings is obviously limited to these population segments. Further study is needed into the potential influences of varying socio-demographic backgrounds, for example certain aspects of religious observance or ethnic diversity, issues which have not been investigated here.

CONCLUSION AND IMPLICATIONS

This study reveals that a sample of Israeli adolescents aged twelve to eighteen years who have been exposed to repeated terrorist events over a period of several years experience significant levels of psychological distress, including Post Traumatic Stress Symptoms or Disorder along with clinically significant overall, internalizing and externalizing mental health problems. Consistent with similar research, our findings underscore the need to provide both preventive actions and adequate interventions to help adolescents cope with the ongoing risk of terror in order to limit its adverse effects. Given the wide range of the study along with the repeatedly documented gender differences in the types of psychological distress expressed, including clinically significant levels of oppositional and aggressive behavior along with feelings of hostility in a sizeable proportion of the adolescents, mental health actions need to be modulated accordingly to make them more effective.

Also, while a comparison of students from urban and rural locations with different levels of objective exposure to terrorist attacks confirms that the lower the exposure level and the more remote the area, the less young people experience mental health difficulties, the finding that higher levels of objective exposure are not systematically associated with higher levels of PTSS/D and other mental health problems calls for further investigation of the concept of exposure and differentiation of its components. Our findings clearly reveal that aspects that are specific to ongoing exposure to terrorism should be addressed more extensively in future research (e.g. cumulative effects, experienced risk of exposure to future events, etc.). For example, location (choice of living area) may in itself reflect an attempt to cope with (anticipated) terror-related risks and therefore reflect

psychological vulnerabilities that merit further study. Importantly, our findings suggest that different dimensions of exposure such as the subjective experiences of threat need to be taken into account to account for related mental health outcomes, an aspect we are currently investigating. Thus, a multidimensional approach to the 'exposure to terror' concept is recommended to shed further light on the variability in PTSD and internalizing and externalizing difficulties among adolescents. As has been evidenced in other fields of developmental psychopathology, for example as currently experienced in the ongoing multi-site European FACE[®] program (for 'Facilitating Adjustment of Cognitions and Emotions') for youth with emotional and behavioral problems and their families, addressing both subjective and more dynamic personal characteristics tends to be fundamental in strengthening resiliency when facing multiple, ongoing life stresses (Celestin, Celestin-Westreich, 2006; Celestin-Westreich et al., 2005). From this perspective, coping is a strong potential candidate to deepen our understanding of how youth adjust cognitively and emotionally to experiences of persistent sources of stress, an aspect that has recently begun to be investigated in the context of exposure to terrorism (Gil, 2005; Somer, Ruvio, Soref and Sever, 2005; Zeidner, 2005). Finally, as our current results further indicate, age may exert multidirectional influences depending on the correlation between the combined effects of, on the one hand, increased cognitive, emotional, and behavioral mastery over time and, on the other hand, longer and potentially more intense exposure. Prevention and/or intervention programs aimed at fostering adolescents' adjustment processes should be modulated accordingly in order to help them cope more effectively with the stresses and consequences of ongoing exposure to terror risks.

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