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## Personality and Individual Differences

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## Adult attachment, perceived stress, and PTSD among civilians exposed to ongoing terrorist attacks in Southern Israel

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### ABSTRACT

This study examined the relationships among exposure to terrorism, individual differences in adult attachment dimensions, perceived stress, and posttraumatic stress disorder (PTSD). A representative sample of 254 adults who had experienced more than 7 years of ongoing exposure (OGE) to rocket and mortar fire in southern Israel was compared to 308 individuals with no exposure (NE) to terrorism. OGE individuals reported significantly elevated levels of insecure attachment, perceived stress, and PTSD-symptoms as compared to the NE individuals. The associations between perceived stress and PTSD-symptoms were significantly stronger in the OGE group, compared to the NE group. For OGE individuals, the elevated level of perceived stress mediated the association between Attachment Anxiety and PTSD-symptoms. Theoretical and clinical implications of the findings are discussed.

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### 1. Introduction

Exposure to terrorism has been consistently associated with mental health problems (for review, see e.g., Neria, Nandi, & Galea, 2008), including elevated levels of posttraumatic stress disorder (PTSD; APA, 1994). Although a number of studies have previously documented PTSD in Israeli populations (e.g., Bleich, Gelkopf, & Salomon, 2003; Shalev, Tuval, Frenkiel-Fishman, Hadar, & Eth, 2006), only few studies have focused on the mental health impact of the recent ongoing attacks on civilian populations (Besser & Neria, *in press*; Besser & Priel, *in press*).

The current study focused on adult population in the town of Sderot (S'de-rote) and its surrounding communities, located approximately seven kilometers from the Israel–Gaza border in southern Israel. This population has endured nearly eight years of exposure (between 2000 and 2008) to rocket and mortar fire from Hamas and Islamic Jihad forces operating from the Gaza Strip. Over 6000 rockets and 2500 mortar shells have been launched into this area during this time, threatening personal and family safety in the small and interconnected communities of the area, causing considerable destruction of property, and resulting in more than 20 fatalities and 430 injuries.

A central limitation of previous research has been its focus on singular traumatic events (e.g., 9/11 attacks), while the mental

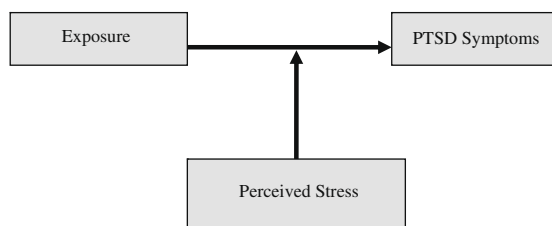
health impact of continuous and ongoing exposure to terrorism has only rarely been examined (e.g., Bleich et al., 2003; Shalev et al., 2006). Moreover, to date, no prior research has examined the role of attachment style in the individual's response during ongoing exposure to trauma. Extensive research has focused on the roles of attachment anxiety and Attachment Avoidance (e.g., Mikulincer & Shaver, 2003; Mikulincer & Shaver, 2007) in emotional self-regulation (e.g., Mikulincer & Shaver, 2003) and in individuals' responses to situations of distress (Mikulincer, Birnbaum, Woddis, & Nachmias, 2000). Individuals scoring high on the Attachment Anxiety dimension tend to intensify negative emotional states (*hyperactivation* strategies), while those high on the Attachment Avoidant dimension tend to distance themselves from emotional situations (*deactivation* strategies). Accordingly, highly avoidant–attached individuals are likely to restrict the acknowledgement of distress, dismiss its importance, and erect barriers against their own stressful affects and thoughts. Consequently, they appear to be less sensitive to stress (see Mikulincer & Shaver, 2007 for a review).

While previous studies have documented the associations between insecure attachment styles and PTSD in a number of populations exposed to trauma (e.g., war veterans, recruits for military training, prisoners of war, and Holocaust child survivors; see Mikulincer & Shaver, 2007 for a review and the references therein), suggesting that anxious attachment style increased vulnerability to stress reactions, no study to date has examined the consequences of long-term, direct exposure to trauma in civilian populations exposed to terrorism. Furthermore, no study has examined the

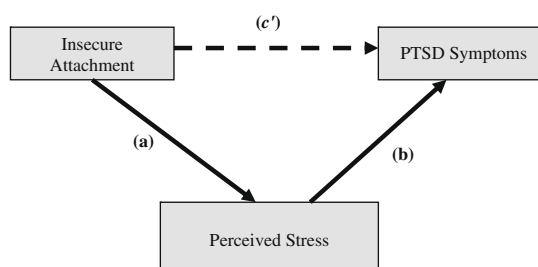
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1) *Moderational Models*: Perceived Stress affects the strength of the relationship between Exposure to trauma (OGE vs. NE) and PTSD Symptoms.



2) *Mediational Models*: Under direct and ongoing exposure (OGE), Perceived Stress accounts for the relationship between Insecure Attachment and PTSD Symptoms.



The dotted path (c') indicates a significant decrease in Path c when Perceived Stress is included in the model (a and b).

Fig. 1. Hypothesized theoretical models for this study.

question whether the degree of perceived stress *moderates* the relationship between exposure and PTSD or *mediates* the relationship between insecure attachment and PTSD (see Fig. 1).

The primary goal of the present study is to extend the current knowledge by examining the associations among extreme and ongoing exposure to terrorism, insecure attachment styles, perceived stress, and PTSD by studying a population that has been continuously exposed to direct trauma over a long period of time.

### 1.1. Hypotheses

1. Ongoing exposure (OGE) residents will manifest elevated levels of PTSD-symptoms and stress as compared to their no exposure (NE) counterparts.
2. OGE residents who report high levels of stress will exhibit elevated levels of PTSD; NE is expected to *moderate* the associations between perceived stress levels and PTSD-symptoms, or low perceived stress is expected to moderate the associations between OGE and PTSD-symptoms (Fig. 1; moderation model).
3. Based on the model previously proposed by Pielage, Gerlisma, and Schaap (2000), suggesting that stress mediates the association between insecure attachment and psychopathology, OGE residents, who are insecurely attached will experience high levels of perceived stress, which, in turn, will be associated with the exhibition of higher levels of PTSD-symptoms; perceived stress is expected to *mediate* the relationships between insecure attachment dimensions and PTSD-symptoms (Fig. 1; mediation model).

## 2. Method

### 2.1. Participants

The study was conducted between October 2007 and April 2008. The sample was composed of two groups. One group in-

cluded 254 (111 [44%] men and 143 [56%] women) adults, with a mean age of 33.20 years (SD = 10.44) and a mean of 13.24 years of formal education (SD = 2.38), with more than seven years of direct and ongoing exposure to terrorism in Sderot and its surrounding communities (OGE residents). The other group included 308 (150 [49%] men and 158 [51%] women) adults, with a mean age of 34.80 years (SD = 9.39) and a mean of 13.57 years of formal education (SD = 1.94), living in a distant geographic area in southeastern Israel (Eilat and its surrounding communities) that is located about 350 km from the OGE community (NE residents). These participants matched those of the study group on sociodemographic characteristics and type of community (e.g., size of town), but had never been directly exposed to life-threatening experiences related to terrorism or war. Furthermore, they did not have relatives, friends, or acquaintances living in the OGE area. We have employed a stratified sampling probability method followed by a multistage cluster sampling<sup>1</sup>. In *both* groups, we limited the sampling to Jewish Israelis aged 20 or older who are fluent in Hebrew. To ensure that all participants in the OGE group had been exposed to the long-term missile threat, we included (for both groups) only adults who had lived in the geographical area for the last 10 years.

### 2.2. Procedure

Potential participants were asked if they would be willing to complete a questionnaire on "personality and mood." We approached participants in their households for personal interviews. To ensure that participants were not interdependent, spouses or those living in the same household were not approached. The questionnaires were translated into Hebrew. After the completion of the questionnaires, participants were given a written debriefing. Potential order effects were controlled by means of randomized presentation of the questionnaires within and between participants.

### 2.3. Measures

#### 2.3.1. Adult attachment dimensions

Participants' self-reported attachment dimensions were evaluated using the 36 items of the Experiences in Close Relationships-Revised (ECR-R; Fraley, Waller, & Brennan, 2000). The ECR-R Measure's scores fall along two subscales, Avoidance (or *discomfort with closeness and discomfort with depending on others*) and Anxiety (or *fear of rejection and abandonment*). In the present study, we obtained internal consistency reliability coefficients of  $\alpha = .91$  (OGE),  $.88$  (NE) for Attachment Anxiety and  $.90$  (OGE),  $.85$  (NE) for Attachment Avoidance.

#### 2.3.2. Stress arousal checklist

The Stress Arousal Checklist (SACL; Mackay, Cox, Burrows, & Lazznerini, 1978) is a 30-item instrument intended to assess a person's psychological experience. The checklist is comprised of two factors, Stress and Arousal. Adjectives associated with each of the subscales are rated on an ordered 4-point response scale, ranging from *definitely feel* through *definitely do not feel*. Respondents were asked to rate each item based on their experiences over the past seven days. Items were given a score of 1 when respondents felt that the adjective definitely or slightly described their feelings and 0 when they were either undecided or the adjective did not describe their feelings. In the present study, the Stress subscale, with 18 stress-related items, was used. We obtained internal consistency

<sup>1</sup> See Besser and Neria (in press) and Besser and Priel (in press) for detailed information on the sampling.

**Table 1**  
Attachment, perceived stress, and PTSD among individuals who had experienced direct and ongoing exposure (OGE) to terrorism and individuals who had not (NE).

Measure	Exposure				Analysis	
	OGE N = 254		NE N = 308		<i>t</i> <sub>(339)</sub>	Effect size ( <i>d</i> )
	M	SD	M	SD		
<i>Attachment style</i>						
AnxAtt	3.66	0.91	3.30	1.04	4.32***	0.37
AvoidAtt	2.70	0.99	2.37	0.91	4.13***	0.35
<i>Perceived stress</i>						
SACL	8.00	4.81	5.00	4.55	7.57***	0.64
<i>PTSD-symptoms</i>						
Intrusion	1.92	1.15	0.80	0.81	13.57***	1.15
Avoidance	1.62	0.89	0.99	0.78	8.87***	0.75
Hyperarousal	1.94	1.19	0.55	0.64	17.70***	1.50

Note. AnxAtt and AvoidAtt = Attachment Anxiety and Attachment Avoidance.  
\*\*\* *p* < .001, two-tailed.

reliability coefficients of  $\alpha = .95$  and  $.92$  for the OGE and NE groups, respectively.

### 2.3.3. PTSD-symptoms

The Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997) was used to assess PTSD-symptoms. This revised instrument includes 22 items that resemble the entire list of DSM-IV PTSD criteria (APA, 1994). Respondents were asked to rate each item on a scale of 0 to 4 [0 (*not at all*), 1 (*a little bit*), 2 (*moderately*), 3 (*quite a bit*), and 4 (*extremely*)] based on their experiences over the past seven days. All participants were asked to specifically link the symptoms to the terrorist attacks on the OGE area. The IES-R has good psychometric properties and good convergent validity with other measures of PTSD (e.g., Creamer, Bell, & Failla, 2003). In the present study, we obtained internal consistency reliability coefficients of  $\alpha = .89$  (OGE),  $.82$  (NE) for Intrusion,  $.85$  (OGE),  $.80$  (NE) for Hyperarousal, and  $.86$  (OGE),  $.85$  (NE) for Avoidance.

## 3. Results

### 3.1. Group differences

We first compared the OGE and the NE groups in terms of demographics and the study variables. No significant differences

were found for gender ( $\chi^2_{(1)} = .139$ , *ns*), age ( $t_{(560)} = 1.91$ , *ns*), or education ( $t_{(560)} = 1.80$ , *ns*). However, as shown in Table 1, participants in the OGE group reported significantly higher levels of PTSD-symptoms and SACL as compared to the NE comparison group. In addition, participants in the OGE group reported significantly higher levels of Insecure Attachment Anxiety and higher Avoidance scores (Table 1). These results remained significant when controlling for demographics.

### 3.2. Bivariate associations

Table 2 provides a summary of the zero-order correlations for all of the study variables. As shown in this table, gender was associated with SACL and PTSD-symptoms, with women reporting higher scores. In addition, less educated individuals reported more PTSD-symptoms. Furthermore, Attachment Anxiety and Avoidance were associated with SACL and PTSD-symptoms. In order to examine the unique associations of exposure, attachment variables, and SACL as well as the interactive associations of exposure with SACL and with attachment variables on the various PTSD-symptoms (while controlling for demographic variables), the data was analysed using a series of hierarchical regressions with interactions represented by product terms (Aiken & West, 1991; Table 3).

### 3.3. Multivariable analyses

#### 3.3.1. The moderating model: perceived stress moderates the relationship between exposure and PTSD-symptoms

As shown in Table 3, after designating the relevant demographic variables (gender, age, and education) as covariables in Step 1 and controlling for the significant effect of exposure on PTSD symptom variables in Step 2, we found that (beyond the obtained significant effects of gender, low education, and direct exposure), Attachment Anxiety (but not the Avoidance dimension) was positively associated with PTSD symptom scores. In the next step, SACL scores significantly predicted high PTSD symptom scores (Table 3). We next tested the hypothesized Exposure  $\times$  Perceived Stress interaction. To control for the presence of all other interactions in the model, the two-way interactions of exposure with SACL, with Attachment Anxiety, and with Attachment Avoidance were entered in Step 5. Analyses revealed no meaningful two-way interactions between Attachment Avoidance and Attachment Anxiety. Results indicated

**Table 2**  
Correlations among study variables.

Variable	1	2	3	4	5	6	7	8	9
1. Exposure <sup>a</sup>	–								
<i>Demographics</i>									
2. Gender <sup>b</sup>	–.05	–							
3. Age (years)	–.08	.02	–						
4. Education (years)	–.08	–.03	.10	–					
<i>Attachment styles</i>									
5. AnxAtt	.18***	–.11**	–.04	–.08	–				
6. AvoidAtt	.17***	.17***	.05	–.06	.25***	–			
<i>Perceived stress</i>									
7. SACL	.30***	–.15***	–.05	–.05	.37***	.17***	–		
<i>PTSD-symptoms</i>									
8. Intrusion	.50***	–.12**	.02	–.11**	.26***	.12**	.42***	–	
9. Avoidance	.35***	–.12**	.04	–.10	.24***	.14***	.29***	.72***	–
10. Hyperarousal	.60***	–.14***	.00	–.11**	.24***	.16***	.49***	.88***	.71***

Note. To ensure that the overall chance of type I error remained less than 0.05, a full Bonferroni correction was applied. AnxAtt and AvoidAtt = Attachment Anxiety and Attachment Avoidance.

<sup>a</sup> Exposure is a binary-coded variable (0 = NE; N = 308, 1 = OGE; N = 254).

<sup>b</sup> Gender is a binary-coded variable (0 = women, 1 = men).

\*\* *p* < .01.

\*\*\* *p* < .001, two-tailed.

**Table 3**  
The moderating role of exposure in the associations between stress and PTSD-symptoms.

Predictors	PTSD-symptoms														
	Intrusion					Avoidance					Hyperarousal				
	R <sup>2</sup>	ΔR <sup>2</sup>	β	t/F	p<	R <sup>2</sup>	ΔR <sup>2</sup>	β	t/F	p<	R <sup>2</sup>	ΔR <sup>2</sup>	β	t/F	p<
Step 1	.03			5.53	.001	.03			5.3	.001	.04			6.7	.0001
Gender <sup>a</sup>			-.12	-2.95	.003			-.13	-3.04	.002			-.15	-3.5	.0001
Age			.04	0.85	ns			.05	1.20	ns			.02	0.52	ns
Education			-.12	-2.87	.004			-.11	-2.54	.01			-.12	-2.90	.004
Step 2	.27	+24%		181.31	.0001	.15	+12%		76.71	.0001	.38	+34%		310.8	.0001
Exposure <sup>b</sup>			.49	13.47	.0001			.35	8.76	.0001			.59	17.63	.0001
Step 3	.29	+2%		10.60	.0001	.18	+3%		10.31	.0001	.40	+2%		7.12	.001
AnxAtt			.17	4.39	.0001			.16	3.87	.0001			.11	3.08	.002
AvoidAtt			.01	0.23	ns			.05	1.32	ns			.05	1.34	ns
Step 4	.35	+6%		46.33	.0001	.20	+2%		11.70	.001	.48	+8%		83.44	.0001
Stress (SACL)			.26	6.81	.0001			.15	3.42	.001			.32	9.14	.0001
Step 5	.39	+4%		26.54	.0001	.24	+4%		17.30	.0001	.53	+5%		52.31	.0001
Exposure × stress			.40	5.15	.0001			.35	4.16	.0001			.47	7.23	.0001

AnxAtt and AvoidAtt = Attachment Anxiety and Attachment Avoidance.

<sup>a</sup> Gender is a binary-coded variable (0 = women, 1 = men).

<sup>b</sup> Exposure is a binary-coded variable (0 = NE; N = 308, 1 = OGE; N = 254). *t* = *t* value associated with β; *F* = *F* value associated with the changes in R<sup>2</sup>, two-tailed tests.

that the only significant two-way interactions in the prediction of all three PTSD-symptoms scores were the Exposure × Perceived Stress interactions. For the sake of simplicity, among the two-way interactions, only these interactions are presented in Table 3 and Fig. 2. Finally, none of the three-way interactions examined in the subsequent step were significant. Using a simple slope examination (see Fig. 2), we found that levels of SACL were significantly associated with levels of PTSD-symptoms as a function of exposure. Significant associations between SACL and PTSD-symptoms were found among OGE individuals, but not among NE individuals.

### 3.3.2. The mediating model: under OGE, perceived stress mediates the relationships between insecure attachment and PTSD-symptoms

In order to examine the hypothesis that levels of SACL mediate the association between Insecure Attachment and PTSD under conditions of OGE, we followed Baron and Kenny's (1986) criteria for mediation. Using this strategy, we first analysed the direct associations of Attachment Anxiety and Avoidance scores with PTSD-symptoms. Correlation analyses revealed that while Attachment Anxiety is significantly associated with PTSD-symptoms ( $r_{(254)} = .21, .24, .18, ps < .0001$ ; for Intrusion, Avoidance, and Hyperarousal, respectively), Attachment Avoidance is not ( $r_{(254)} = .01, .11, .08, ns$ ; for Intrusion, Avoidance, and Hyperarousal, respectively). In addition, while Attachment Anxiety was associated with levels of SACL ( $r_{(254)} = .25, p < .0001$ ), the association between Attachment Avoidance and SACL was not significant ( $r_{(254)} = .08, ns$ ). Accordingly, Attachment Avoidance did not fulfill the requirements for mediation and, therefore, further analyses focused only on the associations between Attachment Anxiety, SACL levels, and PTSD-symptoms.

As shown in Fig. 3 and Table 4, the significant associations between Attachment Anxiety and PTSD-symptoms (indicated as *c*) decreased significantly (indicated as *c'*) in the presence of higher SACL levels<sup>2</sup> [see Table 4 for significance, Sobel's *Z* statistic for the drop in the direct associations]. Thus, under OGE, stress levels mediated (albeit not exclusively) the Attachment Anxiety vulnerability to

PTSD-symptoms. Results remained significant when controlling for demographic effects.

## 4. Discussion

Our findings are consistent with previous research (e.g., see Neria et al., 2008 for a review), suggesting that direct exposure to trauma has a greater debilitating effect than indirect exposure with regards to level of PTSD-symptoms, and that low education and female gender are associated with increased risk of PTSD (Bleich et al., 2003; Hobfoll, Tracy, & Galea, 2006; Neria et al., 2006). Our study extends previous research by indicating that trauma exposed individuals had also higher levels of insecure attachment than their counterparts from the non-rocket-assaulted zones. This result suggests that extreme exposure to trauma may affect internal working models of attachment and that these insecure attachment models affect the perception of additional traumatic events. One possible explanation is that OGE to traumatic experiences mobilizes internal and external resources for coping with stress, such as inner representations of security, interfering with the regulation process and intensifying stress and distress. The state of mind of a person who is undergoing trauma may be characterized by overwhelming shock and intense feelings of panic, vulnerability, helplessness, and exhaustion (Horowitz, 1982). These conditions may automatically activate the attachment system at a high level (see Mikulincer, Shaver, & Pereg, 2003). Yet, it is important to note that in our sample, the distribution of attachment dimension scores was not skewed, but followed a normal curve. This indicates that our OGE sample is not an extreme group. In the context of attachment activation effects, longitudinal research is needed in order to examine the question of whether increased insecure attachment may be a consequence of individuals' extreme and chronic exposure to trauma<sup>3</sup>. Chronic exposure may lead to chronic activation of secondary attachment strategies, which may result in lasting *scar effects* (e.g., Rhode, Lewinsohn, & Seeley, 1990) in that even when the exposure disappears, OGE individuals may continue to show higher levels of Avoidance and Anxiety Attachment.

<sup>2</sup> To ensure that the perceived stress and PTSD symptom variables do not essentially convey the same information, despite the fact that these variables are highly correlated, multicollinearity diagnostic analyses were performed. Eigenvalues of the scaled and uncentered cross-products matrix, condition indices, and variance-decomposition proportions, along with variance inflation factors (VIF) and tolerances from multicollinearity diagnostic analyses, indicated the absence of multicollinearity. Thus, the measures of perceived stress and PTSD-symptoms are not redundant.

<sup>3</sup> In an ancillary analysis, when the effect of severity of exposure to trauma on attachment anxiety and avoidance was reanalyzed while stress and the three PTSD-symptoms were covaried, we found that the effect of severity of exposure on insecure attachment remained significant beyond levels of distress. This finding might further support the potential existence of a scar effect.

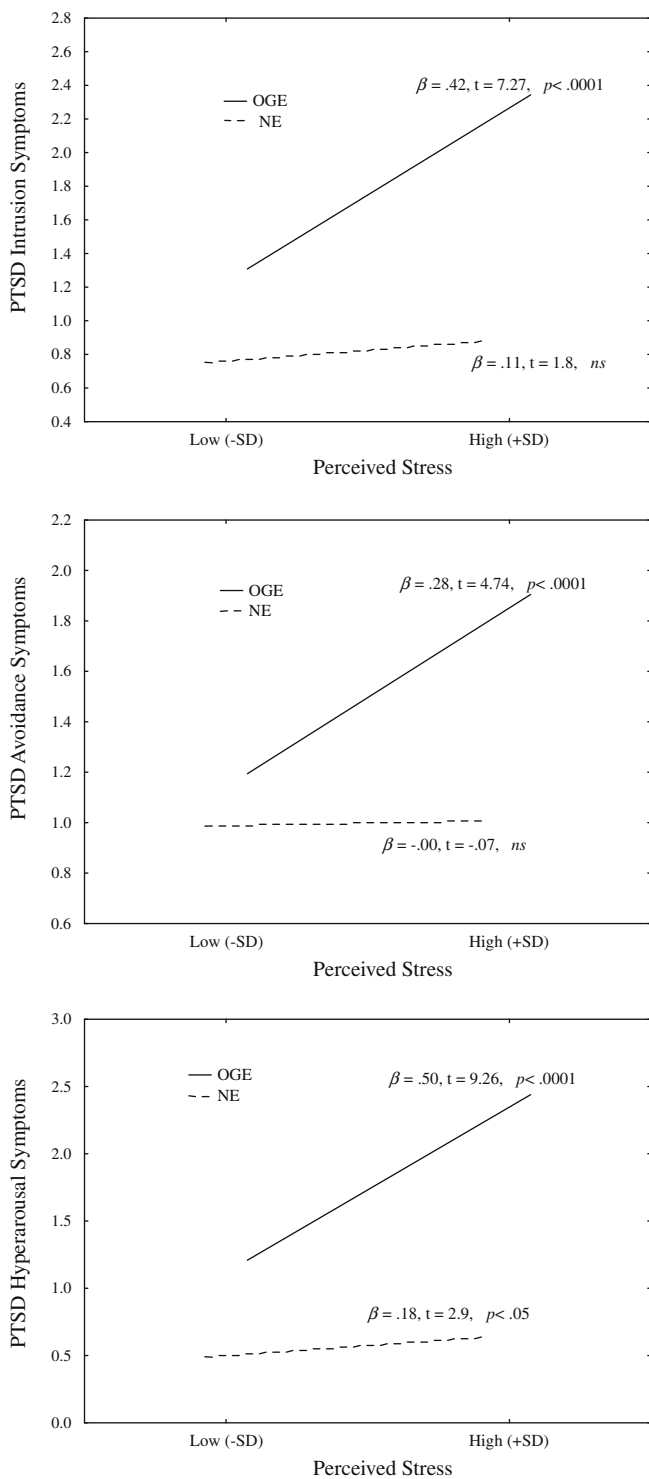


Fig. 2. The role of perceived stress in the associations of exposure and PTSD.

In the present study, severity of traumatic exposure (OGE) was associated with higher levels of stress and, among the OGE group, those who had experienced high levels of stress exhibited elevated levels of PTSD-symptoms. Thus, the interaction between severity of traumatic exposure and individual differences in stress perception is important for determining the risk of mental health problems, emphasizing the role of subjective appraisal in determining the effect of traumatic events. An OGE situation may aggravate one's stress by creating a "pressure-cooker effect" (Hobfoll & London, 1986), especially because others are in a similar situation of shared

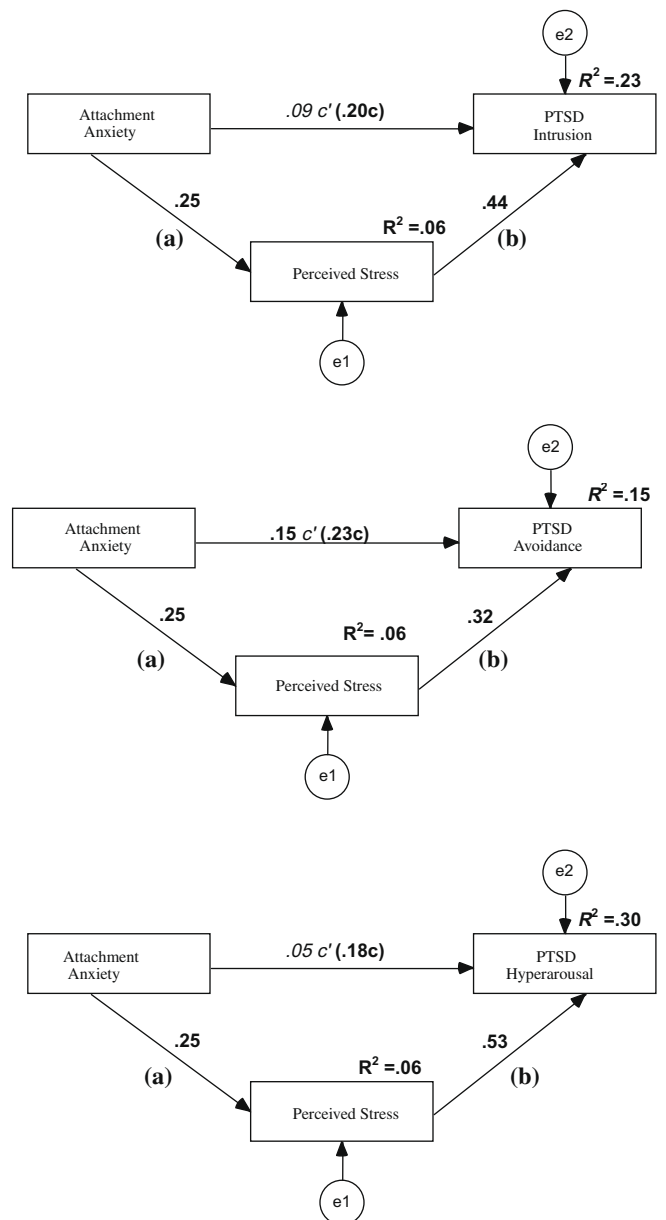


Fig. 3. The mediating role of perceived stress in the attachment PTSD associations in OGE. Note. The path c' indicates a significant drop in Path c when the Perceived Stress scale was included in the model (a and b). Bolded estimates are significant regression coefficients  $\beta$ s. Numbers in parentheses represent the  $\beta$  values before the perceived stress scale (assumed mediator) was entered into the model. Small circles represent residual variances and unidirectional arrows depict hypothesized associations.

fears and worries. Indeed, in recent studies, we found that OGE residents were characterized by low levels of social support (Besser & Priel, in press) and diminished satisfaction with life (Besser & Neria, in press), demonstrating the depletion of psychological resources among highly and continuously exposed individuals. The results of our study are consistent with previous findings that demonstrated positive associations among insecure attachment styles, stressful events, general psychological symptoms, and mental health problems (for review see Mikulincer & Shaver, 2007). As for the mechanism underlying the link between attachment style and psychopathology, our results seem to corroborate a model that suggests insecurely attached individuals may appraise events as more stressful as compared to secure attachment individuals, consequently leading to the development of psychopathology (see

**Table 4**  
Summary of the Mediation Models.

Attachment Anxiety → stress	Stress (SACL) → PTSD-symptoms	Two-tailed Sobel's Z-test
$\beta = .25, t = 4.150, p < .0001$	Stress → intrusion $\beta = .44, t = 7.746, p < .0001$	$Z = 3.27, p < 0.001$
	Stress → avoidance $\beta = .32, t = 5.328, p < .0001$	$Z = 3.66, p < 0.001$
	Stress → hyperarousal $\beta = .53, t = 9.821, p < .0001$	$Z = 3.82, p < 0.001$

Mikulincer et al., 2000). Thus, the subjective appraisal of events plays a crucial role in the links between the severity of traumatic exposure, as well as individual differences in adults' insecure models of attachment, and the development of PTSD-symptoms.

While Attachment Anxiety was found to be a vulnerability factor for PTSD-symptoms, Attachment Avoidance was not. Our findings are in line with results that suggest that the Anxiety dimension of attachment is more of an issue in psychological distress and the occurrence of PTSD than the Avoidance dimension (Declercq & Willemsen, 2006). Furthermore, the results support findings regarding the association of an Avoidant Attachment regulation strategy with less sensitivity to stress (e.g., see Mikulincer & Shaver, 2007).

Our findings seem consistent with observations in the attachment literature that describe insecurely attached individuals of the Attachment Anxiety dimension as reacting to stressful events by mentally ruminating on negative thoughts, affects, and memories. Ultimately, when confronted with stressful events, individuals with Attachment Anxiety appear to be hypersensitive to the problems that they experience. The persistent harmful effects of extreme and ongoing traumatic events have a significant negative impact on the individual's sense of safety and security, posing great challenges to that individual's ability to maintain attachment capacities. The horror of extreme and continuous exposure to terrorism can readily alter pre-existing attachment patterns, even those that would be considered secure.

The findings of this study have a number of clinical implications. Trauma-focused intervention with an attachment-based paradigm may be suitable for populations exposed to trauma on an ongoing basis, especially when attachment injuries result from exposure to extreme traumatic stressors. Moreover, our findings suggest that OGE to terrorism may elicit excessive distress. In this respect, counseling interventions for individuals with attachment anxiety might be oriented toward modification of their inflexible tendency for emotional hyperactivation.

Our results point to the potential coexistence of attachment effects on reactions to ongoing exposure to trauma as well as to the possible effects of adults' exposure to ongoing threats on their internal working models of attachment. Moreover, while our model is based on the theory that perceived stress mediates the insecure attachment and PTSD association, it is possible that attachment anxiety increases vulnerability to PTSD-symptoms, which in turn elevate stressful mood, thus PTSD might be the mediating factor. These possibilities, known as equivalent models, limit the possibility to determine which model better fits the empirical data. In order to explore the direction of the observed associations among stress and PTSD-symptoms as well as of their associations with insecure attachment in terms of cause and consequences, further studies, utilizing longitudinal design in the framework of Crossed-Lagged modeling are needed. Yet, it should be noted that the phenomenon under investigation is unique and characterized by an unpredictable starting point that did not allow for the collection of baseline measures. Moreover, further studies should consider better operationalization of stress, that include assessment of general psychological health (e.g., distress or chronic stress) and objective biomarkers in order to better capture long-lasting stress among exposed populations.

Despite its limitations, to our knowledge, the present study represents the first attempt to investigate associations between attachment dimensions, stress, and PTSD during a period of direct and repeated life-threatening terrorist attacks. The findings underscore the need to assess both contextual and *intrapersonal* processes in trauma exposed populations, and the need to consider the role of *interpersonal* protective factors, most pronouncedly social support (see Besser & Priel, in press; Henrich & Shahar, 2008).

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### References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182.
- Besser, A., & Neria, Y. (in press). PTSD-symptoms, satisfaction with life and prejudicial attitudes towards the adversary among Israelis exposed to ongoing terrorist attacks. *Journal of Traumatic Stress*.
- Besser, A., & Priel, B. (in press). Personality vulnerability, low social support, and maladaptive cognitive emotion regulation under ongoing exposure to terrorist attacks. *Journal of Social and Clinical Psychology*.
- Bleich, A., Gelkopf, M., & Salomon, Z. (2003). Exposure to terrorism, stress-related mental health symptoms, and coping behaviors among a nationally representative sample in Israel. *JAMA*, *290*, 612–620.
- Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the impact of event scale – Revised. *Behaviour Research and Therapy*, *41*, 1489–1496.
- Declercq, F., & Willemsen, J. (2006). Distress and post-traumatic stress disorders in high risk professionals: Adult attachment style and the dimensions of anxiety and avoidance. *Clinical Psychology and Psychotherapy*, *13*, 256–263.
- Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item-response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, *78*, 350–365.
- Henrich, C. C., & Shahar, G. (2008). Social support buffers the effects of terrorism on adolescent depression: Findings from Sderot, Israel. *Journal of the American Academy of Child & Adolescent Psychiatry*, *47*, 1073–1076.
- Hobfoll, S. E., & London, P. (1986). The relationship of self-concept and social support to emotional distress among women during war. *Journal of Social and Clinical Psychology*, *4*, 189–203.
- Hobfoll, S. E., Tracy, M., & Galea, S. (2006). The impact of resource loss and "traumatic growth" on probable PTSD and depression following terrorist attacks. *Journal of Traumatic Stress*, *19*, 867–868.
- Horowitz, M. J. (1982). Stress response syndromes and their treatment. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 711–732). New York: Free Press.
- Mackay, C. J., Cox, T., Burrows, G., & Lazzarini, T. (1978). An inventory for the measurement of self-reported stress and arousal. *British Journal of Social and Clinical Psychology*, *17*, 283–284.
- Mikulincer, M., Birnbaum, G., Woddis, D., & Nachmias, O. (2000). Stress and accessibility of proximity-related thoughts: Exploring the species-typical and intra-individual components of attachment theory. *Journal of Personality and Social Psychology*, *78*, 509–523.
- Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioral system in adulthood: Activation, psychodynamic, and interpersonal processes. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (35, pp. 53–152). San Diego, CA: Academic Press.

- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure dynamics, and change*. New York: Guilford Press.
- Mikulincer, M., Shaver, P. R., & Pereg, D. (2003). Attachment theory and affect regulation: The dynamics, development, and cognitive consequences of attachment-related strategies. *Motivation and Emotion*, 27, 77–102.
- Neria, Y., Nandi, A., & Galea, S. (2008). Posttraumatic stress disorder following disasters: A systematic review. *Psychological Medicine*, 38, 467–480.
- Neria, Y., Gross, R., Olfson, M., Gameroff, M., Wickramaratne, P., Das, A., et al. (2006). Posttraumatic stress disorder in primary care one year after the 9/11 Attacks. *General Hospital Psychiatry*, 28, 213–222.
- Pielage, S. B., Gerlsma, J., & Schaap, C. P. D. R. (2000). Insecure attachment as a risk factor for psychopathology: The role of stressful events. *Clinical Psychology and Psychotherapy*, 7, 296–302.
- Rhode, P., Lewinsohn, P. M., & Seeley, J. R. (1990). Are people changed by the experience of having an episode of depression? A further test of the scar hypothesis. *Journal of Abnormal Psychology*, 99, 264–271.
- Shalev, A. Y., Tuval, R., Frenkiel-Fishman, S., Hadar, H., & Eth, S. (2006). Psychological responses to continuous terror: A study of two communities in Israel. *American Journal of Psychiatry*, 163, 667–673.
- Weiss, D., & Marmar, C. (Eds.). (1997). *Impact of event scale revised*. New York: Guilford Press.