

## Psychiatric reactions to continuous traumatic stress: A Latent Profile Analysis of two Israeli samples



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### ARTICLE INFO

#### Keywords:

Continuous traumatic stress  
Ongoing exposure  
War  
PTSD

### ABSTRACT

Many individuals worldwide are exposed to continuous traumatic stress (CTS). However, the psychiatric sequela of CTS and the relevance of posttraumatic stress disorder (PTSD) diagnostic criteria in this situation have yet to be determined. Filling this gap, the present study assessed psychiatric reactions to CTS and the relationship between such reactions and functional impairment among two representative samples of adults exposed to ongoing shelling over 6 (n = 387) and 9 years (n = 468). Assessment included PTSD symptomatology (i.e., intrusion, avoidance, hyperarousal), anxiety, somatization, and depression. Profile categorization aimed to underscore variations in symptom clustering and severity, and determine whether or not a profile is dominated by PTSD symptoms. Latent Profile analyses (LPA) of sample I revealed four distinct symptoms profiles: (1) 'symptomatically resilient'; (2) 'symptomatically low-moderate'; (3) 'symptomatically moderate-high'; and (4) 'symptomatically overall high'. LPA of sample II revealed three distinct symptoms profiles: (1) 'symptomatically resilient'; (2) 'symptomatically low-moderate'; (3) "symptomatically moderate-high". Moreover, profile variation was implicated in dysfunction. Consistent with studies focusing on single trauma exposure, the findings revealed that the most prevalent profile was the symptomatically resilient, indicating that most people exposed to CTS seem to evince a scarce number of psychiatric symptoms. Moreover, reactions to CTS proved broader than the existing PTSD symptomatology. Examining symptom dominance and severity in relation to impairment and dysfunction, and clinical considerations are discussed.

### 1. Introduction

Continuous traumatic stress (CTS) is a thirty year old concept (Straker & the Sanctuaries Counselling Team, 1987) which has recently attracted a renewed interest (e.g., Eagle & Kaminer, 2013; Nuttman-Shwartz & Shoval-Zuckerman, 2015; Stevens, Eagle, Kaminer, & Higson-Smith, 2013). CTS denotes the condition of living under circumstances of an ongoing protracted threat, typically lasting several years. Such situations are prevalent worldwide (e.g., Heidelberg Institute for International Conflict Research, 2016), and transpire in various constellations, ranging from life under constant urban violence or in a prison environment (e.g., Roach, 2013), continuous rocket shellings and/or sporadic terror attacks (e.g., Chipman, Palmieri, Canetti, Johnson, & Hobfoll, 2011), or otherwise living in a region infested with war and civil conflict (e.g., Turton, Straker, & Moosa, 1991). Nevertheless, empirical research in this domain remains very preliminary.

The current edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013) endorses

only one diagnostic entity wherein longlasting posttraumatic symptoms manifest, namely posttraumatic stress disorder (PTSD). Typically, the psychopathological ramifications of CTS are considered under the conceptual framework of PTSD and are accordingly assessed using PTSD measures (e.g., Schwartz, Bradley, Sexton, Sherry, & Ressler, 2005; Lahad & Leykin, 2010). Notwithstanding, it has been suggested that, as a conceptual framework, PTSD may not be adequate for characterizing the psychological sequelae of the individuals exposed to CTS (e.g., Stein, Wilmot, & Solomon, 2016).

Arguably, as a threat remains relatively constant and unrelenting in CTS, understanding responses to this condition may only partially draw on a concept addressing *past* traumatic experiences. Following this line of thought, several scholars have argued that the PTSD construct fails to validly address the complexity of CTS (e.g., Diamond, Lipsitz, & Hoffman, 2013; Lahad & Leykin, 2010). The primary concern has been that while cases of CTS do result in PTSD-like symptomatology (e.g., intrusion, hyperarousal, and avoidance), such symptoms may possess a somewhat adaptive and protective nature in the case of CTS, since the threat in these

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instances remains very real (e.g., Diamond, Lipsitz, Fajerman, & Rozenblat, 2010; Diamond et al., 2013). The argument made by Diamond et al. (2010, 2013) is that both alertness and avoidance, and their concomitant behaviors, may actually be protective when the threat is real (e.g., for civilians who have 15 s to run to a shelter from the moment of siren onset, alertness to sounds and avoidance of no-shelter areas are extremely valuable). Moreover, it has been argued that understanding the ramifications of life under CTS may necessitate a consideration which exceeds that of post-traumatic stress symptoms (PTSS; e.g., Nuttman-Shwartz & Shoval-Zuckerman, 2015). This is because the reaction to CTS seems to include additional emotional, cognitive, and behavioural phenomena, such as anxiety, helplessness, somatization, depression, and constant concern for the future (e.g., Hobfoll, Canetti-Nisim, & Johnson, 2006; Neria, Besser, Kiper, & Westphal, 2010).

To date, however, no systematic effort has been undertaken to delineate the emerging psychopathological sequelae under such conditions, nor have any studies determined the variety of psychological reactions in CTS situations. In beginning to fill this gap, the current study presents a preliminary effort towards such delineations. Prior to embarking on this investigative endeavor, however, the extant lacuna must be more fully explicated.

### 1.1. Nuanced reaction to trauma

Psychiatric symptoms often co-occur (Kessler, Chiu, Demler, & Walters, 2005). This has also been demonstrated by the existence of a “p factor”, a general psychopathological dimension that captures much of the shared variance of psychopathological symptoms (Caspi et al., 2014). Moreover, concerning different reactions to trauma, a rapidly growing body of research now indicates that such reactions must be evaluated in a more nuanced manner than merely assessing the existence of psychopathological symptoms or lack thereof (e.g., Bonanno & Mancini, 2012). For instance, recent studies have indicated that reactions to trauma may evince different pathological profiles, including mild, moderate and severe symptomatic responses and comorbidities (e.g., Contractor et al., 2015). Hruska, Irish, Pacella, Sledjeski, and Delahanty (2014) have studied post traumatic reactions among motor vehicles accident victims and found profiles of individuals who differed not only in the intensity of symptoms but also in the types of symptoms comprising each profile. That is, reactions to trauma cannot be adequately represented using a PTSS severity index, but must be approached as gestalt, which takes into consideration a wider gamut of psychopathological potentialities. Such nuanced investigations, however, have yet to be applied in instances wherein trauma is ongoing (i.e., CTS).

Another domain wherein CTS situations and the detriments they entail may differ from classic PTSD is that of functioning. Dysfunction is a mandatory criterion in any clinically and diagnostically recognized disorder, trauma-related disorders included (American Psychiatric Association, 2013). This is because dysfunction and impairment presumably emanate from the torment encompassed in the other symptoms. However, in CTS, dysfunction can arise not only in light of symptom manifestation but also in the face of actual threat. Indeed, given the protracted threat in CTS circumstances, disturbances to functioning are to be expected. However, while such impediments to functioning have been found in CTS, adaptive functioning is also significantly evident (e.g., Diamond et al., 2013). When considering the psychiatric responses to CTS, it is then important to establish to what extent dysfunction is related to symptom manifestation rather than merely to ongoing stress. Moreover, the investigation of pathology goes hand in hand with the investigation of resilience. Given that resilience is not adequately captured by the clinical symptomatic picture, but is also present in functioning (Bonanno, 2012), adding the assessment of functioning into the picture has the potential of highlighting not only symptomatic resilience and vulnerability (i.e., low vs. high symptomatology), but also functioning resilience and vulnerability (i.e., low vs. high functioning in relation to symptomatic manifestation or regardless of it). This too, however, has yet to be investigated.

Being the first to address these lacunae in the CTS domain, the current study is exploratory in nature. Two main objectives have been set:

1. To identify profiles of psychiatric symptomatology and their prevalence among adult individuals living in conditions of CTS. Seeking to delineate reactions to such traumas in a broad sense, we measured PTSS clusters, anxiety, depression and somatization, all of which have previously been associated with CTS (e.g., Neria et al., 2010).
2. To assess the relation between the various profiles of psychiatric reactions to CTS and functional impairment.

## 2. Method

A particular case of CTS has been taking place in the south of Israel since 2001. During these years, as part of the Israeli-Palestinian conflict, individuals living in this region have been subject to frequent rocket shelling from Gaza. While there have been relatively quiet periods, several intensive armed conflicts have taken place, each interspersed with a fluctuating amount of shelling, spiking to approximately 3000 rockets and mortars a year right before and during the conflicts. The thousands of rockets and mortars that have been fired into Southern Israel during these years have caused death, injury, damage and disruption to everyday life. During rocket attacks, an electronic audio alert siren is broadcasted signaling to Israeli citizens living near the Gaza strip that they are to run for cover to a nearby safe area (e.g., bomb shelter). In line with official government and military instructions, from the time of siren onset the civilians in this region have 15 s to find cover. In times of intense shelling the civilians are required to stay in shelters and cannot attend school, work or continue their daily routine life.

Data for the current study consisted of representative samples of adults living in this region. For the current study only those who lived in areas that were exposed to CTS were included. Data were collected at two points in time from two different representative samples. The first sample was assessed in 2007, 6 years into their exposure to CTS. The second sample was assessed in 2010, 9 years into their CTS exposure. Both samples consisted of residents of a city located approximately 3 km from the Gaza strip (i.e., Sderot), and additional rural communities on the border with the Gaza strip (i.e., Otef Gaza).

### 2.1. Procedure

Participants in both samples were recruited through a major polling service using an in-region random digit dialing methodology. Phone numbers were obtained from the national telephone directory which provides regional and community-specific dialing information. Telephone interviews were carried out by experienced interviewers in Hebrew or Russian using a structured questionnaire. Three attempts were made to contact an adult at each telephone number. Participation was anonymous and oral informed consent was obtained at the beginning of the interview. The Helsinki Ethics Committee of the Lev Hasharon Mental Health Medical Center approved the study design and procedures.

### 2.2. Participants

#### 2.2.1. Sample 1 (2007)

The sample included 387 adults. City residents comprised 80.5% of the sample and 19.5% were from rural communities; 49.3% were males and 50.7% were females; 29.9% were single, 56.9% were married, and 13% were widowed or separated. The average age was 42.25 ( $SD = 16.88$ ). Average years of education were 13.24 ( $SD = 3.28$ ). Seventy-four (21.6%) of the participants met the criteria for PTSD (full diagnosis with F criteria) and 122 (35.7%) without F criteria. One

hundred seventy-two (50.2%) met criteria for GSI, 145 (42.5%) met somatization criteria, 198 (58%) met depression criteria and 189 (55.2%) met anxiety criteria. In this data there were 0–1.7% missing values.

### 2.2.2. Sample II (2010)

The sample was comprised of 468 adults. Of these, 65.9% were city residents and 34.1% were from rural communities; 41% were males and 59% were females; 31.6% were single, 68.3% were married. The average age was 45.2 ( $SD = 15.03$ ). Average years of education were 13.15 ( $SD = 3.14$ ). Forty-nine (10.4%) of the participants met the criteria for PTSD (full diagnosis with F criteria) and 111 (23.8%) without F criteria. One hundred fifty-six (25.2%) met criteria for GSI, 156 (25.2%) met somatization criteria, 171 (27.6%) met depression criteria and 158 (25.5%) met anxiety criteria. In this data there were 0–.5% missing values.

### 2.2.3. Demographic comparisons between samples

Samples were compared regarding the demographic variables of age, gender and years of education using *t*-tests for independent groups. Results showed that the groups did differ in age ( $t(853) = 3.16$   $p = .002$ , Cohen's  $d = .24$ ) and education ( $t(852) = 3.42$   $p = .001$ , Cohen's  $d = .22$ ). Sample 2 participants reported higher education in years ( $M = 14.8$   $SD = 9.3$ ) and higher age ( $M = 44.4$ ,  $SD = 15.2$ ) compared to sample 1 age ( $M = 41.2$   $SD = 13.8$ ) and education ( $M = 13.2$   $SD = 2.8$ ). No differences were found for gender ( $\chi^2(1) = 1.23$   $p = .26$ ,  $r = .04$ ). The groups did differ in the area of residency, ( $\chi^2(1) = 22.4$   $p < .001$ ,  $r = .16$ ). There was a higher proportion of city residents in sample 1 (80.5%) compared to sample 2 (65.9%), though in both city residents were more prevalent compared to rural residents.

### 2.2.4. Exposure differences between samples

Samples were compared on exposure variables of: *personal exposure*, *other injured*, and *loss of other*. There were significant differences in *personal exposure*, ( $t(853) = 5.41$   $p < .001$ , Cohen's  $d = .36$ ). The participants in the 2010 data ( $M = 2.72$ ,  $SD = .8$ ) reported higher *personal exposure* compared to those from the 2007 data ( $M = 2.43$   $SD = .8$ ). We also found significant differences in the *other injured* exposure, ( $t(853) = 2.28$   $p = .02$ , Cohen's  $d = .16$ ). Participants from the 2010 data ( $M = .87$   $SD = .63$ ) reported higher *other injured* exposure compared to the 2007 data ( $M = .77$   $SD = .63$ ). We also found significant differences in exposure to *loss of other* ( $t(853) = 2.42$   $p = .02$ , Cohen's  $d = .22$ ), such that the residents from the 2010 data ( $M = .58$   $SD = .53$ ) reported higher loss than the participants in the 2007 data ( $M = .46$   $SD = .54$ ).

## 2.3. Measures

PTSD symptomatology was assessed using the Hebrew version of the PTSD Checklist, DSM-IV version (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL is a well-validated 17-item measure of intrusion, avoidance, and arousal symptoms. Items are rated on a 5-point Likert scale ranging from (1) not at all bothered to (5) extremely bothered. Due to the prolonged and chronic nature of the stressor, individuals were asked to respond to items in relation to “the security situation” and to report on symptoms experienced during the previous month. The PCL was found to have strong internal consistency ( $\alpha = .85$ –.94 for subscales and full scale), test-retest reliability, good convergent validity ( $r > .75$  with scores obtained on IES and MS-C), as well as discriminant validity (from SCL and CES-D) (e.g., Ruggiero, Del Ben, Scotti, & Rabalais, 2003) and was found to have good internal reliability in the present samples ( $\alpha$  ranging between .82 and .90 for all posttraumatic symptoms clusters).

Psychiatric symptomatology other than PTSS was assessed using the Hebrew version of the 18-item Brief Symptom Inventory (BSI-18;

Derogatis, 2001). Respondents reported the degree to which they were distressed by symptoms/problems experienced in the previous month and rated them on a 5-point Likert scale from (0) not at all to (4) extremely. The BSI-18 is comprised of three subscales: anxiety, depression, and somatization. Studies in several different populations found the tool to have good internal reliability ( $\alpha = .74$ –.89 for the three subscales and total score) (Derogatis, 2001), satisfactory retest reliability ( $r = .68$ –.82) and good convergent validity (Andreu et al., 2008). In the present study the internal reliability of the BSI-18 was good (sample I:  $\alpha = .90$  for somatization,  $\alpha = .82$  for depression and  $\alpha = .91$  for anxiety; sample II:  $\alpha = .89$  for somatization,  $\alpha = .88$  for depression and  $\alpha = .92$  for anxiety).

Functioning was assessed in six domains (vocational, educational, spousal, parental, social, and intimate; e.g., “How well do you function as a parent?”) and was measured using a 5-point Likert scale ranging from (0) inadequate to (4) perfectly adequate. The scale was developed in Hebrew for the current studies (Gelkopf, Berger, Bleich, & Silver, 2012). Internal reliabilities in sample I and sample II were .87 and .89, respectively.

Exposure to trauma related to three types of exposure assessed on a Guttman scale (0 = no; 1 = yes): 1) *Personal exposure* – participants were asked whether: a) they heard or saw a rocket fall, b) it fell close by, c) their house was hit and d) they were physically wounded; 2) *Other injured* – participants were asked if they knew someone who was physically injured, and whether a family member or close relative was physically injured; 3) *Loss of close other* – participants were asked if an acquaintance, family member or close relative was killed by a rocket fall. All participants lived in the fire area and therefore were all exposed to CTS. However, participants who gave a positive answer to at least one of the questions of each category was considered to be exposed to these categories.

## 2.4. Data analysis

We first assessed the normality of somatization, depression, anxiety, intrusion, avoidance, and hyperarousal in both the 2007 and 2010 datasets. For this purpose we used the Skewness index for all of these variables and found all values are within acceptable limits of  $\pm 2$  (Field, 2000 & 2009; Gravetter & Wallnau, 2014; Trochim & Donnelly, 2006). Missing data were treated using maximum likelihood (ML) estimation in Mplus 7 (Muthen & Muthen, 2012). We tested 1–4 factors and chose the model that had the best fitting model. Results of the exploratory analyses are presented in Table 1.

To identify symptom patterns among participants' latent profile analysis (LPA; Lanza & Rhoades, 2013), models using Mplus 7 (Muthen & Muthen, 2012) were conducted separately for the two samples. LPA is a person centred approach that enables the identification of profiles constituted from a combination of several aggregates of psychiatric symptoms, and indicates the prevalence of these profiles in the explored population. PTSD symptoms, assessed via the PCL, and depression, anxiety, somatization, as assessed by the BSI-18, were included in the analysis. To determine the number of profile groups in our data, we ran models containing one to five pattern groups. The final model was chosen based upon fit indices and substantive interest. Models were judged to exhibit better fit under the following conditions: a) lower AIC, lower BIC, lower ssBIC. We used the 10-point difference in BIC values to indicate the best fitting model (Raftery, 1995); b) a significant Lo-Mendell-Rubin likelihood ratio test (LMR-LRT; Jung and Wickrama 2008); and c) high latent class membership probabilities as indicated by entropy values approaching 1 (Jung & Wickrama, 2008).

In the second procedure, we used the most likely class membership variable, taking into account the rate of classification uncertainty, to test the association of variables with the profiles found, outside of the model, specifically using SPSS. Stimulation studies suggested that for the model with high entropy ( $> .80$ ), covariate estimation of the most likely class membership is a viable alternative to including covariates in

**Table 1**  
Fit indices and group assignment accuracy for sample I (2007) and sample II (2010) LPA models.

Number of prototypical patterns	AIC	BIC	Sample size adjusted BIC	Entropy	LRT
<b>Sample I</b>					
1	7314.4	7361.8	7323.8	N/A	N/A
2	5723.5	5798.7	5738.5	.94	< .001
3	5235.4	5338.3	5255.8	.93	.002
4	<b>5033.1</b>	<b>5163.8</b>	<b>5059.1</b>	<b>.92</b>	<b>.03</b>
5	4950.6	5108.9	4982.02	.89	.32
<b>Sample II</b>					
1	8114.7	8164.5	8126.4	N/A	N/A
2	6107.4	6186.2	6125.9	.97	.001
3	<b>5357.1</b>	<b>5464.9</b>	<b>5382.4</b>	<b>.96</b>	<b>.004</b>
4	5371.1	5507.9	5403.2	.96	.50
5	4936.6	5102.5	4975.5	.95	.29

Note. Entropy and LRT values are not available (N/A) for single pattern models. AIC = Akaike information criterion, BIC = Bayesian information criterion, LRT = Likelihood Ratio Test.

the model (Clark & Muthén, 2009). To further illustrate differences between classes, posterior class assignments were exported from Mplus to SPSS. They were then utilized as variables in a series of ANOVAs for detecting the role of external correlates of exposures and functioning outcomes with means and variances in each class. Effect sizes were calculated as r values according to Cohen's recommendation (1988). Cohen (1988) hesitantly defined effect sizes as “small,  $r = .2$ ,” “medium,  $r = .5$ ,” and “large,  $r = .8$ ,”

### 3. Results

#### 3.1. LPA analyses

To identify profiles of psychiatric symptoms among participants from both samples we conducted two LPA models for 1 to 5 pattern groups (Table 1). In the 2007 LPA, both of the pattern groups 4 and 5 were considered as potential solutions, in both samples according to their fit indices (i.e., lower AIC, lower BIC and adjusted BIC). However the LMR-LRT was not significant in the 5-profile solution, suggesting a solution with four profiles.

In the 2010 data, we found the 3-profile solution to be the most optimal. The AIC, BIS and adjusted BIC continued to decrease from the 1–3 profile solutions, but from the 3–4 profile solutions, there was an increase and a non-significant LMR-LRT. In both data sets, the entropies were high, indicating high accuracy in the 2007 4-profile solution and 2010 3-profile solution.

Profile categorization then followed Marsh, Lüdtke, Trautwein, and Morin (2009) recommendations for criterion that also reflect qualitative (typological) differences between individuals. The 4-profile model (sample 1) and 3-profile model (sample 2) were the most applicable. In contrast, higher number of profile solution contained subgroups that were not clinically differentiated, and were therefore not taken into account. Profile categorization was done by examining average scores for each profile. Since the governing rationale for the use of both measures was that CTS may exceed PTSS, the profile categorization also attempted to determine whether or not PTSS dominated the psychiatric picture characterizing the emerging profiles. Since a lack of dominance was evident, the profile was categorized as representative of an overall trend of symptom manifestation.

The latent profiles estimated for both samples are exhibited in Fig. 1. In sample I, profile 1 showed a pattern of very low means on all symptom scales, as compared to the markers of the variables. Therefore, consistent with trauma terminology (e.g., Bonanno & Mancini, 2012), this profile was categorized as ‘symptomatically resilient’ ( $n = 161$ , 41.6% of the sample). Profile 2 yielded low degrees of intrusion and

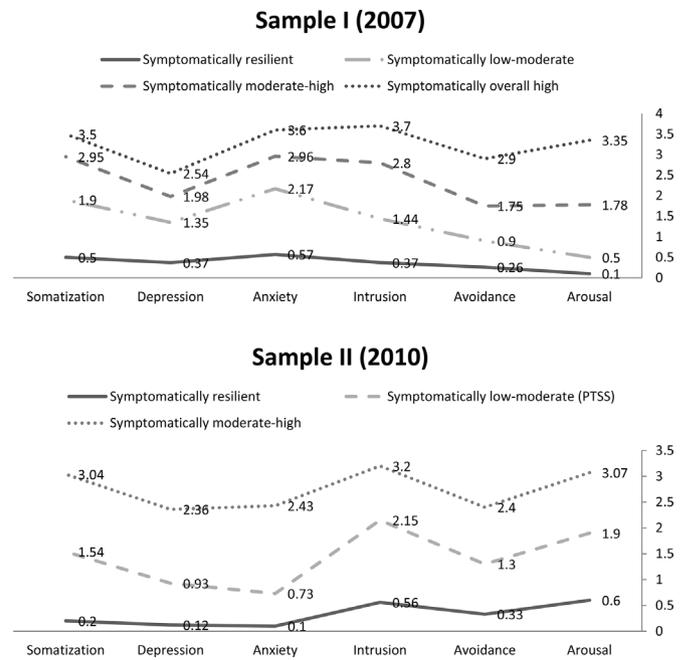


Fig. 1. Profiles of psychiatric symptoms in sample I (2007) and sample II (2010).

avoidance, whereas all other symptoms were low-moderate. Therefore this profile was categorized as ‘symptomatically low-moderate’ ( $n = 97$ , 25.1%). Profile 3 showed high intrusion, arousal, and anxiety, whereas the means for avoidance, somatization, and depression were moderate. We therefore categorized profile 3 as “symptomatically moderate-high” ( $n = 95$ , 24.5%). Profile 4 showed a pattern with generally higher levels of scores of all symptoms, especially somatization, anxiety, intrusion, and arousal. This profile was therefore categorized as ‘symptomatically overall high’ ( $n = 34$ , 8.8%).

In sample II, profile 1 showed a pattern of low means on all scales, and was accordingly characterized as “symptomatically resilient” ( $n = 297$ , 63.5% of the sample). Profile 2 showed a moderate-low level of PTSS and somatization with low anxiety and depression and was therefore categorized as ‘symptomatically low-moderate’ ( $n = 109$ , 23.3%). Profile 3 exhibited a pattern with generally high scores on all symptom measures, with intrusion, arousal, and anxiety falling into the high category. We therefore interpreted this profile as “symptomatically moderate-high” ( $n = 62$ , 13.2%).

#### 3.2. Between profiles comparisons

We compared the profiles in both samples in exposure and functioning measures. All effect sizes are reported in Tables 2 and 3 and indicated that exposure comparisons have medium effect sizes in 2010 and small effect sizes in 2007. The functioning comparisons showed medium effect sizes. Comparisons are reported below.

Exposure. 2007 data: The participants with the ‘symptomatically resilient’ profile reported lower personal exposure ( $F(3338) = 6.5 p < .001$ ), compared to the other three profiles, and lower other injured exposure ( $F(3338) = 3.4 p = .02$ ), and loss of significant others ( $F(3338) = 2.65 p = .04$ ), compared to the ‘symptomatically moderate-high’ profile (see Table 2). 2010 data: The participants with the ‘symptomatically resilient’ profile reported lower personal exposure compared to the ‘symptomatically moderate-high’ ( $F(3464) = 18.03 p < .001$ ). The ‘symptomatically resilient’ profile participants reported also lower other injured exposure ( $F(3464) = 27.82 p < .001$ ) compared to the ‘symptomatically low-moderate’ who reported lower than those in the “symptomatically moderate-high”. The resilient group reported lower loss of other ( $F(3464) = 18.8 p < .001$ ), compared to the other two profiles (see Table 3).

**Table 2**

Estimates for the final four prototypical profiles in sample I (2007) and mean and standard deviation of exposure and functioning level in each profile group.

Symptoms	Profile groups <i>M</i> ( <i>SD</i> )				<i>F</i> (3338)	R effect size
	Symptomatically resilient (41.6%)	Symptomatically low-moderate (25.1%)	Symptomatically moderate-high (24.5%)	Symptomatically overall high (8.8%)		
Intrusion	.10 (.02)	.5 (.1)	1.78 (.2)	3.35 (.2)		
Avoidance	.26 (.03)	.9 (.1)	1.75 (.1)	2.9 (.2)		
Arousal	.37 (.05)	1.44 (.12)	2.8 (.1)	3.7 (.1)		
Somatization	.57 (.06)	2.17 (.1)	2.96 (.1)	3.6 (.1)		
Depression	.37 (.04)	1.35 (.1)	1.98 (.1)	2.54 (.2)		
Anxiety	.50 (.06)	1.9 (.1)	2.95 (.1)	3.5 (.1)		
Personal exposure	2.2 (.7)	2.6 (.72)	2.6 (.8)	2.7 (.74)	6.5***	.13
Other injure	.71 (.62)	.84 (.6)	.98 (.67)	.83 (.6)	3.4*	.09
Loss of other	.38 (.5)	.49 (.54)	.59 (.53)	.47 (.6)	2.65*	.08
Functioning	3.30 (.6)	2.9 (.7)	2.3 (.85)	1.37 (.9)	66.05***	.38

Note. \*\*\* =  $p < .001$ , \* =  $p < .05$ .

Functioning, 2007 data: Using ANOVAs revealed that in sample I (see Table 2) all groups differed significantly from one another ( $F(3333) = 66.05$   $p < .001$ ). Functioning deteriorated between the 'symptomatically resilient' profile in comparison to all other profiles. The lowest functioning occurred in the 'symptomatically overall high' group ( $p < .001$  for all comparisons). 2010 data: Using ANOVAs revealed that in sample II (see Table 3), all groups differed significantly from one another ( $F(2464) = 110.3$   $p < .001$ ) and that functioning deteriorated between the 'resilient profile' in comparison to all of the other profiles. The lowest functioning occurred in the 'symptomatically moderate-high' profile ( $p < .001$  for all comparisons).

#### 4. Discussion

The current study sought to uncover latent profiles of psychiatric reactions to CTS, including PTSS, anxiety, somatization, and depression; as well as to determine how these reactions are implicated in the functioning among two Israeli samples distinguished by the duration of exposure to repeated shelling (6 and 9 years). Findings indicated that reactions to CTS vary considerably. Painted in broad strokes, these psychiatric reactions can be characterized by four distinct profiles in sample I and three distinct profiles in sample II, with some important nuances between the samples. The first profile in both samples was a 'symptomatically resilient' profile, characterized by exceptionally low overall symptomatic manifestation. This profile proved to be the most frequent in both samples. The second profile evinced a 'symptomatically low-moderate' configuration in both samples and the third profile was characterized by moderate-high symptoms in both samples. Finally, a 'symptomatically high' profile was evident only in sample I, and had the lowest overall rate of occurrence in this sample.

**Table 3**

Estimates for the final four prototypical profiles in sample II (2010) and mean and standard deviation of exposure and functioning level in each profile group.

Symptoms	Profile groups <i>M</i> ( <i>SD</i> )			<i>F</i> (2468)	R effect size
	Symptomatically resilient (63.5%)	Symptomatically low-moderate (23.3%)	Symptomatically moderate-high (13.2%)		
Intrusion	.60 (.04)	1.9 (.1)	3.07 (.14)		
Avoidance	.33 (.03)	1.3 (.1)	2.4 (.14)		
Arousal	.56 (.04)	2.15 (.1)	3.2 (.14)		
Somatization	.1 (.02)	.73 (.1)	2.43 (.14)		
Depression	.12 (.01)	.93 (.1)	2.36 (.14)		
Anxiety	.2 (.02)	1.54 (.1)	3.04 (.12)		
Personal exposure	2.6 (.76)	2.77 (.82)	3.24 (.64)	18.03***	.19
Other injure	.73 (.58)	1.03 (.6)	1.3 (.61)	27.82***	.24
Loss of other	.47 (.51)	.71 (.53)	.86 (.5)	18.8***	.2
Functioning	3.52 (.55)	2.9 (.73)	2.1 (1.05)	110.3***	.44

Note. \*\*\*All p-values are  $p < .001$ .

with numerous studies exploring various populations exposed to single traumatic events, indicating that, in most cases, individuals do not develop psychological symptoms in response to intensive and life threatening situations (see Bonanno, 2004). Furthermore, the finding that the participants in the current study evinced high symptomatic resilience despite being continuously subjected to tremendous daily stress for many years, underscores the adaptability of the human psyche, and emphasizes that, for most, resilience may prevail even in the face of prolonged exposure to traumatic stress. However, it is important to note that the CTS situation in the current study is characterized by a fluctuation in the intensity of shelling, implying that although the threat is constant, the population has also been experiencing long periods with no actual shelling.

A complementary explanation for the high prevalence of the 'symptomatically resilient' profile is that it may also reflect a habituation effect. Habituation is the gradual decrease in response to negative events when these occur across time in a relatively stable manner (Thompson & Spencer, 1966). Studies conducted with populations exposed to ongoing threat during the Gulf War in Israel, for instance, revealed a relative decline over time in the number of hospitalized cases due to stress reaction. The researchers interpreted their findings as possibly resulting from a natural and adaptive habituation process (Bleich, Dycian, Koslowsky, Solomon, & Wiener, 1992). Similarly, in a recent study (Gelkopf et al., *In press*) it has been found that even during an intensive shelling period (e.g., during an ongoing military operation) there is a clear reduction of symptomatic manifestations. Given that the current study did not include longitudinal data of either sample, it is difficult to evaluate any type of process over time, and interpretation of these findings must be approached with caution. Nevertheless, the finding that the later assessed sample (i.e., the sample exposed for the longer duration) suffered also from higher exposure and exhibited higher symptomatic resilience than the former sample, suggests the possibility of a certain degree of habituation.

Looking beyond the intensity of symptoms among the profiles, quite similar patterns of symptom types emerged within and between the samples. The dominance of these symptom types points to the centrality of the activation of the arousal system (Rief, Shaw, & Fichter, 1998; van Der Kolk & Saporta, 1991) in reaction to CTS. This also stands in line with the high average regarding the level of intrusion and arousal found among this population in other studies (e.g., Lahad & Leykin, 2010). However, it is important to note that although exhibited to a lesser degree, depression and avoidance symptoms were also evident in the profiles.

Concerning functioning, in the present study, individuals who adhered to more severe symptom profiles usually exhibited lower levels of functioning, suggesting that dysfunction may be more closely related to the psychiatric ramifications of exposure to CTS than to the exposure itself. That said, any attempt to make more substantive claims explaining these links mandates further research. Notwithstanding, given that the markers of dysfunction and impairment play a pivotal role in diagnostic significance (American Psychiatric Association, 2013), such impairments in functioning suggest the clinically significant nature of symptomatic reactions to CTS.

Finally, the current study underscores the need to view reactions to CTS in a broader context than that offered by PTSD symptomatology, and suggests the importance of more nuanced observations of symptom manifestation. While profiles in the current study included PTSD, they also included somatization, anxiety and depression. To the best of our knowledge, this is the first study to investigate the distinct profiles of psychiatric symptoms in a population exposed to CTS. As far as we know, extant studies wherein latent profiles of symptomatology were sought, have all been conducted among adult populations exposed to either type I (i.e., a single traumatic event) or type II (i.e., past repeated traumatic events, mostly in childhood) traumas.

Clinical implications of the current study include the importance of a broad assessment of psychopathology, recognizing that the

ramifications of CTS include responses that are more extensive than PTSD allows, and that are also different than the full PTSD diagnosis. The pattern of profiles that emerged in this study call for interventions that target the over activation of the arousal system, while at the same time recognize that living under CTS requires a certain level of alertness and safety behaviors. The techniques should help the patient to be aware of his/her physiological response and may include biofeedback training (Gapen, van der Kolk, Hamlin, Hirshberg, Suvak, & Spinazzola, 2016), which allows the practice of breathing/relaxation techniques while also keeping a certain level of alertness, as well as mindfulness (Goodman & Kalderon, 2012).

#### 4.1. Study limitations

The findings in the present study must be realized in the context of several limitations. First, although commonly used in trauma research, the measurement of psychiatric symptoms relied solely on self-report questionnaires that may reflect effects of social desirability and other reporting biases. Second, since the data collection for the current study occurred prior to dissemination of the DSM-5, PTSD symptom clusters were based on DSM-IV criteria. Third, although the present study expands the understanding regarding the psychological evaluation of continuous exposure to traumatic stress, the use of the chosen psychiatric symptom assessment measures do not include the full range of symptoms and reactions that may arise under such conditions. This should be taken into account when designing future research.

#### 4.2. Conclusions

Notwithstanding these limitations, results from the current study provide an important addition to the literature by delineating symptomatic profiles in CTS victims, linking these to functioning, and concomitantly showing that the majority of individuals exposed to CTS do not exhibit psychiatric symptoms or impairments in functioning, despite the length and duration of exposure. Those who do indeed suffer from symptomatic reactions, however, may exhibit a mixed pattern of symptoms at varying levels (including depression, anxiety, somatization, and PTSD), as well as varying degrees of impaired functioning. Moreover, these symptomatic conglomerations may be dominated by PTSD or be otherwise spread out more evenly across symptoms, exhibiting an overall symptom severity. To the best of our knowledge, this is the first study to evaluate symptomatic reactions to CTS using person-centred LPA. Doing so allowed us to further expand the understanding of the human response to a different type of traumatic stress than that captured by nosological categories addressing past traumas (i.e., PTSD), and to address an important gap in the field of traumatology. Although the current study focused on the unique population of Southern Israel, CTS exposure occurs not only in political situations, but also in other contexts, such as in inner-city violence where residents are subjected to ongoing threats and stress for prolonged periods of time. Future studies may do well to replicate this study in various CTS contexts.

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