

A Prospective Study of the Mediating Role of Tonic Immobility and Peritraumatic Dissociation on the 4 *DSM-5* Symptom Clusters of Posttraumatic Stress Disorder

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ABSTRACT

Objective: Tonic immobility (TI) and peritraumatic dissociation (PD) are common peritraumatic reactions associated with psychopathology following trauma. The present study aimed to test whether TI and PD mediated the relationship between perceived threat during an episode of rocket shelling and subsequent posttraumatic stress symptoms.

Methods: In a prospective study among 226 Israeli civilians, data were collected both during rocket shelling, between May 14, 2021, until ceasefire on May 21, 2021 (T₁) and 1 to 2 months after

ceasefire (T₂). Measures included the Tonic Immobility Scale, Peritraumatic Dissociative Experiences Questionnaire, and PTSD Checklist for *DSM-5*. Four mediation models were applied for each posttraumatic stress symptom cluster.

Results: Findings showed that a substantial proportion of participants had developed posttraumatic stress disorder (PTSD) symptoms at the time of follow-up (18.8%). Both TI and PD fully mediated the relationship between perceived threat and symptoms of intrusion, avoidance, and negative alterations in mood and cognition, but only PD mediated the relationship with alterations in arousal and reactivity.

Conclusions: The present findings suggest that TI and PD may serve as mechanisms underlying the link between individuals' appraisals of threat during the peritraumatic phase and subsequent PTSD symptomatology. Future research should seek to replicate the present findings before any conclusions can be drawn. In particular, the association between PD and arousal and reactivity symptoms should be further explored, given that it might be multifaceted in nature.

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War can expose large populations of civilians to trauma, which can result in posttraumatic stress disorder (PTSD).¹⁻⁴ PTSD is a severe psychiatric disorder associated with functional impairment and decreased quality of life.^{5,6} Although traumatic events can elicit peritraumatic and acute trauma-related symptoms, the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (*DSM-5*) PTSD criteria require persistence of symptoms for more than 1 month, as many victims exhibit spontaneous remission within the first few weeks.⁷ Key diagnostic criteria are distributed across 4 symptom clusters: intrusion, avoidance, negative alterations in mood and cognition, and alterations in arousal and reactivity.⁷

Given that not all trauma victims develop PTSD, it is important to uncover risk factors that contribute to trauma psychopathology. Several risk factors have already been identified, including age at the time of trauma,^{8,9} gender,¹⁰ history of mental health problems,¹¹ and previous

exposure to traumatic events, such as childhood abuse.¹¹⁻¹³ Moreover, perceived threat^{14,15} has also been associated with PTSD, suggesting that the subjective appraisal of threat during trauma exposure explains subsequent PTSD.

Peritraumatic reactions, which denote emotional, behavioral, cognitive, and psychological responses that occur during or immediately after a traumatic event,¹⁶ represent another important group of factors associated with PTSD development.¹⁷ Tonic immobility (TI) and peritraumatic dissociation (PD) are both common peritraumatic reactions associated with psychopathology following trauma.¹⁸

PD is a central defense mechanism against overwhelming danger and represents a psychological escape from elevated distress resulting from trauma exposure.¹⁹ This defensive reaction may involve both compartmentalization, ie, psychobiological functioning is disconnected and consciousness divided,^{19,20} and detachment, ie,

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Clinical Points

- Perceived threat and peritraumatic reactions such as tonic immobility (TI) and peritraumatic dissociation (PD) are associated with PTSD. Yet, their contribution in explaining different PTSD symptom clusters is not well understood.
- PD and TI mediated the relationship between perceived threat and different PTSD clusters. Interventions aiming to weaken TI and PD may reduce a patient's risk for later PTSD.

derealization, depersonalization, and emotional numbing.^{19,21} PD has been linked to a variety of traumatic events,^{19,22,23} including war- and terror-related trauma in veterans²⁴ as well as child and adult civilians.^{4,25,26}

The other peritraumatic reaction, TI, is characterized by strong motoric inhibition and paralysis of movement, thought, vocalization, and emotion.²⁷ This reaction evolved to protect humans and other animals when facing an impending threat to life where escape is perceived to be impossible.²⁸ Although TI has been described as maladaptive,²⁹ it serves to protect victims from pain via analgesia, and to increase chances of survival, as the predator is more likely to lose interest in or get distracted by a victim who appears paralyzed or dead.²⁹ Whereas TI in humans has primarily been studied in relation to sexual assault,^{28,30} it has also been linked with war,^{30–32} accidents,³³ and disasters.³⁴

Although TI and PD are often associated and co-occur under threat,¹⁸ they may arise independently and have different protective purposes.¹⁸ When victims are experiencing PD, manifested in disconnection from their surroundings or themselves, they may not necessarily be in a state of TI. Similarly, when victims are experiencing TI, they remain conscious to scan their surroundings for ways to escape.^{28,35}

As previously noted, PD and TI have defensive qualities; nevertheless, they appear to put individuals at risk for PTSD. This might be explained by the effect of PD on dysfunctional trauma memories²⁵ and self-related cognitions,³⁶ as well as the elevated guilt that has been found in relation to TI.²⁸ Research has indeed indicated that both predict subsequent PTSD^{18,28,37} and posttraumatic distress manifested in depression, anxiety, and chronic dissociation.^{11,34,37–39} Furthermore, the trauma literature implies that both may serve as mechanisms at the basis of the relationship between perceived threat and PTSD.^{18,29} According to this view, elevated sense of threat during trauma exposure may generate defensive reactions of PD and TI that, in turn, impede reprocessing the trauma and therefore may lead to PTSD.

To date, no studies have examined the mediating role of TI and PD in the relationship between perceived

threat and PTSD, and only a few studies have explored the contribution of both TI and PD in explaining PTSD. Results of these studies indicated contradictory patterns: while some indicated that TI is associated with PTSD after controlling for PD,^{33,40,41} others found PD to be the only significant predictor of PTSD, after controlling for TI.^{42,43} Yet, given that these studies used retrospective and cross-sectional data, their ability to infer the role of TI and PD in predicting subsequent PTSD is limited.

Furthermore, to date, the contribution of both peritraumatic reactions in explaining different PTSD symptom clusters has received limited attention. One study⁴⁴ has demonstrated that, whereas TI mediated the relationship of fear with reexperiencing and avoidance/numbing, it did not mediate the relationship between fear and hyperarousal symptoms. Another study⁴⁵ indicated that victims with high PD score significantly higher on all PTSD symptom clusters. These findings suggest that the implications of TI and PD may not be the same for all PTSD clusters. As suggested by Bovin and colleagues,⁴⁴ the co-occurrence of TI and PD might interfere with our understanding of the link between these two peritraumatic reactions and PTSD symptomatology. Therefore, an investigation assessing the mediating role of TI and PD, while exploring each of the PTSD symptom clusters, is needed.

The present prospective study aimed to fill these gaps. This study was conducted among Israeli civilians affected by rocket shelling during the Operation Guardian of the Walls; the operation lasted for 11 days in May 2021 and involved 4,360 rockets and mortar shells being fired at Israel. The data are unique in that they were collected both during the operation (T₁) and 1 to 2 months after ceasefire (T₂) and thus measured both peritraumatic reactions and subsequent PTSD symptomatology.

The current study aimed to test whether TI and PD mediated the relationship between perceived threat and PTSD symptom clusters. Given that both TI and PD are known to occur under severe threat¹⁸ and both have been identified as important risk factors for PTSD symptomatology,^{18,28,37} 2 main hypotheses were set: (1) TI and PD at T₁ would predict PTSD symptoms at T₂ and (2) TI and PD at T₁ would mediate the relationship between perceived threat at T₁ and PTSD symptom clusters at T₂, after adjusting for well-documented risk factors for PTSD (eg, age, gender, mental health history, and history of childhood abuse). As the study is exploratory in nature, no specific hypothesis was formed for each PTSD symptom cluster.

METHODS

Participants and Procedure

A convenience sample of Israeli adults was drawn from an online survey distributed on social media platforms. Data were collected at 2 timepoints: (1) during the

peritraumatic phase (T_1), from the fifth day of Operation Guardian of the Walls, May 14, 2021, until ceasefire on May 21, 2021, and (2) during the posttraumatic phase (T_2), 1 to 2 months after ceasefire between June 30 and July 31, 2021. The survey was administrated using Qualtrics software (Qualtrics Labs, Inc., Provo, Utah), and the completion time ranged from 15 to 30 minutes. All procedures and instruments were approved by the Tel Aviv University institutional review board (IRB). Participants were informed about the research goals, nature of the questions, and approval of the study by the relevant IRB. A consent form was signed by all respondents.

A total of 739 individuals who participated at T_1 had been exposed to rocket shelling during the operation and thereby qualified for inclusion in the study. Of them, 226 participated at T_2 (30.6%), which constitutes the current sample. Respondents were Jewish. The mean age was 37.7 years ($SD = 10.4$), and 151 (66.8%) were secular. The majority of the sample were female (81%) and had an undergraduate or graduate degree (64.2%). In terms of income levels, 101 (44.7%) reported a below-average income, 60 (26.5%) an average income, and 65 (28.8%) an above-average income. More than half of the sample (53.5%) reported a history of childhood abuse, and 23.3% reported a history of mental health problems.

Dropout Analyses

No significant differences were found at T_1 between participants who took part in the study at T_1 and T_2 and those who dropped out between waves in terms of gender ($\chi^2_1 = 2.15$, $P = .14$, Cramer $V = 0.05$), religiosity ($\chi^2_1 = 0.65$, $P = .42$, Cramer $V = 0.03$), relationship status ($\chi^2_1 = 2.55$, $P = .11$, Cramer $V = 0.06$), mental health history ($\chi^2_1 = 2.30$, $P = .13$, Cramer $V = 0.06$), childhood abuse ($\chi^2_1 = 1.70$, $P = .19$, Cramer $V = 0.06$), age ($t_{731} = 1.13$, $P = .19$), perceived threat $t_{731} = 1.10$, $P = .27$), TI ($t_{657} = 1.10$, $P = .57$), and PD ($t_{674} = 0.87$, $P = .39$).

Measures

Background variables. Participants completed a brief demographic questionnaire assessing age, gender, income, education, religiosity, and history of mental health problems.

Perceived threat. Respondents were asked to rate at T_1 the degree to which they felt threatened by the rocket shelling from 0 (not at all) to 100 (very much).

Tonic Immobility Scale (TIS). Consistent with previous research,^{32,41,46–48} TI was assessed at T_1 via 3 items of the TIS (ie, froze or felt paralyzed, felt unable to move even though not restrained, and unable to call out or scream). Participants rated the items on a 7-point Likert scale ranging from 0 = not at all to 6 = completely.^{35,49} In this study, internal consistency was good ($\alpha = .79$).

Peritraumatic Dissociative Experiences Questionnaire (PDEQ). PD was assessed at T_1 via 7 out of 8 items of the PDEQ.^{50,51} Given that less than 1% of the

sample had suffered a physical injury, an item that refers to physical injury was omitted. In the present study, internal consistency was good ($\alpha = .85$).

PTSD Checklist for DSM-5 (PCL-5). The PCL-5⁵² was used to assess for PTSD symptoms at T_2 . The 20-item self-report measure asks participants to indicate the extent to which they experienced each PTSD symptom on a 5-point Likert scale ranging from 0 = not at all to 4 = extremely. Items correspond to PTSD criteria in DSM-5.⁷ The original version was adapted so that the index event was the rocket shelling during Operation Guardian of the Walls. Research has suggested that a cutoff score of 33 is a useful threshold for indicating clinical symptomatology.⁵³ The PCL-5 has good psychometric properties.⁵³ Internal consistency was good in the current study for intrusion, avoidance, negative alterations in mood and cognition, and alterations in arousal and reactivity ($\alpha = .90$, .88, .91, and .86, respectively).

Control variables. Given that age,^{8,9} gender,^{9,10} childhood abuse,^{11,12} and mental health history¹¹ have been found to be related to PTSD, they were included as control variables in the mediation analyses. Participants were asked whether they had been diagnosed with a mental disorder prior to Operation Guardian of the Walls. History of childhood abuse was assessed via 15 items of the short form of the Childhood Trauma Questionnaire,⁵⁴ which refer to emotional, physical, or sexual abuse.

Data Analysis

We used SPSS 28 and PROCESS computational macro⁵⁵ to analyze the data.

First, Pearson correlation tests (for continuous variables), independent sample t tests, and χ^2 tests with Yates continuity correction (for dummy variables) were conducted to assess the association between TI, PD, and PTSD symptoms. Next, we used a bootstrapping method with 5,000 bootstrap resamples in PROCESS (model 4⁵⁶). Bootstrapping is a nonparametric method that generates an estimate of the indirect effect, including a 95% confidence interval (CI). When zero is not in the 95% CI, one can conclude that the indirect effect is significantly different from zero at $P < .05$ (2-tailed). Thus, the effect of the independent variable (perceived threat) on the dependent variable (PTSD symptoms) is mediated by the proposed mediating variable (TI, PD).⁵⁶

RESULTS

At T_1 , on average participants reported perceived threat: mean = 56.33, $SD = 28.41$ (range: 0–100); PD: mean = 9.96, $SD = 4.33$ (range: 5–35); and only low levels of TI: mean = 0.99, $SD = 2.45$ (range: 0–18). At T_2 , 18.8% ($N = 39$) scored above the cutoff score for clinically significant PTSD symptoms. Of the total sample, 45.7% ($N = 95$) reported at least 1 intrusion symptom, 29.8% ($N = 62$) reported at least 1 avoidance symptom,

Table 1.

Intercorrelations Between All Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	1											
2. Gender ^a	2.24*	1										
3. Childhood abuse	0.03	-0.55	1									
4. Mental health history ^a	-1.47	0.01	3.96***	1								
5. Threat	0.02	-3.12**	0.02	-1.38	1							
6. TI	-0.10	-0.30	0.18**	1.86	0.28**	1						
7. PD	-0.20**	-2.2*	0.32**	2.25**	0.31**	0.63**	1					
8. Intrusion	-0.06	-3.28**	0.26**	1.48	0.32**	0.47**	0.50**	1				
9. Avoidance	-0.05	-2.25*	0.18**	1.96	0.27**	0.42**	0.39**	0.71**	1			
10. Negative alterations	-0.08	-0.76	0.20**	-0.76	0.19**	0.48**	0.42**	0.64**	0.64**	1		
11. Arousal	0.01	-1.46	0.16*	0.42	0.23**	0.35**	0.40**	0.68**	0.55**	0.71**	1	
12. PTSD symptoms ^a	1.26	0.81	-2.83**	4.42*	-2.98**	-3.78***	-3.97***	-12.07***	-12.32***	-12.28***	-11.65***	1
Mean/%	37.68	81%	56.33	23.3%	56.33	0.99	9.96	1.21	0.46	1.33	1.89	18.8%
SD/category	10.41	Women	28.41	Yes	28.41	2.45	4.33	1.68	0.76	1.94	1.74	Yes

^aIntercorrelations between dummy variables were calculated using either an independent samples *t* test or the χ^2 test for independence with Yates continuity correction.

P* < .05. *P* < .01. ****P* < .001.

Abbreviations: PD = peritraumatic dissociation, PTSD = posttraumatic stress disorder, TI = tonic immobility.

Table 2.

Indirect Effects of TI and PD on the 4 Symptom Clusters^a

Indirect effect	Intrusion			Avoidance			Negative alterations			Arousal		
	β (SE)	95% CI		β (SE)	95% CI		β (SE)	95% CI		β (SE)	95% CI	
Threat → TI → PTSS	0.004 (0.002)	0.001 to 0.008		0.002 (0.001)	0.001 to 0.004		0.006 (0.003)	0.002 to 0.013		0.002 (0.002)	-0.002 to 0.005	
Threat → PD → PTSS	0.007 (0.002)	0.003 to 0.012		0.002 (0.001)	0.0003 to 0.004		0.006 (0.003)	0.001 to 0.011		0.008 (0.002)	0.004 to 0.013	
Total indirect effect	0.011 (0.003)	0.007 to 0.016		0.004 (0.001)	0.002 to 0.006		0.012 (0.003)	0.006 to 0.018		0.010 (0.002)	0.006 to 0.015	
Total model	β (SE)	<i>P</i>	<i>R</i> ²	β (SE)	<i>P</i>	<i>R</i> ²	β (SE)	<i>P</i>	<i>R</i> ²	β (SE)	<i>P</i>	<i>R</i> ²
	0.018 (0.004)	<.0001	39%	0.007 (0.002)	.0002	26.6%	0.014 (0.005)	.005	29.5%	0.015 (0.004)	.001	25.3%

^aModels controlled for age, gender, childhood abuse, and previous mental health problems.

Abbreviations: PD = peritraumatic dissociation, PTSS = posttraumatic stress symptoms, TI = tonic immobility.

47.6% (*N* = 99) reported at least 1 symptom of negative alterations in mood and cognition, and 69.1% (*N* = 143) reported at least 1 arousal and reactivity symptom.

Intercorrelations for study variables are evident from Table 1. TI and PD had significant positive correlations of medium effect sizes with all PTSD symptom clusters. The higher the TI and PD level at *T*₁, the higher the PTSD symptoms level at *T*₂. Perceived threats also correlated positively with TI and PD, as well as with all PTSD symptom clusters, with small to medium effect sizes. Hence, the higher the perceived threat levels, the higher the TI, PD, and PTSD symptoms levels.

Table 2 and Figure 1 present the results of the mediation. Results showed that TI and PD mediated the relationship between perceived threat and intrusion, avoidance, and negative alterations in mood and cognition and that the direct effect of perceived threat became nonsignificant. Hence, TI and PD fully mediated these relationships.

On the other hand, results indicated that only PD mediated the relationship between perceived threat and

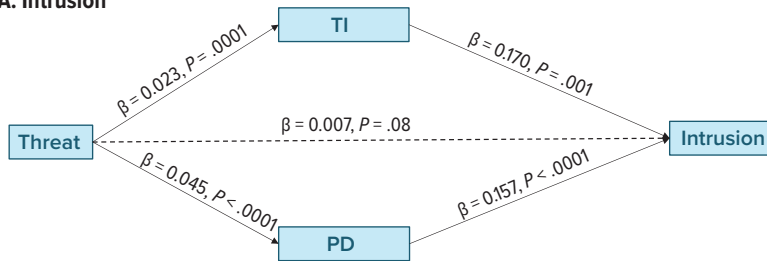
alteration in arousal and reactivity and that the direct effect of perceived threat became nonsignificant. Thereby, PD fully mediated the relationship between perceived threat and alterations in arousal and reactivity. Both the direct and indirect effects of TI on arousal and reactivity were nonsignificant.

DISCUSSION

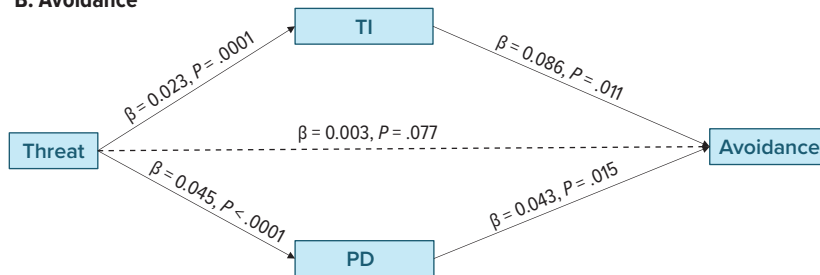
This study explored the relationship between perceived threat, TI, PD, and PTSD symptoms among civilians following exposure to war. Results showed that a substantial proportion of participants had scored above the cutoff score for clinically significant PTSD symptoms at follow-up, and many more exhibited subclinical symptoms of PTSD. Interestingly, TI and PD fully mediated the relationship between perceived threat and symptoms of intrusion, avoidance, and negative alterations in mood and cognition, but only PD mediated the relationship with alteration in arousal and reactivity.

Figure 1.
TI and PD as Mediators of the 4 PTSD Symptom Clusters^a

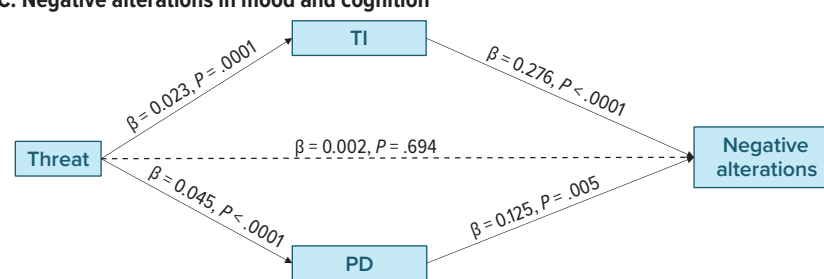
A. Intrusion



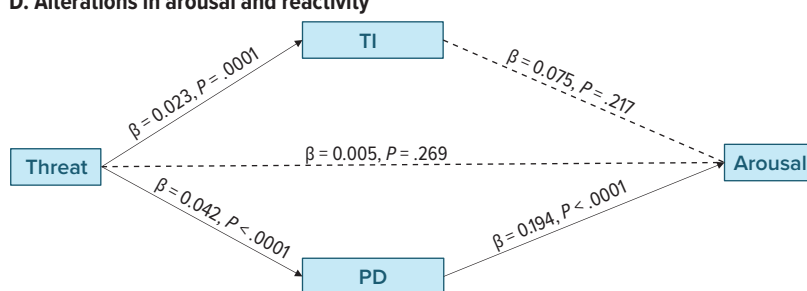
B. Avoidance



C. Negative alterations in mood and cognition



D. Alterations in arousal and reactivity



^aModel of perceived threat as a predictor of (A) intrusion, (B) avoidance, (C) negative alterations in mood and cognition, and (D) alterations in arousal and reactivity symptoms. Models control for age, gender, childhood abuse, and history of mental health problems.

Abbreviations: PD = peritraumatic dissociation, PTSD = posttraumatic stress disorder, TI = tonic immobility.

Findings indicate that both TI and PD were at the basis of the link between perceived threat and intrusion, avoidance, and negative alterations in mood and cognition. Therefore, it appears that individuals who evaluated their exposure to rocket shelling as particularly threatening tended to experience TI and PD during the peritraumatic phase. Despite their potential defensive qualities, these reactions may negatively affect adjustment over time. A peritraumatic reaction of TI may enhance learning of avoidance^{28,44} and thus may increase the risk for avoidance PTSD symptoms. At the same time, as victims interpret their immobility as an inability to protect

themselves,²⁸ the reaction of TI may arouse feelings of guilt, which are part of the negative alterations in mood and cognition PTSD cluster. Furthermore, blaming oneself for one's reaction during trauma exposure may result in rumination, which could fuel intrusion symptoms.⁴⁴

Similarly, PD may contribute to PTSD symptomatology.^{11,57} It has been argued that when PD occurs, the prefrontal cortex inhibits emotional processing in limbic structures like the amygdala, resulting in fragmented trauma memories.^{25,58} Difficulties with recalling a coherent chronological memory, in turn, may result in intrusion and negative alteration in mood and cognition, as the traumatic memories are replaced by impulsive sensations. Therefore, it is theorized that PTSD development is partly explained by the inability to process an event at a verbal and symbolic level following PD.^{25,59,60} It is important to note, however, that researchers have questioned the trauma fragmentation theory, as evidence to support this theory has been severely limited.⁶¹ Rather than actual fragmented memories, empirical evidence suggested that the *perception* of fragmented trauma memories following PD during trauma may be associated with PTSD development.⁶¹ Thus, empirical investigations that rely on prospective and experimental studies and that include control groups, more rigorous designs, and precise definitions of dissociation and trauma fragmentation are needed to fully understand the link between PD and PTSD.⁶¹

Nevertheless, our results indicated that only PD mediated the relationship between perceived threat during the peritraumatic phase and arousal and reactivity symptoms at follow-up. These results support the notion according to which TI and PD are two distinct phenomena¹⁸ and suggest that PD might be underlying arousal symptoms among individuals who view traumatic events as particularly threatening. Several explanations might be offered for the present findings.

According to the first, it might be that, although both TI and PD underlie arousal and reactivity symptoms,^{29,62} the effects of PD are particularly strong and therefore overshadow those of TI. Alternatively, it might be that, contrary to PD, TI does not underlie the linkage between perceived threat and arousal symptoms. This idea is consistent with the findings of Bovin and colleagues,⁴⁴ which indicated that TI did not mediate the relationship between fear and arousal symptoms among sexual assault survivors. Bovin and colleagues⁴⁴ suggested that this finding reflects a reduced autonomic responding linked to TI, which has been documented in animal studies.^{44,63,64} However, as the psychophysiological correlates of TI vary by species, more research is warranted.⁴⁴

Another potential explanation offered by Bovin et al⁴⁴ is that PTSD arousal symptoms might be dampened by the same process that promote PD.^{45,65} However, the current findings challenge this notion, as PD was found to mediate the relationship between perceived threat and elevated, rather than dampened, arousal.

According to theoretical models⁶⁶ and empirical studies,^{45,65,67} PD is associated with decreased autonomic response, eg, bradycardia. The *DSM-5* has even included a dissociative PTSD subtype,⁷ characterized by chronic dissociation, which differs from the regular PTSD diagnosis, which is sometimes referred to as the reexperiencing/hyperaroused subtype.⁶⁸ Nevertheless, studies have also demonstrated that PD is associated with later hyperarousal. For instance, Griffin and colleagues⁴⁵ found that trauma victims who experienced high PD reported elevated hyperarousal compared to a low-PD group. Yet, whereas the high-PD group exhibited similar physiologic responses at baseline and when discussing a neutral topic, they exhibited significantly lower heart rates when talking about the traumatic event and in the time hereafter than did the low-PD group.

This discrepancy between self-reported arousal versus physiological responses might reflect the implications of PD on emotional or behavioral arousal, manifested in irritable, aggressive, and reckless behaviors, as compared to its effects on physiological arousal, manifested in autonomic responses. It is plausible that PD reduces the ability to process the traumatic event and therefore fuels emotional and behavioral symptoms of arousal over time, but simultaneously dampens autonomic response in the face of trauma reminders. Hence, the current findings, which relied on the self-reported measure (PCL-5⁵³), and did not incorporate autonomic responses assessment, might reflect the implications of PD for emotional and behavioral manifestations of arousal only.

Although the current findings yielded interesting results, they should be understood in light of their strengths and limitations. Obvious strengths include the prospective nature of the study, which allowed us to assess the peritraumatic reactions with limited risk of recall bias and to examine symptom development in the

posttraumatic phase. Nevertheless, this study suffers from several limitations. First, the study relied on self-report measures, rather than on a thorough clinical assessment. Second, the sample was a convenience sample collected online and thus not representative of all victims of the rocket shelling. The prevalence of childhood abuse and mental health problems was high in the present study, and female participants were overrepresented in the sample. Given the fact that we assessed 3 subtypes of childhood abuse (physical, emotional, and sexual), the present rates of childhood abuse seem to be consistent with global rates reported by the World Health Organization.⁶⁹ Yet, given that history of mental health was assessed via asking participants to report prior mental health problems, current rates are presumably elevated compared to clinically diagnosed mental health disorders. Furthermore, previous research has shown that women are more likely to develop PTSD than are men.⁹ Hence, although the present study controlled for gender, it would be relevant to replicate the present findings in a male sample.

Third, the presence of TI was small in the present sample, which might be explained by trauma type.^{30,31} Fourth, perceived threat was not measured by a validated measure. Hence, replicating these findings while utilizing a validated measure is needed. Finally, the dropout rate was high, which is, unfortunately, common for this type of study.

Despite the limitations mentioned, the present findings imply that individuals who evaluate the traumatic event as a substantial threat may benefit from clinical interventions provided during the peritraumatic phase and that interventions that aim to weaken TI and PD may reduce their risk for later PTSD symptoms. However, future research should replicate the present findings before we can draw any conclusions. In particular, future studies that explore the association between PD and arousal symptoms are necessary, given that its nature might be multifaceted.

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