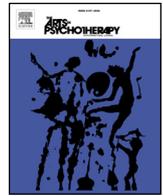




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Research Article

Preliminary validation of the peri-traumatic dissociation trauma drawing assessment (PDTDA): The case of military trauma

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ABSTRACT

The Peri-Traumatic Dissociative Traumatic Drawing Assessment (PDTDA) is an art-based assessment technique developed to evaluate peri-traumatic dissociation subsequent to traumatic events, based on the trauma resolution and time perception literature. To validate the PDTDA, associations between six drawing feature scales; namely, the participants' peri-traumatic dissociation, persistent dissociation, post-traumatic stress symptoms and history of traumatic events were assessed in a sample of 49 Israeli adults who experienced military trauma. Bivariate correlation analyses indicated that peri-traumatic dissociation negatively correlated with the presence of a boundary line between the event and coping, but positively correlated with new distress symbols. A history of traumatic events negatively correlated with new resource symbols, whereas post-traumatic stress symptoms positively correlated with new distress symbols. The clinical implications are discussed in light of these preliminary findings.

Introduction

The associations between experiencing a traumatic event and subsequent dissociative reactions such as; altered sense of time, out-of-body experiences, derealization, depersonalization, feeling disconnected from one's body, and feeling confused or disoriented, are well-documented (e.g., Briere, Scott, & Weathers, 2005; Lev-Wiesel & Amir, 2014). Dissociative experiences throughout a traumatic event or shortly after are known as peri-traumatic dissociation (Marmar, Weiss, & Metzler, 1998). Peri-traumatic dissociation is thought to arise in the context of extreme traumatic distress due to fear, helplessness, or terror (Bernat, Ronfeldt, Calhoun, & Arias, 1998; Friedman, 2000). This type of dissociation may serve to regulate aversive affect while it is being experienced (Wagner & Linehan, 1998). Although peri-traumatic dissociation can be an adaptive, self-protective way to manage extreme stress and personal threats (van der Velden & Wittmann, 2008), in the long term, it may contribute to the onset of post-traumatic stress disorder symptoms that can disrupt and impair a person's life and adjustment (Sugar & Julian, 2012), while other factors may be responsible for preserving these symptoms over time (Kumpula, Orcutt, Bardeen, & Varkovitzky, 2011).

Post-traumatic stress disorder (PTSD) is one of the most commonly observed stress-related conditions occurring in the aftermath of human-

made disasters, and peri-traumatic dissociation is the greatest risk factor for the development of full or partial PTSD. In spite of this knowledge there is a paucity of instruments that measure peri-traumatic symptoms. Current techniques have not been developed to assess specific traumatic events such as combat stress-related exposure (e.g., Agorastos et al., 2013), and those that are available tend to not be suitable for administration in therapeutic settings for this specific population (e.g., Birmes et al., 2005; Martin, Marchand, Boyer, & Martin, 2009).

All 18-year-old Israeli men and women must do compulsory military service in the Israel Defense Forces (IDF) for 2–3 years. During their military service, conscripts are exposed to a stressful, demanding, hierarchical, and rigid environment. They are forced to cope with loss of autonomy and obligatory obedience to authority, numerous relocations and changes in living conditions, disrupted sleeping and eating routines, physical separation from family and friends, and must take on the enormous responsibility for other people's lives while still in adolescence. Soldiers in combat units are also required to deal with situations associated with life-threatening experiences, violence, human suffering and tests of their identity (Hai & Mayseless, 1998; Mayseless & Scharf, 2003).

Studies have shown that exposure to a high and continuous level of cortisol - the hormone secreted by the adrenal glands during periods of

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stress - suppresses the immune system, causes functional changes in the limbic system, damages memory functions, impacts attention, and alters emotions (Charney, 2004; Fischer et al., 2003). It can thus be assumed that active duty and reserve soldiers, as well as veterans, can be exposed to many forms of pressure that are known to be related to poor mental well-being (Hotopf et al., 2006; Killgore et al., 2008) and risk long-lasting PTSD symptoms in addition to the risk of injury or death (Jones, Perrotta, Canham-Chervak, Nee, & Brundage, 2000).

Empirically, high rates of stress-related symptoms such as risk-taking behavior, reduced functioning, and PTSD symptoms have been observed in combat and non-combat veterans (e.g., Brief et al., 2018; Kashdan, Breen, & Julian, 2010; Milliken, Auchterlonie, & Hoge, 2007; Rona et al., 2010). This behavioral response has been shown to intensify in situations of exposure to life-threatening experiences such as witnessing the death of a friend and injury (Browne et al., 2007; Rona et al., 2007; Thandi et al., 2015; Wilk, Quartana, Clarke-Walper, Kok, & Riviere, 2015). Data suggest that 15% to 30% of all veterans suffer from PTSD (Bleich & Solomon, 2004; Kulka et al., 1988; Loughran & Heaton, 2013), and that peri-traumatic dissociation in military veterans with post-traumatic stress disorder is more frequent than in veterans with no signs of the disorder (Bremner et al., 1992). However, over 50% do not seek or receive treatment (Ralevski, Olivera, & Petrakis, 2014). To better understand these issues, the current study was designed to validate a pictorial projective assessment instrument to assist practitioners in treating military veterans.

The current study

This study was inspired by the literature on trauma resolution: the extent to which individuals regain emotional and behavioral control, and understand how the trauma has affected both their inner world and their behavior (e.g., Saltzman, Pynoos, Lester, Layne, & Beardslee, 2013; Spooner & Lyddon, 2007), as well as the literature that links individuals' time perception with their ability to cope and level of adjustment (Laghi, Baiocco, Liga, Guarino, & Baumgartner, 2013; Henson, Carey, Carey, & Maisto, 2006; Laghi, Liga, Baumgartner, & Baiocco, 2012). In addition, this study is based on trauma-informed art therapy conceptions, such as visual symbolization processes reflecting mental aspects that had been split as a result of trauma (Avrahami, 2005). The symbol is considered a visual expression of dissociative parts (Eisenbach, Snir, & Regev, 2015) and the construction of new form is thought to promote integration of fragmented traumatic memories. Naming and verbalizing the art work promote encounter with the nonverbal representations of nonintegrated memories, of dissociative aspects, and impaired self-regulation (Bat Or & Megides, 2016). For veterans visual imagery may be necessary for the symbolic processing involved in creating a trauma narrative (Nanda, Gaydos, Hathorn, & Watkins, 2010). The visual art work allows one to symbolize, externalize, create meaning, and construct a coherent narrative from the fragmented memory of army-related traumatic events (Lobban, 2014; Walker, Kaimal, Koffman, & DeGraba, 2016). Following previous research studies that found expressions of dissociation in drawings (Amir & Lev-Wiesel, 2007; Lev-Wiesel, 2005), this study presents preliminary validation findings on the Peri-Traumatic Dissociation Trauma Drawing Assessment (PDTDA). This test, developed initially by Lev-Wiesel, was used to evaluate peri-traumatic dissociation in 49 Israeli veterans coping with military-related trauma. On the PDTDA, individuals were asked to make two consecutive drawings: a drawing of the traumatic event, and a second one repeating the first drawing and then also depicting what helped cope with it.

The use of an art-based technique stems from the assumption that drawings can provide an additional window onto individuals' inner experiences and state of health, especially in the case of internal distress, which is covert (Goldner & Scharf, 2012; Guillemain, 2004; Lev-Wiesel & Liraz, 2007). Since the traumatic event is often recalled in a fragmented, dissociated, and nonverbal manner, the use of drawings

can provide a unique approach for working with individuals suffering from PTSD by allowing the trauma to reveal itself in pictorial form (Avrahami, 2005; Huss, Nuttman-Shwartz, & Altman, 2012; Lev-Wiesel, 2005). Specifically, we examined the associations between drawing scales that reflect a heightening/lessening of the military trauma and participants' peri-traumatic dissociation, dissociation, post-traumatic stress symptoms, and history of traumatic events. We hypothesized that the level of post traumatic symptoms (PTS) and level of peri-traumatic dissociation would be correlated with the number and size of the symbols in the drawing of the event as well as in the drawing of coping with the event. Specifically, we hypothesized that a greater history of traumatic events (TEQ), peri-traumatic dissociation (PDEQ), persistent dissociation (DES), and post-traumatic stress symptoms (PTSDI) would be negatively correlated with the (1) smaller trauma symbols, (2) new resource symbols, and (3) the presence of a boundary between the event and coping, representing positive scales. But positively correlated with the (4) larger trauma symbols, (5) new distress symbols, and (6) Disconnection, considered negative scales.

Method

Participants and procedure

The sample consisted of 49 adults aged 19–61 years ($M = 28.92$, $SD = 6.74$), who experienced a traumatic event during their military service. Participants were recruited as a convenience sample from four academic institutions in the northern part of Israel, and through online forums. Criteria for inclusion were age (18 to 65 years), being Hebrew speaking and having prior service in the Israeli army. In addition, the sample included only participants who described army-related traumatic events in their drawings, which they consider to be the most difficult event that happened during their lives. The sample included men (61%, $n = 30$) and women (19%, $n = 19$), with the majority the born in Israel (94%, $n = 46$; the Former Soviet Union, 4%, $n = 2$; Morocco, 2%, $n = 1$). All participants spoke Hebrew as their first (90%, $n = 44$), or second (Arabic, 6%, $n = 3$; Russian, 2%, $n = 1$; English, 2%, $n = 1$) language, and had academic (Bachelor's, 45%, $n = 22$; Master's, 14%, $n = 7$) or school education (high school, 39%, $n = 19$; elementary school, 2%, $n = 1$). Most participants were in relationships (married, 49%, $n = 24$; unmarried, 10%, $n = 5$). Others were either single (39%, $n = 19$) or divorced (2%, $n = 1$), and most had no children (65%, $n = 32$). Most reported being in very good health (47%, $n = 23$) and a fair financial situation (59%, $n = 29$). Others reported better (excellent health, 30%, $n = 15$; good financial situation, 37%, $n = 18$) or worse (good health, 22%, $n = 11$; poor financial situation, 4%, $n = 2$). Most participants were agnostic (61%, $n = 30$) and the rest were religious to some extent (traditional, 26%, $n = 13$; observant, 12%, $n = 6$). After receiving ethical approval from the Committee to Evaluate Human Subject Research of the Faculty of Health Sciences and Social Welfare of the University of Haifa, requests for consent were sent. Participants completed the drawings in a face-to-face session with no time limit conducted by one of the authors. Then, participants filled out online questionnaires. Participants were assured of the confidentiality of their responses.

Measures

The peri-traumatic dissociative traumatic drawing assessment (PDTDA)

This measure is an art-based technique designed to assess peri-traumatic dissociation through drawings, and the extent to which individuals appraise and resolve their past painful events and coherently reorganize them. The participants were asked to think about the most challenging event they had experienced since the age of 18 and to indicate whether the event was unexpected (Yes/No) and whether during the event they felt fear, horror, or helplessness (Yes/No). Then each participant was given two A4 (21 × 29.7 cm) sheets of white drawing

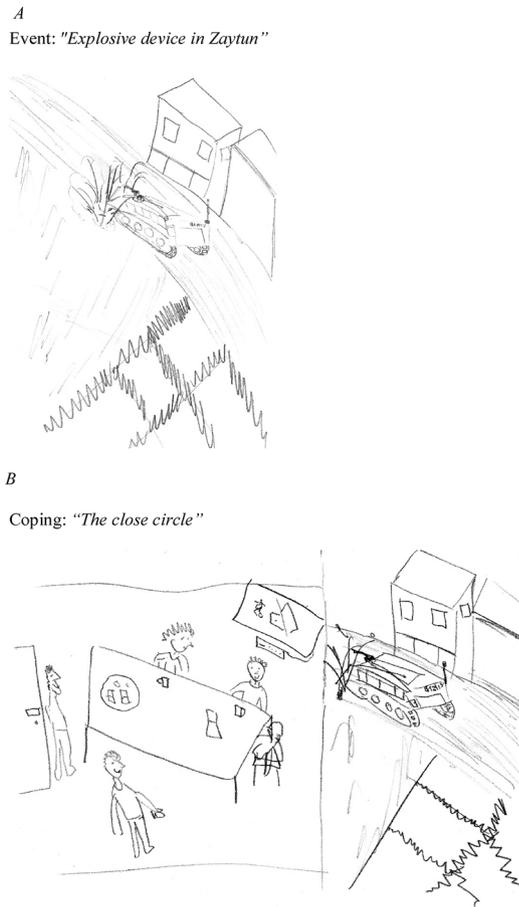


Fig. 1. (A) Event: "Explosive device in Zaytun" (B) Coping: "The close circle".

paper and a pencil, and asked to draw two drawings in sequence with no time limit. The instructions for the first drawing were: "Please draw the event." After the participants had finished the first drawing, they were instructed to "Copy the first drawing to a new page, then add [pictorially] what helped you cope." The second drawing was compared to the first in terms of six features on a scale from 1 (present) to 3 (absent).

The first scale, *smaller trauma symbols*, represents decreases in the second drawing in the size of the symbols (see Fig. 1). The second scale, *new resource symbols*, evaluates the appearance of new symbols in the second drawing such as help-seeking help, social support, faith, self-strength, whole figure, complete figure outline, detailed and vital nature which reflect the elaboration of coping resources (see Fig. 1). The third scale, *the boundary between the event and coping*, is represented by the depiction of a line between the traumatic event and the coping attempts and reflects the progress of the participant since the traumatic event and their ability to resolve the event without being immersed in it (see Fig. 1). The fourth scale, *larger trauma symbols*, assessed increases in the size of the trauma symbols in the second drawing, which leave less space for the surroundings and give more to the event, and sometimes extend to the edges of the page (see Fig. 2). This scale represents a fixation in time perception and a preoccupation with the traumatic event. The fifth scale, *new distress symbols*, assesses new traumatic symbols representing distress in the second drawing (see Fig. 2). The sixth scale, *disconnection*, represents the degree of similarity or difference between the first and the second drawing, or the extent to which there were no connections between the representations in the drawings (see Fig. 3).

We posited that the appearance of larger trauma symbols, fewer support symbols, and less connection between the drawings could



Fig. 2. (A) Event: "Horror" (B) Coping: "Shiver".

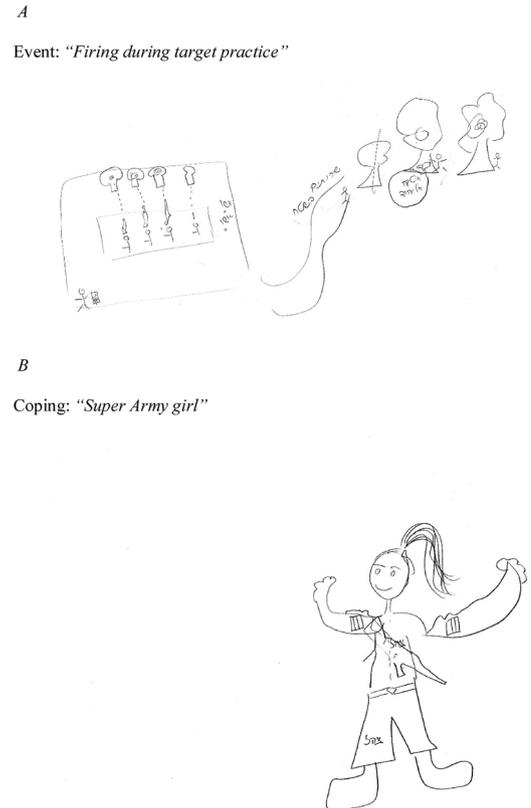


Fig. 3. (A) Event: "Firing during target practice" (B) Coping: "Super Army girl".

reflect individuals' heightened and hyper-activated expressions of distress, overwhelming emotional intensity, numerous details, anger and contradictory descriptions of the past traumatic event, and the inability

to resolve it. In contrast, the appearance of smaller trauma symbols, the use of support symbols, and a boundary between the traumatic event and coping could reflect individuals' ability to reorganize the traumatic event in a coherent and balanced manner while merging affect and cognition in an optimal manner without being caught up in the traumatic event through constant negative emotions such as pain, anger, mourning, and loss. In this study, the intra-class correlation coefficients based on 12 (25%) of the drawings ranged from 0.72 to .98.

The traumatic events questionnaire (TEQ; Vrana & Lauterbach, 1994)

The Hebrew version of the Traumatic Events Questionnaire (Stolovy, Lev-Wiesel, & Witztum, 2015) was used to assess experiences with various types of traumatic events from birth to the present (e.g., accidents, crime, adult abusive experiences). To adequately cover the scope of possible traumatic events among Israeli adults, the Hebrew version included additional detailing of military events, such as combat in the First or the Second Lebanon war, military operations in the West Bank and Gaza intifadas, serious training accidents (Amir & Sol, 1999), and experiences of war as a civilian such as missile and terror attacks. In addition, events related to women's health, such as miscarriage, were added based on previous studies (Lev-Wiesel, Daphna-Tekoah, & Hallak, 2009). To obtain a trauma exposure score, the number of events for each participant was summed. To assess trauma intensity, respondents provided written information on each event, including being asked to rate how traumatic the event was on a scale of 1 (not at all) to 5 (extremely), how often the traumatic event was experienced, and their age when it occurred. The trauma intensity score included the sum of events that the subject defined as traumatic (scored from 1 to 5 on a Likert scale).

Additional points were assigned if the event happened more than once, based on an epidemiological study showing that exposure to multiple traumatic events strongly predisposes toward the development of PTSD (Breslau, Chilcoat, Kessler, & Davis, 1999). In addition, an additional point was given if the event occurred during childhood (below the age of 14), based on the notion that older adults who experience their most distressing traumatic event during childhood report more severe symptoms of PTSD than older adults who experience their most distressing trauma after the transition to adulthood (Ogle, Rubin, & Siegler, 2013). The TEQ has shown appropriate validity (Crawford, Lang, & Laffaye, 2008) and good test-retest reliability coefficients ranging from 0.72 to .99 (Vrana & Lauterbach, 1994).

Peri-traumatic dissociative experiences questionnaire (PDEQ; Marmar, Weiss, & Metzler, 1997)

The PDEQ (Marmar et al., 1997) evaluates peri-traumatic dissociation or dissociative experiences that occurred during a traumatic event and in the minutes and hours that followed. In this study participants were instructed to refer to the army-related traumatic event, which they described in their PDTDA drawings. Participants rate on a Likert scale from 1 (not at all true) to 5 (extremely true), the degree to which they experienced: (1) depersonalization, (2) derealization, (3) amnesia, (4) out of body experiences, (5) altered time perception, and (6) altered body image. The PDEQ is scored as the mean item response across all items. The total score ranges from 10 to 50, with higher scores indicating increased dissociation. The PDEQ has shown a good reliability of 0.80 (Marmar et al., 2007) and test-retest reliability has been reported as a correlation coefficient of 0.72 and an internal consistency of 0.78 to .79 (Birmes et al., 2005). The Hebrew version has shown a relatively good reliability of 0.79 to .86 (Shalev & Freedman, 2005). In the current study, the Cronbach's alpha was 0.86.

Dissociative experiences scale (DES; Bernstein & Putnam, 1986)

The DES (Bernstein & Putnam, 1986) is a 28-item questionnaire assessing the frequency of dissociative experiences in the daily lives of the participants. Participants are asked to rate how often the experiences happened to them. Items are scored from 0% (never) to 100%

(always). A total score is calculated by averaging the scores of the 28 items (Waller, Putnam, & Carlson, 1996). In addition to the total score, subscales represent absorption, amnesia, and depersonalization-derealization (Carlson et al., 1991). The DES has good test-retest reliability ranging from 0.79 to .96, high internal reliability (Cronbach alpha = .95), and strong convergent, discriminant, and criterion validity (Bernstein & Putnam, 1986; Carlson & Putnam, 1993). The Hebrew version (H-DES) has shown good test-re test, split-half reliability, and good criterion-related validity on the DSM-IV dissociative disorder diagnoses criteria (Somer, Dolgin, & Saadon, 2001), and a Cronbach alpha of .95 (Zerach, Greene, Ginzburg, & Solomon, 2014). In the present study, the Cronbach alpha was .93 for the total DES score.

Post-traumatic stress inventory (PTSDI; Solomon, Neria, Ohry, Waysman, & Ginzburg, 1994)

This scale assesses posttraumatic stress using 17 items based on symptoms listed in the *DSM-IV-TR* (American Psychiatric Association, 2000). Each symptom is rated on a scale ranging from 0 (not at all) to 3 (almost always) according to how often it appeared in the previous month. Scoring is used to diagnose PTSD as well as to evaluate symptoms. In the current study, the inventory was used to assess participants' posttraumatic stress symptoms by calculating a global score using the mean score of all 17 items. The PTSDI showed high convergent validity when compared with diagnoses based on structured clinical interviews (Solomon et al., 1993). The Cronbach alpha for the scale was reported to be .91 (Dekel, Levin, & Solomon, 2015) and was .93 in the current study, indicating high-reliability values.

Results

Preliminary analyses

In an attempt to control for possible confounding variables which could compromise hypothesis testing, the correlations between participants' demographic variables, event characteristics variables (i.e., history of traumatic events, time elapsed since the event), and the study variables (i.e., peri-traumatic dissociation, persistent dissociation and post-traumatic stress symptom), as well as between the drawing scales (i.e., smaller trauma symbols, new resource symbols, boundary-event coping, larger trauma symbols, new distress symbols and disconnection) were tested using multivariate analyses of variance (MANOVA) and Pearson product-moment correlation coefficients. The analyses revealed negative correlations between age and time elapsed since the event ($r = .83, p < .01$) and larger trauma symbols ($r = -.29, p < .05$). In addition, *t*-test analyses were conducted to detect differences in the study variables between participants who reported combat-related trauma events compared to those reporting system-related trauma events, as well as between those who reported the event was unexpected and included feelings of fear, horror, and helplessness compared to those who reported the event did not include these experiences. The analyses revealed group differences in peri-traumatic dissociation [$t(40) = -2.65, p < .05$; the mean difference was $-.62$ with a 95% confidence interval ranging from -1.1 to -1.5]. The mean number of participants who described the event as unexpected and having feelings of fear, horror, and helplessness was $2.45, SD = .96$; the mean for participants who did not was $1.83, SD = .64$].

Then we tested our hypotheses by examining the associations between five of the PDTDA (i.e., the drawing scales: smaller trauma symbols, new resource symbols, boundary-event coping, new distress symbols and disconnection) and the study variables [i.e., persistent dissociation (DES) and PTS (PTSDI)] using Pearson product-moment correlation coefficients. The associations between the five PDTDA drawing scales mentioned above and the participants' level of peri-traumatic dissociation (PDEQ) was tested using partial Pearson correlations while controlling for type of reported event (i.e., unexpected and including feelings of fear, horror, and helplessness versus not).

Table 1
Bivariate Pearson Correlations.

	1	2	3	4	5	6	7	8	9	10	11
1 Smaller trauma symbols (PDTDA)	–										
2 New resource symbols (PDTDA)	.13	–									
3 Boundary-event coping (PDTDA)	.13	.20	–								
4 Larger trauma symbols (PDTDA)	–.26*	–.17	–.08	–							
5 New distress symbols (PDTDA)	–.19	–.33**	.14	.15	–						
6 Disconnection (PDTDA)	–.09	.16	–.12	–.08	–.06	–					
7 History of traumatic events (TEQ)	–.18	–.25*	–.16	.09	.16	–.03	–				
8 Peri-traumatic dissociation (PDEQ)	–.11	–.04	–.31*	.23	.36**	.10	.29*	–			
9 Persistent dissociation (DES)	–.19	–.17	–.18	.11	.19	–.00	.51**	.59**	–		
10 Post-traumatic stress symptoms (PTSDI)	–.02	–.21	–.17	.11	.26*	–.01	.56**	.47**	.59**	–	
11 Time in months since the event	.04	.00	.03	–.29*	.03	–.10	–.06	–.21	–.13	.04	–
<i>M</i>	1.39	2.16	1.63	1.35	1.04	1.18	5.84	2.13	13.21	.46	93.55
<i>(SD)</i>	(.61)	(.77)	(.78)	(.60)	(.29)	(.44)	(4.57)	(.87)	(11.47)	(.50)	(68.46)

Note. *n* = 49. **p* ≤ .05, ***p* ≤ .01, ****p* ≤ .001 (One-tail).

PDTDA = Peri-traumatic Dissociation Trauma Drawing Assessment; TEQ = Traumatic events questionnaire; DES = Dissociative experiences scale; PTSDI = Post-traumatic stress inventory; PDEQ = Peri-traumatic dissociation questionnaire. Partial Pearson correlation; (1) between PDTDA scales; smaller trauma symbols, new resource symbols, boundary-event coping, larger trauma symbols, new distress symbols and disconnection and the peri-traumatic dissociation (PDEQ) controlling for type of reported event (unexpected, fear, horror and helplessness), and (2) between PDTDA drawing scale larger trauma symbols and (a) persistent dissociation (DES) and post-traumatic stress symptoms (PTSDI) controlling for age, and (b) peri-traumatic dissociation (PDEQ) controlling for both age and type of event.

Partial Pearson correlations were also employed to examine the associations between the PDTDA "larger trauma symbols" drawing scale and participants' level of persistent dissociation (DES) and post-traumatic stress symptoms (PTSDI) while controlling for age, and participants' level of peri-traumatic dissociation (PDEQ) while controlling for both age and type of reported event (i.e., unexpected and including feelings of fear, horror, and helplessness versus not).

Bivariate correlation analyses

As shown in Table 1, the hypotheses were partially supported. As expected, peri-traumatic dissociation (PDEQ) negatively correlated with a boundary between the event and coping and positively correlated with new distress symbols. History of traumatic events (TEQ) negatively correlated with new resource symbols and post-traumatic stress symptoms (PTSDI) positively correlated with new distress symbols.

Drawing analyses

The above associations were also manifested in the narratives associated with the drawings. For example, the pair of drawings in Fig. 1 were made by a 30-year-old male participant and illustrate the use of resource symbols and a boundary between the traumatic event and coping. The participant described the drawing of the event as follows: "During operational activity in the Gaza Strip, my team walked into an explosive device; as a result, two soldiers in the team were killed. In the drawing, I depicted the area as I remember it." The drawing was titled: "Explosive Device in Zaytun."

The description of the drawing of coping with the event reflected the use of social coping resources. The drawing was titled "The close circle" and was accompanied by the following narrative: "This was not one event, I drew a reunion with friends, family, where things came out, together." The scales emerged from the drawings and were found to be associated with the study variables: more boundaries between the event and coping were related to lesser peri-traumatic dissociation, and higher levels of new resource symbols were related to a lower traumatic event history. The positive scale "smaller trauma symbols" in the drawings were not related to the variables.

The drawings in Fig. 2 were made by a 19-year-old male participant. He described the drawing of the event as follows: "A shell shot at a

domed ceiling. The projectile got stuck in the ceiling, which then cracked. The ceiling crumbles but does not collapse, fragments fall like rain on the floor, and in the center is a nondescript man with a sad expression." He titled the drawing "Horror" which reflects the overwhelming emotions characterizing the traumatic event. His description of the drawing of coping with the event reflects the peri-traumatic dissociation symptom of emotional numbness. He stated: "I added a female figure lacking an expression to the first drawing. The figure is located behind the central figure, with her arms outstretched to embrace him." This description corresponds to the new distress symbols scale: "I added a knife covered in blood and a directed energy weapon," which corresponds to the higher peri-traumatic dissociation and post-traumatic stress symptom scores. The rest of his description reveals the use of emotional numbing (e.g., avoiding reminders of the trauma): "the expression of the figure went from sad to indifferent." The hyper-arousal symptom (e.g., hypervigilance) is reflected in the title: "Shiver."

The drawings in Fig. 3 were made by a 23-year-old female participant who described the drawing of the event as follows: "I was a commander in basic training. During soldiers' shooting practice, I went to pee in the bushes, and a terrorist from one of the nearby villages pointed an M16 towards me. The base is surrounded by Arab settlements, and I ran to escape. Finally, the Golani brigade caught him." She entitled the drawing "Firing during target practice." The description of the drawing of coping with the event reflects the use of instrumental resources (the uniform she wore and weapon she used as a means of providing a feeling of security and resiliency). She said, "What made me much stronger and resilient is the uniform I was wearing. During my entire army stint when I wore the uniform, and I had my weapon, I felt strong and resilient and that nothing could threaten me. In fact, I had forgotten this event, since I considered that in the army we are more exposed to danger from hostile parties." The title also reflects her resilient self-perception: "Super Army Girl." Unlike the positive features reflected in the text, the drawing corresponded to the negative scale "disconnection." Nevertheless, this scale was not associated with the study variables.

Discussion

The aim of this study was to explore whether peri-traumatic dissociation can be found in drawings depicting army-related "traumatic events" and "coping with the event" when drawn by Israeli veterans. We

assumed that the combination of the pair of drawings and its accompanying narratives could represent the way survivors of a trauma resolve the traumatic event and their use of peri-traumatic dissociation. Previous studies have found expressions of dissociation in drawings of sexually abused survivors. Specifically, children's drawings were reported to include images symbolizing distinct personality states (Lev-Wiesel, 2005); in adults' drawings, scales of derealization in drawings of traumatic events were associated with peri-traumatic dissociation scores (Amir & Lev-Wiesel, 2007). In the current study, the presence of a boundary line between the traumatic event and coping was negatively correlated with peri-traumatic dissociation. The use of new distress symbols was positively correlated with peri-traumatic dissociation and positively with the post-traumatic stress symptom score (PTSDI), whereas the new resource symbols score was negatively correlated with a history of traumatic events.

Hence, the association between the boundary between the event and coping in the artwork could reflect the individual's level of mental organization, emotional regulation and self-containment, and low levels of unwanted intrusions into awareness or behavior (Cardea & Carlson, 2011), by creating a symbol. The boundary circumscribes the inner chaotic, fragmented, and formless traumatic experience (Avrahami, 2005). This suggestion is consistent with a study of veterans' drawings that argued that the encapsulation of sensitive material facilitated containment and provided compartmentalization for overwhelming feelings (Campbell, Decker, Kruk, & Deaver, 2016). Similarly, drawing the line could indicate these individuals' ability to move beyond the fatalistic past and not remain immersed in the traumatic event. On the other hand, the findings also showed that higher levels of new distress symbols were associated with higher peri-traumatic dissociation. The depiction of symbols of distress may reflect an escalation of the trauma, immersion in the traumatic event, and a possible emotional struggle with the traumatic memories. Previous studies have shown that peri-traumatic dissociation was related to later development of distress (Breh & Seidler, 2007; Hetzel-Riggin, 2010; Lensvelt-Mulders et al., 2008; Marx & Sloan, 2005; Ozer, Best, Lipsey, & Weiss, 2003). Future studies should examine which aspect of dissociation—namely, a lack of integration of mental modules or systems, an altered state of consciousness, or a defense mechanism (Schauer & Elbert, 2010) is reflected in the boundary between the event and coping/distress symbols in PDTDA.

Similarly, the positive association between the number of new distress symbols in the drawings and post-traumatic stress symptoms may point to rumination on traumatic memories over time. In an art therapy study (Eisenbach et al., 2015), survivors of childhood trauma described their struggle with traumatic memories through distressing symbolic elements such as blood, guns, knives, graves and fire, which they interpreted as their wish to die and/or be reborn. In a group art therapy study (Lobban, 2014), veterans used artwork to communicate how traumatic memories continue to replay without the addition of new adaptive information. Thus, the new symbols of distress may reflect post-traumatic stress symptoms of intrusion or hyper-arousal (Dekel et al., 2015). PTSD has a negative impact on individuals' well-being and functioning (Walser, Tran, & Cook, 2012). Specific sensory experiences related to the traumatic memory do not fade over time, which often results in hypervigilance (a failure to transform and integrate sensory imprints related to the trauma). This phenomenon keeps individuals in a cognitive state that prevents feeling a sense of psychological well-being and physical safety (van der Kolk, 2002). Drawings might serve as a visual narrative for survivors (Amir & Lev-Wiesel, 2007). Since increased distress may reflect a dominant negative belief system by focusing on the trauma survivors' injuries and losses from the event (Lahav, Solomon, & Levin, 2016), future studies should include an examination of the survivors' worldview of the trauma and specific symptoms with regard to the symbolic expression of distress in the PDTDA.

In addition, the findings indicated a negative association between

new resource symbols and a greater history of traumatic events. This association may point to the fact that a history of traumatic events is related to later distress. Our findings are in line with an epidemiological study (Breslau et al., 1999) that showed that exposure to multiple versus single traumatic events more strongly predisposed the participants to the development of PTSD. In a study of Israeli university students (Amir & Sol, 1999), being exposed to a singular kind of traumatic event was related to the highest distress, compared to no exposure or being exposed to more than one event. However, being exposed to multiple traumas was related to PTSD. Older adults who experienced their most distressing traumatic event during childhood exhibited more severe symptoms of PTSD than those who experienced their most distressing trauma after the transition to adulthood (Ogle et al., 2013).

In this study, participants described an army-related event that occurred during their emerging adulthood (ages 18–26 years). This period of transition from adolescence to adulthood is a unique developmental period characterized by devoting time to intensive identity exploration. At the end of the period, young adults are expected to make significant decisions about crucial life domains such as education, employment, and romantic relationships. Similarly, during this period, worldviews are examined including values, norms, ethical standards, and political and social attitudes (Arnett, 2007; Flanagan & Levine, 2010; Nelson, Badger, & Wu, 2004; Padilla-Walker, Nelson, Madsen, & Barry, 2008).

In Israel children are socialized from an early age to join the army, and most of them complete their military service during their emerging adulthood years (Levin, 2011). Though the army environment is considered to have a positive influence on the psychological development of the emerging adult (Hicks, Bell, & Gray, 2018), it may be that experiencing the most distressing trauma during the process of identity consolidation has an excessive significance, influencing both symptoms of post-traumatic stress and the pictorial description of the event. Future studies should explore different types of traumatic event histories as a function of age when exploring the presence of fewer resource symbols in PDTDA.

Finally, preliminary analyses revealed a negative association between larger trauma symbols and time elapsed since the event. It may be that larger trauma symbols represent preoccupation with the traumatic event, or aspects of impaired self-regulation resulting from coping with the trauma. In group art therapy, veterans described being prisoners of time. They created images to externalize symbols of their inner experience. This process promoted discovery of personal meaning, and further constructing a narrative by using higher-order thinking, reasoning, and analysis (Lobban, 2014). It may be that changes in pictorial processing of traumatic memory reflect psychological aspects of the trauma time perception. Future studies may explore symbols representing trauma in the context of time perception (2013, Henson et al., 2006; Laghi et al., 2012).

Limitations and implications

This study has several limitations that should be taken into consideration. First, the research design was observational and correlative; therefore, it does not allow causal inference. Second, the study was composed of a small sample of Israeli veterans who reported army-related traumatic events. Military service in Israel is mandatory. Furthermore, Israelis are exposed to distress due to ongoing political conflicts, sometimes resulting in terror and wars. In 2003, 16.4% of the population was directly exposed to a terrorist attack and 37.3% had a family member or a friend who had been exposed (Bleich, Gelkopf, & Solomon, 2003). Soldiers are trained for operations and combat, and experience the related stress during and after deployment (Hoge, 2010). Therefore, future studies aiming to replicate the findings should recruit larger samples and examine various trauma survivor populations from different cultures. Third, our analysis did not include factors that may impact symptoms, such as undergoing therapy, time spent in therapy, and the therapeutic approach used. Future research should include the

monitoring of variables such as trauma therapy.

Despite these limitations, the PDTDA may have clinical implications for working with veterans. As an assessment tool, the measure may point to individuals' past and present traumatic experiences. Since coping resources affect the intrapsychic or behavioral steps people take to manage stress (Taylor & Stanton, 2007), and since veterans' various traumatic life events are considered a risk factor for development of traumatic stress (McCaslin, Ortigo, Simon, & Ruzek, 2018), the PDTDA may help facilitate clinical screening processes.

As a therapeutic technique, the PDTDA may also support trauma processing. Expressing trauma through implicit symbolic modes of communication may enable survivors to access dissociated self-states (van der Kolk, 2002), in that art-making is thought to contribute to the embodiment of dissociated traumatic experiences through sensory functions and memory stimulation (Buk, 2009; Loumeau, 2011). For veterans, art therapy enables the externalization of visual and tactile memories of the trauma and supports containment of overwhelming emotions (Malchiodi, 2012). Some trauma-informed art therapy intervention protocols emphasize accessing traumatic memories and processing the trauma narrative (Rappaport, 2010; Talwar, 2007) and offer stages of verbal assessment of dissociation. The aim is to monitor psychological states while creating a visual narrative that illustrates stages of the instinctual trauma response (Gantt & Tinnin, 2007). However, protocols do not differentiate between peri-traumatic and persistent dissociation mechanisms. In the therapy of individuals who experienced peri-traumatic dissociation, clinicians should not only explore retrospective beliefs of the response during the trauma but also prospective assumptions about the emotional state and its adequacy going forward (Thompson-Hollands, Jun, & Sloan, 2017). Art therapy models for treating combat-related stress symptoms emphasize non-verbal stages of containment and security, narration and exposure allowance, integration, and maintenance (Naff, 2014). A drawing intervention specifically aimed at increasing the boundary between the event and coping may support more effective trauma processing when the individual has experienced peri-traumatic dissociation, in particular because art therapy protocols include processing memories to achieve insight (Collie, Backos, Malchiodi, & Spiegel, 2006).

For individuals with PTSD, the ability to change symbols can lead to a greater sense of control over the traumatic experience itself. This begins with the processes of healing and facilitates the onset of reorganization and generation of changes (Avrahami, 2005). Drawings support the expression of the fragmented, dissociated and nonverbal traumatic memory (Huss et al., 2012; Lev-Wiesel, 2005), and based on experimental study, viewing highly negative and graphic photographs and then imagining of new related details, leads to less recollections of these photographs as appeared involuntarily in consciousness. This suggests that effortful imagination of new trauma-related details leads to increased tendency to not endorse trauma exposure over time (Oulton, Strange, Nixon, & Takarangi, 2018).

Expression of dissociated self-states through a series of art work has been observed to increase pictorial variety over time (Somer & Somer, 1997). In an art therapy case study of a veteran coping with traumatic brain injury and post-traumatic stress symptoms, creating a visual description of an intrusive image, which appeared as flashbacks or in nightmares, promoted self-regulation with regard to other memories of the trauma (Walker et al., 2016). The ability to change the symbol can lead to a greater sense of control over the traumatic experience itself, begin the process of healing, and facilitate the onset of reorganization that may generate life changes (Avrahami, 2005). This study found that new distress symbols related to both peri-traumatic dissociation and post-traumatic stress symptoms. Acknowledging that art therapy offers alternate paths for accessing and processing visual and motor information and memories (Lusebrink, 2004), and therefore introduces new learning at a structural level of the brain (Kapitan, 2010), it can be argued that visual reshaping and meaning-making of distress symbols may support trauma processing when the event experienced included

peri-traumatic dissociation and later post-traumatic stress symptoms.

For survivors of war, treatment models emphasize the importance of coping resources (Lahad & Leykin, 2015). Identifying resources such as strengths, beliefs, and skills was shown to help establish self-concept and worldview revision in a task-oriented approach to art therapy in trauma treatment (Rankin & Taucher, 2003). In a four-drawing art therapy protocol, trauma survivors were guided to draw the internal and external resources that helped them with the problem in an aim to increase resiliency (Hass-Cohen, Bokoch, Findlay, & Witting, 2018). Thus, fewer resource symbols in PDTDA may call for more in depth relating to traumatic event history as intervention within veterans' trauma therapy.

For members of the military, art therapy can reinforce the development of a coherent narrative from fragmented memories (Walker et al., 2016), the expression of inner dialogues (Jones, Walker, Masino Drass, & Kaimal, 2017), and protective coping (Kern & Perryman, 2016). The unique nature of combat and operational stress during and after deployment thus requires specific therapeutic interventions (Breitbach, Rabinowitz, & Warner, 2018). For veterans, representing the trauma narrative visually may help them to regain confidence and work toward mastery of post-traumatic stress symptoms. In art therapy, veterans have described how, through creating art and reflecting on it, they were able to identify problem areas (such as feeling disconnected, trying to control or avoid feelings, wanting to present a false self to the world to protect their vulnerability, or feeling the stuck in their traumatic memories; Lobban, 2014). The creative process enables an intermediate space between subjective imagery and the objective product. Acknowledging that the art work becomes a witness and a messenger between dissociated self-states (Richman, 2014) and offers a mechanism for containment by providing concrete form and boundary for a wide spectrum of trauma-related associations and sensations (Avrahami, 2005), future studies should hence examine the effectiveness of PDTDA with military service personnel for assessment and therapeutic purposes.

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