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Posttraumatic Growth and Shattered World Assumptions Among Ex-POWs: The Role of Dissociation

Yael Lahav, Elisheva S. Bellin, and Zahava Solomon

Objective: The controversy regarding the nature of posttraumatic growth (PTG) includes two main competing claims: one which argues that PTG reflects authentic positive changes and the other which argues that PTG reflects illusionary defenses. The former also suggests that PTG evolves from shattered world assumptions (WAs) and that the co-occurrence of high PTG and negative WAs among trauma survivors reflects reconstruction of an integrative belief system. The present study aimed to test these claims by investigating, for the first time, the mediating role of dissociation in the relation between PTG and WAs. *Method:* Former prisoners of war (ex-POWs; $n = 158$) and comparable controls ($n = 106$) were assessed 38 years after the Yom Kippur War. *Results:* Ex-POWs endorsed more negative WAs and higher PTG and dissociation compared to controls. Ex-POWs with posttraumatic stress disorder (PTSD) endorsed negative WAs and a higher magnitude of PTG and dissociation, compared to both ex-POWs without PTSD and controls. WAs were negatively correlated with dissociation and positively correlated with PTG. PTG was positively correlated with dissociation. Moreover, dissociation fully mediated the association between WAs and PTG. *Conclusion:* These findings imply that PTG might reflect illusory defenses and raise questions regarding the integration between the co-occurrence of high PTG and negative WAs among trauma survivors.

Trauma literature includes two main competing claims regarding the nature of posttraumatic growth (PTG): one argues that PTG reflects authentic positive transformation (e.g., Calhoun & Tedeschi, 2006) and the other argues that PTG reflects an illusory or self-deceptive coping mechanism (e.g., Hobfoll et al., 2007; Maercker &

Zoellner, 2004). The former also suggests that PTG evolves from shattered world assumptions (WAs) and that the co-occurrence of high PTG and negative WA among trauma survivors reflects a reconstruction of an integrative belief system. With the aim to test these claims, the present study investigates the effects of war captivity on WAs

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and PTG, as well as the role of dissociation in explaining the association between PTG and WAs.

WORLD ASSUMPTIONS

World assumptions (WAs) are core cognitive schemata through which individuals interpret themselves, others, and the world (e.g., Janoff-Bulman, 1989). According to the world assumptions theory, humans hold inherently positive core assumptions that generally support feelings of invulnerability and optimism in daily life (Janoff-Bulman, 1989). There are three chief categories of assumptions: (a) world benevolence, which refers to the belief that the world is a good place and people are basically good and caring; (b) meaningfulness of the world, which refers to the belief that the distribution of good versus bad outcomes is not arbitrary but is based on justice and also depends on individuals' behaviors and actions; (c) self-worth, which refers to belief in one's goodness, decency, morality, and luck.

Janoff-Bulman (1989) argues that trauma challenges individuals' WAs. Traumatic events are unexpected experiences that entail a threat to life, limb, and social order and incite salient and critical information which cannot be accounted for by the person's preexisting assumptions (e.g., Janoff-Bulman, 1989). Therefore, trauma victims often suffer from a shattering of their WAs and subsequently hold negative perceptions of the self and the world, which in turn increases their vulnerability to posttraumatic stress disorder (PTSD).

Research has revealed negative WAs among survivors of various traumatic events, such as sexual trauma (e.g., Littleton, Grills-Taquechel, Axsom, Bye, & Buck, 2012), civilians exposed to bombing (e.g., Freh, Chung, & Dallos, 2013), and former prisoners of war (ex-POWs; e.g., Solomon, Lev-Shalem, & Dekel, 2007). Furthermore, previous research has confirmed the association between WAs and PTSD, with higher PTSD

symptoms among trauma survivors associated with negative WAs (e.g., Ginzburg, 2004).

POSTTRAUMATIC GROWTH

Alongside evidence of shattered WAs, research reveals positive changes in cognitive perceptions among trauma victims characterized as PTG (Calhoun & Tedeschi, 2006). PTG is the tendency to report enhanced changes in perception of the self, philosophy of life, and relationships with others in the aftermath of traumatic events (e.g., Calhoun & Tedeschi, 2006). PTG was observed among victims of a variety of traumas, such as life-threatening illness (e.g., Weiss, 2002), assault or accident (e.g., Snape, 1997), and terror (e.g., Levine, Laufer, Hamama-Raz, Stein, & Solomon, 2008).

PTG has also been documented following exposure to the harsh traumatic event of war captivity, which is the subject of matter in the present research (e.g., Feder et al., 2008; Sledge, Boydston, & Rabe, 1980; Ursano, Wheatley, Sledge, Rahe, & Carlson, 1986). Early research studying former Vietnam POWs found that 91% of respondents reported favorable changes following captivity, including greater understanding of themselves and others and a clearer sense of life's priorities (Sledge et al., 1980). Furthermore, Ursano et al. (1986) found that ex-POWs who reported having benefited from their experience were kept in captivity for a significantly higher average number of days than those who did not endorse benefit from captivity.

The nature of PTG is not well understood. While some view PTG as a genuine transformation in basic schemas about the self and the world (e.g., Calhoun & Tedeschi, 2006), others suggest that PTG may reflect an illusory defense that may be maladaptive and hinder long-term coping (e.g., Hobfoll et al., 2007; McFarland & Alvaro, 2000). The Janus face model (Maercker & Zoellner, 2004) suggests that

PTG simultaneously includes both a constructive aspect and an illusory maladaptive aspect. Whereas the constructive component of PTG is purportedly associated with functional cognitive restructuring and adjustment, the self-deceptive component is linked to denial, avoidance, wishful thinking, self-consolidation, or palliation in the long run.

The controversy about the nature of PTG is accentuated by mixed empirical results, from both cross-sectional and longitudinal studies, regarding the association between PTG and posttraumatic stress symptoms (e.g., Helgeson, Reynolds, & Tomich, 2006). While some studies revealed negative association between PTG and posttraumatic stress symptoms (e.g., Frazier, Conlon, & Glaser, 2001), with lower levels of distress associated with greater growth, others indicated positive correlations between the two (e.g., Greene, Lahav, Kanat-Maymon, & Solomon, 2015). Others have uncovered a curvilinear relationship between posttraumatic stress symptoms and PTG (Levine et al., 2008).

WORLD ASSUMPTIONS AND POSTTRAUMATIC GROWTH

The aforementioned literature seems to indicate two contradicting cognitive shifts in the aftermath of trauma: shattered WAs and PTG. However, according to Calhoun and Tedeschi's (2006) model these two phenomena are associated through schema reconstruction. Calhoun and Tedeschi (2006) argue that although basic assumptions might be damaged as a result of trauma, this can serve, at the same time, as fertile ground for PTG.

Calhoun and Tedeschi's (2006) schema reconstruction process leading to PTG entails several phases. In the first phase, survivors experience distress and low PTG as they are confronted with conflicting pre- and posttraumatic schemas and beliefs. Subsequently, survivors experience rumination or cognitive processing in which a new

narrative about life goals and aspirations is formed. This stage is often accompanied by anxiety or PTSD. In the final phase of PTG, schema reconstruction is under way. The schemas become wider than before and integrate both negative and positive aspects. At the end of this phase, individuals hold more complex views, including negative cognitions about the world and the self (i.e., more negative WAs), alongside higher PTG.

Empirical studies, overall, reported contradictory findings regarding the relationship between PTG and WAs. While some studies revealed positive correlations (e.g., Valdez & Lilly, 2015), others revealed negative (Cann et al., 2010) or combined positive and negative correlations between PTG and different subscales of WAs (e.g., Carboon, Anderson, Pollard, Szer, & Seymour, 2005).

The inconsistency of findings regarding the correlation between PTG and WAs suggests a need for reevaluation. Moreover, it seems that to investigate Calhoun and Tedeschi's (2006) reconstruction theory there is a need not only to assess the association between PTG and WAs but also to explore the mechanism at the basis of this association. The present study is aimed at filling the knowledge gap by exploring the potential role of dissociation as a mediator in the relationship between WAs and PTG.

THE ROLE OF DISSOCIATION

Dissociation is defined as the process whereby the usually integrated functions of consciousness, memory, identity, or perception of the environment are disrupted. Dissociative experiences are characterized by a compartmentalization of consciousness, that is, certain mental events that are ordinarily processed together (e.g., thoughts, emotions, sensations, memories, and attitudes) are isolated from one another and rendered inaccessible to consciousness and/or voluntary recall (American Psychiatric Association, 2000).

Dissociation is often considered a psychological defense that works to regulate the

aversive aspects of trauma and ultimately contributes to the avoidance of unwanted emotions, thoughts, and memories (e.g., Foa & Hearst-Ikeda, 1996). Dissociation may therefore represent an individual's ability to selectively block out information that may be upsetting. Although dissociation may initially serve as a defense mechanism for trauma survivors, it often becomes embedded in their mental processes long after the traumatic exposure (Classen, Koopman, & Spiegel, 1993).

Captivity has repeatedly been implicated in the genesis of dissociation. Due to the absence of other means to escape, POWs often use dissociation to alter their perception of reality, employing denial, thought suppression, and minimization (Herman, 1992). Research has consistently reported high dissociation among ex-POWs, particularly among traumatized ex-POWs (e.g., Bremner & Brett, 1997).

To the best of our knowledge, the role of dissociation within the relationship between WAs and PTG has never been investigated. The aforementioned contested discourse regarding the nature of PTG raises two competing hypotheses concerning the interplay between WAs, PTG, and dissociation. The first assumes that if PTG reflects positive transformation (Calhoun & Tedeschi, 2006) it will be linked with lower tendencies to block out upsetting information, in other words, low dissociation, in the long term. Moreover, based on the reconstruction theory (Calhoun & Tedeschi, 2006) one would expect an integration between WAs and PTG.

However, the alternative hypothesis might assume that if PTG reflects illusory defenses, it might be rooted in increased dissociation. Furthermore, if PTG serves as an avoidance strategy in the face of trauma, it might not be involved in a process of greater schema integration. Instead, one could expect that negative WAs and PTG will coexist but will be detached from each other, and that dissociation will mediate this relationship.

The present study, which was conducted among ex-POWs and comparable combat veterans, will investigate these competing alternatives by testing (a) the differences between the two study groups (ex-POWs versus controls) in PTG, dissociation, and WAs; (b) the differences between the three study groups (ex-POWs with PTSD, ex-POWs without PTSD, and controls) in PTG, dissociation, and WAs; (c) the associations between WAs and PTG; (d) the associations between WAs and dissociation, as well as between PTG and dissociation; and (e) the mediation role of dissociation between WAs and PTG.

METHODS

This research is part of a longitudinal study on the consequences of captivity and the psychological implications of war among Israeli ex-POWs from the 1973 Yom Kippur War (for full details, see Solomon, Horesh, Ein-Dor, & Ohry, 2012). Data on the three study measures of PTG, WAs, and dissociation was collected only in the third wave of measurement in 2008. Hence, the present study refers only to this time point. Two groups of Yom Kippur War combat veterans participated: (a) ex-POWs and (b) a matched control group of non-POW combat veterans.

Participants

Ex-POWs

According to Israel's Ministry of Defense, 240 combat veterans from the Israeli infantry were captured during the Yom Kippur War and held in either Egypt or Syria. Personal reports of ex-POWs indicate that, after falling captive, most of them were held in solitary confinement, handcuffed, and blindfolded. They were usually held in tiny spaces under unhygienic conditions and were subjected to deliberate and systematic abuse on the part of their captors. Brutal torture included severe beatings,

electric shock to sensitive organs, sexual abuse, burns, deprivation of medical treatment, and systematic deprivation of food and water. They were also subjected to various forms of oppression and humiliation, including verbal abuse, such as curses, mock executions, threats (of death, mutilation, or killing family and friends), and demoralizing misinformation about their country and loved ones. Length of captivity ranged from 1.5 to 8 months. Of the 240 ex-POWs, 11 could not be located, 20 had died, 11 lived abroad, and six could not participate due to deterioration in their mental status. Of the remaining 192 ex-POWs, 158 participated in the current study.

Controls

A control group of combat veterans of the Yom Kippur War from land forces was matched to the POWs in personal (age, ethnic background, marital status, education) and military background (military units, roles, and Israeli Defense Forces [IDF] psychosocial profiles), and was sampled from IDF computerized data banks. A total of 106 control combatants participated in the current study.

Examination of the participants' sociodemographic characteristics during the war revealed that age, ethnic background, marital status, and educational background were similar between the two groups. The mean age of the subjects during the war was 22. Fathers' country of origin was Israel in 7% of cases, Asia or Africa in 36%, and Europe or the United States in 57%; 26% of the subjects were married during the war; 70% had completed high school.

Background Variables

At the time of the current study ex-POWs and controls did not differ in sociodemographic variables such as age, $t(261) = -.74$, $p = .460$, $d = -.09$; length of marriage, $t(225.53) = -1.86$, $p = .064$, $d = -.24$; years of schooling, $t(225.91) = .70$,

$p = .448$, $d = .09$; income, $\chi^2(4, N = 257) = 8.79$, $p = .067$, Cramer's $V = .19$.

We subsequently divided the veterans into groups according to their PTSD status: ex-POWs with PTSD ($n = 91$; 35.1%), ex-POWs without PTSD ($n = 67$; 25.9%), and controls without PTSD ($n = 101$; 39.0%). We excluded veterans who had missing data regarding PTSD. Only 1.9% ($n = 5$) of the controls were classified as having PTSD and were thus omitted from the analyses.

The three groups did not differ at the time of the data collection in sociodemographic variables such as age, $F(2, 225) = 2.18$, $p = .115$, $\eta^2 = .02$; length of marriage, $F(2, 235) = 2.90$, $p = .057$, $\eta^2 = .02$; and years of schooling, $F(2, 250) = 1.90$, $p = .152$, $\eta^2 = .02$. Significant differences were found in regard to income $\chi^2(8, N = 252) = 29.31$, $p < .001$, Cramer's $V = .34$. Only 13.6% of ex-POWs with PTSD rated their income as average or higher than average, compared to 42.2% of ex-POWs without PTSD and 39.0% of controls.

Procedure

The study was approved by the IDF and by the Tel Aviv University Institutional Review Board (IRB). Participants were contacted by phone and, after explaining the purpose of the study, were invited to participate. Participants completed questionnaires in their homes or other location of their choice. Before administering the questionnaires, all participants signed an informed consent form.

Measures

PTSD Inventory

The PTSD Inventory (PTSD-I; Solomon et al., 1993) was used for the measurement of combat-related posttraumatic stress symptoms. This instrument is based on *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision (DSM-IV-TR) criteria (American Psychiatric Association, 2000). The questionnaire consists of 17

statements describing PTSD symptoms following a war experience. Respondents were required to rate each statement according to the frequency they experienced the described content during the past month. Ratings were on a 4-point scale ranging from *Never* to *Very often*. Respondents were classified as suffering from PTSD when they reported at least one intrusion symptom, one avoidance symptom, and two hyperarousal symptoms. In the present study, the PTSD-I was found to have high internal consistency (Cronbach's $\alpha = .96$). The PTSD-I has proven psychometric properties and convergent validity Solomon et al., 1993).

Dissociation Experiences Scale—II

The Dissociation Experiences Scale—II (DES-II; Bernstein & Putnam, 1986), a revised version of the Dissociation Experiences Scale, is a 28-item self-reporting questionnaire that measures the frequency of dissociative experiences, with questions including experiences that may occur in one's daily life (e.g., not recognizing friends or family, having no recollection of past events, being unable to discriminate between an actual occurrence and a dream). In the current study, respondents were asked to rate the frequency with which they experienced each of the 28 dissociative reactions on a 10-point scale (1 = *Never*; 10 = *All the time*), not an 11-point scale like the original DES-II (0 = *Never*; 100 = *All the time*). Hence, only the respondent's mean score was used in this study, representing his tendency to dissociate, with higher scores reflecting stronger tendencies toward dissociation. The DES-II has been shown to have high validity and reliability (Frueh, Johnson, Smith, & Williams, 1996). In the present study, the inventory was found to have high internal consistency (Cronbach's $\alpha = .95$).

The Post Traumatic Growth Inventory

The Post Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) was used

to assess the salutary impact of trauma. The items can be linked to a specified traumatic event; in the present case, it reads: "For each of the statements below, please indicate the extent to which this change occurred in your life as a result of your captivity or your participation in the war." This 21-item, self-reporting scale included five subscales: relating to others; new possibilities; personal strength; spiritual change; appreciation of life. Each item was scored on a 4-point scale (1 = *I didn't experience this change at all*; 4 = *I experienced this change to a very great degree*). Subscale scores and general scores were calculated. The PTGI has good internal consistency as well as good construct, convergent, and discriminant validity (Tedeschi & Calhoun, 1996). In the present study, the inventory was found to have adequate internal consistency (Cronbach's $\alpha = .84, .81, .80, .55, .79, .93$ for relating to others, new possibilities, personal strength, spiritual change, appreciation of life, and total score, respectively).

World Assumptions Scale

The World Assumptions Scale (WAS; Janoff-Bulman, 1989) is a 32-item, self-report rating scale used to assess world assumptions. This scale incorporates eight assumptions, as well as three core cognitions concerning the benevolence of the world (i.e., assumptions of benevolence of the world and of people), the meaningfulness of the world (i.e., assumptions of randomness, control, and justice), and self-worth (i.e., assumptions of self-control, luck, and self-controllability). Participants were asked to indicate the extent to which they agreed with each statement using a 6-point Likert scale, (1 = *Strongly disagree*; 6 = *Strongly agree*), with lower scores indicating lower beliefs in that assumption. In the present study the inventory was found to have adequate internal consistency (Cronbach's $\alpha = .84, .84, .63, .81$, for total score, benevolence of the world, meaningfulness of the world, and self-worth scales, respectively).

Data Analysis

To compare WAs, PTG, and dissociation between two of the groups (ex-POWs and controls) we conducted a series of one-way analyses of variance (ANOVAs). To compare WAs, PTG, and dissociation among the three groups (ex-POWs with PTSD, ex-POWs without PTSD, and controls) we conducted a series of one-way analyses of covariance (ANCOVAs) and controlled for income, which, as was mentioned, differed among the groups. Group (either two groups or three groups) was treated as the independent variable. PTG, WAs, and dissociation were the dependent variables. Pearson correlations were conducted to examine the associations between WAs, PTG, and dissociation.

To assess the mediation effect of dissociation in the association between WAs and PTG, we used a bootstrapping method with 1,000 bootstrap resamples (Preacher & Hayes, 2008). 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 $p < .05$ (two tailed) and thus that the effect of the independent variable (in this case WAs) on the dependent variable (PTG) is mediated by the proposed mediating variable (dissociation). We controlled for the three study group variables (ex-POWs with PTSD, ex-POWs without PTSD, and controls) by entering two dummy variables into the model: The first variables included ex-POWs with PTSD versus the other participants in the study; the second included ex-POWs without PTSD versus the other participants in the study. The analyses were conducted using SPSS, Version 21.0.

RESULTS

Group Differences in PTG, WAs, and Dissociation

To examine differences between ex-POWs and controls in PTG, WAs, and dissociation, we conducted ANOVAs (Table 1). The analyses revealed significant effect for group on PTG (total score and all subscales), WAs (total score and all subscales), and

TABLE 1. Means, SDs, and Univariate *F* Results of PTG, WAs, and Dissociation Among Ex-POWs and Controls

	Ex-POWs	Controls	<i>F</i> (<i>df</i> ₁ , <i>df</i> ₂)	η_p^2
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
Posttraumatic growth				
Total score	2.32 (.64)	1.76 (.73)	42.83*** (1, 262)	.14
Relating to others	2.13 (.75)	1.66 (.71)	25.89*** (1, 261)	.09
New possibilities	2.08 (.81)	1.65 (.79)	18.00*** (1, 258)	.07
Personal strength	2.65 (.85)	1.91 (.92)	46.36*** (1, 262)	.15
Spiritual change	1.90 (.84)	1.59 (.92)	7.93** (1, 250)	.03
Appreciation of life	2.99 (.96)	2.08 (1.00)	55.21*** (1, 261)	.18
World assumptions				
Total score	118.36 (17.03)	129.61 (14.53)	31.02*** (1, 262)	.11
Benevolence of the world	29.82 (6.94)	33.33 (6.08)	17.95*** (1, 262)	.06
Meaningfulness of the world	44.73 (10.41)	50.00 (9.12)	17.95*** (1, 262)	.06
Self-worth	48.54 (8.69)	53.83 (7.90)	25.31*** (1, 262)	.09
Dissociation				
Total score	2.76 (1.54)	1.80 (.88)	33.52*** (1, 262)	.11

Note. PTG = posttraumatic growth; WAs = world assumptions; ex-POWs = former prisoners of war.

* $p < .05$; ** $p < .01$; *** $p < .001$.

dissociation. Ex-POWs reported higher PTG and dissociation and more negative WAs than controls.

PTG, WAs, and Dissociation as a Function of PTSD

To examine differences among ex-POWs with PTSD, ex-POWs without PTSD, and controls in regard to PTG, WAs, and dissociation, we conducted ANCOVAs (Table 2). We controlled for income, which differed among the groups. The analyses revealed that ex-POWs with PTSD reported a higher level of PTG (total score and all subscales) compared to the other two groups. In addition, ex-POWs without PTSD reported a higher level of total score on PTG as well as on the subscales of relating to others, personal strength, and appreciation of life, compared to controls. Regarding WAs, ex-POWs with PTSD reported more negative scores on benevolence of the

world, meaningfulness of the world, and self-worth subscales compared to the other two groups. Furthermore, ex-POWs with and without PTSD reported negative WAs total score compared to controls, and ex-POWs without PTSD reported negative self-worth compared to controls. Regarding dissociation, ex-POWs with PTSD reported higher dissociation compared to the other two groups.

Association Among WAs, PTG, and Dissociation

To examine the associations between WAs, PTG and dissociation, we conducted Pearson correlation analyses (Table 3). The analyses revealed significant negative correlations between WAs scores (total score and all subscales) and PTG total score. In addition, there were significant negative correlations between benevolence of the world and meaningfulness of the world, on one hand, and

TABLE 2. Means, SDs and Univariate *F* Results of PTG, WAs, and Dissociation for Ex-POWs With PTSD, Ex-POWs Without PTSD, and Controls

	Ex-POWs With PTSD	Ex-POWs Without PTSD	Controls	<i>F</i> (<i>df1</i> , <i>df2</i>)	η_p^2	Group Differences
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			
Posttraumatic growth						
Total score	2.44 (.59)	2.14 (.66)	1.74 (.72)	22.24*** (2, 248)	.15	a,b > c
Relating to others	2.29 (.75)	1.91 (.70)	1.62 (.68)	16.65*** (2, 247)	.12	a > b > c
New possibilities	2.17 (.83)	1.92 (.77)	1.64 (.80)	8.10*** (2, 245)	.06	a > c
Personal strength	2.69 (.75)	2.60 (.96)	1.89 (.93)	21.10*** (2, 248)	.15	a > b > c
Spiritual change	2.04 (.85)	1.74 (.82)	1.57 (.91)	3.59* (2, 236)	.03	a > c
Appreciation of life	3.21 (.78)	2.71 (1.11)	2.03 (.98)	31.08*** (2, 247)	.20	a > b > c
World assumptions						
Total score	115.19 (18.55)	122.20 (13.68)	130.80 (13.66)	20.86*** (2, 248)	.14	a,b < c
Benevolence of the world	28.03 (7.53)	32.38 (5.30)	33.76 (5.88)	15.99*** (2, 248)	.11	a < b,c
Meaningfulness of the world	42.05 (11.29)	48.56 (7.94)	50.64 (8.82)	15.99*** (2, 248)	.11	a < b,c
Self-worth	46.53 (9.70)	51.00 (6.06)	54.47 (7.39)	18.00*** (2, 248)	.13	a < b < c
Dissociation						
Total score	3.33 (1.67)	1.98 (.93)	1.70 (.62)	40.43*** (2, 248)	.25	a > b,c

Note. Income was controlled in the analyses. The Group Differences column compares the mean level of the variable in each group: a: ex-POWs with PTSD; b: ex-POWs without PTSD; c: controls. PTG = Posttraumatic growth; WAs = world assumptions; ex-POWs = former prisoners of war.

p* < .05; *p* < .01; ****p* < .001.

TABLE 3. Intercorrelations Between Main Study Measures

Measure	1	2	3	4	5	6	7	8	9	10	11
1. PTG: Total score	1										
2. PTG: Relating to others	.89***	1									
3. PTG: New possibilities	.86***	.70***	1								
4. PTG: Personal strength	.84***	.65***	.67***	1							
5. PTG: Spiritual change	.63***	.52***	.49***	.38***	1						
6. PTG: Appreciation of life	.81***	.62***	.59***	.68***	.47***	1					
7. WAs: Total score	-.12*	-.11	-.05	-.11	-.12	-.11	1				
8. WAs: Benevolence of the world	-.13*	-.10	-.08	-.07	-.15*	-.15*	.70***	1			
9. WAs: Meaningfulness of the world	-.13*	-.10	-.08	-.07	-.15*	-.15*	.70***	.80***	1		
10. WAs: Self-worth	-.16**	-.17**	-.08	-.14*	-.14*	-.10	.84***	.48***	.48***	1	
11. Dissociation	.33***	.33***	.18**	.32***	.22***	.30***	-.31***	-.33***	-.33***	-.34***	1
M (SD)	2.10 (.72)	1.96 (.77)	1.90 (.82)	2.36 (.94)	1.77 (.88)	2.64 (1.08)	122.30 (17.52)	31.07 (6.94)	46.61 (10.40)	50.35 (9.09)	2.38 (1.40)
Range	3	3	3	3	3	3	96	33	49.50	60	6.82

Note. PTG = posttraumatic growth; WAs = world assumptions.

* $p < .05$; ** $p < .01$; *** $p < .001$.

PTG spiritual change and appreciation of life subscales, on the other hand. Last, there were significant negative correlations between the self-worth subscale and PTG relating to others, personal strength, spiritual change, and appreciation of life subscales. The more negative the WAs, the higher the PTG scores.

The analyses revealed significant negative correlations between dissociation and WAs scores (total score and all subscales): the more negative the WAs scores, the higher the dissociation. The analyses also revealed significant positive correlations between dissociation and all PTG subscales: the higher the dissociation scores, the higher the PTG scores.

Dissociation as a Mediator Between WA and PTG

To assess the mediation effect of dissociation in the association between WAs and PTG, we used a bootstrapping method (Preacher & Hayes, 2008) (Figure 1). As mentioned, we controlled for the three study groups variable (ex-POWs with PTSD, ex-POWs without PTSD, and controls).

Results showed that dissociation mediates the relationship between the WAs and PTG (mediated effect = $-.0202$, $SE = .0132$, 95% $CI = -.0616, -.0023$) (Figure 1). The variance in total PTG score accounted for by the total WAs, while dissociation score regressed was nonsignificant ($\beta = .0719$, $SE = .0638$, $t(254) = 1.1261$, $p = .2612$).

Hence, the relationship between the total WAs and the total PTG was fully mediated by dissociation. Negative WAs predicted increased dissociation, which in turn was related to higher levels of PTG.

DISCUSSION

This study explored the role of dissociation within the relationship between WAs and PTG among ex-POWs and combat veterans. Ex-POWs reported negative WAs and higher PTG and dissociation compared to controls. Ex-POWs with PTSD endorsed negative WAs and a higher magnitude of PTG and dissociation compared to ex-POWs without PTSD and controls. With regard to the association among WAs, PTG, and dissociation, negative WAs was associated with higher PTG and dissociation. Higher dissociation was associated with higher PTG. Moreover, dissociation fully mediated the association between WAs and PTG.

The present findings indicate that ex-POWs, and ex-POWs who suffer from PTSD, demonstrate a higher magnitude of PTG and dissociation and negative WAs. In general, the present findings are consistent with previous research that points toward negative WAs, high dissociation, and high PTG among both survivors of interpersonal trauma (Feder et al., 2008; Lilly, 2011; Maercker, Beauducel, & Schützwohl, 2000) and trauma survivors who suffer from PTSD (e.g., Bremner & Brett, 1997).

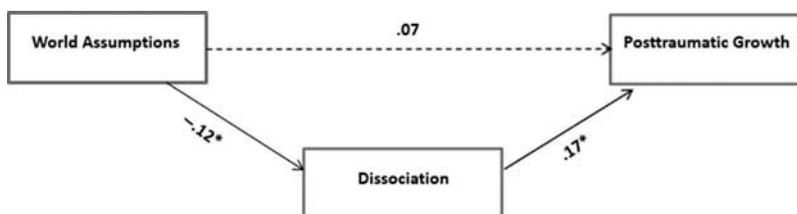


FIGURE 1. Dissociation as mediator in relationship between WA and PTG. All coefficients represent standardized regression coefficients. Solid lines represent significant predictions. Dashed lines represent nonsignificant predictions. The three-study group variable was controlled for in the model. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

One possible explanation of the present findings offers that the individuals' dissociation, as well as cognitive changes of challenged WAs and PTG due to traumatic exposure, increase vulnerability and leads to PTSD (Foa & Rothbaum, 1998; West & Martin, 1994). Research indeed indicates that higher peritraumatic dissociation (e.g., Bremner & Brett, 1997) as well as negative beliefs (e.g., Dunmore, Clark, & Ehlers, 2001) predict PTSD.

However, one can also postulate the opposite effect. Posttraumatic stress symptoms are pervasive and may penetrate the traumatized inner psychological world and trigger negative posttrauma schemas (e.g., Dalgleish & Power, 2004), dissociation, as well as PTG (Tedeschi & Calhoun, 1996).

The cross-sectional nature of the data in the present study does not enable preference of one explanation over the other. Moreover, the empirical support for both implies there may be a bidirectional relationship between PTG, WAs, dissociation, and PTSD. Cognitive shifts and dissociation may increase the survivors' vulnerability and generate posttraumatic stress symptoms. This, in turn, activates top-down processes by which PTSD symptoms deepen the negative schemas as well as PTG, and increase dissociation.

The main contribution and innovation of the present study relates to its investigation of competing theories regarding the nature of PTG and its association with WAs and dissociation—one which assumes PTG reflects positive transformation (Calhoun & Tedeschi, 2006) and is linked with lower dissociation, and the other which suggests PTG reflects illusionary defenses (e.g., Hobfoll et al., 2007; Maercker & Zoellner, 2004; McFarland & Alvaro, 2000). The former also presumes the process of schema reconstruction, so that coexistence of PTG and negative WAs is suggested to reflect an integrative belief system.

The results in this study indicate that PTG is associated with elevated dissociation and that dissociation mediated the

relationship between WAs and PTG: Negative WAs are associated with higher dissociation, which in turn predicted higher PTG. The findings challenge Calhoun and Tedeschi (2006) and support the questioning of PTG made by several researchers (e.g., Hobfoll et al., 2007; Maercker & Zoellner, 2004; McFarland & Alvaro, 2000).

The present results imply that PTG might have an illusory defensive quality, at least in part (e.g., Maercker & Zoellner, 2004; McFarland & Alvaro, 2000). PTG reported by trauma survivors may be connected to elevated usage of the defense mechanism of dissociation to rely on blocking out traumatic material that raises unbearable feelings. According to Maercker and Zoellner (2004), the use of PTG as an avoidance strategy in the face of trauma is maladaptive in the long run. The present findings offer that the consequences of this illusory aspect of PTG might include disintegration and fragmentation of the belief system.

Survivors of interpersonal traumatic events, such as ex-POWs and combat veterans, often experience a harsh collapse of their belief systems (e.g., Janoff-Bulman, 1989). Basic perceptions concerning the world, others, and the self are in many cases brutally demolished and might never be restored (Herman, 1992). Coloring day-to-day experiences, even 35 years after homecoming, these shattered beliefs might raise feelings of anguish and helplessness. Under extreme distress, dissociation enables trauma survivors to find an inner place of safety. However, dissociation not only entails detachment and distancing from the unbearable pain resulting from past trauma but also allows for adopting an alternative narrative. The trauma literature recognizes the role of dissociation in the creation of defensive beliefs, such as denying the traumatic event itself or adopting the point of view of the aggressor (e.g., West & Martin, 1994).

The present findings may offer that PTG represents another kind of alternative narrative stemming from dissociation. If so,

then alongside shattered WAs, trauma survivors develop positive beliefs regarding the trauma, which are manifested in PTG. Although, these positive beliefs are comforting and might help the survivors feel potent and enhance hope, as if the traumatic event was not in vain, they might be maladaptive at the long run. Defensive beliefs represented by PTG might be incongruent with reality and could stay detached and unconnected to other split-off parts of the self which experience loss of faith, desperation, and pessimism. This disintegration could hinder working through the traumatic experience and impede the healing process (Classen et al., 1993).

The possible role of dissociation in the development of PTG might explain the mixed empirical findings concerning the relationship between PTG and well-being (for a review, see Helgeson et al., 2006). One might speculate that if trauma survivors hold on to two separated disintegrated belief systems—one which assumes benefits from trauma and one which reflects the damages and losses the trauma has inflicted—then fluctuations in reporting of well-being and distress will occur as well. At times, the defensive positive system of PTG will dominate and the reports of mental health and well-being will be positive, while at other times the negative belief system will be activated, leading to expression of the survivors' elevated distress. The present findings indicate the need for future studies to take into account the role of dissociation while assessing the implications of PTG.

One should note, however, that the use of the DES-II (Bernstein & Putnam, 1986) in the present study could not discriminate between pathological and nonpathological dissociation (e.g., Waller, Putnam, & Carlson, 1996). While pathological clinical dissociation is characterized by such processes as amnesia, identity alteration, depersonalization, and derealization, nonpathological

dissociation constitutes, for example, absorption (i.e., episodes of total attention to external stimuli to the point that focal attention is increased and peripheral awareness is significantly diminished) (e.g., Waller et al., 1996). Hence, it is possible that negative WAs resulting from exposure to trauma enhance non-pathological dissociative tendencies, which in turn boost the development of PTG. As the relationship between PTG and dissociation has not received attention in both theory and research, one can offer this explanation as general speculation only.

Several limitations may have affected our findings. First, this study was based on self-report measures, which may be subject to response biases and shared method variance. Moreover, the DES-II (Bernstein & Putnam, 1986) and the WAS (e.g., Janoff-Bulman, 1989), which were used in the present study, might suffer from significant shortcomings. As was mentioned, the DES-II cannot discriminate pathological from nonpathological dissociation (Waller et al., 1996). In addition, there is evidence regarding temporal instability of the WAS (Kaler et al., 2008). Last, the present study used cross-sectional data; hence we cannot infer the direction of association between WAs and PTG. Hence, our findings should be interpreted with caution.

The present findings have important implications for the theory and treatment of survivors of trauma. Our results highlight the possible role of dissociation with regard to the relation between WAs and PTG. Ex-POWs and combat veterans who report PTG might hold defensive beliefs resulting from dissociation. Thus, they might hold disintegrated belief systems and suffer from elevated difficulties in working through the trauma. This knowledge may be critical for therapists treating trauma survivors who report high PTG alongside negative WA. However, the potential complexities of PTG needs to be taken into account and more studies should be conducted before any determined conclusions can be drawn.

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