Posttraumatic Growth Amongst Community Volunteers in Indonesia following The Yogyakarta Earthquake in 2006

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2016
BSc in Psychology

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Foreword

Submitted in partial fulfillment of the requirements of the BSc Psychology degree, Reykjavík University, this thesis is presented in the style of an article for submission to a peer-reviewed journal.
Acknowledgement

The present study was accepted by the Board of the Indonesian Red Cross and was carried out on volunteers who participated in helping procedures following an immense earthquake in Indonesia in 2006.

I want to thank my supervisors, Heiðdís B. Valdimarsdóttir and Sigríður B. Thormar, for excellent advises, support and assistance. Additionally, I want to give special thanks to Sigríður B. Thormar for giving me access to her valuable data for being able to carry out this analysis. Moreover, I thank Haukur Freyr Gylfason for statistical assistance and analysis. Furthermore, I thank my parents, Skúli Gunnarsson and Dagný Björnsdóttir, my sister, Unnur Skúladóttir, and my partner, Aron Már Ólafsson for their unconditional support. Finally, I want to thank my best friend Sunna Sasha Larosiliere for her help and editing skills.
Abstract

Volunteering in critical situations can involve great distress, which can result in detrimental outcomes, such as posttraumatic stress disorder (PTSD). Research has also shown that traumatic experience can result in positive outcomes like posttraumatic growth (PTG) which is expressed among other things as more appreciation for life and greater personal strength. The objective of the present research was to examine the relationship between posttraumatic growth and posttraumatic stress amongst 506 volunteers who participated in helping procedures in Yogyakarta, Indonesia in 2006 following a large-scale earthquake. Posttraumatic stress and growth were assessed six months and 12 months after the earthquake. Results showed that participants who reported more posttraumatic growth at the 6 months assessment exhibited more posttraumatic stress symptoms at 12 months. These findings suggest that posttraumatic growth can be a coping mechanism in the form of denial and/or an illusion shortly after a traumatic event.

Keywords: posttraumatic growth, posttraumatic stress disorder, coping, illusion, denial, volunteering, disaster settings
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The Yogyakarta Earthquake in 2006

Natural disasters like hurricanes, tsunamis, and earthquakes can result in traumatic experiences, such as fatalities, loss of personal belongings, and physical and/or psychological harm (Akbar, 2014; Whitfield, 2010). Since the 1990s, such disasters have affected approximately 217 million individuals annually and have three folded in frequency from 2000 to 2009 compared to 1980 to 1989 (Centre for Research on the Epidemiology of Disasters [CRED], 2012). In the wake of disasters, external help is often required (Michel, 2007). Volunteerism is an activity whereby individuals devote their time willingly to be of service to others in need of help or assistance (Wilson, 2000). When working in emergency situations, volunteers often work for countless hours under a great amount of stress and insecure circumstances, often with little support (Inter-Agency Standing Committee [IASC], 2010), this is thought to be one of the most vital protective factors following a trauma (Cadell et al., 2003; Lev-Wiesel & Amir, 2003). Furthermore, witnessing tragedy, hazard, and human affliction can greatly affect one’s emotional wellbeing and increasing evidence suggests that volunteers experience heightened distress in the course of undertaking disaster relief, which can result in post-traumatic stress disorder (PTSD) (IASC, 2010; North et al., 2002; Tak, Driscoll, Bernard, & West, 2007; Thormar, Gersons, Juen, Djakababa, Karlsson, & Olff, 2013).

According to DSM-V (American Psychiatric Association [APA], 2013), PTSD is a trauma- and stressor-related disorder that can result from one or more traumatizing life experiences, such as natural disasters (Galea, Nandi, & Vlahov, 2005; North, Kawasaki, Spitznagel, & Hong, 2004), sexual assault (Ullman, Townsend, Filipas, & Starzynski, 2007), or being diagnosed with a life threatening disease, like cancer (Andrykowski & Cordova, 1998; Cordova, Studts, Hann, Jacobsen, & Andrykowski, 2000), or HIV (Machtinger,
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Wilson, Haberer, & Weiss, 2012). Common symptoms of PTSD include hyper arousal, avoidance of thinking about the event, anxiety, numb emotions, and recurring flashbacks (APA, 2013). Reports of PTSD are considered to be more prevalent amongst younger and less educated people (Breslau, Davis, & Andreski, 1995), as well as single females (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Furthermore, studies illustrate that neuroticism is associated with PTSD symptoms (Bolger & Zuckerman, 1995; Breslau et al., 1995; Brewin, Andrews, & Valentine, 2000; Engelhard et al., 2014; Magnus, Diener, Fujita, & Pavot, 1993; Suls et al., 1998), whereby individuals displaying high levels of neuroticism report PTSD symptoms to a greater extent, with neuroticism being more prevalent among women (Lynn & Martin, 1997).

Recently it has been demonstrated that a traumatic experience does not solely have negative effects, as some individuals may exhibit positive outcome from the experience, such as posttraumatic growth (PTG) (Tedeschi & Calhoun, 1996). PTG is perceived when an individual who has experienced exceedingly stressful conditions or trauma, experiences positive emotions such as escalated personal strength, affirmative inner change, greater gratitude of life, closer personal relationships, and new priorities in life as a result of these experiences (Peterson, Park, Pole, D’Andrea, & Seligman, 2008; Tedeschi, Park, & Calhoun, 1998). Research has revealed that different trauma survivor groups report different rates of positive changes following traumatic events; in one research, 90% of cancer survivors reported positive changes, as opposed to 45% of childhood sexual assault survivors (McMillan, 1999). Furthermore, it has been demonstrated that PTG is more prevalent amongst the young (Curbow, Legro, Baker, Wingard, & Somerfield, 1993; Davis, Nolen-Hoeksema, & Larson, 1998; Widows, Jacobsen, Booth-Jones, & Fields, 2005), less educated (Widows et al., 2005), married (Andrykowski, Brady & Hunt, 1993; Curbow et al., 1993), and those of the female gender (Curbow et al., 1993; Park, Cohen, & Murch, 1996;
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(Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010). Although studies reveal beneficial outcomes of perceived growth (Peterson et al., 2008; Tedeschi et al., 1998), findings have also highlighted negative outcomes from people reporting growth (Butler et al., 2005; Engelhard, Lommen, & Sijbrandij, 2014; Tomich & Helgeson, 2004).

The relationship between PTSD and PTG appears to be complex, and results from studies that examine the relationship have been inconsistent with some indicating a negative relationship (Frazier, Conlon, & Glaser, 2001), while others point to a positive relationship (Engelhard et al., 2014; Park et al., 1996; Taku et al., 2007). According to two meta-analyses (Helgeson, Reynolds, & Tomich, 2006; Shakespeare-Finch & Lurie-Beck, 2014) there was a positive relationship between PTSD and PTG. However, the studies included in these reviews were cross-sectional, deeming it impossible to make causal inferences about the relationship. In addition, it has been suggested that initially there is a positive relationship between these constructs as both are responses to major stressors, and growth could be a coping strategy in the form of illusion and/or denial (Affleck & Tennen, 1996; Davis et al., 1998; Park & Folkman, 1997; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000; Tedeschi & Calhoun, 1995 & 2004; Zoellner & Maercker, 2006). Thus, it has even been argued that one needs to experience PTSD in order for PTG to develop (Tedeschi & Calhoun, 1996).

Increasingly, longitudinal studies have been conducted to examine the long-term relationship between PTG and PTSD (Dekel et al., 2012; Engelhard et al., 2014; Frazier et al., 2001; Kleim & Ehlers, 2009; Salsman, Segerstrom, Brechting, Carlson, & Andrykowski, 2009). For example, Frazier et al. (2001) found a negative relationship between the two constructs. The subjects were 171 female sexual assault survivors who were assessed approximately two weeks following the assault, and again 12 months later. Results demonstrated a significant negative correlation between PTG and PTSD symptoms, whereas higher levels of PTG two weeks following the assault predicted fewer PTSD symptoms 12
months after the assault. In contrast, a recent longitudinal study noted a positive relationship between PTG and PTSD symptoms (Engelhard et al., 2014) amongst soldiers five and 15 months after deployment in Iraq. The results from a cross-lagged panel analysis demonstrated that the greater PTG the soldiers reported five months after deployment, the more PTSD symptoms they reported 15 months after deployment. The results were the same when controlled for stressor severity, posttraumatic stress at five months, as well as potential pre-deployment confounders, such as extraversion, neuroticism, and cognitive ability. Another longitudinal research (Butler et al., 2005) was conducted on a sample of people who had been physically exposed to or had a close friend or relative injured or killed in the terrorist attacks on September 11, 2001. Results revealed that the initial PTG nine weeks after the trauma was associated with greater PTSD symptoms six months after the trauma. The authors suggested that certain types of traumatic experiences are more likely to develop PTG than others.

As highlighted by the aforementioned literature, the relationship between PTG and PTSD symptoms is complex; results are not consistent and further studies are required. Therefore, the primary objective of this study is to examine if PTG at the early stage after a traumatic episode predicted more or less PTSD symptoms at a later stage, while controlling for neuroticism. The sample consisted of 506 volunteers who participated in disaster relief following an immense earthquake that shook the territory of Yogyakarta, Indonesia in 2006. Volunteers were core and non-core participants with various levels of affectedness to the event.
Method

Participants and procedures

At 5:53 a.m. on May 27, 2006, an earthquake measuring 6.3 on the Richter scale shook the territory of Central Java and Yogyakarta, Indonesia. The earthquake affected the lives of hundreds of thousands of people and caused approximately 5,700 deaths, 37,000 injuries, and rendered several hundred thousand people homeless. The bodies of the deceased were neglected and over 200,000 citizens required immediate assistance and an expeditious response from local humanitarian organizations, such as the Indonesian Red Cross – Palang Merah Indonesia (PMI).

During introductory meetings, the PMI volunteers were told what to expect on the field and tasks they would be assigned to, and were given a quick training program. Additionally, all volunteers were supplied with safety equipment and assigned to a team leader; however, on the field they were forced to rely on their discretion and insights. Although the entire operation lasted for two years, the duration in which each volunteer operated in the field varied from a few days to a week (Thormar et al., 2013).

The Board of the Indonesian Red Cross was approached for approval of the study, which was granted. The questionnaire for this study was initially piloted on 30 volunteers that helped with post-tsunami aid relief in 2004 for practicability and cultural propriety. At initiatory meetings the study was introduced to all volunteers who could consent or refuse to participate (Thormar et al., 2013). Sampling was conducted on 506 (57%) of the 877 volunteers who participated in disaster relief subsequent to the earthquake. The participants were community members. While some were trained PMI volunteers, those that were not had nonetheless responded to the great need of help (see Table 1). The data in this study was gathered on two different time points from January 2007 to January 2008, 6 and 12 month post disaster.
Measures

A bilingual Indonesian trauma psychologist translated the instruments that were utilized to the Bahasa Indonesian language; a third person then back-translated it to English prior to administration (Thormar et al., 2013).

Demographic characteristics were evaluated through questions regarded as basic demographic information, such as age, education, and marital status (see Table 1). In addition, enquiries were raised as to whether the participants were core or non-core volunteers.

The Impact of Event Scale-Revised (IES-R) (Weiss & Marmar, 1997) was used to measure PTSD symptoms. This is a 22-item self-report measurement, which assesses symptoms of post-traumatic stress in relation to a specific event according to 14 of the 17 DSM-IV criteria of PTSD symptoms. The scale ranges from 0 to 88, whereby higher scores indicate greater distress. The response format is on a 5-point scale with a 0 to 4 response format with equal intervals (Thormar et al., 2013). The scale is reported to have a high test-retest correlation (Creamer, Bell, & Failla, 2003). In the present study, the Cronbach’s alpha was high on the 6 and 12 month assessment (α = 0.88; α = 0.9), indicating good internal consistency of the scale.

The Post-Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996) was utilized to assess PTG among participants. The inventory includes 21 items on a range from 0 to 105 that are answered on a 6-point Likert scale where 0 = I did not experience this change and 5 = I experienced this change to a very great degree. PTGI is scored on five subscales: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. The PTGI produces a total score of post-traumatic growth, together with scores on the five previously mentioned subscales. The scale has good internal consistency (α = 0.91), as well as an acceptable test-retest reliability, good validity, and scores are normally distributed
(Tedeschi & Calhoun, 1996). In this study, the scale had an excellent level of internal consistency at the 6 and 12 month assessment, as determined by Cronbach’s alpha (α = 0.91; α = 0.93).

The Eysenck Personality Questionnaire-Neuroticism (EPQ-N) (Eysenck & Eysenck, 1991) was utilized to assess neuroticism amongst participants. The questionnaire ranges from 0-22 with a total of 12 items with dichotomous questions. It has excellent psychometric properties (α = 0.90) (Eysenck & Eysenck, 1985), and the neuroticism scale is supposedly more reliable with better psychometric properties compared to the other scales in the questionnaire (Corulla, 1987). The scale in the present study had an acceptable level of internal consistency, as determined by Cronbach’s alpha of 0.63.

Level of personal affectedness. The group of participants was divided into three subgroups based on their level of affectedness. The participants’ level of affectedness was evaluated at 6 months with the question “Do you consider yourself to be (a) an external helper coming from outside the area, (b) an external helper but also personally affected due to family or close friends being affected, or (c) a directly affected helper?”

Statistical analysis

The data were analyzed with SPSS, and AMOS SPSS was used to set up a cross-lagged panel model. First, independent t-tests were used to compare dropouts with non-dropout participants. Second, a mixed ANOVA design was used to evaluate if any demographics predicted PTG or PTSD symptoms. Third, a Pearson’s correlation coefficient was computed to assess the relationship between PTG, PTSD symptoms, and neuroticism. Finally, a cross-lagged panel model was performed in AMOS to examine how the constructs of PTG and PTSD changed and covaried over time with other constructs, while controlling for neuroticism and gender.
The model fit was assessed by using root-mean-square error of approximation (RMSEA), Tucker-Lewis index (TLI), and comparative fit index (CFI). Standard guidelines were used to evaluate the fit with less than .06 illustrating a good fit for RMSEA, and from .90-.95 illustrating good fit for both CFI and TLI (Hu & Bentler, 1999). Significance tests in the current study were two-tailed ($\alpha = .05$).

Results

Sample Characteristics

The demographic characteristics of participants are exhibited in Table 1. In total, 350 males (74.2%) and 121 females (25.8%) participated in the study, wherein 54% were 25 years of age and younger. Marital status demonstrated that 75.5% were single and the majority (55.5%) had completed senior high school. The distribution of core participants (50.8%) or non-core participants (49.2%) was similar. This was the same for the distribution of the level of affectedness; non-affected (30%), indirectly affected (33%), and directly affected (37.2%).

PTG and PTSD

Six months following the trauma, 28.2% participants had a score over 33 on the IES-R, which signifies a strong likelihood of the presence of PTSD (Creamer et al., 2003). Volunteers who dropped out (22.5%) 12 months following the trauma did not have significant difference in outcomes or demographics from those who continued to participate. Therefore, dropout participants were considered as missing at random. To determine if demographic variables needed to be included in the analyses below, we examined the relationship between the demographic variables and PTSD and PTG at both time points. The results from a mixed design ANOVA illustrated that there were no statistically significant differences between demographic groups and PTSD symptoms or PTG.
Table 1.

**Sample characteristics**

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>350</td>
<td>74.2%</td>
</tr>
<tr>
<td>Female</td>
<td>122</td>
<td>25.8%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;25 years old</td>
<td>279</td>
<td>54%</td>
</tr>
<tr>
<td>25-29 years old</td>
<td>73</td>
<td>22.7%</td>
</tr>
<tr>
<td>30-34 years old</td>
<td>49</td>
<td>10.7%</td>
</tr>
<tr>
<td>&lt; 35 years old</td>
<td>58</td>
<td>12.6%</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>362</td>
<td>75.5%</td>
</tr>
<tr>
<td>Married</td>
<td>110</td>
<td>23%</td>
</tr>
<tr>
<td>Divorced</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>Separated</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>Widowed</td>
<td>4</td>
<td>0.8%</td>
</tr>
<tr>
<td><strong>Level of education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>2</td>
<td>0.5%</td>
</tr>
<tr>
<td>Junior high school (&lt; 15 years old)</td>
<td>18</td>
<td>4.4%</td>
</tr>
<tr>
<td>Senior high school (&lt; 18 years old)</td>
<td>227</td>
<td>55.5%</td>
</tr>
<tr>
<td>Post-senior high skill education</td>
<td>52</td>
<td>12.7%</td>
</tr>
<tr>
<td>University education</td>
<td>110</td>
<td>26.9%</td>
</tr>
<tr>
<td><strong>Type of affectedness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not affected</td>
<td>98</td>
<td>30%</td>
</tr>
<tr>
<td>Indirectly affected</td>
<td>110</td>
<td>33%</td>
</tr>
<tr>
<td>Directly affected</td>
<td>123</td>
<td>37.2%</td>
</tr>
<tr>
<td><strong>Type of volunteer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-core</td>
<td>222</td>
<td>49.2%</td>
</tr>
<tr>
<td>Core</td>
<td>229</td>
<td>50.8%</td>
</tr>
</tbody>
</table>

Note: Data was missing on some demographics.
Correlational relationship

A Pearson correlation was computed to determine the relationship between neuroticism, PTG, and symptoms of PTSD. The data did not show any violation of normality, as assessed by Kolmogorov-Smirnov test ($p < .05$), linearity, as interpreted by a scatterplot, or homoscedasticity whatsoever. Table 2 below illustrates the correlation between neuroticism, PTG, and PTSD symptoms at the 6 and 12 month assessments, as well as the mean and standard deviations of the scores.

Table 2.

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. EPQ-N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. PTGI</td>
<td>-.077</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. IES-R</td>
<td>.298**</td>
<td>.119**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. PTGI</td>
<td>-.131*</td>
<td>.487**</td>
<td>.008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. IES-R</td>
<td>.224**</td>
<td>.143**</td>
<td>.494**</td>
<td>.155**</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>31.55</td>
<td>74.01</td>
<td>26.06</td>
<td>71.04</td>
<td>24.09</td>
</tr>
<tr>
<td>SD</td>
<td>5.94</td>
<td>15.42</td>
<td>12.59</td>
<td>16.80</td>
<td>13.31</td>
</tr>
</tbody>
</table>

Note: EPQ-N = neuroticism, PTGI = Posttraumatic Growth Inventory, IES-R = Impact of Event Scale-Revised

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

PTSD symptoms decreased little between the six and 12 month assessment time, and the same applies for the PTG. There was a weak positive significant correlation between PTG and PTSD symptoms at the six month assessment ($r = .119**$, $p = .010$) and the 12 month assessment time ($r = .155**$, $p = .003$). Furthermore, there was a weak positive significant
correlational relationship between PTG at the six month assessment and PTSD symptoms at the 12 month assessment \((r = .143^{**}, p = .010)\). Conversely, there was not a significant correlation between PTSD symptoms on the six month assessment and PTG at the 12 month assessment \((r = .008, p = .879)\).

Additionally, a significant negative correlation between neuroticism and PTG was found on the 12 month assessment time \((r = -.131^*, p = .017)\), whereas participants who displayed more neuroticism were more likely to exhibit less growth. Moreover, results revealed a weak significant positive correlation between neuroticism and PTSD symptoms on both the six month assessment \((r = .298^{**}, p = .00)\) and the 12 month assessment time \((r = .224^{**}, p = .00)\).

**Cross lagged panel model**

Figure 1 depicts a cross-lagged panel model that comprises of the assessment of PTGI and IES-R when controlled for neuroticism and gender. Results revealed that the fit was excellent \(\chi^2 (6, N = 505) = 9,804, p = .133, \text{RMSEA} = .035, \text{CFI} = .985, \text{TLI} = .946\). Paths of stability were significant of both IES-R and PTGI. A greater PTGI score at the six month assessment was significantly correlated with the IES-R score at the 12 month assessment. Furthermore, a greater IES-R score at time point 1 was not correlated with a greater PTGI score at time point 2. According to the model, neuroticism predicted higher IES-R scores at both time points 1 and 2, whereas it did not predict for a greater PTG at time points 1 or 2. Gender was significantly correlated to neuroticism but it was not correlated to other variables in the model. The partial correlation between IES-R and PTGI were significant at time point 1; however, on the contrary, the correlation was insignificant at time point 2. The model was run again solely controlling for neuroticism which resulted in a mediocre fit \(\chi^2 (6, N = 505) = 7,538, p = .023, \text{RMSEA} = .073, \text{CFI} = .977, \text{TLI} = .829\).
Figure 1. Cross-lagged panel model exhibiting posttraumatic growth (Posttraumatic Growth Inventory, PTGI) and posttraumatic stress symptoms (Impact of Events Scale - Revised, IES-R) when controlled for neuroticism and gender. The values displayed are standardized coefficients; solid lines demonstrate a significant relationship ($p < .05$) and dashed lines demonstrate a non-significant relationship.

**Discussion**

The current study was carried out on volunteers following an immense earthquake that shook the territory of Yogyakarta, Indonesia in 2006. It offers to shed light on the
relationship between posttraumatic growth and posttraumatic stress symptoms. The main objective was to examine if PTG in the early posttraumatic stage predicts PTSD symptoms at a later stage. The results indicated that PTG at the early phase predicted more PTSD symptoms later on.

The results from a cross-lagged panel model suggest that volunteers who reported more perceived growth six months following the trauma were significantly more likely to display increased PTSD symptoms 12 months after the trauma – beyond neuroticism. These results are in line with other cross-sectional studies (Helgeson et al., 2006; Shakespeare-Finch & Lurie-Beck, 2014) and longitudinal studies (Butler et al., 2005; Engelhard et al., 2014). But, as research demonstrates, the relationship is supposedly stronger between PTG and PTSD symptoms in samples that have experienced natural disasters and war as opposed to sexual assault (Shakespeare-Finch & Lurie-Beck, 2014).

The above results suggest that PTG could be a coping strategy in the form of denial or illusion shortly following a traumatic event. This supports various research and theories (Affleck & Tennen, 1996; Davis et al., 1998; Maercker & Zoellner, 2004; Park & Folkman, 1997; Taylor et al., 2000; Tedeschi & Calhoun, 1995, 2004). For example, The Janus face model of self-perceived posttraumatic growth (Maercker & Zoellner, 2004) regards PTG as consisting of two different parts; one positive and the other illusory. The “openness to new experiences” represents the positive side of PTG, and the “optimism” represents the illusory aspect. This therefore explains why shortly following a traumatic incident people tend to use the coping mechanism of illusions or denial, but at a later stage the PTSD symptoms become too invasive and overcome the perceived growth. Butler et al. (2005) suggested that denial and avoidance could enable psychological rest that is essential for positive reinterpretations to grow and find benefit following a trauma. An alternative explanation of more perceived growth early after experiencing trauma could be that survivors have often heard of others
benefiting from negative life experiences and might feel pressure to express the same outcome. Whether interpreting the results from the current study as PTG associated with negative outcomes or as due to a coping mechanism to help trauma survivors after a traumatizing event, it should be noted that growth and stress often coincide. No matter the reason, it should be kept in mind that although people may express high levels of growth in the early phase of a trauma, they may be masking high levels of PTSD symptoms that might not emerge until months later. Our focus should not be limited to whether growth is either good or bad, but rather one should consider it as an interaction of both good and bad consequences and try to limit the negative outcomes.

The findings from this study also reveal that individuals who report more stress symptoms experience neuroticism to a greater extent. Those results are consistent with other research (Engelhard et al., 2014) and add to the literature that confirms that individuals with high levels of neuroticism display emotional reactivity to a greater extent following a traumatic experience (Bolger & Zuckerman, 1995; Suls et al., 1998), and are more often exposed to negative occurrences (Bolger & Zuckerman, 1995; Magnus et al., 1993).

Moreover, the findings indicated no significant difference in age, gender, education, marital status, or level of affectedness in relation to growth. This was unexpected, as the literature demonstrates that PTG is more prevalent amongst the young (Curbow et al., 1993; Davis et al., 1998; Widows et al., 2005), less educated (Widows et al., 2005), married (Andrykowski et al., 1993; Curbow et al., 1993) and those of the female gender (Curbow et al., 1993; Park et al., 1996; Vishnevsky et al., 2010). Similarly, there was no significant difference in the demographics in relation to PTSD symptoms, which is again inconsistent with findings confirming that it is more prevalent amongst younger and less educated people (Breslau et al., 1995), as well as single females (Kessler et al., 1995). As a matter of interest, results revealed that the level of affectedness did not have an impact on perceived growth.
Thormar et al. (2013) received similar results from the same sample regarding the level of affectedness associated with PTSD symptoms, which indicates that volunteering in disaster settings is possibly an independent contributor to PTSD symptoms, as well to PTG.

The current study is not short of limitations. First, 371 volunteers declined participation or were not sought out by the PMI to begin with, and therefore it is not possible to know if they deviated from those who participated in the study. Those who did not participate could have had more symptoms of post-traumatic stress disorder that would have impacted the results and generalizability of the study. Thus, the volunteers who participated could have been in a more privileged position compared to those who did not, or vice versa. Second, the majority of participants were male and under 25 years of age. As the literature reports, PTG is more prevalent among younger individuals (Curbow et al., 1993) and women (Curbow et al., 1993; Park et al., 1996). Therefore, the generalizability of the results is to a lesser extent. Finally, when using self-reports, problems regarding bias, such as social desirability of answers, honesty, understanding the questions, and introspective ability may arise (Field, 2013). These shortcomings must be considered when interpreting the results of this study.

Despite limitations, the present study also has its strengths. First, the volunteers’ sample was comparatively large, consisting of 506 respondents. Second, the study design was longitudinal which is more advantageous than cross-sectional studies which have mostly been carried out concerning the relationship between PTG and PTSD symptoms (Helgeson et al., 2006; Shakespeare-Finch & Lurie-Beck, 2014). Third, the development of the questionnaires was rigorous (Thormar et al., 2013) with a high response rate. Although there were some dropouts, results indicated that they did not differ from non-dropouts. Fourth, the scales used had high to excellent internal consistency except the EPQ-N. Finally, this is the first
longitudinal study, to this day, to examine post-traumatic growth amongst community volunteers in a disaster work.

To conclude, whereas natural disasters are increasing in frequency (CRED, 2012) and researchers have found a connection between trauma and negative outcomes, especially PTSD (Andrykowski & Cordova, 1998; Cordova et al., 2000; Galea et al., 2005; Machtinger et al., 2012; North et al., 2004; Ullman et al., 2007), it can be helpful for some trauma survivors to apply coping mechanisms, although growth may mask high levels of PTSD at the early phase. Whether more growth at an early stage causes increased PTSD symptoms at a later stage, or if growth is a coping mechanism for safeguarding shortly after a trauma is not known and requires further research. As Butler et al. (2005) explain following their research, these results call attention to the inevitable involvement of cognitive and coping mechanisms to psychological growth in the short and long term after experiencing a traumatizing event. The clinical and practical significance of this outcome is that it might be useful for researchers and clinicians to bear in mind that although trauma survivors may appear to cope very well at the beginning, this does not necessarily mean that they will continue in the same fashion.

Future research should focus on prospective longitudinal studies. It would be interesting to study why some individuals are more prone to this coping mechanism at an early phase than others, and how intrusive PTSD symptoms must be to overcome growth. As well, further research is required to ascertain what trauma groups are more prone to this positive association between PTG and PTSD. Moreover, studying the difference in reports on perceived growth across dissimilar cultures and attitudes towards life may yield valuable answers to the relationship between PTG and PTSD. Hopefully, the results will contribute to the research field in traumatology, with emphasis on benefit finding and growth, as well as the impact of volunteer work in disastrous settings.
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