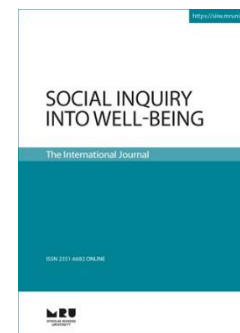




<http://siw.mruni.eu>
2016, Vol. 2, No. 2

DOI:10.13165/SIiw-16-2-2-03

Social Inquiry into Well-Being



E-ISSN 2351-6682

A Study of Subjective Well-Being, Resilience, and Risk of PTSD among Israeli Adolescents Exposed to Terrorism

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Abstract

While many studies have analyzed the role of subjective well-being components in building psychological resilience in times of stress, there is also evidence that certain aspects of well-being may be tied to increased risk of psychological distress in the aftermath of a traumatic event. Based on a sample of 368 Israeli adolescents surveyed before and after a bout of missile attacks on their city, this study investigates (a) the relationship between subjective well-being components (hope, life satisfaction, and positive and negative affect) and PTSD, thereby assessing their role as protective or risk factors, and (b) changes in the latter well-being measures from before to after the attacks, thereby assessing individuals' ability to "bounce back" to prior levels of well-being. Using structural educational modeling, our study revealed that life satisfaction was the only subjective well-being factor before the attacks to serve as a protective factor against PTSD symptoms. Negative affect and hope before the attacks served as direct risk factors, while positive affect served as an indirect risk factor. There was a significant increase in hope from before to after the missile attacks, with no change in other well-being measures. Implications of these findings are discussed.

Keywords: posttraumatic stress, subjective well-being, hope, life satisfaction

Acknowledgement

This work was supported by the Center for Learning Skills at Israel Sci-Tech School Network, and by the Research Unit of the School of Business Administration at the College of Management Academic Studies, Rishon Le'zion, Israel. At the time of writing this paper, the first author was a postdoctoral fellow at the Crown Family Center for Jewish & Israel Studies, Northwestern University

The question how individuals can build resilience to overcome negative life events has been a central focus of a growing body of literature over the past two decades. While many definitions of resilience have been proposed, most are based on the concepts of positive adaptation to adversity (Fletcher & Sarkar, 2013; Leipold & Greve, 2009; Masten, 2001) and on individuals' ability to "bounce back" to their

prior functioning and well-being after the traumatic event (Smith, Tooley, Christopher, & Kay, 2010). Researchers working within a positive psychology framework have emphasized the need to focus on positive psychological traits both as a means to a happier life and as a way to build resilience during stressful times (Deiner, Suh, Lucas, & Smith, 1999; Seligman & Csikszentmihalyi, 2000). Yet,

studies in the context of continued threat of terrorism specifically have shown that positive emotional and cognitive states may also be linked to an increased risk of posttraumatic stress disorder (PTSD) (Hall, et al., 2010; Zoellner & Maercker, 2006; Israel-Cohen, Kashy-Rosenbaum, & Kaplan, 2014). Hence, there is a need for further inquiry into when positive psychological factors can be protective factors building resilience in the face of exposure to terrorism and when they can be tied to increased risk.

Based on a field study of Israeli adolescents surveyed before and after a bout of missile attacks on their city, this study investigates the following questions: (a) what is the relationship between SWB and PTSD in this context, i.e., to what extent do SWB components serve as protective or risk factors? (b) Do Israeli adolescents “bounce back” to their prior level of SWB shortly after exposure to terrorism? Both questions contribute to a more nuanced understanding into the relationship between SWB and resilience, a central focus of the positive psychology literature (Seligman & Csikszentmihalyi, 2000).

The Subjective Well-Being Construct

At the core of conceptions surrounding SWB are cognitive and emotional appraisals of one’s life (Oishi, Diener, Lucas, & Suh, 1999). The measures life satisfaction, positive affect and negative affect are widely recognized as central components of SWB, with life satisfaction representing the cognitive appraisal component, and positive and negative affect representing the emotional components (e.g., Diener, Oishi, & Lucas, 2003; Lyubomirsky, King, & Diener, 2005). In addition to one’s perceived positive life orientation towards the present and past, SWB has been tied to hope, which is defined as the feeling of competence with regards to one’s future goal attainment (Park, Peterson, & Seligman, 2004; Ryan & Deci, 2001). In the following, we focus on first the cognitive and then emotional components of SWB and their relationship to traumatic stress in the literature.

Cognitive Appraisal Components of SWB & Traumatic Stress

The cognitive appraisal components of SWB examined in this study are hope and life satisfaction. Hope refers to the agency (goal-directed energy) and pathways (planning to meet goals) that drive future goal expectations (Snyder, et al., 1991; Snyder, 2002). Hope theorists suggest that reestablishing hope may work to protect against feelings of vulnerability and uncontrollability (Snyder, 1999) as well as helping restore meaning to individuals’ lives after a traumatic event (Allen, 2008; Yohani & Larson, 2012). Moreover, when a traumatic event is perceived as uncontrollable and unpredictable, hopeful individuals can make interpretations that help reestablish perceived controllability and predictability, thereby buffering against traumatic stress (Michael, 2000). For these reason, hope has become a focus in the coping literature (Kasler, Dahan, & Elias, 2008) and restoring hope, a central form of

psychotherapy following a traumatic event (e.g., Allen, 2008; Gilman, Schumm, & Chard, 2012).

In the trauma literature, hope has also been linked to posttraumatic growth (PTG), characterized in large part by benefit finding and a positive future outlook stemming from the traumatic experience (Helgeson, Reynolds, & Tomich, 2006; Tedeschi & Calhoun, 1995). PTG is generally viewed as a positive reaction to trauma (Helgeson, et al., 2006). Yet, more recent literature has tied cognitions associated with PTG to increased risk of traumatic stress. For example, Hall and colleagues (2010) found that PTG was tied to higher levels of PTSD among a population-wide sample of Israelis exposed to terrorism. They suggest that when a crisis is chronic and the threat is ongoing, such as in the case of repeated exposure to terrorism, the feeling of PTG may “represent a failed attempt to make sense of a traumatic event that makes no sense” (Hall, et al., 2010; 184). Similarly, a study of Israeli adolescents and adults who experienced terrorism and war showed that those with greater PTG had greater PTSD scores (Levine, Laufer, Stein, Hamama-Raz, & Solomon, 2009). Research based on the 2011 Oslo bombings found that PTG experienced 10 months after the bombing was associated with higher levels of PTSD experienced 22 months after the bombing (Blix, Birkeland, Hansen, & Heir, 2016).

The complex relationship between cognitive processes associated with PTG and PTSD has been given wide attention in the Janus-face model of self-perceived posttraumatic growth (Maercker & Zoellner, 2004). In this model, cognitions such as positive future orientation can at least in part be distorted positive illusions. Such deceptive forms of cognition are not constructive and can ultimately be a form of avoidance which may increase the risk of PTSD (Maercker & Zoellner, 2004). In light of this, it is a question whether individuals with higher hope are in fact more resilient or at greater risk in the face of exposure to terrorism.

The second cognitive component of SWB analyzed in this study is life satisfaction. While hope focuses on how one thinks about future goals, life satisfaction focuses on how one appraises his or her life from the past to the present. Life satisfaction has been negatively associated with depression and anxiety (Huebner, 1991a; Proctor, Linley, & Maltby, 2009). Studies on the relationship between life satisfaction and PTSD have shown a negative correlation between the two. For example, in a study which focused, much like the present one, on Israeli youth under fire from missile attacks, life satisfaction was suggested to buffer against PTSD symptoms (Israel-Cohen, Uzefovsky, Kashy-Rosenbaum, & Kaplan, 2015). The authors suggested that life satisfaction could detract from the perception that life is unfair or that one was dealt a bad hand, thereby buffering against feelings of helplessness. In a separate study of the Israeli civilian population under missile attack, those who had greater exposure to traumatic stress experienced both more PTSD and less life satisfaction (Besser & Neria, 2009). While there has not been a great deal of theorizing on the role of life satisfaction as a buffer against traumatic stress, in general, the tendency to appraise life in a positive manner has been tied to effective coping (Lazarus, 1991). To our knowledge, there have been no studies tying life satisfaction with increased risk of traumatic stress.

Emotional Appraisal Components of SWB & Traumatic Stress

The emotional components of SWB are frequently measured by a two dimension positive and negative affect scale (Watson, Clark, & Carey, 1988). Negative affect is a clear risk factor tied to psychopathology and heightened levels of anxiety and stress (Joiner, Catanzaro, & Laurent, 1996; Kring, 2008; Watson, et al., 1988). Over the past couple decades, there has been increasing attention on the relationship between positive emotions and traumatic stress. Some have suggested that positive emotions are critical in the coping process after a traumatic event (Folkman, 1997; 2008). One explanation is that positive emotions “broaden and build” people’s thought action tendencies thereby undoing the effects of negative emotions (Fredrickson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000). Yet, Gruber, Mauss, & Tamir (2011) argued that the expression of positive emotions when the environment is threatening may be a maladaptive response. In this vein, research on Israeli adolescents exposed to terrorism has shown that being in an excessively positive emotional state is tied to a higher risk of PTSD (Israel-Cohen, Kashy-Rosenbaum, & Kaplan, 2014). The authors suggest that given the significance of emotion regulation in PTSD (e.g., Ehring & Quack, 2010; Tull, Barrett, McMillan, & Roemer, 2007) and more generally in resilience (Bonanno, 2004), having too high positive emotions during and immediately after such experiences may be a sign of poor emotion regulation and thus increase susceptibility to PTSD symptoms.

Indeed, a growing number of researchers have cautioned that positive psychological factors are not necessarily protective factors at all times and under all conditions (e.g., Grant & Schwartz, 2011; Gruber, et al., 2011; Shahar, et al., 2012). Overall, the above review underscores the need to consider both the risk and protective aspects of SWB when questioning how positive mental states are tied to resilience.

An additional component worth considering when looking at the relationship between SWB and resilience is the extent to which individuals are able return to their prior level of SWB before the traumatic event. As noted, the ability to “bounce back” to prior levels of functioning and well-being is a defining aspect of resilience in the literature (Smith et al., 2010). The following section of the literary review addresses this question.

Changes in SWB as a result of extraordinary life events

Even before the notion of psychological resilience became popular, it was well-known that that good and bad life events tend to temporarily affect SWB and that, by and large, people habituate to their situation and tend to return to their ‘happiness’ set point (see Frederick & Loewenstein, 1999 for a review; see Diener, Lucas, & Scollon, 2006 for some reservations). This concept, known as the hedonic treadmill model (Brickman & Campbell, 1971), was popularized with a study showing that lottery winners did not report being happier than non-winners and that accident victims did not report being less happy with their lives than

those who were not paralyzed in an accident. Moreover, all groups expressed similar optimistic hopes about the future (Brickman, Coates, & Janoff-Bulman, 1978). While the latter study suggests that people return to their happiness set point within a year of an extraordinary life event, another study suggests that good and bad life events affect SWB particularly if they occurred in the past two months (Suh, Diener, & Fujita, 1996). Studies that focus on resilience in the aftermath of a negative life event specifically have also suggested that most people are in fact able to return not only to normal functioning but also to their prior well-being levels (Bonanno, 2005). Indeed, the type of traumatic life event experienced is tied to the rebound time. The present study thus offers an interesting empirical case study investigating rebound time in the context of an adolescent sample exposed to terrorism.

Research Background and Aims

Since 2001, the South of Israel has been the target of repeated rocket and missile attacks from the Gaza strip. Over the years, the population has suffered injuries and casualties. Each time the city is under immediate threat (i.e., rockets have been launched to the area), school is canceled and the population is advised to remain in close vicinity to bomb shelters. Many residents have built-in shelters in their homes and apartment buildings. There are also public bomb shelters in each neighborhood. Inhabitants have between 30 to 60 seconds to reach a bomb shelter from the time a siren is set off to alert the population of the potential threat.

Research on the psychological development of adolescents in this context, like in other parts of the world affected by war, has shown the detrimental effects of exposure to war and terrorism on youth development (Tol, Song, & Jordans, 2013; Dimitry, 2012). In the Israeli context specifically, for example, adolescents living in areas under continuous missile threat not only have higher levels of traumatic stress (Pat-Horenczyk, 2005; Laufer & Solomon, 2006) but also higher levels of risk-taking behavior (Schiff, Zweig, Benbenishty, & Hasin, 2007; Pat-Horenczyk, et al., 2007) and of depression (Gelkopf & Berger, 2009).

Within this complex context, the present study contributes to the literature on well-being and resilience in the face of terrorism, with implications for both the local and global contexts. Specifically, we investigate (a) the relationships between the SWB components before the missile attacks, their added significance after the attacks, and their combined effects on PTSD symptoms, and (b) changes in SWB from before to after the missile attacks. Such research is particularly significant in light of the contrasting findings regarding the role of central SWB components as protective or risk factors against PTSD in the context of exposure to terrorism. Furthermore, more generally, prospective and longitudinal studies of risk and protective factors associated with PTSD based on the experience of real life trauma are greatly needed (Neria, Nandi, & Galea, 2008). Such studies provide valuable insights that cannot be extracted from laboratory studies or from correlational studies after the traumatic event.

Method

Participants and Procedures

This study is based on a sample of ($N = 368$) Israeli adolescents (7th-11th grade, 55% female) from the south of Israel who completed questionnaires before and after exposure to missile attacks. During the bout of missile attacks, the students remained home from school for a period of 5 days and spent extended periods in bomb shelters. Questionnaires were distributed 3-5 weeks prior to the attacks at Time 1 (T1) measuring hope, life satisfaction, positive affect and negative affect. Questionnaires were distributed to the students again 3 months following the attacks at Time 2 (T2). The battery of questionnaires distributed at T2 included repeated measures of all SWB components at T1 and an additional questionnaire measuring PTSD symptoms.

As noted, missile attacks had occurred in the city over a number of years prior to this study, yet the present study took place after an extended period of quiet to the region (approximately 8 months). From the period of the attacks to the distribution of the questionnaires during T2, there were no additional attacks on the immediate region in which the subjects lived.

This study was approved by the school board, school principals and an ethics committee at the College of Management Academic Studies. Parents were informed of the study and given the opportunity to request that their child not participate in the survey. The questionnaires were distributed during class time by the first author and a team of research assistants. Students were informed that they were not required to participate in the survey and that there would be no penalty for non-participation. The students were also informed that they could stop completing the questionnaire at any time. Student questionnaires from T1 and T2 were matched using a student code provided to them.

Measures

Hope. The 6-item Children's Hope Scale (Snyder, et al., 1997) was used to measure hope. Each item was ranked on a 6-point Likert-type scale from 1 (never) to 6 (all the time). For example, "I can think of many ways to get the things in life that are most important to me"; "When I have a problem, I can come up with lots of ways to solve it." In samples of children and adolescents, the internal reliability Cronbach's alpha for the hope scale ranged from .72 to .86 (Snyder, et al., 1997). In our study, Cronbach's alpha was .82 for T1 and .81 for T2. Hope scale scores ranged from 1 to 6, with higher scores indicating higher hope. Although the distribution of hope responses had a slight negative skew (-0.50, -0.84, T1, T2, respectively) and were slightly platykurtic (-0.15, T1) and lobkurtic (1.18, T2), most of these values were within acceptable limits (i.e., between -1.0 and +1.0) demonstrating acceptable levels of skewness and kurtosis for normal distribution (Miles & Shevlin, 2004).

Life Satisfaction. Participants completed the 5-item Students' Life Satisfaction Scale (SLSS; Huebner, 1991b), ranking their global life satisfaction on a 6-point Likert-type

scale from 1 (do not agree at all) to 6 (strongly agree). For example, "my life is going well"; "I would like to change many things in my life". The SLSS was designed for students in grades 3-12 and has been validated in numerous studies with diverse adolescent populations (Huebner, Suldo, & Valois, 2005). Coefficient alphas have consistently been reported across all age groups for this scale in the .70 to .80 range (Huebner et al., 2005). In this study, internal reliability Cronbach's alpha was .82 for T1 and .80 for T2. SLSS scores ranged from 1 to 6, with higher scores indicating higher life satisfaction. In this study, the distribution of SLSS was skewed to the left: Skewness = -1.16, kurtosis = 1.78 (T1); skewness = -1.21, kurtosis = 1.87 (T2). Despite the skewed SLSS distribution, only univariate skewness of 2.0 and higher and kurtosis of 7.0 and higher is considered moderate to high nonnormality and has been found to create problems in analyses (Curran, West, & Finch, 1996). The SLSS distribution in the present study had values below these levels.

Positive and Negative Affect. Participants completed the widely used 20-item Positive Affect and Negative Affect Schedule (PANAS; Watson et al., 1988). Positive Affect (PA) and Negative Affect (NA) were measured separately by 10 items for each scale. The participants were asked to rank the extent to which they felt each emotion over the past month on a 5-point Likert-type scale ranging from 1 (not at all) to 5 (extremely). Proctor, Linley, and Maltby (2010) reported internal consistency reliabilities ranging from .86 to .90 for positive affect (PA) and from .84 to .87 for negative affect (NA), in a sample of 410 adolescents. In our study, internal reliability Cronbach's alpha for the PA scale were .80 and .84 (T1 and T2, respectively) and for NA scales, .81 and .85 (T1 and T2, respectively). PANAS scales scores ranged from 1 to 5, with higher scores indicating more positive affect and more negative affect. Correlations between PA and NA were $r = .01$, $p = .849$ (T1) and $r = .16$, $p = .002$ (T2). The distribution of PA scores was not skewed: Skewness = -0.06, kurtosis = -0.06 (T1); skewness = -0.40; kurtosis = 0.24 (T2). The distribution of NA scores was skewed slightly to the right: Skewness = 0.70, kurtosis = 0.38 (T1); skewness = 0.75, kurtosis = 0.13 (T2). Although the distribution of NA had a slight negative skew and was slightly platykurtic, these values are within acceptable limits (i.e., between -1.0 and +1.0) demonstrating acceptable levels of skewness and kurtosis (Miles & Shevlin, 2004) and, therefore, a normal distribution of scores on the NA scale.

PTSD Symptoms. The self-report version of the PTSD Symptoms Scale (PSS-SR, Foa, Riggs, Dancu, & Rothbaum, 1993) was used to measure PTSD symptoms during T2. The scale contains 17-items that diagnose PTSD and assess the severity of the PTSD symptoms. Each item is ranked on a 4-point Likert-type scale from 0 (never) to 3 (almost always). The scale has been shown to have good internal consistency and is considered a conservative measure of PTSD in comparison to the interview version of the PSS (Foa, et al., 1993). In this study, we used a measure of PTSD symptoms based on the severity and number of PTSD symptoms, resulting in a score ranging from 0-51, higher scores indicated stronger levels of PTSD. The distribution of PTSD symptom scores was skewed to the right (skewness = 1.11; kurtosis = 0.79; $M = 9.95$; $SD = 9.72$; $Mdn = 7$).

Furthermore, only univariate skewness of 2.0 and higher and kurtosis of 7.0 and higher are considered moderate to high nonnormality and have been found to create problems in analyses (Curran, et al., 1996). The PTSD distribution in the present study had values below these levels.

Data Analysis

For variables missing less than 5% of cases, a missing data procedure was conducted using multiple imputation (5000 imputed datasets) on the AMOS 22 software. In this procedure, multi-item measures were imputed by the remaining items and by a model in which the missing values were predicted by other multi-item measures (full details can be found in Gross-Manos, Shimoni, & Ben-Arieh, 2015).

To investigate the contribution of each SWB component before the attacks and the added significance of their presence after the attack in predicting PTSD symptoms, we used AMOS 22 Structural Equation Modeling (SEM). This procedure allowed us to examine the direct and indirect relationships between SWB at T1 and T2 as predictors of PTSD symptoms and to assess the overall model fit. Because of the exploratory nature of the study, we examined an unconstrained model and used the maximum likelihood method (ML) estimates for measuring coefficients and measurement error. Assessing the fit of our theoretical model with the data, we followed procedures recommended by Kline (1998) by examining several goodness-of-fit indices: The SEM goodness-of-fit index (GFI), the Comparative Fit Index (CFI), the Standardized Root Mean Square Error of Approximation (RMSEA) and the chi-squared ratio divided by degrees of freedom of the model. A model is judged to fit a dataset well if the CFI and GFI are greater than .95, the RMSEA is less than .05 (Bollen & Curran, 2006), and the chi-squared ratio/df is < 3.0 and not significant.

To investigate changes in SWB following exposure to trauma, we conducted a two-way repeated measure ANOVA analysis in a factorial structure of 2 x 4 (Time [T1, T2] x SWB measures [hope, life satisfaction, PA, NA]), followed by four t-test pair tests for continued analysis. These procedures allowed us to estimate significant changes in SWB from T1 to T2 as a theoretical structure and to measure the significant changes in each of the SWB components separately.

Results

Table 1 displays the means and standard deviations for all T1 and T2 variables for the Israeli adolescent sample in this study. As can be seen, the participants experienced moderate-high levels of life satisfaction, hope, and positive affect and low levels of negative affect.

Relationship between SWB (T1, T2) and PTSD symptoms

Before investigating the relationships between SWB and PTSD using SEM, we conducted preliminary testing for multi-collinearity. Intercorrelations between the independent variables confirmed that our measures were

distinct from one another. Correlation strengths ranged from .01 to .57 at T1 and from .16 to .57 at T2.

All suggested indexes of SEM showed a good fit for the data in the proposed model ($\chi^2 = 18.31$, $df = 15$, $\chi^2/df = 1.22$, $p = .247$, $NFI = .985$, $GFI = .989$, $RMR = .025$). Figure 1 shows the standardized path coefficients estimated by SEM illustrating the associations between SWB measures (T1, T2) and PTSD symptoms. Our findings revealed that at T1, only life satisfaction buffered against PTSD symptoms. Hope (T1) was positively correlated with PTSD symptoms, suggesting that the higher one's sense of hope before the missile attacks, the higher the likelihood of experiencing PTSD symptoms. Neither positive nor negative affect at T1 had a direct effect on PTSD symptoms. Three months following the missile attacks (T2), only negative affect was directly associated with higher PTSD symptoms.

Interestingly, while positive and negative affect were not associated during T1, positive affect at both T1 and T2 was positively correlated with negative affect at T2. This suggests that higher positive affect may in fact serve as a risk factor for PTSD symptoms, in spite of its positive relationships with SWB components and its lack of relationship with negative affect during T1. Reference to the intercorrelations between each component of SWB from T1 to T2 in Figure 1 will be made in the following section on changes in SWB from T1 to T2.

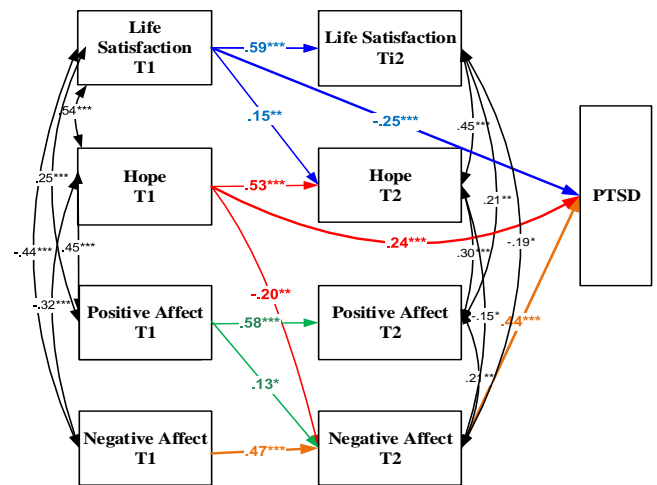


Figure 1. Path-Analytic Framework Between SWB T1 and T2 to PTSD Symptoms (N = 368).

Changes in SWB from T1 to T2

Repeated measures results showed no significant change in the SWB structure from T1 to T2, Wilk's $\lambda = .13$, $F(3, 365) = 1.00$, $p = .317$, $\eta^2 = .00$, but a significant interaction between Time X SWB measures, Wilk's $\lambda = .96$, $F(3, 365) = 4.94$, $p = .002$, $\eta^2 = .04$. In order to examine the source of the variance in the interaction, we conducted t-test pair's analysis between T1 and T2 SWB measures separately. Table 1 shows the means and standard deviations for all variables of SWB and t-test pairs results. The only significant change in SWB measures from T1 to T2 was in hope, for which there was a significant increase. Life

satisfaction, positive affect, and negative affect were not significantly different at T1 and T2.

Furthermore, as can be seen in Figure 1, there were moderate to relatively high strength correlations between

each component of SWB from before to after the missile attack, meaning that Israeli adolescents tend not to change their relative position in SWB following exposure to the missile attacks.

Table 1

Means and Standard Deviations for all Variables of SWB, t-test pairs Between T1 & T2 SWB Measures (N = 368)

<i>SWB measures</i>		<i>M</i>	<i>SD</i>	<i>Md</i>	<i>SD(Md)</i>	<i>t</i>
Life satisfaction	T1	4.91	0.80			
	T2	4.93	0.85	0.02	0.74	0.50
Hope	T1	4.56	0.83			
	T2	4.69	0.86	0.13	0.73	3.46***
Positive affect	T1	3.23	0.71			
	T2	3.21	0.83	-0.02	0.70	0.43
Negative affect	T1	2.12	0.68			
	T2	2.08	0.80	-0.04	0.73	1.27

T1: before missile attacks; T2 - after missile attacks; *Md* = Mean Difference.

*** $p < .001$

Discussion

This study offers insights into the relationship between SWB and resilience based on a sample of Israeli adolescents surveyed before and after a bout of missile attacks on their city. Our first research aim was to examine the relationship between SWB components and PTSD symptoms. This was particularly relevant to consider given the findings in the literature pointing to both risk and resilient aspects of SWB as they relate to traumatic stress. Of the four SWB components analyzed, hope received the most attention in the literature both as a resilient factor in the face of trauma (e.g., Snyder, 2004; Yohani & Larson, 2012) and as a cognition associated with increased risk of PTSD (e.g., Hall et al., 2010; Blix et al., 2016; Maercker & Zollner, 2004). Our findings showed that hope before the missile attacks was associated with higher PTSD, thus adding support for the potential risks that come with positive future thinking in the context of exposure to terrorism. It has been argued that a positive future orientation may at times be a signal of distorted positive illusions and therefore a risk factor in the face of trauma (Maercker & Zoellner, 2004). The negative effects of positive future thinking in the context of terrorism have also been attributed to a failed attempt to make sense of a traumatic event that “makes no sense” (Hall et al., 2010; 184). In our findings, individuals who had high hope before the attacks were at greater risk, regardless of their level of hope after the attacks. Thus, it may not necessarily be the case that feeling a state of hopefulness after the traumatic event lends itself to increased risk of traumatic stress, but rather that hopeful individuals are at greater risk. We suggest that this may have to do with the theoretical link between hope, as a trait, and sense of personal control (Brackney, & Westman, 1992). That is, in a context which is completely unpredictable and outside the realm of personal control (such as terrorism or natural disasters), high hope individuals in particular may struggle with the dissonance between the aspect of control over their future goals and the uncontrollable outside predicament, thereby leaving them more psychologically vulnerable after an attack than those with lower hope.

While positive cognition about the future was found to be a risk factor for PTSD in this study, life satisfaction (i.e., positive cognition regarding one’s past to the present) before the attacks buffered against PTSD. As with hope, life satisfaction after the attacks did not enhance the prediction of PTSD symptoms. The finding that people with higher life satisfaction were more resilient is consistent with previous research (Israel-Cohen, et al., 2015; Besser & Neria, 2009). We suggest that positive cognition about the past may serve as a source of resilience because it does not entail the element of unpredictability that the cognition regarding the future does. In this respect, put in simple terms, the feeling that you have had a good life so far may provide a sense of security which can be relied on when times get tough. Further research should consider the ways in which life satisfaction and hope, as central cognitions of SWB, are associated with resilience and risk in different ways.

Of the emotional components of SWB, negative affect after the missile attacks predicted PTSD symptoms, as can be expected from the literature (Joiner, et al., 1996; Kring, 2008; Watson, et al., 1988). Positive affect was not directly associated with PTSD. Yet, based on the SEM model, it did have an indirect effect through its positive association with negative affect. This finding stands in contrast to Fredrickson’s theory that positive emotions provide increased resilience in the face of trauma by “undoing” the effects of negative affect (Fredrickson, et al., 2000). Not enough attention has been given to the potential risks of positive affect under threatening environments. Gruber and colleagues (2011) suggest that positive emotions are beneficial when the environment is safe, but not necessarily when it is threatening. In support of this, one study has shown that adolescents with high positive affect shortly after exposure to missile attacks were at greater risk of developing PTSD (Israel-Cohen, et al., 2014). The authors suggest that driving the relationship between positive affect and PTSD was the arousal component, one of the clusters used to diagnose PTSD according to the DSM-5 (American Psychiatric Association, 2013). The present study offers further empirical evidence for the need for greater theorizing on the relationship between positive affect and maladaptation after a traumatic event.

The second research aim examined in this study was whether Israeli adolescents returned to their prior levels of SWB three months after exposure to missile attacks. Our study found medium to strong correlations between the repeated measures of SWB and no significant changes in life satisfaction, positive affect, and negative affect from before to after the attacks. These results could be interpreted as evidence of resilience and support for the well-established hedonic treadmill model in which both good and bad events affect happiness only temporarily (Brickman & Campbell, 1971; see also Diener, et al., 2006; Frederick & Loewenstein, 1999).

Hope was the only SWB component for which there was a significant increase, though it did not increase the risk for PTSD. The heightened sense of hope shortly after the attacks is consistent with findings based on a study of a cross-sectional sample surveyed before and after Sept. 11th which showed an increase in hope two months after the attacks (Peterson, & Seligman, 2003). The increase in sense of hope was explained by a desire for a better future more so than an actual assessment of perceived personal competences. These findings run contrary to prior theorizing that a traumatic event depletes hope (Irving, Telfer & Blake, 1997; Sympson, 2000; Yohani & Larsen, 2012). We suggest that further research consider the changes in hope and their relationship to resilience in the face of terrorism.

There were a number of limitations to this study that should be noted. First, there was no base-line measure of PTSD symptoms at T1 as well as measures of other factors that may have contributed to levels of traumatic stress, such as individual's history of trauma. Such information is particularly important in the present context in which adolescents have been exposed to repeated missile attacks over the years. Though there were no missile attacks for at least an 8-month period prior to T1, the subjects' reality is one in which such occurrences are ingrained in their memory. An additional limitation is that there was no assessment of SWB in the immediate days or weeks following the missile attacks. Our working assumption, in line with the hedonic treadmill model (Brickman & Campbell, 1971), was that the subjects in fact returned to

prior levels, rather than assuming consistency in SWB from T1 to T2. It should also be noted that the measure of PTSD symptoms used in this study was based on a scale developed before the DSM-5, which now pays more attention to the behavioral symptoms that accompany PTSD and is based on four clusters instead of the traditional three clusters of symptoms (American Psychiatric Association, 2013). Another limitation is that the adolescents in this sample were drawn from one school of lower- middle socioeconomic status who experienced a specific context of trauma. Hence, as with any study that is not based on a representative sample, caution should be taken when drawing implications to other populations.

Despite the above limitations, our study sheds light on the complex relationships between SWB and resilience in the face of terrorism. Positive psychologists have paid almost exclusive attention on the benefits of positive mental states as sources of resilience. Yet, this study underscores the importance of recognizing both the potential risks and protective aspects associated with SWB. Particularly, the feeling of hope and positive emotions may present a risk for increased traumatic stress. Life satisfaction in this context continues to be a positive factor that can contribute to increased resilience.

Finally, there are a number of clinical implications that can be drawn from this study: 1) those working with individuals after exposure to trauma, and specifically exposure to terrorism, should be aware of the possible risks associated with hope in this context. It may be the case that the expression of hope should not be taken at face value as a sign of resilience. 2) Related to the latter point, particular attention should be paid to the need for control in high hope individuals as this may be the source of difficulty in dealing with the traumatic situations outside their realm of control. Yet, as noted, research should set out to investigate the role of a need for control as a risk factor associated with hope, 3) strengthening life satisfaction when times are calm in populations under continuous threat of terrorism may be a useful preventative mechanism buffering against PTSD.

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