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Nina Ogińska-Bulik[1]
University of Łódź

Posttraumatic growth following the death of someone close – the role of temperament and resiliency

Abstract:

This study investigates the role that temperament and resiliency play in posttraumatic growth among people who have experienced the death of someone close. Seventy-four participants completed a series of questionnaires measuring posttraumatic growth, using the Posttraumatic Growth Inventory, resiliency by the Resiliency Assessment Scale, and temperamental traits using the Formal Characteristics of Behaviour – Temperament Inventory. The respondents' ages ranged from 21 to 74 years (M=38.4; SD=15.5), with 63.5% being women. Most participants had lost a parent – 37.8%. Results reveal that increased appreciation for life and improved relations with others are the most prevalent areas of posttraumatic growth.

Findings suggest that posttraumatic growth is more likely to be determined by resiliency defined as skills gained from coping with various difficult events rather than biologically determined temperamental traits.

Keywords:

posttraumatic growth, resiliency, temperament, bereavement

Streszczenie:

Podjęte badania miały na celu ustalenie roli temperamentu i prężności psychicznej w potraumatycznym wzroście u osób, które doświadczyły śmierci bliskiej osoby. Analizie poddano wyniki badań 74 osób, które wypełniły następujące narzędzia badawcze: Inwentarz Potraumatycznego Rozwoju, Skalę do Pomiaru Prężności oraz Kwestionariusz Temperamentu - Formalną Charakterystykę Zachowania. Wiek badanych mieścił się w zakresie 21-74 lat (M=38.4; SD=15.5). Kobiety stanowiły 63.5% badanych. Najwięcej spośród badanych (37.8%) doświadczyło straty rodzica. Wśród analizowanych czterech obszarów wzrostu po traumie większe zmiany dotyczyły doceniania życia i relacji z innymi niż zmian w percepcji siebie i zmian w sferze duchowej. Uzyskane wyniki badań sugerują, że wzrost po traumie wynikający ze śmierci bliskiej osoby jest w większym stopniu zdeterminowany prężnością, definiowaną jako zdolność nabywana w wyniku radzenia sobie z różnymi trudnymi sytuacjami niż biologicznie uwarunkowanym temperamentem.

Słowa kluczowe:

wzrost potraumatyczny, prężność, temperament, żałoba

[1] Nina Ogińska-Bulik, Institute of Psychology, Faculty of Educational Sciences, University of Łódź, ul. Smugowa 10/12 91-433 Lodz, Poland, e-mail: noginska@uni.lodz.pl.

Introduction

Death of someone close and posttraumatic growth

The death of someone close is a potentially devastating experience that can lead to various negative outcomes, including intense grief, anxiety, longing, and guilt feelings. However, many people also report some positive transitions resulting from bereavement, called posttraumatic growth (Tedeschi, Calhoun, 1996). The authors refer this phenomenon to the existential approach and assume that posttraumatic growth (PTG) results when cognitive processes are engaged such as changes in one's self-understanding and in the world involving their deeper understanding and making sense out of what happened. The mechanism underlying PTG is connected with cognitively restructuring information, reconstructing cognitive schemes, seeking meaning of the event and its importance for one's future functioning (Tedeschi, Calhoun, 1996, 2007). Tedeschi and Calhoun (2007) assume that PTG does not result from actually experiencing the trauma, but rather results from the undertaken coping strategies.

Research conducted by Shuchter and Zisook (1993) showed that 42% of the bereaved participants indicated positive changes two months after losing someone close, whereas Felcyn-Koczewska, Oginska-Bulik (2012) reported that 33.7% of their respondents indicated high, 38.6% average, and 27.7% low positive change levels. A study reported by Hogan, Greenfield & Schmidt (2001) showed that bereaved individuals experienced increased PTG. Higher positive emotion levels and spiritual development, and increased personal strength levels were also found in Kim, Kjervik, Belyea, and Choi's study (2011). Among parents who have lost a child, PTG was related to more positive beliefs regarding self-worth and seeing themselves as more characteristically fortunate (Engelkemeyer & Marwit, 2008); and with increased spirituality, religious beliefs, and benefit-finding, that is, a desire to help and show compassion for others' suffering (Lichtenthal, Currier, Neimeyer & Keesee, 2010).

Resiliency and posttraumatic growth

The term resiliency is defined as the ability to bounce back from unpleasant life events, which allows more effective coping with daily stress and negative emotions. Resiliency, treated as a personality characteristic, is expressed by persistence and flexible adaptation to life demands, the ability to take remedial actions in difficult situations, and tolerance of negative emotions and failures. A resilient individual is characterised by emotional stability and perceives difficulties as an opportunity to gain new experiences (Oginska-Bulik, 2013, Oginska-Bulik, Juczynski, 2008; Semmer, 2006).

A positive relationship between resilience and PTG, especially in changes relating to others, new possibilities and personal strength, was found in a group of motor vehicle accident survivors (Nishi, et. al 2010). Similarly, Polish studies (Felcyn-Koczewska, Ogińska-

-Bulik, 2011; Felcyn-Koczewska, Ogińska-Bulik, 2012, Ogińska-Bulik, 2014) showed a positive relationship between resiliency (treated as a personality characteristic) and PTG.

On the contrary, Levine and colleagues (2009) found a negative relationship between resilience, defined as the ability to adapt to new conditions without having adverse consequences in one's psycho-social life, and PTG in a group of people experiencing horror in war. Moreover, resilience conceptualized and measured by lack of PTSD symptoms following adversity was inversely associated with PTG (Tedeschi, Calhoun, 2004; Westphal, Bonanno, 2007).

Due to different conceptualisations of the term in literature, namely, the process (resilience), and the personality characteristic (resiliency), the relationship between resilience/y and PTG is not clear. Some authors equate resilience with PTG (Westphal, Bonanno, 2007). Others assume that PTG is a form of resiliency (Johnson et al. 2007), whereas still others assume that a benefit from trauma is something more than resilience and therefore plays a superior role (Lepore, Revenson, 2006). Tedeschi and Calhoun (1995) clearly distinguish the two concepts, emphasizing that development following trauma results from a transformation. They stress that resilient individuals do not necessarily have to experience PTG, as not all traumatic events are subjectively identified as challenging.

The inconsistencies in previous studies investigating a relationship between resilience and PTG suggest a need for further research. In order to address the issues from previous research, this present study adapts Tedeschi and Calhoun's (1995) approach, which treats resilience and PTG as two independent phenomena. Moreover, the study defines resiliency as a personality characteristic rather than a process.

Temperament and posttraumatic growth

Temperamental traits are rather formal behavioural characteristics, no matter what this behavioural content or direction is (Strelau, Zawadzki, 2005). Their contribution to behaviour is especially evident when individuals are confronted with stressful demands, including participation in traumatic events. In a study conducted by Strelau & Zawadzki (2005) temperamental traits such as emotional reactivity and perseveration were positively related to PTSD, whereas briskness and endurance – negatively. Briskness and endurance act as buffers lowering the trauma-inducing effect. In turn, emotional reactivity and perseverance act as augmenters increasing the effect of a trauma. Furthermore, emotional reactivity appeared to be the best predictor of PTSD's intensity. Strelau & Zawadzki (2005) stress that briskness and endurance, which are related to rather chronically decreased activation levels, share some common variance with extraversion; whereas emotional reactivity reveals a positive relationship to neuroticism, which in turn is negatively related to posttraumatic growth.

To date, there are no studies indicating the role of temperament in PTG development. Therefore, the present study addresses the following research questions: What is temperament's role and resiliency in PTG? Which dimensions, if any, of resiliency and temperament can predict PTG? What is the relationship between temperament and resiliency? Based on previous research on temperament and PTSD, one may expect that temperamental traits are also related to PTG. It is hypothesised that briskness, endurance and activity are positively related to PTG, while emotional reactivity and perseveration relate negatively. However, emotional reactivity is expected to be the strongest predictor. Figure 1 presents the model of the study.

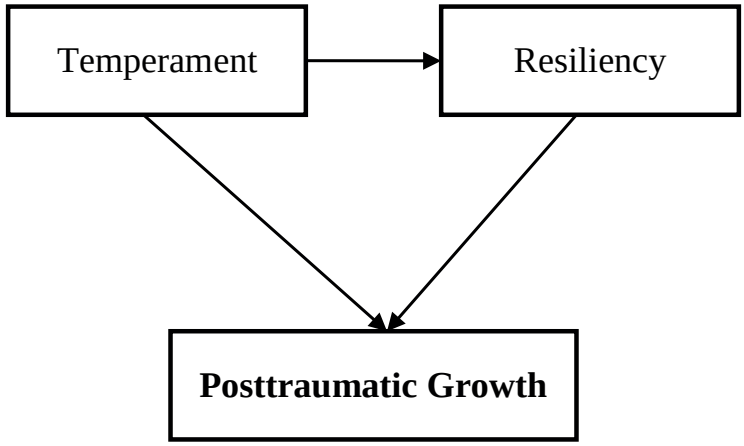

Figure 1. The relationship between temperament, resiliency and posttraumatic growth.

Method

Participants and Procedure

The study investigated the role that temperament and resiliency play in developing positive changes following the death of someone close. Eighty-four persons who experienced such an event were recruited by mail solicitation and through an announcement at the University of Lodz. The research project was accepted by the local Ethics Commission. A majority of the respondents were invited to complete a series of questionnaires at the university, and the other respondents completed questionnaires at home and returned them to the university. The eligibility criteria were as follows: the deceased person was both close and loved (a parent, a spouse, a child, a sibling or a very dear friend). Additionally, in cases of parental deaths, the age of the examined person was not more than 50. A death had to be unexpected, and had to occur no sooner than three months before and no longer than three years prior to the start of the examination. Taking into account the above, eight participants did not meet the criteria, and two persons did not complete the questionnaires. Thus, the analysis was conducted on 74 participants. The age ranged

from 21 to 74 years (M=38.4; SD=15.5), with 63.5% being women. The majority of the participants lost a parent – 37.8%. Among the remaining: 21.6% lost a child, 18.9%, a spouse or a partner, 10.8% a sibling and 10.8% a very close friend.

Materials

The following techniques were used in the study: the Polish adaptation of the Posttraumatic Growth Inventory (PTGI), the Formal Characteristics of Behaviour–Temperament Inventory (FCB-TI) and The Resiliency Assessment Scale (SPP-25).

The Posttraumatic Growth Inventory (PTGI) developed by Tedeschi and Calhoun (1996) is the most frequently used and best-validated questionnaire to assess positive changes in the aftermath of a trauma. It contains 21 items (i.e. "I changed my priorities about what is important in life") rated on a Likert-type scale from 0 ("I did not experience this change as a result of my crisis") to 5 ("I experienced this change to a very great degree as a result of my crisis"). Higher scores indicate higher posttraumatic growth levels. The Polish adaptation of PTGI (Oginska-Bulik, Juczynski, 2010) comprises the following four factors: Factor 1. Changes in self-perception – from having experienced trauma a person notices new opportunities and perceives growth in personal strength; Factor 2. Changes in relating to others – a greater sense of relation to others, increased empathy and altruism; Factor 3. Greater appreciation of life – life philosophy changes, priority changes, greater appreciation of everyday life; Factor 4. Spiritual changes – better understood spiritual problems and an increase in religiosity. Internal consistency measured by Cronbach's alpha for the full scale is high – 0.93 (for particular factors from 0.63 to 0.87). Test-retest reliability after two months is also high (0.93; 0.74, respectively).

Temperament was assessed by the Formal Characteristics of Behaviour–Temperament Inventory (FCB-TI) developed by Zawadzki and Strelau (1997). It includes 120 items (i.e. "If I sleep shorter than normally I feel distorted and tired the following day.") to which a respondent answers YES (1) or NO (0). Higher scores indicate higher levels of a particular temperamental trait. FCB-TI has been shown to be a reliable technique (Cronbach's alpha from 0.75 to 0.85) and comprises six scales: 1. Briskness – tendency to react quickly, to keep at a high tempo in performing activities, and to shift easily in response to changes in the surroundings from one behaviour to another; 2. Perseveration – tendency to contribute and to repeat behaviour or experience emotions after a stimuli evoking this behaviour or emotion has ceased; 3. Sensory Sensitivity – ability to react to sensory low stimuli ; 4. Emotional Reactivity – tendency to react intensively to an emotion-generating stimuli, expressed in high emotional sensitivity and in low emotional endurance; 5. Endurance – ability to react adequately in situations demanding long-lasting or highly stimulating activity and under intense external stimulation; 6. Activity – tendency to undertake highly stimulating behaviours or to supply by means of behaviour strong stimulation from the surroundings.

The Resiliency Assessment Scale (SPP-25) by Oginska-Bulik and Juczynski (2008) measures resiliency treated as a personality characteristic. It consists of 25 items (i.e. "I undertake actions to deal with problems no matter how difficult the problems are.") rated from 0 (definitively not) to 4 (definitively yes). Factor analysis revealed five factors: determination and persistence in actions (1), openness to new experiences and a sense of humour (2), competencies to cope with and tolerate a negative affect (3), tolerance of failures and treating life as a challenge (4), and optimistic life attitude and ability to mobilize in difficult situations (5). SPP-25 is a reliable tool: Cronbach's alpha = 0.89; internal stability (measured after 4 weeks) = 0.85.

Results

To establish the differences among mean values of the variables, a t-test was used (for two groups) and F-one way of Anova with the Tukey-test (for more than two groups). Relationships between variables were assessed using Pearson correlation coefficients. Regression analysis (forward stepwise) was used to find posttraumatic growth predictors.

Prevalence of posttraumatic growth, temperamental traits, and resiliency

The means and standard deviations for all analysed variables are presented in Table 1.

Table 1. Means and standard deviations of analysed variables.

Variable	M	SD	Min	Max
Posttraumatic growth – total	58.86	20.21	1	92
1. changes in self-perception	21.89	9.96	1	74
2. changes in relations to others	21.97	7.42	1	41
3. appreciation of life	9.94	3.39	2	15
4. spiritual changes	5.05	2.95	0	9
Briskness	13.39	4.61	3	20
Perseveration	12.45	3.57	1	19
Sensory sensitivity	14.75	3.32	4	19
Emotional reactivity	11.58	4.11	4	20
Endurance	8.64	4.58	0	19
Activity	7.62	4.46	0	17
Resiliency – total	65.61	14.67	36	97
1. determination and persistence in action	12.98	3.08	3	18
2. openness to new experiences and sense of humour	14.02	2.36	10	20
3. competencies to cope and tolerance of negative affect	13.00	3.98	5	20
4. tolerance of failures and treating life as a challenge	13.36	3.20	4	19
5. optimistic life attitude and ability to mobilize in difficult situations	12.23	4.17	4	20

Notes: M - Mean, SD - Standard Deviation, Min - Minimum Value, Max - Maximum Value.

Normative data developed for the PTG Polish version (Oginska-Bulik, Juczynski, 2010) indicates that the examined group presented average level posttraumatic growth (Sten score = 5), while 39.2% revealed low, 35.1% average and 25.7% high. Positive change levels (M=58.86) were similar to levels obtained by individuals who experienced other adverse life events, such as a spinal cord injury – (M=59.86, p<0.08), mastectomy (M=60.44, p<0.07), cardiological surgery (M=60.7, p<0.07), or a serious illness of a child (M=60.01, p<0.08) (Ogińska-Bulik, Juczynski, 2010).

Changes levels in particular posttraumatic growth dimensions were also examined. In this case, the each mean was divided by the number of items loading each factor. Higher levels of changes were observed in appreciation for life (M=3.31) and relationship to others (M=3.14), than in self-perception (M=2.43) (t=7.29 p<0.001; t=6.54 p<0.001) and the spiritual sphere (M=2.52; t=4.73 p<0.01).

Temperamental traits levels were similar to normative data obtained by Zawadzki & Strelau (1997) (M=14.30; 12.63; 14.79; 11.72; 8.63; 8.87, respectively). The levels of resiliency were lower than levels obtained in normative data (M=72.3 for men and M=69.45 for women). According to the norms developed for SPP-25 (Oginska-Bulik, Juczyński, 2008), the obtained mean corresponds to the lower limit of sten 5 and indicates an average level of resiliency.

Gender and age differences in posttraumatic growth

Gender was related to the posttraumatic growth levels. Higher levels of positive changes were observed in women than men (M=62.31; SD=18.46 and M=52.85; SD=21.53; t=1.99 p<0.05). The differences mainly denote changes in relations to others (M=23.81; SD=7.10 and M=18.77; SD=6.99; t=2.94 p<0.01) and appreciation for life (M=10.57; SD=3.06 and M=8.85; SD=3.70; t=2.15 p<0.05), both significantly higher in women. Gender was not related to resiliency levels or any temperamental traits. Participant age did not differentiate posttraumatic growth levels (M=60.34; SD=22.49 for younger and M=56.50; SD=15.22 for older participants), and the levels of resiliency (M=66.78; SD=15.46 and M=63.67; SD=13.31 respectively) but was related to two traits of temperament. Older participants presented higher sensory sensitivity levels (M=15.89; SD=2.94 and M=12.93; SD=3.13; t=4.06 p<0.001), and activity in comparison to younger participants (M=8.52; SD=4.11 and M=6.14; SD=4.64; t=2.29 p<0.05).

Type of loss and posttraumatic growth

The relationship between types of loss and levels of positive changes was checked using ANOVA. Posttraumatic growth means are shown in Table 2.

Table 2. The relationship between the types of losses and posttraumatic growth levels.

Type of loss	Posttraumatic growth	
	M	SD
1. Spouse (n=14)	60.4	14.3
2. Parent (n=28)	64.5	19.4
3. Child (n=16)	43.5	15.7
4. Sibling (n=8)	78.8	9.5
5. Close friend (n=8)	47.3	21.2

Notes: M - Mean, SD - Standard Deviation.

Results indicate a relationship between the type of loss and posttraumatic growth level. Persons who experienced a parent's or sibling's death revealed higher levels of positive changes compared to individuals who lost a child. Moreover, a brother's or sister's death seemed to lead to a higher posttraumatic growth level than did the death of a close friend ($2>3$, $p<0.01$; $3<4$, $p<0.001$; $4>5$, $p<0.01$). Loss of a child or a very close friend was related to the lowest posttraumatic growth levels.

Relationship between analysed variables

In the next step, Pearson's correlation coefficients were calculated to check the relationship between analysed variables. Data is presented in Tables 3 and 4.

Table 3. Pearson's correlation coefficients between temperament and resiliency and posttraumatic growth.

Temperament and Resiliency dimensions:	PTG total	F.1	F.2.	F.3.	F.4.
Briskness	0.07	0.14	-0.14	0.27*	0.06
Perseveration	-0.09	-0.21	0.05	-0.05	0.07
Sensory sensitivity	0.07	0.09	0.13	-0.12	-0.01
Emotional reactivity	-0.12	-0.27*	0.16	-0.18	-0.10
Endurance	0.16	0.18	0.07	0.25*	0.19
Activity	0.08	0.14	-0.04	0.19	-0.07
Resiliency – total	0.42**	0.48***	0.14	0.49***	0.34**
1. determination and persistence in action	0.43***	0.46***	0.19	0.43***	0.37**
2. openness to new experiences and sense of humour	0.25*	0.22	0.08	0.34**	0.33**
3. competencies to cope and tolerance of negative affect	0.46***	0.52***	0.20	0.51***	0.33**
4. tolerance of failures and treating life as a challenge	0.22	0.36**	-0.08	0.29*	0.14
5.optimistic life attitude and ability to mobilize in difficult situations	0.42***	0.48***	0.14	0.49***	0.34**

Notes: F.1 – changes in self-perception; F.2 – changes in relations to others; F.3 – appreciation of life; F.4 – spiritual changes, *p < .05, **p < .01, ***p < .001.

As shown in Table 3, resiliency was positively related to posttraumatic growth. The strongest relationships have been found between resiliency and its subscales, and changes in self-perception and appreciation of life. The relationship between resiliency and spiritual changes was weaker, whereas there was no association between resiliency and changes in relations to others. The following resiliency factors revealed moderate relationships with PTG: determination and persistence in action (F.1), competencies to cope with and to tolerate negative affect (F.3), and an optimistic life attitude and ability to mobilize in difficult situations (F.5).

Temperament was poorly associated with PTG. There was no significant relationship between temperament dimensions and posttraumatic growth–total. Among temperamental traits only emotional reactivity was negatively correlated with changes in self-perception, whereas briskness and endurance were positively correlated with appreciation of life.

Table 4. Pearson's correlation coefficients between temperament and resiliency.

Temperament dimensions:	Resiliency total	1	2	3	4	5
Briskness	0.52***	0.45***	0.32**	0.61***	0.36**	0.45***
Perseveration	-0.10	-0.11	0.05	-0.21	0.03	-0.09
Sensory sensitivity	-0.20	-0.20	0.03	-0.20	-0.19	-0.22
Emotional reactivity	-0.52***	-0.34**	-0.37**	-0.59***	-0.44***	-0.47***
Endurance	0.32**	0.11	0.15	0.44***	0.20	0.39**
Activity	0.35**	0.06	0.24*	0.43***	0.39**	0.33**

Notes: 1. determination and persistence in action; 2. openness to new experiences and sense of humour; 3. competencies to cope and tolerance of negative affect; 4. tolerance of failures and treating life as a challenge; 5. optimistic life attitude and ability to mobilize in difficult situations, *p < .05, **p < .01, ***p < .001.

Temperament was significantly related to resiliency, especially to two of its factors: briskness (positively) and emotional reactivity (negatively). They were related to all dimensions of resiliency; however, the strongest relationship was found with competencies to cope, and tolerance of negative affect. Resiliency was correlated to a moderate degree with endurance and activity, while there was no significant relationship between resiliency and perseveration and sensory sensitivity.

Predictors of posttraumatic growth

In order to investigate posttraumatic growth predictors among persons who have lost someone close, a multiple regression analysis series (step-wise) was performed for the total scale of PTG and for each individual PTG factor. Resiliency and temperamental traits were simultaneously entered into the model of regression. The final results are presented in Tables 5-6.

Table 5. Predictors of posttraumatic growth total – regression analysis results.

Predictors	**Beta**	**R^2**
Resiliency 3: competencies to cope and tolerance of negative affect	0.61	0.23
Temperament: Briskness	-0.42	0.07
Resiliency 4: tolerance of failures and treating life as a challenge	-0.31	0.05

Notes: $F(6.67)= 7.72$ $p<0.001$; $R=0.62$; $R^2=0.39$.

Two dimensions of resiliency (3 & 4), and briskness as a temperamental trait were found to be significant posttraumatic growth predictors (see Table 5). They explained 35% of the total variance in the dependent variable. The most significant predictor was resiliency factor three (competencies to cope and tolerance of negative affect), which explains 23% of variance. The relationship between resiliency and posttraumatic growth seems to be quite complex. In line with the expectations, competencies to cope associated with tolerance of negative affect are positively related with PTG; however, tolerance to failures and treating life as a challenge are negatively correlated. Therefore, it may suggest that proneness to tolerating failures does not necessarily promote positive changes after traumatic events. Briskness appeared to be a weak predictor (negatively related), as it explains only 7% of the total PTG variance.

Table 6. Predictors of posttraumatic growth dimensions – regression analysis results.

Predictors of changes in self-perception	**Beta**	**R^2**
Resiliency 3: competencies to cope and tolerance of negative affect	0.43	0.26
Temperament: Briskness	-0.39	0.05
Notes. $F(6.67)=7.58$ $p<0.001$; $R=0.63$; $R^2=0.40$		
Predictors of changes in relations to others		
Temperament: Emotional reactivity	-0.30	0.11
Resiliency 4: tolerance of failures and treating life as a challenge	-0.60	0.09
Temperament: Briskness	-0.46	0.05
Notes. $F(8.65)=4.74$ $p<0.01$; $R=0.60$; $R^2=0.36$		
Predictors of appreciation of life		
Resiliency 5: optimistic life attitude and ability to mobilize in difficult situations	0.45	0.26
Notes. $F(4.69)=8.63$ $p<0.001$; $R=0.58$; $R^2=0.33$		

Predictors of spiritual changes		
Resiliency 1: determination and persistence in action	0.39	0.13
Resiliency 4: tolerance of failures and treating life as a challenge	-0.49	0.07
Notes. $F(5.68)$ $p<0.001$; $R=0.54$; $R^2=0.29$		

The most significant predictor of positive changes in self-perception was factor three of resiliency – competencies to cope and to tolerate a negative affect, which explains 26% of the dependent variable. The second predictor, briskness, explains 5% of the variance and was negatively related to PTG. Each remaining variable that was included in the model explained less than 5% of the variance.

Two temperamental traits: briskness and emotional reactivity, and factor four of resiliency appeared to be significant predictors of positive changes in personal interrelations. They explained 25% of PTG variance. All are negatively related to changes in relations to others. Each of the remaining variables: three resiliency factors: determination and persistence in action (factor one), openness to new experiences and sense of humour (factor two), and competencies to cope and to tolerate a negative affect (factor three) and two temperamental traits – endurance and sensory sensitivity – explained less than 5% PTG variance.

An optimistic life attitude and the ability to mobilize in a difficult situation were significant predictors for appreciation of life. None of the remaining variables – resiliency three and four, and emotional reactivity – predicted changes in appreciation of life significantly.

Two resiliency factors: determination and persistence in action, and tolerating failures and treating life as a challenge were found to be significant spiritual changes predictors, the former being positively, and the latter negatively related to spiritual changes. The remaining three factors included in the analysis have not been found to be significant spiritual changes predictors.

Discussion

The examinees, all of whom experienced a negative life event such as the death of someone close to them, are prone to revealing positive changes, although to varying degrees. Of the participants 39.2% revealed a low level (score range: 0-53), 35.1% average (54-72) and 25.7% high (73-105) of posttraumatic growth. Higher changes level occurred in appreciation for life and relations to others, in comparison to changes in self-perception and the spiritual sphere. Moreover, no participant stated a lack of positive change in the trauma's aftermath.

The results in this study are congruent with data obtained from another group who experienced losing someone they loved, where 27.7% manifested low, 38.6% average and 33.7% high levels of posttraumatic growth (Felcyn-Koczewska & Ogińska-Bulik, 2012).

Resiliency seems to play a more significant role in developing positive changes after experienced trauma than temperament does. The results revealed a moderate relationship between resiliency and all posttraumatic growth dimensions, apart from relations to others. The strength of relationships for self-perception and life appreciation was medium, and small for spiritual changes. The strongest relationship between posttraumatic growth and temperamental traits (medium strength) revealed itself in determination and persistence in action (F.1), competencies to cope with and tolerate a negative affect (F.3), and an optimistic life attitude and ability to mobilize in difficult situations (F.5).

The above data suggest that resiliency can facilitate positive changes in the aftermath of trauma. However, it is also possible that successful coping with traumatic events resulting in posttraumatic growth might enhance the level of resiliency, especially a belief in coping skills. Data of multiple regression analyses revealed various roles of resiliency in developing positive changes in individuals who experienced the death of someone close. Competencies to cope and tolerate a negative affect (factor 3 of resiliency) appeared to be predictors of total posttraumatic growth and changes in self-perception. Tolerance to accept failures and treat life as a challenge (factor 4) has been found to be a predictor (negatively related) of changes in relations with others, whereas an optimistic life attitude and ability to mobilize in difficult situations (factor 5) has been found to be a predictor of changes in the appreciation of life. Finally, determination and persistence in action (factor 1) and tolerance of failures and treating life as a challenge (factor 4) have been found to be predictors of spiritual changes. It should be emphasized that the predictive power of the factors comprising resiliency was varied. Factor three possessed the highest predictive power in competencies to cope and to tolerate negative affect (self-perception), and factor five in optimistic life attitude and ability to mobilize in difficult situations (appreciation of life). Each explained 26% of the dependent variable's variance.

A higher change levels in self-perception and life appreciation could be seen as the outcome of successful coping with negative life events; therefore, competencies to cope associated with tolerating a negative affect seem to play a very significant role. It is also possible that these two posttraumatic growth factors can be, at least partially, treated as a form of resilience. However, this hypothetical explanation needs further investigation.

Unexpectedly, one factor resiliency: tolerating failures and treating life as a challenge, has been found to be a negative predictor in two posttraumatic growth dimensions, namely changes in relations to others and spiritual changes. The results suggest that high failure tolerance along with a tendency to perceive life as a challenge can inhibit rather

than facilitate these types of positive changes following a traumatic event. It is possible that improvements in relations to others and changes in the spiritual sphere, or generally speaking changes in life philosophy, require greater sensitivity, reflection, emotional engagement and possibly stronger processing of the trauma.

The study also showed that temperament was poorly associated with positive changes. Emotional reactivity was negatively correlated with changes in self-perception, while briskness and endurance were positively correlated with appreciation of life ($p<0.05$).

Briskness and endurance also allow for predicting positive changes after a negative life experience; however, to a slight extent. Both traits have been found to be predictors (negatively related) of positive changes in relations to others. Additionally, briskness was a predictor of positive changes in self-perception and total posttraumatic growth. A negative relationship between emotional reactivity and total posttraumatic growth was very likely, whereas the negative association between briskness and positive changes in relations with others was not congruent with the expectations. Emotional reactivity also allows one to predict PTSD symptoms (Oniszczenko, 2010; Strelau and Zawadzki, 2005). Additionally, emotional reactivity is a trait that shares essential variance with neuroticism, which is negatively related to growth after trauma (Linley and Joseph, 2004). In turn, briskness, expressed in tendency to react quickly, to keep at a high tempo in performing activities, and to shift easily in response to changes in the surroundings from one behaviour to another, should rather increase the probability of positive changes occurring after a traumatic event, especially since briskness was positively related to life appreciation, and to resiliency and all its factors. Moreover, results from Strelau and Zawadzki's study revealed (2005) that briskness was negatively related (but weakly $p<0.05$) to the PTSD level. However, the participation of briskness in predicting posttraumatic growth is small (7%). The negative relationship between briskness and PTG may be explained by the fact that the tendency to react quickly and to keep in high tempo in performing activities do not facilitate processing trauma or delaying a process that modifies cognitive schemas, which is necessary to create a new vision of the world along with positive changes in the trauma aftermath. Posttraumatic growth requires time and the ability to reflect, which is not necessary sustained by briskness.

Interestingly, temperamental traits appeared to be weak predictors of posttraumatic growth, but on the other hand they are rather strongly related to resiliency. Briskness is positively, and emotional reactivity negatively related to all dimensions of resiliency. The strongest relationships were found between temperament, and competencies to cope and tolerate a negative affect. Endurance and activity were related to resiliency to a moderate degree, whereas there was no significant relationship between perseveration and sensory sensitivity and resiliency.

The more significant role of resiliency, compared to temperament, in experiencing positive changes after negative life events indicates that posttraumatic growth is more likely to be determined by skills gained from coping with various difficult situations rather than from biological determinants. Therefore, predispositions to experience positive changes in the aftermath of a trauma might be developed and shaped during life.

The study has delivered new data about positive changes after traumatic events and their relationship with individual human characteristics. However, its limitations should also be considered. Firstly, the sample size was small and the participants experienced various types of loss, which could act as a confounding variable. Secondly, the study's cross-sectional design cannot fully reveal causality. PTSD symptoms or trauma related stress were not measured; so it is difficult to say whether the death of a loved one was really a traumatic event for all participants. The positive changes were assessed using a self-reported questionnaire; therefore, the impact of the social approval variable on the effect size should be considered. People may have a tendency to make false claims that changes have occurred. Their declaration may be the effect of imagination, wishful thinking, illusion, or serve to raise self-esteem. In order to increase the objectivity for assessing positive changes following trauma it would be useful to incorporate other measurements, such as additional assessments made by someone close to the respondent or as Linley & Joseph (2004) suggest, physiological measures of hormone secretion in response to a traumatic event.

It would also be useful to assess coping strategies and social support, which are regarded as factors promoting positive effects after traumatic events.

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