

Factors Associated with Posttraumatic Growth among the Spouses of Myocardial Infarction Patients

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Abstract

To clarify the rationale behind Posttraumatic Growth (PTG), a model by Schaefer and Moos describes the relative contribution of environmental resources, individual resources, event related factors, cognitive processing and coping (CPC) on PTG. In the present study, this model was tested with the spouses of myocardial infarction patients with data from various hospitals in Turkey. A structural equation model revealed that neither individual nor environmental resources had indirect effects on PTG through the effect of event-related factors and CPC, while they showed direct effects on PTG. The findings were discussed in the context of the theoretical model.

Keywords

- *cognitive processing*
- *environmental factors*
- *individual factors*
- *myocardial infarction patients*
- *posttraumatic growth*
- *spouses of myocardial infarction patients*

CARDIOVASCULAR problems in over 80.7 million adults in the USA (American Heart Association, 2008) are accepted as a potentially life threatening illness (Paul & Sneed, 2004). Recent studies have examined a variety of factors mediating the impact of myocardial infarction on psychosocial functioning (e.g. Aalto et al., 2007; Boersma, Maes, Joeke, & Dusseldorp, 2006; Brink, Karlson, & Hallberg, 2002; Joeke, van Elderen, & Schreurs, 2007; Nordin, Knutsson, & Sundbom, 2008). Patients suffering from these problems and their close family members (e.g. spouses, children) often experience intense stress (Rohrbaugh et al., 2002). Pointing out the impact of heart problems on the family members of patients, Hilscher, Bartley and Zarski (2005, p. 222) suggested that: 'A heart, whether healthy or impaired, does not beat alone.' Likewise, spouses had a tendency to evaluate a partner's heart failure as 'our problem' when asked the ways of coping with the patient's health (Rohrbaugh, Mehl, Shoham, Reilly, & Ewy, 2008). As assumed by systems theory, Delon (2006) stated that the equilibrium of marriage can be changed after the onset of cardiac illness. Additionally, Delon (2006) highlighted that if a spouse uses effective coping skills, she/he can make a contribution to the relief of the patient. Also, marital quality can significantly affect heart failure symptoms (Rohrbaugh et al., 2008).

'Posttraumatic growth' (PTG) refers to the occurrence of positive changes following trauma or major life crises (Calhoun, Cann, Tedeschi, & McMillan, 2000) as particularly observed in the individual's views of self, relationship with others and philosophy of life (Tedeschi & Calhoun, 1996). Generally, PTG is investigated in the sufferers such as breast cancer patients (Bellizzi & Blank, 2006; Bozo, Gündoğdu, Buyukasik-Çolak, *in press*), MS patients (Pakenham, 2005) and heart attack patients (Sheikh, 2004). Conversely, PTG is also observed in a group, family, classroom or larger social group (Schaefer & Moos, 1998) such as wives of prisoners of war (Dekel, 2007), husbands of breast cancer survivors (Weiss, 2004) and parents of adolescent cancer survivors (Barakat, Alderfer, & Kazak, 2006). However, among the spouses of myocardial infarction patients (SMIP), the factors associated with PTG have not been verified. Heart-related problems are different from other chronic problems in accordance with increasing risk of mortality and having complex treatment approaches such as lifestyle changes (Rohrbaugh et al., 2002) or surgery which is life threatening. In addition, during recovery, SMIP can

experience intense stress due to the absence of definite information regarding the prognosis of myocardial infarction (MI) patients and contact with the medical personnel (Coyne & Smith, 1991).

Individual differences in PTG reactions have been associated with several variables including environmental resources (ER) (i.e. social and familial support, O'Leary, Alday, & Ickovics, 1998), individual resources (IR) (i.e. socio-demographic variables such as age, Schaefer & Moos, 1998; hardiness and its components—commitment, control and challenge, O'Leary et al., 1998; locus of control, Cohen, Hettler, & Pane, 1998; depression, Park & Helgeson, 2006), event related factors (ERF) (i.e. threat to mortality, Schaefer & Moos, 1998; prognosis and perceived severity of the diagnosis, Bellizzi & Blank, 2006), cognitive processing (i.e. event related rumination, religious beliefs, individual's level of religious participation, Calhoun et al., 2000) and coping (Göral, Kesimci, & Gençöz, 2006). These factors can be described as a complex catalyst (Schaefer & Moos, 1998).

Among the models conceptualizing the factors associated with the PTG, Schaefer and Moos (1998) suggested a conceptual framework for understanding positive outcomes of life crises and transitions. According to this model, IR (e.g. socio-demographic variables) and ER (e.g. family support) foreshadow the ERF during life crises. In turn, the ERF can shape cognitive processing and coping (CPC) responses of the individuals. As an end-product of CPC style, positive outcomes of life crises may occur during the transition period.

Schaefer and Moos's model has been empirically tested in a small number of studies. Siegel, Schrimshaw and Pretter (2005) demonstrated that while negative affect, positive reappraisal coping and emotional support significantly predicted PTG among the HIV/AIDS patients, stress-related characteristics (e.g. number of physical symptoms and time passed since HIV diagnosis), self-esteem, perceived control, practical support and positive affect did not. In another study, biased recall of bone marrow transplantation experience accounted for 7 percent of the variance in PTG (Widows, Jacobsen, Booth-Jones, & Fields, 2005). Conversely, approach coping, psychological distress and social support did not make a significant contribution to PTG.

The main purpose of the present study was to examine the role of individual, environmental, event-related, cognitive processing and coping factors on PTG in spouses of MI patients within the

framework of Schaefer and Moos's model. Variables used in the present study were selected on the basis of the recent literature on PTG in a variety of samples. The model consists of four latent variables or constructs (ER, IR, ERF and CPC) as exogenous variables and one outcome variable (PTG). It is hypothesized that ER, IR and CPC would combine to influence PTG. In particular, the following hypotheses were tested using a structural equation model (SEM) in the sample of spouses of MI patients: (1) ER and IR would influence ERF and PTG; (2) ERF would influence CPC; (3) CPC would influence the PTG; and (4) the relationship between both the ER and IR and PTG would be affected by the ERF and CPC.

Method

Participants

The sample consisted of a total of 132 participants, 117 women (88.6%), and 15 men (11.4%), all spouses of MI patients, with a mean age of 52.04 (SD = 11.05). In terms of education level, 12.9 percent were literate, 43.5 percent completed their education at primary school, 8.8 percent at secondary school, 16.3 percent at high school, 6.8 percent at university and 1.4 percent at doctorate level. Among participants, 57.1 percent were housewives, 17 percent were retired and 4.8 percent were self-employed. The average monthly family income was 1075.15 New Turkish Liras (approximately 500 €; in the medium income range in Turkey). The mean length of marriage was 28.44 years (SD = 13.81) and the mean of the perceived quality of marriage was 9.5 (SD = 2.59) (see below for details of this measure).

Measures

The *Posttraumatic Growth Inventory* (PTGI) was developed by Tedeschi and Calhoun (1996) to assess positive changes after the trauma using 21 items on a six-point Likert scale. It yields a total score and five subscale scores for 'improved relationship' (IRP), 'new possibilities for one's life' (NPOL), 'greater appreciation of life' (GAL), 'greater sense of personal strength' (GSPS) and 'spiritual development' (SD). In the Turkish adaptation study of the scale, internal consistency was found to be .94 and factor analysis yielded a three-factor solution explaining 59 percent of variance (changes in the relationship, changes in the philosophy of life and changes in self-perception).

The internal consistencies of these subscales were .86, .87 and .88 respectively (Dirik, 2006).

In the present study, the original factor structure suggested by Tedeschi and Calhoun (1996) was used. Internal consistency of the total scale was found to be .94. The alpha coefficients of the factors were .78 for IR, .84 for NPOL, .74 for GAL, .82 for GSPS and .59 for SD. Lower alpha coefficient obtained from SD may be due to the fact that spiritual changes are seen after years from the stressful life events (Cohen et al., 1998).

Measures of ER The *Multidimensional Scale of Perceived Social Support* (MSPSS) developed by Zimet, Dahlem, Zimet and Farley (1988) is a 12-item self-report instrument to assess a person's perception of the adequacy of social support on a seven-point Likert scale. The original scale is composed of three factors: social support from friends, family and significant others. The same factor structure was also yielded in the adaptation of the scale to Turkish (Eker & Arkar, 1995). In the present study, Cronbach's alpha value was found satisfactory for the total scale (.85). The three factors also had satisfactory internal consistencies: .81, .80 and .91 respectively.

The *Quality of the Marital Relationship* among the partners was assessed by three questions: 'What was the relationship with your husband/wife before the heart problems?', 'What is the relationship with your husband/wife now?' and 'What do you suppose to be your relationship with your husband/wife in the future?' Participants responded to questions on a Likert scale ranging from with 0 (not good so much) to 4 (always good).

Measures of IR The *Beck Depression Inventory* (BDI) developed by Beck, Ward, Mendelson, Mock and Erbaugh (1961) is a 21 item self-report to assess emotional, motivational and cognitive symptoms of depression on a four-point Likert type scale. In the Turkish adaptation of the scale, split-half reliability was .74 and concurrent validity (MMPI Depression subscale) was .63 (Hisli, 1988). In the present study, the internal consistency of the scale was found as .81.

The *Psychological Hardiness Scale* (PHS) was developed by Durak and Motan (2009) on the basis of a Personal Views Survey assesses hardiness for Turkish samples with 19 items on a four-point Likert scale. Factor analysis yielded three factors (commitment, control and challenge). Internal consistency was .81. In the present study, Cronbach's alpha was found satisfactory for the total scale (.67).

For the subscales, Cronbach's alpha was in an acceptable range (commitment, .63; control, .50; and challenge, .48). The lower internal consistencies of the subscales may be related to the smaller sample sizes using only a four-point Likert scale. Additionally, the education level of the majority of participants was at a relatively low to moderate level. The lower internal consistencies might be due to lack of understanding of the meaning of the scale items.

The *Locus of Control Scale* (LCS) as revised by Dağ (2002) for Turkish samples on the basis of Rotter's scale consists of 47 items rated on a five-point Likert scale. Internal consistency of the scale was found to be .92 and the test-retest reliability was .88. In the present study, the internal consistency was .86.

The *Rosenberg Self Esteem Scale* (RSES) consists of 10 items rated on a four-point Likert scale (Rosenberg, 1965). The scale was adapted to Turkish by Çuhadaroglu (1986) who found an internal consistency of .71. In the present study, Cronbach's alpha value was found to be .80.

Measures of CPC The *Impact of Event Scale – Revised* (IES-R) was developed by Weiss and Marmar (1997) to measure dimensions of the Post Traumatic Stress Disorder (PTSD) with 22 items rated on a five-point Likert scale. It has three dimensions, namely 'rumination', 'avoidance' and 'hypervigilance'. A Turkish version was adapted by Işıklı (2006) with an alpha coefficient for the total scale of .93 (three factors .83, .82 and .90 respectively). In the present study, the internal consistency for the total scale was found to be .90 (three factors .88, .72 and .82 respectively).

The *Ways of Coping Inventory* (WCI) was developed by Folkman and Lazarus (1980) to measure the problem-focused and the emotion-focused types of coping with 66 items rated on a five-point Likert type scale. The adaptation of the WCI into Turkish was made by Siva (1991) who added eight new items to the scale. Factor analysis of the Turkish version of the scale by Gençöz, Gençöz and Bozo (2006) yielded three factors: 'problem focused coping' (active engagement of the problem), 'emotion focused coping' (alleviating emotions by reinterpreting) and 'indirect coping' (seeking social support). In the present study, the internal consistency of the total scale was .71 and of the three factors, .75, .84 and .69 respectively.

Religious Participation and Belief was assessed with two questions based on Wuthnow (1994): 'How often do you attend religious services

currently?' (0 = not any change; 4 = complete change) and 'How is your belief of God currently?' (0 = get weaker; 4 = get strengthened).

Measures of ERF *Perceived Prognosis and Severity of the Disease*, similar to previous studies (Bellizzi & Blank, 2006; Pakenham, 2005), was measured by two Likert questions. The first question was: 'What is your perception in terms of the subjective evaluation of the health status of your husband/wife?' Possible responses ranged from 0 (very bad) to 4 (very good). Subjective evaluation of the perceived prognosis of MI patients' health was also evaluated. The second question was: 'What is the degree of life threat of the disease to your husband/wife?' Possible responses ranged from 0 (not any vital hazard) to 4 (excessive degree of vital hazard). This provided data on the spouses' fears regarding the degree of perceived threat in the future.

A *Demographic Information Form* included questions on age, education, socio-economic-status, length of marriage and time since diagnosis.

Procedure

After obtaining written informed consent from either the Ethical Committee or the hospital director, participants were selected from four different state hospitals in Turkey. Potential participants were identified with the help of cardiologists and nurses in the hospitals based on the patients' MI history on their files. Patients diagnosed with other cardiovascular problems, spouses with a history of MI or other life-threatening illness (cancer or stroke) either themselves or in their children were excluded.

Participants were contacted in two ways: telephone and face to face interview. The contact phone numbers obtained from the hospital's cardiology department were used for a short mini-telephone interview, mainly explaining the reason of the call and inviting them to hospital for the administration of the scales. A few participants ($N = 22$ out of 168) decided not to participate in the study. Second, some of the participants were contacted while attending the hospital for a routine check-up visit. After explaining the aim, a few of these participants ($N = 14$ out of 168) also decided not to participate. People who volunteered to participate signed a written informed consent form before filling out the questionnaires. The questionnaires were individually administered to each participant. Each administration lasted approximately 1.5–2.5 hours. If necessary, a five to 10-minute break was given. The order of

administration of the questionnaires was randomly determined for each participant. After the data collection and statistical analysis had been completed, all participants were invited to a debriefing group meeting where they were debriefed about the findings of the study.

Results

Data cleaning

Before statistical analysis, data were cleaned in terms of missing values and outliers: three cases with missing values over 5 percent and one case with a multivariate outlier were deleted. A total of 132 cases were examined for further analysis.

Means, standard deviations of the variables and correlations between variables

Descriptive results and correlations among the variables are presented in Table 1. Additionally, PTGI scores obtained from MI patients (reported by Şenol-Durak, 2007) and their spouses were significantly correlated ($r = .46, p < .001$). Fifty-two percent of the participants had PTG scores indicating overall 'moderate' to 'a great deal' of growth. As can be seen from Table 1, PTGI scores were closely related to support from family, friends and significant others. Furthermore, the PTGI scores of the participants were significantly correlated with the scores for coping, hardiness and the IES-R subscales.

Testing Posttraumatic Growth Model

To examine the role of latent variables on the PTG, structural equation modeling was employed using AMOS.6 software (Arbuckle, 2004). Results revealed that the model could be accepted as adequate: $\chi^2 (427, N = 132) = 808.38, p < .001$. The $\chi^2/\text{d.f.}$ ratio was within the suggested range ($\chi^2/\text{d.f.} = 1.89$); however the model did not fit the data according to Goodness of Fit Tests (GIFs); Root Mean Square Error (RMSEA; Browne & Cudeck, 1993) = .078, the Comparative Fit Index (CFI; Bentler, 1990) = .68 and the Incremental Fit Index (IFI; Bollen, 1989) = .70.

Post hoc model modifications were performed in an attempt to develop a better fitting model. The modifications suggested by the AMOS program included removal of the effect of some variables: number of children, children living with family younger than the age of 18, marital quality, age, gender, depression, having other disorder, religious

participation and problem focused coping. After deleting the nonsignificant paths, the model was retested, and the fit of the data to the model was adequate, $\chi^2 (202, N = 132) = 335.01, p < .001$. Furthermore, the χ^2 ratio was below the suggested 2:1 ratio ($\chi^2/\text{d.f.} = 1.65$). GIF showed that the fit could be regarded as adequate; RMSEA = .06, CFI = .86, IFI = .87. IR was significantly related to both ERF (Regression Estimate (RE) = $-.61, p < .01$) and PTG (RE = $-.16, p < .05$) directly (Fig. 1). While ER was significantly related with PTG (RE = $.21, p < .05$) directly, ER was not significantly related to the ERF (RE = $-.21, \text{NS}$). Therefore, the first hypothesis in the present study was partially supported. However, ERF was significantly related with CPC (RE = $-.35, p < .05$) as predicted by the second hypothesis. Moreover, CPC was significantly related to PTG (RE = $-.40, p < .05$) as predicted in the third hypothesis.

In terms of the explained variance, 42 percent of variance in the ERF was explained by IR and ER. Moreover, ERF explained 13 percent of variance in CPC. Finally, CPC explained 16 percent of variance in the PTG. In addition, IR explained 6 percent variance in the PTG, while ER explained 4 percent variance in the PTG. Consequently, 26 percent of variance in PTG was explained by three variables: CPC, IR and ER.

As shown by the indirect effects among the variables of the model, the fourth hypothesis was not supported by the SEM analysis. The examination of the indirect effect of IR and ER on PTG via ERF and CPC indicated that both ER (RE = $.03, \text{NS}$) and IR (RE = $.09, p < .05$) did not show significant indirect effect on PTG.

Discussion

The findings of the present study have confirmed the Schaefer and Moos (1998) model for PTG on the spouses of MI patients. When testing a comprehensive model of PTG developed by Schaefer and Moos, first, ERs were positively related to PTG. Similar to the findings obtained by Weiss (2004), ER was found to be a significant factor for PTG even though the explained variance was small (4%). While social support from friends, significant others and family played a considerable role in PTG in Weiss's (2004) study, this was not found in other studies (Sheikh, 2004; Widows et al., 2005). Second, hardiness (control, challenge and

Table 1. Correlations between variables and descriptive values of the variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. PTGI	1.00	.93**	.90**	.80**	.81**	.81**	-.03	.18*	.26**	.25**	.04	.11	-.01	.03	.07	.18*
2. PTGI1		1.00	.76**	.66**	.69**	.70**	-.08	.13	.29**	.21*	.06	.06	.03	.01	.10	.16
3. PTGI2			1.00	.64**	.67**	.71**	-.06	.11	.25**	.26**	.04	.13	.01	.13	.09	.22*
4. PTGI3				1.00	.58**	.57**	.07	.22*	.18*	.21*	-.02	.15	-.13	-.08	-.01	.12
5. PTGI4					1.00	.65**	.01	.22*	.16	.19*	.03	.06	.04	.02	-.01	.19*
6. PTGI5						1.00	.02	.12	.12	.14	.06	.05	.02	.06	.13	.04
7. Marital							1.00	.30**	.07	.02	-.13	.06	-.24**	-.14	-.28**	-.01
8. Family								1.00	.33**	.17	-.10	-.08	.09	-.01	-.22*	.16
9. Friend									1.00	.58**	-.12	.02	-.01	-.07	-.11	.26**
10. Signific										1.00	-.05	-.01	.05	-.18*	.04	.23**
11. Child											1.00	.01	.33**	.04	.15	-.01
12. Child18												1.00	-.52**	-.01	-.05	.06
13. Age													1.00	.21*	.13	-.07
14. Gender														1.00	.06	.08
15. Depres															1.00	-.06
16. Commit																1.00
X=	59.18	19.84	10.53	12.65	9.80	6.35	9.53	24.96	19.89	18.24	2.68	.45	52.04	.11	9.37	10.36
SD=	24.24	9.00	6.89	5.22	3.73	3.05	2.59	3.87	6.07	7.48	1.07	.81	11.04	.318	6.57	2.65
17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	
1. PTGI	-.07	.31**	.07	-.10	-.03	-.08	.10	.28**	.21*	-.33**	.33**	.35**	.31**	.20*	.28**	
2. PTGI1	-.07	.24**	.05	-.06	-.07	-.05	.10	.29**	.16	-.28**	.28**	.32**	.23**	.15	.19*	
3. PTGI2	-.09	.29**	-.01	-.05	-.04	-.07	.11	.17	.20*	-.20*	.29**	.30**	.30**	.23**	.25**	
4. PTGI3	.07	.27**	.15	-.21*	.06	-.04	.12	.29**	.12	-.30**	.29**	.28**	.28**	.16	.23**	
5. PTGI4	-.05	.40**	.14	-.14	.11	-.04	.10	.31**	.22*	-.39**	.28**	.29**	.23**	.09	.33**	
6. PTGI5	-.21	.17	-.02	.02	-.10	.02	-.08	.14	.24**	-.31**	.28**	.32**	.28**	.19*	.29**	
7. Marital	.19*	-.03	.06	-.25**	.13	.13	-.06	-.10	-.04	.02	.01	.05	-.05	.09	.08	
8. Family	.10	.20*	.16	-.15	.07	.10	.08	.02	.15	.03	-.32**	.11	-.01	.07	.05	.03
9. Friend	.12	.21*	.05	-.11	-.02	.05	.02	.10	.15	-.07	-.01	.09	.09	.02	-.07	.10
10. Signific	.04	.10	.01	-.06	.08	-.07	.01	.10	.07	.11	.01	.08	.08	.04	-.06	.14
11. Child	-.19*	-.03	-.13	.17	-.14	.16	.16	-.02	.12	.24**	-.08	.09	.17	.17	-.15	
12. Child18	.18*	.06	.21*	-.07	-.11	.10	-.25**	.07	.12	-.19*	.02	-.07	-.08	-.06	-.08	
13. Age	-.14	.01	-.15	.16	.04	-.02	.31**	.03	-.19*	.25**	-.07	-.05	.06	-.01	-.10	-.03

Table 1. (Continued)

	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.
14. Gender	.02	.12	.09	.07	-.01	-.06	-.02	-.06	.01	.08	-.08	-.03	.09	-.04	.02	-.03
15. Depres	-.27**	-.10	-.33**	.37**	-.25**	.08	.15	-.03	-.16	.26**	-.15	.35**	.15	.40**	-.04	.05
16. Commit	.09	.53**	.15	-.28**	.05	-.08	.12	.05	.22*	.07	-.16	.12	.10	.01	-.09	.04
17. Control	1.00	.09	.37**	-.45**	.35**	-.07	-.01	.08	.29**	-.38**	.11	-.19*	-.13	-.25**	.03	.03
18. Challenge		1.00	.27**	-.30**	.02	-.14	.01	.11	.36**	.12	-.31**	.09	.17	.03	.12	.10
19. Esteem			1.00	-.31**	.19*	-.08	-.26**	.13	.54**	-.18*	-.17	-.12	-.11	-.18*	.07	.05
20. Locuscont				1.00	-.22*	.15	-.06	-.17	-.41**	.28**	.03	.14	.01	.18*	-.15	-.08
21. Prognosis					1.00	-.28**	-.06	.09	.08	-.11	.07	-.11	-.06	-.17	.02	.02
22. Threat						1.00	.17	-.08	-.07	.07	-.08	.19*	-.04	.14	-.13	-.01
23. Disord							1.00	-.05	-.08	.18*	-.10	.09	.08	.11	-.14	-.10
24. Time (day)								1.00	.04	-.08	.10	-.11	-.13	-.12	.08	.02
25. Problem									1.00	.06	-.35**	.09	.07	-.01	.04	.29**
26. Emotion										1.00	-.49**	.30**	.34**	.38**	-.02	.11
27. Indirect											1.00	-.29**	-.24**	-.34**	.03	-.11
28. Ruminat												1.00	.39**	.83**	.01	.16
29. Avoidance													1.00	.37**	.14	.16
30. Hypervigil														1.00	.02	.13
31. Relipartici															1.00	.34**
32. Relibelief																1.00
X=	10.35	9.93	30.33	80.47	2.67	1.78	.47	1427.7	70.58	38.87	24.34	12.26	11.80	9.17	.81	2.74
SD=	3.27	2.45	5.92	18.12	.74	1.14	.50	2938.1	11.94	11.41	6.83	7.51	5.51	5.94	1.24	.92

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

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

PTGI = PTGI total score; PTGI1 = IRP; PTGI2 = NPOL; PTGI3 = GAL; PTGI4 = GSPS; PTGI5 = SD; marital = marital quality; family = social support from family (one factor of MSPSS); friend = social support from friend (one factor of MSPSS); signific = social support from significant other (one factor of MSPSS); child = number of children; child18 = number of children living with family; age = age; gender = gender; depres = depression (BDI); commit = commitment (one factor of PHS); control = control (one factor of PHS); challenge = challenge (one factor of PHS); esteem = self-esteem (RSES); locuscont = locus of control (LCS); prognosis = perceived prognosis; threat = perceived threat of disorder; disord = having disorder; time = time since the MI; problem = problem focused coping (one factor of WCI); emotion = emotion focused coping (one factor of WCI); indirect = indirect coping (one factor of WCI); ruminat = rumination (one factor of IES-R); avoidance = avoidance (one factor of IES-R); hypervigil = hypervigilance (one factor of IES-R); relipartici = religious participation; relibelief = religious belief

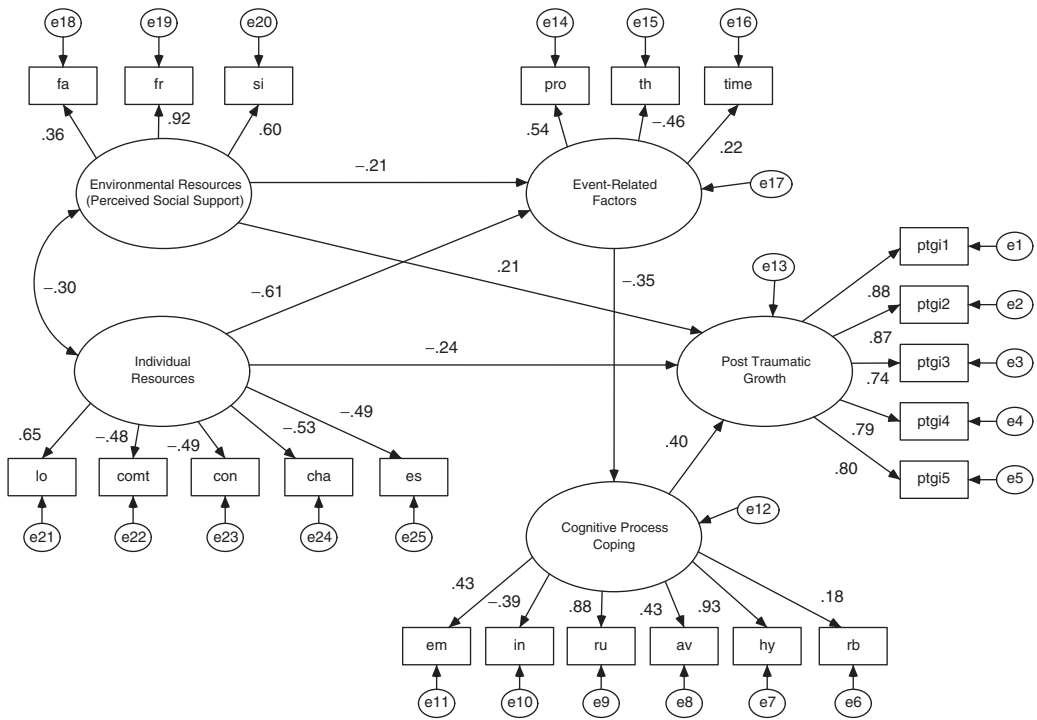


Figure 1. The structural equation model testing the factors associated with PTG of the SMIP

Notes: ^a Full details of the analyses are available from the authors

fa = social support from family; fr = social support from friend; si = social support from significant other; lo = locus of control; comt = commitment; con = control; cha = challenge; es = self-esteem; pro = perceived prognosis; th = perceived threat of disorder; time = time since the MI; em = emotion focused coping; in = indirect coping; ru = rumination; av = avoidance; hy = hypervigilance; rb = religious belief; ptgi1 = IR; ptgi2 = NPOL; ptgi3 = GAL; ptgi4 = GSPS; ptgi5 = SD

commitment) (Linley, 2003), locus of control (Cohen et al., 1998) and self-esteem made smaller contributions in explaining PTG. There are inconsistent findings regarding the effect of some IR in literature. For instance, the effect of self-esteem was not found among HIV/AIDS patients (Siegel et al., 2005). Third, both the ER and IR were related negatively with the ERF (explaining 42% of variance) as suggested by Schaefer and Moos (1998). Among the observed variables of ERF, while perception of threat was negatively related (such as findings obtained from the MI patients, Şenol-Durak, 2007), perceived prognosis and time-since-diagnosis were positively related confirming the results of Weiss (2004) and Widows et al. (2005). Fourth, CPC was positively related to PTG (explained 16% of variance) as consistent with the findings from the samples of trauma survivors

(e.g. Calhoun et al., 2000). When indirect effects were evaluated in the model, neither IR nor ER demonstrated indirect effects on PTG via ERF and CPC.

There were no data to serve as cut off scores for the spouses' *Posttraumatic Growth Inventory* (PTGI) scores. In comparison with prior research obtained from Weiss (2004) ($M = 47.0$, $SD = 22.9$) the spouse sample had higher scores on the PTGI ($M = 59.2$, $SD = 24.2$). It is known that the PTG scores and the determinants of PTG may vary in different samples and cultures. Therefore, the results should be interpreted only in the context of the stressful nature of MI living in Turkish culture. Further research is necessary using various samples experiencing different traumatic life events to examine the divergent validity of the findings. Additionally, the effect of other factors on PTG

such as introversion–extraversion (Sheikh, 2004), positive and negative affect (Pakenham, 2005), emotional state of partners (Dekel, 2007), marital commitment and marital relationship (Weiss, 2004) should be taken into consideration in future studies.

One of the important limitations of the present study was sample size. Since SEM is based on variances, the larger the sample size, the higher the homogeneity of variances and explained variances. The Parsimony Adjustment to CFI index (.683), one of the case-sensitive measures of goodness of fit (Mulaik et al., 1989), demonstrated that the model indicated adequate fit. However, a bigger sample size is needed to obtain a better fit of the model to the data and to control over-fit. Ten participants per indicator are recommended generally (Tabachnik & Fidell, 1996). Using this guideline, more than 220 participants would have been needed in the present study. However, Kline (2005) accepted those fewer than 100 subjects as small, those with 100 to 200 participants as medium and those with more than 200 participants as large. When considering this guideline, the present study may be accepted as having medium sample size.

The characteristics of the sample may be another problem such as gender (Schaefer & Moos, 1998) and socio-economic level. In larger samples, these individual variables should be represented in equal proportions. The sample also varied greatly in terms of the onset of the disease of the participants' spouses. While some individuals may deal with the MI attack in a relatively short interval (i.e. two days), other individuals deal with MI in a much longer interval (i.e. seven years). The effect of the passage of time after the heart crisis on PTG presents one limitation in terms of the generalizability of the findings. Additionally, the inconsistency in the completion of the questionnaires during data collection may have limited the results also. Questions completed with the help of researchers may have given socially desirable responses.

The clinical implications of the present findings are that a group of variables (especially locus of control, social support received from friends and significant others) were associated with PTG responses in this Turkish sample of spouses of MI patients. Regarding the explained variance of latent variables, clinicians first may focus on the role of CPC in facilitating PTG. Consistent with the previous findings (Calhoun et al., 2000), clinicians sharing the ruminative ideas of spouses or their hypervigilance concerning MI may help to facilitate PTG in

spouses. It is known that constructive rumination related to contemplating changes after trauma help individuals to grow (Weiss, 2004). Clinicians may help with the painful side of this engagement which offers emotional regulation.

In summary, in addition to traditional medical treatment approaches, working with either patients or partners facilitates integration of the treatment of patients (Hilscher et al., 2005). Therefore, providing an environment that encourages PTG in MI patients and their families will make a contribution to the healing processes in the patients. Facilitating such growth might be a crucial role for health professionals in dealing with traumatic problems and taking on a positive perspective. In response to the stressful nature of heart disease, IR, ER and CPC are directly associated with the PTGI scores of spouses. Particularly, locus of control, social support received from friends and significant others, rumination and hypervigilance play a considerable role in the development of PTG of the spouses of heart disease patients. In turn, this effect might contribute to the healing process of the patients.

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