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Possible Correlates of Posttraumatic Growth Among Patients with Type II Diabetes

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Keywords
Diabetes, posttraumatic growth, self-efficacy, perceived social support, cognitive processing

Abstract
Diabetes, a chronic illness, affects individuals' lives dramatically. The present study aims to evaluate the role of possible psychosocial variables associated with Posttraumatic Growth (PTG) among outpatients with diabetes with a history of inpatient treatment. Within a theoretical framework of the model of Schaefer and Moos (1998), the roles of perceived social support, self-efficacy, diabetes-related variables, and cognitive processing have been examined by employing structural equation modeling in a sample of outpatients with diabetes having a history of at least one inpatient treatment. A total of 275 diabetic outpatients, 183 women and 92 men, who were treated at least once in a hospital, participated in the study. The mean age of participants was 52.09 ± 9.49 years. Diabetes-related factors mediated the relationship between perceived social support and PTG. Also, cognitive processing mediated the relationship between self-efficacy and PTG. Increasing patients' self-efficacy and facilitating social support networks should be taken into account when designing psychosocial intervention programs in diabetic patients, as the programs with content support high control perception of their health.

Anahtar kelimeler
Diyabet, travma sonrası gelişim, öz yeterlilik, algılanan sosyal destek, bilişsel işlemleme

Tip II Diyabetli Hastalarda Travma Sonrası Gelişimin Olası İlişkileri
Öz
Kronik bir hastalık olan diyabet, bireylerin yaşamlarını çarpıcı biçimde etkiler. Bu çalışma yatarak tedavi alma öyküsü bulunan diyabetli hastalarda travma sonrası gelişim (TSG) ile ilişkili olası psikososyal değişkenlerin rolünü değerlendirmeyi amaçlamaktadır. Schaefer ve Moos (1998) modelinin teorik çerçevesi dikkate alınarak, diyabetli hasta grubunda algılanan sosyal desteğin, öz yeterliliğin, diyabetle ilgili değişkenlerin ve bilişsel işlemenin rolü yapısal eşitlik modeli kullanılarak incelenmiştir. Araştırmaya diyabet nedeniyle yaşamında en az bir kez hastanede tedavi gören 183 kadın ve 92 erkek olmak üzere toplam 275 ayaktan tedavi gören diyabet hastası katılmıştır. Katılımcıların yaş ortalaması 52.09 ± 9.49 yıldır. Bulgulara bakıldığında, diyabetle ilgili faktörlerin, algılanan sosyal destek ile TSG arasındaki ilişkiye aracılık ettiği görülmüştür. Ayrıca, bilişsel işlemleme, öz yeterlilik ve TSG arasındaki ilişkiye aracılık etmiştir. Hastaların öz yeterliliğini arttırmak ve sosyal destek ağlarını kolaylaştırmak içerikli programlar, hastaların sağlıklarına ilişkin yüksek kontrol algısını desteklediği için diyabetli hastalarda psikososyal müdahale programları tasarlarken dikkate alınmalıdır.

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Posttraumatic growth (PTG) is described as perceiving positive aspects of life after experiencing stressful life events (Frazier & Kaler, 2006), which results in positive changes in an individual's social and personal life (Tedeschi & Calhoun, 2004). Variables associated with PTG have been examined in various samples, such as patients with breast cancer (Ruini, Vescovelli, & Albieri, 2013), HIV/AIDS (Sawyer, Ayers, & Field, 2010), and heart disease (Bluvstein, Moravchick, Sheps, Schreiber, & Bloch, 2013). Although there has been an increasing amount of prevalence worldwide (World Health Organization, 2018), positive influences of diabetes among patients have investigated in a limited number of studies.

Diabetes mellitus dramatically affects every aspect of life. It leads to organ failure (i.e., kidney failure, cardiovascular problems), organ loss (i.e., retinopathy), and even death (American Diabetes Association, 2014; World Health Organization, 2018). There are two well-known types of diabetes. Type I diabetes starts at earlier onset especially among children and adolescents due to deficits in the autoimmune system. On the other hand, Type II diabetes is seen among adults (in middle age range) who are experiencing high stress and bad habits with additional physical illnesses. Researchers reported that patients with diabetes frequently experience "diabetes burnout" (Bagner, Williams, Geffken, Silverstein, & Storch, 2007; Polonsky, 2000) and psychological distress (Downie, Mullan, Boyes, & McEvoy, 2019) due to the impact of the disease on their daily lives. Diabetes burnout is seen among both diabetic patients such as Type I diabetic patients as well as their parents (Lindström, Åman, & Norberg, 2011). Also, genetic and pathologic markers (American Diabetes Association, 2014), environmental factors (Rewers & Ludvigsson, 2016) and stress (American Diabetes Association, 2014; Hägglöf, Blom, Dahlquist, Lönnberg, & Sahlin, 1991; Rewers & Ludvigsson, 2016) are emphasized as some of the risk factors in the etiology of both Type I (Lindström et l., 2011) and Type II diabetes (Rewers & Ludvigsson, 2016). Stress experienced by those patients is particularly associated with controlling the threats of illness (i.e., multiple organ failure and organ loss) and admiring the treatment plan (i.e. diet). Stress, experienced as post-traumatic stress disorder (PTSD) among patients with diabetes, has been examined in some studies (Landolt, Vollrath, Ribi, Gnehm, & Sennhauser, 2003; Lukaschek et al., 2013). In a longitudinal study over 22 years, PTSD increased the presence of Type II diabetes twice among women patients, and the relationship between two variables was significant when other psychological problems controlled (binge drinking, anxiety, depression, and childhood abuse) (Roberts, 2015). Similarly, in a population-based study (N=2970), 10.5% of participants had partial or elevated scores from PTSD, and there was a significant relationship between PTSD and Type II diabetes when socio-demographic (age, gender), metabolic (obesity, alcohol consumption) and psychological variables (depression, anxiety) controlled (Lukaschek et al., 2013). Also, in the clinical sense, routine assessment of diabetes distress is recommended for professionals working with these patients since distress experienced by patients have poorer diabetic treatment outcomes (American Diabetes Association, 2014) especially in higher blood glucose level (Downie et al., 2019). Other studies examined resiliency among adolescent patients with diabetes with hypoglycemia symptoms (Wee, Lee, Ravens-Sieberer, Erhart, & Li, 2005) and spiritual growth among female patients with diabetes (Cagle, Appel, Skelly, & Carter-Edwards, 2002). Posttraumatic growth among patients with diabetes, however, has not been extensively studied, despite the significant amount of research dedicated to PTG among patients with other chronic illnesses. Higher stress-related growth relationship with higher social support and self-esteem among diabetic patients (Author, 2013), higher posttraumatic growth relationship with the lower length of hospital stay and better familial relations among parents of diabetic children (Hungerbuehler, Vollrath, & Landolt,

2011) have been investigated. Therefore, the purpose of the present study is to examine the possible correlates of Posttraumatic growth among patients with diabetes.

Schaefer and Moos (1998) proposed a model to explain the factors related to PTG. According to this model, both personal and environmental systems affect event-related factors by triggering the cognitive processing of the event, in the course of which individuals experience positive outcomes. Internal locus of control (Cohen, Cimbolic, Armeli, & Hettler, 1998), higher positive affect (Hamama & Sharon, 2013), higher self-acceptance (Zhao, An, Sun & Liu, 2019) and higher self-efficacy (Carver, 1998; Spielman & Taubman-Ben-Ari, 2009; Pellicano, 2019) were personal system variables that were correlated with PTG. Also, personal growth was positively correlated with self-efficacy in a sample of patients with a history of recent cancer surgery (Luszczynska, Mohamed, & Schwarzer, 2005) and a sample of spinal-cord injury patients (Kunz, Joseph, Geyh, & Peter, 2019). Also, self-efficacy plays a considerable role in the recovery after traumatic incidents on the basis of social cognitive theory (Benight & Bandura, 2004). Similarly, self-efficacy is noted as promoting the use of new coping strategies during stressful times (McMillen, 2004).

In regard to the effect of environmental factors, PTG and familial support were positively correlated with each other in a sample of parents having a diabetic child (Hungerbuehler et al., 2011). Similarly, having higher emotional support after three months of elapsed diagnosis of cancer was positively correlated with PTG in a longitudinal study (Schroevers, Helgeson, Sanderman, & Ranchor, 2010). The relationship between perceived social support and PTG was also found in another study conducted with rescue workers (Zhao et al., 2019). Thus, both personal and environmental system factors are significantly associated with PTG for patients, their caregivers, and significant others.

The studies examining the relationship between cognitive processing and PTG showed that higher scores in cognitive processing are correlated with higher scores in PTG (Calhoun, 2014; Stockton, 2011). Rumination, avoidance, and hypervigilance among the spouses of patients with heart disease (Authors, 2010), deliberate rumination among trauma survivors (i.e., cancer, bereavement) (Stockton, 2011), positive constructive restructuring, denial and comparison among stroke patients (Gangstad, Norman, & Barton, 2009) were mentioned to be positively associated with PTG in several studies. Therefore, cognitive processing is considered to facilitate PTG.

Concerning the disease-related factors, the time elapsed since the diagnosis (Gangstad, et al., 2009), the course of the event (Bellizzi & Blank, 2006), perceived threat, and perceived prognosis of the illness (Authors, 2010) have been investigated in the PTG literature. For instance, the mediator role of time elapsed after brain stroke was found in the relationship between cognitive processing and PTG; an increase in the length of illness was associated with higher cognitive appraisal (resolution, downward comparison) which result in higher PTG (Gangstadet al., 2009). The perception of a good prognosis was particularly crucial for developing PTG in heart disease survivors (Authros, 2010). Similarly, showing adherence to diabetes treatment and PTG was positively associated with each other in diabetic patients (Kayano et al., 2018). Moreover, higher threat perception was correlated with PTG among patients with breast cancer (Cordova, Cunningham, Carlson, & Andrykowski, 2001). On the other hand, using Schafer and Moos' model as their theoretical framework, Siegel and her colleagues (2005) reported that the stage of the disease, number of physical symptoms, and time passed since diagnosis were not significantly associated with PTG in HIV/AIDS patients. The inconsistent findings on the relative importance of event-related factors might be

related to the type of illness. Therefore, the association of these factors with PTG should be further examined empirically.

In the light of the literature mentioned above, and based on the model suggested by Schaefer and Moos (1998), the present study aimed to reveal possible correlates of posttraumatic growth among Turkish patients with Type II diabetes. The model is aimed to examine in the context of diabetes that earlier studies tested the model with individuals having other life struggles. After examining the effects of self-efficacy, perceived social support, diabetes-related variables, and cognitive processing on PTG, a new model was proposed to determine the possible correlates of PTG. The model included one observed variable, Self-Efficacy, and three latent variables, Perceived Social Support (PSS), Diabetes-Related Variables (Dbt), and Cognitive Processing (CP). Using structural equation modeling, the following hypotheses were tested; (1) Perceived social support would be positively associated with Dbt, CP, and PTG; (2) Self-efficacy would be positively associated with SS, CP, and PTG; (3) Dbt would be positively associated with PTG; (4) CP would be positively associated with PTG, and (5) the relationship of both SS and Self-efficacy with PTG would be partially mediated by Dbt and CP.

Method

Participants

The study was conducted on 275 outpatients with diabetes (M_{age} = 52.09, *SD* = 9.49), who have been admitted to and treated in a hospital at least once as an inpatient. The reason for recruiting formerly hospitalized patients with diabetes was to include relatively more severe cases to our study. All of the participants were patients with Type II diabetes. More than half of the sample (*n* = 183, 66.5%) was women, and the rest were men (*n* = 92, 33.5%). Approximately half of the participants were primary school graduates (*n* = 130, 47.3%), and the remainder of the participants were middle school (*n* = 34, 12.4%), high school (*n* = 44, 16%), or college (*n* = 21, 7.6%) graduates. A relatively small number of participants were literate with no formal education (*n* = 46, 16.7%).

The majority of the participants were married (*n* = 245, 89.1%), and the remaining were widowed (*n* = 17, 6.2%), divorced (*n* = 9, 3.3%), or single (*n* = 4, 1.5%). The mean of number of children that the participants had was 2.94 (min. = 0, max. = 6). While 57.5% (*n* = 158) of the participants had never been employed, the rest were either employed or unemployed at the time of data collection, even though they had been employed in the past (*n* = 44, 16%; *n* = 73, 26.5%, respectively).

All participants were outpatients with inpatient treatment history. More than half of the participants were hospitalized only once (*n* = 178, 64.7%), while the rest had received inpatient treatment twice (*n* = 51, 18.5%) , three times (*n* = 21, 7.6%), four times (*n* = 6, 2.2%), five times (*n* = 2, 7%), six times (*n* = 7, 2.5%), seven times (*n*=1, 4%), eight times (*n* = 1, 4%), 10 times (*n* = 7, 2.5%), or 15 times (*n* = 1, 4%).

In terms of the current treatment regimen, 27.3% (*n* = 75) of the participants were being treated only with oral medication, 11.6% (*n* = 32) were being treated only with insulin, and 61.1% (*n* = 168) were being treated with both oral medication and insulin. Almost all of the participants had health insurance (*n* = 270, 98.2%).

Measures

In the present study, five constructs were being assessed, namely, self-efficacy, perceived social support, cognitive processing, diabetes-related variables, and PTG, which can only be evaluated via self-report scales due to the nature of the constructs. In this model, all constructs are separate concepts and did not overlap with one another.

Demographic Information: This form included questions regarding the age, gender, education, and monthly income of the participants. There were also illness-related questions, such as the type of diabetes, treatment regimen, the number of hospitalizations, perceived prognosis, and perceived threat of the disease.

***Post Traumatic Growth Inventory (PTGI)*:** PTGI aims to examine degree of positive change among people with a history of traumatic life events. It is a 21 item, 6-point Likert-type scale (Tedeschi & Calhoun, 1996). The scale has 5 factors (new possibilities, relating to others, personal strength, spiritual change, and appreciation of life), explaining 60% of the variance (Cohen, Hettler, & Pane, 1998). Dirik (2006) found good internal consistency, with alpha values of .86, .87, and .88, respectively. In the present study, the revised version of the inventory was used, and it's Cronbach's alpha reliability for the present sample was .95.

Impact of Event Scale-Revised Form (IES-R:. IES-R aims to assess current subjective distress for any specific life event in terms of intrusions, hyperarousal, and avoidance (Horowitz, Wilner, & Alvarez, 1979). It consists of 21 items measured on a 5-point Likert-type scale. The questions are about the frequency of the symptoms experienced during the past week. The Turkish version of the scale yielded satisfactory validity and reliability (Isikli, 2006) (internal consistency ranged between .82 to .90). In the present study, IES-R was used to assess cognitive processing regarding diabetes, and the Cronbach's alpha reliability of total IES-R for the present sample was .95.

The Multidimensional Scale of Perceived Social Support (MSPSS): MSPSS aims to assess the level of perceived social support an individual perceives from friends, family, and significant others, with alpha internal consistency reliabilities ranging between .79 and .98, and test-retest reliabilities ranging between .72 and .85 (Zimet, Dahlem, Zimet, & Farley, 1988). Eker, Arkar, and Yaldiz (2000) adapted the scale into Turkish with satisfactory internal consistency reliabilities ranging between .80 and .95 in a study conducted on psychiatric patients, their visitors, and control subjects. The Cronbach's alpha reliabilities of the factors for the present sample ranged between .92 and .95.

Generalized Self-Efficacy Scale (GSES): GSES is a 10 item, 4-point Likert-type scale that assesses whether the person has a positive self-view and whether he/she is goal-oriented or not (Schwarzer & Jerusalem, 1995). The scale has satisfactory internal consistency coefficients ranging between .76 and .90 in different samples (Schwarzer, 1992). The scale was adapted to Turkish by Aypay (2010) with satisfactory internal consistency (.83). In the current study, the internal consistency reliability of the scale was .94.

Procedure

The research protocol with the accompanying recruitment plan was approved by the Institutional Research Board of Bolu Abant Izzet Baysal University. After the ethical permissions were obtained from the

hospitals, the head of the clinics, clinicians, and clinicians' treatment personnel were informed about the study. After the patients agreed to be referred to the researchers, they were approached and informed about the study. In the present study, a paper-and-pencil questionnaire format was preferred instead of face-to-face interviews since it has an advantage over face-to-face interviews regarding social desirability (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The participants, who gave consent, were included in the study. They completed the questionnaires in an empty room, a clinic, or the waiting rooms of polyclinics in about 30-45 minutes. Researchers helped to read the questions to participants who have no formal education to answer questions.

Results

Descriptive Statistics for and Intercorrelations among the Study Variables

Descriptive statistics for and intercorrelations among the study variables are presented in Table 1.

Table 1
Correlations between variables and descriptive values of the variable

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. PTG	1	.26**	.18**	.25**	.30**	.31**	.30**	.42**	.04	.11	.11	.01
2. Family Support		1	.36**	.47**	.40**	-.02	-.06	.08	-.11	.01	.16**	-.07
3. Friend Support			1	.53**	.21**	-.10	-.11	.00	-.08	-.07	.23**	-.06
4. Other Support				1	.22**	-.08	.00	.07	-.09	-.04	.13*	-.01
5. Self-Efficacy					1	-.05	-.03	.18**	-.16**	-.01	.23**	-.11
6. Rumination						1	.79**	.31**	.17**	.06	-.27**	.11
7. Hypervigilance							1	.37**	.19**	.10	-.27**	.10
8. Avoidance								1	-20**	.11	.03	.07
9. Treatment									1	.16**	-.16**	.34**
10. Perceived threat										1	-.21**	.22**
11. Perceived prognosis											1	-.20**
12. Time since illness												1
X	47.99	22.16	16.30	16.38	20.02	9.14	7.43	9.17	1.95	2.23	2.16	3554.79
SD	24.63	6.98	8.10	8.73	7.22	7.30	5.70	6.61	1.35	1.18	.89	2522.29
Range	104	24	24	24	30	27	23	28	3	4	4	14235

**Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Checking for Common Method Variance (CMV)

Measuring the predictor(s) and criterion variables by utilizing the same source, same time with self-report measures leads to potential problems of common method variance (CMV) (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). which is defined as variance that is attributable to the measurement method rather than to the constructs the measures represent (Podsakoff et al., 2003). In other words, method variance can either inflate or deflate observed relationships between constructs, thus leading to both Types I and Type II errors (Podsakoff et al., 2003).

Due to these reasons, we performed Harman's single-factor test was used so as to check for the probability of emergence of a single factor and to see whether a general factor can clarify the covariance among variables (Krishnaveni & Deepa, 2013) An initial principal component without any rotation analysis was performed prior to testing the model by SEM.; it revealed 4 factors with eigenvalues over 1, accounting for 61.92% of the total variance. The percentages of variances accounted for each factor are presented as such; 21.58%, 20.48%, 11.09%, and 8.77%, respectively. These results show that there is no single factor for all variables. Also, a single factor does not explain the majority of the variance; it is lesser than %50 total variance; it explains only % 22 of the total variance.

Besides, Harman's single-factor test was performed by using CFA to check the probability of a single factor emerging according to the variable loadings (Podsakoff et al., 2003). The model exhibited a very poor fit; χ^2 (64, N=275) = 812.714, p = .000, χ^2 / df = 12.699, RMSEA = .207 (LO 90 = .194 – HI 90 = .219), SRMR = .153, TLI = -.034, CFI = .001. The results of the Harman's single-factor test indicated that the majority of the variance cannot be explained by a general single factor.

Factors Related to PTG: The Tested Model

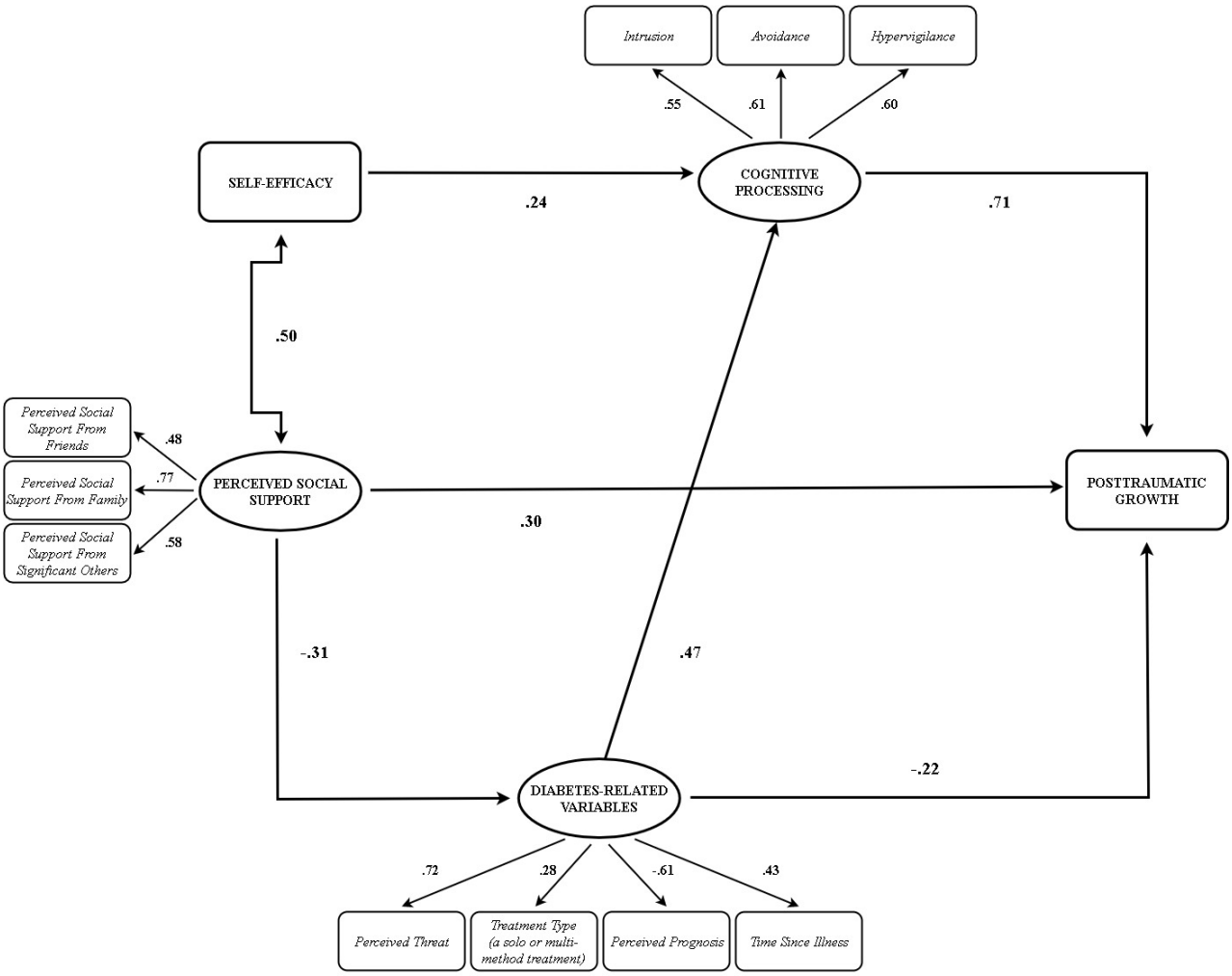

Figure 1. The Factors Related to PTG

Using AMOS 21 software (Arbuckle, 2012), the proposed model was tested using structural equation modeling in order to examine the possible associations of the latent and observed variables regarding PTG. Based on the findings, the model was adequate; $\chi^2(44, N = 275) = 89.60 p = .001$, $\chi^2/df = 2.04$. Goodness of fit indices (GIFs) revealed adequate fit for the model; the Root Mean Square Error (RMSEA; (Browne & Cudeck, 1993)) = .06, the Comparative Fit Index (CFI; (Bentler, 1990)) = .94, the Tucker-Lewis coefficient (Bollen, 1989) = .90, and the Incremental Fit Index (Bollen, 1989) = .94. Yet, according to regression estimates, the relationship between self-efficacy and PTG [Regression Estimate (RE) = .04, *p* = n.s.] and the relationship between perceived social support and cognitive processing [RE = .06, *p* = n.s.] were not significant. Therefore, SEM analyses were repeated excluding the insignificant relationships. The results of the second analysis revealed an adequate model ($\chi^2(46, N = 275) = 90.00$, $p = .012$, $\chi^2/df = 1.95$). The fit of the second model was also satisfactory (RMSEA = .05, CFI = .94, TLI = .92, IFI= .94) (see Figure 1).

As expected, perceived social support was significantly correlated with diabetes-related variables (RE = -.31, p < .001) and PTG (RE = .30, p < .001). Therefore, the first hypothesis was only partially supported because the link between perceived social support and cognitive processing was removed from the analyses. Parallel to our expectations in the second hypothesis, self-efficacy was significantly correlated with SS (RE = .50, p < .001) and cognitive processing (RE = .24, p < .001). Thus, as in the first hypothesis, the second hypothesis was partially supported due to the removal of the link between self-efficacy and PTG in the proposed model. Similarly, in line with the third hypothesis, cognitive processing was significantly correlated with PTG (RE = .71, p < .001). Moreover, 5.7% of the variance in CP was explained by self-efficacy, and 9.6% of the variance in diabetes-related variables was explained by perceived social support. Moreover, SS (9%), diabetes-related variables (4.8%), and CP (50.4%) explained the 64.2% of the variance in PTG. As stated in the fifth hypothesis, the relationship between perceived social support and PTG was mediated by diabetes-related variables (RE = .07, p < .001). Additionally, the relationship between self-efficacy and PTG was mediated by cognitive processing (RE = .17, p < .001).

Discussion

The present study examined the factors associated with PTG among Turkish patients within the theoretical framework of Schaefer and Moos (1998) model. In this regard, the results of the present study demonstrated that PTG among outpatients with Type II diabetes with a history of inpatient treatment could be explained by various factors described in Schaefer and Moos (1998) model.

Consistent with the research on different samples, perceived social support was significantly related to self-efficacy and PTG (Hungerbuehler et al., 2011). Individuals with higher perceived social support had higher scores from PTG (Zhao et al., 2019) with higher self-efficacy. Perceived types of social support showed a significant and high correlation among themselves. Each perceived social support type correlates significantly with PTG. However, the perceived social support from the family is associated with a higher degree of PTG than the perceived social support from the other two types of perceived social support, from friends and significant people. Also, the relationship between higher self-efficacy and higher PTG was similarly seen in other studies (Kunz et al., 2019; Pellicano, 2019) Additionally, parallel to the previous findings (Authors, 2010) individuals with higher scores on cognitive processing (having higher rumination, hypervigilance, and avoidance) received higher scores from PTG. The more cognitively thinking and

ruminating about the process, you grow more. Therefore, cognitive processing helps patients to elaborate more about the illness which results in finding positive sides of the illness. In the literature, the more cognitively and thinking about the process, you grow more. Also, diabetes-related factors were closely related to PTG, which supports previous findings in the literature. To illustrate, perceived threat, perceived prognosis (Authors, 2010), time passed since diagnosis (Gangstad, Norman, Barton, 2009), and treatment type were significantly correlated to PTG. To put it differently, type II diabetic patients being treated with a single treatment modality (i.e., oral medication only or insulin only) had higher scores from PTG as compared to those who were being treated with more than one modality. Patients perceiving lower levels of illness-related threat and perceiving a better prognosis had higher scores from PTG. Additionally, patients who were more recently diagnosed with type II diabetes had higher scores from PTG.

Contrary to the findings of previous studies (Luszczynska et al., 2005), the relationship between self-efficacy and PTG was not significant. The relationship between self-efficacy and PTG was significant through the effect of a third variable, cognitive processing. Higher scores on self-efficacy were correlated with higher scores on cognitive processing, which was in turn correlated with higher PTG scores. Conflicting with other studies in the relevant literature (eg. Authors, 2010), diabetes-related variables had a mediator role in the relationship between social support and PTG. Moreover, lower scores on perceived social support were correlated to higher scores on diabetes-related variables that were significantly associated with PTG. This inconsistency between current findings and the previous literature might be due to the fact that each study uses a different patient sample with different illnesses, which brings different medical regimens and daily routines. In our study, complying with diet restrictions, a crucial part of the diabetes treatment, would be more comfortable with perceived social support particularly from family members and friends.

The findings discussed above can be beneficial for professionals working in the health care system. The management of diabetes requires high self-control over one's health, and therefore, patients' personality traits gain particular importance. Consequently, likewise in other disorders (Gere, Martire, Keefe, Stephens, & Schulz, 2014), professionals may benefit from evaluating their patients' self-efficacy, which is vital due to its effect on diabetes-related variables (i.e., insulin level) as well as on emotional well-being (Rubin, Peyrot, & Saudek, 1993). Moreover, consistent with the literature (Authors, 2010), health care professionals can also enhance the social support network of their patients, which would facilitate self-care (Rosland et al., 2014; van Dam et al., 2005) and provide growth. Considering the explained variance over PTG, clinicians might also assess the cognitive processing in patients with Type II diabetes. Exploring the meaning and impact of diabetes with patients would facilitate growth.

The present study *was* not without its limitations. *The* first limitation involved the generalizability of the findings. Data were obtained from outpatients with Type II diabetes with a history of inpatient treatment, and therefore, the results cannot be generalized to all patients with diabetes. Thus, it is recommended that future studies involve patients with different types of diabetes, managed with different treatment modalities. Moreover, the present findings were obtained through a cross-sectional design based upon self-reports. Thus, in order to make causal inferences, future studies are strongly suggested to use longitudinal designs. Longitudinal studies are also recommended with patients who newly diagnosed to have type II diabetes to examine the effect of posttraumatic growth over the course of the illness. Another limitation is using self-report measurements. The possible effect of CVM is taken into consideration both during the process of

research design and data analysis, as explained in the procedure, results, and discussion sections. In the future, the results of the present study will be tested by the longitudinal research design.

In addition to the effect of self-efficacy, diabetes-related variables, perceived social support, and cognitive processing, other psychosocial and illness-related variables can be examined in future studies to strengthen the validity of the findings. For instance, received social support (Cadell, Regehr, & Hemsworth, 2003), emotional support (Siegel et al., 2005), resiliency (Tedeschi, Park, & Calhoun, 1998), and locus of control (Cohen, Cimbolic, et al., 1998) are some of the variables that were found to influence the PTG responses and can be further investigated in relation to Type II diabetes.

Investigating the factors related to PTG among Type II diabetic patients is a relatively new area of study. The findings of the present study could be applied to clinical settings while working with Type II diabetic patients who tend to feel burned-out more quickly due to their illness (Bagner et al., 2007).

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