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Resilience and meaning-centered coping as mediators in the relationship between life satisfaction and posttraumatic outcomes among earthquake survivors in Turkey

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Abstract

This study aimed to examine the mediating roles of resilience and meaning-centered coping in the relationships between life satisfaction and posttraumatic growth and depreciation. The sample consisted of 255 participants (70% females, M_{age} = 23.35), who directly experienced the earthquakes that occurred in Turkey on February 6, 2023. Using an online survey, participants answered self-reported questions about their perceived life satisfaction, posttraumatic growth, depreciation, resilience, and meaning-centered coping. Findings showed that life satisfaction significantly predicted resilience, meaning-centered coping, and posttraumatic depreciation. Resilience and meaning-centered coping significantly predicted both posttraumatic growth and depreciation. Importantly, resilience and meaning-centered coping significantly mediated the association of life satisfaction with posttraumatic growth and depreciation. In conclusion, the findings of this study have important implications for customizing interventions designed to enhance the resilience and coping mechanisms of individuals dealing with traumas, including those with posttraumatic stress disorder.

Abbreviations: BRS = brief resilience scale, COVID-19 = coronavirus disease 2019, KMO = Kaiser-Meyer-Olkin, MCCS = meaning-centered coping scale, PTD = posttraumatic depreciation, PTD-S = posttraumatic depreciation scale, PTG = posttraumatic growth, PTG-S = posttraumatic growth scale, PTGDI-X-SF = posttraumatic growth and posttraumatic depreciation scales short forms, PTSD = posttraumatic stress disorder, SWLS = satisfaction with life scale, SES = socioeconomic statuses.

Keywords: life satisfaction, meaning-centered coping, posttraumatic depreciation, posttraumatic growth, public health, resilience

1. Introduction

Trauma is defined as emotional responses to terrible events[1] Traumatic experiences include accidents, emergency health problems, and natural disasters such as floods and earthquakes.[2,3] Trauma can have profound effects on individuals and can fundamentally shake the way they interpret the world and their assumptions about the world.[4] Similarly, an earthquake can destroy everything depending on its size and intensity.[5] Especially, the major earthquakes in Turkey, centered on Kahramanmaraş on February 6, 2023, caused severe destruction in 11 cities and killed about 50,000 people.[6] Considering the human casualties, injuries, and material losses caused by these earthquakes, they are among the largest earthquakes ever. Traumatic experiences such as loss of relatives, loss of work, and loss of home caused by these earthquakes have created a ground where approximately 13 million people (total population living in 11 provinces in the earthquake region) may experience various mental health problems.[7,8] Therefore, understanding the psychological effects of these earthquakes on individuals will facilitate more effective support for them.

Informed consent was obtained from all participants.

The authors have no funding and conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The study protocol was reviewed and approved by Siirt University (reference number: 4728).

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Studies on the psychological effects of earthquakes show that individuals experience many problems such as psychological distress and posttraumatic stress disorder (PTSD) after the earthquake.[9] Chronic PTSD, persisting for at least 3 months following a traumatic event, has been extensively studied in earthquake research.[10] This temporal delay in research is grounded in the belief that individuals can provide more accurate and realistic reports after some time has passed since the trauma.[11] Central to this study is the investigation of positive changes following trauma. It is well-established that not every individual experiences negative consequences from adverse life events due to individual differences. Moreover, adverse experiences such as trauma can potentially lead to positive outcomes. Shakespeare-Finch and Lurie-Beck[12] conducted a meta-analysis demonstrating that PTSD and PTG may co-occur in response to traumatic experiences. This study underscores that focusing solely on the negative consequences of adversity may limit individuals' healing processes. Therefore, to offer a more comprehensive perspective on the effects of adverse experiences, it is crucial to consider and study positive changes such as PTG alongside PTSD.

PTG refers to the positive psychological changes individuals undergo following a traumatic event.[13] These changes encompass enhanced personal strength, improved relationships, newfound possibilities, a heightened appreciation of life, and spiritual growth.[14] Research indicated that approximately 52% of individuals reported moderate to high levels of PTG following various traumas.[15] Additionally, studies in the literature highlighted that earthquakes can lead to positive outcomes such as PTG.[16,17] PTG manifests uniquely for each individual, influenced by their internal resources, support systems, and the nature of the trauma. Examples of PTG include increased personal empowerment, strengthened social support networks, a realization of life's transient nature leading to a focus on enjoying life, seizing new opportunities such as career advancements, and deepening spiritual or religious beliefs.[4] Moreover, PTG has been linked to improved emotional well-being, enhanced stress-coping abilities, and life satisfaction.[18] Evidence also suggests that PTG may positively impact physical health by bolstering the immune system and promoting overall well-being.[19]

While posttraumatic growth (PTG) assesses the positive outcomes of trauma, posttraumatic depreciation (PTD) serves to evaluate the negative consequences.[20] Baker[21] introduced the concept of PTD as the counterpart to PTG, aiming to study adverse changes perceived by individuals following traumatic experiences. PTD means that posttrauma individuals start to value their lives less and have difficulty determining a new path for their lives. PTD also includes individuals' weakening of their connections with people due to the disappointments they experience posttrauma and discovering that they are weaker than they thought.[22] PTD is the development of certain responses to traumas like PTG, independent of posttraumatic stress disorder. Although there are many studies on PTG, it can be said that the concept of PTD is new in the trauma literature.[23] Considering that individuals may experience PTG and PTD simultaneously,[24] it is understood that these 2 phenomena should be investigated together.

Several reasons enable individuals to experience PTG or PTD after their traumatic experiences. It is thought that one of these determinant variables may be life satisfaction. Hence it is known that PTG, PTD, and life satisfaction have positive and negative significant relationships[25,26] and PTG is a predictor of life satisfaction.[27] However, PTG cannot be called only a process that increases life satisfaction. PTG is also a result perceived by the individual to be associated with the traumatic experience and its aftermath.[28] The support resources (social, psychological, etc) to be offered to individuals after trauma are as important as the type and severity of the traumatic experience.[29] These support resources improve the well-being of individuals and can increase their life satisfaction.[30,31]

Considering that life satisfaction is defined as the similarity of the individual's expectations and living conditions,[32] the importance of the quality of posttraumatic experiences is understood. Further, it is claimed that life satisfaction and the subdimensions of PTG (appreciation of life, etc) measure similar constructs and both can increase and decrease simultaneously.[33] However, although it is known that PTG predicts life satisfaction, there is a very limited number of studies on the prediction of life satisfaction on PTG.[34–36] These studies were conducted on university students in the COVID-19 period and adults who had a myocardial infarction. Furthermore, as far as the authors know, there is no study in the literature on the prediction of life satisfaction on PTD. Especially, an earthquake's risk of decreasing life satisfaction[37] is thought to play an important role in the growth and depreciation of individuals. Therefore, there is a need for research on the predictive role of life satisfaction on PTG and PTD in individuals exposed to earthquakes.

Jeon et al[38] suggested that in addition to PTG, it also resulted in the strengthening of psychological resilience. Resilience is defined as the ability to resist challenging life events and to remain strong in the face of them.[39,40] While traumatic experiences can increase the resilience of the individual, on the other hand, resilience can play a protective role in preventing posttraumatic stress.[41] Therefore, it can be said that resilience is one of the ways of coping with traumas. Research on resilience during COVID-19 supports this view.[42,43] Similarly, it was observed that resilience predicted PTSD and PTG in the early period study of the February 6 Turkey earthquakes.[44] Therefore, it was thought that resilience could be a predictor for PTD and PTG in this study. Besides, another protective factor against traumatic experiences is meaning-centered coping.[45] Meaning-centered coping is to reinterpret stress factors positively by centering the meaning of experiences.[46,47] The core beliefs of individuals exposed to negative life events may be shaken and they may face a deep loss of meaning.[48] This means the reconstruction process experienced after trauma can also be positively associated with posttraumatic growth.[49,50] Moreover, it is known that the presence of meaning in life has a positive significant relationship with PTG.[51,52] As a result, it can be said that both the individual's having meaning in life before trauma and the posttraumatic meaning-making process can be predictors of PTG and PTD.[53]

2. Present study

To provide psychological support to individuals adversely affected by the earthquakes in Turkey on February 6, it is crucial to understand the diversity of emotions and thoughts experienced since the event. Specifically, examining the variables that may to associated with PTG and PTD resulting from this traumatic experience is essential for fostering PTG and managing PTD. Furthermore, despite a growing body of research on PTD in recent years, it is significant that there is only one study on PTD conducted in Turkey.[54] Also, it is noteworthy that the study of Ikizer et al[54] extends its relevance to the context of COVID-19, as there is currently no research exploring the connection between earthquakes and PTD. Therefore, there is a distinct need for understanding the contribution of positive psychological factors (e.g., life satisfaction, resilience, and meaning-centered coping) in explaining the PTD and PTG resulting from traumatic events like earthquakes within the Turkish demographic. Besides, the variables underlying the significant relationships between life satisfaction, PTG, and PTD are not yet known. In other words, there is a need to know through which variables life satisfaction causes PTG and PTD after traumatic experiences. Considering these necessities and aligning with both theoretical frameworks from existing literature, our study aims to examine the mediating roles of resilience and

meaning-centered coping in the associations between life satisfaction and PTG and PTD. In light of this aim, we tested the following hypotheses: life satisfaction will be positively associated with resilience, meaning-centered coping, and PTG, while it will be negatively associated with PTD; resilience and meaning-centered coping will be positive to associated with PTG, while they will be negative to associated with PTD; and resilience and meaning-centered coping will act as significant mediators in the relationships between life satisfaction and both PTG and PTD. Furthermore, as the Turkish version of the Posttraumatic Growth and Posttraumatic Depreciation Scales Short Forms (PTGDI-X-SF) was unavailable during the implementation of the current study, our additional goal was to validate and assess the psychometric properties of this measure by introducing it to the Turkish context.

3. Method

3.1. Design

This research is a descriptive cross-sectional study conducted using the relational screening model. This model was preferred to understand the experiences of individuals affected by the earthquake and the role of their social relations in their recovery processes. The relational screening model makes it easier to reach earthquake victims through their social networks, making data collection from affected individuals more effective. Thanks to this model, information was accessed through the participants' connections within the society, and elements such as social solidarity were examined through these connections.

3.2. Sample selection

The sample of the research was determined by the nonprobability convenience sampling method. The reason for choosing this method is that access to individuals affected by earthquakes is limited, and accessing them through their social networks provides convenience. The data collection tool used in the study is a structured questionnaire form aimed at understanding the earthquake experiences, social relations, and recovery processes of the participants. A relational survey aims to collect data to determine certain characteristics of a group.[55] The significance level is 95%. Confirmatory and exploratory factor analyses were conducted to determine the goodness of fit and factor loadings of the scales.

3.3. Procedure

An online questionnaire was prepared to collect data. On the first page of the online survey, participants were informed about the duration and purpose of the study. Google Forms were used to send the research link to the participants via social media platforms and messaging programs such as WhatsApp, Twitter, and Instagram. The inclusion criteria of the study specified residences in 11 cities affected by the February 6 earthquake, namely Kahramanmaraş, Gaziantep, Şanlıurfa, Diyarbakır, Adana, Adıyaman, Osmaniye, Hatay, Kilis, Malatya, and Elazığ, where significant destruction and fatalities occurred. Individuals who met these criteria and volunteered to participate in the study were included in the study. Since the earthquake is a sensitive traumatic experience, participants were informed that they could stop answering the questionnaire if they felt uncomfortable. Additionally, participants were advised not to provide information about personal information to protect confidentiality and anonymity. The response time of the questionnaire was specified as 10 minutes at the beginning of the questionnaire. The data collection for the study commenced 5 months after the earthquakes struck. The inclusion criteria were focused on individuals impacted by the earthquakes across 11 provinces. Due to the challenges in locating eligible participants, the data collection process spanned approximately 2 months, from June to August 2023. Data were analyzed with SPSS 26 and AMOS 24 package programs (Armonk, New York).

3.4. Ethical considerations

Informed consent was obtained from all participants included in the study. Each participant was given an informed consent form at the beginning of the survey, explaining the aims of the study and guaranteeing the anonymity and confidentiality of their voluntary responses for research purposes. They were also informed that they had the option to stop their participation at any point if they wished. In addition, earthquake survivors who volunteered to participate in the study provided electronic consent. Institutional review board approval was obtained before starting the data collection process. Approval was requested from all participants before they participated in the study. Ethics committee approval of this research was obtained from Siirt University (blinded for review), and all research stage was carried out under the Declaration of Helsinki (Date: May 3, 2023, No: 601).

3.5. Participants

The sample of the study consisted of individuals (76 males and 179 females) who experienced the February 6, 2023, Turkey earthquakes in 11 disaster provinces where destruction and deaths occurred intensely. They aged between 15 and 58 years with a mean of 23.35 years (standard deviation = 6.68) and self-identified as having different socioeconomic statuses (SES; low SES = 27.5%, medium SES = 70.6%, high SES = 2.0%). Most respondents were undergraduates 178 (69.8%), followed by high school 63 (24.7%), master 8 (3.1%), PhD 2 (0.8%), primary 2 (0.8%), and secondary 2 (0.8%). The damage status of the participants' houses is respectively undamaged (25.9%), slightly damaged (45.9%), moderately damaged (12.2%), heavily damaged (12.2%), and destroyed (3.9%). Additionally, as for the participants' experience of loss of relatives in the earthquake: No loss (77.6%), first degree (children, mother, and father) loss (2.0%), and second degree (nephew, uncle, and aunt) loss (20.4%).

3.6. Measures

3.6.1. The Short Form of the Posttraumatic Growth and Posttraumatic Depreciation Inventory: Expanded Version. The PTGDI-X-SF were developed by Platte et al.[24] The PTGDI-X-SF includes 2 subscales: posttraumatic growth and posttraumatic depreciation. Each scale consists of 10 items, and participants rate each item on a 6-point Likert scale ranging from 0 (I did not experience this change because of my crisis) to 5 (I experienced this change to a very great degree because of my crisis). The internal consistency coefficients of the original scale indicate high reliability for PTG (α = .88) and PTD (α = .88). These 2 scales have 5 subdimensions (personal strength, relation to others, new possibilities, appreciation of life, spiritual-existential change). Each sub-dimension consists of 2 items. The present study found Cronbach alpha values of 0.81 for posttraumatic growth and 0.83 for posttraumatic depreciation. PTG-S and PTD-S Turkish versions were developed using a translation and back-translation process. Turkish versions of PTG-S and PTD-S were created by following the translation and back-translation steps. Results indicate that the PTG-S and PTD-S are valid and reliable for assessing posttraumatic growth and depreciation in individuals who have experienced traumatic experiences.

3.7. Meaning-centered coping scale

The Meaning-Centered Coping Scale[45] was used to evaluate participants' meaning-centered coping. The 9-item Turkish version of the scale contains items rated on a 7-point Likert scale ranging from 1 (I do not agree at all) to 7 (I agree) (e.g., " I have faith that something positive will come out of this "). The Cronbach alpha internal consistency coefficient of the original scale is 0.88. A minimum score of 9 and a maximum score of 63 can be obtained from the scale. Higher scores on the scale indicate higher meaning-centered coping. The present study showed that Cronbach alpha internal consistency score ($\alpha = 0.82$) was high.

3.8. Satisfaction with life scale

The 5-item Satisfaction With Life Scale,[32] Turkish version,[56] was used to assess meaning in life. Items (e.g., "If I were born again, I would change almost nothing in my life" and "I have a life close to my ideals") are rated on a 5-point Likert scale from 1 (Completely disagree) to 5 (Completely agree). Cronbach alpha internal consistency coefficient of the adaptation scale is 0.88. The total score ranges between 5 and 25. The higher the score, the higher the satisfaction with life. The present study showed that Cronbach alpha internal consistency score ($\alpha = 0.84$) was high.

3.9. Brief resilience scale

The Brief Resilience Scale (Smith et al,[57] Turkish version[58]) was developed to measure the ability of individuals to recover, bounce back, return to functioning, and readjust. The Cronbach alpha internal consistency coefficient of the original scale is 0.84. The Cronbach alpha internal consistency coefficient of the adaptation scale is 0.83. The scale includes 6 items (e.g., I can bounce back quickly after troubled times), and each item is rated on a 5-point Likert scale type ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). A higher score on the scale refers to a higher level of resilience. The present study showed that Cronbach alpha internal consistency score ($\alpha = 0.84$) was high.

4. Results

Before proceeding to the factor analyses of the adapted scale, the mean scores of those who lost their relatives in the earthquake and those who did not lose their relatives in the earthquake were analyzed according to the demographic variables, and the mean scores obtained from PTG, PTD, and other scales were analyzed and added to Table 1.

4.1. Descriptive statistics and correlation analysis

The findings from the descriptive analyses indicated that the skewness values, ranging from –0.83 to 0.31, and kurtosis values, ranging from –0.44 to 1.07, all fell within the satisfactory range for normal distributions, as reported in Table 2. In the correlation analysis, life satisfaction exhibited statistically significant positive correlations with resilience, meaning-centered coping, and posttraumatic growth. It also displayed a statistically significant negative correlation with posttraumatic depreciation. Resilience and meaning-centered coping were found to have statistically significant positive correlations with posttraumatic growth, whereas they demonstrated statistically significant negative correlations with posttraumatic depreciation. Additionally, there was a significant positive correlation between resilience and meaning-centered coping and a significant positive correlation between posttraumatic growth and posttraumatic depreciation. A summary of the results from the correlation analysis can be found in Table 2.

4.2. Factor structure of PTGDI-X-SF

To examine the structure of the PTG-S and the PTD-S, an exploratory factor analysis was conducted. The results showed that Kaiser–Meyer–Olkin and Bartlett test of sphericity analyses were performed. The Kaiser–Meyer–Olkin coefficient was 0.82 for the PTG-S and 0.85 for the PTD-S, and the Bartlett sphericity test value was calculated as 0.00 for the PTG-S and 0.00 for the PTD-S. These results revealed that the data were suitable for factor analysis. The results of confirmatory factor analysis showed that the 5-factor model had a poor fit, whereas the 1-factor model demonstrated a good fit for PTG and PTD, respectively. In addition, the second-order model did not provide a good fit as in the 5-factor solution (see Table 3). For PTG, all items loaded between 0.58 and 0.95 on the assigned domains. Besides, for PTD, standardized factor loadings reached from 0.61 and 0.95.

4.3. Mediation analysis

After conducting preliminary analyses, a mediation analysis was performed to explore the potential mediating roles of resilience and meaning-centered coping in the relationship between life satisfaction, posttraumatic growth, and posttraumatic depreciation. The results of the mediation analysis indicated significant direct and indirect effects between the variables of this study (see Tables 4 and 5). In particular, the analysis revealed that life satisfaction had a significant predictive effect on both resilience ($\beta = 0.35$, $P < .001$) and meaning-centered coping ($\beta = 0.52$, $P < .001$). Life satisfaction accounted for

Table 1

Mean scores obtained from the scales according to demographic variables.

Demographic variables	PTG	PTD	Meaning-centered coping	Satisfaction with life	Brief resilience scale
Gender					
Male	32.79	21.49	42.24	12.70	16.82
Female	32.73	21.48	42.20	12.67	16.78
Loss of relatives					
First degree	33.81	22.05	42.40	12.49	16.43
Second degree	32.67	21.56	42.11	12.65	16.74
No losses	32.73	21.48	42.40	12.67	16.78
Damage to the house					
Minimal damage	32.85	21.35	42.34	12.69	16.83
Moderate damage	32.60	21.50	41.95	12.55	16.72
Heavy damage	32.78	21.52	42.15	12.70	16.83
Destroyed	33.75	22.01	42.28	12.78	16.50
Undamaged	32.72	21.52	42.10	12.68	16.80

Table 2

Descriptive statistics, reliability, and correlations between the variables.

	Descriptive statistics						Reliability	Correlation coefficients				
Variable	Min	Max	Mean	SD	Skewness	Kurtosis	α	1	2	3	4	5
1. Posttraumatic growth	0	50	32.74	9.30	–0.83	1.07	0.81	1	–.35*	.36*	.67*	.36*
2. Posttraumatic depreciation	0	50	21.48	10.86	0.27	–0.44	0.83		1	–.46*	–.43**	–.39*
3. Resilience	6	30	16.79	4.96	0.00	–0.01	0.84			1	.38*	.35*
4. Meaning-centered coping	9	63	42.20	10.75	–0.44	–0.13	0.82				1	.52*
5. Life satisfaction	5	25	12.67	4.71	0.31	–0.43	0.84					1

*$P < .01$.

Table 3

Fit indices of the 3 models of the Turkish PTGDI-X-SF.

Variable	CMIN	df	CMIN/df	RMSEA	CFI	IFI	TLI
PTG							
1-factor model	87,236	32	2.726	0.08	0.92	0.93	0.89
5-factor model	41,849	5	8.370	0.17	0.90	0.90	0.80
Second-order 5-factor model	153,996	30	5.120	0.13	0.83	0.83	0.75
PTD							
1-factor model	88,653	33	2.686	0.08	0.92	0.92	0.92
5-factor model	20,807	5	4.161	0.11	0.96	0.90	0.92
Second-order 5-factor model	99,227	30	3.308	0.09	0.90	0.85	0.90

CFI = comparative fit index, CMIN = chi-square minimum discrepancy, IFI = incremental fit index, RMSEA = root mean square error of approximation, TLI = tucker-lewis index.

Table 4

Unstandardized coefficients for the mediation model.

	Consequent															
	M_1 (resilience)				M_2 (meaning-centered coping)				Y_1 (posttraumatic growth)				Y_2 (posttraumatic depreciation)			
Antecedent	Coefficient	SE	*t*	*P*	Coefficient	SE	*t*	*P*	Coefficient	SE	*t*	*P*	Coefficient	SE	*t*	*P*
X (life satisfaction)	0.36	0.06	5.86	<.001	1.19	0.12	9.74	<.001	-0.01	0.11	–0.07	<.001	–0.40	0.14	–2.75	<.001
M_1 (resilience)	–	–	–	–	–	–	–	–	0.22	0.10	2.29	0.94	–0.69	0.13	–5.47	<.001
M_2 (meaning-centered coping)	–	–	–	–	–	–	–	–	0.54	0.05	11.11	<.001	–0.22	0.06	–3.37	<.001
Constant	12.17	0.84	14.50	<.001	27.11	1.65	16.40	<.001	6.33	1.97	3.22	<.001	47.31	2.60	18.20	<.001
	$R^2 = 0.12$				$R^2 = 0.27$				$R^2 = 0.46$				$R^2 = 0.30$			
	$F = 34.34$; $P < .001$				$F = 94.86$; $P < .001$				$F = 70.72$; $P < .001$				$F = 36.70$; $P < .001$			

Table 5

Indirect effects and 95% bias-corrected confidence interval.

Path	Effect	SE	Boot LLCI	Boot ULCI
Total indirect effect of life satisfaction on posttraumatic growth	0.72	0.11	0.53	0.95
Life satisfaction→resilience→posttraumatic growth	0.08	0.04	0.00	0.17
Life satisfaction→meaning-centered coping→posttraumatic growth	0.64	0.10	0.46	0.85
Total indirect effect of Life satisfaction on posttraumatic depreciation	–0.51	0.11	–0.74	–0.32
Life satisfaction→resilience→posttraumatic depreciation	–0.25	0.07	–0.41	–0.13
Life satisfaction→ meaning-centered coping→ posttraumatic depreciation	–0.26	0.09	–0.45	–0.09

LLCI = lower level confidence interval, SE = standard error, ULCI = upper level confidence interval.

12% and 27% of the variance in resilience and meaning-centered coping, respectively. Additionally, resilience ($\beta = 0.12$, $P < .05$) and meaning-centered coping ($\beta = 0.53$, $P < .001$) were found to significantly predict posttraumatic growth, explaining 46% of the variance in this outcome, while life satisfaction did not have a significant direct effect on posttraumatic growth ($\beta = 0.01$, $P = .94$). Furthermore, life satisfaction ($\beta = –0.17$, $P < .05$), resilience ($\beta = –0.32$, $P < .001$), and meaning-centered coping ($\beta = –0.21$, $P < .001$) had significant predictive effects on posttraumatic depreciation, explaining 30% of the variance in this outcome variable.

Most importantly, the mediation analysis showed a significant indirect effect of life satisfaction on posttraumatic growth and depreciation through resilience and meaning-centered coping, as indicated in Tables 4 and 5 and Figure 1. In the mediation analysis, for the path of life satisfaction → resilience → posttraumatic growth, the indirect effect was found to be 0.08 (95% confidence interval [CI]: 0.00–0.17). For the path

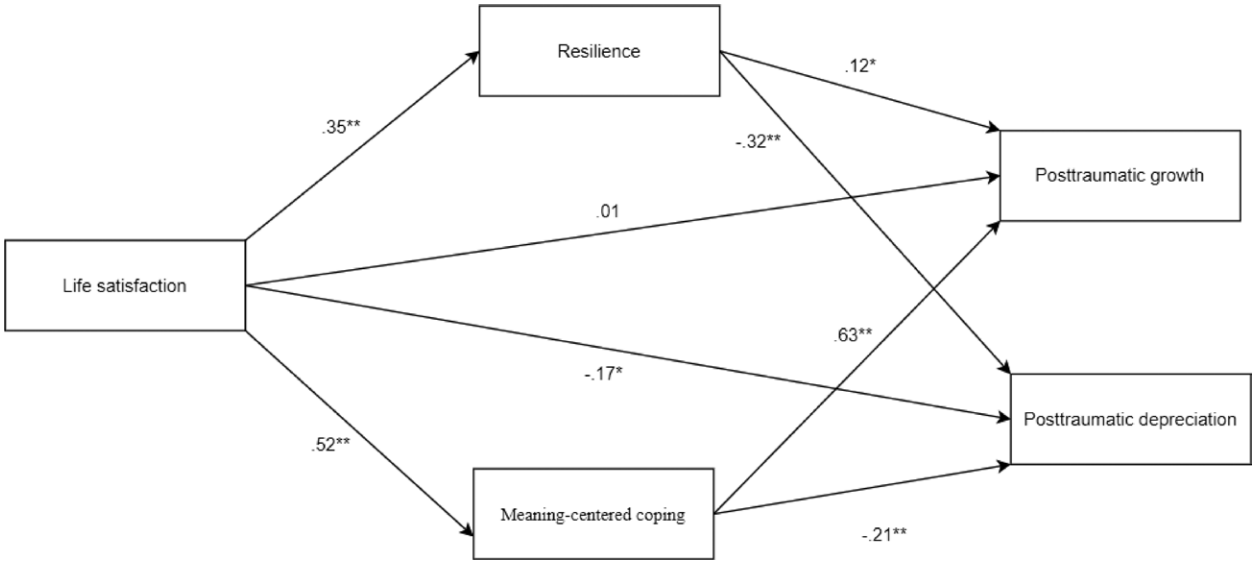

Figure 1. Proposed structural model showing the associations between the variables.

life satisfaction → meaning-centered coping → posttraumatic growth, the indirect effect was 0.64 (95% CI: 0.46–0.85). Also, for the path life satisfaction → resilience → posttraumatic depreciation, the indirect effect was −0.25 (95% CI: −0.41 to −0.13). Finally, for the path life satisfaction → meaning-centered coping → posttraumatic depreciation, the indirect effect was −0.26 (95% CI: −0.45 to −0.09). This finding suggests that resilience and meaning-centered coping serve as mediators in the association between life satisfaction, posttraumatic growth, and posttraumatic depreciation.

5. Discussion

This study aims to examine the relationships between PTG, PTD, life satisfaction, psychological resilience, and meaning-centered coping. Data from this study were collected from individuals who experienced the earthquake in Turkey, which was called the "disaster of the century." According to the validity and reliability analyses, the single-factor structures of the PTG-S and PTD-S showed adequate psychometric properties in Turkish. The results also demonstrated that life satisfaction, psychological resilience, and meaning-centered coping were positively associated with PTG and negatively associated with PTD. A positive relationship between life satisfaction and PTG is expected when the literature is examined.[59–61] There is a fine line between ending one's life because of the negative effects of traumas and making life meaningful and satisfying. One of the factors that correlate with this line is having life satisfaction. When reviewing the literature, it is observed that there is a limited number of studies conducted on those who experienced earthquakes. It is known that trauma is not only caused by natural disasters; intense treatment processes such as cancer also lead to trauma. In a clinical study with cancer patients, a positive correlation was found between PTG and life satisfaction in the examination after the end of treatment, confirming that life satisfaction has a protective effect for cancer patients.[51] Ten years later, it was found that improving PTG levels of Wenchuan earthquake survivors improved their quality of life.[62] When the PTG levels and quality of life of the 2011 Tohoku earthquake survivors were analyzed at 6, 12, and 42 months, it was observed that PTG significantly increased the quality of life.[63] Another study revealed a positive relationship between PTG scores and the determinants of life satisfaction in individuals with physical disabilities because of an accident.[64] Similarly, another study found that life satisfaction positively predicted PTG.[35]

Another protective factor related to the development of PTG is psychological resilience. Psychological resilience can be expressed as the individual's ability to capture the pretrauma mode in the face of negative situations such as trauma. There are many studies investigating the positive relationship between PTG and psychological resilience.[65–67] In a meta-analysis study conducted with 4156 cancer patients by considering the findings of 17 studies, a positive relationship was found between PTD and resilience.[68] According to the results obtained from the Congolese refugee sample, psychological resilience was found to be a protective factor for PTG.[69] From these results, it can be said that psychological resilience is a shield against the negative consequences of the trauma experienced and is effective in raising the individual from a negative psychological level to a better level.

One of the results of the study is the positive effect of a meaning-centered coping style on PTG and the negative effect on PTD. Meaning-centered coping is defined as the positive reappraisal and reinterpretation of a stressor.[70] Meaning-centered coping makes people more psychologically resilient in the face of traumatic events.[71] Reviewing the negative consequences of the earthquake trauma on the perceived value of life and discovering new ways to maintain psychological well-being after the trauma may be one of the meaning-centered coping strategies. Perhaps, if the trauma had not occurred, it would have been difficult for individuals to control their psychological well-being and discover ways to look at life from a different perspective and search for meaning. This means that all traumas will have a negative consequence on the individual. It shows that trauma and psychological well-being are mutually associated with each other. Danhauer et al[72] emphasize that the absence of stress or distress does not mean that life continues positively; instead, optimal positive psychosocial human functioning can be achieved through the greater use of meaning-centered coping strategies. It may not be possible for individuals who say "life goes on very well" to develop meaning-centered coping skills when they do not encounter difficulties. Challenges that are associated with human life, such as trauma, pave the way for the development of these skills. Meaning plays an important role in coping with stress and trauma, leading to better psychological functioning and reduced distress.[73] Furthermore, the development of meaning-centered coping skills plays an important role in reducing psychological disturbances associated with negative

situations that may occur after trauma. In coping processes, meaning-centered learning, which is an evaluation-based coping that addresses the person's beliefs, values, and existential goals, is important. This type of coping is linked to better psychological functioning and lower distress.[73] A study with patients diagnosed with cancer confirms that postdiagnosis reappraisal (getting back up and moving on despite negativity and focusing on the positive aspects of that negativity) and the presence of meaning-centered coping skills act as a shield against the negative effects of trauma.[74,75]

The final finding from this research is that psychological resilience and meaning-centered coping act as important mediators in the relationships between life satisfaction and both PTG and PTD. Studies have confirmed the positive effect of life satisfaction on PTG and the negative effect on PTD.[61,76,77] The positive effect of life satisfaction on PTG and the negative effect on PTD are partially explained by psychological resilience and meaning-centered coping. High psychological resilience is an important protective factor in terms of its contribution to life satisfaction.[78–80] Psychological resilience, a protective mental health variable, is important in terms of mediating the effect of life satisfaction on PTG and PTD. In addition, the positive effect of the meaning-centered coping variable, which is the ability to find meaning in life and make life meaningful, on PTG and its negative effect on PTD confirms that it is an important mediating factor.

6. Limitations and strengths

The current study has limitations. First, the study used self-report-based measurement tools to collect data. In further studies, it would be useful to use different methods such as observation, interview, and peer assessment to overcome this limitation. In addition, the data of the study was limited by the fact that individuals did not want to answer the questionnaires due to the death of family members who had recently experienced earthquake trauma (n = 225). Since the study was conducted cross-sectionally, it could only measure perceptions of PTG and PTD at a single point in time. Longitudinal studies, which take measurements before and after the trauma, are needed to evaluate actual PTG and PTD. Another limitation is that the majority of the sample consisted of young undergraduate students. Future studies should include other age groups, such as middle-aged and elderly individuals, to provide a better understanding. Another limitation is related to self-selection biases where participants took part in the study rather than being randomly assigned. Therefore, future research might include conducting randomized controlled trials or using stratified sampling methods to enhance the external validity of the study and mitigate self-selection biases. Moreover, as an inclusion criterion in this study, participants were not asked whether they were already receiving psychotherapy and counseling support. Since receiving therapy support after traumatic experiences such as earthquake may affect PTG and PTD, this issue may be considered in future trauma studies. Finally, it is important to note that PTSD was not measured in this study. Given that PTG and PTD occur after traumatic experiences, the lack of data on PTSD represents a significant limitation. Future studies should consider incorporating a PTSD measure to ensure a more accurate assessment of the participant's experiences and outcomes. Despite these limitations, the importance of the model established in the study cannot be denied. The positive effect of life satisfaction on PTG and the negative effect on PTD are important. Besides, the presence of psychological resilience and meaning-centered coping strategies, which have a protective effect in terms of mediating this effect, reduces the negative correlation of trauma on the individual. Strengthening the level of psychological resilience is a protective shield against traumas. It is important in terms of reducing the negative consequences of trauma that individuals who can question life because of sudden trauma such as an earthquake have a high ability to search for a meaningful life. However, the fact that one of the authors of the study went to the earthquake zone on the first day of the earthquake and participated in both search and rescue and psychosocial support services is an important factor that eliminates the limitations of the study. Sharing an environment where the feelings of individuals who experienced the earthquake trauma were warm with them paved the way for the shaping of the concepts of the research.

7. Conclusions

This study confirmed that there is a positive relationship between life satisfaction and resilience, meaning-centered coping, and PTG. As the life satisfaction level of the participants increased, it was revealed that there was a strong link between resilience and meaning-centered coping skills and PTG. However, as the level of life satisfaction decreased, a negative relationship was observed with PTD. Second, resilience and meaning-centered coping were found to be positively associated with PTG and negatively associated with PTD. These findings suggest that developing individuals' resilience and meaning-centered coping skills may play an important role in coping with traumatic experiences and promoting growth. Third, resilience and meaning-centered coping were found to be important mediators in the relationships between life satisfaction and both PTG and PTD. These results suggest that resilience and meaning-centered coping play a critical role in individuals' processes of coping with traumatic experiences that affect life satisfaction. Given that Turkey experienced the biggest earthquake in its history, these findings are of vital significance for Turkey. Intervention programs to be developed to cope with the negative psychological consequences of the earthquake should focus on increasing the life satisfaction of individuals. Notably, theoretically, validated protective factors such as resilience and meaning-centered coping should be included in strategies to improve PTG and manage PTD. Furthermore, the current study revealed that the adapted versions of the PTG-S and PTD-S are easy-to-use scales that can be practically used to understand and assess traumatic experiences by individuals.

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