



BASIC RESEARCH ARTICLE



## Post-traumatic stress, growth, and depreciation during the COVID-19 pandemic: evidence from Turkey

Gözde İkizer , Ayşe Nuray Karancı , Ervin Gul  and Ilknur Dilekler 

<sup>a</sup>Department of Psychology, TOBB University of Economics and Technology, Cankaya Ankara, Turkey; <sup>b</sup>Department of Psychotherapy, Fachklinik St. Vitus GmbH, Visbek, Germany

### ABSTRACT

**Background:** A worldwide health threat, the COVID-19 pandemic, has highlighted the need to focus on its mental health impact. However, literature on mental health effects including post-traumatic consequences of the pandemic is scarce.

**Objective:** The current study examined post-traumatic stress (PTS), growth (PTG), and depreciation (PTD) during the pandemic, and explored factors associated with these mental health outcomes in an adult community sample from Turkey.

**Method:** A total of 685 participants responded to an online survey that gathered data on sociodemographic characteristics, financial loss during the pandemic, time spent at home and frequency of social media use, perception of COVID-related risks, stress, and event-related rumination. Data analysis included correlation and regression analyses.

**Results:** Results showed that PTS, PTG, and PTD were positively correlated with each other. Younger age and being single were associated with higher PTS and PTD, and lower education levels predicted all three outcomes. Experiencing financial loss during the pandemic, more frequent social media use to follow COVID-related news and posts, and longer time spent at home during the pandemic were associated with higher PTS. Anticipating financial risks during the pandemic were associated with all outcomes while anticipating health-related risks due to COVID-19 and perceived stress levels predicted PTS and PTD but not PTG. Both intrusive and deliberate rumination were associated with higher levels of PTS and PTD, and PTG was predicted solely by deliberate rumination. Moreover, provisional PTSD was indicated in 47.9% of the participants. Membership to the provisional PTSD group was predicted by age, level of education, time spent on social media, anticipating COVID-19-related health risks, perceived stress, and event-related rumination.

**Conclusions:** The current study provides empirical evidence for the short-term post-traumatic effects of the COVID-19 pandemic and related factors, which can help to guide mental health services during the pandemic.

### Estrés Postraumático, crecimiento y depreciación durante la pandemia del COVID-19: evidencia de Turquía

**Antecedentes:** La pandemia del COVID-19, una amenaza de salud mundial, ha puesto de relieve la necesidad de centrarse en su impacto en la salud mental. Sin embargo, la literatura relacionada con los efectos en la salud mental, incluidas las consecuencias postraumáticas de la pandemia, es escasa.

**Objetivo:** Este estudio examinó el estrés postraumático (PTS por sus siglas en inglés), crecimiento (PTG por sus siglas en inglés) y depreciación (PTD por sus siglas en inglés) durante la pandemia y exploró los factores asociados con estos resultados en salud mental en una muestra de una comunidad adulta de Turquía.

**Método:** Un total de 685 participantes respondieron a una encuesta en línea que reunió características sociodemográficas, pérdidas económicas durante la pandemia, tiempo en el hogar y frecuencia del uso de redes sociales, percepción de riesgos relacionados con COVID-19, estrés y rumiación de eventos relacionados. El análisis de datos incluyó análisis de correlación y regresión.

**Resultados:** Los resultados mostraron que PTS, PTG y PTD se correlacionaron positivamente entre sí. Menor edad y la soltería se asociaron con más altos PTS y PTD, y menor nivel de educación predijo los tres resultados. Experimentar pérdidas económicas durante la pandemia, un uso de redes sociales más frecuente para seguir las noticias y publicaciones relacionadas con COVID y el pasar más tiempo en el hogar durante la pandemia estuvieron asociados con PTS más altos. La anticipación de los riesgos económicos durante la pandemia estuvo asociada con todos los resultados, mientras que anticiparse a los riesgos relacionados con la salud debido a COVID-19 y los niveles de estrés percibidos predijeron PTS y PTD pero no PTG. Tanto la rumiación deliberada como intrusiva estuvieron asociadas con niveles más altos de PTS y PTD y el PTG se predijo únicamente por rumiación deliberada. Además, TEPT provisorio se indicó en un 47,9% de los

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### PALABRAS CLAVE

Estrés postraumático; crecimiento postraumático; depreciación postraumática; estrés percibido; rumiación relacionada con el evento; COVID-19

### 关键词

创伤后应激; 创伤后成长; 创伤后退化; 感知压力; 事件相关反刍; COVID-19

### HIGHLIGHTS

- Post-traumatic stress, growth, and depreciation were positively correlated with each other.
- Post-traumatic outcomes were differentially associated with sociodemographic characteristics, variables related to COVID-19, perceived stress, and event-related rumination.

participantes. La pertenencia al grupo provisorio de TEPT se predijo por la edad, nivel de educación, tiempo dedicado a las redes sociales, la anticipación de los riesgos en salud relacionados con COVID-19, estrés percibido y rumiación relacionada con esos eventos.

**Conclusiones:** El presente estudio proporciona evidencia empírica para los efectos postraumáticos a corto plazo de la pandemia COVID-19 y sus factores relacionados, que pueden ayudar a orientar los servicios de salud mental durante la pandemia.

### 疫情期间的创伤后应激、成长和退化：来自土耳其的证据

**背景:** 全球性健康威胁COVID-19疫情凸显了对于关注其对心理健康影响的需求。但是, 关于包括疫情创伤性结果的心理健康影响的文献很少。

**目的:** 本研究在一个土耳其成人社区样本中考查了疫情期间的创伤后应激 (PTS), 成长 (PTG) 和退化 (PTD), 以及这些心理健康结果的相关因素。

**方法:** 共有685名参与者对在线调查做出了回应, 收集了社会人口统计特征, 疫情期间的经济损失, 居家时间和社交媒体使用的频率, 对COVID相关风险, 压力和事件相关反刍的感知的数据。数据分析包括相关性和回归分析。

**结果:** 结果表明, PTS, PTG和PTD彼此呈正相关。较小的年龄和单身与较高的PTS和PTD相关, 而较低的教育水平可以全部预测这三个结果。疫情期间经历了经济损失, 更频繁地使用社交媒体来关注COVID相关的新闻和帖子以及疫情期间更长的居家时间, 与更高的PTS相关。对疫情期间经济风险的预期与所有结果相关, 而对因COVID-19引起的健康相关风险的预期, 感知压力水平可以预测PTS和PTD, 无法预测PTG。侵入性和故意反刍都与较高的PTS和PTD水平相关, 而PTG仅由故意反省预测。此外, 有47.9%的参与者表现出暂时的PTSD。是否成为暂时PTSD由年龄, 受教育程度, 在社交媒体上花费的时间, 对COVID-19相关健康风险的预期, 感知压力以及事件相关反思预测。

**结论:** 本研究为COVID-19疫情的短期创伤性影响及其相关因素提供了实证证据, 可帮助指导疫情期间的心理健康服务。

The coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has been spreading at an exponential rate around the world since December 2019. Rapid escalation of COVID-19 urged countries to implement containment strategies and to increase efforts in order to control the spread of the disease. Daily lives of people around the world changed drastically due to lockdown measures to mitigate the spread of the SARS-CoV-2. Turkey urged its citizens to go into self-quarantine after the first official cases were reported on 11 March 2020, and on the same date, the World Health Organization declared that the COVID-19 outbreak is a global pandemic. The government also imposed weekend and holiday lockdowns between April and June 2020.

Unprecedented large-scale quarantine measures, uncertainties about transmission of the virus, reports of shortages of medical supplies, and perceived economic instability can lead to detrimental mental health consequences for the public (Di Crosta et al., 2020; Dong & Bouey, 2020). Luo, Guo, Yu, Jiang, and Wang (2020) reported that anxiety and depression are the most common mental health problems in many countries including Turkey. Similarly, Casagrande, Favieri, Tambelli, and Forte (2020) and Tang et al. (2020) showed that individuals who suffer from increased anxiety and distress also experience sleep disturbances. Thus, understanding the impact of the pandemic and factors affecting these impacts are urgently needed to support mental health services.

Like similar epidemics in the past, the COVID-19 pandemic has been suggested to promote post-traumatic stress disorder (PTSD) in the general population

(Dutheil, Mondillon, & Navel, 2020). Recent empirical studies have indeed provided findings consistent with this suggestion. Prevalence of COVID-19-related PTSD symptoms has been reported 5.6% (Zhao, An, Tan, & Li, 2020) or 7% (Liu et al., 2020) in China, 17.7% in Ireland (Karatzias et al., 2020), and 29.5% (Forte, Favieri, Tambelli, & Casagrande, 2020) or 35.6% (Di Crosta et al., 2020) in Italy. The escalation in the number of SARS-CoV-2-infected people, the inadequacy of health-care centres/workers, the unclarity of the information about the virus in the media, the insufficiency of resources, and the unsafety of social contacts are indicated as the factors that may account for the increase of extreme anxiety and helplessness, thus PTS (Liu et al., 2020).

In addition to the negative impacts of overwhelming events, individuals may also experience positive transformations, namely post-traumatic growth (PTG; Tedeschi & Calhoun, 1996), which is a positive transformation due to coping with adversity. According to Tamiolaki and Kalaitzaki (2020), identifying predictors of PTG can be a promising approach in the battle with SARS-CoV-2. Previous studies on past pandemics (e.g. Lau, Yang, Tsui, Pang, & Wing, 2006) have indeed provided evidence for positive effect on social and family support, mental health awareness, and lifestyle changes, possibly alleviating the effects of negative outcomes.

On the other hand, growing from adversity may be accompanied by post-traumatic depreciation (PTD; Cann, Calhoun, Tedeschi, & Solomon, 2010). It is important to note that PTD and PTS are categorized by different experiences. PTS involves symptoms such as intrusively re-experiencing the trauma, avoiding event-related situations, and feeling emotional numbness and/

or hyperarousal. However, PTD indicates the seemingly negative aspects of changes after traumatic experiences (Taku et al., 2020). Although it may seem paradoxical and counterintuitive, people can experience both growth and depreciation in the same domain (Baker, Kelly, Calhoun, Cann, & Tedeschi, 2008). For example, individuals may develop new interest areas during the COVID-19 pandemic, but at the same time may lose previous interests. During times of quarantine or social distancing, individuals may understand how important and precious some friendships are, while others may find such experiences as time consuming or destructive. From this perspective, it seems that PTG and PTD are not dependent on each other (Barrington & Shakespeare-Finch, 2013). Studies exploring the relationship between these variables are scarce. Furthermore, a recent study in 10 countries has shown that the relationship between PTG and PTD is variant across samples (Taku et al., 2020). Hence, the relationship between these constructs during the pandemic is worth examining because there is yet no consensus on how they are related. In addition, although the presence of anxiety, stress, and fear in the general public are widely acknowledged during the pandemic, references to trauma in the public discourse are relatively absent (Horesh & Brown, 2020). The current study aims to better understand trauma-related outcomes and their associates in the context of COVID-19, thereby helping to close the gap.

There is an established literature showing that some individuals and populations are more susceptible to experiencing adverse effects of stressful situations, major life events, and/or disasters (e.g. Dwyer, Zoppou, Nielsen, Day, & Roberts, 2004; Goldmann & Galea, 2014). Yet our knowledge of the possible mental health outcomes of major public health crises including the current COVID-19 pandemic is limited. Schaefer and Moos (1992) have previously suggested that through coping and cognitive appraisals like event-related rumination, stressor-related factors coupled with personal and environmental factors influence the health and well-being of individuals during life crises and transitions faced by individuals. In dealing with traumatic events, two rumination styles, intrusive and deliberate rumination (Cann et al., 2011) were shown to have different influence patterns on post-traumatic consequences. The current study examines the three distinct outcomes, and explores factors associated with those possible outcomes in an adult community sample.

## 1. Method

### 1.1. Participants and procedures

A total of 685 adult Turkish participants completed the online survey. The mean age of participants was 34.62 years ( $SD = 15.04$ ). Statistics on the frequency

**Table 1.** Sociodemographic characteristics of the participants.

Variable	<i>n</i>	%
<b>Gender</b>		
Female	436	63.6
Male	237	34.6
Prefer not to answer/other	12	1.8
<b>Marital status</b>		
Single	441	64.3
Married	244	35.6
<b>Education level</b>		
Secondary school	3	.4
High school	207	30.2
Vocational school	21	3.1
University	260	38
Master's degree	111	16.2
PhD/Doctorate degree	83	12.1

distribution of gender, marital status, and education level are displayed in Table 1.

Data were collected through the internet-based survey platform Qualtrics™ using snowball sampling methods. Invitations to participate in the survey were sent via an anonymous link. Participants were not remunerated. The study was approved by the Ethics Committee of TOBB University of Economics and Technology and carried out in compliance with the latest revision of the Declaration of Helsinki. All participants gave informed consent prior to participation and data collection took place between 17 June and 21 August 2020. New cases in Turkey had plateaued between June and August at around 1000 a day compared to mid-May numbers reaching over 5000 a day during April 2020. During this period, there were 74,689 new cases ( $M = 1131.65$ ,  $SD = 166.23$ ) and 1233 new deaths ( $M = 18.68$ ,  $SD = 2.75$ ) in Turkey (see World Health Organization, 2020).

### 1.2. Measures and instruments

#### 1.2.1. Background information

Sociodemographic data were collected on gender, age, education level, and marital status.

#### 1.2.2. COVID-19-related variables

A questionnaire composed of six questions was administered to assess the severity of COVID-19 exposure. Participants were asked whether they contracted COVID-19 before or during the data collection period and whether they experienced financial loss as a result of the pandemic (rated as 1 = yes, 2 = no). The degree of media exposure was assessed by participants reporting the number of minutes per day spent on following COVID-19-related social media posts or news. In order to assess compliance with safety measures, the percentage of time spent at home during the pandemic was also collected. Moreover, perception of risks associated with a possible infection was also assessed using two questions ('If you become ill with COVID-19, to

what extent this can adversely affect your (1) health and (2) financial situation?") rated on a 4-point Likert scale from 1 (not at all) to 4 (very much).

### 1.2.3. Event-related rumination

The Event-Related Rumination Inventory (ERRI; Cann et al., 2011) was administered to assess post-traumatic cognitive processing related to the COVID-19 pandemic. The 20-item inventory consists of two subscales with equal number of items under each subscale (i.e. intrusive rumination and deliberate rumination). Items are rated on a 4-point scale (0 = not at all, 3 = often). Scores are presented as means for each subscale. Possible range of scores is 0–30 for each subscale, with higher scores indicating more intrusive or deliberate rumination. The ERRI was translated and adapted into Turkish by Haselden (2014). The two factors in the Turkish form accounted for 57% of total variance. Cronbach's alpha coefficients in the current study were .95 for the intrusive rumination and .91 for the deliberate rumination subscales.

### 1.2.4. Perceived stress

The level of perceived stress related to the current pandemic experience was measured with the 10-item Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988). The items are rated on a 5-point scale from 0 (never) to 4 (very often) and the possible range of scores is 0–40. Scores are summed to obtain a total stress score and higher scores indicate higher stress levels. The PSS was translated into Turkish by Eskin, Harlak, Demirkiran, and Dereboy (2013). The 10-item Turkish form had two subscales (i.e. perceived insufficient self-efficacy and perceived stress/distress) and showed good internal consistency (.82) and test-retest reliability (.88). Consistent with the aims of the study, only the total score was used. Cronbach's alpha in the current study for the PSS was .73.

### 1.2.5. Post-traumatic stress

The Turkish version of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (PCL-5; Weathers et al., 2013) was used for the assessment of PTSD symptom severity over the last month (Boysan et al., 2017). It includes four subscales mapping the PTSD clusters of the DSM-5 (American Psychiatric Association, 2013). The items are scored on a 5-point scale, ranging from 0 (not at all) to 4 (extremely). Item scores are summed into a total PTSD symptom severity score and possible range of total scores is 0–80. A cut-off score between 31 and 33 was proposed to indicate provisional/probable PTSD in initial research (National Center for PTSD, 2016). Ashbaugh, Houle-Johnson, Herbert, El-Hage, and Brunet (2016) further showed that a cut-off score of 31 best predicted provisional PTSD in English and French samples. The Turkish

form had good concurrent and divergent validity; and composite reliability of the PCL-5 was reported as excellent by Boysan et al. (2017). Cronbach's alpha in the current study was .95 for the scale.

### 1.2.6. Post-traumatic growth and depreciation

PTG and PTD were assessed with the Posttraumatic Growth Inventory-42 (PTGI-42; Baker et al., 2008). Participants were asked to state the degree to which each change occurred in their lives as a result of the COVID-19 pandemic. This inventory includes 21 items from the Posttraumatic Growth Inventory (PTGI) by Tedeschi and Calhoun (1996) and additional 21 items for PTD by Baker et al. (2008) who used negative alternatives to each item in the PTGI. Both PTG and PTD scales have five subscales: appreciation of life, spiritual change, relating to others, personal strength, and new possibilities. Items are rated on a 5-point scale, ranging from 0 (I did not experience this change) to 5 (I experienced this change to a very great degree). Possible range of scores is 0–110 for both PTG and PTD. Higher scores in respective scales indicate higher levels of PTG and PTD. In the current study, the Turkish form of the PTGI by Dirik and Karanci (2008) was administered. The remaining 21 PTD items were first translated into Turkish and retranslated into English and examined by independent experts in trauma psychology and experts in Turkish language. Cronbach's alpha in the current study was .92 for PTG and .93 for PTD scales.

## 1.3. Data analysis

Analysis was performed using IBM SPSS Statistics v27.0 for Windows. All participants with valid data were included in the study. After data screening, descriptive analyses were conducted, and Pearson product-moment correlation coefficients were calculated. Gender was dummy-coded. Three multiple regression analyses were performed to identify predictors of PTS, PTG, and PTD. In addition, a sequential logistic regression analysis was used to identify factors associated with provisional PTSD. Variables were entered into the equation via four steps in all regression analyses in the following order: Sociodemographic characteristics, variables related to COVID-19, perceived stress, and event-related rumination.

## 2. Results

### 2.1. Descriptive statistics and bivariate associations

Means, standard deviations, and score ranges for study variables are shown in Table 2. Observed mean scores of the PTG and PTD scales in the current study were



lower and mean scores of the PTS scale were higher than the absolute midpoints of the respective scales.

Frequency statistics summarizing COVID-19-related health consequences showed that only three (0.4%) of the participants received a positive COVID-19 diagnosis before or during the time of data collection. Among participants, 240 (35%) reported experiencing financial loss due to the pandemic.

Results indicated a positive correlation between PTS and PTG,  $r = .30$ ,  $p \leq .01$ . PTS was also positively correlated with PTD,  $r = .63$ ,  $p \leq .01$ . There was a

positive correlation between PTG and PTD,  $r = .25$ ,  $p \leq .01$ , as well.

## 2.2. Prediction of post-traumatic outcomes

Table 3 depicts the findings of regression analyses with PTS, PTG and PTD as dependent variables. Sociodemographic variables, COVID-19 related variables, perceived stress, and COVID-19 related rumination explained a significant proportion of variance change in PTS, PTG and PTD scores of the participants except for the effect of perceived stress on PTG.

For higher levels of PTS severity, younger age ( $\beta = -.18$ ,  $p < .001$ ), lower education level ( $\beta = -.12$ ,  $p < .01$ ), and being single ( $\beta = -.09$ ,  $p < .05$ ) were significant predictors. Longer time spent on social media to follow COVID-related news and posts ( $\beta = .12$ ,  $p < .001$ ) and time spent at home due to the pandemic ( $\beta = .09$ ,  $p < .05$ ) were associated with higher PTS. Having experienced financial loss during the pandemic ( $\beta = -.10$ ,  $p < .01$ ) also predicted higher PTS. The same pattern of association between the PTS and perceiving pandemic as a source of health risk ( $\beta = .19$ ,  $p < .001$ ) and financial risk ( $\beta = .09$ ,  $p < .05$ ) existed. In addition to the mentioned COVID-19 related variables, increased levels of perceived stress ( $\beta = .43$ ,  $p < .001$ ), intrusive rumination ( $\beta = .45$ ,  $p < .001$ ), and deliberate rumination ( $\beta = .15$ ,  $p < .001$ ) significantly predicted PTS.

**Table 2.** Descriptive statistics for study variables.

Variable	<i>M</i>	<i>SD</i>
<b>COVID-19 exposure severity</b>		
Frequency of daily social media use to follow COVID-related news (in minutes)	52.23	135.60
Percent of time spent at home to prevent possible infection	78.54	24.78
Perception of financial risks	2.20	1.01
Perception of health risks	2.92	0.89
<b>COVID-19-related stress</b>		
Perceived stress	21.26	6.07
<b>COVID-19-related rumination</b>		
Intrusive rumination	1.30	0.87
Deliberate rumination	1.47	0.79
<b>Post-traumatic outcomes</b>		
PTS	31.49	18.57
PTG	30.85	20.86
PTD	23.93	21.48

**Table 3.** Summary of the regression analyses predicting post-traumatic outcomes.

Predictors	<i>R</i>	$\Delta R^2$	$\beta$	<i>t</i>	$\Delta F$	<i>R</i>	$\Delta R^2$	$\beta$	<i>t</i>	$\Delta F$	<i>R</i>	$\Delta R^2$	$\beta$	<i>t</i>	$\Delta F$
	Post-traumatic stress					Post-traumatic growth					Post-traumatic depreciation				
<b>Step 1: Sociodemographic variables</b>	.39	.15			23.02***	.20	.04			5.33***	.41	.17			26.87***
Age			-.18	-3.66***				-.03	-0.56				-.20	-4.08***	
Women (vs. men and other)			.06	0.43				.12	0.77				-.02	-0.10	
Men (vs. women and other)			-.14	0.94				-.03	-0.17				-.07	-0.45	
Marital status (single vs. married)			-.09	-2.01*				-.03	-0.58				-.17	-3.76***	
Education level			-.12	-2.69**				-.10	-2.06*				-.13	-2.96**	
<b>Step 2: COVID-19 exposure variables</b>	.49	.10			16.00***	.29	.04			6.11***	.46	.04			7.36***
Financial loss due to pandemic <sup>±</sup>			-.10	-2.81**				-.07	-1.79				-.06	-1.50	
Frequency of social media use to follow COVID-related news			.12	3.57***				.04	0.94				.07	1.94	
Time spent at home during the pandemic			.09	2.37*				-.06	-1.60				.05	1.35	
Perceived health risks of the disease			.19	4.83***				.08	1.81				.10	2.41*	
Perceived financial risks of the disease			.09	2.20*				.12	2.73**				.12	2.85**	
<b>Step 3: COVID-19 related stress</b>	.63	.16			167.22***	.29	.00			1.49	.60	.15			155.81***
Perceived stress level			.43	12.93***				-.05	-1.22				.43	12.48***	
<b>Step 4: COVID-19 related rumination</b>	.79	.23			199.06***	.50	.17			72.58***	.65	.06			32.14***
Intrusive rumination			.45	13.53***				.05	1.13				.12	2.79**	
Deliberate rumination			.15	4.60***				.42	9.31***				.19	4.67***	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . <sup>±</sup> 1 = yes, 2 = no.

**Table 4.** Results of logistic regression analysis showing variables associated with membership to the provisional PTSD group.

Variable	<i>B</i>	<i>SE</i>	Wald test ( <i>z</i> -ratio)	<i>p</i>	OR	95% CI for OR	
						Lower bound	Upper bound
Age	−0.02	0.01	9.06	.003	0.98	.96	.99
Level of education	−0.16	0.07	4.93	.026	0.85	.74	.98
Time spent in social media	0.003	0.001	4.72	.030	1.003	1.003	1.005
Perceived health risks of a possible COVID-19 diagnosis	0.52	0.11	20.70	.000	1.68	1.34	2.10
Perceived stress	0.16	0.02	63.72	.000	1.18	1.13	1.22
Intrusive rumination	1.14	0.17	45.79	.000	3.15	2.25	4.37
Deliberate rumination	0.65	0.18	13.46	.000	1.92	1.35	2.71

OR, odds ratio; CI, confidence interval.

Higher PTG was associated with lower levels of education ( $\beta = -.10, p < .05$ ) and anticipating financial risks as a result of pandemic ( $\beta = .12, p < .01$ ). Moreover, engaging in deliberate rumination ( $\beta = .42, p < .001$ ) emerged as another predictor of PTG.

Higher PTD was associated with younger age ( $\beta = -.20, p < .001$ ), lower education level ( $\beta = -.13, p < .01$ ), and being single ( $\beta = -.17, p < .001$ ). Moreover, perceived health ( $\beta = .10, p < .05$ ) and financial ( $\beta = .12, p < .01$ ) risks of a possible COVID-19 diagnosis, perceived stress ( $\beta = .43, p < .001$ ), intrusive rumination ( $\beta = .12, p < .01$ ), and deliberate rumination ( $\beta = .19, p < .001$ ) predicted increases in PTD scores.

### 2.3. Prediction of membership to the provisional PTSD group

There were 328 (47.9%) participants who scored  $\geq 31$  on the PCL-5, indicating a provisional PTSD diagnosis in those participants. Results showed that age, level of education, time spent on social media to follow COVID-related news and posts, perceived health risks of a possible COVID-19 diagnosis, perceived stress, and both intrusive and deliberate rumination were significant predictors of membership to the group of individuals with provisional PTSD at  $p < .05$ . The Hosmer–Lemeshow test showed no evidence of lack of fit for the model. Gender, marital status, having experienced financial loss during the pandemic, and time spent at home due to the pandemic had no significant predictive capacity in the logistic regression analyses. This model correctly predicted 81.8% of the participants without PTSD and 77.4% of those with PTSD with an overall success rate of 79.7%. Results are shown in Table 4.

## 3. Discussion

This study was to our knowledge, the first to evaluate PTS, PTG, and PTD simultaneously during the COVID-19 pandemic. Findings showed that the outcomes assessed in the current study were positively correlated with each other. The positive relationship between severity of PTS symptoms and PTG is

consistent with previous literature (e.g. Karanci et al., 2012; Liu, Wang, Li, Gong, & Liu, 2017), supporting the model by Tedeschi and Calhoun (2004), which asserts that PTG occurs following a metaphorically seismic event. Although depreciation has been previously suggested to be independent of growth (e.g. Baker et al., 2008; Barrington & Shakespeare-Finch, 2013), the current study showed that they were positively related. Our findings suggest that growth and depreciation can co-occur with PTS in the COVID-19 context. This sheds light on the possibility of a broad range of post-traumatic changes during the course of the pandemic.

It has been previously suggested that younger age and lower education augmented negative mental health outcomes including a range of psychiatric symptoms and stress in H1N1 and SARS outbreaks (e.g. Kamigaki & Oshitani, 2010; Sim, Chan, Chong, Chua, & Soon, 2010). Being single, younger, and having lower education levels have also been related to higher perceived stress during the COVID-19 pandemic in 26 countries (Kowal et al., 2020). Similarly, these characteristics have been associated with increased levels of PTS and depreciation and were predictive of provisional PTSD in our study. This can be attributable to the limited access of these groups to the material and psychological resources required to cope with an unexpected aversive event. PTG was only predicted by education level, suggesting that higher education levels were related to lower PTG. Although these results are in line with another study in a Turkish community sample (Gul & Karanci, 2017), no consensus is available in the literature about its directionality. According to the model of Tedeschi and Calhoun (2004), struggling with traumatic events activate cognitive processing and thus PTG. Also, time is required in order to step into PTG. Since having higher education was associated with lower levels of PTS and PTD in our study, they might be less adversely affected, and one might expect PTG levels of highly educated individuals to be relatively low.

Financial loss during the pandemic was associated with higher PTS. Boyraz and Legros (2020) have suggested that job loss, loss of health insurance coverage or housing-related stressors due to COVID-19 can

increase the risk for PTSD. The current results support this association. Gersons, Smid, Smit, Kazlauskas, and McFarlane (2020) argue that such challenges can become a second disaster during or after the pandemic. Anticipating financial risks of a possible coronavirus infection was also associated with PTS but also with PTD and PTG. Such anticipation may heighten anxiety and thus foster feelings of depreciation and PTS but also may involve an appreciation of the present situation, therefore promoting growth to some extent. Investigating the relationship of anticipation of risks not only with PTS and PTD but also with PTG in the pandemic context is thought to bring a novel perspective that might be a particular subject of further investigation in future studies. Furthermore, addressing current and possible future financial problems would be an important agenda for communities in the battle with adverse effects of the pandemic.

Compliance with preventive measures as indicated by time spent at home trying to protect from possible infection was positively related to PTS in the current study. Although it is important to limit social relationships and self-isolate to mitigate COVID-19, such measures could carry adverse psychological consequences for the public as they may decrease social support which is an important resource in coping with trauma (Southwick et al., 2016). Furthermore, negative cognitive appraisals about staying at home and increased rumination can lead to perceiving circumstances during the pandemic as stressful and traumatic (Ehlers & Clark, 2000; Hu, Koucky, Brown, Bruce, & Sheline, 2014). Similarly, increased time spent looking up additional information on COVID-19 through social media predicted higher PTS. Although this variable also predicted membership to the provisional PTSD group, the odds ratio was almost negligible. In the context of COVID-19, media use has also been shown to be related to boredom, anxiety, stress (Chao, Chen, Liu, Yang, & Hall, 2020) and depression (Zhao & Zhou, 2020). The current study further highlights the importance of advising the general public on the possible deleterious effects of social media use on mental health.

Perceived stress during the pandemic strongly predicted PTS and PTD in this study. Moreover, for every one-unit increase in stress, the odds of having provisional PTSD increased by a factor of 1.3. Previous studies have shown that the more stressed people feel, the poorer their physical and psychological health outcomes are (e.g. Maddock & Pariente, 2001; Pereira-Morales, Adan, & Forero, 2019). Stress was also correlated with PTD in trauma survivors (Barrington & Shakespeare-Finch, 2013). A recent review and meta-analysis have shown that almost one-third of individuals in the general population reported stress during the COVID-19 pandemic (Salari et al., 2020). This

study provides evidence that perceived stress is a strong predictor of PTS and also depreciation. Moreover, higher PTS and PTD were associated with anticipating adverse health consequences of possible COVID-19. Increase in anticipation of health risks during the pandemic also increased the odds of having provisional PTSD. Viral diseases can even pose greater psychological difficulties for those with heightened perceived stress (Kisely et al., 2020). Therefore, aiming for stress reduction in the general public would be an important focus for public health interventions since decreased stress may act as a buffer against negative post-traumatic outcomes.

In the context of COVID-19, intrusive and deliberate rumination were differentially related to PTS, growth, and depreciation. Specifically, PTS and PTD were predicted both by intrusive and deliberate rumination, whereas PTG was only associated with deliberate rumination. These findings are consistent with the literature showing that intrusive rumination about traumatic events occurs suddenly in a destructive manner and is mostly associated with negative outcomes (e.g. Cann et al., 2010; Taku et al., 2020). In the current study, intrusive rumination had the highest odds ratio in the logistic regression analysis; the odds of having provisional PTSD increased by a factor of 3.2 for every one-unit increase in intrusive rumination. This destructive effect of intrusive rumination can be interpreted both as a maintenance effect of PTS symptoms and as a leading factor to mental health difficulties other than PTSD like mood disorders, in which the individuals tend to avoid or have difficulty in regulating the negative emotions evoked by the traumatic event (Dell'Osso et al., 2019). Such rumination is indeed related to negative thinking, counterproductive behaviours, and poor problem-solving in interpersonal relationships (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Deliberate rumination, however, requires an intentional evaluation, re-examination and formulation of alternative perspectives in order to facilitate growth. However, deliberate rumination is a more progressive way of approaching trauma and is related mostly to positive results like PTG (Tedeschi & Blevins, 2015) and with a poor yet significant connection to PTD (Allbaugh, Wright, & Folger, 2016). During the pandemic, deliberately thinking about the event and related factors, trying to evaluate the meaning of the event and to focus on a further solution seem to have contributed to experiencing more growth. However, when the individuals' capacity or resources are not sufficient to reprocess the event in times of continuous stress (Ehlers & Clark, 2000), the individual may become stuck in the deliberate rumination phase which might lead to more difficulties and heightened stress. Therefore, this may be attributed not only to the event characteristics but also to the capacity to overcome/control the intrusive symptoms

as well as cognitive processes like intrusive rumination (Gul & Karanci, 2017; Stockton, Hunt, & Joseph, 2011). This may cause deliberate rumination to act as an indicator of PTS and also a predictor of having provisional PTSD. However, when the event and stress are both cognitively well-reprocessed and intrusive rumination is controlled or handled, deliberate rumination occurs, which produces the opportunity to foster growth (Cann et al., 2011; Zoellner & Maercker, 2006). Therefore, it may be fruitful to evaluate the content of deliberate rumination after traumatic events like the current pandemic in order to understand the paths to outcomes and to guide effective strategies for improving mental health.

There are several limitations to the current study that should be noted. First, this study had a cross-sectional design which relied on self-report measures. This might have led to common method biases. Also, the causal relationships between the study variables cannot be inferred from the current study. Second, although distributing online surveys through snowball sampling entailed some advantages given the circumstances during the pandemic, the participants neither nationally represented the Turkish population nor were representative of the populations' gender breakdowns and educational attainment. This limits the generalizability of study findings. Moreover, only three participants reported being infected before or during data collection. It is possible that individuals with good physical health participated in the study, and individuals with illness symptoms and possibly higher stress due to COVID-19 were not adequately represented in the sample. The use of snowball sampling could also have limited access to specific populations such as elderly since the mean age of participants was 34.62. These limitations with the sample might represent a possible bias when interpreting the results. Although this study shows the negative role of financial challenges in people's lives, individuals living in poverty conditions and other disadvantaged populations who might have minimal access to the internet might not have been reached at all. The reason underlying these might also complicate how they respond to and cope with COVID-related circumstances as Patel et al. (2020) also highlighted. Regression models explained 25%-63% of variance in the post-traumatic outcomes, suggesting that there may be other important variables not included in this study, especially for predicting PTG. Future studies need to aim to include other variables to understand post-traumatic outcomes of the pandemic and also to conduct longitudinal studies using representative samples to capture trajectories.

Despite limitations, this study highlights the predictive role of individual and COVID-related factors in post-traumatic outcomes in a community sample. Importantly, the relatively high prevalence rate of provisional PTSD in our sample urges the need for a serious consideration of the mental health impact of

the COVID-19 pandemic once again. The pandemic requires the adoption of trauma-informed strategies both during and after the crisis (Javakhishvili et al., 2020). Through assessing distinct trauma-related outcomes and associated factors during this major public health crisis, this study would hopefully assist in developing tailored interventions and strategies which would foster growth and combat stress and depreciation in the general public.

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## Open scholarship



This article has earned the Center for Open Science badge for Open Data. The data are openly accessible at <https://osf.io/nbu94/>.

## ORCID

Gözde İkizer  <http://orcid.org/0000-0003-3567-5991>

Ayşe Nuray Karancı  <http://orcid.org/0000-0003-1632-3851>

Ervin Gul  <http://orcid.org/0000-0001-9867-4238>

Ilknur Dilekler  <http://orcid.org/0000-0002-9231-8141>

## References

- Allbaugh, L. J., Wright, M. O., & Folger, S. F. (2016). The role of repetitive thought in determining posttraumatic growth and distress following interpersonal trauma. *Anxiety, Stress, and Coping*, 29, 21–37. doi:10.1080/10615806.2015.1015422
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*. (5th ed). Washington, DC: Author. doi:10.1176/appi.books.9780890425596
- Ashbaugh, A. R., Houle-Johnson, S., Herbert, C., El-Hage, W., & Brunet, A. (2016). Psychometric validation of the English and French versions of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5). *PLoS One*, 11(10), e0161645. doi:10.1371/journal.pone.0161645
- Baker, J. M., Kelly, C., Calhoun, G., Cann, A., & Tedeschi, R. G. (2008). An examination of posttraumatic growth and posttraumatic depreciation: Two exploratory studies. *Journal of Loss & Trauma*, 13(5), 1–10. doi:10.1080/15325020802171367



- Barrington, A., & Shakespeare-Finch, J. (2013). Posttraumatic growth and posttraumatic depreciation as predictors of psychological adjustment. *Journal of Loss & Trauma*, 18, 429–443. doi:10.1080/15325024.2012.714210
- Boyraz, G., & Legros, D. N. (2020). Coronavirus disease (COVID-19) and traumatic stress: Probable risk factors and correlates of posttraumatic stress disorder. *Journal of Loss & Trauma*, 1–20. doi:10.1080/15325024.2020.1763556
- Boysan, M., Guzel Ozdemir, P., Ozdemir, O., Selvi, Y., Yilmaz, E., & Kaya, N. (2017). Psychometric properties of the Turkish version of the PTSD checklist for diagnostic and statistical manual of mental disorders, fifth edition (PCL-5). *Psychiatry and Clinical Psychopharmacology*, 27(3), 300–310. doi:10.1080/24750573.2017.1342769
- Cann, A., Calhoun, L. G., Tedeschi, R. G., & Solomon, D. T. (2010). Posttraumatic growth and depreciation as independent experiences and predictors of well-being. *Journal of Loss & Trauma*, 15, 151–166. doi:10.1080/153250209.03375826
- Cann, A., Calhoun, L. G., Tedeschi, R. G., Triplett, K. N., Vishnevsky, T., & Lindstrom, C. M. (2011). Assessing posttraumatic cognitive processes: The Event Related Rumination Inventory. *Anxiety, Stress, and Coping*, 24(2), 137–156. doi:10.1080/10615806.2010.529901
- Casagrande, M., Favieri, F., Tambelli, R., & Forte, G. (2020). The enemy who sealed the world: Effects quarantine due to the COVID-19 on sleep quality, anxiety, and psychological distress in the Italian population. *Sleep Medicine*, 75, 12–20. doi:10.1016/j.sleep.2020.05.011
- Chao, M., Chen, X., Liu, T., Yang, H., & Hall, B. J. (2020). Psychological distress and state boredom during the COVID-19 outbreak in China: The role of meaning in life and media use. *European Journal of Psychotraumatology*, 11(1), Article 1769379. doi:10.1080/20008198.2020.1769379
- Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the USA. In S. Spacapan & S. Oskamp (Eds.), *Social psychology of health* (pp. 31–67). Newbury Park, CA: Sage.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4), 385–396. doi:10.2307/2136404
- Dell'Osso, L., Cremone, I. M., Carpita, B., Dell'Oste, V., Muti, D., Massimetti, G., ... Gesi, C. (2019). Rumination, post-traumatic stress disorder, and mood symptoms in borderline personality disorder. *Neuropsychiatric Disease and Treatment*, 15, 1231–1238. doi:10.2147/NDT.S198616
- Di Crosta, A., Palumbo, R., Marchetti, D., Ceccato, I., La Malva, P., Maiella, R., ... Di Domenico, A. (2020). Individual differences, economic stability, and fear of contagion as risk factors for PTSD symptoms in the COVID-19 emergency. *Frontiers in Psychology*, 11, 2329. doi:10.3389/fpsyg.2020.567367
- Dirik, G., & Karanci, A. N. (2008). Variables related to posttraumatic growth in Turkish rheumatoid arthritis patients. *Journal of Clinical Psychology in Medical Settings*, 15, 193–203. doi:10.1007/s10880-008-9115-x
- Dong, L., & Bouey, J. (2020). Public mental health crisis during COVID-19 pandemic, China. *Emerging Infectious Diseases*, 26(7), 1616–1618. doi:10.3201/eid2607.200407
- Dutheil, F., Mondillon, L., & Navel, V. (2020). PTSD as the second tsunami of the SARS-CoV-2 pandemic. *Psychological Medicine*. Advance Online Publication. doi:10.1017/S0033291720001336
- Dwyer, A., Zoppou, C., Nielsen, O., Day, S., & Roberts, S. (2004). *Quantifying social vulnerability: A methodology for identifying those at risk to natural hazards* (Record 2004/14). Canberra: Geoscience Australia.
- Ehlers, A., & Clark, D. M. (2000). A cognitive model of post-traumatic stress disorder. *Behaviour Research and Therapy*, 38, 319–345. doi:10.1016/S0005-7967(99)00123-0
- Eskin, M., Harlak, H., Demirkiran, F., & Dereboy, C. (2013). The adaptation of the Perceived Stress Scale into Turkish: A reliability and validity analysis. *New/Yeni Symposium Journal*, 51(3), 132–140.
- Forte, G., Favieri, F., Tambelli, R., & Casagrande, M. (2020). COVID-19 pandemic in the Italian population: Validation of a post-traumatic stress disorder questionnaire and prevalence of PTSD symptomatology. *International Journal of Environmental Research and Public Health*, 17(11), 4151. doi:10.3390/ijerph17114151
- Gersons, B. P. R., Smid, G. E., Smit, A. S., Kazlauskas, E., & McFarlane, A. (2020). Can a 'second disaster' during and after the COVID-19 pandemic be mitigated? *European Journal of Psychotraumatology*, 11, Article 1815283. doi:10.1080/20008198.2020.1815283
- Goldmann, E., & Galea, S. (2014). Mental health consequences of disasters. *Annual Review of Public Health*, 35, 169–183. doi:10.1146/annurev-publhealth-032013-182435
- Gul, E., & Karanci, A. N. (2017). What determines posttraumatic stress and growth following various traumatic events? A study in a Turkish community sample. *Journal of Traumatic Stress*, 30, 54–62. doi:10.1002/jts.22161
- Haselden, M. (2014). *Exploring various variables as predictors of posttraumatic growth on university students in Turkish and American cultures: A model proposal* (Unpublished doctoral dissertation). Hacettepe University.
- Horeh, D., & Brown, A. D. (2020). Traumatic stress in the age of COVID-19: A call to close critical gaps and adapt to new realities. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(4), 331–335. doi:10.1037/tra0000592
- Hu, E., Koucky, E. M., Brown, W. J., Bruce, S. E., & Sheline, Y. I. (2014). The role of rumination in elevating perceived stress in posttraumatic stress disorder. *Journal of Interpersonal Violence*, 29(10), 1953–1962. doi:10.1177/0886260513511697
- Javakhishvili, J. D., Ardino, V., Bragesjö, M., Kazlauskas, E., Olf, M., & Schäfer, I. (2020). Trauma-informed responses in addressing public mental health consequences of the COVID-19 pandemic: Position paper of the European Society for Traumatic Stress Studies (ESTSS). *European Journal of Psychotraumatology*, 11(1), 1780782. doi:10.1080/20008198.2020.1780782
- Kamigaki, T., & Oshitani, H. (2010). Influenza pandemic preparedness and severity assessment of pandemic (H1N1) 2009 in South-east Asia. *Public Health*, 124(1), 5–9. doi:10.1016/j.puhe.2009.11.003
- Karanci, A. N., Işık, S., Aker, A. T., İzmit Gül, E., Başbuğ Erkan, B., Özkol, H., & Yavuz Güzel, H. (2012). Personality, posttraumatic stress and trauma type: Factors contributing to posttraumatic growth and its domains in a Turkish community sample. *European Journal of Psychotraumatology*, 3(1), 17303. doi:10.3402/ejpt.v3i0.17303
- Karatzias, T., Shevlin, M., Murphy, J., McBride, O., Ben-Ezra, M., Bentall, R. P., ... Hyland, P. (2020). Posttraumatic stress symptoms and associated comorbidity during the COVID-19 pandemic in Ireland: A population-based study. *Journal of Traumatic Stress*, 33(4), 365–370. doi:10.1002/jts.22565
- Kisely, S., Warren, N., McMahon, L., Dalais, C., Henry, I., & Siskind, D. (2020). Occurrence, prevention, and management of the psychological effects of emerging virus outbreaks on healthcare workers: Rapid review and meta-analysis. *BMJ*, 369, m1642. doi:10.1136/bmj.m1642

- Kowal, M., Coll-Martín, T., Ikizer, G., Rasmussen, J., Eichel, K., Studzińska, A., ... Ahmed, O. (2020). Who is the most stressed during the COVID-19 pandemic? Data from 26 countries and areas. *Applied Psychology: Health and Well-Being*. Advance Online Publication. doi:10.1111/aphw.12234
- Lau, J. T. F., Yang, X., Tsui, H. Y., Pang, E., & Wing, Y. K. (2006). Positive mental health-related impacts of the SARS epidemic on the general public in Hong Kong and their associations with other negative impacts. *Journal of Infection*, 53(2), 114–124. doi:10.1016/j.jinf.2005.10.019
- Liu, A.-N., Wang, -L.-L., Li, H.-P., Gong, J., & Liu, X.-H. (2017). Correlation between posttraumatic growth and posttraumatic stress disorder symptoms based on Pearson correlation coefficient: A meta-analysis. *The Journal of Nervous and Mental Disease*, 205(5), 380–389. doi:10.1097/NMD.0000000000000605
- Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., ... Liu, W. (2020). Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry Research*, 287, Article 112921. doi:10.1016/j.psychres.2020.112921
- Luo, M., Guo, L., Yu, M., Jiang, W., & Wang, H. (2020). The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public – A systematic review and meta-analysis. *Psychiatry Research*, 291, 113190. doi:10.1016/j.psychres.2020.113190
- Maddock, C., & Pariente, C. M. (2001). How does stress affect you? An overview of stress, immunity, depression and disease. *Epidemiology and Psychiatric Sciences*, 10(3), 153–162. doi:10.1017/S1121189X00005285
- National Center for PTSD. (2016). *PTSD checklist for DSM-5 (PCL-5)*. Retrieved from <https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp>
- Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science*, 3(5), 400–424. doi:10.1111/j.1745-6924.2008.00088.x
- Patel, J. A., Nielsen, F. B. H., Badiani, A. A., Assi, S., Unadkat, V. A., Patel, B., ... Wardle, H. (2020). Poverty, inequality and COVID-19: The forgotten vulnerable. *Public Health*, 183, 110–111. doi:10.1016/j.puhe.2020.05.006
- Pereira-Morales, A. J., Adan, A., & Forero, D. A. (2019). Perceived stress as a mediator of the relationship between neuroticism and depression and anxiety symptoms. *Current Psychology*, 38(1), 66–74. doi:10.1007/s12144-017-9587-7
- Salari, N., Hosseini-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., Rasoulpoor, S., & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: A systematic review and meta-analysis. *Global Health*, 16, Article 57. <https://doi.org/10.1186/s12992-020-00589-w>
- Schaefer, J. A., & Moos, R. H. (1992). Life crises and personal growth. In B. N. Carpenter (Ed.), *Personal coping, theory, research, and application* (pp. 149–170). Westport, CT: Praeger.
- Sim, K., Chan, Y. H., Chong, P. N., Chua, H. C., & Soon, S. W. (2010). Psychosocial and coping responses within the community health care setting towards a national outbreak of an infectious disease. *Journal of Psychosomatic Research*, 68(2), 195–202. doi:10.1016/j.jpsychores.2009.04.004
- Southwick, S. M., Sippel, L., Krystal, J., Charney, D., Mayes, L., & Pietrzak, R. (2016). Why are some individuals more resilient than others: The role of social support. *World Psychiatry*, 15(1), 77–79. doi:10.1002/wps.20282
- Stockton, H., Hunt, N., & Joseph, S. (2011). Cognitive processing, rumination, and posttraumatic growth. *Journal of Traumatic Stress*, 24(1), 85–92. doi:10.1002/jts.20606
- Taku, K., Tedeschi, R. G., Shakespeare-Finch, J., Krosch, D., David, G., Kehl, D., ... Calhoun, L. G. (2020). Posttraumatic growth (PTG) and posttraumatic depreciation (PTD) across ten countries: Global validation of the PTG-PTD theoretical model. *Personality and Individual Differences*. Advance Online Publication. doi:10.1016/j.paid.2020.110222
- Tamoliaki, A., & Kalaitzaki, A. E. (2020). “That which does not kill us, makes us stronger”: COVID-19 and posttraumatic growth. *Psychiatry Research*, 289(Article), 113044. doi:10.1016/j.psychres.2020.113044
- Tang, W., Hu, T., Hu, B., Jin, C., Wang, G., Xie, C., ... Xu, J. (2020). Prevalence and correlates of PTSD and depressive symptoms one month after the outbreak of the COVID-19 epidemic in a sample of home-quarantined Chinese university students. *Journal of Affective Disorders*, 274, 1–7. doi:10.1016/j.jad.2020.05.009
- Tedeschi, R. G., & Blevins, C. L. (2015). From mindfulness to meaning: Implications for the theory of posttraumatic growth. *Psychological Inquiry*, 26, 373–376. doi:10.1080/1047840X.2015.1075354
- Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, 9, 455–471. doi:10.1002/jts.2490090305
- Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, 15(1), 1–18. doi:10.1207/s15327965pli1501\_01
- Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). *The PTSD checklist for DSM-5 (PCL-5)*. Scale available from the National Center for PTSD. Retrieved from [www.ptsd.va.gov](http://www.ptsd.va.gov)
- World Health Organization. (2020). *WHO coronavirus disease (COVID-19) dashboard*. Turkey: Author. Retrieved from <https://covid19.who.int/region/euro/country/tr>
- Zhao, N., & Zhou, G. (2020). Social media use and mental health during the COVID-19 pandemic: Moderator role of disaster stressor and mediator role of negative affect. *Applied Psychology: Health and Well-Being*. Advance Online Publication. doi:10.1111/aphw.1222
- Zhao, Y., An, Y., Tan, X., & Li, X. (2020). Mental health and its influencing factors among self-isolating ordinary citizens during the beginning epidemic of COVID-19. *Journal of Loss & Trauma*, 25(6–7), 580–593. doi:10.1080/15325024.2020.1761592
- Zoellner, T., & Maercker, A. (2006). Posttraumatic growth in clinical psychology: A critical review and introduction of a two-component model. *Clinical Psychology Review*, 26, 626–653. doi:10.1016/j.cpr.2006.01.008