



## Research article

## Personal growth initiative moderates the mediating effect of COVID-19 preventive behaviors between fear of COVID-19 and satisfaction with life

Zane Asher Green<sup>a,b,\*</sup>, Murat Yıldırım<sup>c,d</sup><sup>a</sup> Faculty of Business Administration, Preston University, Islamabad Campus, No 85, Street 3, Sector H-8/1, Islamabad, Pakistan<sup>b</sup> Contemporary Research Initiative, Preston University, Islamabad Campus, Pakistan<sup>c</sup> Department of Psychology, Faculty of Science and Letters, Ağrı İbrahim Çeçen University, Erzurum, Yolu 4 Km 04100, Merkez, Ağrı, Turkey<sup>d</sup> Department of Neuroscience, Psychology and Behavior, University of Leicester, Leicester, UK

## ARTICLE INFO

## Keywords:

Personal growth initiative  
 Fear of COVID-19  
 COVID-19 preventive behaviors  
 Satisfaction with life  
 Moderated mediation model

## ABSTRACT

This study focused on a moderated mediation model. First, it determined the mediating effect of COVID-19 preventive behaviors between fear of COVID-19 and satisfaction with life. Next, it examined whether personal growth initiative moderated the mediation effect. The study comprised 461 Pakistani university students (52% men and 48% women) between 18 and 35 years ( $M = 24.66$ ,  $SD = 3.51$ ). Results indicated that higher levels of fear of COVID-19 were linked to greater adherence to COVID-19 preventive behaviors, which in turn were related to higher levels of satisfaction with life (mediation model). With regard to the hypothesized moderated mediation model, results showed that personal growth initiative moderated the mediating path from fear of COVID-19 to satisfaction with life and from COVID-19 preventive behaviours to satisfaction with life. Further, results suggested that fear of COVID-19 and COVID-19 preventive behaviours had stronger effects on satisfaction with life when personal growth initiative was high, but not when it was low or moderate. It was therefore concluded that personal growth initiative may play a protective role in buffering the negative effect of higher levels of fear of COVID-19 on satisfaction with life and an enabling role in strengthening the relationship between COVID-19 preventive behaviors and satisfaction with life. Theoretical contribution and practical implications of the results are discussed as well as the study limitations and future research prospects.

## 1. Introduction

With the emerging new variants of the coronavirus and consequently the increasing infection and mortality rates, the COVID-19 pandemic continues to devastate the world (cf. Aleem et al., 2022; Ceban et al., 2021; Renaud-Charest et al., 2021). Studies have indicated that people around the globe have been suffering from mental health issues (e.g., depression, anxiety, and stress) because of the pandemic (cf. Rodríguez-Fernández et al., 2021; Wang et al., 2021a, 2021b; Xiong et al., 2020). Moreover, the abrupt, unprecedented changes in people's daily routine brought about by the restrictive measures (e.g., home-confinement/quarantine and social distancing) imposed by the governments—to contain the spread of the pandemic—have had adverse effects on their general health (cf. Di Stefano et al., 2021a, 2021b; Sánchez-Sánchez et al., 2020). Researchers have reported the following effects of governments' restrictive measures: increased physical inactivity and sedentary behaviors, poor sleep quality leading to mental health problems and obesity, and increased consumption

of processed foods—high in fats, sugar, and salt—instead of fresh foods (C. Zhang et al., 2020; Di Renzo et al., 2020; Di Stefano et al., 2021a; Fernández-García et al., 2021; Ramos-Padilla et al., 2021). Further, the increased levels of fear associated with contracting the deadly virus are predominantly due to its rapid and invisible transmission (Ashraf et al., 2021; Lippi et al., 2020). Of note is that the perceived risk of contracting COVID-19 has been shown to relate to death distress in terms of death anxiety, death depression, and death obsession (Yıldırım and Güler, 2021).

Additionally, because of these challenging times, university students have had to experience academic stress (Green et al., 2021a), anxiety about their academic future (Kaleem et al., 2020), and future career anxiety (Mahmud et al., 2021). Research by Aucejo et al. (2020) has indicated that due to the pandemic, 13% students delayed their graduation; 40% lost a job, an internship, or a job offer; and 29% expected to earn less at the age of 35. Furthermore, the fear of COVID-19 has been shown to relate to procrastination, intolerance for uncertainty (Doğanülkü et al., 2021), generalized anxiety disorder (Perz et al., 2022),

\* Corresponding author.

E-mail addresses: [zanearts@gmail.com](mailto:zanearts@gmail.com), [zanearts@yahoo.com](mailto:zanearts@yahoo.com) (Z.A. Green).

and depression from COVID-19 (Mahmud et al., 2021) among university students. Also, after reopening of educational institutions, college students have had to experience mental health problems on account of such factors as taking the final examinations, lockdown restrictions, quarantine of classmates, self-quarantine, and take-out food availability (Ren et al., 2021).

Research on Pakistan's university students has demonstrated that women as compared to men, younger students as opposed to older, undergraduates and graduates as compared to post graduates, and those suffering from severe anxiety as opposed to moderate, mild, and minimal experienced greater fear of the pandemic. In addition, increased fear of COVID-19 was prevalent in students who (a) feared that their loved ones could contract the virus, (b) knew someone suffering from the virus, and (c) believed that the COVID-19 situation adversely influenced their academic performance (Green et al., 2021b). University students may need to adopt various strategies for preventing their fear of the pandemic from spiraling out. Practicing COVID-19 preventive behaviors is a worthwhile strategy in this regard. It not only protects people from getting infected, but also helps in containing the spread of the virus (Kowalski and Black, 2021). For instance, face masks are more apt at preventing virus spread from asymptomatic individuals as well as limit the volume and travel distance of respiratory droplets of infected individuals while they are talking, breathing, and coughing (European Centre for Disease Prevention and Control, 2020; Zhai, 2020). Research has demonstrated that infrequent use of face masks is a contributing cause for significantly more physical symptoms resembling COVID-19, increased medical consultation, and more frequent COVID-19 testing and hospitalization (cf. Wang et al., 2020). The higher education institutions may therefore emphasize the use of well-fitting face masks consistently and correctly on- and off-campus. They may also encourage students to maintain physical distancing of at least six feet, perform hand hygiene, practice good respiratory etiquette, and stay home when sick and get tested (Centers for Disease Control and Prevention, 2022). Relevant to note here is that the fear of COVID-19 may itself act as a motivator to comply with COVID-19 preventive behaviors (Yildirim et al., 2021a,b), which are instrumental for engaging in daily life activities in a safer, smarter, and productive manner. Thus, in spite of the threat of the coronavirus, it is possible for university students to experience satisfaction with life based on following COVID-19 protective guidelines.

Furthermore, it may be important for university students to manage personal initiatives for self-improvement and reinventing themselves to adapt to the new normal way of life (i.e., integrating the use of COVID-19 preventive behaviors in their daily lives) to derive greater life satisfaction. Personal growth initiative may also act as a protective shield to counter the negative effect of higher levels of fear of COVID-19 on satisfaction with life.

This research is based on a sample of Pakistan's university students. It has two major objectives. First, it examines the mediating effect of COVID-19 preventive behaviors between fear of COVID-19 and satisfaction with life. Second, this contribution analyzes whether personal growth initiative moderates the mediating effect of COVID-19 preventive behaviours between fear of COVID-19 and satisfaction with life (cf. Figure 1). To the best of our knowledge, this is perhaps the first study to demonstrate the protective role of personal growth initiative in buffering the negative effect of higher levels of fear of COVID-19 on satisfaction with life as well as its enabling role in strengthening the relationship between COVID-19 preventive behaviors and satisfaction with life.

### 1.1. Mediating role of COVID-19 preventive behaviors

The Protection Motivation Theory (PMT; Rogers, 1975) sheds light on how people may be motivated to respond in a self-protective manner towards a perceived threat to their health. PMT may be applicable to any threat for which there exists an effective recommended response that can be practiced by an individual (Floyd et al., 2000). The coronavirus disease is life threatening because of its unpredictable and ever-evolving

nature, its rapid and invisible transmission rate, and its rate of morbidity and mortality (Ahorsu et al., 2020; Ashraf et al., 2021; Lippi et al., 2020). As such, the fear associated with the disease is an important factor that may enable individuals to practice preventive behaviors as protective measures. According to Rogers (1975), fear may be considered a relational/interpersonal construct activated in response to a perceived threat or dangerous situation towards which protective action is needed. According to PMT, fear is pertinent for a patient to change his/her behavior (i.e., take the necessary protective action) to avoid getting sick (Adunlin et al., 2020; Ahorsu et al., 2020; Harper et al., 2021). In line with the theory, the fear that COVID-19 may be contracted by oneself and/or one's family members, relatives and friends (Green et al., 2021b; Kaleem et al., 2020) is possibly the motivation for practicing preventive behaviors (Jørgensen et al., 2020; Perz et al., 2022)—to counter the life threat based on effective and efficacious mitigation options. Studies have also indicated a relationship between FCV-19S and COVID-19 preventive behaviors (e.g., Green et al., 2021b; Mahmood et al., 2022). It is also important to indicate that fear of COVID-19 is negatively related to various measures of well-being; for instance, life satisfaction (Dybecka et al., 2021; Karataş et al., 2021; Özmen et al., 2021), flourishing (Elemo et al., 2021), and mental well-being (Green et al., 2021b).

The second part of the mediation model suggests that the increased adherence to preventive behaviors—representing positive learnable and implementable strategies to manage the risk—motivated by the fear of COVID-19 may then possibly relate to life satisfaction. Previous scholarly work has indicated that preventive behaviors (i.e., compliance with health recommendations) and health practices are related to life satisfaction (Grygiel et al., 2018; Rogowska et al., 2021). Moreover, physical wellness behaviors (body dimension) have been shown to relate to life satisfaction (Green et al., 2020a). Also, practicing COVID-19 preventive behaviors has been shown to relate to better mental health (Yildirim and Güler, 2020) and predict subjective well-being (Yildirim and Özaslan, 2021). Furthermore, evidence from 21 countries indicates a bidirectional relationship between life satisfaction and health-promoting behaviors (Grant et al., 2009). Practicing COVID-19 preventive behaviors is hence in all likelihood related to satisfaction with life.

In light of the aforementioned, we predicted that preventive behaviors will mediate between fear of COVID-19 and life satisfaction.

### 1.2. Moderating effect of personal growth initiative

Considered as a principal expression of eudemonia (Robitschek and Keyes, 2009), personal growth initiative is a self-directed process representing a person's active and deliberate involvement in his or her self-improvement. Personal growth initiative reflects the desire to grow based on identifying the required resources as well as formulating a concrete plan to achieve personal growth goals (Robitschek, 1998). Personal growth initiative was chosen as a moderator between preventive behaviors and life satisfaction as well as between fear of COVID-19 and life satisfaction because of three major reasons.

First, personal growth initiative may be particularly relevant during the COVID-19 pandemic enabling university students to take charge of their lives as well as make the necessary changes in their daily activities and take the required action steps to achieve their educational and vocational goals (Robitschek, 1998). Adopting the new normal way of life based on following the COVID-19 preventive behaviors may therefore be naturally triggered by their desire to be actively engaged in changing, growing, and developing themselves (personal growth initiative). Being safe from the virus is most likely important if students are to reap the fruits of their efforts for achieving personal growth and prosperity.

Second, personal growth initiative nurtures mental health. Research suggests that personal growth initiative has predicted Keyes's multidimensional mental health model (comprising psychological, social, and emotional well-being) in two samples of college students. Also, several years of psychotherapy theory proposes that personal growth advances mental health (Robitschek and Keyes, 2009). Furthermore, personal

growth initiative has been shown to relate strongly and negatively to psychological distress (Robitschek and Kashubeck, 1999). Hence, we believed that personal growth initiative may help in assuaging university students' fear of COVID-19.

Third, theoretically, higher levels of personal growth initiative foster greater well-being, as these reflect the core of eudemonic well-being, i.e., feelings of happiness or contentment expressed as a result of behaviors aimed at realizing one's potential (Ryff, 1989). Research has demonstrated that personal growth initiative is related to psychological well-being (Robitschek, 1998) and its six dimensions as well as positive affect, life satisfaction, and happiness (Robitschek and Keyes, 2009). Moreover, intrinsically motivated personal growth goals—as reflected in the items of the Personal Growth Initiative Scale (PGIS)—tend to report higher levels of subjective well-being as compared to those that are extrinsically motivated (Deci and Ryan, 1985; Robitschek and Keyes, 2009). Thus, higher levels of personal growth initiative most likely further greater satisfaction with life.

## 2. Study hypotheses

Based on the literature reviewed above, we formulate the following two hypotheses: (i) COVID-19 preventive behaviours mediate the association of fear of COVID-19 with satisfaction with life—higher levels of fear of COVID-19 are linked to greater adherence to COVID-19 preventive behaviours, which in turn are related to higher levels of satisfaction with life (*Hypothesis 1*)—and (ii) the mediation effect is moderated by personal growth initiative (moderated mediation effect)—the conditional indirect effects are stronger under conditions of higher personal growth initiative (*Hypothesis 2*). The general moderated mediation model is depicted in Figure 1.

## 3. Method

### 3.1. Participants

Studying in public and private universities situated in the cities of Islamabad, Rawalpindi, and Peshawar, the study participants ( $n = 461$ ) comprised 52% men and 48% women between 18 and 35 years of age ( $M = 24.66$ ,  $SD = 3.51$ ). Most of the participants were single (75%) and unemployed (66%). A detailed description of participants' characteristics is presented in Table 1.

### 3.2. Measures

#### 3.2.1. Fear of COVID-19

Fear of COVID-19 Scale (FCV-19S; Ahorsu et al., 2020) was used to measure students' fear related to the COVID-19 pandemic. The FCV-19S comprises seven items rated on a 5-point Likert-type scale varying from 1

(strongly disagree) to 5 (strongly agree). A sample item is “I am most afraid of coronavirus-19.” Previous research on Pakistan's university students has demonstrated good psychometric properties of the FCV-19S (cf. Green et al., 2021b). In this study, the internal consistency coefficient for the FCV-19S amounted to 0.87.

#### 3.2.2. COVID-19 preventive behaviors

Preventive Behaviors related to COVID-19 Scale (PBCV-19S; Mahmood et al., 2022) was employed to assess students' involvement in preventive behaviours related to the pandemic. The scale consists of seven items rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). A sample item is “I maintain social/physical distance while meeting others.” The PBCV-19S has demonstrated good validity and reliability in a study by Green et al. (2021b). In this study, the internal consistency coefficient for this scale calculated to 0.82.

#### 3.2.3. Personal growth initiative

Personal Growth Initiative Scale (PGIS; Robitschek, 1998; 1999) was used to assess students' active and intentional engagement in changing and developing as an individual. The PGIS includes nine items rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). A sample item is “I know how to change specific things that I want to change in my life.” Pertaining to the study sample, confirmatory factor analysis (CFA) revealed that the PGIS was an adequate fit,  $\chi^2(27) = 35.90$ ,  $p = .007$ ;  $\chi^2/df = 1.329$ ; RMSEA = .046; RMSEA 90% CI [.02; .07]; CFI = 0.99; TLI = 0.99; NFI = 0.99; SRMR = 0.024. Factor loadings ranged from 0.41 to 0.63. Further, the Cronbach's alpha value for the PGIS showed a good internal consistency ( $\alpha = 0.86$ ). These assessed the suitability of administering the PGIS to university students in Pakistan.

#### 3.2.4. Satisfaction with life

The Satisfaction with Life Scale (SWLS; Diener et al., 1985) was used to measure students' cognitive evaluation of their lives. The SWLS includes five items answered on a 7-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree). A sample item is “I am satisfied with my life.” However, in this study, its five items were rated on a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The SWLS has demonstrated good validity and reliability in previous research based on Pakistan's university students (Green, 2020a; Green et al., 2020a). In this study, the internal consistency coefficient for the SWLS amounted to 0.91.

### 3.3. Procedure

This research is part of the COVID-19 and the New Normal project of the Contemporary Research Initiative, Preston University. After obtaining the necessary approval for conducting the study, an online survey was developed through Google forms. The link to the survey was sent to the

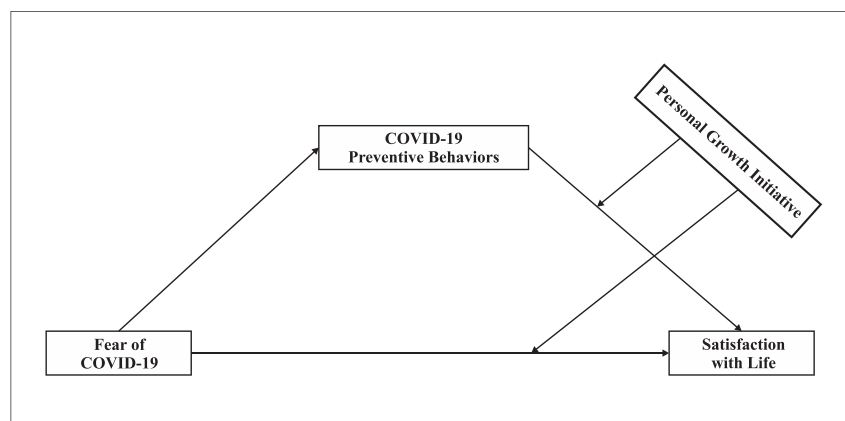


Figure 1. Moderated mediation model showing the associations between the variables.

**Table 1.** Participants' characteristics.

Variable	Level	Frequency	Percent
Gender	Male	239	52
	Female	222	48
Marital status	Single	348	75
	Married	113	25
Employment status	Unemployed	302	66
	Employed	159	34
Education level	Undergraduate	298	65
	Graduate	115	25
	Post-graduate	48	10

Note. All percentages have been rounded off.

student affairs department at each of the six public and five private universities, which agreed to participate in the study. The survey link was also shared with the relevant university student groups on social media. Also, the programs office at each university was requested to forward the link to class groups on WhatsApp. In addition, the researchers shared the survey link with their contacts at these universities and requested them to forward the survey to their students and colleagues. Participation in the study was anonymous and voluntary. The first page of the online survey provided information about the purpose of the study as well as informed the participants about the confidentiality of their responses. This page also asked for their participation consent. Participants had to complete all the items in the survey for it to be submitted and as such none of them were excluded.

### 3.4. Data analyses

Prior to conducting the main analysis, we reported the descriptive statistics, reliability estimates, and correlation between the study variables. Skewness and kurtosis statistics were used to assess whether the study variables were normally distributed. According to Field (2009), the values between +2 and -2 for the statistics are considered acceptable for proving univariate normal distribution. In addition, the Cronbach's alpha coefficient was used as a measure of the internal consistency reliability of the scales. Further, Pearson correlation coefficient was computed to assess the relationship between the study variables. Finally, we tested the proposed moderated mediation hypothesis. In this regard, Model 15 of the PROCESS macro version 3.5 was used with the bootstrap method (5,000 resamples to estimate the 95% confidence intervals) to examine the indirect effect (Preacher and Hayes, 2008; Hayes, 2018). Data were analyzed using SPSS version 24.

## 4. Results

### 4.1. Preliminary analyses

Descriptive analysis indicated that skewness and kurtosis values fell within an acceptable range of normal distribution (skewness range = -.84 and .22; kurtosis range = .02 and .82). The internal consistency reliability estimates for the scales employed in this study varied from good ( $\alpha = .82$ ) to strong ( $\alpha = .91$ ). As for the correlations between the variables, results indicated that fear of COVID-19 had a positive and significant relationship with COVID-19 preventive behaviors as well as a negative and significant relationship with personal growth initiative and satisfaction with life. Also, the COVID-19 preventive behaviors had a significant and positive relationship with personal growth initiative. Furthermore, there was a significant and positive relationship between personal growth initiative and satisfaction with life (cf. Table 2).

### 4.2. Testing the mediation effect

Results of the mediation analysis (Model 4) indicated that fear of COVID-19 significantly predicted COVID-19 preventive behaviors ( $\beta =$

.29,  $p < .001$ ) by explaining 8% of the variance in COVID-19 preventive behaviors. Fear of COVID-19 ( $\beta = -.22$ ,  $p < .001$ ) and COVID-19 preventive behaviors ( $\beta = .13$ ,  $p < .001$ ) significantly predicted satisfaction with life. These two variables collectively accounted for 5% of the variance in satisfaction with life. In addition, the indirect effect of fear of COVID-19 on satisfaction with life was significant through COVID-19 preventive behaviors (effect = .03, 95% CI [.01, .05]). These results suggest that the fear of COVID-19 was related positively and indirectly (via COVID-19 preventive behaviors) to satisfaction with life. Results support Hypothesis 1, as higher levels of fear of COVID-19 were linked to greater adherence to COVID-19 preventive behaviors, which in turn were related to higher levels of satisfaction with life.

### 4.3. Testing the moderated mediation effect

Results of the moderated mediation analysis revealed that fear of COVID-19 had a significant and positive effect on COVID-19 preventive behaviors by explaining 8% of the variance in preventive behaviors. Also, fear of COVID-19 and COVID-19 preventive behaviors did not have significant effects on satisfaction with life. Personal growth initiative had a significant and positive predictive influence on satisfaction with life. Furthermore, the interactions between fear of COVID-19—personal growth initiative and COVID-19 preventive behaviors—personal growth initiative were significant by explaining 1% of the additional variance (for both interaction effects) in the proposed model. This model accounted for 48% of the variance in satisfaction with life (cf. Table 3). Analyses of simple slopes showed that the conditional effect of fear of COVID-19 on satisfaction with life (cf. Figure 2) and the conditional effect of COVID-19 preventive behaviors on satisfaction with life (cf. Figure 3) occurred when personal growth initiative was high (+1 SD), but not when it was low (-1 SD) or moderate (0 SD). Thus, results confirm Hypothesis 2.

## 5. Discussion

Results suggest that the mediating effect of COVID-19 preventive behaviors was greater for individuals characterized by higher levels of personal growth initiative as opposed to those with lower or moderate levels. Results make important contribution to theory and practice as discussed in the following paragraphs.

### 5.1. Theoretical contribution

Results have important theoretical implications. First, the PMT provides a modus operandi for understanding how fear of COVID-19 may influence COVID-19 preventive behaviors. In consonance with the theory, the impetus for practicing COVID-19 preventive behaviors may be triggered from the innate instinct to protect oneself from the life threatening COVID-19 virus. PMT is applicable here because for the threat of the pandemic, there is an effective recommended response in the form of well-recognized COVID-19 preventive strategies that can be practiced by individuals (Floyd et al., 2000). The fear of COVID-19 may therefore be a motivator for practicing COVID-19 preventive behaviors (Yildirim et al., 2021a,b). Second, this research underscores the importance of COVID-19 preventive behaviors in nurturing greater satisfaction with life. To the best of our knowledge, there is practically no research that specifically indicates a positive relationship between COVID-19 preventive behaviors and satisfaction with life as in the mediation model of this study. However, research has demonstrated that preventive behaviors (i.e., compliance with health recommendations) and health practices are related to satisfaction with life (Grygiel et al., 2018; Rogowska et al., 2021). Third, as a moderator, personal growth initiative supports the view that higher levels of personal growth initiative promote greater well-being (Robitschek and Keyes, 2009; Ryff, 1989). Testing the role of personal growth initiative as a moderator during the pandemic provides meaningful insights into how it may reflect the true

**Table 2.** Descriptive statistics, reliability, and correlation analysis for the study variables.

Variable	Descriptive				Reliability	Correlation			
	Mean	SD	Skewness	Kurtosis	$\alpha$	1.	2.	3.	4.
1. Fear of COVID-19	18.70	5.60	0.22	0.02	0.87	–	.29**	–.26**	–.18**
2. Preventive behaviours	27.94	5.43	–0.83	0.20	0.82		–	.17**	.07
3. Personal Growth Initiative	35.36	4.91	–0.19	0.55	0.86			–	.68**
4. Satisfaction with life	20.13	3.77	–0.84	0.82	0.91				–

Note. \*\* $p < 0.01$ .

spirit of eudemonic well-being. Lastly, this study provides first evidence regarding the protective role of personal growth initiative in buffering the negative effects of higher levels of fear of COVID-19 on satisfaction with life. It also provides first evidence regarding the enabling role of personal growth initiative in strengthening the relationship between COVID-19 preventive behaviors and satisfaction with life.

**5.2. Practical implications**

Results of the study suggest a need for fostering personal growth among university students. In this regard, student affairs professionals may team up with positive psychologists, intervention specialists, and instructional designers to develop and launch educational interventions for university students. Character strengths interventions geared at furthering personal growth and environmental mastery may be offered (cf. Green, 2020a). These interventions may also focus on helping university students in identifying and using their signature strengths. Encouraging students to use their signature strengths to develop their weaker strengths may be germane to their personal growth (Green, 2022). We recommend the following topics for advancing personal growth among university students: developing proactivity and career

adaptability, becoming a better version of oneself, discovering the winning track, developing a positive mindset for greater inner strength, fostering greater self-knowledge, enhancing happiness based on positive thought, furthering the X-Factor, finding meaning in life, cultivating hope and optimism, nurturing PERMA-oriented well-being, and mastering the art-of-living (cf. Green, 2020b, 2021a, 2021b, 2021c, 2021d; Green et al., 2015a, 2015b, 2015c, 2015d, 2020b, 2021a, 2022; Lang and Schmitz, 2016; Yildirim et al., 2021a,b).

During the pandemic, the interventions may be delivered through a blended learning approach encompassing an online learning mode as well as an offline personal and collaborative learning mode. The online learning mode may be based on various sessions (e.g., interactive lecturette, individual activity, collaborative learning, reporting of homework activities, and question and answer). The offline personal and collaborative learning mode may be based on interesting experiential learning activities (cf. Green, 2019a, 2019b, 2021b for examples) tasked as homework. Students may use WhatsApp and Zoom for completing the group and pair-based homework activities. Previous studies have also advocated the suitability of this blended learning approach for increasing the effectiveness of teaching and learning as well as ensuring the safety of all concerned during the pandemic (cf. Green, 2021a, 2022; Bao, 2020). Furthermore, the emotionalized learning experiences format may be used to make blended learning more permanent, engaging, and gratifying as well as motivate learners to apply the lessons learned to their unique contexts (cf. Green, 2019a, 2021a; Green and Batool, 2017; Green et al., 2022).

In addition, faculty may need to be oriented to the significance of personal growth initiative and how it may be pertinent for advancing students' academic performance and overall well-being amid the pandemic. Furthermore, to promote personal growth, counseling sessions may need to focus on such areas as personal insight, future-orientation, advancing life goals, obstacles to personal growth, self-acceptance, perceptions of control and mastery over the environment, sense of autonomy regarding life and daily choices, and social support.

Findings may also provide university counselors useful information with regard to devising and implementing a system for properly monitoring university students' fear of the pandemic—especially during the Omicron wave—so that appropriate interventions may be offered to alleviate it. Moreover, students may need to be motivated to discuss their fear of the pandemic with university counselors without inhibitions (Green et al., 2021b). Also, cognitive behavioral therapy (CBT) may be relevant for assuaging the fear of COVID-19. Research suggests the use of CBT as a mental health strategy for treating the psychological impact of COVID-19 (Ho et al., 2020). Offering Internet CBT (I-CBT) interventions to university students may prevent the spread of the pandemic. Moreover, these Internet interventions have been effective and efficacious—as indicated by a systematic review and meta-analysis by Sijbrandij et al. (2016). Further, M.W. Zhang and Ho (2017) recommend using Moodle—a renowned open-source learning management system platform—as it is not only a cost-effective, but also a user-friendly solution for implementing a spectrum of I-CBT interventions. Additionally, such CBT strategies as positive visualizations, identification of self-defeating beliefs, and cognitive priming may be beneficial for fostering optimism (cf. Salzgeber, 2012) and personal growth among

**Table 3.** Unstandardized coefficients for the moderated mediation model.

Antecedent	Consequent			
	M (Preventive behaviours)			
	Coeff.	SE	t	p
X (Fear of COVID-19)	.28	.04	6.39	<.001
Constant	.00	.24	.00	1.00
$R^2 = .08$ $F = 40.81; p < .001$				
	Y (Satisfaction with life)			
X (Fear of COVID-19)	.01	.03	.25	.801
M (Preventive behaviours)	–.03	.03	–1.22	.224
W (Personal growth initiative)	.53	.03	19.11	<.001
X*W	.01	.00	2.49	<.05
M*W	–.02	.01	–3.38	<.001
Constant	20.28	.13	151.89	<.001
$R^2 = .48$ $F = 84.45; p < .001$				
Conditional indirect effects of fear of COVID-19 on satisfaction with life				
Personal growth initiative	Effect	BootSE	BootLLCI	BootULCI
M – 1SD (–4.91)	.02	.01	–.01	.01
M (.00)	–.01	.01	–.02	.01
M + 1SD (4.91)	–.03	.01	–.06	–.01
Index of moderated mediation				
Personal growth initiative	–.01	.00	–.01	–.00

Note. 95% confidence interval levels; Number of bootstrap samples for percentile bootstrap confidence intervals: 5,000; W (moderator variable) values in conditional tables are the mean and +/- SD from the mean; X = predictor; M = mediator.

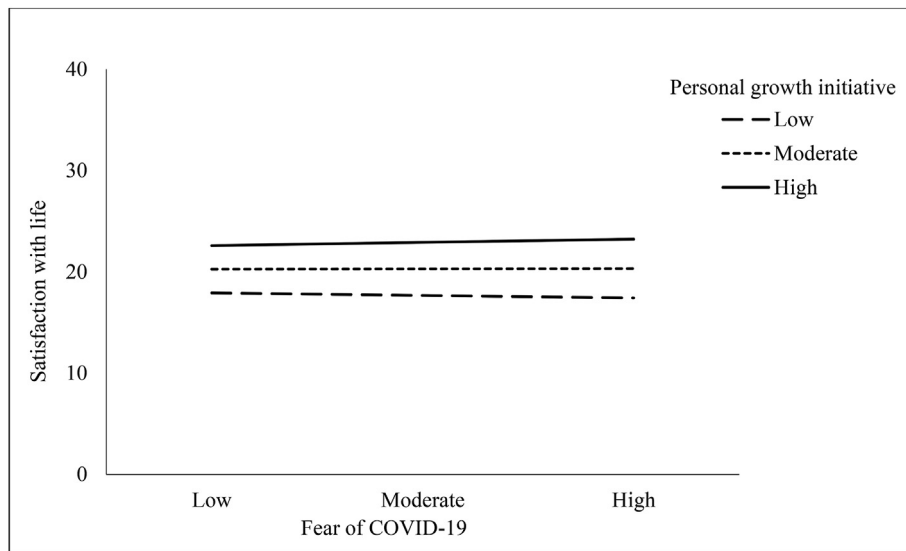


Figure 2. The simple slope indicating the moderating effect of personal growth initiative in the association between fear of COVID-19 and satisfaction with life.

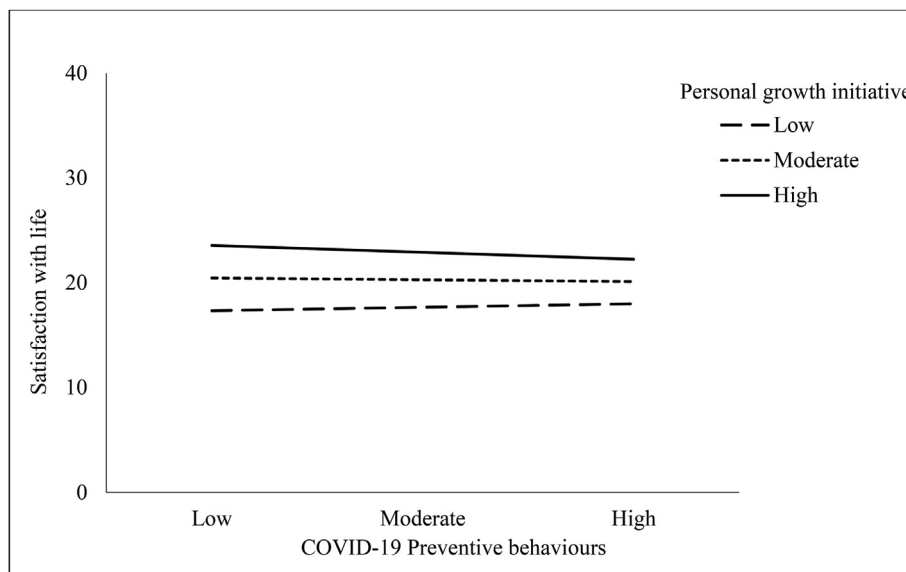


Figure 3. The simple slope indicating the moderating effect of personal growth initiative in the association between COVID-19 preventive behaviours and satisfaction with life.

university students amid the pandemic. For instance, students may be tasked to (a) read or watch inspirational material to conceptualize optimistic events to approach situations positively (cognitive priming), (b) use their imagination to visualize desired future outcomes in the context of general personal improvement or becoming an overall effective person to successfully address life's challenges (positive visualizations), and (c) recognize negative beliefs and associated triggers (identification of self-defeating beliefs) to overcome their barriers to achieving personal growth outcomes (Green, 2021b; Salzgeber, 2012).

Furthermore, the importance of practicing COVID-19 preventive measures on- and off-campus may need to be repeatedly emphasized. Also, short lectures may be delivered throughout the year (Green et al., 2020a; 2021b) on such topics as COVID-19 variants, body-mind-spirit dimensions of wellness, leading the new normal way of life, enhancing mental well-being, and long-term effect of the pandemic on society. Finally yet importantly, arrangements may be made by the universities to

administer the booster dose of the coronavirus vaccine to students to help improve the protection provided by the original shots.

### 5.3. Limitations and future directions

The hypothesized model was tested using a cross-sectional design, which cannot provide a definitive causal relationship between the study variables. Future research may focus on a longitudinal design by separating the variables in time. To confirm causal relationships, it may be necessary to incorporate the three variables collected at each time point in the longitudinal analysis. Also, the data for this study were gathered using self-reported measures, which may have introduced subject-related biases. Different methods of data collection (e.g., interview and peer reports) may therefore be applied in subsequent research for examining the relationship between the variables. Further, to improve generalizability, future research may be based on university students across

Pakistan. Moreover, to increase the application of the moderated mediation model, future research may be based on children, adolescents, older adults, and clinical samples.

## 6. Conclusion

This contribution indicates that personal growth initiative moderated the mediating effect of preventive behaviours in the relationship between fear of COVID-19 and satisfaction with life in a sample of Pakistan's university students. Personal growth initiative buffered the adverse effect of the fear of COVID-19 on preventive behaviours and satisfaction with life. All in all, this research offers new evidence that the conditional effect of fear of COVID-19 on satisfaction with life and the conditional effect of COVID-19 preventive behaviours on satisfaction with life occur when personal growth initiative is high, but not when it is low or moderate.

## Declarations

### Author contribution statement

Zane Asher Green & Murat Yıldırım: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

### Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Data availability statement

Data will be made available on request.

### Declaration of interest's statement

The authors declare no conflict of interest.

### Additional information

No additional information is available for this paper.

## References

- Adunlin, G., Adedoyin, A.C.A., Adedoyin, O.O., Njoku, A., Bolade-Ogunfodun, Y., Bolaji, B., 2020. Using the protection motivation theory to examine the effects of fear arousal on the practice of social distancing during the COVID19 outbreak in rural areas. *J. Hum. Behav. Soc. Environ.* 31 (1-4), 168–172.
- Ahorsu, D.K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M.D., Pakpour, A.H., 2020. The Fear of COVID-19 Scale: development and initial validation. *Int. J. Ment. Health Addict.*
- Ashraf, A., Ali, I., Ullah, F., 2021. Domestic and gender-based violence: Pakistan scenario amidst COVID-19. *Asian J. Soc. Health Behav.* 4 (1), 47–50.
- Aleem, A., Akbar Samad, A.B., Slenker, A.K., 2022. Emerging variants of SARS-CoV-2 and novel therapeutics against Coronavirus (COVID-19). In: *StatPearls*. StatPearls Publishing.
- Aucejo, E.M., French, J., Araya, M.P.U., Zafar, B., 2020. The impact of COVID-19 on student experiences and expectations: evidence from a survey. *J. Publ. Econ.* 104271.
- Bao, W., 2020. COVID-19 and online teaching in higher education: A case study of Peking University. *Hum. Behav. Emerg. Technol.* 2, 113–115.
- Ceban, F., Nogo, D., Carvalho, I.P., Lee, Y., Nasri, F., Xiong, J., Lui, L., Subramaniapillai, M., Gill, H., Liu, R.N., Joseph, P., Teopiz, K.M., Cao, B., Mansur, R.B., Lin, K., Rosenblat, J.D., Ho, R.C., McIntyre, R.S., 2021. Association between mood disorders and risk of COVID-19 infection, hospitalization, and death: a systematic review and meta-analysis. *JAMA Psychiatr.* 78 (10), 1079–1091.
- Centers for Disease Control and Prevention, 2022. Guidance for Institutions of Higher Education (IHEs). Retrieved from. [https://www.cdc.gov/coronavirus/2019-ncov/community/colleges-universities/considerations.html#anchor\\_1643908464100](https://www.cdc.gov/coronavirus/2019-ncov/community/colleges-universities/considerations.html#anchor_1643908464100). (Accessed 18 April 2022).
- Deci, E.L., Ryan, R.M., 1985. *Intrinsic Motivation and Self-determination in Human Behavior*. Plenum Press, New York.
- Diener, E., Emmons, R.A., Larsen, R.J., Griffin, S., 1985. The satisfaction with life scale. *J. Pers. Assess* 49 (1), 71–75.
- Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., Leggeri, C., Caparelo, G., Barrea, L., Scerbo, F., Esposito, E., De Lorenzo, A., 2020. Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. *J. Transl. Med.* 18 (1), 229.
- Di Stefano, V., Battaglia, G., Giustino, V., Gagliardo, A., D'Aleo, M., Giannini, O., Palma, A., Brighina, F., 2021a. Significant reduction of physical activity in patients with neuromuscular disease during COVID-19 pandemic: the long-term consequences of quarantine. *J. Neurol.* 268 (1), 20–26.
- Di Stefano, V., Ornello, R., Gagliardo, A., Torrente, A., Illuminato, E., Caponnetto, V., Frattale, I., Golini, R., Di Felice, C., Graziano, F., Caccamo, M., Ventimiglia, D., Iacono, S., Matarazzo, G., Armetta, F., Battaglia, G., Firenze, A., Sacco, S., Brighina, F., 2021b. Social distancing in chronic migraine during the COVID-19 outbreak: results from a multicenter observational study. *Nutrients* 13 (4), 1361.
- Doğanülkü, H.A., Korkmaz, O., Griffiths, M.D., Pakpour, A.H., 2021. Fear of COVID-19 lead to procrastination among Turkish university students: the mediating role of intolerance of uncertainty. *BMC Psychol.* 9, 178.
- Dymecka, J., Gerymski, R., Machnik-Czerwik, A., Derbis, R., Bidzan, M., 2021. Fear of COVID-19 and life satisfaction: the role of the health-related hardiness and sense of coherence. *Front. Psychiatr.* 12, 712103.
- Elemo, A.S., Ahmed, A.H., Kara, E., Zerkeshi, M.K., 2021. The Fear of COVID-19 and flourishing: assessing the mediating role of sense of control in international students. *Int. J. Ment. Health Addict.*
- European Centre for Disease Prevention and Control, 2020. *Using Face Masks in the Community*. Author, Stockholm.
- Fernández-García, Á.I., Marín-Puyalto, J., Gómez-Cabello, A., Matute-Llorente, Á., Subías-Periá, J., Pérez-Gómez, J., Lozano-Berges, G., Mañas, A., Guadalupe-Grau, A., González-Gross, M., Ara, I., Casajús, J.A., Vicente-Rodríguez, G., 2021. Impact of the home confinement related to COVID-19 on the device-assessed physical activity and sedentary patterns of Spanish older adults. *BioMed Res. Int.* 2021, 5528866.
- Field, A., 2009. *Discovering Statistics Using SPSS*. Sage publications.
- Floyd, D.L., Prentice-Dunn, S., Rogers, R.W., 2000. A meta-analysis of research on protection motivation theory. *J. Appl. Soc. Psychol.* 30 (2), 407–429.
- Grant, N., Wardle, J., Steptoe, A., 2009. The relationship between life satisfaction and health behavior: a cross-cultural analysis of young adults. *Int. J. Behav. Med.* 16 (3), 259–268.
- Green, Z.A., 2019a. Emotionalized learning experiences: Inspiring students in Pakistan to reinvent themselves to nurture social competence. *J. Coll. Student Dev.* 60 (3), 337–360.
- Green, Z.A., 2019b. Multiple intelligences mediate generalized self-efficacy and academic achievement. *Baltic J. Psychol.* 20 (1,2), 34–51.
- Green, Z.A., 2020a. The mediating effect of well-being between generalized self-efficacy and vocational identity development. *Int. J. Educ. Vocat. Guid.* 20 (2), 215–241.
- Green, Z.A., 2020b. *Well-being Calendar 2021—Researchgate Presentation*.
- Green, Z.A., 2021a. Strengthening career adaptation among school teachers in Pakistan: Test of strengths-based career intervention imparted through emotionalized learning experiences. *Int. J. Educ. Vocat. Guid.*
- Green, Z.A., 2021b. Fostering the X-Factor in Pakistan's university students. *Curr. Psychol.* 40, 3073–3102.
- Green, Z.A., 2021c. *Art-of-living Calendar 2022—Researchgate Presentation*.
- Green, Z.A., 2021d. *Discover a New You Presentation 1 – Become a Better Version of Yourself*.
- Green, Z.A., 2022. Character strengths intervention for nurturing well-being among Pakistan's university students: a mixed-method study. *Appl. Psychol.: Health Well-Being* 14 (1), 252–277.
- Green, Z.A., Batool, S., 2017. Emotionalized learning experiences: Tapping into the affective domain. *Eval. Progr. Plann.* 62, 35–48.
- Green, Z.A., Faizi, F., Jalal, R., Zadrán, Z., 2021a. Emotional support received moderates academic stress and mental well-being in a sample of Afghan university students amid COVID-19. *Int. J. Soc. Psychiatr.*
- Green, Z.A., Malik, H., Ahmed, F., 2015a. *Discover a New You Workshop 1: Enhancing Personal Insight—Participants' Resource*. Preston University, Islamabad, Pakistan.
- Green, Z.A., Malik, H., Maqbool, M.S., 2015b. *Discover a New You Workshop 2: Cultivating Happiness through a Positive Outlook on Life—Participants' Resource*. Preston University, Islamabad, Pakistan.
- Green, Z.A., Munawwar, S., Noor, U., Himayat, L., 2015c. *Discover a New You Workshop 4: Unlocking the winner Within—Participants' Resource*. Preston University, Islamabad, Pakistan.
- Green, Z.A., Noor, U., Ahmed, F., 2015d. *Discover a New You Workshop 3: Building Inner Strength and Fortitude—Participants' Resource*. Preston University, Islamabad, Pakistan.
- Green, Z.A., Noor, U., Ahmed, F., 2020a. The body-mind-spirit dimensions of wellness mediate dispositional gratitude and life satisfaction. *J. Happiness Stud.* 21 (4), 3095–3119.
- Green, Z.A., Noor, U., Hashemi, M.N., 2020b. Furthering proactivity and career adaptability among university students: Test of intervention. *J. Career Assess* 28 (3), 402–424.
- Green, Z.A., Noor, U., Ahmed, F., Himayat, L., 2021b. Validation of the Fear of COVID-19 Scale in a sample of Pakistan's university students and future directions. *Psychol. Rep.*
- Green, Z.A., Yıldırım, M., Jalal, R., 2022. Testing the Career Construction Model of Adaptation in a sample of Afghanistan's working adults: a longitudinal study. *J. Career Assess.*
- Grygiel, E., Cygnar, E., Zwolińska-Mirek, K., Mirek, J., Bigosińska, M., Halska, U., 2018. Health behaviors and life satisfaction of health spa patients. *Med. Sci.* 12 (2), 22–28.
- Harper, C.A., Satchell, L.P., Fido, D., Latzman, R.D., 2021. Functional fear predicts public health compliance in the COVID-19 pandemic. *Int. J. Ment. Health Addict.* 19 (5), 1875–1888.

- Hayes, A.F., 2018. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. Guilford Press, New York, NY.
- Ho, C.S., Chee, C.Y., Ho, R.C., 2020. Mental health strategies to combat the psychological impact of coronavirus disease 2019 (COVID-19) beyond paranoia and panic. *Ann. Acad. Med. Singapore* 49 (3), 155–160.
- Jørgensen, F.J., Bor, A., Petersen, M., 2020, May 19. Compliance without Fear: Individual-Level Predictors of Protective Behavior during the First Wave of the COVID-19 Pandemic.
- Kaleem, M., Talha, M., Nazir, R., Hafeez, R., 2020. Perceptions and the associated apprehension stemming from novel COVID-19 among Pakistani students. *Pakistan Armed Forces Med. J. Armed Forces Med. J.* 70 COVID-19 (1), S237–S243.
- Karataş, Z., Uzum, K., Tagay, Ö., 2021. Relationships between the life satisfaction, meaning in life, hope and COVID-19 fear for Turkish adults during the COVID-19 outbreak. *Front Psychol.* 12, 633384.
- Kowalski, R.M., Black, K.J., 2021. Protection motivation and the COVID-19 virus. *Health Commun.* 36 (1), 15–22.
- Lang, J., Schmitz, B., 2016. Art-of-living training: developing an intervention for students to increase art-of-living. *Appl Psychol: Health Well-Being* 8 (3), 279–300.
- Lippi, G., Henry, B.M., Bovo, C., Sanchis-gomar, F., 2020. Health risks and potential remedies during prolonged lockdowns for coronavirus disease. *Diagnosis* 7 (2), 85–90.
- Mahmood, Q.K., Jafree, S.R., Qureshi, W.A., 2022. The psychometric validation of FCV19S in Urdu and socio-demographic association with fear in the people of Khyber Pakhtunkhwa (KPK) Province in Pakistan. *Int. J. Ment. Health Addict.* 20 (1), 426–436.
- Mahmud, M.S., Talukder, M.U., Rahman, S.M., 2021. Does 'Fear of COVID-19' trigger future career anxiety? An empirical investigation considering depression from COVID-19 as a mediator. *Int. J. Soc. Psychiatr.* 67, 35–45.
- Özmen, S., Özkan, O., Özer, Ö., Yanardağ, M.Z., 2021. Investigation of COVID-19 fear, well-being and life satisfaction in Turkish society. *Soc. Work Publ. Health* 36 (2), 164–177.
- Perz, C.A., Lang, B.A., Harrington, R., 2022. Validation of the fear of COVID-19 scale in a US college sample. *Int. J. Ment. Health Addict.* 20 (1), 273–283.
- Preacher, K.J., Hayes, A.F., 2008. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav. Res. Methods* 40, 879–891.
- Ramos-Padilla, P., Villavicencio-Barriga, V.D., Cárdenas-Quintana, H., Abril-Merizalde, L., Solís-Manzano, A., Carpio-Arias, T.V., 2021. Eating habits and sleep quality during the COVID-19 pandemic in adult population of Ecuador. *Int. J. Environ. Res. Publ. Health* 18 (7), 3606.
- Ren, Z., Xin, Y., Ge, J., Zhao, Z., Liu, D., Ho, R., Ho, C., 2021. Psychological impact of COVID-19 on college students after school reopening: a cross-sectional study based on machine learning. *Front. Psychol.* 12, 641806.
- Renaud-Charest, O., Lui, L., Eskander, S., Ceban, F., Ho, R., Di Vincenzo, J.D., Rosenblat, J.D., Lee, Y., Subramaniapillai, M., McIntyre, R.S., 2021. Onset and frequency of depression in post-COVID-19 syndrome: A systematic review. *J. Psychiatr. Res.* 144, 129–137.
- Robitschek, C., 1998. Personal growth initiative: The construct and its measure. *Meas. Eval. Counsel. Dev.* 30 (4), 183–198.
- Robitschek, C., 1999. Further validation of the personal growth initiative scale. *Meas. Eval. Counsel. Dev.* 31, 197–210.
- Robitschek, C., Kashubeck, S., 1999. A structural model of parental alcoholism, family functioning, and psychological health: the mediating effects of hardiness and personal growth orientation. *J. Counsel. Psychol.* 46 (2), 159–172.
- Robitschek, C., Keyes, C.L.M., 2009. Keyes's model of mental health with personal growth initiative as a parsimonious predictor. *J. Counsel. Psychol.* 56 (2), 321–329.
- Rodríguez-Fernández, P., González-Santos, J., Santamaría-Peláez, M., Soto-Cámara, R., Sánchez-González, E., González-Bernal, J.J., 2021. Psychological effects of home confinement and social distancing derived from COVID-19 in the general population—A systematic review. *Int. J. Environ. Res. Publ. Health* 18 (12), 6528.
- Rogers, R.W., 1975. A protection motivation theory of fear appeals and attitude change. *J. Psychol.* 91 (1), 93–114.
- Rogowska, A.M., Nowak, P.F., Kwaśnicka, A., 2021. Healthy behavior as a mediator in the relationship between optimism and life satisfaction in Health Sciences students: a cross-sectional study. *Psychol. Res. Behav. Manag.* 14, 1877–1888.
- Ryff, C.D., 1989. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *J. Pers. Soc. Psychol.* 57, 1069–1081.
- Salzgeber, A.M., 2012. *An examination of an Optimism Training Intervention on Optimism Levels of NCAA Division I Athletes: A Single Subject Design* [Master's Dissertation]. Georgia Southern University.
- Sánchez-Sánchez, E., Ramírez-Vargas, G., Avellaneda-López, Y., Orellana-Pecino, J.I., García-Marín, E., Díaz-Jimenez, J., 2020. Eating habits and physical activity of the Spanish population during the COVID-19 pandemic period. *Nutrients* 12 (9), 2826.
- Sijbrandij, M., Kunovski, I., Cuijpers, P., 2016. Effectiveness of internet-delivered cognitive behavioral therapy for posttraumatic stress disorder: a systematic review and meta-analysis. *Depress Anxiety* 33 (9), 783–791.
- Wang, C., Chudzicka-Czupala, A., Grabowski, D., Pan, R., Adamus, K., Wan, X., Hetnal, M., Tan, Y., Olszewska-Guizzo, A., Xu, L., McIntyre, R.S., Quek, J., Ho, R., Ho, C., 2020. The association between physical and mental health and face mask use during the COVID-19 pandemic: a comparison of two countries with different views and practices. *Front. Psychiatr.* 11, 569981.
- Wang, C., Chudzicka-Czupala, A., Tee, M.L., Núñez, M., Tripp, C., Fardin, M.A., Habib, H.A., Tran, B.X., Adamus, K., Anlacan, J., García, M., Grabowski, D., Hussain, S., Hoang, M.T., Hetnal, M., Le, X.T., Ma, W., Pham, H.Q., Reyes, P., Shirazi, M., et al., 2021a. A chain mediation model on COVID-19 symptoms and mental health outcomes in Americans, Asians and Europeans. *Sci. Rep.* 11 (1), 6481.
- Wang, C., Tee, M., Roy, A.E., Fardin, M.A., Srichokchatchawan, W., Habib, H.A., Tran, B.X., Hussain, S., Hoang, M.T., Le, X.T., Ma, W., Pham, H.Q., Shirazi, M., Taneepanichskul, N., Tan, Y., Tee, C., Xu, L., Xu, Z., Vu, G.T., Zhou, D., et al., 2021b. The impact of COVID-19 pandemic on physical and mental health of Asians: a study of seven middle-income countries in Asia. *PLoS One* 16 (2), e0246824.
- Xiong, J., Lipsitz, O., Nasri, F., Lui, L., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., McIntyre, R.S., 2020. Impact of COVID-19 pandemic on mental health in the general population: a systematic review. *J. Affect. Disord.* 277, 55–64.
- Yıldırım, M., Güler, A., 2020. COVID-19 severity, self-efficacy, knowledge, preventive behaviors, and mental health in Turkey. *Death Stud.* 1–8.
- Yıldırım, M., Güler, A., 2021. Positivity explains how COVID-19 perceived risk increases death distress and reduces happiness. *Pers. Individ. Differ.* 168, 110347.
- Yıldırım, M., Özasan, A., 2021. Worry, severity, controllability, and preventive behaviours of COVID-19 and their associations with mental health of Turkish healthcare workers working at a Pandemic Hospital. *Int. J. Ment. Health Addiction.*
- Yıldırım, M., Arslan, G., Green, Z.A., Ashraf, F., Sugawara, D., Tanhan, A., Asağlı, M., Helmy, M., Çiçek, I., 2021a. Validation and utility of the meaning in life measure for Turkish students. *J. Happiness Health* 1 (1), 40–48.
- Yıldırım, M., Geçer, E., Akgül, Ö., 2021b. The impacts of vulnerability, perceived risk, and fear on preventive behaviours against COVID-19. *Psychol. Health Med.* 26 (1), 35–43.
- Zhai, Z., 2020. Facial mask: a necessity to beat COVID-19. *Build. Environ.* 175, 106827.
- Zhang, M.W., Ho, R.C., 2017. Moodle: the cost effective solution for internet cognitive behavioral therapy (I-CBT) interventions. *Technol Health Care: Off. J. Eur. Soc. Eng. Med.* 25 (1), 163–165.
- Zhang, C., Yang, L., Liu, S., Ma, S., Wang, Y., Cai, Z., Du, H., Li, R., Kang, L., Su, M., Zhang, J., Liu, Z., Zhang, B., 2020. Survey of insomnia and related social psychological factors among medical staff involved in the 2019 novel coronavirus disease outbreak. *Front. Psychiatr.* 11, 306.