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The Impacts of Propensity to Worry and Fear of COVID-19 on Mental Health of University Students

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ABSTRACT

Epidemics and pandemics are difficult periods for the affected community, specifically in the proliferation of mental health issues. In such adverse times, factors of psychological vulnerability such as propensity to worry and low emotional stability might have a detrimental effect on the mental health of the individuals. To investigate the impact of such factors on mental health, this study examined the impacts of propensity to worry and fear of COVID-19 on anxiety depending on the individuals' levels of emotional stability. As a means of such investigation, this study was conducted based on quantitative data, and the research sample was selected using a convenient sampling method. Participants included 304 university students (71.6% were women and 28.4% were men; MAge = 22.37 ± 3.04) and responded to the Penn State Worry Questionnaire, Fear of COVID-19 Scale, Symptom Checklist-90 Revised, and 10-Item Personality Inventory. The moderated mediation analysis using PROCESS macro (Model 14) was performed to examine the study hypotheses. Results revealed that propensity to worry was associated with anxiety symptoms. Fear of COVID-19 mediated this link and emotional stability moderated the relationship between propensity to worry and anxiety. The findings showed that trait worry, trait emotional stability, and fear of COVID-19 are determinants of anxiety symptoms, suggesting that such factors are important in understanding these issues.

Keywords:
Propensity to worry, fear of COVID-19, emotional stability, anxiety, moderated mediation

1. Introduction

Regarded as a "once-in-a-century" pandemic that originated in Wuhan, China, in December 2019, the SARS-CoV-2 outbreak spread rapidly around the world (Gates, 2020). In March, the World Health Organization declared the outbreak as a global pandemic and, as of April 14, reported over 131 million confirmed cases with more than 2.5 million deaths worldwide (European Centre for Disease Prevention and Control, 2020). Because of such rapid spread and higher mortality rates (4.2% globally), the current pandemic is more serious compared with SARS and MERS (Sim, 2020).

Epidemics and pandemics are difficult periods for individuals in so many ways, specifically in the proliferation of mental health issues (Chong et al., 2004). The current pandemic also witnessed the rise in mental health problems including fear of illness (Dai et al., 2020), anger and psychological distress (Bo et al., 2020; Brooks et al., 2020), frustration and boredom (Reynolds et al., 2008), suicide (Bhuiyan et al., 2020), sleep disturbance (Ho et al., 2020), and depression and post-traumatic stress disorder (Arpaci et al., 2020). Another common psychological response to such intense periods is anxiety, a negative emotion that is typically accompanied by unpleasant feelings of fear and worry (Shete & Garkal, 2015). Further, a growing body of research reported the increase in anxiety symptoms across the world throughout the current pandemic (Bendau et al., 2020; Cameron et al., 2020; Han et al., 2020; Hyland et al., 2020; Kılınçel et al., 2020; Nickell et al., 2004; Roy et al., 2020; Spence, 2020; Tsang et al., 2004).

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Epidemiological research suggests that pandemics have long been associated with worry over infection (Alcabes, 2010). As one of the strong correlates (e.g., Parmentier et al., 2019) and predictors of anxiety (e.g., Swee, Olino, & Heimberg, 2019), worry refers to negative thoughts due to the anticipation of a future threat (Korte et al., 2016). Although it is considered as a central feature of emotional disorders such as anxiety and obsessive–compulsive disorder (Goodwin et al., 2017), it is also understood as a non-clinical trait that is associated with negative life outcomes (Matthews et al., 2002; Penney et al., 2015; Raes, 2010; Shoal et al., 2005; Xie et al., 2019). Moreover, studies highlighted that high trait worry exacerbates the severity of psychological responses to stressors and traumatic events (e.g., Spinhoven et al., 2015). In this regard, individuals with higher levels of trait worry are more prone to experience anxiety symptoms compared with low worriers.

Similar to worry, fear of COVID-19 was prominent among individuals throughout the current pandemic. Fear refers to an emotional state that is elicited by perceived dangerous stimuli (de Hoog et al., 2008). Considering the number of confirmed cases, death tolls, and overcrowded intensive care units caused by the pandemic, individuals naturally began experiencing fear (Smirni et al., 2020). Moreover, such fear has evolved into the development of mental problems, such as sleep disturbance (Deng et al., 2020), social isolation and social connectedness (Brooks et al., 2020), and especially anxiety symptoms (Cameron et al., 2020).

Although research regarding the fear of COVID-19 is in its early phases, a growing body of research suggested that the impact of such fear on mental health is affected by psychological vulnerability factors (Lee et al., 2020). Literature demonstrated that emotional stability is one of those fear-related vulnerability factors that might affect the severity of the anxiety symptoms that individuals might experience during a pandemic (Taylor, 2019). By definition, emotional stability is a personality trait that includes the capacities to regulate emotions, control impulses, and cope with life challenges (Costa & McCrae, 2008). Pandemic research highlighted that low emotional stability is associated with coronaphobia (Lee et al., 2020) and fear of contagion (Di Crosta et al., 2020). As such, and similar to high trait worry, low trait emotional stability is associated with increased levels of anxiety (Hamama-Raz et al., 2016; Harris et al., 2010; Ho et al., 2013). Taken together, emotional stability is a potential trait that might affect the impact of fear of COVID-19 on anxiety symptoms.

1.1. Present Study

In light of the findings discussed previously, higher levels of trait worry and fear of COVID-19 are related to higher levels of anxiety symptoms. Thus, in this study, it was proposed that (a) propensity to worry is positively related to fear of COVID-19 and anxiety symptoms and negatively correlated to emotional stability; (b) fear of COVID-19 mediates the relationship between propensity to worry and anxiety symptoms; and (c) emotional stability moderates the relationship between fear of COVID-19 and anxiety symptoms. In examining such hypotheses, this study will provide insights on the underlying mechanism of psychological vulnerability factors (i.e., worry and emotional stability), fear of COVID-19, and university students' increased levels of anxiety symptoms. Considering university students as one of the vulnerable populations strongly affected by the COVID-19 outbreak (Kaparounaki et al., 2020), such study will be useful to promote better mental health in universities during global crises.

2. Methodology

2.1. Research Model

This study was a correlational research in the quantitative realm. In essence, some studies in educational settings often use survey research methods and employ test scores and self-report questionnaires to describe the data (descriptive approach) or confirm the proposed hypothesis and research models (analytical approach) (Cohen et al., 2018). To test the research hypotheses, the current study used an analytical approach to examine the mediator role of fear of COVID-19 and the moderator role of emotional stability in the relationship between propensity to worry and anxiety during COVID-19 crisis.

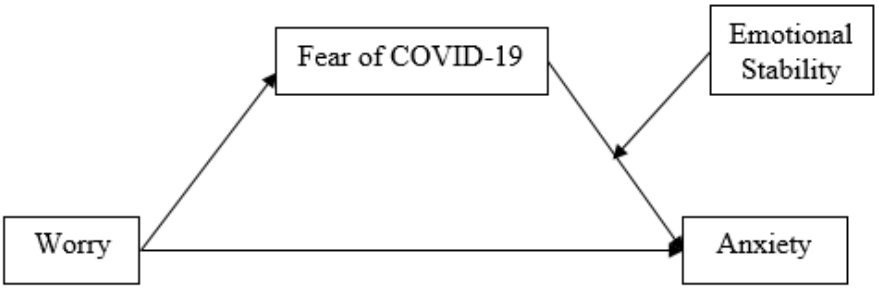

Figure 1. *Proposed Research Model*

2.2. Research Sample

Participants were selected from a public university located in the Northeast of Turkey using online Google Forms, and students who had no access to the Internet were not included in the study. In selecting the participants, a convenient sampling method was used to prevent the loss of time, money, and labor as the COVID-19 pandemic demanded urgent investigations regarding the mental health of university students. In evaluating the adequate sample size, five observations for each parameter were determined as recommended by Bentler and Chou (1987). In this regard, the research sample consisted of 304 individuals (71.6% were women and 28.4% were men; M_{Age} = 22.37 ± 3.04), and the sample size was adequate to conduct and properly analyze the research data (5 × 34 = 170 < 304).

2.3. Data Collection Tools

Penn-State Worry Questionnaire: This is a 15-item self-report questionnaire in which the items are rated using a 6-point rating scale from 1 (*never*) to 6 (*almost always*) and developed to measure individuals' propensity to worry (Meyer, Miller, Metzger, & Borkovec, 1990). Seven items from the questionnaire were selected based on the relevance to the purpose of this study, and example items included the following statements: "When I am under pressure, I worry a lot." and "Once I start worrying, I can't stop." Yılmaz et al. (2008) adapted the Turkish version of the questionnaire and provided adequate psychometric properties.

Fear of COVID-19 Scale: FCV-19S is a new scale to assess the severity of the individuals' fear of COVID-19 and consists of 7 items in which the participants are asked to indicate their levels of agreement with the statements using a 5-point rating scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items included the following statement: "It makes me uncomfortable to think about coronavirus-19" (Ahorsu et al., 2020). A total score is calculated by adding up the item scores. Satici and colleagues (2020) adapted the Turkish version of the questionnaire and provided adequate psychometric qualities.

Symptom Checklist-90-Revised Anxiety Subscale: SCL-90-R is a well-established self-report questionnaire and consists of 90 items to evaluate the psychological symptoms of individuals (Derogatis et al., 1973). Subjects rate each item on a 5-point rating scale from 0 (*not at all*) to 4 (*very much*). The anxiety subscale includes 10 items to measure anxiety symptoms, and example items include "nervousness or shakiness inside." Dağ (1991) validated the Turkish version of the questionnaire, which demonstrated satisfactory psychometric qualities.

Ten Item Personality Inventory: TIPI is a short form inventory and was developed to assess personality traits with the Big Five Inventory (Gosling, Rentfrow, & Swann, 2003). The inventory consists 10 items which are self-descriptive statements answered on a 7-point rating scale from 1 (*disagree strongly*) to 7 (*agree strongly*). The questionnaire comprised five subscales (extraversion, conscientiousness, openness to experience, agreeableness, and emotional stability), and each subscale is assessed by two items. Atak (2013) validated the Turkish version of the questionnaire and provided adequate psychometric qualities.

2.4. Analysis of Data

Prior to the main analyses, descriptive statistics were screened. The normal distribution, skewness, and kurtosis statistics for each variable were examined, and the analyses supported the assumption of normality as the values were between −1 and +1 (Hair et al., 2007). Moderated mediation analysis was conducted employing PROCESS macro (Model 14; Hayes, 2018) to evaluate the indirect effect of worry on anxiety varies as a function of emotional stability. In the analysis, anxiety was entered into the moderated mediation model

as the outcome variable, propensity to worry as the predictor variable, fear of COVID-19 as the mediator variable, and emotional stability as the moderator variable of the relationship between propensity to worry and anxiety. The 95% bias-corrected confidence interval (CI) with 5000 bootstrap samples was generated using the bias-corrected bootstrapping method, and the CI that does not cross zero was considered for the evidence of statistically significant mediation (Preacher & Hayes, 2008).

2.5. Research Ethics

The study procedure was approved by the University Ethics Committee (10/07/2020, 92662996-044/E.20325) and carried out in accordance with the Declaration of Helsinki. Participants responded to the consent form and online questionnaires on a webpage survey after they were gained information about anonymity, and confidentiality of the personal information.

3. Findings

3.1. Descriptive Statistics and Correlation Analyses

Before the main analyses, descriptive statistics for the main study variables were analyzed. Skewness and kurtosis statistics values demonstrated that no severe violations of normal hypotheses were encountered (e.g., skewness from 0.97 to −0.02 and kurtosis from 0.81 to −0.67) (West, Finch, & Curran, 1995). Table 1 indicates the descriptive statistics.

Table 1. *Descriptive Statistics*

	Min	Max	M	SD	Skewness		Kurtosis	
					Stat	SE	Stat	SE
1. Fear of COVID-19	7.00	33.00	17.02	5.63	0.24	0.14	-0.42	0.28
2. Worry	7.00	35.00	17.43	6.79	0.33	0.14	-0.67	0.28
3. Anxiety	0.00	40.00	9.60	9.29	0.97	0.14	0.81	0.28
4. Emotional Stability	2.00	14.00	8.50	2.52	-0.02	0.14	-0.08	0.28

Pearson product-moment correlation analyses were performed between the main study variables, and results showed that propensity to worry was positively linked to fear of COVID-19 and anxiety and negatively correlated to emotional stability, coefficients from $r = 0.51$ to $r = -0.19$.

Table 2. *Correlation Statistics*

	1	2	3	4
1.Fear of COVID-19	1			
2.Worry	.51**	1		
3.Anxiety	.41**	.51**	1	
4.Emotional Stability	-.20**	-.41**	-.39**	1

Note.**$p < 0.01$

3.2. Moderated Mediation Analyses

Model 14 of PROCESS macro was used to examine the relationship between propensity to worry and anxiety, the mediator role of fear of COVID-19, and the moderator role of emotional stability. In the mediation analyses, the direct effect of worry on anxiety was significant (*coeff* = 0.44, $p < 0.001$, 95% CI 0.27, 0.59). Furthermore, propensity to worry significantly and positively predicted fear of COVID-19 (*coeff* = 0.42, $p < 0.001$, 95% CI 0.34, 0.50), and fear of COVID-19 positively predicted anxiety symptoms (*coeff* = 0.32, $p < 0.01$, 95% CI 0.13, 0.49). In the moderated mediation analyses, an interaction effect between fear of COVID-19 and emotional stability on anxiety symptoms was significant (*coeff* = −0.05, $p < 0.05$, 95% CI −0.10, −0.01). As shown in Table 3, the indirect effect was significant for the groups of low, medium, and high levels of emotional stability (low = 0.19, standard error (SE) = 0.05, 95% CI 0.08, 0.30; medium = 0.13, SE = 0.04, 95% CI 0.06, 0.21; high = 0.07, SE = 0.04, 95% CI 0.01, 0.16). However, the magnitude of the relationship was higher for the low emotional stability group. The index of moderated mediation was significant, conveying that indirect effects in the model were significantly different for the levels of emotional stability (index = −0.02, Boot SE = 0.01, 95% Boot CI −0.04, −0.01).

Table 3. *Unstandardized Coefficients for the Conditional Process Model*

		B	SE	t
Outcome: Fear of COVID-19 (Mediator)				
Predictor: Worry		.42	.04	10.28***
Outcome: Anxiety				
Predictor: Worry		.44	.08	5.40***
Fear of COVID-19 (Mediator)		.32	.09	3.48**
Emotional Stability (Moderator)		-.81	.19	-4.23***
Interaction: Fear of COVID-19 × Emotional S.		-.05	.03	-2.04*
Conditional indirect effects of worry on anxiety				
	Coeff	BootSE	BootLLCI	BootULCI
M- 1SD	.19	.05	.08	.30
M	.13	.04	.06	.21
M+1SD	.07	.04	.01	.16
Index of moderated mediation	-.02	.01	-.04	-.01

Note. *p<.05. **p<.01. ***p<.001

4. Discussion and Conclusion

This study explores whether (a) propensity to worry is positively related to fear of COVID-19 and anxiety symptoms and negatively correlated to emotional stability; (b) fear of COVID-19 mediates the relationship between propensity to worry and anxiety; and (c) emotional stability moderates the relationship between fear of COVID-19 and anxiety symptoms. Thus, present study reveals three important results: (a) increased levels of propensity to worry are related to greater levels of COVID-19 related fear, greater levels of anxiety symptoms, and decreased levels of emotional stability; (b) higher levels of trait worry are linked with heightened COVID-19 fear, which, in turn, can be associated with increased levels of anxiety symptoms conveying the mediator role of fear of COVID-19; and (c) fear of COVID-19 is linked with enhanced levels of anxiety symptoms among individuals who report lower levels of emotional stability implying the moderator role of emotional stability.

Concerning the first hypothesis, participants who reported higher levels of propensity to worry also reported greater levels of fear of COVID-19 and anxiety symptoms and lower levels of emotional stability. Such findings are indeed congruent with the findings regarding the impact of propensity to worry on anxiety symptoms during pandemics. Although no study previously explored such a relationship, in a similar study, Baiano and colleagues (2020) reported that high worriers demonstrated a significant increase in anxiety sensitivity and fear of mental health compared with low worriers between pre- and post-lockdown. Furthermore, previous studies are also congruent with the findings of the present study. For instance, numerous studies reported that COVID-19-related fear is associated with higher levels of anxiety (Belen, 2020a; Belen, 2020b; Tsang et al., 2004).

This study demonstrated the mediator role of COVID-19-related fear in the relationship between propensity to worry and anxiety. The findings showed that propensity to worry directly contributes to increased levels of anxiety conveying the higher risk of the individuals with worry proneness to the mental health problems throughout the pandemic. In addition to the direct impact, higher levels of trait worry impacted higher levels of COVID-19-related fear, which, in turn, contributed to increased levels of anxiety symptoms. In other words, trait worry can affect increased anxiety symptoms through fear of COVID-19. These findings are congruent with the literature. For instance, previous studies highlighted that trait worry predicted the strength of fear acquisition in a sample of healthy individuals (Joos et al., 2012). Current pandemic studies also revealed that COVID-19-related worries could facilitate mental health problems such as loneliness and sleep problems (Grossman et al., 2020). Furthermore, several studies demonstrated that fear of COVID-19 affected anxiety symptoms worldwide (e.g., Cameron et al., 2020; Roy et al., 2020).

This study also found that propensity to worry impacts heightened anxiety symptoms through fear of COVID-19 among individuals who report especially lower levels of emotional stability. Such findings are congruent with the literature. For instance, trait emotional stability was found linked with higher levels of coronaphobia (Lee et al., 2020), and fear of contagion (Di Crosta et al., 2020), and increased levels of anxiety (Hamama-Raz

et al., 2016; Harris et al., 2010; Ho et al., 2013). Taken together, emotional stability is a potential trait that might affect the impact of fear of COVID-19 on anxiety symptoms.

Limitations for this study included using a cross-sectional design and employing self-report measures. Future studies may use a diverse sample in selecting participants from different countries, employing a longitudinal study design, and use a mix of self-report and behavioral measures in assessing the main study variables.

Despite these limitations, the findings add knowledge to the current literature in a few ways. First, this study suggests that fear of COVID-19 is a key factor in the relationship between propensity to worry and anxiety during the current global crisis. Next, a detailed investigation of such relationship implied that trait emotional stability influences the strength of the relationship between propensity to worry and anxiety symptoms at its different levels. Lastly, this study reveals that trait worry impacts anxiety through fear of COVID-19 dependent on the participants' levels of trait emotional stability.

5. Implications and Recommendations

The results of this study have specific theoretical and empirical implications for the mental health of university students, one of the vulnerable populations strongly affected by the COVID-19 pandemic and associated lockdowns (Kaparounaki et al., 2020). First, the results of this study identify the constellation of predictive factors (psychological vulnerability) to understand university students' maladaptive responses to COVID-19. With further studies, understanding the causal role of such factors on mental health might contribute to important avenues of future research. Second, this study may have further implications as it may aid to identify potential key targets for interventions to reduce anxiety levels of university students during global emergencies such as the COVID-19 outbreak. Considering the scarcity of research addressing interventions to lessen the effect of the COVID-19 pandemic, the results of this study are fruitful and recommend interventions to reduce worry and fear of COVID-19 and include elements of emotional stability for students to have better mental health. Furthermore, such factors should be addressed in academic institutions, including but not limited to university counselors, lecturers, and university staff as the resumption of face-to-face classes in universities is on the horizon. Thus, all parties (lecturers as gatekeepers) in universities need to pay more attention to the mental health of the students and provide mental health services (e.g., hotline, online, and one-on-one consultations) to reduce worry and fear of COVID-19.

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