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The Impact of Perceived Control on Undergraduate Students' Ability to Tolerate Uncertainty during the COVID-19 Pandemic in Pakistan: Meaning in Life as a Moderator

Nisma Rasheed[1] ⓘD, Iram Fatima[2] ⓘD, Omama Tariq[3] ⓘD

[1]MPhil, Institute of Applied Psychology, University of the Punjab, Lahore, Pakistan
[2]Associate Professor at Institute of Applied Psychology, University of the Punjab, Lahore, Pakistan.
[3]Assistant Professor at Institute of Applied Psychology, University of the Punjab, Lahore, Pakistan.
Correspondence: nisma8419@gmail.com[1]

ABSTRACT

Aim of the study: The present study explored the tolerance of uncertainty among undergraduate students during the COVID-19 pandemic, its relationship with perceived control, and meaning in life as a moderator in this association.

Methodology: This cross-sectional research study included 277 undergraduate students (169 females and 108 males, aged 18-24 years) from three public universities in Pakistan who completed an online survey. The research tools included the Mastery Scale (MS), Meaning in Life Scale (MLS), and Intolerance of Uncertainty Scale (IUS). Pearson's correlation and moderation analyses were employed.

Findings: The study's findings revealed that perceived control has a positive relationship with the presence of meaning in life and tolerance of uncertainty. Both the presence of and search for meaning in life were also positively related to the tolerance of uncertainty. Among sociodemographic variables, gender was associated with perceived control; male undergraduate students had more perceived control than female undergraduate students, while the disturbance in studies due to COVID-19 had a negative association with the presence of meaning in life, perceived control, and tolerance of uncertainty.

Conclusion: The study model demonstrated that the search for meaning in life moderates perceived control and tolerance of uncertainty. Those with high perceived control and lower motivations to seek meaning showed elevated levels of tolerance for uncertainty. The study results highlight the importance of perceived control in tolerating uncertainty during the COVID-19 pandemic and indicate that effective measures should be taken to enhance undergraduate students' control.

Keywords: COVID-19, Tolerance of uncertainty (TOU), Perceived control, Meaning in life (MIL), Presence of meaning in life, Search for meaning in life, Undergraduate students

Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is responsible for the coronavirus disease 2019 (COVID-19) pandemic that started in Wuhan, China, in 2019 and subsequently spread worldwide (Hui et al., 2020). Millions of COVID-19–related deaths have occurred worldwide, and the pandemic is associated with negative psychological consequences in the general population (Anjum et al., 2020). Despite the numerous steps countries have taken to curtail the expansion of SARS-CoV-2, the pandemic has had a significant effect worldwide, leaving individuals battling the virus's aftereffects (Levine, 2022). While vaccines against this virus have been developed, due to their limited effectiveness, the return to normal covered an extensive period. The COVID-19 pandemic has necessitated numerous changes over the past couple of years to business practices, education, and daily life. Notably, college students' lives changed dramatically when their institutes closed, requiring them to adapt to online education. These students have experienced increased stress due to this sudden shift to online learning, particularly those studying subjects not formerly intended for online delivery. Students felt a clear evaluation disadvantage in these courses, which were intended to be interactive and practical, such as workshops, labs, and art presentations. Other students experienced problems accessing the internet and computers in their homes (Liverpool et al., 2023). Students feeling anxious in these stressful situations may also feel uncertain about the future (Xu & Yang, 2023).

Uncertainty is a series of unpredictable or irregular circumstances that result in an emotional or psychological reaction toward its cause (Lee & Kim, 2019). Uncertainty has psychological effects that affect mental health, causing elevated anxiety, stress, and depression (Garfin et al., 2020; Killgore et al., 2020; Lima et al., 2020). Uncertainty is linked to unanticipated events, and people in uncertain situations may think they have little influence over such unpredictable occurrences. While uncertainty cannot be avoided completely, people often strive to tolerate uncertain circumstances to feel better about themselves. Tolerance of uncertainty (TOU) is the process of how a person perceives and responds to uncertainty (Hillen et al., 2017). Tolerating uncertainty is essential for coping with the COVID-19 pandemic because of its positive effects on mental well-being (Deniz, 2021) and the ability to decrease depression and anxiety levels (Rettie & Daniels, 2021). Whereas, an inability to tolerate uncertainty causes negative emotions, anxiety, and the development of several disorders (Amici, 2021). Despite the reported benefits of tolerating uncertainty during the COVID-19 pandemic, it remains necessary to discuss how undergraduate students tolerated uncertainty during this period, including the related predictors and moderating mechanisms.

During the COVID-19 pandemic, perceived control has been associated with an increased ability to tolerate uncertainty (Baluku et al., 2021) and an improved capacity to handle stressors (Alonso-Ferres et al., 2020). Perceived control also protects individuals from the psychological and traumatic influences of the pandemic (Zheng et al., 2020). Individuals constantly strive to have more control over their lives and the environment in which they live (Shaw et al., 2003). Perceived control can change a person's understanding of their capacity to manage their surroundings, affecting how they perceive danger (Witt et al., 2005). Alternatively, perceiving a lack of control frequently induces psychological distress (depression, anxiety, and stress) and an intense desire to reclaim control (Seligman, 1972). Previous research revealed that perceived control is essential for increasing an individual's ability and competency in dealing with consequences, thus ensuring active skills for handling stressors, improving contentment with life, and bettering well-being (Alonso-Ferres et al., 2020; Drewelies et al., 2020). Therefore, perceived control is crucial for coping with challenging and uncertain circumstances caused by the pandemic. Accordingly, the current study aims to comprehend how to manage uncertainty during the COVID-19 pandemic by presenting a hypothetical model of perceived control and its association with the TOU, with meaning in life (MIL) as a moderating variable.

MIL can combat the harmful influences of a pandemic such as COVID-19. A greater sense of MIL is linked with higher levels of mastery (Martela & Steger, 2016), which may make one more tolerant of uncertainty. MIL is "making sense of and giving significance to one's inherent existence and presence"

(Steger et al., 2006; Thompson & Janigian, 1988). The presence of and search for MIL play a distinct role in influencing an individual's TOU; only those with a higher presence of, and intentional search for MIL experience better abilities to tolerate uncertainty (Garrison & Lee, 2017; Morse et al., 2021). During the COVID-19 pandemic, MIL and perceived control buffer against stress (Schnell & Krampe, 2020); specifically, MIL provides a better ability to tolerate uncertainty and improves well-being (Karaman et al., 2020; Korkmaz & Güloğlu, 2021). Previously, lower perceived control has been linked to increased psychological worry and distress (Chapman et al., 2009); more recently, reduced MIL and uncertainty tolerance levels have been related to increased COVID-19–related anxiety (Amici, 2021; Yildirim et al., 2021). Thus, MIL and perceived control should be investigated together to determine how an increase or decrease in either can help people cope with COVID-19–related uncertainty. So, searching for MIL and having MIL are essential coping elements that may moderate perceived control and TOU during the pandemic.

The transactional theory of stress and coping can be used to explain the current model of the study. This theory suggests that, when an individual faces stressful environmental stimuli (like uncertainty), they evaluate the controllability and significance of that stressor in two ways; primary appraisal and secondary appraisal (Folkman & Lazarus, 1984). After appraising the stressor by using one of these two ways, individuals start the coping process, this coping process is further classified into two categories; first is problem-focused coping in which the stressful circumstances are either resolved or changed, and the second is emotion-focused coping in which emotional response to a stressful situation is either changed or controlled (Lazarus, 1998, 1993). This transactional theory of stress and coping can be used as a framework for conceptualizing uncertainty tolerance and the emotion-focused approach individuals use to tolerate uncertain situations (Folkman & Lazarus, 1984; Krohne, 1989; Krohne & Hock, 2011). Perceived control and meaning in life are both coping elements that aid in tolerating uncertain circumstances, so when a person is distressed by the uncertain circumstances, they may try to adjust their emotions of perceived control and meaning in life to tolerate and deal with uncertainty. Thus, in the current scenario of the COVID-19 pandemic where uncertainty is prevalent (Korkmaz & Güloğlu, 2021), this theory offers insight into coping with uncertain conditions.

The purpose of this study was to investigate (a) the associations among perceived control, the presence of MIL, the search for MIL, and the TOU and (b) to test whether the presence of or search for MIL moderates the association between perceived control and TOU. Therefore, we developed a moderation model to explain the current study (Figure 1). This model hypothesized the following: (H1) perceived control is positively associated with TOU; (H2) the presence of MIL and search for MIL act as moderators between perceived control and uncertainty tolerance.
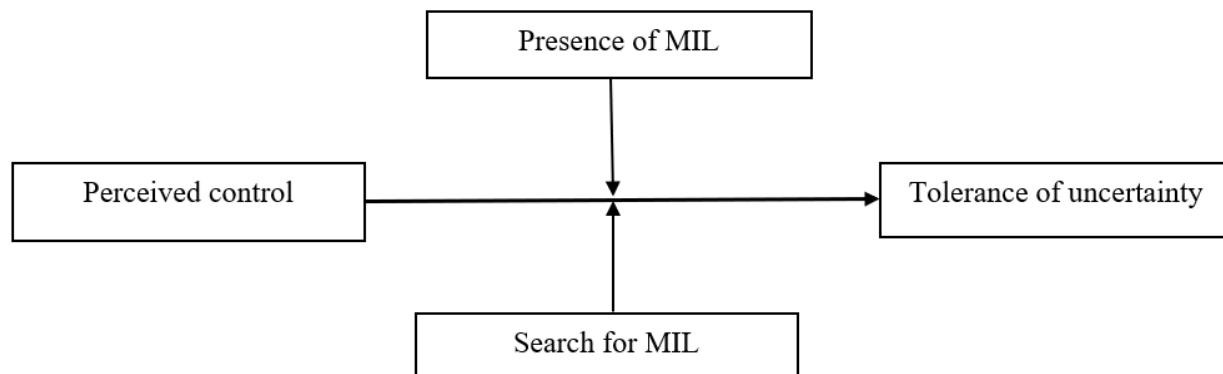
Figure 1. Hypothetical model of the moderation effect of the presence of and search for MIL on perceived control and TOU.

Materials and Methods

Participants and Procedure

This was a cross-sectional study carried out online from April 2021 to May 2021. Convenience and snowball sampling strategies were used to recruit participants. The survey was designed in English using Google Forms. All undergraduate students were invited to participate via email and social media platforms, such as WhatsApp. The students provided informed consent to participate. The study participants were provided assurances that their responses will be kept private, confidential, and anonymous as well. Participants were encouraged to provide honest responses to ensure the validity of the research. There was only one inclusion criterion, i.e., being an undergraduate university student, and there were no exclusion criteria. The study was conducted per the Ethical Standards of the Research Review Board of the Institute where the research was conducted. Formal approval was obtained from the respective authors of the tools for data collection. A total of 279 questionnaires were gathered, 277 of which (mean age = 20.28, SD = 1.46; 39% males and 61% females) were used for the data analysis; two were discarded due to extreme answers and the same responses for all the questions of the survey.

Measures

Demographic Information Sheet

Participants were asked to provide personal information, including age and gender. Respondents were asked separately whether they or any of their family members had tested positive for COVID-19 with 'yes/no' responses (No = 0; Yes = 1). They were also asked whether they had experienced any death in the family due to COVID-19 (No = 0; Yes = 1) and to rate how much disturbance to their studies they had experienced due to the pandemic on a scale of 0 to 5 ('not at all' = 0; 'all the time'= 5).

Mastery Scale

The mastery scale, comprising seven items, was used to assess perceived control (Pearlin & Schooler, 1978). This instrument was developed to assess the extent to which individuals regard their life as under their control instead of fatalistically reigned. A 7-point response scale was used for rating, where 1 = strongly disagree, 6 = strongly agree, and 7 = neither agree nor disagree. A high score on this scale represents greater perceived control. Participants in the current study were told to respond to questions concerning control in their lives while considering the COVID-19 situation. All items of the mastery scale were reliable (Cronbach's α=.524) and valid.

Meaning in Life Scale (MLS)

MLS examines a person's perception of their life's purpose (Steger et al., 2006). This ten-item scale comprised two subscales, five statements regarding the presence of MIL (e.g., "My life has a clear sense of purpose"), and five statements regarding the search for MIL (e.g., "I am always looking to find my life's purpose"). These items were classified on a Likert scale of 1 to 7 (absolutely untrue to absolutely true, respectively). A higher score indicated a greater sense of MIL. To get a gist of MIL during COVID-19, respondents were instructed to answer about their life's significance by first considering the COVID-19 scenario All items of the meaning in life were highly reliable (Cronbach's α=.790) and valid.

Intolerance of Uncertainty Scale (IUS)

TOU was measured using the IUS, which measures an individual's tendency to perceive ambiguous circumstances as unpleasant via a 12-item scale. The scale was scored using a 5-point Likert system (1 = not at all characteristic of me; 5 = entirely characteristic of me). An example statement is as follows: "Unforeseen events upset me greatly" (Carleton et al., 2007). For the present study, all items were reverse-scored to evaluate participants' TOU. Those with higher scores had a greater ability to tolerate uncertainty. Additionally, participants were told that all of the IUS scale's statements refer to COVID-19-related uncertain circumstances and that they should respond by considering how these uncertainties

would influence them. All the items of tolerance of uncertainty had excellent reliability (Cronbach's α=.812) and validity.

Statistical Analysis

The statistical analyses were performed using SPSS version 26. Descriptives of the study variables were calculated. The reliabilities of the study's tools were computed using Cronbach's alpha. The validity of the items was checked using Pearson correlation analysis between each item of the tool and the sum of the scores of all items in that tool, and a significant correlation between a single item and overall score revealed that the item is measuring which it was designed to measure. Pearson's correlation analysis was used to evaluate associations among study variables. A moderation analysis was used to assess the moderating role of the presence of and search for MIL. Missing values and outliers were checked. All of the participants' data were included in the analyses, and there were no outliers.

Results

Preliminary Analysis

Among all the respondents, only 20 (7.2%) had tested positive for COVID-19, while 49 participants (17.7%) had family members who had tested positive. Fifteen participants (5.4%) had family members who died from COVID-19. The average score was 2.68 (SD = 1.71) regarding the disturbance in studies due to COVID-19; the scale was 0 to 5, where 0 = 'not at all' and 5 = 'all the time'. The average participant scores were also determined for perceived control (M = 4.19, SD =.78), the presence of MIL (M = 4.71, SD = 1.26), the search for MIL (M = 5.20, SD = 1.78), and TOU (M = 3.08, SD =.68).

Table 1: *Associations among the study variables.*

Variables	1	2	3	4	5	6	7	8	9	10
1. Gender [a]	1									
2. Age	-.05	1								
3. Tested positive for COVID-19 [b]	-.18**	.08	1							
4. Family member tested positive for COVID-19 [c]	-.06	-.03	.42**	1						
5. Death in the family due to COVID-19 [d]	-.01	.01	-.07	.06	1					
6. Disturbance in studies due to COVID-19	.03	.04	.07	.06	.12*	1				
7. Perceived control	-.23**	.00	.04	-.02	-.02	-.18**	1			
8. Presence of meaning in life	-.01	-.06	-.08	.01	-.07	-.19*	.25**	1		
9. Search for meaning in life	.07	-.04	-.04	.03	-.02	.01	-.05	.14*	1	
10. Tolerance of uncertainty	-.07	.01	-.01	.05	-.05	-.18**	.30**	.15*	-.04	1

* p <.05. ** p <.01. [a] 0 = male and 1 = female. [b] 0 = no and 1 = yes. [c] 0 = no and 1 = yes. [d] 0 = no and 1 = yes

The correlations between the variables of the current study are presented in Table 1. Death in the family due to COVID-19 was positively associated with study disturbances (*r* =.12, *p* <.05). Those who experienced COVID-19–related death in their family reported greater study disturbances. Gender was negatively associated with perceived control (*r* = -.23, *p* <.01); male participants exhibited a greater degree of perceived control than female participants. Disturbance in studies due to COVID-19 was negatively associated with perceived control (*r* = -.18, *p* <.01), the presence of MIL (*r* = -.19, *p* <.05), and TOU (*r* = -.18, *p* <.01). Participants who experienced greater study disturbances exhibited reduced perceived control, a lower presence of MIL, and reduced TOU and vice versa. Perceived control was positively associated with the presence of MIL (*r* =.25, *p* <.01) and TOU (*r* =.30, *p* <.01). The presence of MIL was positively related to the search for MIL (*r* =.14, *p* <.05) and TOU (*r* =.15, *p* <.05).

Assessment of the Hypothesized Model

The PROCESS v4.1 for SPSS was used to perform moderation analysis (Hayes, 2013) and to evaluate the moderation ability of the presence of and search for MIL on perceived control and TOU. All assumptions

were checked before the analysis. Multicollinearity among the predictor variables was checked by tolerance and VIF. Normal values are <.2 for tolerance and >4 for VIF (Hair, 2011). In the current study, all predictor variables had multicollinearity within acceptable ranges. Moreover, the Durbin–Watson value, representing the independence of errors, was 1. 96, which is within the normal range. All the independent variables considered in the moderation analysis were mean-centered.

The process software used a bootstrapping sample of 5000 and model template no. 2 for the analysis. As presented in Table 2, the results from the analysis specified that the model was significant with 13% variance in the dependent variable [F (5,271) = 8.39, p <.01]. Perceived control significantly and positively predicted TOU (B =.27, SE =.05, p <.01). The presence of MIL (B =.04, SE =.03) and the search for MIL (B = -.02, SE =.03) as predictors had no significant effect on the outcome variable. The moderating influence of the presence of MIL between perceived control and TOU was also nonsignificant (B = -.05, SE =.04). Whereas, the interaction effect of perceived control and the search for MIL on TOU was significant (B = -.13, SE =.04, p <.01). The greatest and smallest values regarding the search for MIL were considered one-point standard deviation above and one-point standard deviation below the mean value, respectively. The conditional effects of perceived control on TOU were significant at low (-1.18; B =.42, SE =.07, p <.01) but non-significant at high (+1.18; B =.13, SE =.07) search for MIL values. This indicates that the conditional moderated effects were only significant among individuals with a lower tendency to search for MIL, signifying that the moderating effect varies depending on the extent of the moderator.

Table 2. *Process of the moderation analysis to reveal the predictors and moderators of TOU*

Variable	*B*	SE	*t*	95% CI		*p*
				LL	UL	
Dependent variable: TOU						
Constant	3.09	.04	77.99	3.01	3.16	.00
Perceived control	.27	.05	5.11	.17	.38	.00
Presence of MIL	.04	.03	1.30	-.02	.11	.20
Search for MIL	-.02	.03	-.55	-.08	.05	.58
Perceived control X presence of MIL	-.05	.04	-1.28	-.12	.03	.20
Perceived control X search for MIL	-.13	.04	-3.09	-.21	-.05	.00

Note: CI = confidence interval; LL = lower limit; UL = upper limit.

Overall, the results demonstrated that the search for MIL moderates the relationship between perceived control and TOU, while the presence of MIL does not. An examination of the moderation plots (Figure 2) revealed that TOU increased when perceived control was high and the search for MIL was low. While TOU decreased when both perceived control and the search for MIL had lower values. During COVID-19, undergraduate students with a lower tendency to seek MIL who demonstrated high perceived control exhibited an elevated ability to tolerate uncertainty.
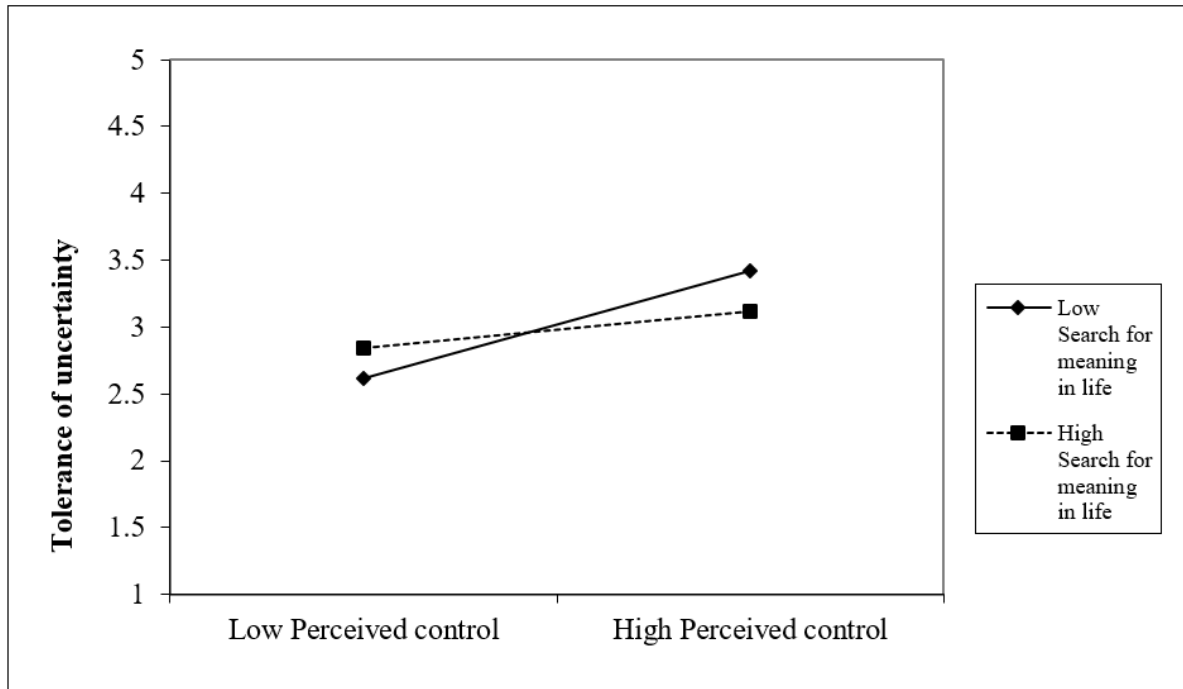
Figure 2. The search for MIL moderates the relationship between perceived control and TOU.

Discussion

Many individuals across numerous nations worldwide have experienced stress as a result of the recent pandemic. It is critical to explore the extent of the pandemic's mental impacts as well as the signs and consequences of those impacts. Therefore, this study explored the moderating function of the presence of MIL and search for MIL between perceived control and TOU during the COVID-19 affliction. The first hypothesis of the current research was that 'there is a positive relationship between perceived control and TOU'. The study's results support this hypothesis; perceived control was observed to be related to both the presence of MIL and TOU. However, the correlation between the two independent variables, i.e., perceived control and the presence of MIL, was weak in terms of its effect size ($r =.25$), thus, fulfilling the assumption for the hypothesized moderation model. The first finding aligns with the results from previous studies, e.g., that of Yuan et al. (2021), who found that the presence of an internal locus of control positively influences MIL. However, other studies have determined that mastery is positively linked with MIL, indicating that more meaning is connected to more control (Korte et al., 2012; Shek, 2001). Moreover, a sense of control is crucial for coping with uncertainty, enabling individuals to handle hazardous stimuli. For example, Ruggiero et al. (2012) revealed that a lack of perceived control is related to greater intolerance of uncertainty. Additionally, with better levels of perceived control, individuals may believe they can handle any unpredictable scenario, including a pandemic; such as Baluku et al. (2021) discovered that perceived control protects against the effects of uncertainty during the COVID-19 and safeguarded individuals from the associated harmful circumstances.

The second hypothesis was that the presence of MIL and search for MIL moderate perceived control and TOU. This hypothesis was partially accepted; only the search for MIL in life moderated perceived control and TOU. This finding shows that meaning-seeking works as a negative element rather than a protective one for TOU when people experience higher perceived control in their lives. The beneficial effect of perceived control on TOU was only notable in the group with a low tendency to seek meaning. During the pandemic, undergraduate students with a lower disposition to search for MIL who had a greater sense of perceived control demonstrated a greater ability to tolerate uncertainty than those who had a greater tendency to search for MIL and a reduced sense of perceived control. This outcome aligns with the

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findings of previous studies that revealed that during the COVID-19 epidemic, a person's perception of MIL serves as a risk factor (Chao et al., 2020). Among those who lack MIL during the pandemic, the perception of control helps in restoring mental health (Schnell & Krampe, 2020). Having a meaningful life has previously been linked to psychological well-being (Ryff, 1989), whereas seeking MIL has been linked to dysfunction, (Steger et al., 2006) and adverse effects during the COVID-19 outbreak (Newman et al., 2022). Thus, those with existing meaningful lives may not feel the need to seek further meaning (Steger, 2017), and those with a greater sense of control may also avoid searching for meaning. Therefore, a lower tendency to search for MIL is potentially related to greater perceived control and TOU. Likewise, when individuals search for more meaning, they may experience lesser existence of their current MIL and a greater degree of intolerance of uncertainty, suggesting that reduced searching for meaning is required to develop TOU (Morse et al., 2021). As suggested by Schumpe et al. (2020), those who seek more purpose in their lives are inclined to chase sensation and excitement, and, in the process, experience a lack of personal control (Li et al., 2019), potentially affecting their ability to handle unexpected situations. The opposite can be true for people who do not seek meaning in their lives, consistent with this study's findings. However, these assertions are hypothetical, and future studies should investigate the precise mechanisms that underpin the moderating function of the search for MIL between perceived control and TOU.

Regarding the demographic variables, gender was found to be associated with perceived control. Males exhibited a greater sense of perceived control than females, and this finding aligns with that of a previous research study in China (Zheng et al., 2020). Likewise, Pakistan is a male-dominant society; thus, males are expected to have more control over their lives than females (Zaidi & Mohsin, 2013). Furthermore, there was a negative relationship between the study disturbances due to the COVID-19 pandemic and the presence of MIL, perceived control, and TOU. Study disturbances due to the circumstances of the COVID-19 pandemic likely cause stress (Liverpool et al., 2023); and this COVID-19 stress has previously been associated with adverse effects on MIL, perceived control, and TOU during the pandemic, therefore, potentially explaining the current finding of the study (Brailovskaia & Margraf, 2021; Rettie & Daniels, 2021; Trzebiński et al., 2020).

Limitations and Implications

Although this study presented significant findings, it still had some shortcomings. First, the results of this study cannot be used to draw any conclusions about how the study variables change over time, because it used a cross-sectional methodology. Future studies should employ a longitudinal technique to thoroughly comprehend the moderating function of MIL on perceived control and TOU over time. Second, because of the pandemic, there was no face-to-face interaction with participants and the data collection was done online. Only participants with easy access to the internet and who were comfortable using it, participated in this study. Moreover, the study's findings cannot be applied to the general population in Pakistan because the findings are limited to this sample group. Future studies should include a broader range of people who might not need access to this level of education or internet technology.

Finally, TOU is a multifaceted and complicated concept and a relatively new research area. This study intended to recognize the elements that can help individuals handle uncertain circumstances such as the Coronavirus outbreak, and guide upcoming research studies. The present findings indicate that students should concentrate on obtaining control in their life during difficult situations, such as the pandemic since perceived control is connected to a greater ability to cope with various uncertainties. These important discoveries notably aid in comprehending the adaptational role of perceived control, which keeps individuals secured from the epidemic's negative impacts. Similarly, reducing meaning-seeking in life and enhancing the personal sense of control may serve as a coping strategy during the epidemic (Li et al., 2020). The study model offers important real-world applications for reducing disaster-related uncertainty. Students in uncertain situations must adjust their coping mechanisms and strengthen their sense of control, especially those who actively search for MIL. Educational institutions should place a high

priority on teaching and regulating a sense of control in students and training them to address uncertainties.

Conclusions

In summary, this study demonstrated that perceived control has a positive relationship with the ability to tolerate uncertainty. Additionally, the search for MIL was found as a negative moderator of perceived control and TOU during COVID-19. Focusing on the search for MIL might help explain the link between perceived control and TOU during the pandemic. The results reveal that increasing perceived control may improve TOU among students exposed to situations such as COVID-19, particularly among those with a lower tendency to seek MIL. In the future, researchers should explore the underlying nature of the associations revealed in this study and generalize the findings to different cultures.

ORCID iDs

Nisma Rasheed [1] https://orcid.org/0000-0001-8443-7469
Iram Fatima [2] https://orcid.org/0000-0001-9517-5062
Omama Tariq [3] https://orcid.org/0000-0003-0775-0405

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