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Need for cognitive closure predicts stress and anxiety of college students during COVID-19 pandemic

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ABSTRACT

The COVID-19 pandemic has taken a massive toll on mental well-being. The unprecedented level of uncertainty associated with the pandemic may be a contributing factor to stress and anxiety, especially among individuals with high intolerance to uncertainty (Rettie & Daniels, 2021). Individual differences in need for cognitive closure have also been linked to mental distress during unpredictable situations (Berenbaum et al., 2008). The present study tested the hypothesis that individuals with a high need for cognitive closure would experience relatively higher stress and anxiety during the COVID-19 pandemic. College students (N = 400) completed an abbreviated Need for Closure Scale (Roets & Van Hiel, 2011), the Generalized Anxiety Disorder Scale (Spitzer et al., 2006), and the short-version of the Perceived Stress Scale (Cohen & Williamson, 1988). Results supported the hypothesized relationship between high need for cognitive closure and higher levels of stress and anxiety. Findings have relevance to college students who are experiencing heightened psychological stress during the COVID-19 pandemic.

1. Introduction

1.1. The 'second pandemic'

The scope and magnitude of the COVID-19 pandemic was unexpected, to say the least.

Within months of initial case reports, COVID-19 became epidemic and quickly ballooned into a world-wide crisis (World Health Organization, 2020). The measures taken to curb the rapid spread of COVID-19 have resulted in widespread collateral damage to economies, educational structures, society, and quality of daily life (Bareket-Bojmel et al., 2020; Breslau et al., 2021). During much of the first year of the pandemic, people lost access to schools, workplaces, gyms, restaurants, and recreation; and, in many cases, the social support of family and friends (Palgi et al., 2020). The collective impact of these factors has had a devastating effect on mental health; a so-called 'second pandemic' (Choi et al., 2020) that has inspired a flurry of research worldwide to understand the nature and scope of pandemic-related decline in mental health (Daly et al., 2020; Rossi et al., 2020; Xiong et al., 2020).

Studies confirmed widespread spikes in the incidence of stress, anxiety, and depression during the COVID-19 pandemic (Breslau et al., 2021; Daly et al., 2020; Huang & Zhao, 2020; O'Connor et al., 2021). Sources of anxiety included disease threat, economic instability, changes in educational structures, and disruption to everyday life (Bareket-Bojmel et al., 2020; Haliwa et al., 2021). Frontline healthcare workers faced a unique combination of stressors; exposure to COVID-19, suffering, and loss of life; the pressure of extended work hours paired with insufficient resources and information; and personal factors contributed to psychological distress in the medical workforce (Domenicano, 2020; Lu et al., 2020; Mazza et al., 2021). And among the general public, younger adults and individuals with preexisting psychological conditions were at relatively high risk for pandemic-related mental health decline (Breslau et al., 2021; Daly et al., 2020; Huang & Zhao, 2020; O'Connor et al., 2021; Palgi et al., 2020; Rossi et al., 2020). Individual susceptibility to psychological distress during the pandemic was further moderated by situational variables and individual differences factors. Among college students, mental health decline related to the pandemic was mitigated by financial security, urban living, and access to family support (Li et al., 2021; Wilson et al., 2021). Among healthcare workers in Italy, Mazza et al. (2021) linked a specific attachment style (detachment) to psychological distress; and, negative affect and female gender predicted higher stress and anxiety.

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1.2. A pandemic of uncertainty

The COVID-19 pandemic has been marked by uncertainty on many fronts (Durodié, 2020). This element of unpredictability may have increased the toll of the pandemic on mental well-being; especially for people who are unable or unwilling to tolerate uncertainty (Berenbaum et al., 2008; Brizi & Biraglia, 2021). Intolerance to uncertainty (IU) refers to how well a person copes with unpredictable situations (Berenbaum et al., 2008). In a study of the UK public during the lockdown period, Rettie and Daniels (2021) found that high intolerance to uncertainty was associated with higher stress and anxiety. Moreover, this relationship was mediated by the use of maladaptive coping strategies (Rettie & Daniels, 2021).

Individual differences in a similar construct, need for cognitive closure, may likewise influence the way people cope with uncertainty (Webster & Kruglanski, 1994). Like people with high intolerance to uncertainty, individuals with high need for cognitive closure may make suboptimal decisions in response to unpredictable situations (Berenbaum et al., 2008; Webster & Kruglanski, 1994). In a cross-national study of participants in the United States and India, Brizi and Biraglia (2021) found that individuals with a high need for closure, presumably in an effort to offset the uncertainty of food availability, engaged in higher levels of food stockpiling during the COVID-19 pandemic. Brizi and Biraglia (2021) did not examine psychological distress in their study. However, other research suggests that people with high need for cognitive closure experience uncertainty distress during unpredictable situations (Berenbaum et al., 2008; Chirumbolo & Areni, 2010). Thus, the taxing influence of the COVID-19 pandemic on mental health may be heightened for individuals with relatively high need for cognitive closure.

1.3. Overview of the present study

College students have had a unique set of stressors during the COVID-19 pandemic, and many of these were future-oriented; concerns about campus closures, delays in degree completion, and, as the economy continued to decline, worry about future job prospects (Cao et al., 2020; Li et al., 2021). Given the unpredictable nature of the COVID-19 pandemic, we predicted that high need for cognitive closure would be associated with greater stress and anxiety among college students. To test this hypothesis, we administered a set of self-report measures to a large group of college students during the second year of the COVID-19 pandemic (March–April 2021). Need for cognitive closure was evaluated using an abbreviated version of the Need for Closure Scale (NFCS-15; Roets & Van Hiel, 2011). Stress was measured using the brief (10-item) Perceived Stress Scale devised by Cohen and Williamson (1988), and anxiety was assessed via the Generalized Anxiety Disorder Scale (Spitzer et al., 2006). Because previous research identified disease threat as a predictor of psychological distress among college students early in the pandemic (Haliwa et al., 2021), we also included questions to assess COVID-19 vulnerability.

2. Method

2.1. Participants

Data were collected via an online survey administered between March 27, 2021 and April 13, 2021 to 424 students enrolled in Introductory Psychology at the University of Michigan. Participants completed the study in exchange for experimental participation credit. A total of 24 participants were excluded due to missing or incomplete survey responses. The final sample consisted of 400 participants between the ages of 18–22 years ($M = 19.6$, $SD = 1.6$).

2.2. Materials

2.2.1. COVID-19 risk assessment questions

Individual vulnerability to COVID-19 disease was evaluated by asking participants (a) whether they had an underlying physical condition that might increase the likelihood of a severe outcome in the event of COVID-19 infection; and (b) whether they had contact with people outside of their household that may increase their risk of exposure to COVID-19. Individuals who answered yes to either item were considered at high-risk; individuals who answered no to both items were considered low-risk.

2.2.2. Brief Need for Closure Scale (NFCS-15)

Need for cognitive closure was evaluated by an abbreviated (15-item) version of the Need for Closure Scale developed by Webster and Kruglanski (1994). The NFCS-15 (Roets & Van Hiel, 2011) measures all five facets of need for cognitive closure (order, predictability, decisiveness, ambiguity, and close-mindedness) by assessing respondents' level of agreement to items like “I don't like situations that are uncertain” on a 6-point scale, and yields a composite score of need for cognitive closure that ranges from 0 to 6. The psychometric properties of the NFCS-15 are similar to longer versions of the measure; reliability, $r = 0.79$; internal consistency, $\alpha = 0.87$ (Roets & Van Hiel, 2011). In the present study, Cronbach's alpha was $\alpha = 0.82$.

2.2.3. Perceived Stress Scale (PSS-10)

Perceived stress was assessed via the short (10-item) version of the Perceived Stress Scale (Cohen & Williamson, 1988). The PSS-10 asks respondents to estimate the frequency of stressful events over the prior month by asking questions such as, “In the last month, how often have you found that you could not cope with all the things that you had to do?” Scores on the PSS-10 range from 0 to 40. In a 2006 study, Roberti et al. (2006) reported Cronbach's alpha of $\alpha = 0.89$. Internal consistency of the PSS-10 was similar in the present study ($\alpha = 0.89$).

2.2.4. Generalized Anxiety Disorder Scale (GAD-7)

Students' anxiety levels were assessed via the Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006). The GAD-7 asks respondents to rate the frequency of symptoms such as “excessive worry” over the past 2 weeks. Scores for each item range from 0 (no symptoms) to 3 (nearly daily symptoms), for a total score between 0 and 21. Scores of 10 and above may be considered in the clinical range of generalized anxiety (Spitzer et al., 2006). The GAD-7 has shown high internal consistency in a clinical sample ($\alpha = 0.92$; Spitzer et al., 2006) and a non-clinical sample ($\alpha = 0.90$; Rettie & Daniels, 2021). In the present study, $\alpha = 0.89$ for the GAD-7.

2.3. Experimental procedure

The study was administered on an online survey platform, Qualtrics, which participants accessed via a designated link provided on Sona Systems software, a cloud-based research and participant management platform. Participants provided informed consent, followed by the COVID-19 risk assessment questions, the PSS-10, GAD-7, and NFSC-15 surveys. The participants were then provided the debriefing statement and thanked for their participation.

2.4. Statistical analyses

To address our research questions, we first divided the sample according to COVID-19 risk as assessed by responses to the COVID-19 Risk Assessment Questions. We then conducted an ANOVA to compare levels of stress and anxiety (measured by the PSS-10 and GAD-7, respectively) as a function of COVID-19 risk. In a second analysis, we recombined the sample and compared scores for the GAD-7 and PSS-10 against normative samples using one-sample *t*-tests. Thirdly, we divided the sample by

a median split of scores on the measure of need for cognitive closure (NFCS-15) and compared the subgroups on the measures of anxiety and stress using ANOVA. Lastly, we recombined the sample to test NFCS-15 scores as a continuous predictor of stress and anxiety using a linear regression analysis. For this, we created a composite variable of stress and anxiety by summing *z*-transformed scores on the GAD-7 and PSS-10. For all tests, alpha level was set at 0.01 to control for Type I error inflation.

3. Results

3.1. COVID-19 risk

A comparison of high-risk participants ($n = 215$) and low-risk participants ($n = 185$) via ANOVA revealed no reliable differences in anxiety level as measured by the GAD-7 between the high-risk group ($M = 8.38$, $SD = 5.29$) and low-risk group ($M = 8.48$, $SD = 4.98$), $F(1, 398) = 0.041$, $p = .840$, $\eta 2 < 0.001$. Similarly, stress levels as measured by the PSS-10 did not reliably differ between the high-risk ($M = 21.05$, $SD = 6.89$) and low-risk ($M = 21.17$, $SD = 6.02$) groups, $F(1, 398) = 0.034$, $p = .853$, $\eta 2 < 0.001$.

3.2. Comparisons of anxiety and stress levels to normative samples

The levels of anxiety and stress for participants in the present study were compared to normative samples via one-sample *t*-tests. The mean score on the GAD-7 in the present study was 8.43 ($SD = 5.14$) was significantly higher than that reported for a normative sample ($M = 2.97$; Löwe et al., 2008), $t(399) = 21.2$, $p < .001$, $d = 1.06$. Löwe et al. reported that 5% of the normative sample met the cutoff for clinical GAD (score of 10). In the present study, 37.5% of participants scored in the clinically significant range for generalized anxiety. Similarly, levels of stress as measured by the PSS-10 in the present study was higher ($M = 21.1$, $SD = 6.50$) than the average PSS-10 score reported for a college student sample prior to the COVID-19 pandemic ($M = 18.3$; Roberti et al., 2006), $t(399) = 8.63$, $p < .001$, $d = 0.431$.

3.3. Need for cognitive closure, anxiety, and stress

First, we divided the sample using a median split of scores on the measure of need for cognitive closure (NFCS-15). We then compared anxiety (GAD-7) and stress (PSS-10) as a function of need for cognitive closure via ANOVA. As expected, GAD-7 scores were significantly lower for the low need for cognitive closure group ($M = 7.07$, $SD = 4.99$) compared to the high need for cognitive closure group ($M = 9.79$, $SD = 4.94$), $F(1, 398) = 29.98$, $p < .001$, $\eta 2 = 0.070$. Stress levels, as measure by the PSS-10, were also lower in the low need for cognitive closure group ($M = 19.6$, $SD = 6.30$) compared to the high need for cognitive closure group ($M = 22.6$, $SD = 6.36$), $F(1, 398) = 22.4$, $p < .001$, $\eta 2 = 0.053$.

In a second analysis to evaluate the relationship between need for cognitive closure and anxiety and stress levels, we recombined the sample and created a composite measure of anxiety and stress by summing the *z*-transformed scores on the GAD-7 and PSS-10. This composite dependent variable was entered into a linear regression with scores on the NFCS-15 as the predictor variable. Analysis revealed that NFCS-15 scores predicted a statistically significant amount of variance in the composite anxiety and stress measure ($R^2 = 0.116$, $F(1, 398) = 52.5$, $p < .001$) and NFCS-15 scores reliably predicted scores on the composite measure of anxiety and stress, $\beta = 0.341$, $t(398) = 7.243$, $p < .001$.

4. Discussion

The primary objective of our study was to evaluate individual differences in need for cognitive closure as a predictor of mental well-being during the COVID-19 pandemic. Results supported the hypothesized relationship between need for cognitive closure and levels of anxiety and stress among college students during the pandemic. Levels of anxiety and stress did not differ between participants as a function of COVID-19 risk. Relative to normative samples, participants in the present study experienced significantly higher levels of anxiety and stress.

The present findings are mostly consistent with previously reported increases of anxiety and stress among college students during the COVID-19 pandemic (Cao et al., 2020; Haliwa et al., 2021; Li et al., 2021). In contrast to Haliwa et al. (2021), we did not find higher anxiety and stress among participants who reported a higher COVID-19 risk. This discrepancy may have been related to the timing of data collection; the present study was conducted nearly a year after Haliwa et al. (2021). While speculative, perhaps the salience of disease threat had lessened over time. Another factor may have been the availability of a COVID-19 vaccine at the time we collected data. Nonetheless, levels of stress and anxiety in our overall sample were still significantly higher than values reported for normative samples collected before the pandemic. In fact, over one third of the present sample scored in the clinically relevant range of scores on the GAD-7 measure of anxiety.

Our results supported a link between need for cognitive closure and level of psychological distress during the COVID-19 pandemic. Specifically, higher need for cognitive closure was associated with higher levels of anxiety and stress. These findings were conceptually consistent with the positive link between intolerance to uncertainty (IU) and psychological distress reported by Rettie and Daniels (2021). Need for cognitive closure (NCC) and IU share the dimension of 'uncertainty distress;' a discomfort with unpredictability that is shared by individuals with high NCC and high IU. The lockdown period during which Rettie and Daniels (2021) conducted their study was a time of great uncertainty. Despite the many developments that occurred between the early months of the pandemic and the time the present study was conducted, the atmosphere of uncertainty persisted. Of note, the consequences of widespread refusals to get vaccinated against COVID-19 paired with the emergence of the Delta variant of the virus could not be predicted. And, a $1.9 trillion economic stimulus bill had been signed into law in the United States (The White House, 2021). Despite optimism about the short-term benefits of this recovery package, many have voiced concerns about the long-term economic consequences of the government borrowing against its future.

4.1. Limitations

The design of the present study did not allow for comparisons of pre and post-pandemic levels of stress and anxiety. With respect to internal validity, our method was limited by the use of abbreviated measures. We also operated under the assumption that the COVID-19 pandemic was (and is) marked by exceptional uncertainty, but we did not ask participants to verify this. We also did not collect gender information for our participants. However, studies suggest that gender may be a significant factor in predicting individual differences in pandemic-related psychological distress (Brizi & Biraglia, 2021; Mazza et al., 2021). With respect to external validity, we must be cautious in generalizing our findings beyond college students. Levels of stress and anxiety among college students tend to be higher than in the general population; and, young adults have been identified as an at-risk group for mental distress during the COVID-19 pandemic (Cao et al., 2020; Daly et al., 2020; Haliwa et al., 2021).

4.2. Future directions and practical implications

A contribution of the present study is that we highlight a variable, need for cognitive closure, which may be useful to predict anxiety and stress among college students during the COVID-19 pandemic. From a practical standpoint, this information may be useful to identify at-risk individuals and potentially design effective interventions to reduce stress and anxiety. In a study conducted early in the pandemic, Haliwa

et al. (2021) found that college students who practiced mindfulness experienced lower levels of stress and anxiety. Given that college students' concerns are frequently future-oriented, mindfulness may be beneficial, especially for people with a high in need for cognitive closure. Future studies might consider the potential of a mindfulness or similar intervention to reduce stress and anxiety among college students. Further research is necessary to explore gender differences in the observed link between need for cognitive closure and psychological distress, and to more directly test the assumed latent variable of uncertainty as a contributing factor to anxiety and stress among people with high need for cognitive closure.

5. Conclusions

The COVID-19 pandemic has been, and continues to be, a time marked by uncertainty. College students are facing an unpredictable future. While pandemic-era uncertainty may seem unprecedented, life is not predictable at the best of times. For many people, the pandemic has been an opportunity for growth. By learning techniques to reduce the psychological distress of uncertainty, individuals high in need for cognitive closure will be better equipped to handle the stress of unpredictability that they will inevitably face in the future.

Research involving human participants

This study has been approved by the institutional research ethics committee and has been performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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