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Fear of COVID-19, perceived academic stress, future anxiety, and psychological distress of Ghanaian university students: A serial mediation examination

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The study examined the direct and indirect relationships between fear of COVID-19 (FC), perceived academic stress (PAS), future anxiety (FA), and psychological distress (PD) among students in Ghana. Students (n = 241; female = 64.1%; mean age = 21.54 years, SD = 2.04 years) completed online surveys on fear of COVID-19, perceived academic stress, future anxiety, and psychological distress. Following mediation analysis performed in PROCESS, results revealed that academic stress and future anxiety independently and serially mediated the relationship between fear of COVID-19 and psychological distress. Independently, PAS mediated the relationship between FC and PD, and FA similarly mediated this relationship. Considered together, the effect of FC on PD initially occurred through PAS, and then FA. We conclude that high psychological distress is associated with increased fear of COVID-19, perceived academic stress, and future anxiety of Ghanaian university students.

Keywords: fear of covid-19, future anxiety, Ghana, perceived academic stress, psychological distress, university students

Introduction
Measures to contain the novel Coronavirus (SARS-COVID-2019) – such as "stay at home" orders, strict social distancing, ban on public gatherings, wearing of facemask, border closures, regular handwashing practices, and closure of schools – have been a source of psychological distress among university students (Bao et al., 2020; Oti-Boadi et al., 2021). For example, due to COVID-19 lockdown measures, 35% and 46% of South African university students reported subjective feelings of depression and stress, respectively (Visser & Law-van Wyk, 2021). This raises concerns about students' long-term well-being, and particularly their success in managing academic stress and future anxieties.

Academic stress typically results from heavy workload or tasks such as school examinations, fear of failing coursework, competing with others, and meeting the expectations of teachers and parents, accompanied by limited time to accomplish them (Bedewy & Gabriel, 2015; Reddy et al., 2018; Rentala et al., 2019). Further, COVID-19 related changes evoked academic stress in American undergraduate and graduate students (Scheffert et al., 2021). The transition to virtual learning, challenges of internet stability, and fear of COVID-19 increased procrastination and academic stress, leading to greater experiences of depression, anxiety, and stress (Doğan**ülkü** et al., 2021; Fawaz & Samaha, 2021; Patsali et al., 2020; Rodríguez-Hidalgo et al., 2020).

In addition to academic stress, a wave of insecurities about academics, low confidence in one's abilities, and negative thought patterns about the future were reported by students (Bakioğlu et al., 2021; Paredes et al., 2021). Termed as future anxiety, these particular experiences due to the COVID 19 pandemic were linked to dire mental health consequences for students (Carney & Thompson, 2021; Lederer et al., 2021). For instance, a Spanish study found that high levels of perceived COVID-19 threat were related to the future anxiety of undergraduate and postgraduate students aged 18 to 49 years (Paredes et al., 2021). It is unclear how COVID-19 is impacting academic stress and future anxieties of higher education students in developing sub-Saharan African (SSA) countries. Our exploratory study aimed to address this gap in knowledge in the Ghanaian context by examining the risk for academic stress and future anxiety in a higher education student population.

Impact of COVID-19 on students' well-being in SSA
Research in sub–Saharan Africa has reported a negative impact of COVID-19 on the well-being of students (Fodjo et al., 2021; Oppong Asante et al., 2021). The negative impact of the pandemic was not limited to those with pre-existing health conditions (Semo & Frissa, 2020; Sharpe et al., 2021). For instance, in Ethiopia, factors like the death of a relative due to COVID-19, wearing a face mask, and worring about academic activities were found to increase the likelihood of experiencing depression, anxiety, and stress in college students (Assefa et al., 2021). Similar factors were revealed in a Kenyan qualitative study (Mutinda & Liu, 2021). Additionally, Olapegba and colleagues (2021) reported that high scores on fear of COVID-19 increased Nigerian college students' post-traumatic symptomology and psychological distress levels. Although these studies clearly established the impact of COVID-19 on psychological distress, very few investigated the roles of various mediating variables (Oti-Boadi et al., 2021). In their research, Oti-Boadi and colleagues (2021) found that both adaptive and maladaptive coping mediated the relationship between fear of COVID-19 and psychological distress among Ghanaian university students. The present study investigated the role of mediating variables of perceived academic stress and

future anxiety to better understand how fear of COVID-19 impacts students' well-being.

This investigation is grounded in the stress process model (SPM: Pearlin et al., 1981) which proposes that distress occurs because of a combination of three elements including sources of stress (happenings that causes stress), mediators of stress (a variety of behaviours, perceptions, and cognitive appraisals that have the capacity of altering the experience of the stressful events), and outcomes of stress (the consequences of the stressful events experienced by an individual) (see also Fanari & Segrin, 2021; Hish et al., 2019).

Goal of the study

We sought to replicate previous studies and extend findings examining how fear of COVID-19 is associated with (i) academic stress, (ii) future anxiety, and (iii) psychological distress. Our specific research questions were:
(i) What is the relationship between fear of COVID-19, academic stress, future anxiety, and psychological distress?
(ii) Will academic stress and future anxiety independently and serially mediate the relationship between fear of COVID-19 and psychological distress?
Figure 1 presents the conceptual model of this study based on the stress process model.

Methods
Participants and setting
A total of 214 Ghanaian university students were conveniently recruited through an online survey using Google forms. The final sample consisted of more females (64.1%), third-year students (36.8%), and religious students (93.8%). Participants ranged in age from 18 to 28 years (mean age = 21.54 years, DS = 2.04 years).

Measures
Fear of COVID-19
Participants completed the 7-item Fear of COVID survey (FCV-19S: Ahorsu et al., 2020). Items were rated on a 5-point Likert-type scale ranging from 1 = strongly disagree, to 5 = strongly agree. Hicher scores indicate a higher level of fear of COVID-19. Example items include: "I cannot sleep because I'm worrying about getting COVID-19"; and "I am most afraid of COVID-19." A previous study reported very good internal consistency reliability coefficients for scores from the FCV-19S ($\alpha = 0.85$ and $\omega = 0.85$; (Satici et al. 2020). In the present study, the Cronbach's α for scores from the FCV-19S was 0.86.

Academic stress
Participants completed the 18-item Perception of Academic Stress Scale (PAS: Bedewy & Gabriel, 2015), which measures academic stress perceived from several sources including academic expectations, faculty work, examinations, and students' academic self-perceptions. This instrument uses a 5-point Likert scale ranging from 1 = strongly disagree, to 5 = strongly agree to capture the academic stress levels of respondents. Sample items include: "I can make academic decisions easily"; and "I fear failing courses this year." Higher scores on this instrument reflect more agreement in the experience of academic stress. Previous studies reported an internal consistency of 0.70 for scores from the PAS (Bedewy & Gabriel, 2015; Ramli et al., 2018). In the present study, scores from the PAS achieved a Cronbach's alpha of 0.78.

Future anxiety
Participants completed the 5-item Dark Future Scale (DFS: Zaleski et al., 2019), which measures the tendency to think about the future with anxiety, uncertainty, and aversion as well as to experience a fear of anticipated failures. Items
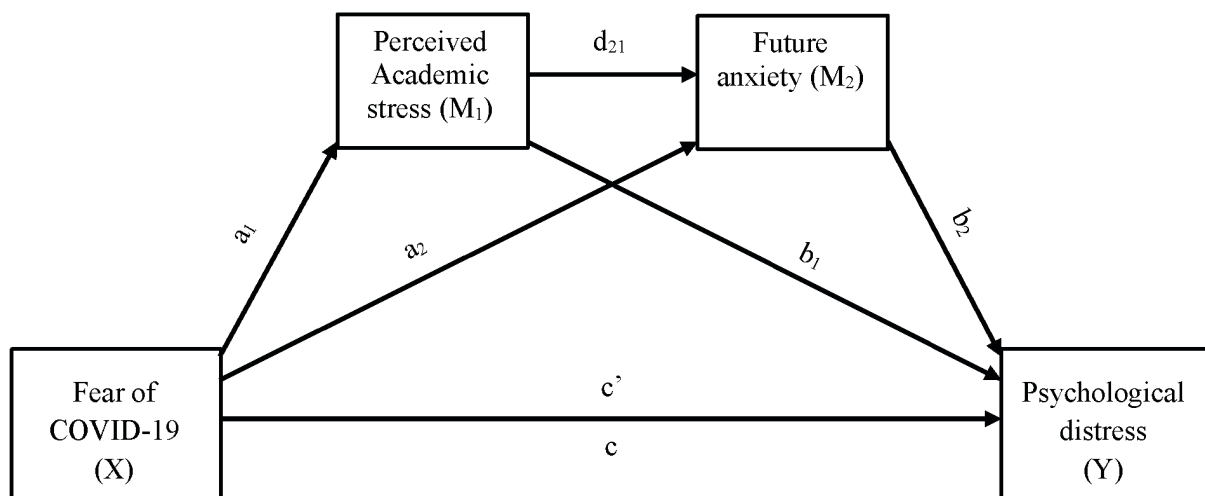

Figure 1. Conceptual serial mediational model with perceived academic stress and future anxiety as mediators between fear of COVID-19 and psychological distress.
Note. Regression pathways a = predictor (X) to mediator path; b = mediator to outcome (Y) path; c = total effect path of X on Y, not controlling effects of mediators (M_1 & M_2); c' = direct effect path of X on Y, controlling the effects of both mediators; and d = serial mediation path.

on the DFS are scored on a 7-point Likert scale ranging from 0 = decidedly false, to 6 = decidedly true. The higher the score, the stronger the future anxiety (anxiety about the future) that the person feels. Sample items include: "I am afraid that changes in the economic and political situation will threaten my future" and "I am disturbed by the thought that in the future I won't be able to realize my goals." Previous studies reported high Cronbach's alpha of 0.90 to 0.92 for scores from the DFS (Sobol et al., 2020; Zaleski et al., 2019). In the present study, the Cronbach alpha for scores from the DFS was 0.88.

Depression, anxiety, and stress
Participants completed the 21-item Depression, Anxiety and Stress Scale (DASS-21: Lovibond & Lovibond, 1995) which consists of three 7-item subscales: depression, anxiety, and stress. Items are scored on a 4-point Likert scale ranging from 0 = did not apply to me at all, to 3 = applied to me very much, or most of the time, in terms of the degree to which a symptom had been present over the past week. Total scores can be computed by summing corresponding item responses on each subscale or summing all 21 item responses (Lovibond & Lovibond, 1995). In this study, the responses to the 21 items were summed to generate a score for psychological distress levels. Sample items include: "I couldn't seem to experience any positive feeling at all" (depression); "I was worried about situations in which I might panic and make a fool" (anxiety); and "I tended to over-react to situations" (stress). In the present study, the Cronbach's α for scores from the DASS -21 was 0.94.

Ethical considerations
The ethics committee, Department of Psychology, University of Ghana approved the study (DREC/016/19-20). Participants consented to the study with assurances of the voluntary nature of their participation, and their choice to withdraw from the research at any time without penalty. The consenting participants completed the anonymised online version of the surveys.

Data analysis
We utilised the IBM SPSS version 24 for the data analysis. Specifically, we performed serial mediation analysis using the PROCESS macro (Model 6: Hayes 2012; Hayes & Rockwood, 2020) to test the mediating effects of perceived academic stress (M_1) and future anxiety (M_2) between fear of COVID-19 (X) and psychological distress (Y). This method enables the segregation of independent effects of each mediator from the outcome variable (Hayes, 2018). We set the statistical significance of the mediating variable at the 95% confidence interval (CI), with 5 000 bootstrap samples. Indirect effects excluding zero indicated statistically significant mediation (Hayes, 2018).

Prior to the mediation analysis, we performed multicollinearity checks between variables using Pearson's correlation analysis. As can be seen in Table 1, the results revealed that none was highly correlated ($r < 0.90$). In addition to this, tolerance (>0.10) and variance inflated factor values (VIF < 10) checked with regression analysis indicated no instance of multicollinearity. For example,

the tolerance and VIF values of fear of COVID-19 were 0.89 and 1.11, respectively, which were below acceptable cut-offs. To ensure that the data met the assumption of no extreme outliers, Mahalanobis distance (value < .15), Cook's distance (value < 1), and centred leverage values (value < 1) were generated. These values were well below the thresholds. The Durbin–Watson value was 1.78, indicating no residual problem. Altogether, the assumptions were met according to Field's (2013) suggestions.

Results
Descriptive analysis results
Table 1 contains a summary of the descriptive statistics, zero-order correlations, and reliabilities (i.e., Cronbach alphas) for the study variables. We found that fear of COVID-19 was significantly and positively related to perceived academic stress ($r = 0.22$, $p = 0.002$), future anxiety ($r = 0.29$, $p < 0.001$), and psychological distress ($r = 0.43$, $p < 0.001$). Perceived academic stress was positively related to future anxiety ($r = 0.31$, $p < 0.001$) and psychological distress ($r = 0.41$, $p < 0.001$). Lastly, future anxiety was also found to be positively associated with psychological distress ($r = 0.52$, $p < 0.001$).

Serial multiple mediational analyses
Total effect of fear of COVID-19 on academic stress, future anxiety, and psychological distress
As indicated in Table 2, total effect models produced significant results, firstly, with fear of COVID-19 being directly related to perceived academic stress ($B = 0.30$, $p = 0.002$). Secondly, fear of COVID-19 ($B = 0.28$, $p < 0.001$) controlling for perceived academic stress ($B = 0.23$, $p < 0.001$) was related to future anxiety. Lastly, fear of COVID-19 was found to be a significantly and positively associated with psychological distress ($B = 0.87$, $p < 0.001$). These results indicate that increasing levels of fear of COVID-19 was independently related to high perceived academic stress, high levels of future anxiety, and high levels of psychological distress. The results also showed that perceived academic stress was significantly related to future anxiety.

Table 1. Summary of descriptive statistics, reliabilities, and zero-order correlation between study variables

Variables	1	2	3	4
1. Psychological distress	—			
2. Fear of COVID-19	0.43**	—		
3. Future anxiety	0.52**	0.29**	—	
4. Perceived academic stress	0.41**	0.22**	0.31**	—
Mean	15.80	19.45	12.36	55.14
SD	12.23	6.04	7.24	8.46
α	0.94	0.86	0.88	0.78
Skewness	0.89	0.08	0.11	0.06
Kurtosis	0.50	−0.28	−0.83	0.31

Note. **$p < 0.01$; *$p < 0.05$; SD = Standard deviation; α = Cronbach's alpha

Table 2. Results of serial mediation pathways of fear of Covid-19 (FC), perceived academic stress (PAS), future anxiety (FA), and psychological distress PD.

Paths	B	SE B	β	p-value	R	R^2	95% CI Lower	95% CI Upper
Total effect								
FC→PD	0.87	0.13	0.43	<0.001	0.43	0.18	0.62	1.12
FC→PAS	0.30	0.10	0.22	0.002	0.22	0.05	0.11	0.49
FC→FA	0.28	0.08	0.24	<0.001	0.39	0.15	0.13	0.44
PA→FA	0.28	0.08	0.26	<0.001	0.39	0.15	0.11	0.34
Direct effect								
FC→PD	0.55	0.12	0.27	<0.001	0.63	0.40	0.33	0.78
PAS→PD	0.34	0.08	0.23	<0.001	0.63	0.40	0.17	0.50
FA→PD	0.61	0.10	0.36	<0.001	0.63	0.40	0.42	0.81
Indirect effect							BLLCI	BULCI
FC→PAS	0.10	0.04					0.03	0.19
FC→FA	0.17	0.06					0.08	0.29
FC→PAS →FA	0.04	0.02					0.01	0.09

Note. B = unstandardised coefficient; β = standardised coefficient; 95% CI= confidence interval; SE = standard error. Bootstrapped samples = 5000. BLLCI=Bootstrapped Lower Limit. BULCI= Bootstrapped Upper Limit

Direct effects of fear of COVID-19, academic stress, and future anxiety on psychological distress

In the direct effect model, fear of COVID-19 ($B = 0.55$, $p = 0.001$), perceived academic stress ($B = 0.34$, $p < 0.001$), and future anxiety ($B = 0.61$, $p < 0.001$) were directly related to psychological distress. This is also indicated in Table 2. These results show that while controlling the effects of academic stress and future anxiety, fear of COVID-19 was significantly related to psychological distress.

Indirect effects of fear of COVID-19 on psychological distress mediated by academic stress and future anxiety

The serial multiple mediation analysis is presented in Figure 2. It shows fear of COVID-19 as the predictor variable, both perceived academic stress and future anxiety as mediator variables, and psychological distress as the outcome variable with unstandardised coefficients on each regression pathway. From these results, fear of COVID-19 was indirectly related to psychological distress through perceived academic stress and future anxiety. In other words, a greater amount of fear of COVID -19 was associated with greater perceived academic stress (B a_1 = 0.30, p = 0.002) leading to a greater likelihood of experiencing psychological distress (B b_1 < 0.001). Also, a greater amount of fear of COVID-19 was indirectly related to high levels of future anxiety (a_2 = 0.28, p< 0.001), consequently increasing psychological distress levels (B b_2 = 0.61, p< 0.001). Collectively, reporting high levels of fear of COVID-19 was associated with high psychological distress because of increased levels of perceived academic stress which produced more apprehension about the future (B d_{21} = 0.23, p < 0.001). Overall, these results confirmed that perceived academic stress and future anxiety mediated the relationship between fear of COVID-19 and psychological distress, answering our second research question.

Table 2 shows that the bootstrap estimation procedure (with a defined bootstrap sample of 5 000) supports these significant indirect effects. Specifically, fear of COVID-19 had a statistically significant indirect effect on psychological distress through perceived academic stress (a_1b_1 = 0.10; 95% CI: 0.03, 0.19), future anxiety (a_2b_2 = 0.17; 95% CI: 0.08, 0.29), and a combination of both mediators ($a_1d_{21}b_2$ = 0.04; 95% CI: 0.01, 0.09) as it was observed that each confidence interval completely excluded zero.

To summarise, mediational analyses showed that there was an indirect relationship between high fear
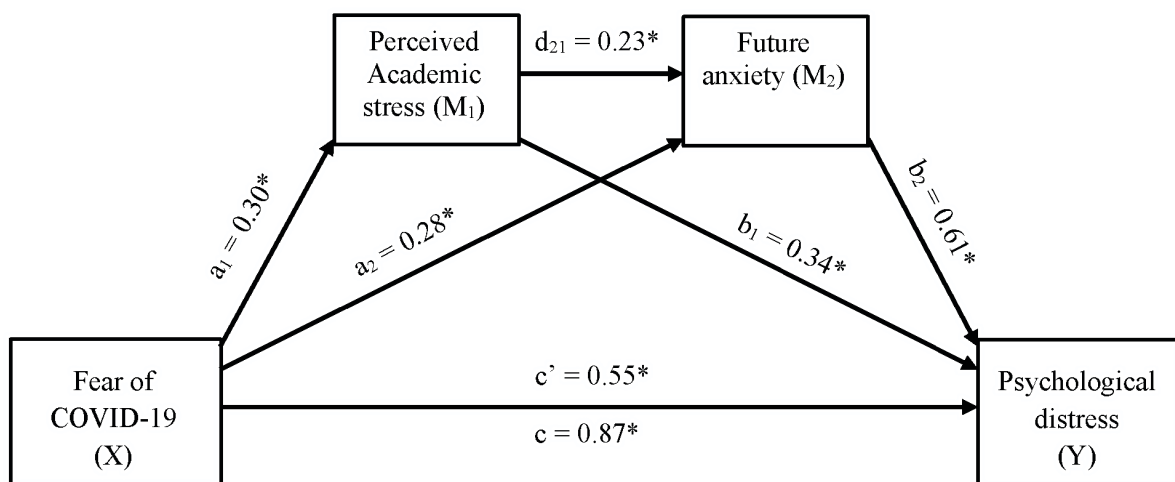

Figure 2. An observed serial mediational model with unstandardised coefficients.
Note. Regression pathways a = IV to mediator path, b = mediator to DV path, c = total effect path, c' = direct effect path controlling for both mediators and d = serial mediation path. *p < 0.05.

of COVID-19 and high psychological distress. This association was mediated by higher levels of perceived academic stress and high levels of future anxiety.

Discussion

Students having higher levels of fear for COVID-19 had increased levels of depression, anxiety, and stress (Mertens et al., 2020; Oti-Boadi et al., 2021; Saravanan et al., 2020). The rapid spread of the virus, the increased number of people affected, the growing number of deaths, mistrust of the health system, ignorance, and misinformation may all have played a role in university students' fear of COVID-19 (Rodriguez-Hidalgo et al., 2020). Globally, students relied heavily on social media during the lockdown for information about COVID-19 (Gao et al., 2020; Khasawneh et al., 2020). Thus, students' lack of control over rumours, and misleading and untrusted information about COVID-19 on social media may have created a new breed of fear, increasing their levels of distress (Moghanibashi-Mansourieh, 2020).

Perceived academic stress was also significantly related to future anxiety. This finding is consistent with studies that reported that an increased level of academic stress leads to a rise in future anxiety (Balaji et al., 2019; Li et al., 2021; Nonterah et al., 2015). One potential reason for such an increase in academic stress during this pandemic is the change in the curriculum from in-person classes to lessons on virtual platforms (Aboagye et al., 2020; Chandra, 2020; Eloff, 2021; Lazarevic & Bentz, 2021). This abrupt change in academic activities provided much uncertainty and adjustments for both students and professors. For example, while contending with varying levels of access to high-quality internet and information technology, students had a limited amount of time to adjust to the use of online teaching and learning styles and finish their semester (Al-Taweel et al., 2020; Barrot et., 2021; Khalil et al., 2020).(Al-Taweel et al., 2020; Barrot et., 2021; Khalil et al., 2020). This change exacerbated Ghanaian students' academic stress and may have led to a fear of the future, negative cognitive appraisals, and a pessimistic outlook, leading to elevated levels of future anxiety.

Perceived academic stress and future anxiety were found to significantly mediate the relationship between fear of COVID-19 and psychological distress. This is consistent with research reporting the impact of COVID-19 on students' academic lives (Amir et al., 2020; Clabaugh et al., 2021) and those that established a link between academic stress and psychological distress (Huang et al., 2020; Yusoff et al., 2021). It is also consistent with findings showing that the presence of fear about COVID-19 generates anxieties about the future (Duplaga & Grysztar, 2021; Mahmud et al., 2020), as well as findings relating future anxieties to distress (AlHadi et al., 2021; Arbona et al., 2021). As stated earlier, in the middle of the year 2020 (when data was collected), normal academic life in higher education institutions was massively disrupted, and new ways to safely deliver education were introduced (Dhawan, 2020; Pokhrel & Chhetri, 2020). At the time, adjusting to this new system presented increasing academic stress levels in students. These experiences combined with surging COVID-19 infections and declining economies led to uncertainties, loss of control about the future, and negative thoughts especially about career prospects (El-Keshky et al., 2020; Hasan & Bao, 2020; Mahmud et al., 2020).

Implications of findings

The findings of the current study have significant implications for policy and practice. The findings shed light on how the fear of COVID-19 affects the distress experiences of young university students, and how that relationship is explained by perceived academic stress and future anxiety. As mitigation, attempts should be made at assessing the source of students' distress in relation to the fear of COVID-19, to enable professionals to design and develop holistic intervention strategies that best suit the needs of students as they navigate the ravages of the pandemic. For instance, student development and support services could use social media platforms to communicate to students on how to cope with their stressors including fear of COVID-19, and related mental health issues, academic distress, and anxieties about their future. Plausibly, students should be trained in stress management and resilient strategies to manage the uncertainties of the scourge of the COVID-19 pandemic, as new variants emerge. As efforts by institutions increase to provide students with online lessons and other educational needs, it is also important that students' physical and psychological burdens related to COVID-19 and learning are prioritised for students to maximise the academic resources being provided by institutions.

Limitations and future recommendations

This study examined the mediational effects of perceived academic stress and future anxiety on the relationship between fear of COVID-19 and psychological distress. Study limitations include the fact that it utilised a correlational design which limited the testing of cause-and-effect relationships. Second, we sampled by convenience, which limits representativeness and generalisation. Lastly, the use of an online survey, although relevant during COVID-19, could also have introduced unknown bias into the data. Future studies should replicate our findings on other samples and use longitudinal methodologies to collect data at different points in time to comprehensively test causal pathways between the variables.

Conclusion

This study highlights the direct and indirect relationships between the fear of COVID-19, perceived academic stress, future anxiety, and psychological distress among young Ghanaian students. The enduring disruptions in academic activities and the adoption of novel and unfamiliar online learning strategies among students has negatively impacted their stress levels and their psychological health. Equipping students with adequate mental health strategies is essential for change and positive results regarding students' overall mental health. This study makes a unique contribution to students' mental health experiences during the pandemic, as well as offers practical and policy implications for stakeholders interested in the affairs of young university students across the world.

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