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COVID-19 anxiety and grit among university students

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ABSTRACT

This study examines differences in anxiety levels among university students. Of particular concern is COVID-19 anxiety and differences among enrollment levels. The study employed a cross-sectional survey research design and snowball sampling. The sample of 55 university students included 16 graduate students. Anxiety was measured by the Coronavirus anxiety scale (CAS) by Lee. The non-parametric analysis included Quade's ANCOVA. Results suggest that although there are differences in anxiety levels between genders, no significant differences were found among enrollment levels after controlling for beginning year anxiety. However, the higher levels of anxiety among seniors and females suggest that these groups need added attention during pandemics.

Keywords: COVID-19 anxiety, grit, non-parametric analysis, higher education

In March 2020, officials around the world declared a worldwide pandemic related to the novel coronavirus SARS-CoV-2 (COVID-19). While the spread of the coronavirus has slowed, the number of related positive cases has reached approximately seven hundred and sixty-eight million, and the number of related deaths approaches seven (World Health Organization, 2023). As a result of the pandemic, many researchers began to investigate the impact of COVID-19 on the world's population. Wide-ranging empirical studies associated with the disease

have included entire populations from countries such as Cuba (Broche-Pérez et al., 2020), Hong Kong (Choi et al., 2020), the Republic of Ireland (Hyland et al., 2020), and The Republic of Turkey (Haktanir et al., 2020). Other studies have addressed mental states such as depression (Ustun, 2021), fear of the virus across race, ethnicity, gender, and age (Niño et al., 2021), and anxiety (Lee et al., 2021).

Peteet (2020) posited that the coronavirus pandemic "evokes in many of us a deeply rooted, existential anxiety experienced as a threat to our accustomed identity, and to our sense of place in the world" (p. 2203). In the educational context, University students and their sense of "place in the world" was threatened. Yalçın et al. (2021) posited that university students may be considered a vulnerable group psychologically affected by COVID-19 epidemic.

Taken as shared is that university students are not immune and continue to be exposed to SARS-CoV-2, especially with countries still under mandates. It is well known that disruptions to university students included pivoting to online learning, having to follow mask mandates with social distancing, and experiencing family members contracting the disease. Although many countries if not all countries have lifted lockdown mandates, university students are not immune from contracting the coronavirus. University students continue to face threats and exposure to SARS-CoV-2.

While the coronavirus caused lockdowns and mandates there may have been an expectation for university students to maintain high levels of achievement, to sustain their commitment to their studies, and to persevere despite adversity. In other words, under the conditions of a pandemic and the possibility of increased anxiety, university students were expected to have grit.

Some studies have addressed the association between levels of anxiety and grit. For instance, Criticos et al. (2020) in their use of a mixed methods study with collegiate athletes found gender differences with anxiety and grit. For the female athletes, the findings suggest that external factors such as stress, emotional conflict, anxiety, and fear may have contributed to higher anxiety. Of interest is that males scored lower on anxiety average and higher on grit average when compared with females. In a meta-analysis of 315 studies (60 studies for COVID-19 related fear and 23 for COVID-19 related anxiety) results revealed that gender had a moderate and statistically significant effect on COVID-19 related fear (Metin et al., 2022). These researchers posited that the COVID-19 outbreak negatively affected females. Swai et al. (2021) found that differences in college students' prevalence of depression and anxiety was significant (i.e., $p < 0.05$), and they also found that studies that included more males than females had a statistically significant higher prevalence of anxiety and depression than those studies with more females than males.

The purpose of this study was to explore the association between grit and COVID-19 anxiety among university students. The research team posed the following question: What is the strength of the association between grit and

COVID-19 anxiety among university students? The study adds to the discussion relating to university students and COVID-19 anxiety and seeks to fill a gap in the related literature.

Literature Review

The literature is organized as follows. The discussion centers on COVID-19 and university students among students from an international context and within the US context. Then there is a brief discussion about grit.

In the international context concerns relating to the threat of coronavirus among university students have been investigated. For example, in Vietnam, university students were surveyed to gauge their beliefs and behaviors during the outbreak of the disease (Van Nguyen et al., 2020). In Saudi Arabia, Elsharkawy and Abdelaziz (2021) found in a sample of undergraduate students that 22.4% had a high level of fear of coronavirus, females were more anxious, and those students who had a family member exposed were also found to have higher levels of anxiety. An ethnographic study of international graduate students in Australia found that, during the covid pandemic, students used coping mechanism such as utilizing technology, making overtures to increase intercultural connections, and appreciating supervisors who helped to build intercultural understanding (Veliz & Marandi, 2023).

In Lebanon, students who were suddenly asked to pivot to online learning because of the pandemic were found to be dissatisfied with their experience and a significant prevalence of anxiety (Fawaz & Samaha, 2021). In their latent profile analysis of 506 undergraduate and graduate students from various universities in Turkey, COVID-19 fear, depression, anxiety, and stress were found to co-exist. The findings from this study suggest that different reactions to the coronavirus pandemic relating to fear and other psychological symptoms seem to exist.

Among university students in Brazil ($N = 261$) trait measures of anxiety explained COVID-19 fear (Gonçalves et al., 2021). In their model, the inclusion of resilience mediated the drop of fear of Covid-19. A qualitative study with a purposive sample of undergraduate university students found that generation Z students built their resilience during COVID-19 pandemic (Ang et al., 2021). Participants recognized resilience as a necessary trait. They also built strategies such as relying on family background and significant people such as faculty. There was also no loss of connection with family through the pandemic (Ang et al., 2021). Ang et al. corroborates Nola et al. (2021). The latter found that spending time with people and with others with whom they are in good relationships mitigated anxiety during the pandemic lockdown. Among university students, non-resilient students were found to experience higher fatigue than resilient students associated with lockdown fatigue. These findings suggest that coping skills are needed in a long-term stressful situation (Labrague & Ballad, 2021). A study with a sample of first-year students at an urban

university found grittier students showed higher levels of resilience to the pandemic even when controlling parental education (Bono et al., 2020).

COVID-19 fear, depression, anxiety, and stress were found to co-exist but significantly different in individuals with low psychological profiles (i.e., low COVID-19 fear, depression, anxiety, stress, and high in mindfulness and resilience) and with profiles classified as high COVID-19 fear, depression, anxiety, stress, and low mindfulness and resilience (Yalçın et al., 2021). Van Der Felz-Cornelis et al. (2020) found that among students affected by the COVID-19 outbreak, 7% lost their job or dropped out of their study, and 10% of students reported sickness and absence from work. Interestingly, although students were found to have high resilience, psychological distress was much higher.

Within the US context, a recent survey found that 91% of students had reported stress or anxiety (Active Minds, 2020). Active Minds (2020) reported that 1 in 5 college students reported that their mental health had worsened during the pandemic, and 80% reported a negative impact on their mental health. In fact, the most common way that the pandemic affected their lives was stress or anxiety. Notwithstanding, 79% felt hopeful about reaching their school-related goals. These findings are of interest because other studies found similar results (Son et al., 2020; Wang et al., 2020). Son et al. (2020) found that in their sample of university students, 91% showed increased levels of fear and worry relating to the covid pandemic, and 11% worried that they may contract the virus. Meaningful to indications of high reporting of anxiety related to covid is research that suggests significant differences in generalized anxiety between doctoral and undergraduate graduates and between master's and sophomores (Wang et al., 2020). A longitudinal case study approach at three University of Nebraska campuses, Bettencourt et al. (2022) used semi-structured interviews with student affairs practitioners and found that among first-generation college students, low-income, and racially minoritized students, the pandemic "magnified the needs…. across material, experiential, and emotional dimensions" (p. 7). Among Black women graduate students in the United States, financial stability was a source of anxiety (Porter et al. (2022). They found that among their sample, 11% selected being *very anxious* prior to COVID, and, since COVID pandemic began, 27% reported that they were *very anxious*.

Given the extent and seemingly widespread of anxiety during the COVID-19 pandemic among university students, there seems to be less focus on teasing apart the population of university students by enrollment levels. During the pandemic, some university students were newly enrolled, and others were closer to graduation. As such, levels of anxiety and how university students at various stages in their university experience cope during a pandemic should be understood.

Grit

Duckworth et al. (2007) conceptualized *grit* as a trait-level measure of perseverance and passion for long-term goals. Grit has predicted achievement in challenging domains and has accounted for higher variance in outcomes over IQ and Big Five Conscientiousness. Grittier individuals were found among older adults as well as among those with higher levels of education (Duckworth et al., 2007; Duckworth & Quinn, 2009). Researchers have investigated grit among university students and found positive effects on academic achievement and positive performance (Alhadabi & Karpinski, 2020; Kannangara et al., 2018; Mason, 2018). Among university students, Kannangara et al. (2018) found that mature students, higher achieving students, and those with lower levels of stress reported higher grit scores.

Grit has been shown to negatively correlate with depression and anxiety (Musumari et al., 2018) as well as fixed mindsets, optimism and life satisfaction, and pessimism (Tuckwiller & Dardick, 2018). In a sample of graduate students, mostly females, no significant correlations were found among anxiety and grit (Potter et al., 2022). Using a meta-analysis with 83 studies, 200 effect sizes, and 66,518 participants, the researchers found that grit is strongly related with social well-being (Hou et al., 2022).

Grit has also been studied with other outcomes as it relates to the ongoing COVID-19 pandemic. Recently, Lytle and Shin (2023) found that participants who reported higher levels of grit expressed lower concerns about career opportunities due to the ongoing COVID-19. And Holland et al. (2022) found that when grit was added to each of their logit models for the association between mental health and worry, there were no notable significant findings with worry. However, Sugawara et al. (2022) found a moderate positive association between fear of COVID-19 and mental distress, but grit had a significantly negative association.

Method

The research team used a cross-sectional design study during the fall semester of the 2021 school year. At the time of the investigation, the coronavirus pandemic was still considered ongoing and not officially declared over by governments or university personnel. The team conducted an online data collection process due to the pandemic. College students enrolled in different colleges and universities in the United States were invited to take part in the survey. To qualify for the study, students had to be currently enrolled in a post-secondary institution of higher learning. We did not distinguish student status as full-time or part-time. Notwithstanding, students were asked about the number of credits they had completed.

Participants

The sample ($N = 55$) was drawn from a combination of convenient and snowball sampling of enrolled university students. Given the nature of sampling, the universities represented were from four-year institutions. No two-year institutions were represented. Also, institutions were not identified as public or private, nor were any identified as single gender or religious. Gender representation was cisgender female (70.9%), cisgender male (23.6%), and nonbinary (5.5%). They self-identified as White (69.1%), Black or African American (10.9%), Hispanic/Latino/Latinx (7.3%), two or more races (5.5%), and Another Hispanic, Filipino, and Japanese (1.8%). Graduate students made up 29.1%.

Instrumentation

The Coronavirus anxiety scale (CAS; Lee, 2020; Lee et al. 2021) is a five-question survey that asks respondents to rate their experience with stress and anxiety due to COVID-19 in the past 2 weeks. It was developed as a brief mental health screener that can be readily used to identify dysfunctional anxiety associated with COVID-19. Each item is rated on a 5-point Likert scale to measure the frequency of the symptom ranging from 0 (*not at all*) to 4 (*Nearly every day over the past 2* weeks). An example question is "I felt nauseous or had stomach problems when I thought about or was exposed to information about the coronavirus." The CAS has strong psychometric properties. Confirmatory Factor Analysis yielded excellent fit [CFI = 1.00; TLI = 1.00; SRMR = 0.01; RMSEA = 0.00 (0.00, 0.05; 90% CI)] and high reliability ($\alpha = 0.93$). A CAS score ≥ 9 classifies a respondent with a dysfunctional level of anxiety. In the present study Cronbach's $\alpha = .933$.

The Grit-S scale (Grit-S; Duckworth & Quinn, 2009) is an eight-item scale developed and validated as an efficient measure of "trait-level perseverance and passion for long-term goals" (Duckworth & Quinn, 2009, p. 172). CFA supported a two-factor structure with strong internal consistency ($r = .59$, $p < .001$). The Grit-S scale has strong predictive and test-retest reliability. Example questions include "*I often set a goal but later choose to pursue a different one," "I finish what I begin,"* and *"I am a hard worker."* Each item is rated on a 5-point scale from 1 (*not at all like me*) to 5 (*very much like me*; Duckworth et al., 2007). The Grit-S scale is a reduced item scale from the original 12-items (see Duckworth et al., 2007). In the present study Cronbach's $\alpha = .728$.

Beginning of the Year and Current anxiety

Respondents rated their feelings of anxiety. Each item was rated on a 5-point scale to measure feelings of anxiety with 0 (n*ot at all*), 2 (*moderately*), and 4 (*extremely*). The first question asks about anxiety at the beginning of the year, and the second asks about feelings of anxiety at the current moment. The first question is *How did you feel at the beginning of the 2021 school year?* The second question is *How do you feel at this moment about the 2021 school*

year? Pressley (2021) has used one-item Likert scales to measure current anxiety, and Davey et al. (2007) has developed and validated a one-item scale to measure current anxiety.

Data Collection

IRB was sought and approval for the study was granted. Recruitment emails were then sent by all members of the research team to students. These students were identified as acquaintances, classmates, and friends. Points of contact included social media (e.g., Facebook) and student organizations. Those who received the email were encouraged to send it to others who fit the inclusion criteria. An embedded link within the email directed participants to the data collection form. The data collection was captured using a secured Google form. Once participants consented to be in the study, they were directed to continue. Data collection occurred for four weeks beginning the third week in November 2021. At the end of the data collection, access to the form was closed to any other responses.

Data Analysis

All data was downloaded from Google forms and transferred to Microsoft Excel then uploaded to SPSS software (v. 28.0). Reverse coding was completed for four items from the GRIT-S, and a grit score for each participant was calculated through averaging the score of all eight items (Duckworth & Quinn, 2009). According to Duckworth and Quinn, individuals with higher reported scores tend to endure longer for long-term goals. COVID-19 anxiety, current anxiety, and grit were examined for normality by inspection of histograms and the Shapiro-Wilks test. Only grit was found to be normally distributed. Log transformations did not change the normality distribution for COVID-19 anxiety nor for current anxiety. Non-parametric analysis was conducted because of the lack of normality and small sample size (Corder & Foreman, 2014).

Results

Of the participants who completed the questionnaire, none were omitted. Most of the participants were female and undergraduates. Most participants reported low levels of COVID-19 anxiety as well as lower levels of current anxiety since at the beginning of the school year. Females were found to have higher mean COVID-19 anxiety (M = 1.90, SD = 3.78) when compared to males (M = .46, SD = .52), and their grit was slightly lower (M = 3.30, SD = .61) than males (M = 3.52, SD = .68). Undergraduates (91+ credits) were found to have the highest level of COVID-19 anxiety (M = 3.43, SD = 5.82), and the lowest levels were found among graduate students (M = .69, SD = .95) and undergraduates (31 – 60 credits; M = 2.94, SD = .34). Beginning of the year anxiety M = 2.45, SD = 1.25 was reported to be higher than current anxiety M = 2.22, SD = 1.33 (Table 1).

What is the strength of the correlation between grit and COVID-19 anxiety among university students?

Spearman's rank order correlation was run to examine the relationship between grit, COVID-19 anxiety, anxiety at the beginning of the year, and current anxiety. There was no significant correlation between grit and COVID-19 anxiety rs = -.046, n = 55, p = .368, between grit and current anxiety rs = -.024, n = 55, p = .430, and between grit and beginning of the school year anxiety rs = -.089, n = 55, p = .259. There was no significant difference between COVID-19 anxiety

Table 1

Means, Standard Deviations in Grit and Covid-19 Anxiety

			Grit		Covid-19 Anxiety	
Variable	***n***	**%**	***M***	***SD***	***M***	***SD***
Female	39	70.9	3.30	.61	1.90	3.78
Male	13	23.6	3.52	.68	.46	.52
Nonbinary	3	5.5	3.42	.58	4.67	6.43
Undergraduate (0-30 crs)	12	21.8	3.46	.55	1.75	3.52
Undergraduate (31-60 crs)	6	10.9	2.94	.34	.67	1.21
Undergraduate (61-90 crs)	7	12.7	3.46	.59	1.43	1.62
Undergraduate (91+ crs)	14	25.5	3.36	.70	3.43	5.82
Graduate	16	29.1	3.40	.69	.69	.95

Scale	***M***	***SD***	***Min***	***Max***	***Mdn***
Grit	3.36	.62	1.88	5	3.25
COVID-19 Anxiety	1.71	3.54	0	20	0
Current Anxiety	2.22	1.33	0	4	3
Beginning of Year Anxiety	2.45	1.25	0	4	2

Note: N = 55

and current level of anxiety rs = .087, n = 55, p = .265 and between COVID-19 anxiety and beginning of school year anxiety rs = .188, n = 55, p = .085. There was a significant correlation but weak positive relationship between current and beginning of the year anxiety rs = .285, n = 55, p = .017 (Table 2).

Are there differences in COVID-19 anxiety between undergraduate and graduate students, after adjusting for beginning year anxiety?

A non-parametric ANCOVA, Quade's, was conducted to determine the effect of university enrollment status on COVID-19 anxiety when controlling for anxiety at the beginning of the school year. Table 3 displays ANCOVA results that show there was no significant main effect for enrollment [$F(4, 50) = .603$, $p = .662$]. Figure 1 shows the 95% CI coronavirus anxiety score of undergraduates and graduate students.

Table 2

Spearman Rank-Order Correlations Between Grit and Anxiety

Variable	1	2	3	4
1. Grit	-			
2. COVID-19 Anxiety	-.046	-		
3. Begin Year Anxiety	-.089	.188	-	
4. Current Anxiety	-.024	.087	.285*	-

Note. *$p < .05$

Are there differences in grit between undergraduate and graduate students?

A Mann-Whitney *U* test indicated no significant differences in grit between undergraduate (*Mdn* = 3.25, *n* = 39) when compared to graduate students (*Mdn* = 3.21, *n* = 16) *U* = 307.5, *z* = -.084, *p* = .933. A follow up using a Kruskal-Wallis test did not reveal a statistically significant difference in grit across the enrollment levels, chi-sq (4, *N* = 55) = 3.87, *p* = .424. Grit was lowest amongst Undergraduate (31 – 60 credits; *Mdn* = 3.00) and Graduate students (*Mdn* = 3.31) when compared to Undergraduates (0 – 30 credits; *Mdn* = 3.32), Undergraduates (61 – 90 credits; *Mdn* = 3.63), and Undergraduates (91+ credits; *Mdn* = 3.38).

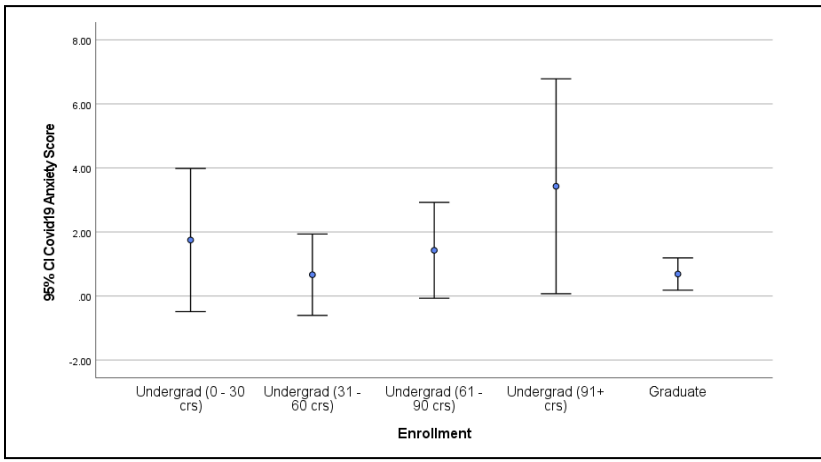
Table 3

ANCOVA Summary Table

Source	***SS***	***df***	***MS***	***F***	***p***
Enrollment Status	527.10	4	131.77	.603	.662
Error	10929.02	50	218.58		
Total	11456.12				

Figure 1

95% CI Coronavirus Anxiety Score



Discussion

The research team set out to investigate grit and COVID-19 anxiety among university students. The purpose of the study was to explore the association between grit and COVID-19 anxiety among university students. To answer the question, the research team utilized a cross-sectional design study. The research collected data during the fall 2021 semester from a convenient sample of undergraduate and graduate students. These results may be affected due to surveys being distributed and filled out during and close to finals week. There is the possibility that individuals may have felt more stress due to finals and not necessarily due to COVID.

Although data collection did not include other measures of mental states, the COVID anxiety results may be affected due to individuals being less anxious about the pandemic with time and other mitigating activities when compared to the previous year. Notwithstanding, high COVID-19 fear, depression, anxiety, and stress among university students has been found (Yalçın et al., 2021). However, Nola et al. (2021) found that spending time with family could help to

mitigate anxiety in the context of the covid pandemic. Additionally, students and teachers can use strategies to help mitigate pandemic effects. For students who study abroad, they need to use appropriate strategies to increase their intercultural connections (Veliz & Merandi, 2023). Pre- and in-service teacher knowledge and being comfortable teaching online could help with students feeling safe with learning online (Hunter-Johnson et al. 2023; Smith, 2021). Social well-being is strongly related to grit (Hou et al., 2022).

Other researchers found that among university students, 91% indicated increased levels of fear and worry relating to the covid pandemic, and 11% worried that they may contract the virus (Son et al., 2020). In the present study, undergraduates who reported earning more than ninety-one credits were found to have the highest reported COVID-19 anxiety scores. This finding suggests that senior undergraduate students may have had the highest levels of anxiety relating to the coronavirus. They may have been considering the uncertainty of having to graduate given the lockdowns and uncertainty of gainful employment. This finding suggests that studies relating to COVID-19 anxiety should tease apart enrollment status. Research suggests significant differences in generalized anxiety between doctoral and undergraduate graduates and between master's and sophomores (Wang et al., 2020). Of interest is the difference in means on COVID-19 anxiety between males and females. Although we did not examine these differences, multiple studies have found these differences. For university administrators, they should recognize that leading students through a pandemic may be more complex. Across the board solutions ought to be considered.

Smith (2020) discussed how university faculty may be able to manage through the COVID-19 pandemic. By extension, university students could have deployed the same approaches. For Smith, the plethora of university resources that has appeared suggests that people lean on successful strategies which enable them to "be open to the challenge," practice "being able to meet the changes asked" and to "take note of [their] accomplishments" (p. 126). University students experience challenging academic tasks and face many personal challenges as they negotiate higher education. Some may be better able in their ability to cope with anxiety through COVID-19. Gonçalves et al. (2021) found that resilience mediated the drop of fear of COVID-19. In the present study, there was an inverse relationship between grit and COVID-19 anxiety among all enrollment levels. Taken together, these results corroborate Kannangara et al. (2018) who found that higher achieving students and those with lower levels of stress reported higher grit scores as well as Sugawara et al. (2022) found grit had a significantly negative association with COVID-19 anxiety.

The results in the present study suggested that graduate student grit levels were not significantly different from undergraduates. Undergraduates reporting between thirty-one to sixty credits were found to have similar grit scores to graduate students. This finding could be a result that the age difference may not be spread out. Duckworth et al. (2007) posited that grit increases with

age, but for the present study a clear case cannot be made here. Duckworth et al. included much older adults in their dataset. The number of credit hours earned showed no sign of a relationship with grit. However, there was more variance in grit among undergraduates, and a difference in grit scores between undergraduates with 31 to 60 credits and graduate students, albeit these scores were not statistically different. Of concern was the group of undergraduates who could be considered sophomores. More exploration should be done to examine grit among second year students.

While the present study did not examine the impact of SARS-CoV-2 on first-generation, low-income students, the attention on these factors is of concern. Bettencourt et al. (2022) found that practitioners drew on empathy because they recognized the unique ways the pandemic impacted these students. Practitioners learned about the lack of resources not only for the at-promise students but also for the larger student body. Practitioners managed such as not to push students "beyond the point of resilience" (p. 9).

Research Limitations

One limitation is the small sample size and participants who responded. The convenient sampling method may not be generalizable to the population of the university students since it is limited to students in specific classes and campus organizations. However, the present exploratory study using this sample suggests that researchers can gain an understanding of how university students may handle coronavirus anxiety. Another limitation was the cross-sectional design, which limits any causal inferences. Yet, another limitation is that data collection was done during the pandemic when students were already managing issues such as being informed of the situation as well as managing the pivot to online learning. Many students may have also found comfort with being around family. Notwithstanding, the constant access to reminders relating to the pandemic could have contributed as a source of anxiety.

Practical Implications

The findings of this study suggests that university administrators need to recognize that not all university students may be overly anxious about the coronavirus pandemic. Theoretical implications are for researchers to continue to examine the construct of anxiety, especially as it related to these feelings during a pandemic. There could also be an increase in coping strategies and self-management.

Future studies

Since there are new COVID variants, it is possible that anxiety regarding COVID may rise again. We could do a future test-retest. Researchers will also want to examine the extent of COVID-19 anxiety among female undergraduate students

as well as grit among sophomores. More studies should examine single gender as well private and religious universities.

Future researchers should investigate levels of COVID anxiety and how mitigated with students who took vaccines, booster shots, and the idea of COVID being more normalized after living in a pandemic world for over a year. Future studies could also investigate how the presence of other stressors in the presence of a pandemic could be reduced or eliminated in the presence of factors such as being with family.

Conclusion

COVID-19 is a disease with far-reaching effects. Vaccines have been developed against it, but with the potential for other variants, we must come to live with this disease. University students will continue to be at risk of infection, and they may be asked to go into lockdown and pivot to online learning. These requirements may create feelings of fear and anxiety. It is thus crucial for university administrators to have up-to-date information. Although continued focus should be on methods and policies to help students reduce their fear and anxiety, findings from this study indicate that undergraduate and graduate students continue to persevere. Also, other studies are needed that focus on university students using larger samples and studies should explore cognitive and non-cognitive factors and their effects.

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