

THE PSYCHOLOGICAL IMPACTS OF COVID-19 ON UNDERGRADUATE
STUDENTS IN THE UNITED STATES: A REVIEW

by

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DEDICATION

This thesis is dedicated to all of the students who never got to walk the stage at their graduation ceremonies, and to all those who have continued to not only survive, but thrive in spite of the overwhelming obstacles we face. Remember to take care of yourself and live your life one day at a time.

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
ABSTRACT	vii
 CHAPTER	
I. INTRODCUTION	1
II. BACKGROUND	3
Mental Health Trends in U.S. General Population	3
Mental Health Trends for Young Adults in the U.S.	4
III. LITERATUE REVIEW	5
The Impacts of COVID-19 on the Mental Health of Undergraduate Students in U.S.	6
Methodology Used in Literature	6
Media Interaction and Consumption.....	9
Online Course Delivery	13
Anxiety & Depression.....	14
Suicidal Ideation	18
Demographics of Participants	20
IV. DISCUSSION	24
Limitations of the Literature Review	27
Demographics of Participants	27
Methodology Used in Literature	28
Threats to Validity in Current and Future Studies	29
Recommendations for Future Research	34
Videoconferencing and “Zoom Fatigue”	35
Locus of Control	41
V. CONCLUSION	47
REFERENCES	50

ABSTRACT

In the year since the global emergence of COVID-19 in March 2020, few social landscapes have seen a more dramatic change than that of the college campus. However, little research has been conducted regarding the psychological impacts of the pandemic and the mental health status of university students living in one of the nations most heavily affected by COVID-19: The United States. This study's objective is to synthesize the findings of the currently available studies, identify trends and gaps in the current research's findings, and provide recommendations for future research in the field. Finally, this study aims to propose possible theories of explanation for the observed trends in the results of current research. The findings of this literature review reveal significant increases in both depression and anxiety among university students in all selected studies. One study incorporated the use of a mobile phone sensing application to demonstrate a link between news coverage of the pandemic and levels of anxiety felt by students. Other findings include increased levels of suicidal ideation, feelings of loneliness, and lack of motivation among student respondents. The current study proposes future research into social-learning theories of personality as a possible explanation for observed trends in the literature, in addition to exploring theoretical framework in communication studies demonstrating ways in which videoconferencing can negatively affect students and faculty alike. The findings of this literature review suggest that there is a great need for further research into the psychological implications and lasting repercussions facing young adults and students living through the ongoing pandemic.

“There's no question of heroism in all this. It's a matter of common decency. That's an idea which may make some people smile, but the only means of fighting a plague is — common decency.” – Albert Camus, *The Plague*

I. INTRODUCTION

In December of 2019, reports of a highly contagious SARS-CoV-2 (COVID-19) causing severe respiratory illness began to emerge out of Wuhan and neighboring industrial centers of China. Less than a month later, in January, cases of the novel coronavirus were being reported internationally in several cities around the globe. On March 11th, 2020, the World Health Organization (W.H.O.) declared that the outbreak of COVID-19 had officially reached the status of a global pandemic. Three days later, COVID-19 was declared a national emergency by the United States. Subsequently, individual states began issuing stay-at-home orders and implementing lockdown measures in an effort to mitigate the spread of the virus, with the state of Georgia being the last to implement mitigation efforts on April 3rd, 2020.

Impact of Lockdown Measures on the Higher Education Community

Given the proximity of announcements and recommendations from the World Health Organization to several universities' scheduled week of spring break, many university administrations opted to extend spring break for an additional week to give staff time to regear university resources in preparation for a transition to a fully online method of course delivery to minimize the risk of further on-campus transmission of COVID-19 (Andu & Najmabadi, 2020). Additionally, many in-person events such as

commencements and graduations were either indefinitely postponed or canceled altogether. Actions taken by universities across the United States to mitigate the spread of COVID-19 amid an unprecedented surge in reported cases dramatically changed the landscape of the collegiate environments. Nichole Hadler of the University of Michigan writes that “many students have lost their on-campus or local jobs, and likewise, the job search for seniors has been severely disrupted. All the while, college students are experiencing these sudden and unexpected changes while physically separated from their familiar on-campus support systems” (Hadler, 2020). A recent study from the Pew Research Center demonstrated how the rapid change in day-to-day life combined with the loss of local or university employment resulted in 52% of young adults residing with one or both of their parents, with the youngest adults (ages 18 to 24) accounting for most of the growth in the number of 18 to 29-year-olds living with their parents from February to July, surpassing numbers only previously seen during the Great Depression (Fry et al., 2020). It is well documented that college students are more susceptible to anxiety and depression (Farabaugh, 2020) than the general population. It is therefore worth investigating the impact of how these changes in lifestyle, economic stressors, and the rapidly evolving nature of the pandemic contribute to overall feelings of uncertainty, as well as exacerbate symptoms of anxiety and depression in many young adults attending universities. Moreover, if the issues central to the development of increasing rates of anxiety and depression in young people go unaddressed or untreated, their conditions stand to worsen and potentially develop into far more harmful activities such as substance use, self-harm, or even suicidal behaviors.

II. BACKGROUND

The United States has reported more confirmed cases and the highest rate of infection than any other country in the world (Associated Press, 2020). Additionally, when compared to other Western nations, the United States government has provided considerably less relief to its citizens (Barone, 2020), resulting in roughly 8 million Americans falling below the poverty line since the summer of 2020 (Long, 2020). In order to properly understand the impacts of the COVID-19 pandemic on young adults attending college, it is crucial to explore recent trends in mental health within the general population and trends within young adults in the United States leading up to the emergence of COVID-19.

Mental Health Trends in U.S. General Population

Over the past two decades, several studies have documented significant increases in individuals reporting symptoms of anxiety and depression. One such study by Goodwin et al. (2020) found that the rate of reported anxiety increased from 5.12% in 2008 to 6.68% in 2018 ($p < 0.0001$) among adult Americans. Alarming, the National Center for Health Statistics (NCHS) reported that from 1999 through 2018, the suicide rate increased 35%, from 10.5 per 100,000 to 14.2, suicide rates increased for both men and women, with greater increases occurring after 2006 (Hedegaard & Warner, 2020). That same report also found that the rate of suicide increased on average approximately 1% per year from 1999 to 2006 and by 2% per year from 2006 through 2018 (Curtin et al., 2020). This information correlates with an additional report from the Centers for

Disease Control and Prevention (CDC) which listed suicide as the 10th leading cause of death in the United States for 2017 (Murphy et al, 2018).

A recent longitudinal cohort study found that from 2009 to 2018, the prevalence of alcohol-related, substance-related and suicide-related diagnoses increased by 37%, 94%, and 170% respectively (Brignone et al., 2020). That same study also found that diagnoses of diseases of despair (i.e., drug overdose, suicide, alcoholic liver disease) increased by 68% between 2009 and 2018 among a cohort of people studied in the United States (Brignone et al., 2020).

Mental Health Trends for Young Adults in the U.S.

Unusually high rates of anxiety and depression have been well documented to be even more present in adolescents and young adults when compared to the general population in the United States. The findings of 2013 systematic review found that university students experience depression at rates that are substantially higher than that of the general population (Ibrahim et al., 2013). Additionally, longitudinal research by Goodwin et al. (2020) found that anxiety rates among participants aged 18–25 years old nearly doubled from 7.97% in 2008 to 14.66% at the end of the study in 2018. The increase in anxiety observed among those aged 18–25 years old was the most notable and was more rapid than participants aged 26–34 and 35–49 years old when data was stratified by age. (Goodwin et al., 2020).

Strikingly, the longitudinal study by Brignone et al. (2020) on diseases of despair also found that members of the cohort that were under 18 accounted for a 287% increase in suicide-related diagnoses, the largest of the entire cohort (Brignone et al., 2020).

Considering that the longitudinal study concluded in 2018, it is reasonable to assume that members of the cohort who were younger than eighteen at the time of the conclusion are now old enough to attend university or are actively enrolled in undergraduate programs. Additionally, a 2019 study analyzing trends in suicide among young people in the U.S. aged 10 to 19 years old found that the historically large gap between men and women has been narrowing since 2007 (Ruch et al., 2019) corroborating other reports (Curtin et al, 2020) from the CDC which also show a significant uptick in suicide rates after 2006.

III. LITERATURE REVIEW

It is well documented that even before the global pandemic, the overall trends in mental health for adults in the United States, especially young adults, are charting in a very troubling direction. While there have been studies on the psychological impacts of COVID-19 on mental health from several countries, some conducted on a global scale, one group that has not been studied in-depth are current undergraduate students attending universities in the United States. Given the underlying mental health trends existing within the young adult population in the U.S., it is pertinent to understand the ways in which an already psychologically vulnerable population is handling the ongoing pandemic which has caused the entire global community a great deal of stress, anxiety, and depression. The objective of this literature review is to analyze relevant data and studies as to how the psychological impacts of COVID-19 and the subsequent public health measures have affected the mental health and well-being of undergraduate students in the United States.

This literature review analyzes 6 published articles aimed at studying the implications of the pandemic on the mental health of university students in the United States. Additionally, this review includes analysis from a Morbidity and Mortality Weekly Report (Czeisler, et al. 2020) published by the Centers for Disease Control (CDC) for the purpose of comparing the trends observed among college students to that of the general population. Given the relative novelty of the coronavirus, its ramifications in the United States, and the general similarities in surveying methods among relevant studies, this literature review has organized the findings of the relevant articles in a thematic manner to effectively analyze them as well as adequately identify and gaps in the current literature.

The Impacts of COVID-19 on the Mental Health of Undergraduate Students in U.S.

Methodology Used in Literature

Due to the limitations and health concerns brought about by the global spread of COVID-19, all relevant articles have used web-based questionnaires, many of which were sent out via email, in which all answers were self-reported by students. Given the practical challenges facing researchers, current studies have relied centrally on analyzing the cross-sectional correlation of temporal trends. While this methodology is in the best interest of the health of both researchers and participants, it also has a high potential for confounding variables to influence the responses given by participants, given that the outbreak of COVID-19 has changed so many facets of day-to-day life and routine. Furthermore, with all current studies only being able to study the correlation of factors as they relate to individuals and COVID-19, they are unable to prove a relationship of

causality between any factors, thus leading to uncertainty as to what the underlying causes of the observed trends in behavior from the current research.

While all relevant studies utilized web-based surveys, one study that stood out from the rest of the literature was a longitudinal study conducted by Huckins et al. (2020) at Dartmouth College that included mobile sensing data from a smartphone application called StudentLife in addition to ecological momentary assessments (EMAs). The application, which is part of Dartmouth's larger StudentLife study "collects data from several of the phone's sensors, including but not limited to the GPS, accelerometer, and lock/unlock status" with anonymous data collected from the app being "uploaded to a secure server when a participant is both using WiFi and charging their phone" (Huckins et al., 2020, p. 4). Additionally, researchers note that previous data shows that while levels of stress, anxiety, and depression typically increase at various points in the semester, those levels often return to the baseline over the break. In their study, Huckins et al. (2020) write that the ability to compare the highly abnormal pandemic semester against "the cyclical nature of college students' mental health within a typical academic term provides a unique control in our study", thus increasing the validity of their study (Huckins et al., 2020, p.10). The methodology used in this study provides the specific advantage of the ability to track changes in student mental health over the course of an academic term rather than serving as a snapshot during one moment in time.

Studies conducted by Huckins et al. (2020), Kecojevic et al. (2020), Kibbey et al. (2021), Tasso et al. (2021), and Wang et al. (2020) were all conducted using the student populations of a single university, several of which were located on the east coast of the United States. A study by Browning et. al (2021) differed from the rest of the relevant

literature in that it surveyed students from seven different U.S. universities. Among the seven large universities in the study conducted by Browning et al. (2021) were Arizona State University, Clemson University, North Carolina State University, Oregon State University, Pennsylvania State University, University of Montana, and The University of Utah. This approach not only gave the study a much more geographically diverse population of students to sample from, but the method also managed to net 2,534 completed responses for the administered survey (Browning, 2021).

While the use of online surveys and cross-sectional data analysis is both practical and understandable given the realities of the pandemic, this form of data collection lends itself to potential self-selection bias based on both the interest and availability of student participants. The possibility of an underlying selection bias was listed as a limitation in relevant studies by Browning et al. (2021), Wang et al. (2020), and Kibbey et al. (2021). Furthermore, several of the relevant studies primarily relied on convenience samples from their own universities to gather data about the mental health of undergraduate students (Liu et al., 2020; Kibbey et al., 2021; Wang et al, 2020). The combination of self-selection bias and convenience sampling pose potential threats to the validity of the currently available studies. Additionally, the surveying method used in the literature also lends itself to social desirability biases in the answers to certain survey questions, particularly ones regarding increased substance use since the beginning of the pandemic, potentially being influenced by social desirability effects, a limitation which was noted by Czeisler et al. (2020). Moreover, given the limited number of studies focusing on the mental health of undergraduate students, there is also a great deal of limitation in the way of geographic diversity of respondents in the relevant surveys. Given that this pandemic

has seen a wide range of different public health measures and restrictions implemented by various states and localities, it is worth studying how mental health outcomes differ in undergraduate students attending university in an urban environment with extensive public health restrictions versus a rural university setting with comparatively lax restrictions.

Media Interaction and Consumption

In a rapidly developing situation like the initial outbreak of COVID-19 in the United States, staying informed is crucial. Considering the sheer magnitude of information and news coverage surrounding the pandemic, studies conducted by Browning et al. (2021), Huckins et al. (2020), Kecojevic et al. (2020), and Wang et al. (2020) incorporated measures to study how student participants were gathering information about COVID-19 and if the amount of information students knew about the pandemic would have any impact on their mental health. The role of social media as it relates to today's young adults cannot be understated as many young adults rely on social media platforms like Twitter for information and news. Additionally, while the percentage of people who social media use is on the rise among all age groups, young people aged 18-29 engage in social media, especially applications like Twitter and TikTok, more frequently than their older peers (Pew Research Center, 2021).

All four studies observed a positive relationship between the amount of time a student spent searching for information regarding COVID-19 and the likelihood that the student would report elevated levels of anxiety. For example, the study conducted by Kecojevic et al. (2020) found that "higher levels of anxiety were more likely to be

reported by students other than freshmen and those who spend more than one hour per day looking for information on COVID-19” and that “spending a greater amount of time looking for COVID-19 information on news sites was associated with increased levels of anxiety and somatization, while increased level of anxiety was also associated with spending greater hours looking for information on social media” (Kecojevic et al., 2020, p. 16). Additionally, data analysis by Kecojevic et al. (2020) demonstrated that “the number of hours spent on news sites looking for information on COVID-19 was significantly correlated with the amount of time spent on social media looking for COVID-19 information ($\rho = 0.77$, $p < 0.001$)” (Kecojevic et al., 2020, p. 6). These findings not only reflect the positive relationship between time spent researching COVID-19 and likelihood of reporting elevated levels of anxiety, but they also demonstrate the unique relationship that many young college students have with social media as a source of news, showing that those who spend more hours searching news sites also spend more hours searching social media. For many young students, information gathering involves a blend of both official, verified news outlets and scrolling through their own personal news feeds.

However, this blended approach to information gathering is far from perfect, and as Wang et al. (2020) and Browning et al. (2021) discuss in their research, it may prove to be detrimental to the mental health of students and other young people. For instance, research from Wang et al. (2020) found that three quarters of student respondents indicated fear and worry induced by news outlets. In their discussion of results, Wang et al. (2020) posit that “this type of distress may be exacerbated by the large amount of misinformation, including false and fabricated information, distributed through news and

social media platforms” (Wang et al., 2020, p. 9). The issues surrounding news outlets and inducing fear are complex and multifaceted, but results from Wang et al. (2020) highlight the significance of misinformation in relation to shaping attitudes and beliefs about the pandemic. Similar explanations for increased anxiety among young students were provided by Browning et al. (2021) in their discussion of why young students (ages 18-24) may be at especially increased risk for high levels of psychological impact as a result of the pandemic. In their research Browning et al. (2021) wrote that “given the dominance of the COVID-19 pandemic in the news, younger ‘always-on’ students may be exposed to greater amounts of risk-elevating messages, which can lead to anxiety and poor mental health” (Browning et al., 2021, p. 16). This explanation also aligns with the findings of Kecojevic et al. (2020) in that both demonstrate a positive relationship between time spent consuming pandemic-related news coverage and increased levels of anxiety among students. Findings by Wang et al. (2020) add a layer of nuance onto the findings of Kecojevic et al. (2020) by suggesting false information regarding the pandemic contributes to increased levels of anxiety observed among students.

Additionally, findings from Huckins et al. (2020) support the results of the previous studies with the added benefit of studying anxiety and depression in a longitudinal setting with a cohort of students. In the study conducted by Huckins et al. (2020), students were monitored through the use of the StudentLife smartphone application. The application periodically administered mental health questionnaires to participants and collected anonymized data from participants regarding their GPS location, the number of locations participants visited, and overall phone usage. In their study, Huckins et al. (2020) found that “during the Winter 2020 academic term, sedentary

time increased along with symptoms of anxiety and depression” when compared to previous academic terms and subsequent academic breaks (Huckins et al., 2020, p. 9). Data analysis showed that “in a mixed linear model, phone usage, number of locations visited, and week of the term were strongly associated with increased amount of COVID-19–related news” and that “when mental health metrics (e.g., depression and anxiety) were added to the previous measures (week of term, number of locations visited, and phone usage), both anxiety ($P < .001$) and depression ($P = .03$) were significantly associated with COVID-19–related news” (Huckins et al., 2020, p. 1). Particularly, these findings from Huckins et al. (2020) suggest a positive relationship between the amount of pandemic-related news consumed by an individual, likelihood that an individual will experience increased levels of anxiety and depression. Further analysis from their study also suggests “a strong inferential link between anxiety and COVID-19 news” with that link being best demonstrated in their finding that “self-reported symptoms of depression and anxiety spiked noticeably in week 10, which corresponds to widespread policy changes at the college, local, and national government levels” (Huckins et al., 2020, pp. 7-10). Furthermore, Huckins et al. (2020) also note that week 10 of the study was one week after the first case of COVID-19 was confirmed in the area surrounding Dartmouth College, the university at which the study was being conducted.

The results of studies by Kecojevic et al. (2020) and Huckins et al. (2020) both support the findings of previously established research by Twenge et al. (2017) and Oswald et al. (2020) which suggest that depressive symptoms and poorer mental health outcomes are strongly correlated with increased screen time and sedentary lifestyle among adolescents. Furthermore, the longitudinal cohort, mobile sensing, and periodic

surveying in the study by Huckins et al. (2020) show increases in anxiety and screen time alongside weeks in which major changes to campus life occurred, suggesting a very strong relationship between the mental health of students and the consumption of pandemic-related news.

Online Course Delivery

The transition from in-person classes to online course delivery undertaken by universities in an effort to reduce the spread of the coronavirus was abrupt and challenging for students and university faculty alike. The transition was especially hard for students enrolled in courses that are not well-suited for online delivery, such as labs and those pertaining to the performing arts. Research by Tasso et al. (2021, p. 11) found that “the highest frustration felt by our students was the stress they felt due to change in teaching methods” followed by frustrations with a significant increase in course workload. These findings are mirrored by those of Wang et al. (2020), which found that the biggest contributor to overall increases in stress among students revolved around academics and the transition to online classes. Results from Wang et al. (2020, p.6) found 76.03% of student participants reported difficulties adapting to online course delivery, and 66.57% of respondents citing an increase in class workload. Furthermore, research conducted by Wang et al. (2020, p.6) also found that 90.74% of students surveyed reported difficulties concentrating, with an alarming 34.61% rating their concentration difficulties as severe.

The frustrations and difficulties associated with the transition to online courses were likely compounded by the general uncertainties and ambiguities that surrounded the

first weeks of lockdown in the early phases of the pandemic. One factor that could further lead to struggles with academic performance for students is that many had to move back home with their parents (Fry et al., 2020), due to loss of in-person resources like access to computers and internet at university libraries. The loss of internet resources is likely to have an unequal impact on students of lower socioeconomic status due to what some outlets refer to as “the digital divide”, wherein households of lower socioeconomic status lack access to high-speed broadband internet compared to higher-income households. A 2018 study by the Pew Research Center found that “24% of teens whose annual family income is less than \$30,000 say the lack of a dependable computer or internet connection often or sometimes prohibits them from finishing their homework” (Anderson & Perrin, 2018). The implications of these findings demonstrate how students, through no fault of their own, may have had no choice but to return to households that cannot provide adequate resources in order for them to successfully continue their academic careers, potentially resulting in a great deal of additional frustration and stress. Therefore, future studies ought to place significant focus on surveying the socioeconomic status of students when determining the impact of the pandemic on certain populations.

Anxiety & Depression

All studies reported significant increases in anxiety and depression among student respondents. While anxiety and depression are two distinctly different psychological issues with their own set of symptoms and challenges, most every article used in this literature review reports the observed increases in anxiety and depression alongside one another. Therefore, in the best interest of effectively synthesizing the results of the

relevant literature, the psychological impacts of COVID-19 as they related to anxiety and depression will be analyzed together.

Results from Liu et al. (2020) found elevated levels of depression and anxiety among student respondents, with 45.4% of scores indicating high levels of anxiety, and 43.3% of student scores indicating high levels of depression. Researchers noted that these observed rates are considerably higher compared to prior studies that have used the same cut-off points for both depression and anxiety (Liu et al., 2020). These findings align with those of Czeisler et al. (2020), which revealed that symptoms of anxiety disorder were approximately three times higher than the second quarter of 2019 (25.5% versus 8.1%), and the prevalence of a depressive disorder was approximately four times higher than it was in the second quarter of 2019 (24.3% versus 6.5%) (Czeisler et al., 2020).

Additionally, research conducted by Liu et al. (2020) found that 74.1% of scores from respondents indicated that student participants possessed low distress tolerance, 72.0% of scores also indicated that students had low levels of resilience, and that 61.5% of participants scored as having high levels of loneliness. In their cross-sectional analysis, Liu et al. (2020) found that “high levels of loneliness, high levels of COVID-19-specific worry, and low distress tolerance were significantly associated with clinical levels of depression, anxiety, and PTSD symptoms” (Liu et al., 2020, p. 1).

Correspondingly, research conducted by Kibbey et al. (2021) and Wang et al. (2020) both make note of the prevalence and severity of anxiety and depression among students in their studies. Research conducted by Kibbey et al. (2021) found that 46% of student participants reported elevated levels of psychological distress. Furthermore, findings by Kibbey et al. (2021) reveal that 22.3% of participants had clinically elevated

levels of general anxiety, with 15.3% reporting extremely severe anxiety, and 25.4% of students had clinically elevated levels of depression, with 14.4% reporting extremely severe depression. Similarly, Wang et al. (2020, p. 8) found that 48.14% of students in their survey reported moderate-to-severe levels of depression, and 38.48% reported moderate-to-severe levels of anxiety. More tellingly, 71.26% students in the study also indicated that their levels of anxiety had increased during the pandemic (Wang et al., 2020, p. 6). According to Wang et al. (2020, p. 6), the biggest contributor to overall increases in stress among students revolved around academics and the transition to online classes.

Similarly, student participants in the study conducted by Kecojevic et al. (2020) also reported difficulties focusing on academic work. Furthermore, Kecojevic et al. (2020) found that high levels of depression were associated with difficulties focusing on academic work. Linear regression model analyses conducted by Kecojevic et al. (2020) indicated that difficulties focusing on academics were the second-most significant predictor of depression among respondents, with economic hardship being the strongest indicator overall. Similar observations regarding economic hardship and difficulties focusing were also noted by Browning et al. (2021) in their study. In their discussion of the results, Kecojevic et al. (2020) suggest that “students who are dependent on jobs to support themselves and/or families may be particularly vulnerable to depression and worry due to economic hardship”, which could lead to worsening mental health over time, especially given the uncertainty surrounding future economic prospects in the wake of the pandemic (Kecojevic et al., 2020, p. 12).

Differences Observed Among Female Students. Multivariate modeling conducted by Browning et al. (2021) showed that “being a woman, having fair/poor general health status, being 18 to 24 years old, spending 8 or more hours on screens daily, and knowing someone infected predicted higher levels of psychological impact when risk factors were considered simultaneously” (Browning et al., 2021, p. 2). This analysis ultimately led Browning et al. (2021) to support the assertion that women appear to be more strongly impacted by the long-term psychological impacts of the pandemic.

Cross-sectional analyses by Kecojevic et al. (2020) demonstrated that “those with higher levels of perceived stress were more likely to be females, unable to focus on academic work, and report difficulties in obtaining medications and cleaning supplies” (Kecojevic et al., 2020, p. 2). Additionally, research conducted by Kibbey et al. (2021) found that female students were 2.16 times more likely to report having clinically elevated levels of general anxiety and 2.14 times more likely to report having clinically elevated levels of depression when compared to male students. In their discussion, Kibbey et al. (2021) claim that these observations are consistent with previous studies and “might be understood in the light of the well-documented sex differences in affective disorders” (Kibbey et al., 2020, p. 8). Correspondingly, research conducted by Wang et al. (2020) revealed that female students scored 1.76 points higher than male students on scales measuring depression and 2.22 points higher than male students on scales measuring anxiety, leading Wang et al. (2020) to conclude that gender had significant effects on anxiety and depression ($P < .001$). However, contrary to these findings, the study conducted by Liu et al. (2020) is the only current study that analyzed the relationship between gender and the psychological impacts of the pandemic and did not

observe this trend, concluding that “no differences were observed between men and women” in psychological outcomes (Liu et al., 2020, p. 4).

While several of the studies relevant to this review found that the psychological impacts of COVID-19 affected women at higher rates than men, not much is known about the underlying reasons of why this trend was observed. One potential explanation could be linked to social desirability biases present among male and female respondents. For example, societal norms may incline male participants to downplay the psychological impacts they feel in an effort to appear stronger or more resilient. Additionally, with a record number of young people living at home with their parents during the pandemic (Fry et al., 2020), it is possible that female students especially may be returning to households that expect them to assume greater caregiver responsibilities to support their families, which could increase stress and anxiety among full-time female students.

Suicidal Ideation

Of the literature relevant to this review, only two articles directly surveyed respondents regarding suicidal ideation, the first of which was an online survey conducted by Wang et al. (2020), which began collecting responses from May 4, 2020 and closed on May 19, 2020. Questions in the survey utilized items from the Patient Health Questionnaire-9 (PHQ-9) to measure the various aspects of self-reported mental health of the student respondents. In their study, Wang et al. (2020) wrote “Responses to item 9 of the PHQ-9 (‘over the last two weeks, how often have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?’) showed that 366 (18.04%) participants had thoughts related to self-harm or suicide (250

responded ‘several days,’ 74 ‘more than half the days,’ and 42 ‘nearly every day’)” (Wang et al., 2020, p. 5). Wang et al. (2020) draws a comparison to previous research on the suicidal ideation of college students done by Zivin et al. (2009) in a non-pandemic setting, which found that the rate of suicidal thoughts among college students was around 3% to 7% of those surveyed. Results from previous research stand in stark contrast to findings by Wang et al. (2020) which showed nearly one in five respondents having thoughts of suicide or self-harm, Wang et al. (2020) writes that “this is an alarming finding warranting immediate attention” (Wang et al., 2020, p. 8).

Measures of suicidal ideation among respondents were also conducted by the Centers for Disease Control (CDC) from June 24 through June 30 of 2020, and the corresponding report was authored by Czeisler et al. (2020) in August. While the study surveyed adults in the United States ages 18 and older, the report emphasized the results received from respondents aged 18-24 years. More specifically, while Czeisler et al. (2020) found that approximately twice as many respondents reported serious consideration of suicide in the previous 30 days than U.S. adults in 2018, Czeisler et al. also noted that the “percentage of respondents who reported having seriously considered suicide in the 30 days before completing the survey (10.7%) was significantly higher among respondents aged 18–24 years (25.5%)” (Czeisler et al., 2020, p. 1049). This finding corresponds with results observed by Wang et al. (2020) in their study regarding the mental health of students at Texas A&M University. Additionally, the report also found that at least one adverse mental or behavioral health symptom was reported by 74.9% of all respondents aged 18–24 years (Czeisler et al., 2020, p. 1052). The report expanded upon these findings, saying that “Mental health conditions are

disproportionately affecting specific populations, especially young adults, Hispanic persons, Black persons, essential workers, unpaid caregivers for adults, and those receiving treatment for preexisting psychiatric conditions” (Czeisler et al., 2020, p. 1053).

Findings by both Wang et al. (2020) and Czeisler et al. (2020) demonstrate the alarming trend of increased suicidal ideation among young adults aged 18-24 years old during the initial and secondary phases of the global pandemic. Both studies demonstrated alarming increases in suicidal ideation by comparing their reported percentages against rates of suicidal ideation from years prior. While neither study is able to prove causality between the societal impacts of COVID-19 and the observed increase in suicidal ideation among respondents, authors of both studies call for further research in order to better identify drivers of these troubling rates of adverse mental health and suicidal ideation found in their studies.

Demographics of Participants

Gender of Student Respondents. Beyond universally reported increases in anxiety and depression, another commonality observed across every study was that in each of the surveys sent out to students, a majority of respondents reported to be women. Studies like those conducted by Browning et al. (2021), Wang et al. (2020), and Huckins et al. (2020) reported more balanced numbers on the gender of their respondents with 61%, 61.6%, 67.8% respectively. Alternatively, studies by Kibbey et al. (2021), Tasso et al. (2021), and Liu et al. (2020) all reported even higher rates of female respondents at 72.7%, 75.4%, and 81.3% respectively. The percentage of female students reported in the remaining studies fall somewhere in between the previously mentioned figures.

Some researchers, like Tasso et al. (2021) and Wang et al. (2020), went in so far as to attribute features and limitations of their findings to the differences in gender reported by the students they surveyed. One sampling-related limitation observed by Tasso et al. (2021) in their study was that “self-identified women responded at a disproportionate rate compared to self-identified men (75% to 16%, respectfully), whereas women represent 59% of the campus student body” (Tasso et al., 2021, p. 13). While Tasso et al. (2021) wrote that they are unsure what to make of the gender disparity, they note that a previous study conducted at the same university by Warrener & Tasso (2017) reported 82% of respondents being women, an even larger disparity. Similarly, when discussing limitations of their study, Wang et al. (2020) wrote that “the slightly higher level of depression/anxiety among females may be attributed to the slightly higher percentage of female respondents” (Wang et al., 2020, p. 9).

The higher percentage of female respondents could just simply reflect the reality that more women are going to college than their male peers (NCES, 2016) and that, by extension, women make up a majority of those attending universities in the United States. However, it is still important to gather more male participants for future studies in order to better understand how the pandemic is impacting men, given that research by Czeisler et al. (2020) found that “suicidal ideation was more prevalent among males than females” (Czeisler et al., 2020, p. 1051). Given that participation in the surveys was voluntary, this trend in respondents being majority-women may indicate that universities need to readjust their approach to better reach male university students and gain better insight into their mental health.

Race and Ethnicity of Student Respondents. In addition to the trends in gender among those surveyed, the studies conducted by Browning et al. (2021), Liu et al. (2020), and Czeisler et al. (2020), all reported a majority of respondents identifying as being non-Hispanic white, with the study by Browning et al. (2021) reporting that 79% of participants were white. Studies by Kibbey et al. (2021) and Kecojevic et al. (2020) were the only two studies in which a majority of respondents reported to be non-white, with the percentage of non-white participants being 51.2% and 63% for each study respectively. Studies conducted by Huckins et al. (2020), Tasso et al. (2021), and Wang et al. (2020) did not record the racial demographics of their student respondents.

Interestingly, the severity of psychological impacts of COVID-19 as they relate to racial and ethnic groups is one area where the results of the current research differed the most in their findings. For example, the study by Browning et al. (2021) found that non-Hispanic Asians were less likely to be in the low psychological impact profile while observing no significant differences in impact profiles for non-Hispanic Black students or Hispanic Students. Conversely, research conducted by Liu et al. (2020) found that “Asian Americans compared to Whites were less likely to report high levels of depression”, and that “Asians Americans and Hispanic/Latinos were less likely to report high levels of anxiety during the first two months of the pandemic” (Liu et al., 2020, p. 4). In contrast to the two previously mentioned studies, research by Kibbey et al. (2021) reported that their “results did not, however, indicate that racial and ethnic groups are predictors of distress, despite known disparities in stressors such as medical and economic impacts of the pandemic” (Kibbey et al., 2021, p. 8). To explain their findings, Kibbey et al. (2021) posits that “perhaps homogeneity in shared acute stressors (e.g., campus shutdowns,

uncertainty regarding academic future, etc.) and other factors, such as age and proximity to outbreak hotspot blunted the differential effects of minority-relevant stressors on mental health in the current study” (Kibbey et al., 2021, p. 8).

The differences in results among currently available studies demonstrates the need to further study and better understand the psychological impacts facing students on university campuses across the United States. Given that the Center for the Study of Hate & Extremism (CSUSB) recently released a report that found Anti-Asian hate crimes increased by 149% in 2020 alone, it is worth investigating the ways in which this recent wave of bigotry has impacted Asian American students in the wake of COVID-19. Any future research may want to consider the increase in Anti-Asian bigotry and hate crimes to be a historical threat to the validity of longitudinal studies involving the psychological impacts of the pandemic on Asian American populations. Additionally, recent data being produced by the Centers for Disease Control (CDC) demonstrates COVID-19 is shown to have a significantly higher mortality rate among Black and Hispanic populations when compared the mortality rates among White populations (CDC, 2021).

The differences in COVID-19 mortality rates observed between populations of color and White populations during the pandemic may be potentially explained by racial disparities present among those classified as essential workers. A study conducted by Rogers et al. (2020) concluded that “COVID-19 mortality was higher among non-Hispanic (NH) Blacks compared with NH Whites, due to more NH Blacks holding essential-worker positions” (Rogers et al., 2020, p. 9). Moreover, the study by Rogers et al. (2020) also found that Black people disproportionately occupied the top nine essential occupations, with the highest racial disparities being found in transportation and material

moving, food preparation and serving, and healthcare support (Rogers et al., 2020, p.4). These findings suggest that Black people disproportionately did not have the option of commuting to their workplace virtually, instead being required to physically enter work environments in which they come into close contact with other coworkers and customers each day, thus increasing the risk that they will be exposed to COVID-19. Additionally, the observed disparities in COVID-19 mortality rates could be further explained by well-documented health outcome disparities, unequal access to healthcare, and a greater distrust in the medical system among people of color that are historic and predate the pandemic.

While college students are at a lower risk of serious health complications related to the contraction of COVID-19 by virtue of being younger on average than the general population, future research ought to probe further into the potential psychological stressors brought about by the societal ramifications of the pandemic that unique to specific persons and communities of color.

V. DISCUSSION

Findings reviewed from the selected studies all demonstrate the detrimental psychological impacts associated with the pandemic, as well as its subsequent effects on academia and the mental health of university students. All selected studies found significant increases in levels of anxiety and depression among students during the pandemic. Research conducted by Liu et al. (2020) found that 45.4% of student respondents indicated high levels of anxiety and 43.3% of respondents indicated high levels of depression. These findings agree with results of studies conducted by Kibbey et

al. (2021) Wang et al. (2020). Research by Kibbey et al. (2021) revealed that 37.6% of participants had elevated levels of general anxiety, and 39.8% of students had elevated levels of depression. Similarly, Wang et al. (2020) found that 48.14% students in their survey reported moderate-to-severe levels of depression and 38.48% reported moderate-to-severe levels of anxiety. More tellingly, 71.26% students in the study also indicated that their levels of anxiety had increased during the pandemic (Wang et al., 2020, p. 6). The study conducted by Wang et al. (2020, p. 6) found that the biggest contributor to overall increases in stress among students revolved around academics and the transition to online classes, with 76.03% of student participants reporting difficulties adapting to online course delivery and 66.57% of respondents citing an increase in class workload. Correspondingly, the study by Tasso et al. (2021, p. 11) found that “the highest frustration felt by our students was the stress they felt due to change in teaching methods”, followed by frustrations with a significant increase in course workload. Similar findings regarding the transition to remote course delivery were also found in the study by Kecojevic et al. (2020), which used a linear regression model analysis to indicate that difficulties focusing on academics were the second-most significant predictor of depression among respondents.

Additionally, research conducted by Wang et al. (2020, p. 8) found that 18.04% of students, nearly a fifth of respondents, reported having suicidal thoughts in the 2 weeks preceding the administered survey. These alarming findings were also reflected in the Morbidity and Mortality Weekly Report from the CDC, which found that of the respondents aged 18-24 years old, 25.5% reported having had considered suicide within

the past 30 days (Czeisler et al., 2020). Both of these findings are incredibly concerning and demonstrate the need for further research into the mental health of young adults.

The longitudinal study by Huckins et al. (2020) that made use of a mobile sensing application and incorporated the use of Patient Health Questionnaire provides distinct methodological advantages when compared to other studies within the literature. One of the main findings of this study was the correlational relationship between the consumption of pandemic-related news and levels of anxiety and depression present among student participants. However, as is the case with all other relevant studies, the causality of the observed relationship cannot be determined with certainty. The existence of the relationship between news consumption and anxiety may present a causality dilemma or may suggest the existence of a feedback loop. It is worth investigating in future research whether news coverage of COVID-19 leads more students to feel anxious, or if students who are more anxious about the pandemic seek out more information relating to it. Regardless, it is also worth investigating if the relationship between news consumption and anxiety felt by students is cyclical in nature.

Main takeaways from the findings of this review illustrate the pressing need for further research into how the pandemic and its subsequent effects on daily life for students is impacting their mental health. Unfortunately, due to the methodology used in the selected studies, causality cannot be inferred despite the incredibly strong relationships and correlations between changes in course delivery due to the pandemic and the observed increases in anxiety and depression. Furthermore, the participants in the samples used in the selected studies largely identify as women who are White. This trend

in demographics among respondents also indicates the need to further study the psychological impacts on students of color during the pandemic.

Limitations of the Literature Review

Due to the relatively novel nature of the pandemic and the realities of the scientific publication process, there was not a substantial number of studies within the scope of this review that were readily available, published, and peer reviewed. While the lack of available studies is understandable, it nonetheless serves as a notable limitation to the findings of this review. Be that as it may, I fully anticipate that there will be more studies within the scope of this review available for analysis in the future and it is entirely possible that several studies have been published since I first began writing this literature review in February of 2021.

Demographics of Participants

Another previously noted limitation to the generalizability of the findings of this literature review has to do with the demographics of participants in the relevant studies. Respondents in studies conducted by Kibbey et al. (2021), Tasso et al. (2021), and Liu et al. (2020) all reported rates of female respondents at 72.7%, 75.4%, and 81.3% respectively. Additionally, studies conducted by Browning et al. (2021), Liu et al. (2020), and Czeisler et al. (2020), all reported a majority of respondents identifying as being non-Hispanic white, with the study by Browning et al. (2021) reporting that 79% of participants were white. Only two studies (Kibbey et al., 2021; Kecojevic et al., 2020) did not record a majority of respondents being White. These disparities serve as limitations to the generalizability of these findings across all subgroups of students while

demonstrating how more research on how the pandemic psychologically impacts students of color is needed given the major historical and political events that have occurred since the initial outbreak of COVID-19.

Methodology Used in Literature

While the choice by researchers to administer surveys virtually is understandable given that this method is in the best health and safety interests for researchers and students alike, this methodology still poses potential threats to the findings of the literature. As previously noted, the possibility of an underlying selection bias was listed as a limitation in studies by Browning et al. (2021), Wang et al. (2020), and Kibbey et al. (2021). Furthermore, several of the relevant studies primarily relied on convenience samples from their own universities to gather data about the mental health of undergraduate students (Liu et al., 2020; Kibbey et al., 2021; Wang et al, 2020). The possibility of self-selection and nonresponse biases being present in the findings of currently published literature could potentially suggest that the psychological impacts of COVID-19 are overstated if it is the case that only students who were experiencing particularly high levels of psychological distress responded to the optional surveys used by the researchers in the current literature.

The use of the StudentLife mobile sensing application was an integral design element of the study conducted by Huckins et al. (2020). While the application's incorporation allowed researchers to gain valuable insights into behavioral changes in students during the pandemic, it did not come without its limitations. When discussing the limitations of their study, Huckins et al. (2020, p. 10) noted that "when mobility is

decreased, such as during a stay-at-home order, individuals may not have their mobile phones with them at all times, which could lead to overestimation of sedentary time”. Conversely, Huckins et al. (2020, p. 10) also notes that “participants may be preferentially accessing larger screens (eg, tablets or laptops); therefore, phone usage (as measured by screen unlock duration or number of unlocks) may underestimated the total amount of screen time”. When discussing directions for future research, Huckins et al (2020, p. 11) suggest that future studies could stand to benefit from the incorporation of smartwatch tracking applications in order to better assess the mobility and exercise habits of students.

An additional limitation worth noting is that the of sampling periods of the studies on university students available at the time of selection for this review, all studies, except for the longitudinal study conducted by Huckins, et al. (2020), occurred during the early stages of the pandemic. Of the studies occurring during the early phases of the pandemic, the earliest sampling period began in mid-March of 2020 (Browning et al., 2021) and the latest periods ended in May 2020 (Kibbey, et al. 2021; Liu, et al. 2020; Wang, et al. 2020). Therefore, it is beyond the scope of this literature review to provide any significant conclusions regarding the pandemic’s psychological impacts affecting students beyond May of 2020. Furthermore, the geopolitical turbulence experienced in the United States since the initial outbreak of COVID-19 should not be understated. There have been several stress-inducing historical events that have co-occurred within the span of the pandemic, which may serve as major historical threats or potential confounds to the findings of both current and future studies surveying students within this period.

Threats to Validity in Current and Future Studies

Given the rapidly changing nature of the pandemic and the historical events that have occurred within the pandemic's duration, future studies ought to provide a significant focus on the timeframe in which the study is being conducted. For example, while the emergence of coronavirus and the subsequent transitions to online learning were abrupt and challenging for students and faculty alike, it is reasonable to expect significant differences in the psychological effects and attitudes among students attending U.S. universities during the fall 2020 and spring 2021 semesters, given that they each had their own unique sets of challenges associated with them.

Fall 2020 Semester. Since the end of the spring 2020 semester, students may have rebounded and adequately adapted their academic routines to cope with changes to course delivery; may have had to discontinue their enrollment due to personal and financial hardships brought on by the pandemic; or may have successfully graduated from their institutions. It is also important to acknowledge that many freshman students attending universities in the fall 2020 semester likely were denied important events and milestones during their senior year of high school, such as prom or in-person graduation ceremonies, due to the restrictions on gatherings implemented during the initial outbreak of COVID-19. Because of this, college freshmen may be especially vulnerable to pandemic-related fatigue and loneliness as a result of spending their first semester in college under significant restrictions on socialization and in-person activities.

Furthermore, students surveyed during the fall 2020 semester stand to differ significantly from this literature review's findings, given that the latter half of the year saw significant surges in both the number of daily new coronavirus cases and the number of people dying as a result of COVID-19 that surpassed numbers not seen since the initial

outbreak (Times, 2021). Additionally, it is worth noting that the 2020 presidential election took place within the fall 2020 semester. The 2020 election saw a record number of votes cast by Americans aged 18-29 years old (Beadle, 2020), along with a significant increase in political tensions and polarization which could cause higher levels of stress among students. In addition to the increased polarization of the political climate, the United States saw a 149% increase in hate crimes committed against Asian Americans and Pacific Islanders as a result of misinformation and bigoted political rhetoric targeting China in the wake of the initial outbreak of the coronavirus (CSUSB, 2021).

Spring 2021 Semester. Students sampled in studies during the spring 2021 semester could significantly differ from student populations attending universities in either the spring 2020 or fall 2021 semesters. These differences may be due to previously noted factors like adequate adaptation, dropping out, or graduation, but may also stand to differ from previous semesters in that the spring 2021 semester saw the approval and distribution of several vaccines in the U.S. as well as decreasing numbers of daily new cases and deaths resulting from COVID-19. With universities across the country distributing vaccinations to students and their peers compounding with public health trends moving in a desirable direction, students surveyed during the spring of 2021 could potentially be more optimistic than those surveyed in previous semesters during the pandemic. Given the role that many universities have played in vaccine distribution to their local communities, students who physically attend their campuses may feel particularly optimistic about the future of the pandemic when they can see members of their own community waiting in line to receive vaccinations on their campuses every day.

The spring 2021 semester would also see the state of Texas impacted by severe winter weather in February, which caused the failure of the state's power grid, leaving millions without electricity, heat, and potable water for several days or upwards of a week in some areas. The lingering impacts of the snowstorm along with subsequent damages to plumbing and property were likely significant sources of stress for many college students within the state and should not be understated when analyzing data collected during this period. Additionally, the spring of 2021 would see states like Texas, Mississippi, Alabama, and West Virginia begin to rollback or eliminate pandemic restrictions such as mask mandates and indoor capacity limits (Fitzsimons, 2021). Although, it should be noted that very few universities in the aforementioned states have made any significant policy changes in-line with their state's decreased restrictions. Be that as it may, geographic differences may prove to be a significant factor among students sampled in future studies during this semester due to natural disasters and the announcement of various states and localities removing restrictions or keeping them in place as the semester progresses.

Pandemic Outlook for Future Semesters. Finally, it is crucial to mention that while leadership in the United States and Europe remain optimistic that they can control or eliminate the spread of the coronavirus within their own borders, this same optimism is not shared by the global scientific community, primarily those in developing nations and the Global South. The lack of universal optimism in the global health community primarily stems from deals struck by wealthier nations like the United States, Japan, the United Kingdom, and those in the European Union that secured 3.7 billion doses of COVID-19 vaccines that are expected to limit the number of vaccines distributed globally

(Shah, 2020). Additionally, resolutions by South Africa, India, and over 80 other developing countries to waive the World Trade Organization's (WTO) policies regarding intellectual property and patents on the COVID-19 vaccine to allow for the production of a generic vaccine to be distributed globally have been repeatedly thwarted by Western countries like the United Kingdom, Switzerland, the United States, and those in the European Union (Reuters Staff, 2021).

The implications of the World Trade Organization's policy on vaccine patents mean that while the pandemic may end soon for Western nations like the United States, the realities of the coronavirus will likely continue to affect those in developing nations. The lack of a substantial number of vaccines distributed to many of these developing nations means that the virus will likely continue to spread at a higher rate. Furthermore, the continued spread of the virus increases the likelihood of mutations similar to those observed in the B.1.1.7 and B.1.351 variants of SARS-CoV-2 that could make the disease more contagious, have a higher mortality rate, and potentially resistant to vaccines that are being currently developed and distributed in the West (Bollinger & Ray, 2021). The potential outbreak of a future vaccine-resistant variation of SARS-CoV-2 threatens to reverse all progress made toward ending the pandemic and could send nations like the United States into another phase of lockdowns, which would have negative ramifications on universities and their students by extension.

While the findings of this literature review provide insight into the psychological impacts of the pandemic's initial phases on university students, future research within the scope of this review may want to proceed with caution when generalizing the results of their studies beyond the semester in which they surveyed students due to the constantly

evolving nature of the pandemic. Moreover, external political factors unique to each semester during the pandemic may serve as confounding variables and cannot be understated when providing explanations for the mental health of students. Lastly, while future projections of the pandemic paint an optimistic vision of the fall 2021 semester, it is crucial to understand that these trends could possibly reverse course if certain public health restrictions are lifted too early or if mutations result from the unmitigated spread of the virus.

Recommendations for Future Research

While the currently available research demonstrates the detrimental psychological impacts associated with the pandemic on the mental health of university students, the current literature does not provide adequate explanations for the underlying causes of the observed trends. Therefore, I have identified two areas of future study which could greatly benefit psychologists and universities in their efforts to better understand and aid students in need of psychological assistance. The first area of study, Bailenson's (2021) theoretical arguments for Zoom Fatigue yields great interdisciplinary applicability to educational institutions and any other fields in which Zoom calling is a regular part of daily functions. The second area of study seeks to apply concepts from Rotter's (1966) theories of personality psychology to explain mental health trends present in many of today's young adults. More specifically, this section will explore how historical factors occurring during the formative years of Generation Z's upbringing may have led to a great number of today's adolescents and young adults developing an external locus of control. While the application of Bailenson's (2021) theoretical framework is far more practical, the potential findings of future research into Rotter's (1966) locus of control

theory stands to yield significant insights into the attitudes and mindsets present in many of today's undergraduate students.

Videoconferencing and “Zoom Fatigue”

The vast majority of student participants in research conducted by Tasso et al. (2021, p. 11) and Wang et al. (2020, p. 6) both cited frustrations and difficulties with transitions to remote learning. Additionally, Huckins et al. (2020, p. 11) recommended that future research “would be well suited to investigating differences in mental health and behaviors between typical residential academic terms and terms that have been shifted from residential to online coursework due to COVID-19” in the discussion of their findings. However, I observed that none of the articles that reported students having difficulties transitioning to online course delivery ever elaborated on what specific aspects of virtual learning were contributing to student frustrations.

Since universities made the transition of online course delivery in the spring of 2020, the use of videoconferencing applications has become crucial to higher education's daily operations. The use of videoconferencing applications like Microsoft Teams, Google Meet, and Skype have become part of daily routines for millions of people with Zoom being the most popular among them, boasting 300 million active users in October of 2020 (Hughes, 2020). Despite the near-ubiquitous use of Zoom for everything from lectures and faculty meetings to even graduation ceremonies, little research has been published investigating the ways in which frequent use of applications like Zoom may affect the mental health of its users.

Doctor of cognitive psychology, Jeremy Bailenson (2021) published an article using theoretical arguments based upon studies from fields of communication and psychology to explore ways in which certain aspects of Zoom's interface may cause users to experience nonverbal overload, resulting in exhaustion. Bailenson (2021) coins the term "Zoom Fatigue" to describe this particularly novel phenomena. In his article, Bailenson proposes four possible explanations for Zoom Fatigue: excessive amounts of close-up eye gaze, cognitive load, increased self-evaluation from staring at video of oneself, and constraints on physical mobility (Bailenson, 2021).

Eye Gaze at a Close Distance. Bailenson's (2021, p.2) first theory of explanation, eye gaze at a close distance, stems from observations made regarding the size of participant heads displayed on the monitor during Zoom calls. Bailenson (2021, p.2) measured that when Zoom is configured in "speaker view", the length from the speaker's chin to the top of their head on the screen was about 13 centimeters. When recreating this same dynamic in a face-to-face setting, Bailenson (2021, p. 2) needed to stand approximately 50 centimeters away from the other person to achieve the same head length observed over Zoom. The article notes that foundational work in personal space and communication classifies "intimate space" as a radius of approximately 60 centimeters (Bailenson, 2021, p. 2). These calculations lead Bailenson (2021) to theorize that the intimate environment created by one-on-one meetings violates social norms for communication by having users interact in an environment in which they are maintaining an interpersonal distance with colleagues and coworkers that is typically reserved for family and loved ones (Bailenson, 2021, p.2).

Furthermore, Bailenson likens group meetings of several participants to standing in a crowded elevator, a context in which social norms dictate the avoidance of direct eye contact with fellow passengers. However, as Bailenson notes, the location of the computer's camera and screen forces users to face directly toward fellow participants and maintain direct eye contact with the presenter, something not typically done during in-person presentations (Bailenson, 2021, p. 2). To further illustrate his point, Bailenson asks readers to imagine a situation "similar to being in a crowded subway car while being forced to stare at the person you are standing very close to, instead of looking down or at your phone" (Bailenson, 2021, pp. 2-3).

These factors lead Bailenson (2021) to propose that one potential explanation for the exhaustion felt after Zoom calls is due to how the application's interface violates social norms by forcing users to interact within intimate space combined with users having to maintain substantial eye contact with one another inside that intimate space. Bailenson's argument on eye gaze at a close distance is especially relevant to educational institutions wherein larger class sizes may result in students having to share virtually intimate space with classmates and faculty they are not familiar with, leading to feelings of fatigue among students.

Cognitive Load. The second theoretical explanation for Zoom Fatigue proposed by Bailenson (2021) examines the ways in which Zoom calls complicate nonverbal cues and behavior by requiring users to work harder to both send and receive nonverbal signals. According to Bailenson (2021), one source of increased cognitive load for users relates to users having to send off extra nonverbal cues that are intentionally generated. Examples of additional nonverbal cues performed during Zoom calls include nodding in

an exaggerated fashion for longer to signal agreement and centering oneself in the camera's field of view (Bailenson, 2021, p. 3). Additionally, Bailenson (2021) introduces research conducted by Croes et al. (2019) which found that people speak 15% louder when interacting on video calls compared to face-to-face interactions, demonstrating that even user vocalization over Zoom requires additional effort (Bailenson, 2021, p.3).

The other source of cognitive load, according to Bailenson (2021), comes from the additional effort required by users to receive nonverbal cues. In order to illustrate this dynamic, Bailenson (2021) refers to prior research conducted by Bailenson et al. (2005) in which they tested and developed a virtual-reality communication system. In the study by Bailenson et al. (2005), an “augmented gaze” condition was tested wherein observers perceived 8 consecutive minutes of direct, unwavering eye contact from the speaker as opposed to the speaker's typical use of head movements to scan the room, look down at notes, and make eye contact (Bailenson, et al., 2005). Participants in the 2005 study rated the augmented gaze condition as having the lowest levels of social presence, adding that they did not feel “in tune” with the speaker and did not feel as if the interaction went smoothly (Bailenson et al., 2005). Bailenson (2021) states that the augmented gaze condition is similar to Zoom in that “gaze is perceptually realistic, but not socially realistic” which leads to collective disconnect between participants and thus greater cognitive load by users (Bailenson, 2021, p. 3).

The combination of these elements leads Bailenson (2021) to argue that the increase in cognitive load undertaken by Zoom users when making additional efforts to both send and receive nonverbal cues adds up over time and can accumulate in feelings of Zoom Fatigue for many users. The argument proposed by Bailenson (2021) has

relevance to a university environment in that Zoom is often the preferred means of communication to facilitate synchronous class discussions among faculty and students. Further research into how universities can better tailor virtual discussions among students could lead to greater engagement with course material.

Increased Self-Evaluation. The third theory of Zoom Fatigue put forward by Bailenson (2021) centers around the inclusion of the “self-view” feature on Zoom’s interface. To introduce his argument Bailenson asks readers to imagine themselves in a physical workplace wherein “for the entirety of an 8-hour workday, an assistant followed you around with a handheld mirror, and for every single task you did and every conversation you had, they made sure you could see your own face in that mirror” (Bailenson, 2021, p. 4). While acknowledging that the idea sounds ridiculous, Bailenson (2021, p. 4) argues that a similar phenomenon occurs in essence on Zoom calls when we stare at ourselves throughout hours of daily meetings. Bailenson (2021) supports his argument with a study conducted by Ingram et al. (1988) which found that seeing a video of oneself had a larger impact on women than men across three experiments. The second experiment in particular from Ingram et al. (1988) found that women were more likely than men to direct attention internally in response to seeing themselves on a live video feed. Ingram et al. (1988) argue that the tendency for women to self-focus might prime women to experience feelings of depression. Bailenson (2021) additionally notes that most of the studies on self-observation are short, exposing subjects to a mirror image for less than an hour, and that there is no data currently available on the effects of viewing oneself for several hours a day.

The effects of viewing oneself for many hours a day ought to be of particular interest to universities and public schools conducting class over Zoom. The argument by Ingram et al. (1988) that women may experience feelings of depression when presented with a mirror image of themselves due to self-focus is likely, in part, the result of societal pressures on women to fixate upon and critique their own physical appearance. While societal beauty standards were undoubtedly present in 1988, the effects of these social pressures are likely even more relevant in 2021, with the societal impacts of social media applications and their proliferation of influencer culture contributing to body image issues among young women especially (Fardouly et al., 2015). Given that a majority of college students in the United States identify as women (NCES, 2016), universities ought to further investigate the impacts of increased self-observation on the mental health of students caused by applications like Zoom. Furthermore, the findings of this research would have broader applicability to adolescents and young adults attending class virtually in primary and secondary schools as research has demonstrated that these populations also struggle with body image (Reel et al., 2015).

Constraints on Physical Mobility. The fourth and final theoretical argument for Zoom Fatigue introduced by Bailenson (2021) pertains to the cone of visibility, called a frustrum, provided by the built-in webcams on laptops and desktop computers. Additionally, because Zoom calls are typically done using a computer, most people tend to stay close enough to reach their keyboard, leading Bailenson (2021, p. 4) to estimate that the average user's face is between a half-meter and a meter away from the camera. Bailenson argues that, during face-to-face meetings, participants typically “pace, stand up, and stretch, doodle on a notepad, get up to use a chalkboard, even walk over to the

water cooler to refill their glass” (Bailenson, 2021, p. 4). This example is provided to illustrate Bailenson’s (2021) point that in-person meetings typically allow a greater range of motion and use of gestures to its participants. However, as Bailenson (2021) argues, social and professional norms largely dictate that videoconference participants stay centered within the camera’s frustum, sit still, and face forward. Like the three previously mentioned theories, Bailenson (2021) argues that the difficulties related to being confined to a very physically small cone of vision on Zoom calls eventually accumulate over time, leading to feelings of Zoom fatigue among users.

Future studies on the psychological impacts of spending hours confined to the camera’s field of view ought to be of interest and application to both K-12 education and universities. Findings of future research would be highly applicable in educational settings and would likely help universities better serve students who have learning disabilities or are neurodivergent. More specifically, findings of future research in this area would greatly benefit students with ADHD typically experience difficulty remaining still for long periods of time and difficulties maintaining focus.

While Bailenson’s (2021) article primarily focuses on particular elements of Zoom’s interface, further research into the theories of Bailenson’s arguments yield broader applicability to future improvements made to other videoconferencing applications and technologies as well. Universities ought to conduct further research on the psychological impacts of Zoom on students during the pandemic. The results of these studies would not only yield the benefit of improved course delivery to students attending class remotely, but also yields broader applicability to the fields of international

organization, global finance, and other fields wherein videoconference calls are a frequently used means of communication.

Locus of Control

In 1954, Dr. Julian B. Rotter published theories of personality psychology that would lay the foundations of what would later be developed through a decade of research into his eminent theory: locus of control (1966). As outlined in Rotter's (1966) publication, a person's locus of control is based upon the degree to which the individual believes that they have agency and control over the outcomes of events within their own lives. To determine the orientation of an individual's locus of control, Rotter (1966) developed a scale using questionnaires that would place the respondent on a continuum ranging from strongly internal to strongly external. Rotter (1966) found that most people generally land on one side of the spectrum, but most well-adjusted individuals would end up somewhere between the two polar opposites, avoiding extremes on either end (Rotter, 1966, p. 4).

Individuals with an internal locus of control feel as if events and outcomes within their life are primarily contingent upon their own actions. Conversely, individuals who possess an external locus of control feel as if they do not ultimately control the outcomes of events within their own lives and are instead at the mercy of external factors, such as their social environment or a powerful other. Rotter (1966) argues that individuals develop either of these orientations through reinforcements that strengthen an individual's expectancies which create generalizations from a specific situation to a series of events that are perceived as related or similar (Rotter, 1966, p. 2). If the pattern of

reinforcement is consistent enough over time, a relationship forms “between how the individual views the world from the point of view of internal versus external control of reinforcement and his other modes of perception of causal relationships” (Rotter, 1966, p. 4). According to Rotter’s (1966) theory, an individual’s worldview is largely based upon the orientation of their locus of control, both of which are developed early in life.

More recent research on locus of control, such as a longitudinal study conducted by Hovenkamp-Hermelink et al. (2019), found that participants who possessed a more external locus of control predicted higher levels of anxiety and depression in participants. The same study also found that greater depression severity and more negative life events predicted the development of an externally oriented locus of control among participants (Hovenkamp-Hermelink et al., 2019). Similar findings are reflected in a study conducted by Khumalo and Plattner (2019) at the University of Botswana that found students who possessed an external locus of control (i.e., believing that chance or powerful others controlled their lives) were more likely to have high depression scores. Findings from both of these studies suggest a relationship between possessing an external locus of control and having higher levels of anxiety and depression.

The relationship between having an external locus of control and worse mental health outcomes observed by the previous studies could potentially be applied to explain the findings of mental health trends found in the studies selected for this review, all of which reported elevated levels of anxiety and depression among student respondents. Furthermore, findings from Hovenkamp-Hermelink et al. (2019) that demonstrated negative life events serving as a predictor for the development of an external locus of control could potentially explain the findings of a previously mentioned longitudinal

study by Goodwin et al. (2020), which found that anxiety rates among participants aged 18–25 years old nearly doubled from 7.97% in 2008 to 14.66% at the end of the study in 2018. The study by Goodwin et al. (2020) also noted that the increase in anxiety observed among those aged 18-25 years old was the most substantial among all age groups when stratifying by age.

Additionally, a longitudinal study conducted by Lessof et al. (2016) on a cohort of English children found that members of the 2014 cohort averaged lower scores on scales measuring internal locus of control than members of the 2005 cohort (Lessof et al., 2016, p. 75). Authors of the study observed that the trend toward external loci of control for children “would seem to be a rational reaction to the very challenging time in which young people have been growing up” (Lessof et al., 2016, p. 76). Notably, the 2008 global financial crisis occurred between the surveying of the 2005 cohort and the 2014 cohort. Lessof et al. (2016, p. 76) acknowledge the financial crisis’ impacts by noting that “at the time of the survey there had been a long period of low employment and instability for young people of post-school age”. Based on this observation, Lessof et al. (2016, p. 76) suggest that “it might not be surprising if young people felt that they needed to work harder to succeed, yet at the same time were uncertain about whether this would be enough to ensure their future success”.

Given the alarming mental health trends in anxiety and depression observed in young people before and during the pandemic, studies demonstrating a relationship between possessing an external locus of control and worse mental health outcomes, and data indicating that internal loci of control are declining among children in England, it may be worth investigating if trends similar to those observed by Lessof et al. (2016) may

also be occurring among young Americans today in the wake of the pandemic. Furthermore, it is important to consider historical factors and events predating the pandemic that may have additionally contributed to young people in the United States developing an external locus of control.

Specifically, many young people born after 1997, widely referred to as “Generation Z” (Dimock, 2019), have grown up in a post-9/11 America in which the threat of terrorism and terrorist attacks were portrayed as ever-present. While the threat of terrorism was often characterized as being foreign in origin, members of Generation Z likely possess acute awareness as to just how domestic most terrorism is, with lockdowns and active-shooter drills being commonplace at schools in response to the increasing prominence of mass shootings since 2000. Events like these may have led many young Americans to internalize the belief that simply being in any public place at the wrong time could ultimately cost them their lives.

Additionally, the existential threat posed by global climate change and resulting climate disasters is likely well-understood by a vast majority of young people today, yet those same young people might feel frustrated or disheartened upon seeing world leaders largely ignore or outright deny the existence of climate change despite the overwhelming scientific data. The impacts of ecological grief due to climate change have been the subject of a recent study by Cunsolo and Ellis (2018) and may further point to young people feeling as if they lack control over their own futures and the future of the planet they will inherit.

More immediately, the current global pandemic has occurred during the formative years of many young people, wherein people have become increasingly reliant upon one another to help protect themselves and their communities by following health guidelines to reduce viral transmission. Additionally, the economic outlook for many young people today is increasingly uncertain in the wake of the global economic depression caused by the pandemic. Lessof et al. (2016, p.76) argued that young people seeing their older peers struggle financially after graduation may lead to feelings that they need to work harder to succeed, while simultaneously increasing their uncertainty about whether their own efforts will sufficiently ensure their future success. Future studies should investigate whether decreases in internally oriented loci of control, similar to those observed by Lessof et al. (2016), will be present in young people after the pandemic.

Finally, the impacts of communication technology and social media should not be ignored when conducting future research into locus of control among young people. For example, Western astrology and horoscopes have seen a cultural resurgence on social media over the past several years primarily resulting from its growing popularity with young people (Beck, 2018). According to Google Trends, search terms for both “birth chart” and “astrology” hit five-year highs toward the end of 2020, signaling increased interest among many online. In a recent article, author Hillary George-Parkin (2021) writes that the changing beliefs of Millennials and Generation Z primarily laid the groundwork for the recent wave in interest surrounding astrology. The recent cultural reemergence of astrology could indicate that more young people may be viewing patterns of reinforcement as outside of their own control and instead dependent upon chance, fate, or powerful others.

To my knowledge, this literature review is the first to examine the relationship between generational events leading to the development of an external locus of control among young Americans, primarily those that are a part of Generation Z. Furthermore, this review is the first to suggest future research into loci of control among young people as a means of investigating the documented increases in anxiety and depression among university students observed in literature.

V. CONCLUSION

The objective of this review was to synthesize the findings of the currently available studies, identify trends and gaps in the current research's findings, and provide recommendations for future research in the field. Analysis of all 6 studies found significant increases in anxiety and depression among students attending U.S. universities during the initial phases of the COVID-19 pandemic. Furthermore, several studies indicated that the subsequent transition to online course delivery was found to be a major source of psychological distress for university students. Results also indicated that students may be struggling with suicidal thoughts during the early phases of the pandemic. While this literature review helps to address important unknowns regarding the psychological impacts of the pandemic, the surveying methodology and timeframes of the studies selected for the review limit the scope of its conclusions primarily to the early months of the pandemic. Furthermore, findings of current and future research within the scope of this review are vulnerable to confounding variables and threats to validity due to historical events that have occurred within the timespan of the pandemic.

Based on the findings in the literature, it is apparent that further research is needed on a larger scale to fully understand the causality underlying the observed psychological impacts of the pandemic on students. This review has identified two areas of future study which could greatly benefit psychologists and universities in their efforts to better understand and aid students in need of psychological assistance. The first area of recommendation is Bailenson's (2021) theoretical arguments for Zoom Fatigue, future research using the Bailenson's (2021) theoretical framework may provide further insights as to why so many students reported the transition to online course delivery as a primary cause of psychological distress. The second area of study seeks to apply concepts from Rotter's (1966) theories of personality psychology to explain mental health trends present in many of today's young adults. More specifically, future research is recommended to investigate the relationship between major historical events of the last 20 years and the development of external loci of control among young people. Correspondingly, future research ought to focus how geopolitical events that have occurred over the course of the pandemic may have impacts on students of color. Furthermore, more research investigating the relationship between media consumption and the documented increases in anxiety and depression among students during the pandemic is greatly needed.

The global outbreak of COVID-19 has dramatically transformed the social landscape of college campuses and the nation at large. However, the pandemic has also exposed underlying inequities in our mental healthcare system and access to technological resources, two areas that have been crucial in the transition to life during the pandemic. Universities across the United States need to do far more to address the

mental health of their students by hiring more councilors and removing barriers in order to make mental health services more affordable and accessible to all students.

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