

Exploring differential impacts of COVID-19 related fear and psychological health consequences on college students

The highly infectious, novel Coronavirus disease (COVID-19) has had devastating impacts across the world since it was first reported in Wuhan, China in December of 2019 (CDC 2020). COVID-19 is caused by SARS-CoV-2 and spread through respiratory droplets (e.g., saliva, nasal discharge) (WHO 2021). As of October 2022, there have been 6,561,897 reported global deaths, with 1,063,916 from the United States alone (Dong, Du, and Gardner 2020, 533-534). National lockdowns, drastic levels of mortality, and economic recession have resulted in uncertainty and substantial stress on both individuals and the healthcare system. This stress and uncertainty, in turn, may have profound psychological effects. For example, findings from recent studies point to increased prevalence of psychological distress compared to distress levels prior to the pandemic (e.g., Ahorsu et al. 2020, 6-8; Satici et al. 2020, par. 18). Similarly, the spread of COVID-19 globally increases the risk and severity of mental health problems such as depression and anxiety.

Fear Related to COVID-19

Fear is most often defined as an emotional reaction to immediate threat (Adolphs 2013, 79). This fear response typically manifests as acute stress reactions (e.g., increase in heart rate, hyper-awareness of the surrounding) that will help an individual to focus and deal with the impending threat (Adolphs 2013, 85-87). In this way, fear can be indicative of an adaptive defense response. However, under repeated exposure to prolonged threatening situations, such chronic fear arousal can trigger chronic stress reactions. Unlike acute stress reactions that subside after threat ceases, chronic stress reactions are constantly activated, even in the absence of continued threat exposure. Furthermore, chronic fearful arousal in response to ongoing threats can have long-term consequences on health given that the human stress response system was not designed to be constantly activated (Gonzeles, Polariz, and Martinez 2014, 538). Correspondingly, chronic stress reactions have been associated with various mental and physical health problems (Gonzalez et al. 2014, 536). Currently, the COVID-19 pandemic is an ongoing stressor in our lives, and thus may cause feelings of uncertainty and fear for the future. The constant fear and stress may durably alter physiology (Steimer 2002, 232) and affect both physical and mental health. Increased fear and stress due to COVID-19 may result in the onset of new psychological symptoms or exacerbate previously existing ones (e.g., Gao et al. 2020, par. 13; Wang et al. 2020, 1729). Findings from recent studies suggest that COVID-19 related fear is associated with suicide, anxiety, depression and related disorders, as well as post-traumatic stress (Brooks et al. 2020, 915-917; Ornell et al. 2020, 233-234; Tso and Park 2020, 113423).

People may experience COVID-related fear through multiple domains. First, fear regarding contracting COVID-19, transmitting the virus to loved ones and friends, or worrying about their health (Satici et al. 2020, par. 18) may result in increased rumination, which has further consequences for both physical and mental health (Capobianco, Morris, and Wells

2018, 292-295). In addition to experiencing fear related to physical health concerns, the COVID-19 virus has also increased fear and distrust of others and dramatically changed the structure of daily life including social interactions, financial security, work, school, and family dynamics. Moreover, COVID-related fear may trigger overall nervousness, worry, and/or symptoms of anxiety (e.g., heart palpitations, clammy hands). Symptoms of nervousness, worry, and anxiety can be typical reactions when an individual experiences high levels of fear reacting to the COVID-19 pandemic (Ahorsu et al. 2020, 1). Taken together, these changes have the potential for increasing fear and stress related to uncertainty. Less is known about how fear of COVID-19 affects individuals among different groups (e.g., race, sex). Better understanding of group differences in the level of COVID-related fear in the United States will help inform the development of targeted prevention and intervention programs to mitigate harm and improve health equity.

Disproportionate Effects of COVID-19 for Racial and Ethnic Minorities

Throughout the pandemic, individuals from racial and ethnic minority groups and communities, specifically Black or African American, Hispanic/Latino, Asian American, American Indian, and Native Hawaiians, have been disproportionately affected by COVID-19 in the United States (e.g., CDC 2021; Millett et al. 2020, 37; Rubin-Miller et al. 2020). Compared to White individuals, Black, Hispanic, and Asian individuals have had disturbingly higher infection, hospitalization, and mortality rates (Rubin-Miller et al. 2020). A substantial percentage of Asian American deaths in 2020 was attributable to COVID-19 and compared to non-Hispanic Whites, Asian Americans experience a higher attributable mortality burden (Yan et al. 2021). Another recent study found a strong relation between Black race, Hispanic ethnicity, and population-level COVID-19 mortality (Gross et al. 2020, 3098-3099). Additionally, Black and Hispanic communities are well-documented to experience inequities related to lack of health insurance, healthcare access, experiencing lower socio-economic status, and experiencing discrimination and thus increased stress (e.g., Gould and Wilson, 2020; U.S. Bureau of Labor Statistics 2019), all of which have been exacerbated by the pandemic. Correspondingly, previous findings have elucidated that Black and other marginalized communities experience an increased presence of pre-existing health disparities such as obesity, asthma, hypertension and Type 2 diabetes- each of which conditions put these individuals at a greater risk for contracting and dying from COVID-19 (Gould and Wilson 2020; Millett et al. 2020, 40).

Furthermore, increased stigmatization, stereotyping, discrimination, and physical violence against Asian immigrants in the United States has been documented (Chen, Trinh, and Yang 2020, 556-557). Asian healthcare workers have reported experiencing racial slurs and assaults and care from patients has been refused due to their race (Natividad 2020). Following President Donald Trump's press conference and subsequent Tweets in which he referenced the Coronavirus as the 'China Virus' (Rogers, Jakes, and Swanson 2020), as well as other governmental leaders and senior officials use of monikers and hateful rhetoric such as the "Wuhan virus," (Mangan 2020), and the "foreign virus" (Choi 2020), violent hate crimes against Asian Americans have increased across the United States (Chen, Trinh, and Yang 2020, 556-557;

Natividad 2020). Some news articles suggested that Chinese and other Asian descent individuals should be avoided during the COVID-19 pandemic (Zhao 2020). One national study of 1,141 US residents found that 40% of individuals reported that they would engage in at least one discriminatory behavior toward people of Asian descent (Dhanani and Berkeley 2020). Unfortunately, prejudice on Asian Americans in the face of a public health crisis is not new. During the 2003 outbreak of Severe Acute Respiratory Syndrome (SARS), Asian Americans were the target of prejudice, disease-related stigma, and discrimination (Eichelberger 2007; Person et al 2004).

Additional inequities increase the risk of exposure to COVID-19 for racially diverse individuals and make it more challenging to remain safe. Previous statistics suggest that individuals from racial and ethnic minority groups are disproportionately represented in businesses categorized as “essential,” such as health industries, food, retail, service, and therefore cannot work from home (Fitzhugh et al. 2020; U.S. Bureau of Labor Statistics 2019). Essential workers experience increased risk due to being in close contact with others at work and are more likely to rely on crowded public and mass transportation (McCormack et al. 2020, 388-390), which may in turn increase their likelihood of exposure to COVID-19. Additionally, Hispanic and Black frontline workers are often overrepresented in lower standing occupations as well as lower standing occupations of high-risk (Goldman et al. 2021). Another recent study analyzing COVID-19 effects on Black Americans elucidated that Black Americans make up 15% of the essential workforce and are overrepresented in all essential businesses (Fitzhugh et al. 2020). Residential segregation may also shape living conditions in ways that put Black, Hispanic, and Asian Americans at greater risk of exposure to COVID-19. Compared to predominantly White neighborhoods, Black and Hispanic neighborhoods are often densely populated, experience higher crime rates, and are characterized by economic disadvantage (Sewell 2016). Additionally, Asian Americans have the highest rates of living with multi-generational family members compared to other racial and ethnic groups due to Asian Americans’ high family values (Chin et al. 2021). This may increase the risk of household transmission. Therefore, racial differences in COVID related fear may exist as different racial groups are being disproportionately affected by COVID-19.

Effects of COVID-19 for College Students

Most of the emphasis on disparate impacts have focused predominantly among lower SES communities. However, such racial disparities also exist at higher SES strata such as evidenced on college and university campuses. Furthermore, these disparities may be especially pronounced when considering the impact of COVID-19 on mental health. In a recent report examining psychological distress during COVID-19, young adults ages 18-21 were identified as being especially vulnerable and reported the highest levels of stress and depressive symptoms (American Psychological Association 2020). College students have been impacted academically, physically, financially, and psychologically. At the beginning of the pandemic, academic institutions were forced to adapt to various combinations of online and hybrid delivery options to curb the transmission of the COVID-19 virus (Gewin 2020, 295-296). College students were

required to leave campus and promptly adapt to new living situations as well as remote online learning. This abrupt transition may confer academic stress for and compound anxiety and distress among college students. For example, University at Albany (UAlbany) undergraduate students have shared experiences of increased feelings of stress and mental health burdens related to online learning and productivity (Brink 2021). In addition to academic stress, college students may worry about their physical health due to the risk of contracting COVID-19 while being on campus or transitioning to off-campus living situations. Some UAlbany students reported being scared that any sniffle, cough, or throat tingle became a source of intense worry due to the paranoia that those symptoms would indicate infection with COVID-19 (Brink 2021). Additionally, difficulties in obtaining personal safety (e.g., face masks) and medical supplies such as hand sanitizer and thermometers may have also contributed to increased stress levels.

Moreover, college students may experience heightened financial stress. Prior to the COVID-19 pandemic, many full-time college students engaged in part-time employment. The number of students who rely on part- or full-time employment while attending college is often more prominent at institutions that serve more ethnic minority and non-traditional students due to historical inequities (e.g., decreased generational wealth), such as UAlbany. In 2019 year, a majority of the 13,286 undergraduate students at UAlbany self-identified as racial/ethnic minorities (57%), with 19% identifying as Black or African American, 18% as Hispanic, 8% as Asian, 4% as bi- or multi-racial, (College Navigator, 2021). Additionally, prior to the pandemic, approximately 59% of low-income full-time students at UAlbany reported working more than 15 hours per week (Carnevale and Smith 2018, 11). Due to COVID-19, students may have lost income due to the sudden, long-term closures of retail and service industries. A student loan management survey revealed that 4 out of 5 college students were facing financial difficulties during the pandemic ([Student Loan Hero]; Safier 2020). Moreover, most college students were ineligible for the COVID-19 relief fund under the Coronavirus Aid, Relief, and Economic Security (CARES) Act – which provides stimulus checks for eligible U.S. citizens and permanent residents – because they claimed financial dependency on their parents (Kantrowitz 2020; U.S. Department of the Treasury). Additionally, college students who lost their income source and/or experienced housing insecurities as a result of the pandemic have been found to be most at risk for food insecurity (Owen et al. 2020, 2515). Particularly, Black and Hispanic college students reported higher food and housing insecurity than White students (Safier 2020). As a result, the COVID-19 pandemic has provided the latest lens through which prolonged social inequities are visible.

These disparities secondary to COVID-19 are notably in-addition to pre-pandemic levels of stress and distress among college students. Prior to the pandemic, high baseline levels of stress and psychological distress were observed among college students (Chen et al. 2019, 442-449) – levels which were even more pronounced among ethnic minority college students,

despite having lower rates of psychiatric diagnoses and mental health service utilization (e.g., Chen et al. 2019, 442-449). Specific stressors, such as discrimination and imposter syndrome (briefly defined as the inability to internalize and accept success/achievements; Weir 24) have been documented contributors to elevated rates of mental health problems among ethnic minority college students (Hwang and Goto 2008, 333; Wei et al. 2010, 419; Villwock et al. 2016, 366). Moreover, cultural and systemic factors, such as differences in beliefs of mental health, stigma around mental health and getting mental health services, implicit discrimination by mental health providers, and the lack of cross-culturally competent mental health professionals, may give rise to the low-level utilization of mental health service among ethnic minority students (Cheng, Kwan, and Sevig 2013, 108; Hunt et al. 2015, 523; Kim and Omizo 2003, 358).

Since the outbreak of COVID-19, most college students self-reported increased stress and anxiety levels after school closures, and a portion of students displayed moderate-to-severe levels of depression, anxiety, and suicidal thoughts (e.g., Kecojevic, Basch, Sullivan, and Davi 2020, par. 23). Some UAlbany students have commented on how feelings of panic and anxiety were at an all-time high while there was minimal information to provide comfort or reassurance (Brink 2021). Increased feelings of depression and anxiety are not surprising given that previous longitudinal studies have indicated that the perceived uncontrollability of negative events predict depressive symptoms (e.g., Sanjuán, 2009, 714-718). A survey conducted by University of California Berkeley and the University of Minnesota found that out of 30,725 undergraduate students, 35% of undergraduates screened positive for major depressive disorder while 39% screened positive for generalized anxiety disorder during the pandemic (Chirikov et al., 2020). Given the additional stressors that have been documented to impact already marginalized groups, it is likely that students from marginalized or minority communities have also been particularly vulnerable to experience psychological distress and mental health problems yet also have decreased access to mental healthcare during the pandemic. Furthermore, and in line with increases in anti-Asian and anti-ethnic sentiment in the wake of the COVID-19 pandemic, Asian and Hispanic students reported experiencing more COVID-19 related threats and negative beliefs than White students (Trammell, Joseph, and Harriger 2020, 1). Hence, understanding the psychological impact of the COVID-19 pandemic on different ethnic minority subgroups is important to support individuals most impacted by the COVID-19 pandemic.

Coping Strategies Implored by College Students

Although college students are experiencing heightened levels of depression and anxiety amid the COVID-19 pandemic, less is known about what coping strategies may mitigate this risk. Coping can be broadly defined as an effort used to minimize distress associated with negative life experiences. Current stress and coping literature suggest that individuals may utilize a

variety of coping behaviors, both adaptive and maladaptive. Adaptive coping often includes behaviors that directly address the source of the stressor and may attempt to better the situation or seek additional information or support (Giancola, Grawitch, and Borchert, 2009). Maladaptive coping, on the other hand, often includes strategies such as avoiding the stressor, such as by ignoring it or trying to think about other things (Segrin, Woszidlo, Givertz, and Montgomery 2013). Preliminary research has demonstrated that while use of maladaptive coping strategies (e.g., denial, self-blaming, substance use) is associated with greater depression and anxiety among college students, adaptive coping strategies (e.g., acceptance, planning, positive reframing) were not (Mahmoud et al. 2012). Replicating such findings to illuminate whether different coping strategies could mitigate the adverse effects of the COVID-19 pandemic may have important intervention implications. Further, and as mentioned previously, stress can be both acute (time-limited) or chronic (occur over a longer period) and perceived as controllable or uncontrollable (e.g., unpredictable, uncertain, unavoidable). Controllable stress is related to less distress (Frazier, Patricia, and Jacqueline Caston 2015) compared to uncontrollable stress. Chronic stress also negatively influences mental health of students (Rosiek, Anna, Aleksandra Rosiek-Kryszewska, Łukasz Leksowski, and Krzysztof Leksowski, 2016) and is more strongly related to depression than acute stress (McGonagle, Katherine A., and Ronald C. Kessler, 1990). Due to the prolonged and unprecedented nature of the COVID-19 pandemic, fear related to COVID-19 can be conceptualized as a chronic and uncontrollable stressor.

Research examining coping during COVID-19 are mostly complementary with extant research about the role of various coping strategies to adjustment. Consistent with previous findings, researchers have found a negative coping style was associated with higher levels of psychological distress compared to a positive coping style in Chinese adults (Wang et al 2020). Similarly, in a multi-site study comprising Canadian and American adults, coping strategies often conceptualized as maladaptive, (denial, substance use, venting, behavioral disengagement, distraction, and self-blame) were associated with increased depression and anxiety both at baseline and over time (Shamblaw et al 2021). Further, more adaptive coping strategies (active coping, positive reframing, planning, acceptance, emotional support, and use of informational support) were associated with lower depression at baseline but not over time and was not associated with anxiety. Stated differently, maladaptive coping is associated with a greater number of adjustment problems and over a greater time period indicating that it may be more influential than adaptive coping. Thus, it may be the case that in the presence of a continually ongoing threat, such as the COVID-19 pandemic, reducing maladaptive coping behaviors may be more impactful for reducing depression and anxiety than promoting adaptive coping behaviors. However, this hypothesis would benefit from further empirical testing.

Present Study

The present study aimed to examine the impact of fear related to the novel COVID-19 pandemic on anxiety and depressive symptoms among undergraduate students. The current study has three primary study aims:

1. Examine whether undergraduate student reports of COVID-19 related fear differ across racial/ethnic groups
2. Examine whether COVID-19 related fear is associated with more symptoms of anxiety and depression, and whether associations vary as a function of race
3. Examine whether coping strategies may further moderate the relationship between COVID-19 related fear and symptoms of anxiety and depression

We hypothesized that there would be racial differences in COVID-related fear due to social inequities and certain racial and ethnic groups being disproportionately affected by COVID-19. More specifically, we hypothesized that White students would have less COVID-related fear compared to Black, Asian, and Hispanic students. Secondly, we hypothesized that more COVID-related fear would also undermine students' mental health and well-being and therefore be associated with increased anxiety and depressive symptoms. Additionally, we hypothesized that associations would be especially pronounced among racial/ethnic minority (i.e., Asian, Black, and Hispanic) students given documented racial/ethnic disparities in the impact of COVID-19 on these subgroups. Thirdly, we hypothesized that coping strategies would moderate the strength of the relation between fear of COVID-19 and anxiety and depressive symptoms. Specifically, we hypothesized that higher fear of COVID-19 would only predict anxiety and depressive symptoms among students who used more maladaptive coping strategies (i.e., denial, substance use, self-blame), but not among students who used adaptive (planning, emotional support, instrumental support, positive reframing).

Method

Participants

The present study drew data from 249 undergraduate students (57% female) at the University at Albany, State University of New York. Participants were recruited through the university's undergraduate psychology research pool. Participants received partial credit that could be used to fulfill research participation requirements in psychology courses. Data were collected between April 2020- November 2020. Eligibility criteria for the study included (1) being 18 years of age or older, and (2) were enrolled as a full- or part-time student at the university during the Spring or Fall 2020 semester. Demographic information is presented in Table 1. Undergraduate students were on average 19 years old ($SD = 2.38$, range= 18-37 years), identified as heterosexual (86%), and were single or not in romantic relationships (76%). Just under half of students identified as White (49%), 21% of students identified as Black, 16% of students identified as Asian, and 10% identified as Hispanic. Fewer than 2% of students identified as biracial/ multiracial or Middle Eastern/ North African, and thus were excluded from analyses due to small group sizes. Prior to the start of the pandemic, half of the students reported not working, although 36% of students reported working between 10 and 29 hours per week. The study was approved by the Institutional Review Board at the University at Albany. Participants completed self-report questionnaires using Qualtrics software.

Measures

Fear of COVID-19

The Fear of COVID-19 scale (FCV-19S; Ahorsu et al. 2020) was used to assess fear regarding COVID-19. The instrument consists of seven items (see Figure 2 for items), responded to on a 5-point Likert scale (1= *Strongly Disagree*, 2= *Disagree*, 3= *Neither Agree nor Disagree*, 4= *Agree*, 5= *Strongly Disagree*). A total score (ranging from 7 to 35) was computed by summing each item's score. Higher scores indicate a greater fear of COVID-19. The FCV-19S has been validated for use in US college samples (Perez et al., 2020) and displayed high internal reliability for this sample $\alpha = .90$.

Anxiety Symptoms

The State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, MacLeod, French, and Locke 2000) is a 21-item self-report instrument that was developed to measure cognitive and somatic symptoms of state anxiety. Participants are asked to rate each item on a 4-point scale (1= *Not at all*, 2= *A Little*, 3= *Moderately*, 4= *Very Much So*). A total anxiety score was computed by summing scores for the 21-items. Higher scores indicate greater levels of anxiety. The STICSA has previously demonstrated internal consistency $\alpha = .92$ (Grös et al. 2007, 369-381) and shows excellent internal reliability for this sample $\alpha = .95$.

Depressive Symptoms

The Center for Epidemiologic Studies Depression Scale – Revised (CESD-R; Eaton et al. 2004) was used to assess depressive symptoms. The CESD-R is a 20-item questionnaire that measures 9 subscales as defined by the American Psychiatric Association Diagnostic and Statistical Manual-5 (e.g., sadness (dysphoria), suicidal ideation, loss of interest (anhedonia)). Participants rated their feelings and behaviors in the past week on a 5-point Likert scale (0 = *not at all or less than 1 day*; 1= *1 to 2 days*; 2= *3 to 4 days*; 3= *5 to 7 days*; 4 = *nearly every day for 2 weeks*). A total score (ranging from 0-60) was formed by summing responses to each of the 20 items. The CESD-R has displayed good psychometric properties (Van Dam and Earleywine 2011). Alpha scale reliability in this sample was $\alpha = .96$.

Coping

The Brief COPE (Carver 1997) assesses different coping strategies used to manage life stressors. Participants rated their use of each of 28 coping strategies on a 4-point Likert scale (0= *'I haven't been doing this at all'*; 1= *'I've been doing this a little bit'*; 2= *'I've been doing this a medium amount'*; 3= *'I've been doing this a lot'*). The measure yields 14 subscales of different coping behaviors (i.e., self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, self-blame), with each subscale comprising 2 items. Items in each subscale were summed; higher scores indicate more frequent usage of that strategy. Alpha scale reliability was greater than .60 for all coping strategy subscales except self-distraction and active coping, which were removed from further analyses.

A two-factor structure is most often employed with the Brief COPE although factors are inconsistent, ranging from approach/avoidant coping, adaptive/maladaptive, engaged/disengaged, active/disengaged, direct/indirect, adaptive/avoidant, and active/avoidant (Solberg, Gridley, and Peters 2021). Based on prior categorizations, 'Adaptive Coping' includes Planning, Positive Reframing, Acceptance, Humor, Religion, Using Emotional Support, and Using Instrumental Support. 'Maladaptive Coping' includes Denial, Venting, Substance Use, Behavioral Disengagement, and Self-Blame (Meyer 2001). However, due to the great variability regarding how coping items "group" together, coping strategies will be examined separately rather than as 'Adaptive' and 'Maladaptive' composites.

Covariates

Participant sex assigned at birth and annual family income in the last year were included as covariates for all outcome variables due to their association with depression and anxiety (Altemus, Sarvaiya, and Epperson 2014) and COVID-related fear (CDC 2021; Patel et al. 2020).

Data Analytic Plan

All variables of interest were inspected for normality prior to analyses. All analyses were run in SPSS27 (IBM Corp 2020), and moderation analyses were evaluated using Hayes' PROCESS macro version 3.4.1 (Hayes 2012; 2018). An ANCOVA was used to examine differences in key study variables by racial group. Moderation analyses were run to determine whether fear of COVID-19 predicts anxiety and depression, and whether associations varied as a function of race. Race was dummy coded as White/non-White, Black/non-Black, Hispanic/non-Hispanic, and Asian/non-Asian which were used to test their interactions with fear of COVID-19. Moderation analyses were also run to determine whether fear of COVID-19 predicts anxiety and depression, and whether associations varied as a function of coping strategies. Simple slope analyses probed significant interaction effects at one standard deviation above and below the mean of significant moderators (i.e., coping strategies). Levels of significance were evaluated using the Johnson-Neyman procedure (Johnson and Neyman, 1936). To account for possible Type I error due to multiple comparisons, tests using coping strategies were assessed with a Bonferroni adjusted alpha level of .004 per test (traditional alpha significance of .05/12 comparisons) to determine statistical significance for the 12 models evaluating the contributions of fear of covid, coping, and adjustment. Multiple imputation procedures were used to handle missing data by generating five imputed datasets (Rubin, 1897; Cox et al. 2014). These results were then averaged, creating a pooled dataset across imputed values for all subsequent analyses.

Results

Preliminary Analyses

Descriptive statistics and correlations are presented in Tables 1 and 2. Female students were more likely to report higher fear of COVID-19, more anxiety symptoms, and more depressive symptoms. Students among families with a higher annual income, on average, reported less fear of COVID-19, and less anxiety symptoms. Students who reported higher fear

of COVID-19 were more likely to report increased anxiety symptoms and increased depressive symptoms. Finally, students who reported higher anxiety symptoms were more likely to also report higher depressive symptoms. ANCOVA analyses were run to determine whether key study variables (i.e., fear of COVID-19, Anxiety, Depression, Coping Strategies) differ based on race/ethnicity (i.e., White, Black, Hispanic, Asian).

Racial Differences in Fear of COVID-19, Adjustment, and Coping Strategies

Fear of COVID-19. A one-way ANCOVA was conducted to compare the effect of race on fear of COVID-19 in Black, Asian, Hispanic, and White individuals while controlling for sex and income. Results indicated statistically significant differences between racial groups ($F(3,233) = 6.89, p < .001$) (See Figures 1 and 2). Post hoc pairwise comparisons indicated the mean score for White individuals ($M = 14.40, SD = 5.49$) was significantly lower than Black ($M = 19.47, SD = 5.73, MSE = 0.97, p < .001$) and Asian ($M = 18.95, SD = 6.42, MSE = 1.05, p < .001$) individuals. There were no statistically significant differences among any other pair of racial groups.

Anxiety and Depression. One-way ANCOVAs were conducted to compare the effect of race on anxiety and depression in Black, Asian, Hispanic, and White individuals while controlling for sex and income. Results indicated no statistically significant differences between racial groups for anxiety ($F(3,233) = 0.63, p = .60$) or depression ($F(3,233) = 0.55, p = .65$).

Racial Differences in Coping Strategies. One-way ANCOVAs were conducted to compare the effect of race on coping strategies in Black, Asian, Hispanic, and White individuals while controlling for sex and income. Results indicated statistically significant differences between racial groups for Religious Coping ($F(3,233) = 6.08, p < .001$). Post hoc comparisons indicated the mean score for White individuals ($M = 1.13, SD = 1.56$) was significantly lower than Black individuals ($M = 2.57, SD = 1.92, MSE = 0.31, p < .001$). There were no statistically significant differences between other racial groups or for other coping strategies.

Fear of COVID-19 Predicting Anxiety and Depression as a function of Race

Moderation analyses were performed to examine whether the contribution of fear of COVID-19 in predicting anxiety and depression varies by race, controlling for sex and income. The direct effect demonstrated that greater fear of COVID was associated with greater anxiety ($B = 2.93, SE = 1.37, p = .03$), controlling for sex and income, but not depression. Further, associations between fear of COVID-19 and anxiety differed significantly across racial/ethnic groups, $F(3,229) = 2.89, p = .036, \Delta R^2 = 0.03$. Specifically, Hispanic race moderated the effect of fear of COVID-19 on anxiety symptoms, ($B = 6.89, SE = 2.62, p = .009$; see Figure 3). Hispanic students report anxiety at high but not low levels of fear of COVID-19, with a slope significantly different compared to all other students. There was no main effect of Black, Hispanic, or Asian race.

Fear of COVID-19 Predicting Anxiety and Depression as a function of Coping Strategies

Moderation analyses were performed to examine whether the contribution of fear of COVID-19 in predicting anxiety and depression varies by coping strategy, controlling for sex and income. Results indicated that none of the 7 adaptive coping strategies (Planning, Positive Reframing, Acceptance, Humor, Religion, Emotional Support, or Instrumental Support) were associated with anxiety or depression. However, main effects demonstrated that all 5 maladaptive coping strategies were associated with greater anxiety and depression, as seen in Table 4. Among adaptive coping strategies, only Emotional Support significantly moderated the effect of fear of COVID-19 on anxiety symptoms ($B = -2.34$, $SE = 0.81$, $p = .004$). As seen in Figure 4, simple slope analyses indicated that more fear of COVID-19 was associated with more anxiety at low ($B = 8.31$, $SE = 1.34$, $p < .001$) and mean ($B = 5.96$, $SE = 0.95$, $p < .001$) values of Emotional Support but not high values of Emotional Support ($B = 3.61$, $SE = 1.15$, $p = .002$). No other interaction effects were significant.

Discussion

The current study investigated COVID-19 related fear, anxiety symptoms, depressive symptoms, and the use of coping strategies across undergraduate students from diverse racial and ethnic groups. Study findings suggest that COVID-19 related fear may be more prominent among Black and Asian students compared to other students. One possible explanation is that Black and Asian students may be disproportionately affected by COVID-19 compared to White students (e.g., Rubin-Miller et al. 2020), which may in turn lead to greater fear of infection or fear of racial discrimination. Of interest, results did not support differences in fear of COVID-19 for Hispanic students. Efforts to elucidate resiliency factors both within- and across-groups may provide important insights about mechanisms through which to mitigate racial and ethnic disparities in mental health impacts due to COVID-19.

The second aim was to investigate if COVID-19 related fear predicted symptoms of anxiety and depression, and whether associations varied as a function of race. In partial support of hypotheses, more COVID-19 related fear was a unique predictor of more anxiety symptoms among students after controlling for sex and income, but not depressive symptoms. This indicates that students with higher fear of COVID-19 are also experiencing greater anxiety, though depressive symptoms may not be as affected. Although research examining the mental health impacts of COVID-19 is only just beginning to emerge, one other recent study, by Britan et al. (2020), similarly yielded findings that fear of COVID-19 was more strongly associated with anxiety than depression. Distinct psychological features of anxiety and depression may help to explain these associations. Anxiety is often marked by worry about the immediate or long-term future whereas depression is characterized by feelings of being intensely sad, and/or hopeless. Since COVID-19 is characterized by on-going uncertainty and threats of harm, it may be more likely to prompt anxiety. At the time of data collection, there was also not an FDA-approved vaccine to prevent COVID-19, which may have further heightened feelings of anxiety and fear.

Furthermore, in partial support of study hypotheses, relations between fear of COVID-19 and anxiety, but not depression, differed across racial groups. Fear of COVID-19 predicted

anxiety across all racial groups, however, the slope was significantly different between White and Hispanic students. Compared to White students, fear of COVID-19 had a greater effect on anxiety in Hispanic students with greater fear of COVID-19 associated with greater anxiety. Thus, while Hispanic students had the lowest anxiety at low levels of fear of COVID-19, they had the highest anxiety levels at high levels of fear of COVID-19. In comparison, White students' anxiety was less influenced by fear of COVID-19. This indicates that fear of COVID-19 is associated with greater anxiety across all racial groups, however, Hispanic students, in particular, may experience more anxiety as fear of COVID-19 increases. One possible explanation may lie in the differential distribution across geographic region. The beginning of the COVID-19 pandemic was predominately concentrated in the Northeast which could have contributed to additional geographic disparities, particularly during a time in which testing and mitigation efforts were unknown (Strully, Yang, and Liu 2020). Compared to other areas, the U.S. Northwest Hispanic population is predominately Puerto Rican (Brown and Lopez 2013). Geographical areas in the U.S. with the highest number of both COVID-19 infections and deaths have been found to coincide with counties that have the highest proportion of Puerto Ricans (Almenas, Rodríguez, Torres, and Murphy 2020). Further, New York state displayed the strongest relation between Puerto Rican population and rates of both COVID-19 infection and death (Almenas, Rodríguez, Torres, and Murphy 2020). Additionally, although the rate of COVID-19 infection and hospitalization is highest among Black populations, mortality rate is higher in the Hispanic community in New York, which is predominately made up of Puerto Rican and Dominican individuals. Nevertheless, this finding is interesting and warrants further exploration.

The third aim of our study was to examine whether associations between fear of COVID-19 and symptoms of anxiety and depression differ based on coping strategies. Consistent with study hypotheses, several maladaptive coping strategies were associated with anxiety and depression including denial, substance use, self-blame, and behavioral disengagement. However, no adaptive coping strategies were associated with anxiety or depression. This is consistent with extant literature (Mahmoud et al. 2012) and suggests that adaptive coping strategies may have more nuanced associations with adjustment via COVID-19 than maladaptive coping strategies. Further, identifying the relation between maladaptive coping and anxiety and depression highlights important mechanisms for intervention among college students. Interventions aiming to reduce anxiety and depression may focus on reducing maladaptive coping strategies rather than increasing use of adaptive strategies. University personnel who work with students with anxiety and depression (e.g., counselors, nurses) should assess for maladaptive coping strategies and provide psychoeducation regarding their relation to increased mental health symptoms. On the other hand, students with higher fear of COVID-19 but higher use of emotional support reported lower anxiety than students with low emotional support. This indicates that emotional support (i.e., 'I've been getting emotional support from others.' and 'I've been getting comfort and understanding from someone.'), specifically, may be a critical adaptive coping strategy for students to employ to limit anxiety and fear surrounding COVID-19. Taken together, these findings provide insight on

the role of race and ethnicity on fear perceptions of COVID-19. These findings may also help to inform the development of strategies targeted toward vulnerable communities to alleviate emotional burden and provide better support during these challenging times.

Limitations and Future Directions

Limitations of the present study may inform future directions for related research. First, the present study was cross-sectional rather than longitudinal. While the study design was suitable for our current objectives, it did not allow for the determination of causal relationships between the analyzed variables. Therefore, while the study findings indicated that fear of COVID-19 was associated with increased anxiety among undergraduate students, we do not know if previous or current symptoms of anxiety may have contributed to current COVID-19 related fear or current anxiety symptoms. Future studies should consider a longitudinal design to better understand how different factors may affect the evolution of COVID-19 related fear and anxiety symptoms. Secondly, our study sample consisted only of undergraduate students and not graduate students. While we do not expect significant differences across programs, previous research has indicated that undergraduate students have endorsed more COVID-19 related fear compared to graduate students (Reznik et al. 2020). Future studies may also consider analyzing changes in COVID-19-related fear as the development and distribution of COVID-19 vaccines become more available as well as how COVID-19-related fear may change over time (i.e., with less restrictions).

Research Implications and Strategies Addressing Mental Health Disparities

The findings of the present study suggest that COVID-19 has disproportionately affected the psychological well-being of undergraduate college students. Specifically, ethnic minority undergraduate students experience higher levels of psychological distress compared to White students. A multifaceted and targeted strategy is needed to support students and to help improve the mental health inequities that were exacerbated by COVID-19, particularly as the pandemic is on-going.

1. **Targeted Social Support.** Racial or ethnic minorities may need additional support during the pandemic. Our results indicated that Black and Asian students endorsed significantly higher levels of COVID-19-related fear, and that COVID-19-related fear was a robust predictor of anxiety across racial/ethnic groups – especially for Hispanic students. Programs aimed to increase perceived social support among racial and ethnic minorities may be helpful to mitigate the negative effects of the COVID-19 pandemic. Campus mental health clinicians, and faculty can help facilitate support groups to mobilize informal social support by providing ethnic minority students with understanding, acceptance, and opportunities to discuss challenges with other people who are going through similar hardships. Moreover, research has found that the higher level of perceived social support during COVID-19 is associated with lower levels of maladaptive coping strategies (Mai et al. 2021, 2463). Institutions can have training and workshops

to emphasize the importance of social support and strategies to provide better communication and empathic listening.

2. **Expand access to targeted mental health resources.** Given the disparities in mental healthcare (McGuire and Miranda, 2008), increased investment is needed to make mental health resources more available to ethnic minority groups. According to the 2013 National Survey of Counseling Center Directors (Gallagher, 2014), the average ratio of mental health professionals to students is 1 to 1600. To improve access to mental healthcare, institutions need to increase the number of mental health professionals. Strengthening the cultural competency of existing counseling centers may also increase retention for both students and clinicians. Additionally, the institution's hiring plan should include hiring diverse mental health professionals. Moreover, for institutions that already have mental health resources (e.g., mental health services and programs), continuous effort is needed to enhance the reach of services within their institution, specifically expanding outreach for ethnic minority students. Notably, it is also important to consider the cultural appropriateness of the material used in awareness and outreach efforts, such that appropriate multiracial images, role models, and translated languages are used. To enhance outreach, institutions can create mental health advisory committees that are supervised by mental health professionals to lead a system-wide expansion of mental health resources. Institutions can also create mental health and wellbeing advocate positions to provide preventive outreach or consultations for staff who are working with students. These community outreach positions will help to reduce the burden of mental health professionals who are trying to keep up with the growing clinical demand, especially during the COVID-19 pandemic.

Most New York State colleges and universities, including the UAlbany, transitioned to teletherapy and telecounseling services during the pandemic (e.g., Scharff et al. 2020). While this shift may increase access to care and support for students, additional strategies may continue to be helpful. For example, offering additional available appointment times, increasing counseling and mental health staff to reduce waitlists, and networking with mental health clinicians in the community to expand services as necessary. While the pandemic is ongoing, keeping some telehealth appointments available for students who are still hesitant to be on campus for prolonged periods of time may be particularly beneficial.

3. **Engage faculty and teaching assistants (TAs).** Faculty and TAs are often in front-line roles with undergraduate students and therefore possess increased opportunity to be proactive. Even prior to the COVID-19 pandemic, a challenge that Universities have faced is increasing accessibility to resources that are available to support undergraduate students. A proactive focus on publicizing resources through sending frequent, campus-wide communications (e.g., emails, newsletters, virtual class lectures) to both students and faculty, encouraging faculty to include mental health resources on syllabi and also

announcements during class, (i.e., “The University’s Counseling and Psychological Services Center offers free mental health sessions for undergraduate students”). As students begin transitioning back to campus, faculty may benefit from reminders regarding potential impacts on students’ class engagement and mental well-being. Faculty, staff, and students who hold student-facing positions (e.g., resident assistants, graduate assistants, teaching assistants) should be educated on mental health and the symptoms of mental health difficulties to be better equipped to provide support to students and to direct students to mental health resources. Finally, faculty should be reminded and encouraged to exercise compassion and understanding and to plan for accommodations as necessary.

4. **Target early detection and intervention.** Early detection is integral to better health outcomes as it provides increased opportunity to implement early interventions. Institutions should establish early detection and intervention programs by providing periodic screening programs, especially during the ongoing COVID-19 pandemic. The screening programs should be done anonymously to protect the privacy of the individual and to prevent conflict of interest (e.g., employee and employer relations). Mental health resources should be provided for individuals who display high levels of distress. Furthermore, education on self-care should be emphasized to provide knowledge on how to manage mental health problems and cope with stress.
5. **Addressing social determinants of mental health.** Universities and institutions may consider implementing targeted assistance programs to provide support and assistance on social determinants that affect the mental health of ethnic minorities. These assistance programs can provide consultation, counseling, referral, or follow-up services related to COVID-19 challenges, financial planning, financial aid, legal aid, childcare-related problems, and more. Moreover, institutions should also invest in cultural competency training and education programs to reduce discrimination. Exposure to racial discrimination is associated with poorer mental health among ethnic minorities (Cokley et al., 2011). The framework of cultural competency training includes building awareness of the impact of culture on behavior, the social context of ethnic minority groups, personal prejudice, and tendency to stereotype or discriminate, and improving communication and interaction skills when interacting with people from different cultural backgrounds (Seeleman et al., 2009). Cultural-competency training has been shown to be effective among healthcare providers in delivering culturally competent care (Govere et al., 2016) and we advocate such training for any service-related professions (including faculty, supervisors, managers, educators, etc.).
6. **Understand the community better.** A wider and more equitable lens is required to understand disparities in other factors that may contribute to the disproportionate impact of COVID-19 on ethnic minority groups. Besides providing resources, institutions should gather racial and ethnic demographic data to understand the effect of COVID-19

on their students. Institutions may also consider conducting surveys within the ethnic minority community to better understand specific needs and what type of support may be particularly beneficial. These data would inform more relevant and necessary interventions to those immediately affected.

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Table 1
Demographic Characteristics

Variables	M (<i>SD</i>) or %	Range
<i>Participant Characteristics</i>		
Age	19.6 (2.38)	18-37
Race		
Asian	16%	
Black	21%	
White	49%	
Hispanic	10%	
Biracial/Multiracial	2%	
Other ^a	2%	
Sexual Orientation		
Straight/Heterosexual	86%	
Gay/Lesbian	2%	
Bisexual	11%	
Other	1%	
Relationship Status		
Married or cohabitating	5%	
Partnered	19%	
Single	76%	
Employment Status		
30+ hours/week	4%	
20-29 hours/week	17%	
10-19 hours/week	19%	
<10 hours/week	10%	
Not working	50%	
Annual Family Income ^b		
19.9k or less	15%	

20-39.9k	13%	
40-59.9k	10%	
60-79.9k	10%	
80-99.9k	11%	
100k+	41%	
<i>Substantive Variables</i>	Mean (<i>SD</i>); range	<i>N</i>
Fear of COVID-19	16.53(6.3); 0-28	239
Anxiety Symptoms	38.32(14.1); 21-84	239
Depressive Symptoms	21.18(18.9); 0-75	239
Coping Strategies		
Denial	1.23(1.6); 0-6	239
Substance Use	1.27(1.8); 0-6	238
Emotional Support	2.39(1.7); 0-6	237
Instrumental Support	2.19(1.7); 0-6	238
Behavioral Disengagement	1.38(1.5); 0-6	237
Venting	1.88(1.5); 0-6	239
Positive Reframing	2.62(1.6); 0-6	237
Planning	2.59(1.6); 0-6	237
Humor	2.61(1.8); 0-6	237
Acceptance	3.86(1.6); 0-6	238
Religion	1.61(1.8); 0-6	237
Self-Blame	1.57(1.6); 0-6	237

Notes. ^aIncludes participants who identified as Middle Eastern/North African (1.5%) and “Other” (.5%). ^bAll participants except two indicated that they were financial dependents. Those two were excluded from analyses; Annual family income represents participants’ families’ income

Table 2*Zero-order Correlations*

	1	2	3	4	5	6	7	8
<i>Participant characteristics</i>								
1. Male sex	-	.04	-.20**	.05	-.07	.28***	.17**	.24***
2. Age		-	-.06	.08	-.03	.02	-.07	-.09
3. Annual family income			-	.04	.01	-.31***	-.16*	-.10
4. Relationship status				-	.19**	-.09	-.05	.04
5. Employment status					-	.09	.05	-.01
<i>Substantive variables</i>								
6. Fear of COVID-19						-	.42***	.32***
7. Anxiety Symptoms							-	.76***
8. Depressive Symptoms								-

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. Relationship status was coded 1 if endorsed in a relationship or married.

Table 3.
Summary of Simple Slopes of Fear of COVID-19 by Anxiety given Race

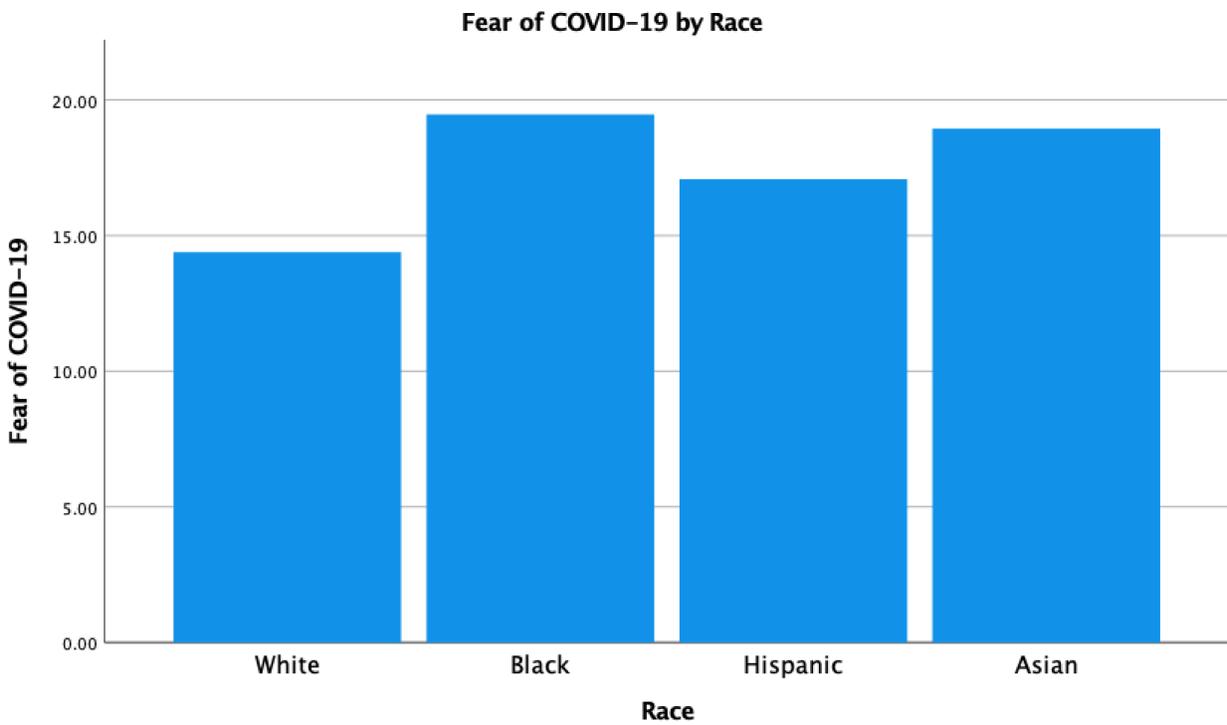
Variable	Anxiety			
	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
White	2.93	1.37	2.14	.03
Black	7.30	1.95	3.74	< .001
Hispanic	9.82	2.89	4.31	< .001
Asian	6.86	2.08	3.30	.001

Table 4.
Summary of Main Effects of Maladaptive Coping on Anxiety and Depression

Variable	Anxiety			Depression		
	<i>B</i>	<i>SE</i>	<i>t</i>	<i>B</i>	<i>SE</i>	<i>t</i>
Denial	2.75	0.94	2.92	4.65	1.32	3.52
Substance Use	3.14	0.87	3.61	6.61	1.16	5.69
Behavioral Disengagement	4.64	0.87	5.36	8.23	1.15	7.13
Venting	3.18	0.93	3.42	4.63	1.28	3.61
Self-blame	5.28	0.89	5.91	9.43	1.17	8.05

Note. All were $p < .001$

Figure 1.
Fear of COVID-19 across different racial groups



Note. The mean of fear of COVID-19 across racial groups

Figure 2.

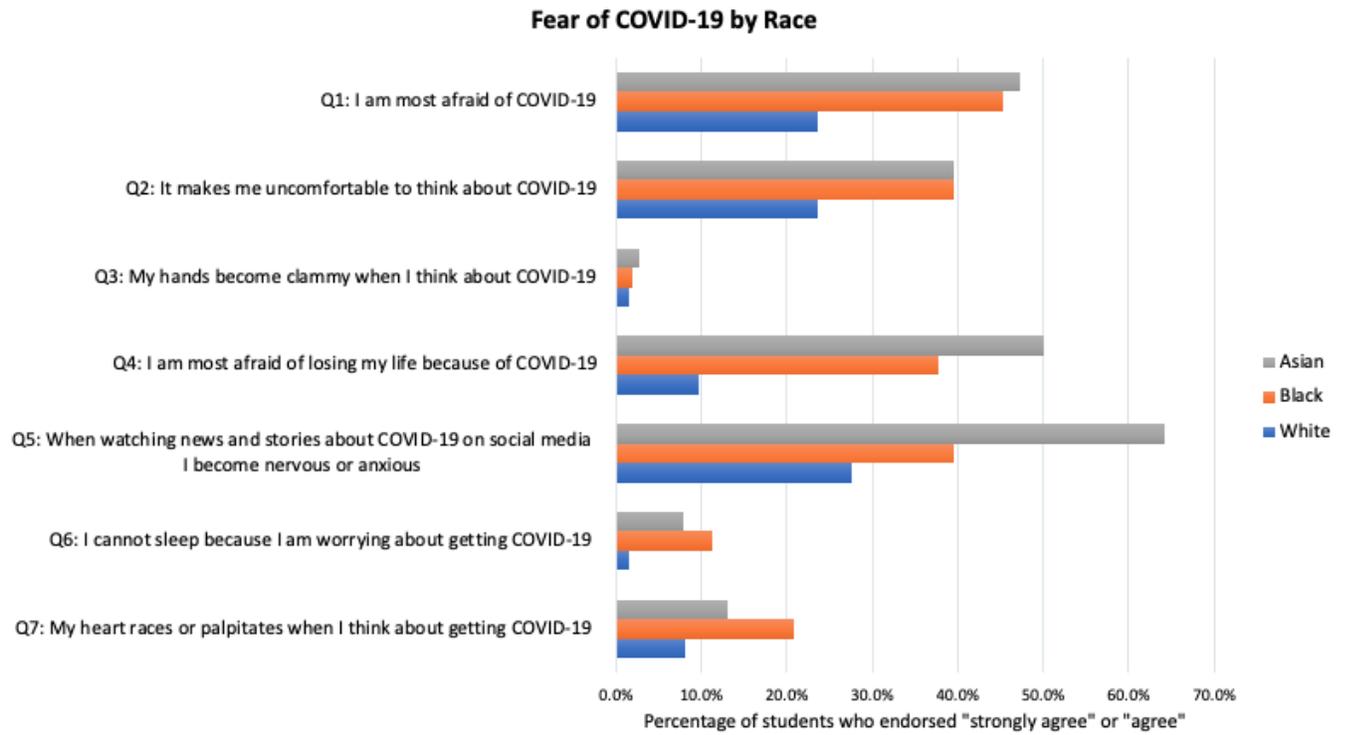


Figure 3.
Fear of COVID-19 and Race Predicting Anxiety

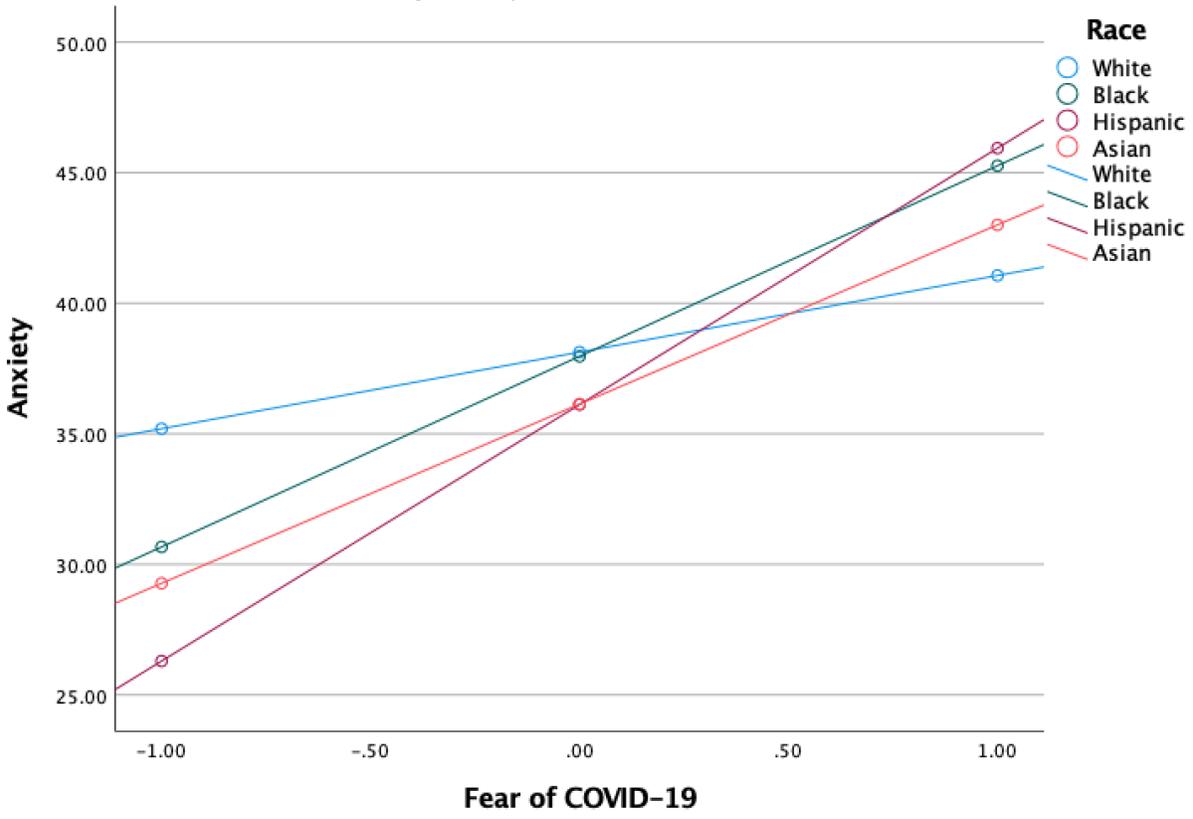


Figure 4.
Interaction Effects of Fear of COVID-19 and Emotional Support on Anxiety

