Intersecting Race and Gender Across Hardships and Mental Health During COVID-19: A Moderated-Mediation Model of Graduate Students at Two Universities

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Abstract

While the effects of the pandemic on the mental health of college students can vary across race and gender, few studies have explored the role of hardships and university assistance in these disparities, as well as how these disparities can manifest themselves differently across intersections of race and gender. We address this gap by using unique survey data ($n=417$) from two large graduate schools of social work, public health, and social policy in the United States. Using multi-group structural equation modeling, we explore how material hardships, academic hardships, and university assistance needed mediates the relationship between race and mental health, including depression and anxiety. We also explore how gender moderates these relationships. We find that Black students are directly related to material hardships and—through these hardships—indirectly related to increased depression, indicating mediation. However, material hardships did not mediate the relationship between race and anxiety. Furthermore, while academic hardships mediated the relationships between race and depression, as well as race and anxiety, these relationships were only significant for females, indicating moderated-mediation. Moreover, although university assistance needed mediated the relationship between race and depression for females only, university assistance needed mediated the relationship between race and anxiety for both males and females. We close with implications for policy and practice.

Keywords Graduate students · Hardships · Mental health · University assistance · COVID-19 · Race/ethnicity · Gender · Intersectionality

Universities not only provide instruction for their students, but also serve as a resource that many students rely on for employment, housing, food, and healthcare needs. Moreover, universities can provide a physical, social, and emotional space for gathering students and building community—both inside and outside of classrooms. As a result, the COVID-19 pandemic—and the sudden transition to online learning and social distancing midway through the 2020 spring semester—created a significant disruption for students (García-Morales et al., 2021). Unsurprisingly, the pandemic has put the mental health and well-being of many university students at risk, particularly those with fewer resources and support structures who may experience increased hardships during the pandemic (Lederer et al., 2021; Nurunnabi et al., 2020; Son et al., 2020).

Much of the early research—across a wide variety of geographies and fields of study—has focused on mental health associations with COVID-19, finding broadly that the pandemic increased anxiety and depression among university students (Aqeel et al., 2021; Cao et al., 2020; Odriozola-González et al., 2020; Qiu et al., 2020). While this early research has identified some important protective factors for university students, such as having income stability and living with one's parents (Cao et al., 2020), research has yet to rigorously explore the types of hardships that are associated with university students' mental health. Also, even though racial/ethnic and gender disparities in hardships, protective factors, and mental health have been reported in university settings (Walsh et al., 2021), research has yet to empirically establish how these disparities relate to differences in mental health outcomes. Furthermore, students' occupation of multiple facets of identity can impact their experiences during

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the pandemic and, ultimately, their mental health (Conrad et al., 2021). Thus, research that considers intersectionality will allow for a more nuanced understanding of mental health during the pandemic, as well as a more comprehensive response from universities seeking to best support all students.

Graduate students may be one subgroup of university students that have unique risks and protective factors that deserve our attention. For instance, graduate students are more likely to be older, work professionally (both currently and previously), have higher amounts of student debt, live off-campus, and have caregiving duties for children and older family members (Polson, 2003; Pyne & Grodsky, 2020). Unsurprisingly, during the pandemic graduate students have indicated significantly more concerns about the risks and implications of in-person campus activities and learning when compared to undergraduate students (Ebell et al., 2020). Furthermore, graduate and professional students have demonstrated soaring rates of depression and anxiety (Chirikov et al., 2020). Overall, as universities search for ways to reduce adverse psychosocial outcomes— and disparities within these outcomes (Grubic et al., 2020)— we provide the first study that explores how hardships and university supports needed can mediate the relationships between race and mental health, while also considering the role of gender.

Background

College students have historically been overlooked as a priority population for health and social initiatives due to misconceptions that they are a homogeneously privileged, well-resourced, and healthy group (Grinstein-Weiss et al., 2016; Liu et al., 2022). However, recent research has demonstrated that this sizeable population has distinct experiences and subsequent health needs (Jack, 2019; Higher Learning Advocates, 2018; Lederer & Oswalt, 2017). These unique experiences and needs have been brought to light during the COVID-19 pandemic in which college students have faced increased material hardships (financial difficulty with the cost of housing, medical, or other bills), academic hardships (switching to remote learning), uncertainty in the labor market (e.g., job prospects), and greater risk for negative educational and health outcomes than the general population (Aucejo et al., 2020; Liu et al., 2022). For example, to the switch from in-person to remote learning has been shown to reduce student motivation, while adding unique demands for technology and space (Walsh et al., 2021).

Another concern is that college students are increasingly experiencing high rates of mental health conditions, especially depression and anxiety (Lederer et al., 2021; Lipson et al., 2019). In a survey of higher education students across nine American universities, depression in graduate students increased from 15% before the pandemic to 32% during the pandemic (Woolston, 2020). Similarly, anxiety in graduate students increased from 26% before the pandemic to 39% during the pandemic (Woolston, 2020). As student demand for mental health services has exceeded the resources available on most campuses (LeViness et al., 2019), some scholars have declared a mental health crisis on college campuses (Schwartz & Kay, 2009). Furthermore, mental health issues have been shown to negatively impact students' academic success (Eisenberg et al., 2009; Lederer et al., 2021). Considering the high level of stress that many college students experienced before the pandemic, it is likely that the COVID-19 pandemic exacerbated stress levels and related mental health issues. Indeed, rigid lockdown restrictions have caused sudden and unexpected changes to students' lives, further affecting their psychosocial well-being (Cao et al., 2020; Wang et al., 2020a, 2020b).

Racial/Ethnic Differences in Hardships and Mental Health during COVID-19

Similar to the COVID-19 disease outbreak itself, impacts from the pandemic are unequally distributed among racial/ethnic, gender, and social class groups. For example, infections and deaths resulting from COVID-19 disproportionately affect Black families and communities (Poteat et al., 2020), while unemployment and eviction rates in the wake of the pandemic have been largest for Hispanics (Grinstein-Weiss et al., 2020; Montenovo et al., 2020). Furthermore, the stress and trauma associated with the pandemic have also led to disparities in mental health symptoms and outcomes (Fortuna et al., 2020)—including suicidal thoughts (Czeisler et al., 2020) for marginalized communities, including Black, Hispanic, Native American, and economically disadvantaged groups.

When considering college students, Unrau et al. (2020) used a survey of undergraduate and graduate social work students to demonstrate that persons of color have experienced large increases in financial and educational hardships during the pandemic. However, when considering racial/ethnic differences in mental health, few significant differences emerge in the literature, especially in cross-sectional studies. For example, using a survey of New York City college students conducted in May 2020, López-Castro et al. (2021) found no racial/ethnic differences in emotional health and well-being, depression, and anxiety. Trammell et al. (2021) also did not find significant mental health differences across race/ethnicity in a cross-sectional study of undergraduate students. When leveraging longitudinal data; however, research has demonstrated increases in depressive symptoms among Black college students (Fruehwirth et al., 2021).

Gender Differences in Hardships and Mental Health during COVID-19

Recent research using survey and administrative data from large university settings demonstrates that women often experience worse economic and health outcomes associated with COVID-19 and therefore are more likely to experience disruptions in their academic outcomes (e.g., changes to their college major). The most drastic differences across gender have been found in mental health outcomes. Using a survey of undergraduate students during the pandemic, Prowse and her colleagues (2021) found that the pandemic had a greater negative effect on female students' academic learning, feelings of social isolation, stress levels, and mental health when compared to male students. Using a repeated cross-sectional survey from university students in Poland, Debowska et al. (2020) found that female students had higher rates of depression, anxiety, and stress. While much of the previous research on gender disparities in mental health during the pandemic have relied on cross-sectional data, and therefore cannot account for pre-existing differences, more recent research provided the stronger evidence of gender differences in mental health (Vloo et al., 2021). Using longitudinal data, Vloo et al. demonstrated that the COVID-19 pandemic caused increased depression for women and increased anxiety for men (2021). Increases in depression for women were also found by Fruehwirth et al. (2021).

Theoretical Framework

Structural racism and sexism in the U.S. can be understood as mutually reinforcing systems of oppression that perpetuate racial and gender discrimination overtly and covertly through policies and practices that systematically exclude persons of color and women from key resources and sources of privilege (Bailey, et al, 2017; Homan, 2019). When considering the racialized and gendered nature of barriers and opportunities in college, we recognize that students can experience the COVID-19 pandemic differently based on their multiple and intersecting identities. Stemming from Black feminist thought, intersectionality theory holds that systems of oppression work to marginalize individuals along multiple dimensions of identity (Collins, 1990; Crenshaw, 1990). As marginalization does not always "fit neatly" into a single dimension of identity, intersectionality provides a framework for understanding how multiple dimensions of identity can lead to unique experiences of marginalization (Cole, 2009).

As intersectionality considers how multiple facets of identity are jointly related to outcomes (Cole, 2009), it is important to analyze phenomena in ways that consider multiple facets of identity simultaneously. Here, multiple facets of identity can lead to "additive" or "multiplicative" marginalization. The application of intersectional frameworks has been loosely grouped into three areas: investigation of intersectional dynamics in research, theoretical and methodological debates, and lenses for political interventions (Cho et al., 2013). Pertaining to research, intersectional approaches to understanding the dynamics of intersecting identities span across multiple fields and disciplines, often offering new paradigms for understanding marginality (Simien, 2007). Previous studies have explored intersectional research questions around race, gender, and mental health in the U.S. For example, Banks and Kohn-Wood (2002) examined how Black women face unique risk factors that can relate to disparate mental health outcomes, while Worthen and her colleagues (2021) demonstrated increased depression rates of Hispanic women. In university settings, intersectional approaches have examined resilience and depression among LGBTQ students (Duran, 2021; Kulick 2017), as well as mental health support-seeking behavior (Lal et al., 2021).

Intersectional research can be applied qualitatively and quantitatively. Quantitative intersectional research often involves group and multi-group comparisons (Cole, 2009). While this can occur through subgroup analyses, moderation (or interaction) models can also increase our understanding of intersecting identities (Hatchel & Marx, 2018; Velez et al., 2018). Moderation models can take the form of interaction terms in regression models or multi-group invariance testing in structural equation models. For example, Parent et al. (2018) explored how the relationships among sexual orientation, age, poverty (IVs) and help-seeking behaviors (DV) differed across racial/ethnic groups (moderator). In our research, intersectionality allows us to explore how Black students' experiences of hardships and supports needed during COVID-19 relate to mental health *and* how these relationships differ across gender.

Current Study and Hypotheses

While some research has found that the effects of the pandemic tend to vary by demographic characteristics, such as socioeconomic status (Aucejo et al., 2020), gender (Zolotov et al., 2020), and age (Qiu et al., 2020), few studies have comprehensively addressed these disparities across U.S. university students, particularly at the graduate level and utilizing an intersectional approach to understand the relationship between demographic characteristics and mental health. We fill this gap in research by exploring the impacts of the COVID-19 pandemic on students at two graduate schools of social work, public health, and social policy located in the Midwest and Northeast regions of the

Fig. 1 Theoretical model of race, hardships, gender, and mental health

Theoretical Model
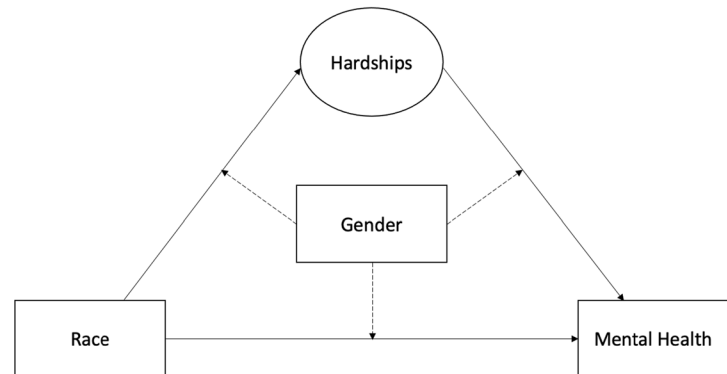
Note. Dotted lines are used to demonstrate the moderating relationship. *Race* is the independent variable, *hardships* is the mediating variable, *gender* is the moderating variable, and *mental health* is the dependent variable.

United States. As seen in our theoretical model (Fig. 1), we hypothesize that (a) the relationship between race and mental health will be significantly mediated by hardships, and (b) the relationships among race, mental health, and hardships will be significantly moderated by gender. In other words, we hypothesize that student hardships will partially explain the relationship between race and mental health during the pandemic (i.e., mediation), yet these relationships will differ across gender (i.e., moderation). In addition to advancing a more comprehensive understanding of students' experiences and needs during the pandemic, our study builds on the previous research that highlights unique experiences, distinct needs, and disparities across diverse student populations in higher education, particularly around mental health.

Methods

Data Source

Data for this study come from an online (Qualtrics) survey conducted at two U.S. universities: (a) the Brown School at Washington University in St. Louis, a private institution which offers graduate programs in social work, public health, and social policy; and (b) the Schools of Social Welfare, Nursing, Health Technology and Management, and the Graduate School at Stony Brook University (SBU), a State University of New York (SUNY) institution located on Long Island. The survey window at Washington University in St. Louis lasted from May 6th, 2020 to May 15th, 2020, while the survey window at Stony Brook University lasted from June 22nd, 2020 to August 23rd, 2020. Both universities received IRB approval. Participants were recruited through school-wide emails; a consent information sheet was provided to students prior to their participation in the survey. Students at Washington University in St. Louis who completed the survey received a $10 Amazon gift card. From our initial sample of 682 students who responded to Race/Ethnicity questions (341 students from Washington University in St. Louis; 341 students from Stony Brook University), 364 students identified as White and 66 participants identified as Black, and thus were retained in the sample. There were 135 students who identified as Asian, 69 students who identified as Hispanic, 8 students who identified as Native American, and 40 students who identified as Other or preferred not to answer the questions, and thus were dropped from the sample. Furthermore, as our gender focus was on those who identify as male ($n=85$) and female ($n=335$), 10 students who identified as non-binary, transgender, other, or who preferred not to answer the question were removed from the sample. Finally, a small proportion of individuals ($<3\%$) had missing observations across other study measures. This resulted in an analytic sample that ranged from 408 to 417.

We used a power analyses tool (semPower) developed by Moshagen and Erdfelder (2016) and informed by MacCallum et al. (1996) to arrive at a post hoc level of power, given our model and sample. Power in SEM models is a function of sample size and degrees of freedom. Results from the power analyses demonstrate that we are adequately powered (power $=0.99$) to detect a small effect size of 0.1 (given alpha level of 0.05).

Measures

Race/Ethnicity

The survey asked participants to indicate if they identified as White/Caucasian, Black/African American, Asian, Native American/Pacific Islander, or some other race. Participants could select multiple options. The survey also asked whether participants considered themselves Hispanic. The question regarding Hispanic origin superseded race, meaning those who considered themselves Hispanic were coded as Hispanic regardless of their racial identity. Based on our research aims, we focus on two racial/ethnic groups in this study—Non-Hispanic White and Non-Hispanic Black (White = 1; Black = 2).

Gender

The survey asked participants whether they identify as male, female, non-binary, or other. Based on our research aims and limited number of non-binary participants, we focus on two gender identity groups in this study—Male and Female (Male = 1; Female = 2).

Mental Health

Anxiety was measured through the General Anxiety Disorder-7 Scale (*GAD-7*). The 7-item GAD-7 examines frequency of anxiety symptoms, such as worrying and feeling nervous, and is scored from 0 (not at all) to 3 (nearly every day) (Spitzer et al., 2006). The GAD-7 scale score is determined by summing all item scores; total scores range from 0 to 21. A score of 10 or greater indicates the threshold for GAD per DSM-V criteria (Spitzer et al., 2006). Depression was measured through the Patient Health Questionnaire (PHQ-9). The 9-item PHQ-9 assesses the severity of depression, such as depressed mood and anhedonia (Kroenke et al, 2001). Each item of the PHQ-9 reflects the DSM criteria and is scored from 0 (not at all) to 3 (nearly every day); total scores with a range from 0 to 27 (Kroenke et al, 2001). A score of 10 or greater indicates the threshold for moderate depression (Kocalevent et al., 2013; Kroenke et al, 2001).

We selected the GAD-7 and PHQ-9 for the survey because (a) these scales have been validated and proven to be reliable measures of mental health across a range or populations, invariant to dimensions of both gender and race/ethnicity (Keum et al., 2018; Sriken et al., 2022); (b) these scales are widely used in mental health research, especially among undergraduate and graduate students during the pandemic (Cao et al., 2020; Wang

et al., 2020a, 2020b); and (c) because these scales are commonly used in short online surveys. Across our sample, anxiety had an Alpha value of 0.91, while depression had an Alpha value of 0.88; each of these reflect high levels of reliability.

Material Hardships

Material hardships consisted of three items with the following question stem: "In the last three months did any of the following occur?" (1) *Housing Hardship*: Did not pay rent or mortgage in the last three months because you could not afford to; (2) *Financial Hardship*: Skipped paying a bill or paid late in the last three months due to not having enough money; and (3) *Medical Hardship*: Did not go to a doctor in the last three months because you could not afford to. Responses were dichotomized to reflect the pandemic's impact on hardships (No/Yes, but not due to COVID-19 = 0; Yes, due to COVID-19 = 1).

Academic Hardships

Academic hardships consisted of two items. Each item started with the following question: "How well do the following statements describe your situation this past semester?" related to students' (1) *Learning Equipment,* "I did not have adequate equipment for online courses and study (personal computer/laptop, WiFi, etc.)" and (2) *Learning Environment,* "It was difficult for me to work from home (small children, large family, small apartment, roommates, etc.)." Each item was scored on a 5-point Likert scale ranging from 1 (not at all) to 5 (exactly).

University Assistance Needed

University assistance needed consisted of five items. Each item started with the following question: "In response to the COVID-19 pandemic, to what extent did you need University assistance in the following areas?" The five items involved included *Academic Services*, *Expanded Career Services*, *Trauma-Informed Counseling Services*, *Student Support Networks*, and *Emergency Financial Assistance*. Each item was scored on a 5-point Likert scale ranging from 1 (not at all) to 5 (very much).

As noted by Lundberg (2017), material hardships measures were first proposed by Mayer and Jencks (1989) and later adapted by the U.S. Census Bureau's Survey of Income and Program Participation (SIPP). Academic Hardships and University Assistance Needed were developed by the research team and specifically tailored toward barriers for distance (remote) learning during the pandemic.

Data Analysis Plan

In order to explore the relationships among race, hardships, mental health, and gender, we employed a structural equation modeling (SEM) approach. SEM allows us to simultaneously test the significance and strength of multiple hypothesized structural relationships with both observed and latent variables (Kline, 2015). Specifically, we employed a four-step process in our analytic approach using Mplus (Version 8).

Step 1 included performing confirmatory factor analysis (CFA) in order to create a valid latent construct of COVID-19 Hardships. *Step 2* included performing a multi-group confirmatory factor analysis (MGCFA) to demonstrate group invariance across our latent construct. We tested three different models of group invariance: (a) a configural model in which the structure of the CFA is the same, but factor loadings and item intercepts (thresholds with ordered categorical data) are free to vary across groups; (b) a metric model in which the factor loadings are constrained to be equal across groups; and (c) a scalar model in which the factor loadings and item intercepts are constrained to be equal across groups (Bryne, 2013). In order to test differences in structural paths across groups, metric invariance must be attained; in order to test differences in latent means across groups, scalar invariance must be attained (Bryne, 2013).

Step 3 involved a single-group SEM to understand the mediating role of COVID-19 hardships on the relationship between race/ethnicity and mental health. Within our SEM models, we used a mean and variance-adjusted weighted least squares (WSLMV) estimator, which involves both diagonal and full weight matrices to compute standard errors and is robust to non-normal distributions within our data. In doing so, we used a probit link function.

Finally, *Step 4* included conducting a multi-group structural equation model (MGSEM) to understand the moderating effects of students' gender. In order to test moderating effects, structural paths are constrained—one at a time—to be equal across groups (Bowen & Guo, 2012). Because models with new parameter constraints are nested within previous, less-restrictive models, chi-squared difference tests can be used to determine whether or not more-restrictive models have statistically significant worse levels of fit (Bowen & Guo, 2012). While chi-square tests can be sensitive to large samples ($N \geq 400$) in determining overall levels of fit in SEM, they are more reliable in testing differences in fit across groups (Bowen & Guo, 2012) and generally used in testing moderation effects in MGSEM. If more-restrictive models do have worse levels of fit, then previous less-restrictive models—where parameters are allowed to vary across groups—are retained (Bowen & Guo, 2012). The parameters that are allowed to vary across groups demonstrate a moderating effect of the group (Bowen & Guo, 2012).

Results

CFA Model Fit

First, we ran three separate CFA models for *Material Hardships*, *Academic Hardships*, and *University Assistance Needed*. In order to identify the latent constructs, the factor loading for *Housing Hardships* was fixed to 1.0 when loaded onto the *Material Hardships* construct; the factor loading for *Learning Equipment* was fixed to 1.0 when loaded onto the *Academic Hardships* construct; and the factor loading for *Academic Services* was fixed to 1.0 when loaded onto the *University Assistance Needed* construct. All factor loadings across all latent constructs were statistically significant and had standardized values at or above the recommended threshold of 0.4 (Stevens, 1992). Across *Material Hardships* (RMSEA = 0.000; CFI = 1.000), *Academic Hardships* (RMSEA = 0.000; CFI = 0.984), and *University Assistance Needed* (RMSEA = 0.049; CFI = 0.998), our CFA models had excellent levels of fit to the data.

Second, we ran three Multi-Group CFA (MGCFA) models. For Material Hardships, the configural (RMSEA = 0.000; CFI = 1.000); metric (RMSEA = 0.002; CFI = 1.000); and scalar (RMSEA = 0.018; CFI = 0.998) models had excellent levels of fit to the data. Here, it is also important to note that the metric (Chi-Square difference value = 2.003; degrees of freedom difference = 2; and *p* value = 0.367) and scalar (Chi-Square difference value = 4.433; degrees of freedom difference = 4; and *p* value = 0.351) models were not significantly different from the configural model, which allows us to use the same factor loadings across groups and by doing so, compare path coefficients and latent variable means. Similarly, for Academic Hardships, the configural (RMSEA = 0.000; CFI = 1.000), metric (RMSEA = 0 = 0.000; CFI = 1.000), and scalar (RMSEA = 0.049; CFI = 0.974) models had excellent levels of fit to the data; furthermore, the metric (Chi-Square difference value = 0.000; degrees of freedom difference = 0; and *p* value = 1.000) and scalar (Chi-Square difference value = 3.574; degrees of freedom difference = 2; and *p* value = 0.167) models were not significantly different from the configural model for Academic Hardships. Finally, for University Assistance Needed, the configural (RMSEA = 0.058; CFI = 0.991), metric (RMSEA = 0.054;

CFI = 0.990), and scalar (RMSEA = 0.047; CFI = 0.991) models had excellent levels of fit to the data; moreover, the metric (Chi-Square difference value = 4.330; degrees of freedom difference = 3; and p value = 0.228) and scalar (Chi-Square difference value = 9.191; degrees of freedom difference = 8; and p value = 0.326) models were not significantly different from the configural model for Assistance needed.

Third, we ran a SEM to test our theoretical models (Figs. 2–4). Across Material Hardships (Depression Model: RMSEA = 0.026; CFI = 1.000 | Anxiety Model: RMSEA = 0.003; CFI = 0.995), Academic Hardships (Depression Model: RMSEA = 0.057; CFI = 0.986 | Anxiety Model: RMSEA = 0.025; CFI = 0.997), and University Assistance Needed (Depression Model: RMSEA = 0.039; CFI = 0.996 | Anxiety Model: RMSEA = 0.048; CFI = 0.994), our initial SEM models had excellent levels of fit to the data.

Fourth, in our MGSEM model involving Academic Hardships and Depression, we found that the relationships between Academic Hardships and Depression, as well as Race/Ethnicity and Depression were not invariant across groups, and thus were also estimated separately across samples. In our MGSEM model involving Academic Hardships and Anxiety, we found that the relationships between Race/Ethnicity and Academic Hardships, Academic Hardships and Anxiety, and Race/Ethnicity and Anxiety were not invariant across groups. Similarly, in our MGSEM model involving University Assistance Needed and Depression, we found that the relationships between Race/Ethnicity and University Assistance Needed, University Assistance

Needed and Depression, and Race/Ethnicity and Depression were not invariant across groups. Finally, in our MGSEM model involving University Assistance Needed and Anxiety, we found that the relationships between University Assistance needed and Anxiety, and Race/Ethnicity and Anxiety were not invariant across groups.

Model Results

When considering our descriptive statistics (Tables 1, 2, 3, 4), we see females have higher levels of depression and anxiety when compared to males. This difference was statistically different ($p < 0.05$) for anxiety, but not depression. Given the relatively slight differences in items, it was not surprising that females did not differ from males in latent constructs means for Material Hardships, Academic Hardships, and University Assistance Needed.

When considering our MGSEM Model, our results demonstrate the unique relationships across race/ethnicity, hardships and supports, and mental health. In Model 1a (Table 5; Fig. 2), identifying as Black is directly associated with increased Material Hardships ($\beta = 0.951$, $p < 0.01$), but not Depression. Material Hardships are not directly associated with Depression either. Nevertheless, through Material Hardships, identifying as Black is indirectly associated with an increase in Depression ($\beta = 0.899$, $p < 0.05$). In Model 1b (Table 6; Fig. 2), identifying as Black is directly associated with increased Material Hardships ($\beta = 0.962$, $p < 0.01$) and decreased Anxiety ($\beta = -2.098$, $p < 0.05$). Similar to Model 1a, Material Hardships are also not directly associated with Anxiety. Unlike Model 1a, there was not an

Table 2 Descriptive statistics for females ($N = 335$)

Variable	Mean	Std. Dev	Min	Max
Material hardships: Rent or mortgage	0.051	0.220	0	1
Material hardships: Paying bills	0.147	0.354	0	1
Material hardships: Doctor bills	0.081	0.273	0	1
Academic hardships: Learning equipment	1.382	0.817	1	5
Academic hardships: Learning environment	2.365	1.317	1	5
University assistance needed: Academic	2.084	1.310	1	5
University assistance needed: Emotional	2.301	1.509	1	5
University assistance needed: Social	2.338	1.369	1	5
University assistance needed: Financial	2.541	1.620	1	5
University assistance needed: Career	2.112	1.449	1	5
Depression	8.269	5.901	0	27
Anxiety	7.804	5.603	0	21

Table 1 Descriptive statistics for males ($N = 85$)

Variable	Mean	Std. Dev	Min	Max
Material hardships: Rent or mortgage	0.082	0.277	0	1
Material hardships: Paying bills	0.129	0.338	0	1
Material hardships: Doctor bills	0.035	0.186	0	1
Academic hardships: Learning equipment	1.435	1.040	1	5
Academic hardships: Learning environment	2.271	1.409	1	5
University assistance needed: Academic	2.035	1.349	1	5
University assistance needed: Emotional	2.035	1.500	1	5
University assistance needed: Social	2.153	1.468	1	5
University assistance needed: Financial	2.447	1.722	1	5
University assistance needed: Career	1.953	1.353	1	5
Depression	7.298	5.254	0	24
Anxiety	6.459	5.609	0	21

Table 3 Spearman rank-order correlations (Males)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Material hardships: Rent or mortgage	1.000											
(2) Material hardships: Paying bills	**0.5214**	1.000										
(3) Material hardships: Doctor bills	0.1741	**0.3056**	1.000									
(4) Academic hardships: Learning equipment	**0.4228**	0.1870	**0.2279**	1.000								
(5) Academic hardships: Learning environment	**0.3761**	0.1731	0.1844	**0.4328**	1.000							
(6) University assistance Needed: academic	**0.4108**	**0.3700**	**0.2647**	**0.4668**	**0.3701**	1.000						
(7) University Assistance Needed: Emotional	**0.3550**	**0.2287**	0.0949	**0.4117**	**0.3253**	**0.6017**	1.000					
(8) University assistance Needed: social	**0.3095**	0.2067	0.1560	**0.3044**	**0.3453**	**0.6483**	**0.7139**	1.000				
(9) University Assistance Needed: Financial	**0.3823**	**0.3441**	0.1366	**0.3585**	**0.2534**	**0.5277**	**0.7551**	**0.6545**	1.000			
(10) University assistance Needed: career	0.1595	**0.2375**	0.1957	0.1181	0.1995	**0.4864**	**0.5436**	**0.6309**	**0.5369**	1.000		
(11) Depression	0.1630	0.1795	0.1499	-0.0642	0.1430	0.1663	0.1099	0.1555	0.1888	0.1753	1.000	
(12) Anxiety	-0.0660	0.1066	0.1978	-0.1247	0.0512	0.0613	0.0090	0.0363	0.0164	0.1746	**0.7642**	1.000

Note. Bold values are statistically significant ($p < .05$)

Table 4 Spearman rank-order correlations (Females)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Material hardships: Rent or mortgage	1.000											
(2) Material hardships: Paying bills	**0.4529**	1.000										
(3) Material hardships: Doctor bills	**0.2427**	**0.2085**	1.000									
(4) Academic hardships: Learning equipment	0.1018	**0.1823**	**0.1727**	1.000								
(5) Academic hardships: Learning environment	**0.1390**	**0.1769**	**0.1233**	**0.2417**	1.000							
(6) University assistance Needed: academic	**0.1582**	**0.1431**	0.0911	**0.2032**	**0.3151**	1.000						
(7) University assistance Needed: emotional	0.1017	0.0351	0.0973	**0.2227**	**0.1662**	**0.5259**	1.000					
(8) University assistance Needed: social	0.1022	**0.1118**	**0.1819**	**0.2220**	**0.2453**	**0.5714**	**0.6021**	1.000				
(9) University Assistance Needed: Financial	**0.2448**	**0.3479**	**0.2282**	**0.2274**	**0.2359**	**0.4381**	**0.4670**	**0.4394**	1.000			
(10) University assistance Needed: career	**0.1437**	**0.1618**	**0.1909**	**0.2188**	**0.2186**	**0.5193**	**0.5192**	**0.5655**	**0.4766**	1.000		
(11) Depression	0.0766	**0.1256**	0.1009	0.1046	**0.1771**	**0.2527**	**0.2019**	**0.2989**	**0.2348**	**0.2732**	1.000	
(12) Anxiety	0.0468	0.0888	0.0538	**0.1542**	**0.1489**	**0.2303**	**0.1998**	**0.3010**	**0.1773**	**0.2748**	**0.7617**	1.000

Note. Bold values are statistically significant ($p < .05$)

Table 5 Model parameters: material hardships and depression (PHQ)

	Male	Female
Factor Loading		
Material Hardships: Rent or Mortgage	1.000(0.000)	
Material Hardships: Paying Bills	1.077***(0.305)	
Material Hardships: Doctor Bills	0.663*(0.262)	
Direct Effect		
White/Black → Material Hardships	0.951**(0.360)	
Material Hardships → Depression	0.945(0.504)	
White/Black → Depression	-1.469(0.814)	
Indirect Effect		
White/Black → Material Hardships → Depression	0.899*(0.404)	
Construct Variance		
Residual		
Depression	25.595***(4.301)	31.521***(3.079)
Material Hardships	0.756**(0.227)	2.777(2.689)
R-Squared		
Depression	0.028	0.074
Latent Material Hardships	0.169	0.035
Material Hardships: Rent or Mortgage	0.789	0.772
Material Hardships: Paying Bills	0.896	0.823
Material Hardships: Doctor Bills	0.375	0.327
Model Fit Index		
N	84	330
Chi-square(df), p-value	15.209(12), p=.2302	
RMSEA	0.036 [90% CI: 0.00-0.084]	
CFI	0.984	

Note. Unstandardized estimates are followed by standard errors in parentheses.

$*p = /< .05; **p < .01; ***p < .001$

indirect relationship between identifying as Black and Anxiety through Material Hardships. None of the relationships in Models 1a or 1b were moderated by gender.

In Model 2a (Table 7; Fig. 3), identifying as Black is directly associated with increased Academic Hardships ($\beta = 0.652$, $p < 0.01$) and—for females—decreased Depression ($\beta = -4.564$, $p < 0.001$). Academic Hardships is directly associated with increased Depression for females ($\beta = 4.271$, $p < 0.01$). Nevertheless, through Academic Hardships, identifying as Black is indirectly associated with an increase in Depression for females ($\beta = 2.784$, $p < 0.01$). In Model 2b (Table 8; Fig. 3), identifying as Black is directly associated with increased Material Hardships, and this relationship is stronger for males ($\beta = 1.088$, $p < 0.01$) when compared to females ($\beta = 0.443$, $p < 0.01$). Similar to Model 2a, identifying as Black is directly associated with Decreased anxiety ($\beta = -4.053$, $p < 0.001$) for females, while Academic Hardships is directly associated with increased anxiety for females ($\beta = 4.693$, $p < 0.01$). Again, through Academic Hardships, identifying as Black is indirectly associated with an increase in Anxiety for females ($\beta = 2.078$, $p < 0.05$)

In Model 3a (Table 9; Fig. 4), identifying as Black is directly associated with increased University Assistance Needed, but this relationship is stronger for males ($\beta = 1.302$, $p < 0.001$) when compared to females ($\beta = 0.305$, $p < 0.05$). Identifying as Black is directly associated with decreased Depression ($\beta = -2.662$, $p < 0.01$) for females, while University Assistance Needed is directly associated with increased Depression for females ($\beta = 2.804$, $p < 0.001$). Through University Assistance Needed, identifying as Black is indirectly associated with an increase in Depression for females ($\beta = 0.856$, $p < 0.05$). In Model 3b (Table 10; Fig. 4), identifying as Black is directly associated with increased University Assistance Needed, and this relationship is also stronger for males ($\beta = 1.296$, $p < 0.001$) when compared to females ($\beta = 0.431$, $p < 0.05$). Unlike Model 3a, there are no differences in gender for direct relationships involving Anxiety; identifying as Black is directly associated with decreased Anxiety ($\beta = -2.582$, $p < 0.01$), while University Assistance Needed is directly associated with increased Anxiety ($\beta = 1.701$, $p < 0.001$). Through University Assistance Needed, identifying as Black is indirectly associated with an increase in Anxiety, and this relationship is stronger for males ($\beta = 2.206$, $p < 0.001$) when compared to females ($\beta = 0.733$, $p < 0.05$).

Table 6 Model parameters: material hardships and anxiety (GAD)

	Male	Female
Factor Loading		
Material Hardships: Rent or Mortgage	1.000(0.000)	
Material Hardships: Paying Bills	1.097***(0.301)	
Material Hardships: Doctor Bills	0.676*(0.276)	
Direct Effect		
White/Black → Material Hardships	0.962**(0.363)	
Material Hardships → Anxiety	0.600(0.369)	
White/Black → Anxiety	-2.098*(0.844)	
Indirect Effect		
White/Black → Material Hardships → Anxiety	0.577(0.317)	
Construct Variance		
Residual		
Anxiety	30.826***(6.000)	29.540***(3.047)
Material Hardships	0.738**(0.230)	3.047(3.048)
R-Squared		
Anxiety	0.021	0.044
Latent Material Hardships	0.175	0.033
Material Hardships: Rent or Mortgage	0.773	0.807
Material Hardships: Paying Bills	0.906	0.797
Material Hardships: Doctor Bills	0.381	0.319
Model Fit Index		
N	85	331
Chi-square(df), p-value	14.793(12), p=.2530	
RMSEA	0.033 [90% CI: 0.00-0.082]	
CFI	0.986	

Note. Unstandardized estimates are followed by standard errors in parentheses.

*p =/< .05; **p < .01; ***p < .001

Discussion

When considering material hardships, we see that Black students are directly related to experiencing hardships and—through these hardships—indirectly related to increased depression. Without a direct relationship to depression, we can infer that it is through experiencing hardships that Black students in this model experience greater rates of depression. However, experiencing hardships did not appear to explain the relationship between Black students and increased anxiety. In fact, Black students demonstrated decreased rates of anxiety, despite increased rates of experiencing hardships—potentially suggesting resiliency in the face of adversity. Similar findings of increased rates for depression during the pandemic among Black college students have been demonstrated in other studies (Fruehwirth et al., 2021; Kim et al., 2022). In addition to material hardships, it is possible that experiencing social isolation during the pandemic increased rates of depression among Black college students (Fruehwirth et al., 2021). Across both depression and anxiety, model relationships did not differ across gender, suggesting that the relationships among race, material hardships, and mental health are more universal than experiencing other types of hardships.

While the relationship between race and academic hardships was similar across gender in the depression model, it was stronger for males in the anxiety model. Moreover, the relationships between race and mental health, as well as the relationships between academic hardships and mental health, were significantly moderated by gender. In each case, these relationships were only significant for females. Even in the anxiety model, where Black males were more likely to experience increased academic hardships, there was no significant relationship between academic hardships and anxiety for males. For females, the relationship between race and mental health was significantly mediated by academic hardships. Despite a direct relationship indicating decreased rates of depression and anxiety for Black females, Black females were indirectly related—through academic hardships—to increased rates of depression and anxiety. Here, Black females may face other obstacles in school, such as the need to take care of family members, as well as other forms of marginalization, that may activate the relationships between academic hardships and mental health. Some of the core tenants of intersectionality theory (Crenshaw, 1990) are reflected in the relationships among academic hardships and mental health, as the intersection of race and gender appear to negatively impact Black females
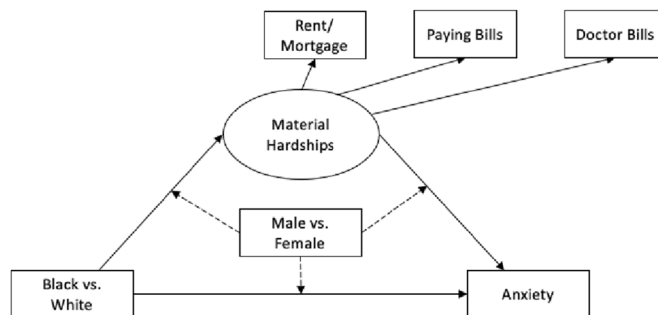
Model 1A: Material Hardships (MH) and Depression

Direct effects:	Male	Female
Race → MH		0.951**(0.360)
MH → Depression		0.945(0.504)
Race → Depression		-1.469(0.814)
Indirect effects:		
Race → MH → Depression		0.899*(0.404)
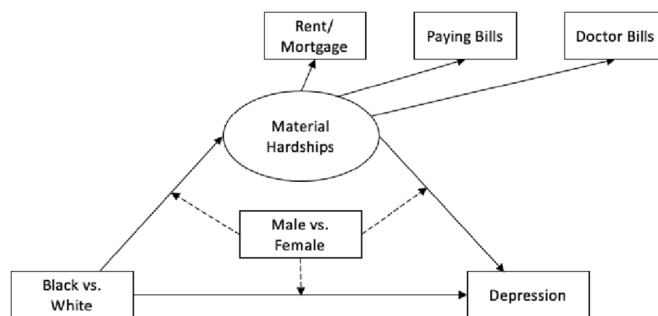
Model 1B: Material Hardships (MH) and Anxiety

Direct effects:	Male	Female
Race → MH		0.962**(0.363)
MH → Anxiety		0.600(0.369)
Race → Anxiety		-2.098*(0.844)
Indirect effects:		
Race → MH → Anxiety		0.577(0.317)

Note. Dotted lines are used to demonstrate the moderating relationship.

Fig. 2 Material hardships and mental health outcomes

Table 7 Model parameters: academic hardships and depression (PHQ)

	Male	Female
Factor Loading		
Academic Hardships: Learning Equipment	1.000(0.000)	
Academic Hardships: Learning Environment	1.037**(0.304)	
Direct Effect		
White/Black → Academic Hardships	0.652**(0.195)	
Academic Hardships → Depression	0.332(0.961)	4.271**(1.529)
White/Black → Depression	2.233(1.490)	-4.564***(1.284)
Indirect Effect		
White/Black → Academic Hardships → Depression	0.217(0.638)	2.784**(0.954)
Construct Variance		
Residual		
Depression	26.209***(4.315)	28.371***(3.332)
Academic Hardships	0.522**(0.160)	0.329(0.171)
R-Squared		
Depression	0.040	0.183
Latent Academic Hardships	0.122	0.128
Academic Hardships: Learning Equipment	0.554	0.355
Academic Hardships: Learning Environment	0.593	0.303
Model Fit Index		
N	84	331
Chi-square(df), p-value	19.920(9), p<.05	
RMSEA	0.076 [90% CI: 0.030-0.122]	
CFI	0.904	

Note. Unstandardized estimates are followed by standard errors in parentheses.

*$p =/< .05$; **$p < .01$; ***$p < .001$

disproportionately during the pandemic, which also supports previous research in this area (Lederer et al., 2021).

Similar patterns to academic hardships emerged when considering university assistance needed. For example, the

Model 2A: Academic Hardships (AH) and Depression

Direct effects:	Male	Female
Race → AH	0.652**(0.195)	
AH → Depression	0.332(0.961)	4.271**(1.529)
Race → Depression	2.233(1.490)	-4.564***(1.284)
Indirect effects:		
Race → AH → Depression	0.217(0.638)	2.784**(0.954)
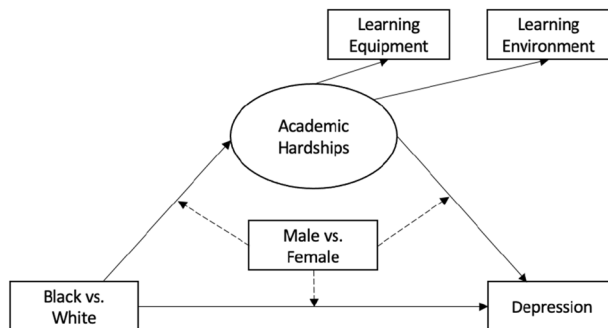
Model 2B: Academic Hardships (AH) and Anxiety

Direct effects:	Male	Female
Race → AH	1.088**(0.335)	0.443**(0.159)
AH → Anxiety	-0.186(0.943)	4.693**(1.706)
Race → Anxiety	0.311(1.803)	-4.053***(1.161)
Indirect effects:		
Race → AH → Anxiety	-0.202(1.025)	2.078*(0.841)
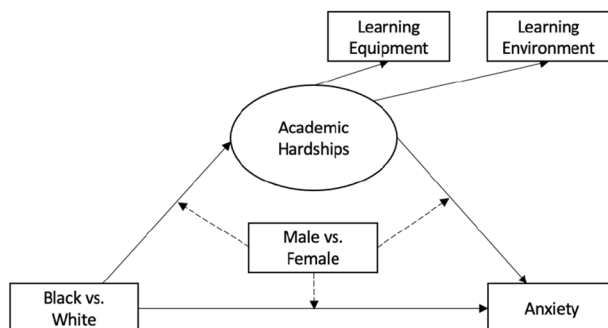
Note. Dotted lines are used to demonstrate the moderating relationship.

Fig. 3 Academic hardships and mental health outcomes

relationship between race and university assistance needed was significantly moderated by gender. Across both depression and anxiety models, males exhibited stronger relationships with university assistance needed. However, only females demonstrated a significant relationship between race and depression, as well as a significant relationship between university assistance needed and depression. Despite a direct relationship indicating lower rates of depression for Black females, Black females were indirectly related—through university assistance needed—to increased rates of depression. Again, Black females may face unique obstacles or forms of marginalization in school that may activate the relationship between university assistance needed and depression. Nevertheless, this was not the case with anxiety, as the relationships between race and anxiety, as well as the relationships between university assistance needed and anxiety, were not moderated by gender. Rather, for Black males and females alike, university assistance needed was significantly related to increased rates of anxiety. Furthermore, there was a significant indirect relationship between race and anxiety for both Black males and females through university assistance needed. However, this relationship was stronger for Black males, which may reflect greater rates of university assistance needed for this group during the pandemic.

Connecting these study findings to intersectionality theory, structural racism—in the form of material hardships—appears to explain depression among Black students, while a combination of structural racism and sexism—in the form of academic hardships—appears to explain depression and anxiety for Black females (Crenshaw, 1990). When considering the distance learning environment during COVID-19 among female graduate students—who often occupy caregiving roles for both younger and older family members—the gendered marginalization within academic hardships may represent inequitable distribution of family duties. Additionally, the theoretical underpinnings of structural racism and sexism (Crenshaw, 1990) also appear to explain the relationship between university supports needed and depression for Black females. However, this was not the case for university supports needed and anxiety, whose relationship was more universally experienced across gender among Black students. Given the long history of discrimination and other forms of marginalization (e.g., sexual assault, microaggressions) that women have experienced in higher education (Lincoln & Stanley, 2021; SteelFisher et al., 2019), it is unsurprising that a lack of university supports may be more acutely experienced and related to depression for Black women.

Table 8 Model parameters: academic hardships and anxiety (GAD)

	Male	Female
Factor Loading		
Academic Hardships: Learning Equipment	1.000(0.000)	
Academic Hardships: Learning Environment	0.774***(0.211)	
Direct Effect		
White/Black → Academic Hardships	1.088**(0.335)	0.443**(0.159)
Academic Hardships → Anxiety	-0.186(0.943)	4.693**(1.706)
White/Black → Anxiety	0.311(1.803)	-4.053***(1.161)
Indirect Effect		
White/Black → Academic Hardships → Anxiety	-0.202(1.025)	2.078*(0.841)
Construct Variance		
Residual		
Anxiety	31.069***(5.975)	25.526***(3.287)
Academic Hardships	0.697**(0.200)	0.242*(0.119)
R-Squared		
Anxiety	0.001	0.184
Latent Academic Hardships	0.223	0.086
Academic Hardships: Learning Equipment	0.747	0.461
Academic Hardships: Learning Environment	0.480	0.224
Model Fit Index		
N	85	332
Chi-square(df), p-value	9.757(8), p=.2825	
RMSEA	0.032 [90% CI: 0.000-0.091]	
CFI	0.984	

Note. Unstandardized estimates are followed by standard errors in parentheses.

*p =/< .05; **p < .01; ***p < .001

Implications

Our results offer meaningful takeaways for university leaders and policymakers, while opening up new lines of inquiry for future analyses. Remedies that arise from an increased understanding of the challenges and experiences that uniquely marginalized students faced during the COVID-19 pandemic can inform how universities support their students in alignment with commitments to inclusion, diversity, equity, and access. When considering these remedies, it is important to first recognize that currently observed disparities reflect a history of marginalization within racialized and gendered university contexts (Espinosa et al., 2019; Lincoln & Stanley, 2021; SteelFisher et al., 2019). Indeed, many of the disparities identified in this study existed long before the pandemic. The relationship among hardships and mental health for Black males and Black females during COVID-19 not only reflects the need for immediate assistance during a global pandemic, but also the larger racialized and gendered context of universities where inequitable distributions of resources and opportunities, microaggressions, and feelings of not belonging have long been expressed (Espenshade & Radford, 2009; Jack, 2019; Liu et al., 2022). Thus, as student mental health and anxiety experiences during the pandemic differ by race, gender, and various hardships, university responses must factor these considerations into their understanding and support of marginalized students (Coakley et al., 2021; Liu et al., 2022).

Going forward, university practices and the ways in which universities distribute resources and support should be guided by an understanding of the unique experiences and circumstances of Black male and female graduate students. Moreover, our findings often demonstrated that it was the intersection of race and gender that activated race and geneder disparities. Thus, universities should prioritize addressing the hardships emerging or deepening through COVID-19 with an intersectional lens that can speak to the systemic and structural inequities in institutions of higher education. For example, Raaper and Brown (2020) describe the importance of higher education institutions recognizing that social support programming and academic policies should be informed by students' diverse backgrounds and social networks.

Our results also include actionable findings for universities seeking to incorporate and apply an equity-focused lens with their academic and student supports. In particular, universities should consider distributing emergency funds for students experiencing material hardships, such as the inability to pay rent and other bills. Universities should also consider providing access to technology tools (e.g., laptop) and study spaces for students who may not have access to the proper equipment or an environment conducive to learning. Given the social and emotional nature of hardships during the pandemic, universities should improve access to trauma-informed counseling services and increase opportunities for student support networks. As university students can face uncertainties in employment

Table 9 Model parameters: University assistance needed and depression (PHQ)

	Male	Female
Factor Loading		
University Assistance Needed: Academic	1.000(0.000)	
University Assistance Needed: Emotional	1.191*** (0.115)	
University Assistance Needed: Social	1.087*** (0.119)	
University Assistance Needed: Financial	1.073*** (0.113)	
University Assistance Needed: Career	0.941***(0.103)	
Direct Effect		
White/Black → University Assistance Needed	1.302***(0.241)	0.305*(0.154)
University Assistance Needed → Depression	0.795(0.733)	2.804***(0.621)
White/Black → Depression	1.415(1.634)	-2.662**(0.931)
Indirect Effect		
White/Black → Univ. Assistance Needed → Depression	1.034(0.960)	0.856*(0.435)
Construct Variance		
Residual		
Depression	25.909***(4.268)	29.830***(2.769)
University Assistance Needed	0.572**(0.108)	0.596**(0.180)
R-Squared		
Depression	0.051	0.145
Latent University Assistance	0.335	0.018
University Assistance Needed: Academic	0.668	0.589
University Assistance Needed: Emotional	0.867	0.627
University Assistance Needed: Social	0.759	0.717
University Assistance Needed: Financial	0.744	0.486
University Assistance Needed: Career	0.608	0.647
Model Fit Index		
N	84	324
Chi-square(df), p-value	49.931(44), p=.2494	
RMSEA	0.026 [90% CI: 0.000-0.055]	
CFI	0.997	

opportunities during the pandemic, expanded career services should also be considered. Finally, as students of color may be particularly prone to these and other hardships during the pandemic, universities should prioritize culturally responsive ways of providing these supports.

In addition to university decision makers, government officials and policy makers should continue to advance a wide range of policies to mitigate the spread of COVID-19, and the ensuing hardships for students. While health and social initiatives have historically overlooked university students due to misconceptions that they are a homogeneously privileged, resourced, and healthy group (Higher Learning Advocates, 2018; Lederer & Oswalt, 2017), recent policies have demonstrated a recognition of the vulnerabilities and hardships that many university students face. For example, the Coronavirus Aid, Relief, and Economic Security (CARES) Act of 2020 allocated more than $2 trillion in response to COVID-19, including $14 billion for universities and colleges—much of which went toward direct support of students during the pandemic. In addition to pandemic relief checks, the U.S. Department of Education paused student loan repayment through December of 2022, potentially providing some short-term relief and reduced stress for graduating students during the pandemic. These and

other measures should also be considered as potential long-term solutions to address inequities in higher education.

Strengths and Limitations

While previous research has found that effects of the COVID-19 pandemic vary by demographic characteristics, studies generally have not compared outcomes across these characteristics and therefore are unable to comprehensively understand disparities. For example, previous studies have included samples exclusively consisting of students of color (Molock & Parchem, 2020; Walsh et al., 2021), racial/ethnic minorities (Inman et al., 2021), and gender identity (Hunt et al., 2021) to explore hardships and mental health. However, studies have yet to explore the role of hardships and university assistance in mental health disparities through an intersectional lens. Doing so can lead to a more comprehensive understanding of student experiences during the pandemic and the types of support that could be tailored to meet specific student needs going forward.

In addition to exploring the role of gender in moderating the relationships among race, hardships, supports, and mental health, our study is unique in its focus on the nuanced

Table 10 University assistance needed and anxiety (GAD)

	Male	Female
Factor Loading		
University Assistance Needed: Academic	1.000(0.000)	
University Assistance Needed: Emotional	1.216*** (0.120)	
University Assistance Needed: Social	1.100*** (0.122)	
University Assistance Needed: Financial	1.086** (0.116)	
University Assistance Needed: Career	0.968***(0.105)	
Direct Effect		
White/Black → University Assistance Needed	1.296***(0.237)	0.431*(0.201)
University Assistance Needed → Anxiety	1.701***(0.386)	
White/Black → Anxiety	-2.582**(0.794)	
Indirect Effect		
White/Black → University Assistance Needed → Anxiety	2.206***(0.576)	0.733*(0.357)
Construct Variance		
Residual		
Anxiety	29.501***(6.050)	27.810***(2.783)
University Assistance Needed	0.550***(0.104)	1.010**(0.331)
R-Squared		
Anxiety	0.052	0.107
Latent University Assistance	0.340	0.021
University Assistance Needed: Academic	0.649	0.593
University Assistance Needed: Emotional	0.869	0.636
University Assistance Needed: Social	0.752	0.721
University Assistance Needed: Financial	0.737	0.487
University Assistance Needed: Career	0.617	0.644
Model Fit Index		
N	85	325
Chi-square(df), p-value	60.674(46), p=.0722	
RMSEA	0.039 [90% CI: 0.000-0.064]	
CFI	0.992	

experiences of graduate students from two distinct universities—both in terms of geography and university type (e.g., elite private university and public flagship university). Graduate students may be in a particularly precarious place during the pandemic, as they often occupy a variety of adult roles (e.g., working, caregiving, etc.) in addition to their student roles. Furthermore, while some structural equation modeling techniques have been used to study various facets of the pandemic and its impacts (Inman et al., 2021; Salehi et al., 2021; Yildirim et al., 2021), including course satisfaction and engagement in online learning (Baloran & Hernan, 2021), as well as compliance with preventive measures (Özdil et al., 2021), we uniquely employ a moderated-mediated structural equation model (SEM). This allows us to demonstrate the intersectional nature of race and gender across students' experiences during the pandemic.

Nevertheless, this study is not without its limitations. First, the cross-sectional samples we collected provide a snapshot of student experiences and attitudes during distinct periods of time relatively early in the pandemic in 2020. Thus, we cannot be sure of the direction of the variable relationships, nor can we account for prior measures of mental health. As our SEM model is designed to demonstrate

structural relationships, we did not account for unobserved confounders in our model through additional covariates, which may represent a source of bias. Considering external validity, while survey participants included over 400 students across two universities, we recognize that the study sample and findings may not be interpretable in a way that reflects all university settings and contexts. While we did not detect any discernable differences in the model relationships across each university, it is important to note that racialization and sexism may occur differently across these contexts. Findings should also be considered with the potential for some selection bias, as students who were more affected by COVID-19 may have been more likely to participate in this study—a common issue with survey research.

Further research should consider longitudinal analysis of university assistance offered—not just needed—in order to allow for a better understanding of how supports can be best deployed to support the needs of marginalized student groups, especially those that may be particularly prone to material and academic hardships. Future research should also focus on different racial/ethnic groups who may also be more prone to hardships during the pandemic, such as Hispanic students. Larger samples or samples focused on

Model 3A: University Assistance Needed (UAN) and Depression

Direct effects:	Male	Female
Race → UAN	1.302***(0.241)	0.305*(0.154)
UAN → Depression	0.795(0.733)	2.804***(0.621)
Race → Depression	1.415(1.634)	-2.662**(0.931)
Indirect effects:		
Race → UAN → Depression	1.034(0.960)	0.856*(0.435)

Model 3B: University Assistance Needed (UAN) and Anxiety

Direct effects:	Male	Female
Race → UAN	1.296***(0.237)	0.431*(0.201)
UAN → Anxiety	1.701***(0.386)	
Race → Anxiety	-2.582**(0.794)	
Indirect effects:		
Race → UAN → Anxiety	2.206***(0.576)	0.733*(0.357)

Note. Dotted lines are used to demonstrate the moderating relationship.
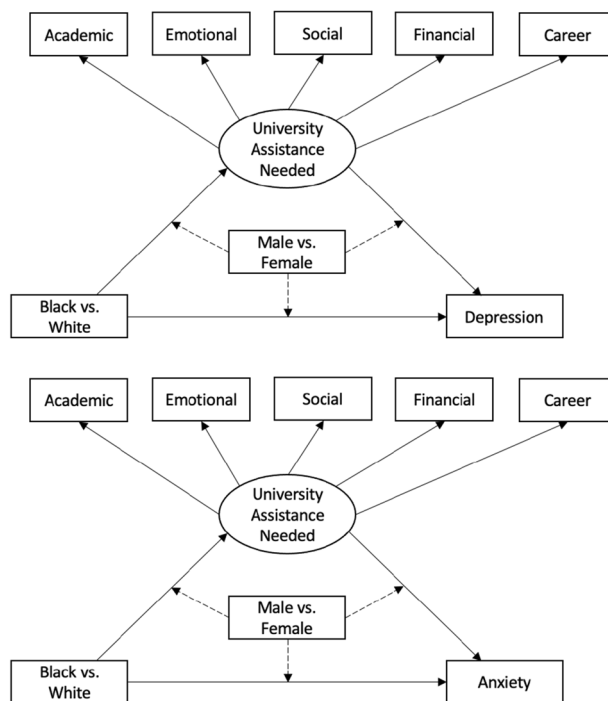
Fig. 4 University assistance needed and mental health outcomes

Conclusion

While experiences of hardships and need of university assistance were not equally distributed during the pandemic, it is important to note that many inequities in higher education existed prior to COVID-19. For example, recent research on inequities in higher education demonstrates that African American and first-generation students are more likely to be food insecure, which is significantly related to instances of dropping out, reduced course loads, neglected academics, and lower GPAs (Phillips et al., 2018). Moreover, housing insecurity is experienced by a disproportionate number of Black and Hispanic students (Vasquez et al., 2019). Furthermore, first-generation students, many of whom are students of color, are more likely to hold additional jobs and live off-campus, which can limit opportunities for social connection, personal development, and—in some cases—academic achievement (Pascarella et al., 2004). Thus, better understanding these inequities will have implications both for COVID-19 pandemic responses, as well as for long-term efforts to address historical disparities and inequities faced by students of color and women in higher education.

Finally, when considering graduate programs in social work, public health, and social policy, the pandemic represents a double-edged sword. On one edge, the COVID-19 pandemic caused new hardships that can exacerbate inequities that existed prior to the pandemic; on the other edge, the pandemic hampered the progress of students who are currently or will eventually be working on the front lines of this pandemic or other future crises. In turn, effective university responses can also act as a double-edged sword: they can work to dismantle current inequities across diverse groups of students, while promoting the mental health and well-being of future front-line professionals.

Declarations

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