



Depression and anxiety among college students: Understanding the impact on grade average and differences in gender and ethnicity

Autumn Asher BlackDeer, David A. Patterson Silver Wolf, Eugene Maguin & Sara Beeler-Stinn

To cite this article: Autumn Asher BlackDeer, David A. Patterson Silver Wolf, Eugene Maguin & Sara Beeler-Stinn (2021): Depression and anxiety among college students: Understanding the impact on grade average and differences in gender and ethnicity, Journal of American College Health, DOI: [10.1080/07448481.2021.1920954](https://doi.org/10.1080/07448481.2021.1920954)

To link to this article: <https://doi.org/10.1080/07448481.2021.1920954>



Published online: 09 Jul 2021.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

MAJOR ARTICLE



Depression and anxiety among college students: Understanding the impact on grade average and differences in gender and ethnicity

Autumn Asher BlackDeer, MSW, PhD Candidate^a , David A. Patterson Silver Wolf, PhD^b, Eugene Maguin, PhD^c and Sara Beeler-Stinn, PhD^d

^aPhD Candidate, Brown School, Washington University in St. Louis, St. Louis, Missouri, USA; ^bAssociate Professor, Brown School, Washington University in St. Louis, St. Louis, Missouri, USA; ^cResearch Scientist, Buffalo Center for Social Research, Buffalo, New York, USA; ^dPhD Candidate, Brown School, Washington University in St. Louis, St. Louis, Missouri, USA

ABSTRACT

Objective: Psychiatric disorders, such as depression and anxiety, can hinder academic performance among college-age individuals. **Participants:** Mental health among college students is a growing public health concern, with some scholars describing collegiate mental health as a crisis (Chen et al., *Psychiatr Serv.* 2019;70(6):442–449). **Methods:** This study analyzes data from four annual administrations of the American College Health Association (ACHA)'S NCHA (n=117,430). **Results:** Overall, anxiety and depression were the most common conditions, at 9.2% and 8.7%, respectively. Of students reporting the focal symptom, 17.87% were treated for depression and 12.91% were treated for anxiety. Compared to not-treated students, diagnosed only students, had significantly lower grade averages, with effect sizes of -0.30 and -0.20 for depression and anxiety, respectively. **Conclusions:** Given the prevalence of depression and anxiety among college-aged students, continued research into help seeking behaviors and their effects on outcomes like grade average is an essential part of understanding the toll these disorders take.

ARTICLE HISTORY

Received 8 July 2020
Revised 8 March 2021
Accepted 18 April 2021

KEYWORDS

Academic success; anxiety; college students; depression; grade average (GPA)

Sixteen million Americans report living with major depression and, even more alarming, are the 42 million Americans who report living with an anxiety disorder in any given year,^{1,2} with nearly 75% experiencing their first episode by age 22.³ Mental illness can lead to impaired daily functioning; the Global Burden of Disease Study found that depression was the leading cause of disability in the world (as cited in Turner et al.⁴). The transition to college is associated with a plethora of changes, including shifts in appetite, concentration, and depression.⁵ There is a demonstrated relatively high prevalence of mental health problems for college students.^{6–8} NAMI also reports that one-half of all chronic mental illnesses will present by the age of 14 and 75% present by the age of 24.² Early development of mental illnesses, such as depression and anxiety, highlight the importance of early intervention, particularly prior to a stressful time like college.

Depression and anxiety are on the rise among US collegians.^{9,10} College students are experiencing unprecedented levels of distress that have direct impacts on their mental health.⁹ Roughly 10% of university college students have been diagnosed or treated for depression within the last 12 months in the US.⁵ The rate of depression diagnoses among collegians is growing, with an

increase in prevalence from 10% to 15% from 2000 to 2006.³ Depression is one of the main causes of poor academic outcomes for collegians^{11,12}; in fact, depression is a central factor for college dropout decisions.¹¹ There is a strong literature base demonstrating the increase of depression and other psychopathology among US college students over the past 50 years.¹¹ Psychiatric disorders, such as depression and anxiety, among college-age individuals can hinder academic attendance and completion.^{13–16}

Anxiety, also rampant among college-age students, is a common co-morbidity among individuals with depression.³ In a 2012 NAMI college student survey on mental health, depression was the top primary mental illness diagnosis at 27%; 11% of college students reported anxiety as their primary mental health diagnosis.¹⁵ National studies of college students such as the ACHA National College Health Assessment (NCHA) illuminate these general mental health prevalence trends. NCHA data from Fall 2008 indicated that 31% of collegians have felt so depressed that it was difficult to function within the past 12 months, yet only 10% received counseling.¹¹ According to the 2016 NCHA, 17% of students were diagnosed or treated for anxiety and 14% were diagnosed or treated for depression.^{6,17} Significant work in the area

of student depression has been undertaken by Eisenberg and colleagues' annual Healthy Minds Web-based survey, however, their work is limited to 26 campuses and focuses more on healthcare use rather than psychological symptoms or diagnoses.¹ Further, the 2008 ACHA NCHA results found that depression and anxiety were among the top 10 factors that impeded academic performance in the past 12 months; stress is rated number one. Stress is particularly important as it "precipitates the onset or recurrence of psychiatric disorders."¹⁶ Similar to depression, overwhelming anxiety is reported from nearly 18% of college students.¹⁸ Also, noteworthy of the ACHA-NCHA (2008) is that females were found to report higher percentages of stress, depression, and anxiety than males. Depression, anxiety, and stress have such profound effects upon students that in-depth research is needed to help future students.⁵

Research has established that gender differences—in addition to their mental health issues—may impact academic performance among college-age students.^{4,14} A 2012 NAMI survey discovered females are twice as likely to report depression in their lifetime compared to males. Female gender roles are associated with help-seeking behavior; females are more likely than males to seek treatment for depression.¹⁵ NAMI hypothesizes that this fact may be due to a female's comfort level in disclosing needs related to their mental health.¹⁵ Mahmoud and colleagues cited research stating similar differences between gender and anxiety levels, with females more frequently reporting unhealthy coping strategies.¹⁹

The experiences of students of color are vastly understudied in mental health research,²⁰ with existing research on collegiate mental illness being limited and inconsistent.⁶ There is a significant gap in the literature investigating mental health diagnoses and more severe symptoms for minority students.⁹ Few studies have examined differences in symptoms and diagnoses by racial and ethnic backgrounds.¹ Despite a plethora of research among undergraduate students, is it unclear if differences exist in mean level depression symptoms of US collegians of different racial groups; further, there is conflicting evidence in the consideration of Black, Hispanic, and white students' mental health prevalence.^{21–23}

Some studies posit that students of color experience a higher prevalence of depression and anxiety, while others say that symptoms do not vary across racial/ethnic groups.^{10,11,20,21} For American Indian college students, depression is among the most common mental health concerns, second only to suicide and alcoholism.²⁴ Similarly, in a study evaluating ethnic minority groups' perception of mental health stigma, African American, Asian American, and Hispanic/Latinx students reported increased levels of psychiatric distress.²⁵ According to the Spring 2015 NCHA data, minority students experienced lower rates of symptoms and diagnoses when compared to white students, with a few exceptions.¹ One of the exceptions include that multiracial and Asian/

Pacific Islanders were more likely to report feeling hopelessness, depression, and overwhelming anger.¹ Additionally, Black and Hispanic students had lower rates of diagnoses when compared to white students.¹

Cokley and colleagues suggested that health disparities between minority populations and whites can partially be explained by experiences of discrimination.²⁶ Hwang and Goto found that racial discrimination is associated with negative mental health outcomes including psychiatric distress, suicidal ideation, anxiety, and depression among Asian and Hispanic/Latinx college students.²⁷ For African American, Asian American, and Hispanic/Latinx students, perceived discrimination has been found to be associated with increased perceived stigmatization of help-seeking behaviors among a sample of racial and ethnic minority college students.²⁵

Several explanations have emerged to explain mental health treatment disparities across racial/ethnic groups, including possible relations to socioeconomic status (SES), parental education, discrimination and cultural beliefs or stigma.^{11,28,29} Cultural factors play a substantial role across the experience, presentation, and treatment of mental health issues for ethnic minority students.³⁰ For example, cross-cultural presentations of depression symptoms vary, such as the Asian concept of "loss of face."³⁰ Additional factors impact various groups, such as the impact of historical trauma on depression and suicide prevalence for American Indian populations.^{31,32}

Despite the established prevalence and risk, college students do not always seek treatment.³³ Limited research is available that examines access and use of mental health services, especially among minority students.⁹ The frequency and severity of mental health problems are steadily increasing yet students are not seeking psychiatric help.²⁵ From the National Epidemiological Study on Alcohol and Related Conditions, Blanco and colleagues found that 50% of students diagnosed with a mood disorder and over 80% of students diagnosed with an anxiety disorder did not access treatment.¹⁶ Not seeking treatment can lead to maladaptive coping, such as substance use,^{13,19,34} which can further decrease the likelihood of academic completion.³⁵

Despite experiencing greater distress, ethnic minority students underutilize mental health services more than white students and hold less favorable attitudes toward seeking professional help.^{25,36} Existing literature states that students of color are less likely to access mental health treatment.^{11,20,37,38} Lipson and colleagues examined 43,375 collegians from 60 institutions from 2012–2015 and found that treatment use was lower among students of color (Black, Latinx, Asian, and Arab), with Asian students having the lowest treatment prevalence.²⁰ Several studies report that Asian, Black, and Hispanic students are less likely to receive treatment for mental illness when compared to whites.^{11,39–41} In a study of 589 undergraduates from 2007–2009, no differences in depression

symptoms were found across racial groups.¹¹ Of those reporting high levels of depression symptoms, nearly 71% did not get any mental health treatment within the previous 12 months.¹¹ White students were 3.7 times more likely to get mental health treatment within the prior 12 months.¹¹ In a study of over 40,000 undergraduates across 60 institutions, Lipson and colleagues found that diagnoses, medication use, and therapy were less prevalent among students of color than white students.²⁰

College campuses are an important point of intervention and mark, for many, the transition from adolescence to adulthood.³¹ Undergraduates typically range from 18–24 years of age, a range known as emerging adulthood, defined as a marked period of transition between late adolescence and adulthood.³ While this transition is expected to be stressful, it still can contribute to the development or exacerbation of mental illness, such as depression.⁴² Treatment is critical during a stressful and transient time such as college, as it prevents further worsening of symptoms and increases social support networks.^{13,15} Moreover, college is documented as a critical time for mental health intervention.⁴³ Randelović et al. describe proper referral and treatment of young people with mental health disorders as an investment in the success of society.⁴⁴ For ethnic minority students attending primarily white institutions that are in stark contrast with their home communities, stress is often exacerbated, thus resulting in a greater mental health adjustment challenge which ultimately increases students' vulnerability to anxiety and depression.³⁶

Untreated mental health has adverse effects on a student's academic performance (GPA) and ultimately increases students' odds for dropping out altogether.¹⁸ While treatment for mental health illnesses, such as depression and anxiety, have been shown to be effective in the general population,⁴⁵ it remains unknown whether treatment leads to success in academic systems. There is a distinct and reliable relationship between academic performance (e.g., GPA) and college completion (see Adelman,^{46,47} DesJardins et al.^{48,49}). Factors related to remaining successful during the college experience are important influences in persistence to graduation, which is the ultimate measure of success. In order to support student success and create equity in persistence and retention, it is essential to understand and address the mental health needs of students of color.²⁰

The research questions we attempted to answer with the current analyses are:

1. What was the prevalence of depression and anxiety symptoms among college students?
2. Is symptom prevalence related to grade average?
3. Among students affirming symptoms what percentage were diagnosed only and what percentage received treatment?
4. How did treatment involvement affect grade averages?

5. Did these relationships differ by gender or by ethnicity?

Methods

Dataset

This study analyzes data from four annual administrations of the ACHA National College Health Assessment (NCHA). The NCHA assesses a broad range of student health issues including personal safety and violence, mental health, weight, nutrition and exercise, and alcohol, tobacco, and other drug use. The NCHA is administered twice yearly in the fall and spring. Each administration of the survey is to a separate, self-selected sample of US and Canadian colleges and universities who have paid to participate in the survey. Participating colleges and universities can select the sampling strategy (i.e., all students or random selection) and the surveying method (i.e., paper or Web) to be used. (See the ACHA's website [achs.org] for further details). ACHA staff have performed comparisons between the NCHA results and other national surveys of college and university students and findings across the surveys are consistent.

The present study uses data from the following time-frames: fall 2008 ($N=26,685$ students, 40 institutions), spring 2009 ($N=87,105$, 117 institutions), fall 2009 ($N=34,208$, 57 institutions), and fall 2010 ($N=30,093$, 139 institutions). There is a major gap in the literature that investigates mental health diagnoses and symptoms, prevalence, access and use of mental health services, especially among racial/ethnic minority students.⁹ These four survey datasets were selected because all students received the same set of survey items. More importantly, the total sample size of four datasets ensured that Native American/Alaska Native students would be present in numbers sufficient to permit meaningful analyses. American Indian/Alaska Native students as a racial/ethnic minority group are often removed from statistical analyses due to small sample sizes. The present study utilized these cycles of the NCHA as a concerted effort to examine American Indian/Alaska Native college students as they constitute a significant sample of Native students.^{32,50,51} This inclusion of American Indian/Alaska Native students in comparison with fellow racial/ethnic minority student groups is a significant contribution to the literature.

The ACHA-NCHA collected paper and Web-based surveys and reported both response rates along with the mean response percentage. The mean response rate for Fall 2008 was 27%, with 63% from paper and 22% from Web-based surveys. The mean response rate for Spring 2009 was 30%, with 82% from paper and 20% from Web-based surveys. Similarly, the mean response rate for Fall 2009 was 36%, with 90% from paper and 21% from the Web. Lastly, the mean response for Fall 2010 was 31%, with 78% from paper and 19% collected from

the Web. According to Claydon and Zullig, paper and Web response rates are similar to other national higher education surveys.⁵² The datasets were fully de-identified with respect to both students and institutions. Because the data are de-identified with respect to institution, it is not possible to know whether an institution is represented more than once in the combined dataset.

Human subjects

This study was exempt from institutional review board approval as it is secondary analysis of deidentified data. The ACHA requires institutional review board approval to implement the NCHA at their specified university, but compiled composite datasets, such as the one utilized in this study, are deidentified and aggregated. Individual respondents are consented twice for the study, and are made aware that their responses are confidential, but not anonymous.

Sample

The sample for this study consists of the subset of students who (a) described themselves either male or female (versus transgender), (b) were undergraduates and were within three years of the normal age progression for a full-time undergraduate student (i.e., 18–21 years for a first year undergraduate), (c) were attending a US institution, (d) did not describe themselves as an “international” student, and (e) reported a valid grade average (i.e., A through D/F). The result analyzed a sample of 117,430 students. The sample was nearly two-thirds female and around 20 years old. One-third of the sample were first-year students, one-quarter each second- and third-years students, one-fifth fourth-year students, and a small group of post-fourth-year students. The sample was nearly three-quarters white; Asian, Black, and Hispanic students each comprised between five percent and eight percent of the sample. See Table 1 for more information regarding the sample.

Variables

Grade average

A single item asked for the respondent’s grade average with potential response profiles of A, B, C, D/F or N/A. A response of N/A was treated as an invalid response and was excluded from analysis. The data were recoded so that D/F = 1, and A = 4.

Ethnicity

Respondents were offered seven “select as many as apply” options for race-ethnicity, as shown in Table 1. Inspection of the endorsement patterns revealed that all combinations of options were marked, including none marked and all marked. We elected to treat the Asian, Black, Hispanic, Native, and white options as

Table 1. Sample demographics ($N=117,430$).

Demographic variable	<i>N</i> (Percent)
Female	77,755 (66.21%)
Age (M, SD)	19.86 (1.51)
Undergraduate year	
1st year	36,848 (31.38%)
2nd year	27,159 (23.13%)
3rd year	26,419 (22.50%)
4th year	20,841 (17.75%)
5th year or more	6,163 (5.25%)
Ethnicity	
Asian	9,598 (8.20%)
Black	6,088 (5.20%)
Hispanic	6,844 (5.85%)
Native American	491 (0.42%)
White	86,109 (73.60%)
Asian-White	1,222 (1.04%)
Hispanic-White	1,141 (0.98%)
Native American-White	935 (0.80%)
Multiple ethnicity	4,564 (3.90%)

Note. A total of 438 students missing ethnicity data were excluded from the Ethnicity tabulation. Asian and Asian-White, Hispanic and Hispanic-White, and Native American and Native American-White were combined for the analyses.

primary categories and Biracial/Multiple and Other as secondary categories. Where multiple primary categories were marked, white was the most frequent second category. Thus, as shown in Table 1, we created white combination categories for Asian, Hispanic, and Native American. In the reported analyses we formed an Asian category by combining Asian with Asian-white and an Under-represented Minorities (URM) category by combining Black, Hispanic, Hispanic-white, Native, and Native-white. The analyzed ethnicity variable returned the breakdown: Asians ($n=10,820$), URM ($n=15,499$), white ($n=86,109$), and Multiple ($n=4,564$).

Symptoms and treatment involvement

As the main purpose of these analyses was to examine the conjunction of symptom prevalence and treatment involvement on grade average, we reviewed the ACHA survey to identify symptom prevalence items and treatment involvement for the symptom. One of the survey questions asked whether students had experienced, in the past year, any of the 11 psychological symptoms: *Felt things were hopeless*, *Felt overwhelmed*, *Felt exhausted*, *Felt very lonely*, *Felt very sad*, *Felt so depressed it was difficult to function*, *Felt overwhelming anxiety*, *Felt overwhelming anger*, *Intentionally injured (cutting/burning) self*, *Seriously considered suicide*, and *Attempted suicide*. Another question asked students if, in the past 12 months, they had been diagnosed or treated by a professional for depression, anxiety, or any of the aforementioned 13 psychological conditions. We elected to use the symptom item *Felt so depressed it was difficult to function* as a focal symptom of depression and the item *Felt overwhelming anxiety* as the focal symptom of anxiety. The symptom response options (*No, never*; *No, not in the last 12 months*; *Yes, in the last 2 weeks*; *Yes, in the last 30 days*; and *Yes, in the last 12 months*) were recoded to a dichotomy of *Never or not in the past 12 months* versus *Yes, in the past 12 months*. The correlation between anxiety

and depression was .50. The treatment involvement response options were *No* (i.e., neither diagnosed nor treated), *Diagnosed but not treated*, *Treated with medication*, *Treated with psychotherapy*, *Treated with medication and psychotherapy*, and *Treated with another treatment*. Because we were interested in the effect of treatment, the four treatment options were combined into a single category. We noted that roughly 0.4% and 2% of students reported diagnosis or treatment for a symptom, respectively, but denied the focal symptom. These students were treated as having the symptom in our analysis. We combined the symptom item and the corresponding treatment involvement item to make the analysis variable, which had four categories: (a) no symptom reported, (b) symptom reported but no diagnosis or treatment (symptom-no Dx/Tx), (c) symptom reported-diagnosis only (symptom-Dx only), and (d) symptom reported-diagnosis and treatment (symptom-Dx/Tx).

Analysis plan

Our primary interests were in describing symptom prevalence, the symptom prevalence-grade average relationship, and the symptom prevalence-treatment involvement-grade average relationship within gender and within ethnic group category, as well as for the total sample. Thus, we present three sets of analyses for depression and for anxiety. Within each set of analyses, we first analyzed symptom prevalence by cross tabulation/chi square, followed by performing an association of symptom prevalence to grade average by ANOVA. Next, we analyzed the likelihoods of diagnosis only and of diagnosis and treatment relative to symptom reported but no treatment involvement by logistic regression, and, lastly, the relationship of symptom-treatment involvement to grade average by ANOVA. Given our interests, we interpreted significant interactions within, but not between, gender and ethnic category levels. Our interests lie in three post-hoc contrasts for the symptom-treatment involvement to grade average analysis: (a) symptom reported but no treatment involvement versus symptom

reported-diagnosis only, (b) symptom reported-diagnosis only versus symptom reported-diagnosis and treatment, (c) symptom reported but no treatment involvement versus symptom reported-diagnosis and treatment. Because sample size ensures that nearly every comparison, and especially those involving whites, will be significant, we interpreted effects based on effect size rather than significance level, although that has also been reported. We found that grade average has a standard deviation of 0.65 to 0.78, depending on the sample split. Rather than the Cohen small effect size of $d=0.3$, which implies a raw score difference of 0.20 to 0.23, we elected to use $d=0.1$ as the threshold effect size for interpretation.

Results

Overall relationships

Depression

The upper panel of Table 2 presents symptom prevalence and mean grade average by symptom-treatment involvement combination. First, the symptom prevalence was 30.84%. The mean grade average of students not reporting and students reporting the symptom was 3.234 versus 3.109. The difference, 0.125, was significant, $t(62,724.8) = 27.73$, $p < .001$ with an effect size, d , of 0.18. Next, the majority of students reporting symptoms, $n = 35,022$, reported neither diagnosis nor treatment (78.16%). A small percentage reported a diagnosis only (3.97%), whereas students that reported diagnosis and treatment was higher (17.87%). An ANOVA of the symptom-treatment involvement means was statistically significant, $F(3, 113,565) = 293.2$, $p < .001$, η^2 (eta squared) = .008. Follow-up comparisons (no correction for multiple tests) showed that the diagnosis only group had a statistically significant ($p < .001$) lower score than both the no treatment group ($d=0.21$) and the treatment group ($d=0.23$). The difference between the no treatment and treatment groups did not reach the threshold.

Table 2. Percentages of students reporting symptoms and treatment involvement and mean cumulative GPA for each symptom-treatment involvement category.

Symptom-treatment Involvement	Symptom		Total	GPA Mean (SD)
	No	Yes		
No depression	78,547 (100%)	0 (0.00%)	78,547 (69.16%)	3.234 (0.663)
Depression-no Dx/Tx	0	27,374 (78.16%)	27,374 (24.10%)	3.113 (0.714)
Depression-Dx only	0	1,391 (3.97%)	1,391 (1.22%)	2.969 (0.750)
Depression-Dx + Tx	0	6,257 (17.87%)	6,257 (5.51%)	3.123 (0.722)
Column total	78,547	35,022	113,569	3.195 (0.683)
Row percentage	(69.16%)	(30.84%)	(100%)	
No anxiety	58,133 (100%)	0 (0.00%)	58,133 (50.56%)	3.219 (0.668)
Anxiety-no Dx/Tx	0	47,273 (83.17%)	47,273 (41.12%)	3.173 (0.696)
Anxiety-Dx only	0	2,231 (3.92%)	2,231 (1.94%)	3.063 (0.720)
Anxiety-Dx + Tx	0	7,338 (12.91%)	7,338 (6.38%)	3.172 (0.694)
Column total	58,133	56,842	114,975	3.194 (0.683)
Row percentage	(50.56%)	(49.44%)	(100%)	

Note. Means with the same subscript did not differ at the .05 level by a Least Significant Differences test.

Anxiety

The lower panel of Table 2 presents the corresponding data for anxiety. First, the symptom prevalence was 49.44%. The grade averages of students not reporting and reporting the symptom were 3.219 versus 3.168, respectively, and although differing significantly, $t(114,973) = 12.53$, $p < .001$, the difference did not reach the threshold. Next, of the 56,842 students reporting the symptom, 3.92% reported a diagnosis only and 12.91% reported diagnosis and treatment. An ANOVA of the symptom-treatment involvement means produced statistically significant results, $F(3, 114,971) = 33.02$, $p < .001$, $\eta^2 = .002$. Follow-up comparisons showed that the diagnosis only group had significantly ($p < .001$) lower scores than both the no treatment group ($d=0.16$) and the treatment group ($d=0.16$). The no treatment-treatment groups' difference did not reach the threshold.

Gender

Depression

We next compared males and females. The upper panel of Table 3 presents the symptom-treatment involvement prevalence and grade average for males above and females below. Of the 38,583 males, 26.10% reported the symptom. Of the 74,986 females, 33.27% reported the symptom. The difference between males and females indicated statistically significant results, $\chi^2(1, 113,569) = 614.1$, $p < .001$, Cramers $V = .07$. An ANOVA for grade average by gender and symptom was significant for gender, $F(1, 113,565) = 489.8$, $p < .001$, $\eta^2 = .004$, and for symptom, $F(1, 113,565) = 755.4$, $p < .001$, $\eta^2 = .007$, but not their interaction. Irrespective of symptom status, females reported higher grade averages than males.

Of the males that reported the symptom, 3.20% were diagnosed only and 12.00% were treated versus 4.28% and 20.23%, respectively, for females. Relative to symptom presence but no treatment involvement, females were 1.51 times more likely to be diagnosed only (95% CI = 1.33, 1.71), and were 1.89 times more likely to be treated (95% CI = 1.77, 2.03), compared to males.

The ANOVA for grade average by symptom-treatment involvement and gender was statistically significant for symptom-treatment involvement, $F(1, 113,561) = 261.4$, $p < .001$, $\eta^2 = .007$, and for gender, $F(1, 113,561) = 53.1$, $p < .001$, $\eta^2 = .0005$, but not their interaction. Compared to males with the symptom but no treatment involvement, males diagnosed only had a significantly ($p < .001$) lower grade average, $M = 3.046$ versus $M = 2.953$, respectively, $d = -0.13$. However, the difference between diagnosed males and treated males did not reach threshold. Neither did the difference between the no-treatment and treatment groups. Females diagnosed only had a significantly ($p < .001$) lower grade average than did females with no treatment involvement ($d = -0.25$), but those with

treatment had a significantly ($p < .001$) higher grade average than those who were diagnosed only ($d=0.26$). The difference between the untreated and treated group, for both males and females, did not reach threshold. To summarize, both males and females diagnosed only had lower grade averages than did the corresponding no treatment group. Only females that received treatment, however, had grade averages higher than their diagnosed-only counterparts.

Anxiety

The lower panel of Table 3 presents the corresponding data for anxiety. Of the 38,815 males, 38.96% reported the symptom, and of the 76,160 females, 54.78% reported the symptom. This difference was statistically significant, $\chi^2(1, 114,975) = 2,572.4$, $p < .001$, Cramer's $V = .15$. The ANOVA for grade average by gender and symptom was significant for gender, $F(1, 114,971) = 653.8$, $p < .001$, $\eta^2 = .006$, and for symptom, $F(1, 114,971) = 248.7$, $p < .001$, $\eta^2 = .002$, but not their interaction. Irrespective of symptom status, females reported higher grade averages than males.

Of the males that reported the symptom, 2.56% were diagnosed only and 8.80% were treated versus 4.42% and 14.40%, respectively, for females. Relative to no treatment involvement, females were 1.89 times more likely to be diagnosed only (95% CI = 1.69, 2.11), and were 1.79 times more likely to be treated (95% CI = 1.68, 1.90).

The ANOVA for grade average by symptom-treatment involvement and gender was significant for treatment involvement, $F(1, 114,967) = 89.48$, $p < .001$, $\eta^2 = .002$, for gender, $F(1, 114,967) = 84.23$, $p < .001$, $\eta^2 = .0007$, and for their interaction, $F(1, 114,967) = 2.64$, $p = .048$, $\eta^2 < .0001$. We elected, however, not to interpret the interaction given its small effect size.

None of the pairwise comparisons for males reached threshold. For females, those diagnosed only had a significantly ($p < .001$) lower grade average than did females with no treatment involvement ($d=0.20$) and those treated had significantly ($p < .001$) higher grade averages than those only diagnosed ($d=0.19$). However, the difference between those untreated and those treated did not reach threshold. To summarize, compared to males, females had a higher anxiety symptom prevalence and were more likely to be diagnosed and to be treated. Results indicated that females benefited from treatment, but males did not.

Ethnicity

Depression

Next, we examined ethnicity. The upper panel of Table 4 presents the symptom-treatment involvement prevalence and grade average by ethnicity for depression. The prevalence of depression varied significantly with

Table 3. Percentages of students reporting symptoms and treatment involvement and mean cumulative GPA for each symptom-treatment involvement category by gender.

Gender	Symptom-treatment	Symptom	Reported	Total	GPA
	Involvement	No	Yes		Mean (SD)
Male	No Depression	28,512 (100%)	0 (0.00%)	28,512 (73.90%)	3.162 (0.681)
	Depression-no Dx/Tx	0	8,540 (84.80%)	8,540 (22.13%)	3.046 (0.735)
	Depression-Dx only	0	322 (3.20%)	322 (0.83%)	2.953 (0.702)
	Depression-Dx + Tx	0	1,209 (12.00%)	1,209 (3.13%)	3.018 (0.777)
	Column total	28,512	10,071	38,583	3.130 (0.699)
	Row percentage	(73.90%)	(26.10%)	(100%)	
Female	No depression	50,035 (100%)	0 (0.00%)	50,035 (66.73%)	3.275 (0.650)
	Depression-no Dx/Tx	0	18,834 (75.48%)	18,834 (25.12%)	3.143 (0.703)
	Depression-Dx only	0	1,069 (4.28%)	1,069 (1.43%)	2.974 (0.764)
	Depression-Dx + Tx	0	5,048 (20.23%)	5,048 (6.73%)	3.148 (0.706)
	Column total	50,035	24,951	74,986	3.229 (0.672)
	Row percentage	(66.73%)	(33.27%)	(100%)	
Male	No anxiety	23,692 (100%)	0 (0.00%)	23,692 (61.04%)	3.157 (0.682)
	Anxiety-no Dx/Tx	0	13,405 (88.64%)	13,405 (34.54%)	3.087 (0.720)
	Anxiety-Dx only	0	387 (2.56%)	387 (1.00%)	3.026 (0.748)
	Anxiety-Dx + Tx	0	1,331 (8.80%)	1,331 (3.43%)	3.060 (0.739)
	Column total	23,692	15,123	38,815	3.128 (0.699)
	Row percentage	(61.04%)	(38.96%)	(100%)	
Female	No anxiety	34,441 (100%)	0 (0.00%)	34,441 (45.22%)	3.261 (0.655)
	Anxiety-no Dx/Tx	0	33,868 (81.18%)	33,868 (44.47%)	3.207 (0.683)
	Anxiety-Dx only	0	1,844 (4.42%)	1,844 (2.42%)	3.070 (0.714)
	Anxiety-Dx + Tx	0	6,007 (14.40%)	6,007 (7.89%)	3.196 (0.681)
	Column total	34,441	41,719	76,160	3.227 (0.672)
	Row percentage	(45.22%)	(54.78%)	(100%)	

Note. Within gender category, means with the same subscript did not differ at the .05 level by a Least Significant Differences test.

ethnicity, $\chi^2(3, 113,157) = 145.1, p < .001$, Cramer's $V = .04$, with prevalence ranging from 36.98% for multiple ethnicity, 33.91% for Asians, 30.78% for under-represented minorities (URM), to 30.12% for whites. An ANOVA for grade average by ethnicity and symptom presence was statistically significant for the interaction, $F(3, 113,149) = 4.28, p < .001, \eta^2 = .0001$, ethnicity, $F(3, 113,149) = 888.2, p < .001, \eta^2 = .023$, and symptom, $F(1, 113,149) = 386.4, p < .001, \eta^2 = .003$. Within each ethnic group, students reporting depression had a significantly (all $p < .001$) lower grade average than students not reporting depression; furthermore, the difference varied across ethnic group with Asians reporting the largest difference, $d = -0.23$, multiples next, $d = -0.23$, then URMs, $d = -0.19$, and last whites, $d = -0.17$. Thus, Asians report the highest symptom prevalence and the largest grade average decrement while whites report the lowest prevalence and the smallest decrement. These results are in alignment with previous research that has found Asian Americans, specifically Chinese American men, reported greater prevalence of depression symptoms when compared to their white counterparts.³⁰

Of students reporting the symptom, the percentages that were diagnosed only were 4.66% (Multiple), 4.21% (URM), 4.00% (white), and 3.20% (Asian). A logistic regression was used to identify the likelihood of diagnosis relative to whites given the symptom. Although the overall effect was statistically significant (Wald = 15.370, $df=3, p = .002$), only the contrast for Asians was significant [b

$= -0.380 \pm 0.100, p < .001$, odds ratio (OR) = 0.684]. Thus, Asians were about two-thirds as likely as the white reference group to be diagnosed only. The percentages of students that were treated were 20.61% (white), 13.80% (Multiple), 11.52% (URM), and 8.70% (Asian). A logistic regression was performed to compute the likelihood of treatment given the symptom. Relative to whites, the overall effect was found to be significant (Wald = 465.1, $df=3, p < .001$) as well as all three contrasts (Asians: $b = -1.018 \pm 0.061, OR = 0.361$; URM: $b = -0.694 \pm 0.049, OR = 0.500$; and multiples: $b = -0.479 \pm 0.074, OR = 0.619$). Compared to whites, Asians were about one-third, URM exactly one-half, and multiples about two-thirds as likely to be treated.

The ANOVA for grade average by symptom-treatment involvement and ethnicity was significant for the interaction, $F(9, 113,141) = 2.837, p = .002, \eta^2 = .0002$, ethnicity, $F(1, 113,141) = 130.7, p < .001, \eta^2 = .003$, and symptom-treatment involvement, $F(3, 113,141) = 130.0, p < .001, \eta^2 = .003$.

The difference between the no involvement and diagnosis groups reached threshold for all ethnic groups (whites: $d = -0.26$, URM: $d = -0.12$, Multiple: $d = -0.27$, and Asians: $d = -0.10$); however, the difference was significant ($p < .001$) for whites only. The difference between the diagnosis and the treatment groups reached threshold for all groups but Multiples (whites: $d = 0.22$, URM: $d = 0.19$, and Asians: $d = 0.10$). The difference was significant for URM (p

Table 4. Percentages of students reporting symptoms and treatment involvement and mean cumulative GPA for each symptom-treatment involvement category by gender.

Ethnicity	Depression-treatment	Symptom		Reported		GPA
	Involvement	No	Yes	Total	Mean (SD)	
Asian + Asian-White	No depression	7,010 (100%)	0 (0.00%)	7,010 (66.09%)	3.167 (0.688)	
	Depression-no Dx/Tx	0	3,169 (88.10%)	3,169 (29.88%)	3.010 (0.734)	
	Depression-Dx only	0	115 (3.20%)	115 (1.08%)	2.939 (0.776)	
	Depression-Dx + Tx	0	313 (8.70%)	313 (2.95%)	3.013 (0.729)	
	Column total	7,010	3,597	10,607	3.113 (0.709)	
	Row percentage	(66.09%)	(33.91%)	(100%)		
URM	No depression	10,428 (100%)	0 (0.00%)	10,428 (69.22%)	2.991 (0.682)	
	Depression-no Dx/Tx	0	3,908 (84.28%)	3,908 (25.94%)	2.860 (0.721)	
	Depression-Dx only	0	195 (4.21%)	195 (1.29%)	2.774 (0.711)	
	Depression-Dx + Tx	0	534 (11.52%)	534 (3.54%)	2.908 (0.718)	
	Column total	10,428	4,637	15,065	2.951 (0.697)	
	Row percentage	(69.22%)	(30.78%)	(100%)		
White	No depression	58,056 (100%)	0 (0.00%)	58,056 (69.88%)	3.292 (0.644)	
	Depression-No Dx/Tx	0	18,863 (75.39%)	18,863 (22.71%)	3.192 (0.694)	
	Depression-Dx only	0	1,001 (4.00%)	1,001 (1.20%)	3.019 (0.750)	
	Depression-Dx + Tx	0	5,157 (20.61%)	5,157 (6.21%)	3.162 (0.713)	
	Column total	58,056	25,021	83,077	3.258 (0.664)	
	Row percentage	(69.88%)	(30.12%)	(100%)		
Multiple	No depression	2,778 (100%)	0 (0.00%)	2,778 (63.02%)	3.108 (0.687)	
	Depression-No Dx/Tx	0	1,329 (81.53%)	1,329 (30.15%)	2.966 (0.708)	
	Depression-Dx only	0	76 (4.66%)	76 (1.72%)	2.882 (0.730)	
	Depression-Dx + Tx	0	225 (13.80%)	225 (5.10%)	2.911 (0.802)	
	Column total	2,778	1,630	4,408	3.051 (0.705)	
	Row percentage	(63.02%)	(36.98%)	(100%)		
Asian + Asian-White	No anxiety	5,414 (100%)	0 (0.00%)	5,414 (50.66%)	3.152 (0.691)	
	Anxiety-no Dx/Tx	0	4,859 (92.17%)	4,859 (45.47%)	3.073 (0.722)	
	Anxiety-Dx only	0	138 (2.62%)	138 (1.29%)	2.935 (0.757)	
	Anxiety-Dx + Tx	0	275 (5.22%)	275 (2.57%)	3.156 (0.710)	
	Column total	5,414	5,272	10,686	3.113 (0.708)	
	Row percentage	(50.66%)	(49.34%)	(100%)		
URM	No anxiety	8,591 (100%)	0 (0.00%)	8,591 (56.72%)	2.972 (0.683)	
	Anxiety-No Dx/Tx	0	5,734 (87.48%)	5,734 (37.86%)	2.921 (0.714)	
	Anxiety-Dx only	0	236 (3.60%)	236 (1.56%)	2.890 (0.718)	
	Anxiety-Dx + Tx	0	585 (8.92%)	585 (3.86%)	2.968 (0.700)	
	Column total	8,591	6,555	15,146	2.951 (0.697)	
	Row percentage	(56.72%)	(43.28%)	(100%)		
White	No anxiety	41,741 (100%)	0 (0.00%)	41,741 (49.53%)	3.285 (0.646)	
	Anxiety-no Dx/Tx	0	34,560 (81.27%)	34,560 (41.01%)	3.236 (0.677)	
	Anxiety-Dx only	0	1,745 (4.10%)	1,745 (2.07%)	3.104 (0.713)	
	Anxiety-Dx + Tx	0	6,221 (14.63%)	6,221 (7.38%)	3.201 (0.686)	
	Column total	41,741	42,526	84,267	3.255 (0.664)	
	Row percentage	(49.53%)	(50.47%)	(100%)		
Multiple	No anxiety	2,170 (100%)	0 (0.00%)	2,170 (48.69%)	3.088 (0.698)	
	Anxiety-no Dx/Tx	0	1,946 (85.09%)	1,946 (43.66%)	3.031 (0.702)	
	Anxiety-Dx only	0	106 (4.63%)	106 (2.38%)	2.943 (0.701)	
	Anxiety-Dx + Tx	0	235 (10.28%)	235 (5.27%)	2.928 (0.750)	
	Column total	2,170	2,287	4,457	3.051 (0.704)	
	Row percentage	(48.69%)	(51.31%)	(100%)		

= .017) and for whites only ($p < .001$). The difference between the no involvement and treatment groups did not reach threshold for any ethnic group. In summary, Asians reported the highest depression symptom prevalence and, as a group, had the largest grade average decrement given the symptoms, but were least likely to be diagnosed or treated.

Anxiety

The lower panel of Table 4 presents the symptom-treatment involvement prevalence and grade average by ethnicity for anxiety. The prevalence of anxiety varied significantly with ethnicity, $\chi^2(3, 114,556) = 271.8, p <$

.001, Cramer's $V = .05$, with prevalence ranging from 51.31% for multiple ethnicities, 50.47% for whites, 49.34% for Asians, to 43.28% for USM. An ANOVA for grade average by ethnicity and symptom presence was significant for ethnicity, $F(3, 114,548 = 1,015.1), p < .001, \eta^2 = .026$, and symptom, $F(1, 114,548 = 91.22), p < .001, \eta^2 = .001$, but not the interaction. Within each ethnic group, students reporting anxiety had a significantly (all $p < .001$) lower grade average than students not reporting anxiety.

Of students reporting the symptom, the percentages that were diagnosed only were 4.63% (Multiple), 4.10% (white), 3.60% (URM), and 2.62% (Asian). A logistic regression was used to identify the likelihood of

diagnosis relative to whites given the symptom. Although the overall effect was statistically significant (Wald = 48.14, $df=3$, $p < .001$), only the contrast for Asians, $b = -0.575 \pm 0.090$, $p < .001$, OR = 0.562, and for URM, $b = -0.204 \pm 0.071$, $p = .004$, OR = 0.815, were significant. Thus, Asians were about one-half as likely and URM was about four-fifths as likely as the white reference group to be diagnosed only. The percentages of students who were treated were 14.63% (white), 10.28% (Multiple), 8.92% (URM), and 5.22% (Asian). A logistic regression was conducted to compute the likelihood of treatment given the symptom. The overall effect (Wald = 477.9, $df=3$) was found to be statistically significant ($p < .001$) as well as all three contrasts (Asians: $b = -1.157 \pm 0.063$, OR = 0.314; URM: $b = -0.568 \pm 0.046$, OR = 0.567; and $b = -0.399 \pm 0.070$, OR = 0.671). Compared to whites, Asians were about one-third, URM about one-half, and Multiples about two-thirds as likely to be treated.

The ANOVA for grade average by symptom-treatment involvement and ethnicity was statistically significant for the interaction, $F(9, 114,540 = 2.786)$, $p = .003$, $\eta^2 = .0002$, ethnicity, $F(1, 114,540 = 153.9)$, $p < .001$, $\eta^2 = .004$, and symptom-treatment involvement, $F(3, 114,540 = 33.82)$, $p < .001$, $\eta^2 = .001$. The difference between the no involvement and diagnosis groups exceeded threshold for whites ($d = -0.20$), Asians ($d = -0.20$), and Multiples ($d = -0.13$), but not URM and were significant for whites ($p < .001$) and Asians ($p = .017$) only. The difference between the diagnosis and the treatment groups exceeded threshold for Asians ($d=0.31$), whites ($d=0.15$), and URM ($d=0.11$), but not Multiples and were significant for whites ($p < .001$) and Asians ($p = .002$) only. Unexpectedly, the difference between the no involvement and treatment groups exceeded threshold for Asians ($d=0.12$), and Multiples ($d = -0.15$) and were significant for Asians ($p = .047$) and Multiples ($p = .026$). The positive-valued d for Asians means that students that received treatment had a higher grade average than untreated (no involvement) students; the converse was true for Multiples. Furthermore, treated Multiples had a numerically lower grade average than diagnosed-only Multiples. In summary, Multiples reported the highest anxiety symptom prevalence and the highest likelihoods—relative to whites—of both diagnosis and treatment; however, Multiples received no benefit from their treatment involvement.

Discussion

The main purpose of the study was to assess the levels of a focal depression symptom and a focal anxiety and subsequent treatment involvement for depression and for anxiety, as well as their relationships to grade average among an undergraduate college student sample.

Overall, anxiety and depression were the most common conditions, at 9.2% and 8.7%, respectively, for which students were diagnosed or diagnosed and treated. The focal depression symptom, *Felt so depressed it was difficult to function*, was endorsed by 30.19% of students and the focal anxiety symptom, *felt overwhelming anxiety*, was endorsed by 48.98% of students. Of students reporting the focal symptom, we found that 17.87% were treated for depression and that 12.91% were treated for anxiety. Compared to not-treated students, students who were diagnosed only, whether for depression or for anxiety, had significantly lower grade averages, with effect sizes of -0.30 for depression and -0.20 for anxiety. Although students receiving treatment had higher grade averages (0.19 for depression and 0.17 for anxiety) than diagnosed-only students, the grade averages of treated students remained slightly lower than those of not-treated students, which were 0.10 for depression and 0.03 for anxiety.

Relationships between focal symptom prevalence and treatment involvement differed by gender, but relationships between treatment involvement and grade average did not. Female students had higher prevalence than males of focal symptoms for both depression and anxiety. Female students also were significantly more likely than males to be diagnosed only and to be treated. These relationships were numerically larger for depression than for anxiety. The effects of treatment involvement and gender on grade average were similar for depression and anxiety. There were significant effects for treatment, as well as for gender. However, we found no evidence of a gender-treatment involvement interaction. Thus, the benefits of treatment were not different between female and male students; these results are similar to existing literature.^{3,53,54}

Previous research presented conflicting results regarding ethnic differences in mental health evaluations of college students, with some reporting no difference when compared to white students and others reporting substantial dissimilarities including mood and self-harm problems.¹⁸ Given the considerable differences in lived experiences combined with higher incidences of depression and anxiety among minority students,¹⁸ it is both harmful and careless to generalize findings from prior studies that focus on predominately white populations to minority students.

Limitations

There are limitations to the results of this study. Both depression and anxiety characterized by multiple symptoms varies greatly for any one individual. Our reliance on a single symptom for each condition, however central that symptom may be, may both include students who were not diagnosable and omit students who were. This may account for some of the students receiving treatment but not reporting the focal symptom.

Separate from symptoms, we have to rely on students' reports of what they were treated for. Further, all applicable measures are self-report data, which answers may be exaggerated or subject to social desirability bias. As such, self-reports of grade average by college students may not be as reliable or accurate.

We analyzed the data as if there were a time ordering to events, however temporal order cannot be established. All we may conclude is that in the past twelve months, two events (focal symptom and treatment involvement) may or may not have occurred and that certain combinations of those events were associated with the grade average values.

More subtly, we analyzed cumulative grade average and the effect anxiety or depression had on current grade average; it was found that, seemingly, this would have had more effect on first year students' grade average than it would on fourth year students' grade average. Further, students have the option to self-select to participate in the ACHA-NCHA; as such, study findings are not necessarily generalizable to all college students.

Implications

Given the prevalence of depression and anxiety among college-aged students, continued research into their effects on outcomes like grade average, which is a key predictor of a student's success, will play a critical role in understanding the toll these disorders take. The statistically significant disparities based on both gender and ethnicity could be important further areas of study. As noted in the background, NAMI suggests that gender differences in the number of diagnoses could be due to the way females are socialized to be more comfortable with help-seeking behaviors.¹⁵ Hypotheses such as this one merit further study, so that these disparities can be addressed, and so that treatment and the grade average benefits associated with it can be made more accessible to the groups that receive it least often—male students, and students with nonwhite ethnic identities.

Additional predictors of academic performance should be assessed in future work. While grade average is the foremost predictor for college completion, other indications of student success have yet to be explored. In the growing movement away from strict grade point average scales, some institutions promote greater focus on qualities of adaptability and resilience, emotional intelligence, and other noncognitive indicators of student success. Research should incorporate differential touchstones of academic performance beyond the sole focus of grade averages.

Future work should seek to further scientific understanding of the present study's findings. Both male and minority college students were less likely to seek treatment for depression and anxiety; however, it is unclear what aspects of these gender and ethnic differences

contribute to help-seeking disparities. While our study illuminated differences in self-reported grade point averages by diagnosis and treatment of depression and anxiety, the main underlying mechanism is help-seeking behaviors. Research among college students with anorexia or bulimia has documented a higher grade average for those who sought treatment compared to those without eating disorders,⁵² indicating that help-seeking behaviors may impact the relationship between mental health and academic performance.

A survey of students' help-seeking behaviors is one possible area of further study that could further break down these disparities. Results from this study could inform future interventions that would motivate mental health help-seeking behaviors among college students. One possible avenue of this research would be to investigate the role of culture in help-seeking behaviors and use results to create a culturally grounded intervention to promote treatment-seeking among ethnic minority collegians. While research has begun to evaluate the role of culture in relation to help-seeking among collegians,^{55,56} interventions have not yet emerged which specifically leverage cultural strengths to address help-seeking disparities for depression and anxiety among college students.

The current study provides insight into the differential effects of anxiety and depression on students by gender and race/ethnicity, but further studies are needed to determine the origins of these differences, and the public health response they necessitate.

Conflict of interest disclosure

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States of America and received approval from the Institutional Review Board of The State University of New York at Buffalo.

Funding

No funding was used to support this research and/or the preparation of the manuscript.

ORCID

Autumn Asher BlackDeer  <http://orcid.org/0000-0001-6122-3687>

References

1. Chen JA, Stevens C, Wong SH, Liu CH. Psychiatric symptoms and diagnoses among US college students: a comparison by

- race and ethnicity. *Psychiatr Serv.* 2019;70(6):442–449. doi:10.1176/appi.ps.201800388.
2. National Alliance on Mental Illness (NAMI). Mental health facts in America. Retrieved from <https://www.nami.org/NAMI/Media/NAMI-Media/Infographics/GeneralMHFacts.pdf>. Publication date unavailable.
 3. Mahmoud JSR, Staten RT, Hall LA, Lennie TA. The relationship among young adult college students' depression, anxiety, stress, demographics, life satisfaction, and coping styles. *Issues Ment Health Nurs.* 2012;33(3):149–156. doi:10.3109/01612840.2011.632708.
 4. Turner DP, Thompson ME, Brunner Huber LR, Arif AA. Depressive symptoms and academic performance of North Carolina college students. *N C Med J.* 2012;73(3):169–175. doi:10.18043/ncm.73.3.169.
 5. Beiter R, Nash R, McCrady M, et al. The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *J Affect Disord.* 2015;173:90–96. doi:10.1016/j.jad.2014.10.054.
 6. Walters KS, Bulmer SM, Troiano PF, Obiaka U, Bonhomme R. Substance use, anxiety, and depressive symptoms among college students. *J Child Adolesc Subst Abuse.* 2018;27(2):103–111. doi:10.1080/1067828X.2017.1420507.
 7. Hunt J, Eisenberg D. Mental health problems and helpseeking behavior among college students. *J Adolesc Health.* 2010;46(1):3–10.
 8. Pedrelli P, Nyer M, Yeung A, Zulauf C, Wilens T. College students: mental health problems and treatment considerations. *Acad Psychiatry.* 2015;39(5):503–511. doi:10.1007/s40596-014-0205-9.
 9. Liu CH, Stevens C, Wong SH, Yasui M, Chen JA. The prevalence and predictors of mental health diagnoses and suicide among US college students: implications for addressing disparities in service use. *Depress Anxiety.* 2019;36(1):8–17. doi:10.1002/da.22830.
 10. Eisenberg D, Hunt J, Speer N. Mental health in American colleges and universities: variation across student subgroups and across campuses. *J Nerv Ment Dis.* 2013;201(1):60–67. doi:10.1097/NMD.0b013e31827ab077.
 11. Herman S, Archambeau OG, Deliramich AN, Kim BS, Chiu PH, Frueh BC. Depressive symptoms and mental health treatment in an ethnographically diverse college student sample. *J Am Coll Health.* 2011;59(8):715–720. doi:10.1080/07448481.2010.529625.
 12. Hysenbegasi A, Hass SL, Rowland CR. The impact of depression on the academic productivity of university students. *J Ment Health Policy Econ.* 2005;8(3):145.
 13. D'Amico N, Mechling B, Kempainen J, Ahern NR, Lee J. American college students' views of depression and utilization of on-campus counseling services. *J Am Psychiatr Nurses Assoc.* 2016;22(4):302–311. doi:10.1177/1078390316648777.
 14. Khanam SJ, Bukhari SR. Depression as a predictor of academic performance in male and female university students. *Journal of Pakistan Psychiatric Society.* 2015;12(2):15–17.
 15. National Alliance on Mental Illness (NAMI). College students speak: a survey report on mental health. Retrieved from www.nami.org/namioncampus. 2012.
 16. Blanco C, Okuda M, Wright C, Hasin DS, et al. Mental health of college students and their non-college-attending peers. Results from the National Epidemiologic Study on Alcohol and Related Conditions. *Arch Gen Psychiatry.* 2008;65(12):1429–1437. doi:10.1001/archpsyc.65.12.1429.
 17. American College Health Association. American College Health Association National College Health Assessment II: Undergraduate Student Reference Group Executive Summary. Hanover, MD: American College Health Association. https://www.acha-ncha.org/pubs_rpts.html. 2016.
 18. Mokruie K, Aciri MC. Subjective health and health behaviors as predictors of symptoms of depression and anxiety among ethnic minority college students. *Social Work in Mental Health.* 2015;13(2):186–200. doi:10.1080/15332985.2014.911238.
 19. Mahmoud JSR, Staten R, Lennie TA, Hall LA. The relationships of coping, negative thinking, life satisfaction, social support, and selected demographics with anxiety of young adult college students. *J Child Adolesc Psychiatr Nurs.* 2015;28(2):97–108. doi:10.1111/jcap.12109.
 20. Lipson SK, Kern A, Eisenberg D, Breland-Noble AM. Mental health disparities among college students of color. *J Adolesc Health.* 2018;63(3):348–356. doi:10.1016/j.jadohealth.2018.04.014.
 21. Twentyman J, Frank M, Lindsey L. Effects of race and ethnicity on mental health and help-seeking amongst undergraduate university students. *J Undergrad Ethnic Minority Psychol.* 2017;3(6):2332–9300.
 22. Twenge JM, Nolen-Hoeksema S. Age, gender, race, socioeconomic status, and birth cohort difference on the children's depression inventory: a meta-analysis. *J Abnorm Psychol.* 2002;111(4):578–588. doi:10.1037/0021-843X.111.4.578.
 23. Menselson T, Rehkopf DH, Kubzansky LD. Depression among Latinos in the United States: a meta-analytic review. *J Consult Clin Psychol.* 2008;76(3):355–366. doi:10.1037/0022-006X.76.3.355.
 24. Beals J, Manson SM, Keane EM, Dick RW. Factorial structure of the Center for Epidemiologic Studies—Depression scale among American Indian college students. *Psychol Assess.* 1991;3(4):623–627. doi:10.1037/1040-3590.3.4.623.
 25. Cheng HL, Kwan KLK, Sevig T. Racial and ethnic minority college students' stigma associated with seeking psychological help: examining psychocultural correlates. *J Couns Psychol.* 2013;60(1):98–111. doi:10.1037/a0031169.
 26. Cokley K, Smith L, Bernard D, et al. Impostor feelings as a moderator and mediator of the relationship between perceived discrimination and mental health among racial/ethnic minority college students. *J Couns Psychol.* 2017;64(2):141–154. doi:10.1037/cou0000198.
 27. Hwang WC, Goto S. The impact of perceived racial discrimination on the mental health of Asian American and Latino college students. *Cultur Divers Ethnic Minor Psychol.* 2008;14(4):326–335. doi:10.1037/1099-9809.14.4.326.
 28. Givens JL, Houston TK, Van Voorhees BW, Ford DE, Cooper LA. Ethnicity and preferences for depression treatment. *Gen Hosp Psychiatry.* 2007;29(3):182–191. doi:10.1016/j.genhosppsych.2006.11.002.
 29. Rao D, Feinglass J, Corrigan P. Racial and ethnic disparities in mental illness stigma. *J Nerv Ment Dis.* 2007;195(12):1020–1023. doi:10.1097/NMD.0b013e31815c046e.
 30. Kalibatseva Z, Leong FTL. Cultural factors, depressive and somatic symptoms among Chinese American and European American college students. *J Cross-Cult Psychol.* 2018;49(10):1556–1572. doi:10.1177/0022022118803181.
 31. Muehlenkamp JJ, Marrone S, Gray JS, Brown DL. A college suicide prevention model for American Indian students. *Prof Psychol Res Pract.* 2009;40(2):134–140. doi:10.1037/a0013253.
 32. Asher BlackDeer A, Patterson Silver Wolf DA, Beeler-Stinn S, Duran B. Substance use and interpersonal violence: exploring potential threats to underrepresented minority students' academic success. *J Coll Stud Ret.* 2020:1–20.
 33. Kenny R, Dooley B, Fitzgerald A. How psychological resources mediate and perceived social support moderates the relationship between depressive symptoms and help-seeking intentions in college students. *Br J Guid Counsell.* 2016;44(4):402–413. doi:10.1080/03069885.2016.1190445.
 34. Bravo AJ, Pearson MR, Henson JM. Drinking to cope with depressive symptoms and ruminative thinking: a multiple mediation model among college students. *Subst Use Misuse.* 2017;52(1):52–62. doi:10.1080/10826084.2016.1214151.

35. King KM, Meehan BT, Trim RS, Chassin L. Marker or mediator? The effects of adolescent substance use on young adult educational attainment. *Addiction*. 2006;101(12):1730–1740. doi:10.1111/j.1360-0443.2006.01507.x.
36. Jardin C, Mayorga NA, Bakhshaie J, et al. Clarifying the relation of acculturative stress and anxiety/depressive symptoms: the role of anxiety sensitivity among Hispanic college students. *Cultur Divers Ethnic Minor Psychol*. 2018;24(2):221–230. doi:10.1037/cdp0000175.
37. Kearney LK, Draper M, Barón A. Counseling utilization by ethnic minority college students. *Cultur Divers Ethnic Minor Psychol*. 2005;11(3):272–285. doi:10.1037/1099-9809.11.3.272.
38. Eisenberg D, Downs MF, Golberstein E, Zivin K. Stigma and help seeking for mental health among college students. *Med Care Res Rev*. 2009;66(5):522–541. doi:10.1177/1077558709335173.
39. Jackson-Triche ME, Sullivan JG, Wells KB, Rogers W, Camp P, Mazel R. Depression and health-related quality of life in ethnic minorities seeking care in general medical settings. *J Affect Disord*. 2000;58(2):89–97. doi:10.1016/S0165-0327(99)00069-5.
40. Simpson SM, Krishnan LL, Kunik ME, Ruiz P. Racial disparities in diagnosis and treatment of depression: a literature review. *Psychiatr Q*. 2007;78(1):3–14. doi:10.1007/s11126-006-9022-y.
41. Alegria M, Chatterji P, Wells K, et al. Disparity in depression treatment among racial and ethnic minority populations in the United States. *PS*. 2008;59(11):1264–1272. doi:10.1176/ps.2008.59.11.1264.
42. Ahmed Z, Julius SH. Academic performance, resilience, depression, anxiety and stress among women college age students. *Indian J Posit Psychol*. 2015;6(4):367–370.
43. Bayram N, Bilgel N. The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Soc Psychiatry Psychiatr Epidemiol*. 2008;43(8):667–672. doi:10.1007/s00127-008-0345-x.
44. Randelović D, Mitrović M, Krstić M. Aggressiveness, depression and academic achievement of students. *Teme - Časopis za Društvene Nauke*. 2015;3:701–714.
45. McHugh RK, Whitton SW, Peckham AD, Welge JA, Otto MW. Patient preference for psychological vs. pharmacological treatment of psychiatric disorders: a meta-analytic review. *J Clin Psychiatry*. 2013;74(06):595–602. doi:10.4088/JCP.12r07757.
46. Adelman C. More than 13 ways of looking at degree attainment. *National Cross-Talk*. 1998;6(4):6–10.
47. Adelman C. *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment*. Jessup, MD: U.S. Department of Education; 1999.
48. DesJardins SL, Ahlburg DA, McCall BP. An event history model of student departure. *Econ Educ Rev*. 1999;18(3):375–390. doi:10.1016/S0272-7757(98)00049-1.
49. DesJardins SL, McCall BP, Ahlburg DA, Moye MJ. Adding a timing light to the “tool box. *Res High Educ*. 2002;43(1):83–114. doi:10.1023/A:1013022201296.
50. Patterson Silver Wolf DA, Perkins JD, VanZile-Tamsen C, Butler-Barnes ST. Impact of violence and Relationship Abuse on Grades of American Indian/Alaska Native Undergraduate College Students. *J Interpers Violence*. 2018;33(23):3686–3704. doi:10.1177/0886260516639255.
51. Fish J, Livingston JA, VanZile-Tamsen C, Patterson Silver Wolf DA. Victimization and substance use among Native American college students. *J Coll Stud Dev*. 2017;58(3):413–431. doi:10.1353/csd.2017.0031.
52. Claydon E, Zullig KJ. Eating disorders and academic performance among college students. *J Am Coll Health*. 2020;68(3):320–325. doi:10.1080/07448481.2018.1549556.
53. Marthoenis M, Meutia I, Fathiariani L, Sofyan H. Prevalence of depression and anxiety among college students living in a disaster-prone region. *Alexandria Journal of Medicine*. 2018;54(4):337–340. doi:10.1016/j.ajme.2018.07.002.
54. Toscos T, Carpenter M, Drouin M, Roebuck A, Kerrigan C, Mirro M. College students' experiences with, and willingness to use. *Telemed J E Health*. 2018;24(12):998–1005. doi:10.1089/tmj.2017.0243.
55. Chen JI, Romero GD, Karver MS. The relationship of perceived campus culture to mental health help-seeking intentions. *J Couns Psychol*. 2016;63(6):677–684. doi:10.1037/cou0000095.
56. Campbell RD, Long LA. Culture as a social determinant of mental and behavioral health: a look at culturally shaped beliefs and their impact on help-seeking behaviors and service use patterns of Black Americans with depression. *Best Pract Ment Health*. 2014;10(2):48–62.