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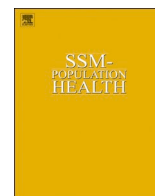
Pickering, Trevor

Martz, Connor

et al.

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Ethno-racial differences in anxiety and depression impairment among emerging adults in higher education☆

Hans Oh [a,*], Trevor A. Pickering [b], Connor Martz [c], Karen D. Lincoln [d], Joshua Breslau [e], David Chae [f]

[a] School of Social Work, University of Southern California, USA
[b] Department of Population and Public Health Sciences, University of Southern California, USA
[c] Population Research Center, University of Texas, Austin, USA
[d] Department of Environmental and Occupational Health, Program in Public Health, University of California, Irvine, USA
[e] RAND Corporation, USA
[f] Department of Social, Behavioral, and Population Science, Tulane School of Public Health & Tropical Medicine, USA

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ABSTRACT

Background: Despite having higher exposure to stressors, many ethno-racial groups report similar or lower prevalence of clinical depression and anxiety compared to their White counterparts, despite experiencing greater psychosocial risk factors for poor mental health outcomes, thus presenting an epidemiological paradox. Ethno-racial differences in impairment, a diagnostic criterion, may in part explain this paradox.

Methods: We analyzed data from the Healthy Minds Study (2020–2021) and using survey-weighted linear mixed effects models, we tested whether there were ethno-racial differences in impairment across multiple ethno-racial groups at various levels of severity for anxiety and depression.

Results: Black students reported lower mean impairment scores relative to White students at moderate and severe anxiety. Hispanic/Latine students only reported lower impairment relative to White students at severe anxiety. Asian students reported relatively lower mean impairment than White students at mild anxiety, and this difference continued to grow as anxiety severity increased. Similar trends were observed for depression. Black and Hispanic/Latino students reported lower mean impairment scores at moderate to severe depression. Asian students reported lower mean impairment scores beginning at mild depression to severe depression.

Conclusion: Self-reported anxiety and depression related impairment varies by ethno-racial group, with Black, Hispanic/Latinx, and Asian students reporting lower impairment compared to White students at higher levels of symptom severity. These findings open the possibility that racial differences in the impairment criterion of clinical diagnoses may explain some of the racial paradox.

1. Introduction

For decades, epidemiologists have sought to unravel the Black-White mental health paradox where Black Americans report similar or lower prevalence of psychiatric disorders than their White counterparts in the United States (US)(Pamplin II & Bates, 2021). The paradox emerges in light of social stress theory, which posits marginalized populations have higher exposures to stressors (such as discrimination) and greater barriers to resources, which should result in higher prevalence of psychiatric disorders (Schwartz & Meyer, 2010). Yet this has not been born out in the epidemiological data for Black Americans, who report similar or even lower prevalence of psychiatric disorders when compared with their White counterparts (Breslau et al., 2005, 2006; Hasin et al., 2018; Jackson et al., 2010).

Currently, the literature paints a complex picture of the Black-White mental health paradox when examining mental health symptoms.

Regarding depressive symptoms, one study showed higher mean levels of depressive symptoms among Black adults when compared with White adults (Skarupski et al., 2005). In another study, Black adults reported greater persistence or severity of depressive symptoms (Breslau et al., 2005). In some studies, Black adults reported higher levels of psychological distress when compared with White adults (Barnes & Bates, 2017). Yet, in general, based on large representative samples of the general population, the lifetime prevalence of mood and anxiety disorders are generally lower for Black adults when compared with White adults (Erving et al., 2019; Thomas Tobin et al., 2022).

There have been several hypotheses posited on how structural and institutional racism might result in the paradoxical findings, including racial biases in clinical interviews, selection biases, and measurement artefacts (Pamplin II & Bates, 2021). The evidence for each of these hypotheses tend to be mixed or inadequate in explaining the entirety of the racial paradox. One hypothesis is that Black individuals may respond differently to structured diagnostic instruments that were largely developed using White samples (Pamplin II & Bates, 2021). In theory, individuals may have culturally specific understandings of the items or have culturally specific experiences of symptoms. For example, one study found differential item functioning in a depression measure by race/ethnicity (Breslau et al., 2008). However, the authors noted that this did not change the relative prevalence of depression across the groups.

Certain items may be more consequential in terms of diagnosis. According to the Diagnostic Statistical Manual (DSM), symptoms must cause impairment in functioning to constitute a diagnosis. Therefore, items that assess for impairment (rather than just symptomology) may more strongly influence whether one receives a formal diagnosis, and it is possible that there are differences in how various ethno-racial groups understand and report impairment. Conceivably, people of color may be less likely to endorse the impairment criterion. Oh et al. (2023) found that at moderate to severe levels of depression, Black students in higher education had lower risk of depression impairment compared with White students.

The Black-White mental health paradox is in fact a part of a much larger ethno-racial paradox pertaining to other ethno-racial groups and a range of psychiatric conditions. Hispanic/Latino Americans frequently experience social stressors and barriers to resources (Colen et al., 2018), yet often exhibit a mental health advantage (Alcántara et al., 2017; Oh et al., 2022; Ruiz et al., 2016), depending on the ethnic subgroup and generational status (Alegría et al., 2008). The mental health advantage is less pronounced for US-born Hispanics/Latines or Hispanics/Latines who arrived as children (Alegría et al., 2017), but nonetheless reveal paradoxical findings. Similarly, Asian Americans experience discrimination (Gee et al., 2009), especially following the COVID-19 pandemic (Oh et al., 2021; Zhou et al., 2023), while also facing challenges to accessing health services (Yang et al., 2020), yet frequently have lower prevalence of most major psychiatric disorders when compared with other ethno-racial groups.

1.1. Study aims

We analyzed a dataset of students at institutions of higher education in the US and build on prior studies by testing whether there were ethno-racial differences in impairment from both anxiety and depression using a broader set of ethno-racial categories.

2. Methods

2.1. Sample

We analyzed data from the Healthy Minds Study (HMS; September 2020–June 2021), which is an online cross-sectional survey administered to undergraduate and graduate students enrolled in 140 schools across the US. All institutions of higher learning elected to participate in the HMS study, which did not have any exclusion criteria for institutional enrollment. The participating institutions are diverse in terms of size of student populations, demographic composition, and geographic location (which span all nine census regions). The smallest school sample was 52 students and the largest was 7829 students; the median number of students was 640, with an inter-quartile range of 405 to 1136. Students must have been 18 years old or older to participate. The registrars at each institution provided information necessary for recruitment and non-response analyses. Students were recruited through email and were offered a chance to win prizes. This strategy resulted in a response rate of 14%, which is comparable to other response rates from non-probability online surveys (Baker et al., 2013; Craig et al., 2013). Survey data were collected through Qualtrics, which presented students with an informed consent page that required agreement to the terms before allowing survey completion. We restricted the sample by age (18–29) to focus on young adults. We then used complete-case analysis resulting in a final analytic sample of 110,362 (Fig. S0 in the Supplemental Materials). Weighted sample characteristics for this study are presented in Table 1 (unweighted sample characteristics are available upon request). Sample characteristics stratified by race/ethnicity are presented in Table 2. Overall, the sample was mostly White (60%), majority women (57%), with an average age of 20. The HMS was approved by the Institutional Review Board Advarra, and the Institutional Review Boards at all participating campuses. This secondary data analysis was approved by the Institutional Review Board at the University of Southern California. The HMS data are publicly available upon request at: https://healthymindsnetwork.org/hms/.

2.2. Measures

Race/ethnicity (predictor). Race is a social construct that has historically been falsely used to infer genetic or biological differences (Braveman & Parker Dominguez, 2021). Ethnicity refers to common culture and ancestry. However, surveys often conflate race and ethnicity

Table 1
Sample characteristics.

	Weighted	Unweighted
	N = 112,399[1]	N = 112,399[1]
Race/Ethnicity		
White	67,531 (60%)	68,541 (61%)
Asian	10,314 (9.2%)	13,417 (12%)
Black	12,906 (11%)	9992 (8.9%)
Hispanic/Latine	9059 (8.1%)	7771 (6.9%)
Two or More	10,755 (9.6%)	10,641 (9.5%)
Middle Eastern/Arab	1347 (1.2%)	1670 (1.5%)
Pacific Islander	196 (0.2%)	144 (0.1%)
American Indian/Alaska Native	291 (0.3%)	223 (0.2%)
Age (Years)	20.00 (19.00, 22.00)	21.00 (19.00, 23.00)
Gender Identity		
Man	44,748 (40%)	31,117 (28%)
Woman	64,057 (57%)	77,571 (69%)
Queer or Non-Binary	3594 (3.2%)	3711 (3.3%)
Depression Severity	8 (4, 14)	8 (4, 14)
Unknown	9180	8318
Depression Impairment		
Not Difficult At All	20,969 (21%)	19,365 (19%)
Somewhat Difficult	50,504 (51%)	52,527 (52%)
Very Difficult	17,990 (18%)	19,098 (19%)
Extremely Difficult	8907 (9.1%)	9167 (9.2%)
Unknown	14,030	12,242
Anxiety Severity	7 (3, 12)	7 (3, 13)
Unknown	9651	8923
Anxiety Impairment		
Not Difficult At All	18,679 (20%)	17,679 (18%)
Somewhat Difficult	48,489 (52%)	50,565 (52%)
Very Difficult	17,810 (19%)	18,987 (20%)
Extremely Difficult	9116 (9.7%)	9460 (9.8%)
Unknown	18,306	15,708

[1] n (%); Median (IQR).

Table 2
Sample characteristics stratified by ethno-racial group.

	Overall	White	Asian	Black	Hispanic/Latine	Multiracial	Middle Eastern/Arab	Pacific Islander	American Indian/Alaska Native	p-value[2]
	N = 112,399[1]	N = 67,531[1]	N = 10,314[1]	N = 12,906[1]	N = 9,059[1]	N = 10,755[1]	N = 1,347[1]	N = 196[1]	N = 291[1]	
Depression Severity	9.42 (6.72)	9.34 (6.68)	9.02 (6.54)	8.72 (6.75)	9.96 (6.82)	10.49 (6.88)	9.77 (6.54)	10.79 (6.22)	10.31 (7.15)	<0.001
Unknown	9180	4940	801	1641	815	817	137	13	15	
Depression Impairment										<0.001
Not Difficult At All	20,969 (21%)	12,263 (21%)	2196 (24%)	2832 (27%)	1631 (21%)	1747 (18%)	209 (18%)	37 (21%)	54 (21%)	
Somewhat Difficult	50,504 (51%)	30,875 (52%)	4926 (55%)	5227 (50%)	4039 (51%)	4665 (48%)	586 (50%)	66 (37%)	120 (46%)	
Very Difficult	17,990 (18%)	11,148 (19%)	1318 (15%)	1530 (15%)	1469 (19%)	2164 (22%)	247 (21%)	49 (28%)	64 (25%)	
Extremely Difficult	8907 (9.1%)	5407 (9.1%)	588 (6.5%)	880 (8.4%)	797 (10%)	1068 (11%)	122 (10%)	25 (14%)	19 (7.5%)	
Unknown	14,030	7838	1286	2436	1123	1111	183	19	34	
Anxiety Severity	8.02 (6.01)	8.17 (6.01)	7.23 (5.76)	7.05 (5.95)	8.14 (5.98)	8.74 (6.09)	8.38 (6.44)	8.69 (5.89)	8.64 (6.72)	<0.001
Unknown	9651	5230	844	1684	822	921	128	12	10	
Anxiety Impairment										<0.001
Not Difficult At All	18,679 (20%)	11,140 (19%)	1902 (22%)	2365 (24%)	1399 (19%)	1611 (17%)	174 (16%)	29 (17%)	58 (23%)	
Somewhat Difficult	48,489 (52%)	29,627 (51%)	4708 (55%)	4936 (51%)	4012 (53%)	4478 (49%)	543 (50%)	78 (47%)	106 (41%)	
Very Difficult	17,810 (19%)	11,115 (19%)	1277 (15%)	1570 (16%)	1391 (18%)	2108 (23%)	246 (22%)	39 (23%)	62 (24%)	
Extremely Difficult	9116 (9.7%)	5694 (9.9%)	612 (7.2%)	850 (8.7%)	745 (9.9%)	1030 (11%)	134 (12%)	21 (13%)	30 (12%)	
Unknown	18,306	9956	1814	3184	1512	1527	250	28	35	

[1] Mean (SD); n (%).
[2] Wilcoxon rank-sum test for complex survey samples; chi-squared test with Rao & Scott's second-order correction.

into the same category, as was the case with the HMS dataset. Race/ethnicity was based on self-report, where students selected from the following list of ethno-racial categories (all that apply): White, Black (including African American), Latine/Hispanic, Asian (including Asian American), Native Hawaiian/Pacific Islander, American Indian or Alaskan Native, Middle Eastern (including Arab and Arab American), and other (self-identified). Each racial category comprises multiple diverse ethnic groups. Individuals who selected more than one category were coded as multiracial (i.e., two or more), though we acknowledge that these individuals may not necessarily self-identify as multiracial.

Depression was measured using the Patient Health Questionnaire – 9 (PHQ-9; Kroenke and Spitzer, 2002), which is validated and widely used in various populations. The PHQ-9 contains nine questions eliciting information about depressive symptoms over the past two weeks. Response choices regarding the frequency of symptoms ranged from 'not at all' to 'nearly every day'. Depression items were summed into a scale ranging from 0 to 27 and were categorized into: minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27). *Depression impairment* (outcome). The depression scale had a reliability of alpha = 0.90 in this sample. Depression impairment was measured using the single ordinal item: "How difficult have these problems [referring to the PHQ-9 items] made it for you to do your work, take care of things at home, or get along with other people?" Response options included: Not difficult at all, Somewhat difficult, Very difficult, Extremely difficult.

Anxiety was measured using the General Anxiety Disorder – 7 (GAD-7; Spitzer et al., 2006), which is also validated and widely used in various populations. The GAD-7 elicited information about anxiety symptoms over the past two weeks. The anxiety items were summed into a scale ranging from 0 to 21, and then categorized into: minimal (0–4), mild (5–9), moderate (10–14), and severe (15–21). The anxiety scale had a reliability of alpha = 0.92 in this sample. Anxiety impairment was measured using the single ordinal item: "How difficult have these

problems (referring to the GAD-7 items) made it for you to do your work, take care of things at home, or get along with other people?" Response options included: Not difficult at all, somewhat difficult, very difficult, extremely difficult.

Sociodemographic characteristics (covariates). Respondents self-reported their age (continuous in years) and gender (man, woman, transgender/nonbinary/other).

2.3. Analysis

To examine the association between symptom severity and impairment across ethno-racial groups, we used survey-weighted linear mixed effects models. These models estimated impairment level (outcome) and included an interaction term between race/ethnicity category and anxiety/depression severity category score, with a random intercept for college/university/school. Model coefficients reflected whether participants with a certain level of anxiety/depression experienced more or less impairment relative to White participants (reference group) with the same level of anxiety/depression. Separate models were estimated to examine the effects of anxiety and depression. A mean impairment difference score of −0.10 indicates that, on average, for every 10 people in that ethno-racial category, one of them responded one-level lower on impairment compared to White individuals. For a difference score of −0.20, on average, for every five people in that ethno-racial category, one of them responded one-level lower on impairment compared to White individuals. We used sample probability weights to adjust for nonresponse. The weights were constructed using administrative data at each participating college/university/school (e.g., race/ethnicity, gender, grade point average). Response propensity was estimated for each type of student, and students who were less likely to complete the survey were weighted more heavily. Models were run both unadjusted and adjusted for gender and age. All models (unadjusted vs. adjusted, weighted vs. unweighted) are available in the Supplemental Materials.

We explored effect modification at the highest levels of anxiety and depression by stratifying by additional characteristics, including gender, sexual orientation, nativity, and disability status, available in the Supplemental Materials. All analyses were performed in R (v4.3.1).

3. Results

The average anxiety impairment score was 2.21 (SD 0.85) and the median was 2 (IQR: 2–3). The average depression impairment score was 2.18 (SD 0.85), and the median was 2 (IQR: 2–3). Both averages reflected that it was slightly more than "somewhat difficult" to perform daily activities.

Across all students, there was a consistent increase in impairment rating as both anxiety and depression severity increased. Mean impairment ratings (on a scale of 1–4) were 1.50 (SD 0.54) for those reporting minimal anxiety, 2.06 (SD 0.55) for those reporting mild anxiety, 2.51 (SD 0.69) for those reporting moderate anxiety, and 3.14 (SD 0.79) for those reporting severe anxiety. Likewise, mean impairment ratings were 1.44 (SD 0.52) for those with no depression, 1.96 (SD 0.55) for those with mild depression, 2.36 (SD 0.65) for those with moderate depression, 2.79 (SD 0.77) for those with moderately severe depression, and 3.31 (SD 0.76) for those with severe depression. This relationship between anxiety/depression severity and impairment ratings was observed across all racial/ethnic groups.

We found that the effect of ethno-racial group on impairment score was moderated by severity category for both anxiety and depression (interaction p's < 0.001). This effect did not appear to be confounded by gender or age; adjusted coefficient estimates did not change appreciably from unadjusted estimates. At minimal levels of anxiety, Black, Hispanic/Latine, and Middle Eastern students reported higher mean impairment scores (+0.04, +0.07, +0.11, respectively, p ≤ 0.002) relative to White students. Black students reported lower impairment relative to White students at moderate anxiety (−0.08, p < 0.001) and severe anxiety (−0.05, p = 0.005). Hispanic/Latine students only reported lower impairment relative to White students at severe anxiety (−0.05, p = 0.008). Asian students reported relatively lower impairment than White students at mild anxiety (−0.05, p < 0.001), and this difference continued to grow as anxiety severity increased (−0.11 for moderate, −0.13 for severe, p's < 0.001). The observed differences for Black and Hispanic/Latine students (vs. White students) become nonsignificant in the unweighted analyses. [Fig. 1].

Similar trends were observed for depression. For students with 'no depression', those who were Black and Hispanic/Latino reported higher mean impairment scores (+0.03, +0.04, p ≤ 0.05) relative to White students. Black and Hispanic/Latino students reported lower mean impairment scores at moderate depression (−0.07, −0.05, p ≤ 0.001), moderately severe depression (−0.14, −0.10, p < 0.001), and severe depression (−0.18, −0.10, p < 0.001). Asian students' impairment scores began to diverge from White students at mild depression (−0.11, p < 0.001), and continued to decrease at moderate depression (−0.19, p < 0.001), moderately severe depression (−0.20, p < 0.001), and severe depression (−0.22, p < 0.001). [Fig. 2].

We explored impairment from anxiety and depression across ethno-racial groups, while stratifying by additional characteristics (see Supplemental Materials). Multiracial men reported lower impairment due to anxiety/depression than White men, but multiracial women were not significantly different from White women. Black and Latino women reported lower impairment than White women for anxiety and depression, but Black and Latino men did not report lower impairment than White men. Asian men and women reported lower impairment for anxiety/ depression compared to White men and women. There did not appear to be significant differences between heterosexual vs. non heterosexual respondents. However, heterosexual Asian students reported lower impairment due to depression than non-heterosexual Asian students. There were no apparent differences in impairment based on nativity. Asians and White students without a disability reported lower impairment due to anxiety and depression compared to those with a disability.

4. Discussion

4.1. Main findings

In this study, we examined whether race/ethnicity was associated with impairment across levels of anxiety and depression severity among a large sample of emerging adult students in higher education across the US. While prior research found evidence that Black students were less likely to report depression impairment than White students (Oh et al., 2023), we found further evidence of ethno-racial differences, such that Hispanic/Latine and Asian American students were also less likely to report impairment at higher levels of anxiety and depression. The results of our study support the notion that certain ethno-racial groups may differ in their evaluations of whether symptoms interfere with their daily life activities, similar to prior studies (Coyne & Marcus, 2006). The main implication is that it is possible that some ethno-racial individuals with severe levels of anxiety or depression would not receive a proper clinical diagnosis by not meeting the impairment criterion, resulting in a lower rate of diagnosis when compared with their White counterparts, which may partly explain the ethno-racial paradox and may also result in lower rates of proper and timely treatment.

Our findings appear to align with existing literature, which has suggested that Black, Hispanic/Latine, and Asian Americans reported lower perceived need for mental health treatment at each level of symptom severity when compared to White Americans; among those with severe symptomology, Asian Americans and Hispanic/Latine Americans interviewed in Spanish (vs English) were the least likely to report perceived treatment need (Breslau et al., 2017). We found that Black, Hispanic/Latine, and Asian American students were less likely to report impairment from anxiety and depression symptoms, and this may contribute to whether they perceive need for treatment. We note that some studies show the opposite pattern among individuals who have been diagnosed with anxiety disorders, namely that there is evidence that Black and Hispanic/Latine individuals can exhibit worse psychosocial functioning and higher levels of impairment among those with a formal anxiety disorder diagnosis (Moitra et al., 2014; Polo et al., 2011).

We would be remiss if we did not also acknowledge that studies have documented the strengths and resilience of Black, Hispanic/Latine, and Asian communities (Andrade et al., 2021; Brown & Tylka, 2011; Iyer et al., 2023; Schmidt et al., 2014). One systematic review found that Black people may cope with racism through social support, religion, avoidance of stressors, and problem-focused strategies (e.g., confronting the problem) (Jacob et al., 2023). Another review of Latine Americans found evidence that ethnic pride and belonging may attenuate the negative impact of perceived discrimination on mental health (Andrade et al., 2021). Further, a literature review found that Asian American communities may engage in collectivistic coping (Kuo, 2013). We did not test whether coping strategies and resilience can explain the paradox; however, the literature raises the question of whether coping resources can reduce impairment for anxiety or dpression without necessarily reducing the actual severity or persistence of symptoms.

4.2. Limitations

We note several limitations of this study. First, findings may be biased due to the non-probability sampling strategy. We used survey weights to account for non-response to make the findings more representative based on the known characteristics of the full populations of students at the participating institutions of higher learning; however, sampling bias remains a concern, as our findings may not necessarily be accurate with respect to under-represented students and students belonging to groups that were less likely to have completed survey. Second, we examined cross-sectional differences across ethno-racial
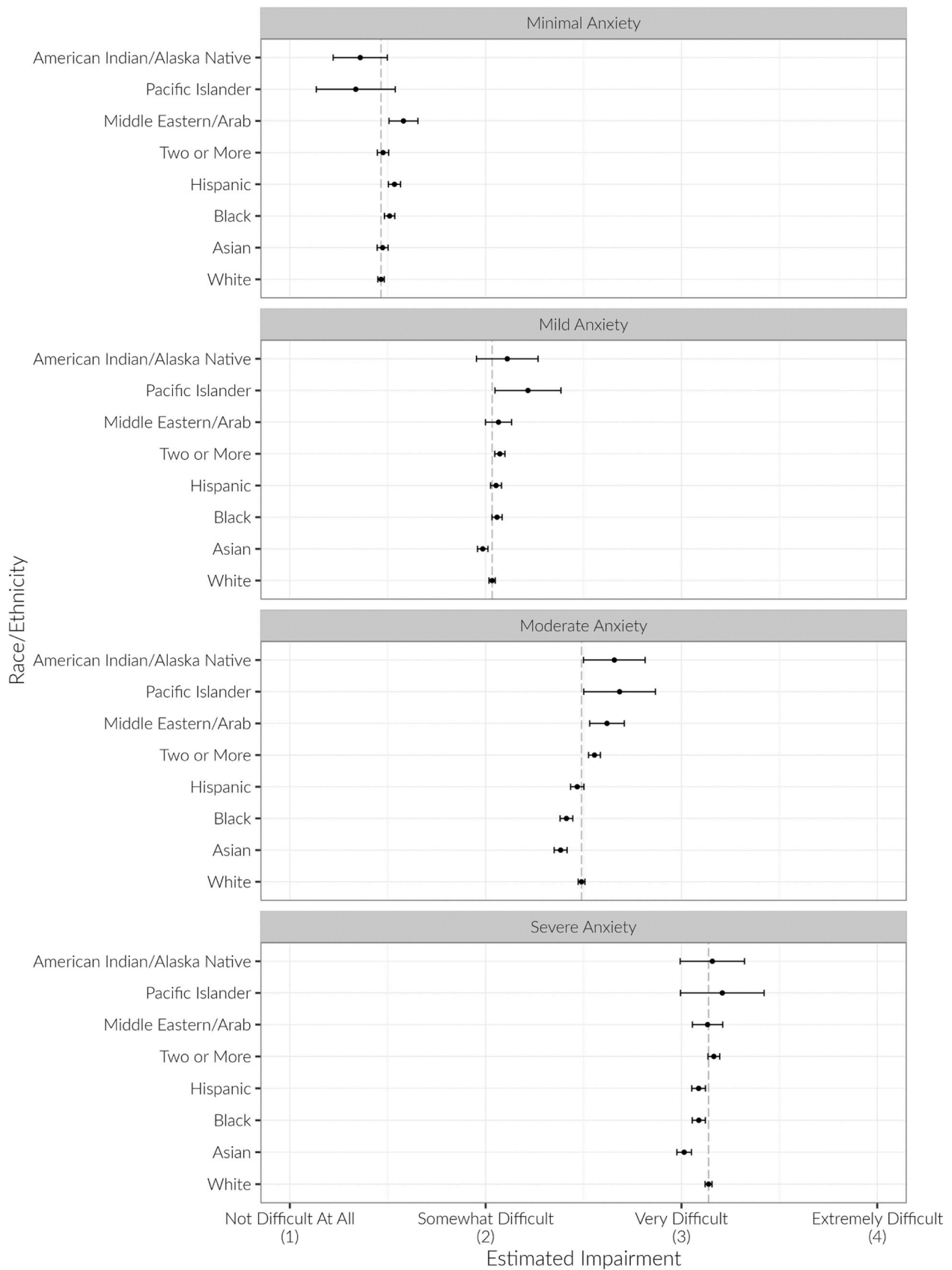
Fig. 1. Estimated impairment levels due to anxiety, by race and anxiety severity category
Linear mixed-effects model adjusting for age and gender, with a random intercept for school. Vertical dashed lines reflect the estimated impairment for White participants at each anxiety severity level. 95% confidence intervals on the estimate are included.

Fig. 2. Estimated impairment levels due to depression, by race and depression severity category
Linear mixed-effects model adjusting for age and gender, with a random intercept for school. Vertical dashed lines reflect the estimated impairment for White participants at each depression severity level. 95% confidence intervals on the estimate are included.

categories among educated emerging adults and more research is needed to determine whether our findings generalize outside of this population. In other words, it is unclear whether ethno-racial differences in impairment exist among young adults who did not pursue higher education. Third, these data were collected during the COVID-19 pandemic which has been linked with an increased prevalence of mental health problems disproportionately impacting ethno-racial minorities (Egede & Walker, 2020; Novacek et al., 2020; Verdery et al.,

2020). At the same time, the year 2020 was also marked by numerous protests against racial injustices following the deaths of Black Americans at the hands of police officers (Njoku et al., 2021), which may have been linked to anxiety and depression (Bowleg et al., 2020; McLeod et al., 2020). Thus, findings may reflect a period effect. Third, the ethno-racial categories we used in the study likely masks important ethnic differences. While we explored intersectionality, we could not account for the countless intersections of identity, which could have modified impairment scores, as suggested in prior studies on perceived need for mental health treatment among Hispanic/Latine and Asian Americans (Bauer et al., 2012; Lee et al., 2020; Villatoro et al., 2018; Williams et al., 2007). Finally, impairment was only assessed using a single item, and future research should administer more robust measures to examine the specific ways in which people experience impairment from anxiety and depression across ethno-racial groups.

4.3. Implications and future research

Our findings can inform practice by educating providers to conduct more thorough screenings when using the GAD-7 or PHQ-9 among ethno-racial minorities. Routine screenings should not dictate need for care purely on the basis on impairment among ethno-racial minorities. Clinicians can administer the GAD-7 and PHQ-9 but should probe more deeply regarding impairment before making clinical decisions.

Existing hypotheses have yet to adequately unravel the racial paradox. Our findings suggest that differential misclassification by instruments remains a contributing factor, though the racial differences we found in our study would not on their own explain away the racial paradox. Future research may continue to study the impairment criterion given how central it is to diagnosis. Also, we explored effect modification by gender, sexual orientation, disability status, and nativity. Estimates were often imprecise when models lacked statistical power. However, findings suggested that certain subgroups may potentially report lower levels of impairment, such as multiracial men (vs. white men) and heterosexual Asian students (vs. sexual minority Asian students). These comparisons call for more quantitative research with larger and more diverse samples, as well as qualitative and participatory approaches, to investigate whether intersectional factors shape the likelihood of reporting impairment from anxiety and depression.

5. Conclusion

We found that self-reported anxiety and depression related impairment varies by ethno-racial group among emerging adults in higher education, with Black, Hispanic/Latine, and Asian American students reporting lower impairment compared to White students at higher levels of symptom severity. These findings open the possibility that ethno-racial differences in the impairment criterion of clinical diagnoses may explain some the racial depression paradox, though not all. Future studies can examine coping and resilience across ethno-racial groups, and disaggregate ethno-racial groups further to examine within-group heterogeneity to explore which subgroups are more likely to endorse impairment.

Ethics statement

The HMS was approved by the Institutional Review Board Advarra, and the Institutional Review Boards at all participating campuses. This secondary data analysis was approved by the Institutional Review Board at the University of Southern California. The HMS data are available upon request at: https://healthymindsnetwork.org/hms/.

CRediT authorship contribution statement

Hans Oh: Writing – original draft, Conceptualization. **Trevor A.**

Pickering: Formal analysis. **Connor Martz:** Writing – original draft. **Karen D. Lincoln:** Writing – review & editing. **Joshua Breslau:** Writing – review & editing. **David Chae:** Conceptualization, Writing – review & editing.

Data availability

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2024.101678.

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