

Mental health differences between multiracial and monoracial college students in the United States: Emerging racial disparities

Journal:	<i>International Journal of Social Psychiatry</i>
Manuscript ID	ISP-22-0170.R1
Manuscript Type:	Original Research Article
Date Submitted by the Author:	09-Oct-2022
Complete List of Authors:	Oh, Hans; University of Southern California, Social Work Du, Jinyu; Southern Methodist University Smith, Lee; Anglia Ruskin University Koyanagi, Ai; Parc Sanitari Sant Joan de Deu
Keywords:	Multiracial, Disparities, Languishing, Suicide, Perceived Need
Abstract:	<p>Background: Multiracial individuals appear to be at higher risk for mental health problems; however, more research is needed to confirm these racial disparities among young adult college populations.</p> <p>Methods: We analyzed data from the Health Minds Study (N=99728 young adult college students aged 18-34), collected online across 140 college campuses from September 2020 - June 2021. We used multivariable logistic regression to examine associations between multiracial identity and several mental health outcomes, including mental and behavioral health (depression, anxiety, languishing, perceived need, loneliness), self-injurious behaviors (non-suicidal self-injury, suicidal ideation, suicide plan, suicide attempt), and history of lifetime psychiatric disorders, adjusting for age and gender.</p> <p>Results: Almost a tenth of the weighted sample were multiracial. Multiracial students had greater odds of all mental and behavioral health outcomes, self-injurious behaviors (though only marginally significant for suicide attempt), and most lifetime psychiatric disorders.</p> <p>Conclusion: Multiracial young adult college students were more likely to have mental health problems than their monoracial counterparts, calling for targeted preventive interventions on college campuses to address these mental health disparities.</p>

SCHOLARONE™
Manuscripts

ABSTRACT

Background: Multiracial individuals appear to be at higher risk for mental health problems; however, more research is needed to confirm these racial disparities among young adult college populations.

Methods: We analyzed data from the Health Minds Study (N=99728 young adult college students aged 18-34), collected online across 140 college campuses from September 2020 - June 2021. We used multivariable logistic regression to examine associations between multiracial identity and several mental health outcomes, including mental and behavioral health (depression, anxiety, languishing, perceived need, loneliness), self-injurious behaviors (non-suicidal self-injury, suicidal ideation, suicide plan, suicide attempt), and history of lifetime psychiatric disorders, adjusting for age and gender.

Results: Almost a tenth of the weighted sample were multiracial. Multiracial students had greater odds of all mental and behavioral health outcomes, self-injurious behaviors (though only marginally significant for suicide attempt), and most lifetime psychiatric disorders.

Conclusion: Multiracial young adult college students were more likely to have mental health problems than their monoracial counterparts, calling for targeted preventive interventions on college campuses to address these mental health disparities.

KEY WORDS: Multiracial; Disparities; Languishing; Suicide; Perceived Need

Mental health differences between multiracial and monoracial college students in the United States: Emerging racial disparities

Hans Oh¹, Jinyu Du², Lee Smith³, & Ai Koyanagi⁴

¹Suzanne Dworak Peck School of Social Work
University of Southern California
Los Angeles, California, USA
hansoh@usc.edu

²Southern Methodist University
jinyud@mail.smu.edu

³Centre for Health, Performance, and Wellbeing
Anglia Ruskin University
Cambridge, United Kingdom
Lee.Smith@aru.ac.uk

⁴Research and Development Unit, Parc Sanitari Sant Joan de Déu
Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM)
ICREA, Pg. Lluís Companys 23, 08010, Barcelona, Spain
a.koyanagi@pssjd.org

CONFLICTS OF INTEREST: None

FUNDING: None

INTRODUCTION

Addressing racial disparities is imperative in the field of public health, as research continues to reveal how differences in health outcomes can be traced to social disadvantages, where racial and ethnic minorities are exposed to stressors and hazards, while being deprived of salutary resources (Williams & Jackson, 2005; Williams & Mohammed, 2009). However, much of the literature thus far has focused on disparities across monoracial groups with less attention to multiracial groups. In recent decades, the multiracial population has grown, with upwards of 10.2% of adults in the United States being multiracial (US Census Bureau, 2020).

Numerous studies suggest that these individuals may be at greater risk for a host of negative health outcomes, such as worse self-rated health (Bratter & Gorman, 2011; Tabb et al., 2019), greater odds of substance use (Chavez & Sanchez, 2010), suicidal behaviors (Chen et al., 2019), as well as chronic health conditions (Subica et al., 2017).

Multiracial identity can be layered and complex (Franco et al., 2021; Parker et al., 2015) and research continues to reveal the nuanced ways multiracial people are vulnerable to mental health problems. According to the Pew Research Center, over half of multiracial people reported being called racial slurs (Parker et al., 2015), which is concerning given that discrimination has been strongly linked to poor mental health (Paradies, 2006; Paradies et al., 2015; Pascoe & Smart Richman, 2009). However, this type of discrimination can come from not only the White majority, but also from the racial/ethnic communities that multiracial people claim membership to. As such, some of the reported buffering effects of ethno-racial identity (Pascoe & Smart Richman, 2009) may not be as readily available to multiracial people, especially among those who experience rejection in their own communities. Many have noted that multiracial people may experience a sense of 'liminality' (Brunsma et al., 2013; Sanchez, 2010) —the state of being 'in-between' identities, not quite belonging in one community or the other. It is possible that multiracial people may also feel what Baumeister and Leary refer to as 'thwarted belongingness' (Baumeister & Leary, 1995), and may not have access to the same protective effects (Albuja et al., 2019). Many multiracial adults report being confused by their racial background, and the majority do not think they have a much in common with other multiracial people (Parker et al., 2015). The trials and vicissitudes of negotiating one's ethno-racial identity may be a source of distress, especially for individuals who view conflicts between aspects of their identity (Cheng & Lee, 2009; Reid Marks et al., 2020).

In this study, we examine whether young adult multiracial individuals attending college also experience greater risk for a broad range of mental health problems. In accordance with minority stress theory, multiracial people likely experience a high degree of stressors that are linked to mental health problems. At the same time, it is

possible that many multiracial people do not enjoy the protective benefits that aspects of racial identity can confer, at least not to the same magnitude as monoracial people. Thus, we hypothesized that multiracial students would have greater odds of mental health problems when compared with monoracial students. Using data collected from a large sample of college students from across the country during the first year of the COVID-19 pandemic, we examined a range of mental health outcomes, some of which have never been examined with respect to multiracial health.

METHODS

Sample

We analyzed data from the Healthy Minds Study (HMS, 2020-2021), a repeated cross-sectional, non-probability, web-based survey examining health and wellness among undergraduate and graduate student populations in the US. The survey was first administered at 37 universities (N=34,168) between September through December 2020, and then administered at 103 universities (N=103,748) between January through June 2021. These data were pooled into a single cross-sectional dataset. At each university, a random sample of 8,000 students was invited by e-mail to participate, except at smaller universities (<8,000 students) where all students were invited to participate. The response rate was 14%. We restricted the sample by age (18-34) to isolate young adults and excluded individuals who were missing data on any of the variables of interest; we used complete-case analysis, resulting in a final analytic sample of 99728. We present information about the missing values in the **Supplemental Materials**. The HMS was approved by the Institutional Review Board Advarra, and the Institutional Review Boards at all participating campuses. All campuses offered incentives to participate through raffles. The HMS data are available upon request at: <https://healthy minds network.org/hms/>.

Mental health outcomes. We examined the following mental health outcomes, which can be categorized as (a) mental and behavioral health; (b) self-injurious behaviors; and (c) lifetime history of psychiatric disorders. A description of the measures is provided in the **Supplemental Materials**. Mental and behavioral health included depression (PHQ-9; (Kroenke & Spitzer, 2002), anxiety (GAD-7; (Spitzer et al., 2006), languishing (defined as the absence of flourishing; (Diener et al., 2009), perceived need for help, loneliness (Hughes et al., 2004), and drug use (checklist of drugs used over the past month). Self-injurious included non-suicidal self-injury and suicidal behaviors. Non-suicidal self-injury was assessed using checklist of behaviors over past year recoded to reflect the presence of any non-suicidal self-injury; and suicidal behaviors were assessed using three dichotomous items eliciting past year suicidal ideation, suicide plan, suicide attempt. Lifetime history of psychiatric diagnoses

1
2
3 were elicited using a checklist that included a broad range of major psychiatric disorders. The codebook for the
4 dataset is available at: <https://healthymindsnetwork.org/hms/>.
5
6
7

8 *Multiracial identity.* Respondents were asked to self-report race/ethnicity using the following categories: White,
9 Black (including African American), Latinx/Hispanic, Asian (including Asian American), Native Hawaiian/Pacific
10 Islander, Middle Eastern (including Arab American and Arab), American Indian/Alaska Native, and Other.
11 Individuals who selected more than one race/ethnicity were categorized as 'multiracial' and the rest were coded
12 as 'monoracial'. Individuals who reported 'Other' were dropped for the purposes of this study. Notably, we
13 found that the majority of Native Hawaiian and Pacific Islanders were categorized as multiracial, consistent with
14 other studies (Wey et al., 2018). The multiracial group does not differentiate bi-racial from identities that
15 encompass more than two races, nor does it capture multi-ethnic identity.
16
17
18
19
20
21
22

23 *Sociodemographic characteristics.* Respondents self-reported age (continuous) and gender (man, woman,
24 transgender/nonbinary/other).
25
26
27

28 *Analysis*

29
30 We calculated the prevalence of mental health outcomes, stratifying by multiracial status (vs. monoracial), and
31 used chi-square tests to ascertain differences between the groups. We then used multivariable logistic
32 regression analyses to examine associations between multiracial identity and each mental health outcome. We
33 adjusted all models for age and gender. To adjust for non-response, sample probability weights were created
34 using administrative data on full student populations at each participating college with respect to gender,
35 race/ethnicity, academic level, and Grade Point Average. Sample weights gave equal aggregate weight to each
36 school in the national estimates rather than assigning weights in proportion to school size, so that overall
37 national estimates were not dominated by schools in the sample with large enrollment. Standard errors were
38 clustered by university. We present results as odds ratios with 95% confidence intervals. We performed all
39 statistical analyses using Stata SE 15.
40
41
42
43
44
45
46
47

48 **RESULTS**

49
50 Nearly a tenth of the weighted sample self-identified with more than one racial category and was thus classified
51 as multiracial. The prevalence of mental and behavioral health problems, self-injurious behaviors, and lifetime
52 psychiatric diagnoses are presented in **Table 1**, with higher prevalence of mental health outcomes among
53
54
55
56
57
58
59
60

multiracial students when compared with monoracial students, though not always to a statistically significant degree, especially for uncommon conditions like Psychotic disorders.

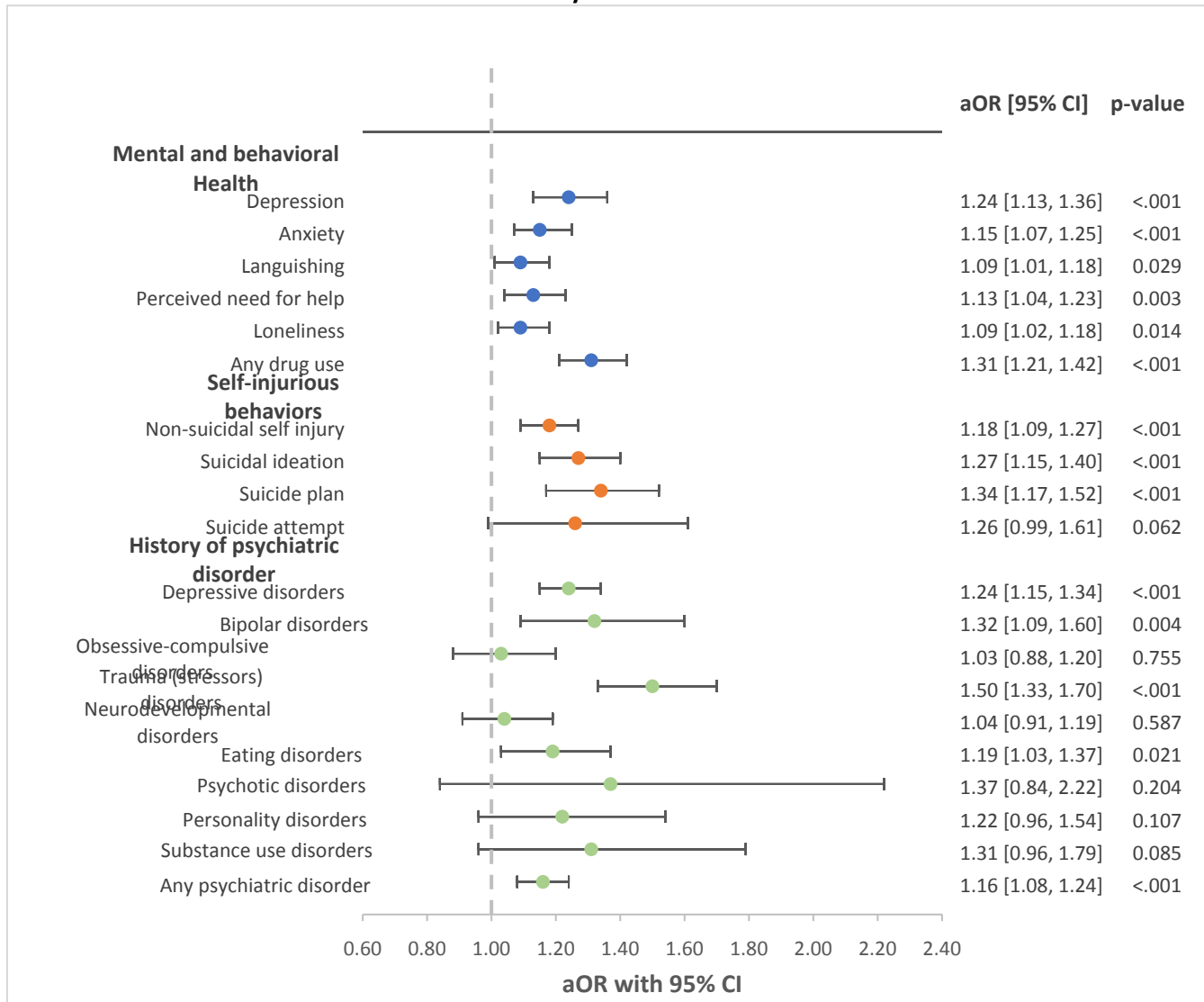
Table 1: Prevalence of mental health outcomes among young adults (aged 18-34) attending colleges in the United States, stratified by multiracial, Health Minds Study (2020-2021)

	Monoracial (n=90149)	Multiracial (n=9579)	Total (N=99728)	P-value
Mental and behavioral Health				
Depression	20017 (22.20%)	2685 (28.03%)	22702 (22.76%)	<0.001
Anxiety	31987 (35.48%)	3898 (40.70%)	35885 (35.98%)	<0.001
Languishing	57339 (63.60%)	6459 (67.43%)	63798 (63.97%)	<0.001
Perceived need for help	57070 (63.31%)	6536 (68.24%)	63606 (63.78%)	<0.001
Loneliness	50201 (55.69%)	5726 (59.78%)	55927 (56.08%)	<0.001
Any drug use	22021 (24.43%)	2980 (31.11%)	25001 (25.07%)	<0.001
Self-injurious behaviors				
Non-suicidal self-injury	22226 (24.65%)	2907 (30.35%)	25133 (25.20%)	<0.001
Suicidal ideation	12263 (13.60%)	1748 (18.25%)	14011 (14.05%)	<0.001
Suicide plan	5025 (5.57%)	789 (8.24%)	5814 (5.83%)	<0.001
Suicide attempt	1244 (1.38%)	190 (1.98%)	1434 (1.44%)	0.008
History of psychiatric disorder				
Depressive disorders	21872 (24.26%)	2904 (30.32%)	24776 (24.84%)	<0.001
Bipolar disorders	2279 (2.53%)	357 (3.73%)	2636 (2.64%)	<0.001
Obsessive-compulsive disorders	4013 (4.45%)	478 (4.99%)	4491 (4.50%)	0.145
Trauma (stressors) disorders	5765 (6.39%)	976 (10.19%)	6741 (6.76%)	<0.001
Neurodevelopmental disorders	6113 (6.78%)	750 (7.83%)	6863 (6.88%)	0.029
Eating disorders	3225 (3.58%)	459 (4.79%)	3684 (3.69%)	<0.001
Psychotic disorders	395 (0.44%)	64 (0.67%)	459 (0.46%)	0.132
Personality disorders	873 (0.97%)	132 (1.38%)	1005 (1.01%)	0.009
Substance use disorders	949 (1.05%)	142 (1.48%)	1091 (1.09%)	0.053
Any psychiatric disorder	39136 (43.41%)	4715 (49.22%)	43851 (43.97%)	<0.001

P-values reflect Chi² test

Across the board, multiracial students had modestly greater odds of all mental and behavioral health outcomes in this sample of young adult college students, adjusting for age and gender. Further, multiracial students had greater odds of self-injurious behaviors, though the association was only marginally significant for suicide attempt. While multiracial students had greater odds of having any lifetime psychiatric disorders, when looking at specific disorders, the associations were not statistically significant for obsessive compulsive disorders, psychotic disorders, personality disorders, and substance use disorders.

Figure 1. Multivariable logistic regression models showing the associations between multiracial identity and mental health outcomes among young adult college students aged 18-34 in the United States, Healthy Minds Study 2020-2021



DISCUSSION

Main findings

In this sample of young adult college students in the United States (from across 140 colleges/universities), we found that when compared with monoracial students, multiracial students had greater odds of mental and behavioral health problems (including anxiety, depression, languishing, loneliness, perceived need for help, drug use), self-injurious behaviors (including non-suicidal self-injury, suicidal ideation, suicide plan), and any lifetime psychiatric disorder (depressive disorders, bipolar disorders, trauma-related disorders, eating disorders). We

1
2
3 found these associations during the first year of the COVID-19 pandemic. Our findings are consistent with prior
4 studies that show that multiracial students are at greater risk for mental health problems than their monoracial
5 counterparts (Chen et al., 2019; Fisher et al., 2014; Franco et al., 2021; Kuentzel et al., 2012; Reid Marks et al.,
6 2020; Subica & Wu, 2018). However, our study was among the first to show that multiracial students in higher
7 education in the US had greater odds of certain mental health outcomes, such as loneliness, languishing, and
8 perceived need for help. Loneliness has been strongly linked to a broad range of health consequences (Leigh-
9 Hunt et al., 2017; Wang et al., 2018), and languishing is a critical but relatively under-researched aspect of
10 mental wellness that reflects a person's sense of meaning and purpose in life (Keyes, 2002). Perceived need is
11 also important because racial/ethnic minorities tend to underutilize formal services; thus, their perceptions can
12 in some instances be more useful than eliciting history of receiving a formal diagnosis from a provider.
13
14
15
16
17
18
19
20
21

22 *Explanation of findings*

23 Our findings comport with social stress theories that posit marginalized individuals face greater social stressors
24 while encountering barriers to resources. These stressors may impact health by way of chronic activation of the
25 hypothalamic pituitary adrenal axis, which has been linked to mental health problems over time (Frodl &
26 O'Keane, 2013; Harrell et al., 2011; Maniam et al., 2014; Rosmond & Björntorp, 2000). Some multiracial
27 individuals may experience discrimination from multiple sources (from the white majority, but also from other
28 minority groups with whom the person identifies), while struggling to negotiate their ethno-racial identities
29 (Franco et al., 2020, 2021; Woo et al., 2011), which can change across situations and across time (Pauker et al.,
30 2018). Thus, we speculate that ethno-racial identity may not reliably protect against discrimination to the
31 degree that ethno-racial identity protects against discrimination for monoracial individuals. Some multiracial
32 individuals may feel that their identities are complex (Shih & Sanchez, 2009), or feel that their identities are
33 unrecognized or de-valued in society, which may be linked to mental health problems (Sanchez, 2010).
34
35
36
37
38
39
40
41
42
43

44 *Strengths and Limitations*

45 The study has many strengths, one of which is that we examined a broad range of health conditions among
46 young adults enrolled in colleges in multiple geographic locations during a world-wide pandemic (COVID-19).
47 Further, the data were collected during a historic moment in the US when racial tensions were brought to the
48 fore following highly publicized incidents of police abuse and ensuing protests, which could have prompted
49 reflections on ethno-racial identity. However, there were several limitations of the study.
50
51
52
53
54
55
56
57
58
59
60

1
2
3 In terms of measurement, we defined multiracial using self-identified race, and a limited number of racial
4 categories, which was then recoded (2+ selections) into a single multiracial category. While defining multiracial
5 in this manner is common, this strategy suffers in that multiracial identity hinges on what categories are
6 presented and how people see themselves. Eliciting information to determine multiracial identity is still a work
7 in progress (Bratter, 2018), especially since sometimes definitions of 'multiracial' do not necessarily comport
8 with how people see themselves (Bratter & Gorman, 2011; Parker et al., 2015). Some have proposed that it may
9 be useful for respondents to indicate a 'primary race' and a 'secondary race' (Wey et al., 2018).

10
11
12 Measuring health outcomes through self-report also raises concerns of social desirability and recall biases. While
13 some measures were validated and widely used among college populations (e.g., PHQ-9; GAD-7), other
14 measures were simple checklists about whether respondents had ever received a diagnosis from a provider.
15 Future studies may utilize administrative data (e.g., insurance claims) and medical records to confirm the mental
16 health disparities impacting multiracial students.

17
18
19 In terms of the sampling, it is unclear why the response rate was so low. It is possible the content of the survey
20 (i.e., mental health) and length of the survey may have deterred students from participating, especially without
21 a guarantee of receiving an incentive (participants were entered into a lottery) (Fan & Yan, 2010). With that
22 being stated, the response rate of 14% is actually comparable to other response rates from online surveys using
23 convenience samples and panels (Baker et al., 2013; Craig et al., 2013). While we attempted to account for non-
24 response using survey weights, sampling bias remains a concern.

25
26
27 Finally, the survey was conducted in 2020, during a time when high-profile murders of Black people by police
28 galvanized protests and gave rise to the Black Lives Matter (BLM) movement, situating racism at the center of
29 public and political discourse. It is unclear how these events may have shaped specific aspects of multiracial
30 identity formation (e.g., salience, regard, importance) among people with Black ancestry (Rogers et al., 2021).
31 Concurrently, the same could be said about Asian Americans/Pacific Islanders, who experienced a barrage of
32 xenophobic attacks in response to the spread of the COVID-19 virus. Racial/ethnic discrimination during this
33 time has been linked to mental health problems for Asian Americans/Pacific Islanders (Huynh et al., 2022; Lee &
34 Waters, 2021; Oh et al., 2021; Zhou et al., 2021). The pandemic may have resulted in greater awareness or
35 salience of Asian American identities; however, again, it is unclear how this impacted multiracial individuals with
36 Asian ancestry. Multiracial identity should be understood within the socio-cultural contexts where individuals

1
2
3 negotiate their identities, cope with stressors, engage in health behaviors, and develop/manage their mental
4 health conditions.
5
6
7

8 *Future Directions*

9
10 The findings of this study speak specifically to young adults in higher education, which represents a specific
11 stage in the developmental life course and a specific stratum of society. Thus, our findings are not necessarily
12 generalizable beyond the students in higher education. However, our findings do contribute to the emerging
13 body of literature that acknowledges the complexity of multiracial identity, and the need to examine the extent
14 to which specific types of multiracial identity are related to mental health outcomes. Specific multiracial
15 identities are rarely examined in relation to health largely because of the complexity of categorizing and
16 analyzing multiracial identity (Parker et al., 2015; Pauker et al., 2018). For example, permutations of the eight
17 crude racial categories used in this study would have result in 28 different combinations that would need to be
18 compared for each mental health outcome. Miller and colleagues' (Miller et al., 2019) examined young adults in
19 the US and found multiracial individuals had poorer mental health than monoracial, but also found that White-
20 Nonwhite multiracial individuals had poorer mental and self-rated health relative to monoracial individuals
21 generally (and Whites specifically), and that Nonwhite-Nonwhite multiracial individuals had greater self-esteem
22 and self-rated health than Whites as well as the aggregated monoracial group. Interestingly, Tabb and
23 colleagues (Tabb et al., 2019) found no significant differences in self-rated health status of multiracial adults in
24 the US when compared with monoracial White adults, but did find variation by multiracial subgroups, namely
25 that Asian-White multiracial adults reported better health than monoracial Asian and monoracial White adults.
26 Currently, no existing theoretical models or frameworks can comprehensively guide how to compare multiracial
27 individuals with other multiracial individuals (Bratter & Gorman, 2011), and which racial categories should serve
28 as the reference group.
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43

44 *Implications*

45 We stress that first and foremost, the most important preventive intervention is to eliminate racism in all its
46 forms and facets. This is an on-going struggle that must be coordinated across disciplines and fields. Potential
47 interventions include anti-racism campaigns on campus and in service settings (Ben et al., 2020; Hassen et al.,
48 2021), implicit bias trainings (Hall et al., 2015), and greater representation of diversity throughout campuses.
49 Our study also calls for research to more consistently define multiracial identity (Sanchez et al., 2020), which is a
50 challenging endeavor (Bratter, 2018), but could be strengthened in several ways, including the triangulation of
51
52
53
54
55
56
57
58
59
60

1
2
3 responses through genetic/ancestry services, racial identities of the respondents' biological parents (or
4 grandparents), and appearance/skin tone (Gonlin, 2022; Parker et al., 2015; Reece, 2019; Woo et al., 2011).
5 Part of these efforts to understand multiracial identity requires deliberate examination of multiracial as a
6 heterogenous group, which could be achieved by pooling years of data to achieve statistical power. In doing so,
7 we may be able to examine multiracial identity through an intersectional lens, to explore how multiracial mental
8 health may be conditional on gender and sexuality (Felipe et al., 2022; Paz Galupo et al., 2019) and
9 socioeconomic status (Bratter & Kimbro, 2013; Hitlin et al., 2006; Mitchell & Warren, 2022). Moreover, there are
10 rich qualitative research on the lived experiences of multiracial individuals (Franco et al., 2020; Museus et al.,
11 2015), which should be included in cross-discipline conversations about how to advance efforts to address
12 multiracial mental health. Further, our findings can inform clinical practice (Franco & McElroy-Heltzel, 2019),
13 raising awareness of risk profile of multiracial people, while underscoring the need to create safe and supportive
14 spaces for individuals to explore identity.
15
16
17
18
19
20
21
22
23
24

25 *Conclusion*

26 Multiracial young adult college students were more likely to have mental health problems than their monoracial
27 counterparts, calling for targeted preventive interventions on college campuses to address these mental health
28 disparities.
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

<https://www.census.gov/library/stories/2021/08/improved-race-ethnicity-measures-reveal-united-states-population-much-more-multiracial.html>

REFERENCES

For Peer Review

SUPPLEMENTAL MATERIALS

MEASURES

Depression was measured using the Patient Health Questionnaire – 9 (PHQ-9; Kroenke & Spitzer, 2002), which is validated and widely used in various populations. The PHQ-9 contained nine questions eliciting information about depression symptoms over the past two weeks, ranging symptoms such as anhedonia to suicidal ideation. Respondents could answer the frequency of these symptoms from ‘not at all’ to ‘nearly every day’. The depression items were summed into a scale ranging from 0-27 and was dichotomized (yes/no) to reflect the presence of moderately severe or severe depression (i.e., a score of 15- to 27).

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, ranging from nervousness to irritability. The anxiety items were summed into a scale ranging from 0-12, and then dichotomized (yes/no) to reflect the presence of moderately severe or severe anxiety (i.e., a score of 11 to 21).

Languishing. While mental health is often understood in terms of negative outcomes (e.g., pathology, deficits, symptoms), it often does not capture positive aspects of wellbeing. As such, flourishing is a term used to describe positive emotions (e.g., happiness, satisfaction), positive psychosocial functioning, and other dimensions of life that involve growth, generativity, goodness, and resilience (Fredrickson & Losada, 2005). The absence of flourishing is referred to as languishing. We assessed flourishing/languishing using a scale (Diener et al., 2009, 2010), which elicits the respondent’s level of agreement to eight statements, such as “I lead a purposeful and meaningful life” and “I actively contribute to the happiness and wellbeing of others.” Respondents could answer: *strongly disagree, disagree, mixed/neither agree nor disagree, slightly agree, agree, strongly agree*. The items were summed into a scale ranging from 8-56, with higher scores representing greater levels of flourishing. The flourishing scale was dichotomized such that a score of 47 or lower was considered languishing in accordance with prior studies (Hone et al., 2014).

Loneliness. Loneliness was measured using the 3-item UCLA loneliness scale (Hughes et al., 2004), where respondents were asked three questions: “How often do you feel that you lack companionship?”; “How often do you feel left out?”; “How often do you feel isolated from others?”. Respondents could answer:

1
2
3 *hardly ever, some of the time, or often*. These items were summed into a scale ranging from 3-9, with
4 greater scores, suggesting more loneliness. This scale was dichotomized to reflect people who were
5 significantly lonely (i.e., who had scores of 6 or higher).
6
7

8
9
10 *Perceived need for help*. How much do you agree with the following statement? - In the past 12 months,
11 I needed help for emotional or mental health problems such as feeling sad, blue, anxious or nervous.
12 Responses options were: *strongly agree, agree, somewhat agree, somewhat disagree, disagree, and*
13 *strongly disagree*. This item was dichotomized (yes/no) to reflect those who strongly agree, agree, or
14 somewhat agree versus those who somewhat disagree, disagree, or strongly disagree.
15
16
17

18
19
20 *Self-injurious behaviors*. Self-injurious behaviors included non-suicidal self-injury, suicidal ideation,
21 suicide plans, and suicide attempt. Non-suicidal self-injury was measured using the item: In the past
22 year, have you ever done any of the following intentionally? Responses included: cut myself, burned
23 myself, punched/banged myself, scratched myself, pulled my hair, bit myself, interfered with wound
24 healing, carved words or symbols into skin, rubbed sharp objects into skin, punched or banged an object
25 to hurt myself, other (please specify). This item was coded dichotomously (yes/no) to reflect the
26 presence of any of the self-injurious behaviors. Suicidal ideation is measured by the dichotomous item
27 (yes/no): "In the past year, did you ever seriously think about attempting suicide?" Individuals who
28 reported suicidal ideation were asked about suicide plans, using the dichotomous items (yes/no) on
29 suicide plans ("In the past year, did you make a plan for attempting suicide?") and suicide attempts ("In
30 the past year, did you attempt suicide?").
31
32
33
34
35
36
37
38
39

40 *Any drug use*. Respondents were then asked to complete a checklist of *illicit and prescription drugs* to
41 which they responded (yes/no) if they had used each drug over the past 30 days: Cocaine (any form,
42 including crack, powder, or freebase), heroin, opioids (pain relievers such as Vicodin, OxyContin,
43 Percocet, Demerol, Dilaudid, Codeine, Hydrocodone, Methadone, morphine, without a prescription or
44 more than prescribed), Benzodiazepines (such as Valium, Ativan, Klonopin, Xanax, Rohypnal/Roofies),
45 methamphetamines (also known as speed, crystal meth, Tina, T, or ice), other stimulants (such as
46 Ritalin, Adderall, without a prescription or more than prescribed), MDMA (also known as Ecstasy or
47 Molly), ketamine (also known as K, Special K), Lysergic acid diethylamide/LSD (also known as acid),
48 Psilocybin (also known as magic mushrooms, boomers, shrooms), athletic performance enhancers
49 (anything that violates policies set by your school or any athletic governing body), kratom, and other
50
51
52
53
54
55
56
57
58
59
60

1
2
3 drugs without a prescription. A single dichotomous variable was created to capture the use of any of
4 these substances.
5
6
7

8 *Lifetime mental health conditions.* Have you ever been diagnosed with any of the following conditions by
9 a health professional (e.g., primary care doctor, psychiatrist, psychologist, etc.)? The conditions
10 included: depression (e.g., major depressive disorder, persistent depressive disorder), bipolar disorder
11 (e.g., bipolar I or II, cyclothymia), anxiety disorder (e.g., generalized anxiety disorder, phobias),
12 obsessive-compulsive or related disorders (e.g., obsessive-compulsive disorder, body dysmorphism),
13 trauma and stressor-related disorders (e.g., posttraumatic stress disorder), Neurodevelopmental
14 disorder or intellectual disability (e.g., attention deficit disorder, attention deficit hyperactivity disorder,
15 intellectual disability, autism spectrum disorder), eating disorder (e.g., anorexia nervosa, bulimia
16 nervosa), psychotic disorder (e.g., schizophrenia, schizo-affective disorder), personality disorder (e.g.,
17 antisocial personality disorder, paranoid personality disorder, schizoid personality disorder), and
18 substance use disorder (e.g., alcohol abuse, abuse of other drugs). A variable was created to capture the
19 presence of at least one of these conditions (yes/no).
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

MISSINGNESS

Mental Health Outcome	Missing values (count)	Missing values (percent %)
Perceived need for help	18335	13.29
Non-suicidal self-injury	17220	12.48
Anxiety	15858	11.49
Suicide attempt	15426	11.18
Suicide plan	15389	11.15
Depression	15282	11.08
Suicidal ideation	15258	11.06
Positive Mental Health	12941	9.38
Sexual orientation	1972	1.43
Multiracial	1275	0.92
Gender	326	0.24
Survey weights	98	0.07
Age	64	0.05
School number	64	0.05
Survey date/school term	64	0.05