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The Mental Health Impact of COVID-19 Related Racial Discrimination Modified by Ethnic Identity in Asian Pacific Islander Desi American College Students

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The Mental Health Impact of COVID-19 Related Racial Discrimination Modified by Ethnic Identity in Asian Pacific Islander Desi American College Students

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Abstract

Objective: In response to the surge in anti-Asian racism during COVID-19, we examined the association of COVID-19 related racial discrimination on the mental health of Asian Pacific Islander Desi American (APIDA) college students and the moderating role of ethnic identity in this relationship. Guided by social identity theory and the risk-protective model of resiliency, we examined how ethnic identity may serve as a psychosocial resource that protects APIDA college students' mental health when faced with racial discrimination during the COVID-19 pandemic.

Method: The data are from the Fall and Spring cohort of the 2020-2021 Healthy Minds Study (HMS). The cross-sectional sample consisted of APIDA college students ages 18-29 (n = 2,559).

Results: Our results show the significant associations between COVID-19 related racial discrimination and poorer mental health among the overall sample of APIDA students. Ethnic identity buffered the association between COVID-19 related racial discrimination and symptoms of anxiety among East Asian students and symptoms of both depression and anxiety among Native Hawaiian and Pacific Islander students. In contrast, ethnic identity intensified the association between COVID-19 related racial discrimination and symptoms of depression among Filipino students.

Conclusion: Our results highlight the importance of investigating the heterogeneity of APIDA communities and their experiences with ethnic identity formation. Further examination is needed on the various ways that ethnic identity can mitigate the effects of racial discrimination.

Keywords: APIDA college students, COVID-19, racial discrimination, mental health, ethnic identity

Public Significance Statement: This study examined the associations between COVID-19 related racial discrimination, ethnic identity, and mental health among Asian Pacific Islander Desi American (APIDA) college students, as well as the moderating role of ethnic identity. Findings highlight the need for further examination of the various ways that APIDA college students explore and understand their ethnic identity, to help mitigate the effects of racial discrimination, in light of the surge in anti-Asian racism during the pandemic.

Introduction

Asian Pacific Islander Desi American (APIDA) communities are the fastest growing racial/ethnic groups in the United States [1], with a total of 20.6 million individuals and making up 6.2% of the US population [2]. Serious psychological distress is also prevalent among these communities [3-8], such that over 2.8 million APIDA were estimated to have any mental health problem in 2019 [9]. Recent data from the 2015-2019 California Health Interview Survey (CHIS) show that about 68% of all APIDA adults with moderate to serious psychological distress experienced unmet need for mental health care, with a range of unmet need including 45% of Japanese adults to 78% of Vietnamese adults [10]. Additionally, Filipinos are almost 1.5 times as likely to have serious psychological distress compared to all other Asian adults [10].

This upward trend of mental health challenges continued during the first year of the COVID-19 pandemic, when APIDA individuals reported experiencing symptoms of depression and anxiety that were seven times higher compared to those reported in 2019 [11]. The introduction and spread of the coronavirus disease triggered harmful rhetoric, with prominent figures in society blaming the pandemic on people of Chinese origin and other diverse APIDA groups [11-14]. The surge in anti-Asian racism and discrimination during this time included verbal harassment and physical assaults [11,14-19]. According to the Asian Pacific Policy and Planning Council (A3PCON), more than 40 percent of the reports were from Chinese individuals and other East Asian ethnic groups [11]. However, other APIDA communities were also targeted, based on their phenotypic characteristics, regardless of their ethnicity or nationality [11]. APIDAs have faced violence, verbal attacks, exclusion, disenfranchisement, microaggressions, and stereotypes across generations [7,14,20-23], and this historical and multigenerational transmission of trauma [24] may also add to the distress that some communities may feel in the current sociopolitical climate [7,14].

Among APIDA populations, young adults are equally, if not more, vulnerable to developing mental health problems than their counterparts belonging to other racial/ethnic groups [4]. A particularly high-risk group is APIDA college students who continue to experience increases in mental health needs because of stressors related to the COVID-19 pandemic, with a study finding that 25% of APIDA college students reported experiencing pandemic-related racial discrimination or hostility [25]. Among APIDA young adults, numerous studies showed that perceived discrimination was associated with mental health outcomes such as depression and anxiety [4,21,26-29]. However, it is unknown whether college-aged APIDAs were at risk for mental health problems specifically due to COVID-19 related racial discrimination, as other studies have examined experiences of discrimination and mental health outcomes prior to the pandemic [30-32], had smaller sample sizes, focused on APIDAs over the age of 30, or found that the relationship between pandemic-related racial discrimination and mental health outcomes did not vary among APIDA groups [11].

Guided by social identity theory [33] and the protective model of resiliency [34,35], this study focused specifically on the association of COVID-19 related racial discrimination on the mental health of APIDA college students and the moderating role of ethnic identity in this relationship. Social identity theory [33] posits that people naturally seek to have a positive self-concept and are also motivated to maintain this concept or image of themselves with their ethnocultural group. When someone experiences racial discrimination, for example, being rejected from the majority group, a person may look for belongingness and acceptance in their ethnocultural communities [33,36]. According to Phinney [37], ethnic identity is a process in which people explore and define the meaningfulness of ethnicity in their lives [38]. Along these lines, the risk-protective model of resiliency [35] posits that positive contextual, social, and

individual variables, also called *promotive resources*, can protect against the negative effects of risks [39,40] and act as modifiers in the relationship between a risk and its deleterious outcomes [35]. These paradigms suggest that ethnic identity may serve as an important protective factor, or social and psychological resource, that helps minoritized populations like APIDAs respond with resilience when experiencing racial discrimination [41]. Therefore, ethnic identity may influence an APIDA college student's perception of race-related stressors, such as racial discrimination, as well as the extent to which they experience those stressors as mentally or emotionally distressing [36,42,43]. Ethnic identity may act as a protective resource when facing racial discrimination by providing a sense of belonging and solidarity with one's ethnic community and increasing one's positive view of their ethnic identity [33,41]. Earlier studies have identified it as an important protective factor against racism and discrimination for APIDAs [4,36,44,45].

Extant research on the mental health outcomes of APIDA college students has often categorized them as one monolithic group [14,36,46], which may not reflect the range of mental health challenges among diverse groups of APIDAs. To our knowledge, no studies have empirically explored whether a sense of ethnic identity moderated the association between COVID-19 related racial discrimination and mental health among APIDA students in higher education. Based on the review of existing research, this study addresses the gap in literature by examining the following hypotheses: (1) COVID-19 related racial discrimination would be positively associated with symptoms of depression and anxiety, (2) A greater sense of ethnic identity would be associated with lower symptoms of depression and anxiety, (3) Ethnic identity would moderate the association between COVID-19 related racial discrimination and symptoms of depression and anxiety, (4) There would be ethnic group differences in the association between COVID-19 related racial discrimination and mental health, (5) There would be ethnic

group differences in the association between ethnic identity and mental health, and (6) There would be ethnic group differences in the moderating role of ethnic identity in the association between COVID-19 related racial discrimination and mental health outcomes.

Methods

Data and Participants

Secondary data for this study were drawn from the Fall and Spring cohort of the 2020-2021 Healthy Minds Study (HMS) [47], a non-probability web-based survey examining health and wellness among students enrolled in higher education in the United States. The HMS data were collected under the approval of Advarra and the Institutional Review Boards at all participating colleges and universities (IRB number: Pro00028565). The secondary analysis presented in this study was deemed exempt under the approval of USC (UP-22-00068). The HMS survey is administered annually to a cross-section of schools, with a different set of schools every year, including community colleges, four-year colleges, and professional schools. The HMS survey uses several validated measures to provide information about the prevalence of mental health outcomes, knowledge and attitudes about mental health, and service utilization.

The survey was administered to 34,168 students attending 37 institutions of higher learning between September through December of 2020, and then administered again to 103,748 students at 103 institutions between January through June 2021. The response rate was 14%, which is comparable to other response rates from online surveys using convenience samples and panels. We restricted the sample by focusing on students identifying as APIDA, with six categorized subgroups (East Asian, Southeast Asian, Desi/South Asian, Filipino, Native Hawaiian/Pacific Islander, Multi-ethnic), by age (18-29) to isolate young adults and further

156 excluded individuals who were missing data on any of the variables of interest; we used
157 complete-case analysis, resulting in a final analytic sample (n = 2,559).

158 **Measures**

159 ***COVID-19 Related Racial Discrimination.*** COVID-19 related racial discrimination was
160 measured using the item: "As a result of the COVID-19 pandemic, have you experienced any
161 discriminatory or hostile behavior due to your race/ethnicity (or what someone thought was your
162 race/ethnicity)?" Responses were coded into a binary format (0 = no, 1 = yes).

163 ***Mental Health.*** As indicators of mental health, we used depressive symptoms and
164 anxiety, two most prevalent mental health problems among college students [48]. Depressive
165 symptoms were measured with the Patient Health Questionnaire (PHQ-9) [49]. The scale
166 includes nine items, including the following questions: "Over the last 2 weeks, how often have
167 you been bothered by any of the following problems?" "Little interest or pleasure in doing
168 things," "Trouble falling or staying asleep, or sleeping too much," and "Thoughts that you would
169 be better off dead or hurting yourself in some way." Each item was measured on a 4-point Likert
170 scale from 0 (Not at all) to 3 (Nearly every day). Total scores range from 0 to 27, and the scale
171 presents a high level of internal consistency ($\alpha = 0.89$). Anxiety was measured with the 7-item
172 anxiety scale (GAD-7) [50], a validated tool for screening Generalized Anxiety Disorder and
173 assessing its severity. The scale includes the following questions: "Over the last 2 weeks, how
174 often have you been bothered by the following problems?" "Feeling nervous, anxious or on
175 edge," "Not being able to stop or control worrying," and "Feeling afraid as if something awful
176 might happen." Each item was measured on a 4-point Likert scale of 0 (Not at all) to 3 (Nearly
177 every day). Total scores range from 0 to 21, and the scale presents a high level of internal
178 consistency ($\alpha = 0.92$).

Ethnic Identity. Ethnic identity was measured using a six-item version of the Multi-group Ethnic Identity Measure (MEIM) [51], which has been psychometrically tested with diverse populations, including different age groups, ethnic backgrounds, and locations [52]. The measure includes: "Being a member of my racial/ethnic group is an important reflection of who I am," "I have a strong sense of belonging with other people in my racial/ethnic group," and "I have a strong attachment to other people in my racial/ethnic group." Each item was measured on a 5-point Likert scale from 1(Strongly disagree) to 5 (Strongly agree). Total scores range from 6 to 30 and the measure presents a high level of internal consistency ($\alpha = 0.87$).

Demographic Variables. Ethnicity (0 = East Asian (e.g., Chinese, Japanese, Korean, Taiwanese), 1 = Southeast Asian (e.g., Cambodian, Vietnamese, Hmong), 2 = Desi/South Asian (e.g., Indian, Pakistani, Nepalese, Sri Lankan), 3 = Filipina/x/o, 4 = Native Hawaiian or Pacific Islander, 5 = Multi-ethnic. Age (18-29) was treated as a continuous variable. Gender identity (0 = man, 1 = woman), sexual orientation (0 = straight, 1 = lesbian, gay, bisexual, queer, or other), international student (0 = no, 1 = yes), and socioeconomic status (0 = parental education college and above, 1 = parental education less than college).

Analytic Strategies

Secondary analyses were conducted using STATA 17.1 [53]. Survey weights were used in all analyses to account for different sampling probabilities to obtain effect estimates and standard errors representative of young adult APIDA college students. Descriptive statistics (frequencies, percentages) of the overall sample and each of the subgroups were examined, including rates of COVID-related racial discrimination, depression, and anxiety. Subgroup differences were evaluated using Chi-square and t-test analyses and the East Asian subgroup was used as a reference group because they are the largest and most-studied ethnic group of Asian

Americans [54]. We calculated bivariate correlations among the study variables to understand their underlying associations and ensure the absence of collinearity. The highest correlation was observed between sexual orientation and depression (Spearman's rho = 0.27, $p < .001$); those who identified as LGBQ+ were more likely to also experience higher symptoms of depression.

We examined multivariable linear regression models of depressive symptoms and anxiety to test direct and moderating effects of COVID-19 related racial discrimination, ethnic identity, and ethnicity. All analyses were conducted with adjustment for sociodemographic variables (age, gender, sexual orientation, citizenship, socioeconomic status). In each model of mental health outcomes, we first tested the direct effects of discrimination (Model 1) and ethnic identity (Model 2), as well as their interaction (Model 3). The subsequent models examined potential ethnic group variations in the effects of discrimination (Model 4) and ethnic identity (Model 5). The final model (Model 6) with a three-way interaction examined how the moderating role of ethnic identity in the association between discrimination and mental health would vary by ethnicity. When an interaction term was found to be significant, the overall sample was divided into subgroups based on the moderating variable (i.e., ethnic identity, ethnicity), and subgroup differences in the effect of a predictor variable on mental health outcome were examined.

Results

Description of the Sample

Table 1 presents the descriptive information of the study sample. The majority of the sample consisted of East Asians (N = 1,072, 41.9%), and the smallest ethnic subgroup was Multi-ethnic APIDAs (N = 127, 5.0%). Nearly a quarter (24%) of the overall sample experienced COVID-19 related racial discrimination, with a range from 5.2% among Desi/South Asian Americans to 37% among multi-ethnic APIDA students. The mean total score for ethnic identity

for the overall sample was 20.0 (SD = 5.3), with a range from 19.5 (SD = 5.6) among Native Hawaiian and Pacific Islander students, to 20.5 (SD = 5.1) among Filipino students. Among the overall sample the mean total score of the PHQ-9 was 9.4 (SD = 6.7), with a range from 8.7 (SD = 6.3) among East Asians, to 11.3 (SD = 7.30) among Native Hawaiians or Pacific Islanders. For anxiety symptoms, the mean total score of the GAD-7 was 7.7 (SD = 5.9), with a range from 7.0 (SD = 5.6) among East Asians to 8.8 (SD = 6.5) among multi-ethnic APIDA students.

Table 1

Descriptive Characteristics of the Sample

	Mean ± SD or %						
	Overall sample (N = 2,559)	East Asian (n = 1,072)	Southeast Asian (n = 359)	Desi/South Asian (n = 653)	Filipino (n = 219)	Native Hawaiian/ Pacific Islander (n = 129)	Multi-ethnic (n = 127)
Age (years)	21.4 ± 3.0	21.6 ± 3.0	20.9 ± 2.6***	21.5 ± 3.1	20.9 ± 2.7***	21.1 ± 2.8	21.0 ± 2.7**
Gender							
Woman	69.1	67.7	71.8*	67.1	73.6*	70.2	74.2
Sexual orientation							
LGBQ+	22.2	22.7	23.7	15.1***	32.3**	29.5	24.6
International student	16.4	19.6	16.2***	20.5	2.3***	2.3***	7.1***
SES (Parental education < college)	26.5	24.9	47.8***	20.7*	18.1	25.0	27.8
Covid-related racial discrimination	24.0	32.7	33.4	5.2***	21.9**	11.6***	37.0
Ethnic identity (MEIM-6)	20.0 ± 5.3	19.9 ± 5.3	20.3 ± 5.2	19.7 ± 5.5*	20.4 ± 5.1	19.5 ± 5.6	19.9 ± 5.0
Depression (PHQ-9)	9.4 ± 6.7	8.7 ± 6.3	9.9 ± 6.5***	9.4 ± 7.0**	10.4 ± 6.6***	11.3 ± 7.3***	10.3 ± 7.2**
Anxiety (GAD-7)	7.7 ± 5.9	7.0 ± 5.6	7.9 ± 5.5***	7.9 ± 6.2***	8.5 ± 5.9***	9.2 ± 6.0***	8.8 ± 6.5***

Note. χ^2 and t-test analyses were conducted by comparing each ethnic group with East Asian; * $p < .05$. ** $p < .01$. *** $p < .001$

Multivariate Linear Regression Analyses on Depressive Symptoms and Anxiety

Regression analyses on depressive symptoms are presented in Table 2. For each outcome, the same set of predictive models (models 1 to 6) was tested for the proposed hypotheses. In the analyses on depressive symptoms, Model 1 shows that COVID-19 related racial discrimination was positively related to symptoms of depression ($b = 2.15$, $p < 0.001$). In Model 2, ethnic identity was negatively associated with depressive symptoms ($b = -0.15$, $p < 0.001$). Model 3 shows that, among the overall sample, ethnic identity did not moderate the association between COVID-19 related racial discrimination and symptoms of depression. Similarly, in Model 4, ethnicity did not moderate the association between COVID-19 related racial discrimination and depression among the overall sample. In Model 5, compared to East Asian students, higher ethnic identity among Desi/South Asian students was associated with lower symptoms of depression. Model 6 shows there were significant differences across ethnic subgroups when analyzing three-way interactions among COVID-19 related racial discrimination, ethnic identity, and ethnicity for symptoms of depression.

Table 2

Regression Models of Covid-19 Related Racial Discrimination and Depression Symptoms among the Full Sample

	B (SE)					
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Discrimination	2.15*** (0.31)		2.21*** (0.43)	2.16*** (0.53)	2.26*** (0.32)	2.39*** (0.65)
Ethnic identity		-0.15*** (0.03)	-0.17*** (0.03)	-0.16*** (0.03)	-0.10* (0.04)	-0.08 (0.05)
Disc x EID			0.02 (0.08)			
Ethnic subgroup						
East Asian	[ref]	[ref]	[ref]	[ref]	[ref]	[ref]
Southeast Asian	0.85 (0.56)	0.90 (0.53)	0.91 (0.55)	0.80 (0.79)	1.04 (0.65)	1.04 (0.90)
Desi/South Asian	1.83** (0.53)	1.29* (0.49)	1.84*** (0.49)	1.89** (0.53)	2.25*** (0.49)	2.36*** (0.53)
Filipino	0.93 (0.81)	0.80 (0.80)	1.00 (0.78)	0.97 (0.89)	1.18 (0.95)	1.46 (1.08)
NHPI	2.11* (0.92)	1.69 (0.96)	2.13* (0.96)	2.18* (1.00)	2.44* (1.07)	2.43* (1.12)
Multi-ethnic	0.84 (0.90)	1.02 (0.90)	0.79 (0.90)	-0.28 (1.17)	0.90 (1.38)	-0.31 (1.54)
Disc x Ethnicity						
Disc x EA				[ref]		
Disc x SEA				0.37 (1.48)		
Disc x DSA				-1.71 (1.09)		

Disc x FI				0.04 (1.42)		
Disc x NHPI				-0.92 (1.95)		
Disc x ME				2.68 (1.58)		
EID x Ethnicity						
EID x EA					[ref]	
EID x SEA					-0.04 (0.08)	
EID x DSA					-0.15* (0.06)	
EID x FI					-0.06 (0.12)	
EID x NHPI					-0.11 (0.16)	
EID x ME					-0.04 (0.21)	
Disc x EID x Ethnicity						
Disc x EID x EA						[ref]
Disc x EID x SEA						0.15 (0.19)
Disc x EID x DSA						0.10 (0.22)
Disc x EID x FI						0.56** (0.17)
Disc x EID x NHPI						-0.64 (0.35)
Disc x EID x ME						-0.17 (0.33)
Overall R^2	0.11***	0.11***	0.13***	0.13***	0.13***	0.13***

Notes:

a. Disc = Covid-19 related racial discrimination; EID = Ethnic identity; EA = East Asian; SEA = Southeast Asian; DSA = Desi/South Asian; FI = Filipino; NHPI = Native Hawaiian/Pacific Islander; ME = Multi-ethnic.
b. All models reflect the full sample of APIDA students and include the following covariates: age, gender, international student status, parental education.
c. Model 1 with direct effect of discrimination on depression including covariates; without interaction terms.
d. Model 2 with direct effect of ethnic identity on depression including covariates; without interaction terms.
e. Model 3 (with two-way interaction between COVID-19 related racial discrimination and ethnic identity) but no significant interaction was found.
f. Model 4 (with two-way interaction between COVID-19 related racial discrimination and ethnicity) but no significant interaction was found.
g. Model 5 (with two-way interaction between ethnic identity and ethnicity) found that compared to East Asian students, higher ethnic identity among Desi/South Asian students was associated with lower symptoms of depression.
h. Model 6 (with three-way interaction among COVID-19 related racial discrimination, ethnic identity, and ethnicity) found that having higher ethnic identity among Filipino students, compared to East Asian students, intensifies the association between COVID-19 related racial discrimination and symptoms of depression.

Regression analyses on anxiety symptoms are presented in Table 3. In the analyses of anxiety symptoms, according to Model 1, COVID-19 related racial discrimination was positively related to symptoms of anxiety (b = 1.81, $p < 0.001$). In Model 2, ethnic identity was not significantly associated with anxiety symptoms ($b = -0.06$, $p > 0.05$). For Model 3, ethnic identity did not moderate the association between COVID-19 related racial discrimination and symptoms of anxiety among the overall sample. In Model 4, ethnicity significantly moderated the association between COVID-19 related racial discrimination and anxiety, specifically showing that compared to East Asians, being Desi/South Asian and experiencing COVID-19 related racial discrimination was associated with decreased symptoms of anxiety. In Model 5, there were no significant interactions among ethnic identity and ethnicity when looking at anxiety symptoms. As with symptoms of depression, Model 6 shows there were significant differences across ethnic subgroups when analyzing three-way interactions among COVID-19 related racial discrimination, ethnic identity, and ethnicity for symptoms of anxiety. This led us to further investigate each ethnic subgroup separately, looking at whether ethnic identity moderated the relationship between COVID-19 related racial discrimination and symptoms of depression and anxiety.

Table 3

Regression Models of Covid-19 Related Racial Discrimination and Anxiety Symptoms among the Full Sample

	B (SE)					
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Discrimination	1.81*** (0.29)		2.22*** (0.37)	2.19*** (0.44)	1.86*** (0.28)	2.92*** (0.57)
Ethnic identity		-0.06 (0.03)	-0.05 (0.03)	-0.07* (0.03)	-0.02 (0.04)	0.03 (0.04)
Disc x EID			-0.10 (0.07)			
Ethnic subgroup						
East Asian	[ref]	[ref]	[ref]	[ref]	[ref]	[ref]
Southeast Asian	0.68 (0.50)	0.70 (0.48)	0.71 (0.50)	0.83 (0.78)	1.06 (0.61)	1.32 (0.82)
Desi/South Asian	2.07*** (0.44)	1.63*** (0.42)	2.06*** (0.43)	2.29*** (0.43)	2.38*** (0.49)	2.76*** (0.49)
Filipino	0.96 (0.63)	0.81 (0.64)	0.99 (0.62)	1.30 (0.65)	0.74 (0.63)	1.23 (0.67)
NHPI	1.77** (0.63)	1.42* (0.66)	1.79** (0.64)	1.93** (0.67)	1.98* (0.80)	2.16* (0.82)
Multi-ethnic	1.37 (0.87)	1.55 (0.87)	1.34 (0.85)	0.59 (1.06)	1.55 (1.25)	0.54 (1.24)
Disc x Ethnicity						
Disc x EA				[ref]		
Disc x SEA				-0.40 (1.45)		
Disc x DSA				-2.72* (1.07)		

Disc x FI				-1.45 (1.11)		
Disc x NHPI				-1.12 (1.89)		
Disc x ME				1.74 (1.31)		
EID x Ethnicity						
EID x EA					[ref]	
EID x SEA					-0.11 (0.08)	
EID x DSA					-0.11 (0.07)	
EID x FI					0.07 (0.10)	
EID x NHPI					-0.07 (0.15)	
EID x ME					-0.07 (0.19)	
Disc x EID x Ethnicity						
Disc x EID x EA						[ref]
Disc x EID x SEA						0.25 (0.23)
Disc x EID x DSA						0.46* (0.23)
Disc x EID x FI						0.36* (0.18)
Disc x EID x NHPI						-0.43 (0.29)
Disc x EID x ME						-0.23 (0.26)
Overall R^2	0.12***	0.10***	0.12***	0.12***	0.12***	0.13***

Notes:

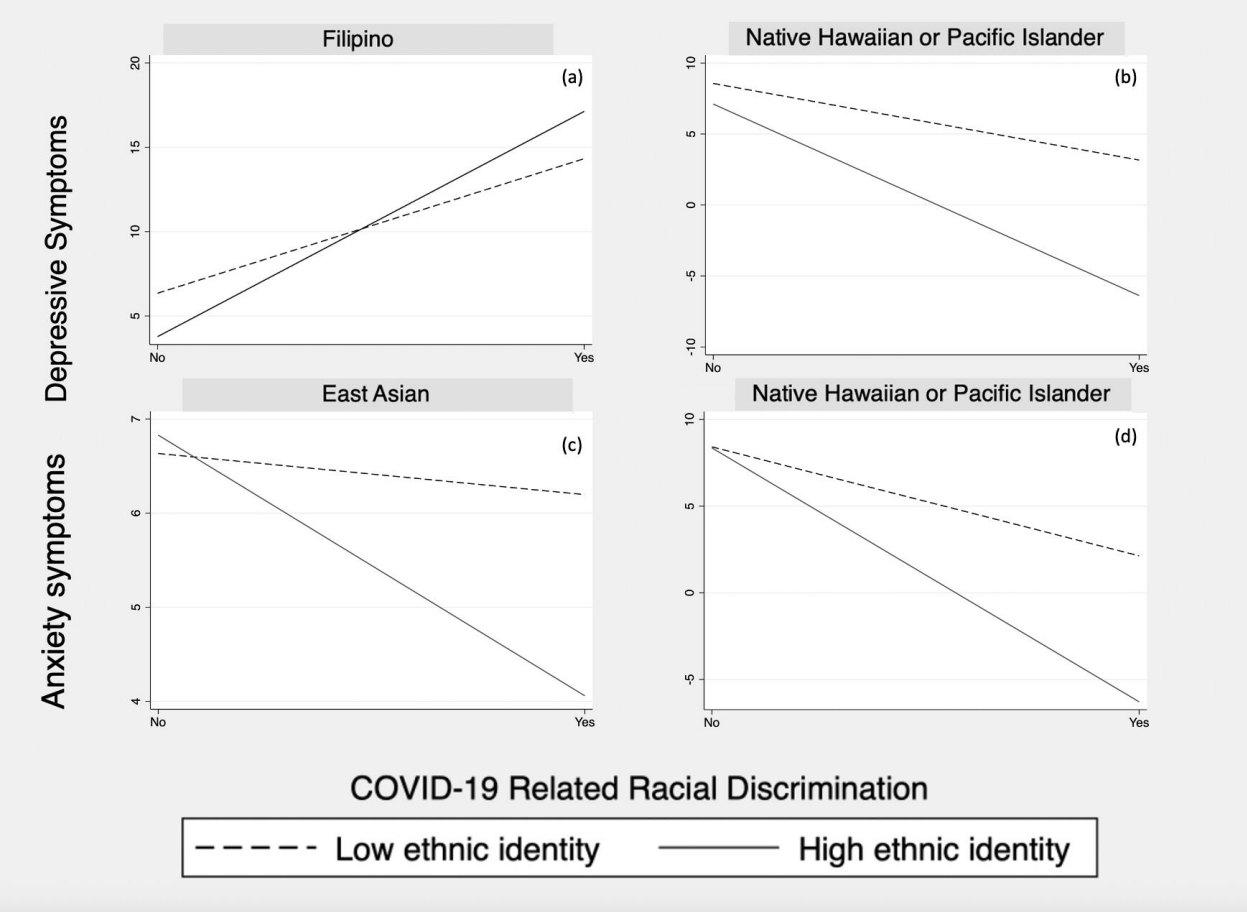
a. Disc = Covid-19 related racial discrimination; EID = Ethnic identity; EA = East Asian; SEA = Southeast Asian; DSA = Desi/South Asian; FI = Filipino; NHPI = Native Hawaiian/Pacific Islander; ME = Multi-ethnic.
b. All models reflect the full sample of APIDA students and include the following covariates: age, gender, international student status, parental education.
c. Model 1 with direct effect of discrimination on depression including covariates; without interaction terms.
d. Model 2 with direct effect of ethnic identity on depression including covariates; without interaction terms.
e. Model 3 (with two-way interaction between COVID-19 related racial discrimination and ethnic identity) but no significant interaction was found.
f. Model 4 (with two-way interaction between COVID-19 related racial discrimination and ethnicity) found that Desi/South Asian students who experienced COVID-19 related racial discrimination, compared to East Asian students, have decreased symptoms of anxiety.
g. Model 5 (with two-way interaction between ethnic identity and ethnicity) but no significant interactions were found.
h. Model 6 (with three-way interaction among COVID-19 related racial discrimination, ethnic identity, and ethnicity) found that having higher ethnic identity among Desi/South Asian and Filipino students, compared to East Asians, intensifies the association between COVID-19 related racial discrimination and symptoms of anxiety.

Among East Asian students, increased ethnic identity buffered the relationship between COVID-19 related racial discrimination and depressive symptoms. Among Native Hawaiian and Pacific Islander students, increased ethnic identity buffered the relationship between COVID-19 related racial discrimination and symptoms of depression and anxiety. Conversely, among Filipino students, ethnic identity intensified the relationship between COVID-19 related racial discrimination and symptoms of depression.

The significant interaction effects of ethnic identity on the relationship between COVID-19 related racial discrimination and mental health outcomes among specific ethnic subgroups are plotted in Figure 1, where the relationship between COVID-19 related racial discrimination (X-axis) and symptoms of depression and anxiety (Y-axis) are plotted for low and high ethnic identity. As can be seen in the figures, the association of COVID-19 related racial discrimination (i.e., the differences between the blue and red slopes) changes as one's ethnic identity increases from "low" to "high.

Figure 1

Ethnic Identity as a Moderator among APIDA Students



Notes:

a. Figure 1(a) shows that ethnic identity moderates the association between COVID-19 related racial discrimination and depressive symptoms among Filipino students (Low ethnic identity: B = -4.93, $p < 0.05$; High ethnic identity: B = 3.93, $p > 0.05$).

b. Figure 1(b) shows that ethnic identity moderates the association between COVID-19 related racial discrimination and depressive symptoms among Native Hawaiian and Pacific Islander students (Low ethnic identity: B = 12.18, $p < 0.01$).

c. Figure 1(c) shows that ethnic identity moderates the association between COVID-19 related racial discrimination and anxiety symptoms among East Asian students (Low ethnic identity: B = 4.78, $p < 0.01$; High ethnic identity: B = 3.01, $p < 0.05$).

d. Figure 1(d) shows that ethnic identity moderates the association of COVID-19 related racial discrimination and anxiety symptoms among Native Hawaiian and Pacific Islander students (Low ethnic identity: B = 8.64, $p < 0.001$).

Discussion

Summary of findings

In this study, we examined the associations between COVID-19 related racial discrimination, ethnic identity, and mental health among APIDA students in higher education, and looked at the moderating roles of ethnic identity and ethnicity. We found evidence to support our first hypothesis that COVID-19 related racial discrimination would be significantly related to poorer mental health (depression and anxiety). In keeping with our second hypothesis, we found evidence that ethnic identity was associated with decreased mental health symptoms. However, we did not find evidence to support our third hypothesis that ethnic identity would moderate the association between COVID-19 related racial discrimination and mental health symptoms, at least not in the larger APIDA sample.

Upon closer examination, we found that a more complex picture emerged when looking at specific APIDA ethnic subgroups. Although we did not find evidence to support our fourth hypothesis, that ethnicity would moderate the association between COVID-19 related racial discrimination and mental health outcomes when applied to the combined APIDA sample, we found that there were significant differences between specific ethnic subgroups (i.e., Desi/South Asian compared to East Asian students) regarding their depressive symptoms. Furthermore, we did not find evidence to support our fifth hypothesis, that ethnicity would moderate the association between ethnic identity and mental health among the combined sample. However, we found that there were significant differences in mental health outcomes when having higher ethnic identity among specific ethnic subgroups (i.e., Desi/South Asian compared to East Asian students). Finally, significant differences were found for our sixth hypothesis, pointing to evidence that ethnic identity buffered the relationship between COVID-19 related racial

discrimination and mental health outcomes for East Asian and Native Hawaiian and Pacific Islander students, while the opposite occurred for Filipino students.

Our study adds to the literature by providing context to a specific snapshot in time when members of APIDA communities experienced and witnessed a surge in anti-Asian racism during the COVID-19 pandemic [11,14-19]. This is consistent with existing research showing that Asian Americans experiencing racial discrimination have greater symptoms of depression [11,55,56] and anxiety [14]. Our study also adds to the literature by showing that higher ethnic identity predicted decreased mental health symptoms. Prior studies among Asian Americans showed that the association between ethnic identity and mental health has been mixed: on one hand, positive ethnic identity predicted well-being among Asian Americans [57,58,59] even when controlling for variables such as age, gender, and socioeconomic status [45,59]; on the other hand, some studies did not find significant associations between ethnic identity and psychiatric disorders [36]. Our study found that positive ethnic identity decreased symptoms of depression and anxiety among our full sample of APIDA students.

The results of our sixth hypothesis highlighted the complex role that ethnic identity plays in the association between COVID-19 related racial discrimination and mental health outcomes. While ethnic identity did not significantly moderate the relationship between COVID-19 related racial discrimination and symptoms of depression and anxiety among our overall sample, ethnic identity did intensify the associations among Filipino students specifically. These results provide a counternarrative to previous studies about the buffering role of ethnic identity among Filipino American adults [44]. While Mossakowki's [44] study found that ethnic identity buffered the relationship between racial discrimination and depression, our study specifically focused on a

younger group of college-aged adults who experienced COVID-19 related racial discrimination during a time of heightened sociopolitical strife in the United States.

The observed association between higher ethnic identity and symptoms of depression associated with COVID-19 related racial discrimination among Filipino college students may potentially illustrate aspects of Filipino and Filipino American socio-historical contexts, which is layered with heterogenous experiences of colonialism and indigenous influences [12,60], that have influenced how students experience and define their ethnic identity. Perhaps experiences of being racially marginalized, mislabeled, or invisibilized within a broader pan-ethnic Asian identity [12,23,61,62] may play a role in Filipino ethnic identity and its impact on the association between COVID-19 related racial discrimination and depressive symptoms. The context of experiencing COVID-19 related racial discrimination may also be compounded with other pandemic-related stressors, for example, having stronger ethnic identity may have led to elevated symptoms of depression at a time when Filipinos were witnessing the effects of COVID-19 related anti-Asian attacks on their communities, with high-profile cases of elders being attacked or killed, and hearing about or directly witnessing loved ones in the healthcare industry (e.g., nurses, nurse assistants, and other essential workers) being disproportionately affected by COVID-19 exposure and deaths [63].

There are, however, mixed findings with ethnic identity as a moderator in the relationship between discrimination and mental health outcomes in general. For example, a study done by Woo and colleagues [36] found that a moderate level of racial/ethnic identity may serve as a protective factor for Asians and African Americans when faced with racial discrimination. However, the same study showed that high racial/ethnic identity increased the psychological burden with other racial/ethnic groups [36]. This may have also been the case with the Filipino

students in the current study, wherein, having a higher sense of group-based identification intensified depressive symptoms, particularly during the most recent surge of anti-Asian discrimination set in the context of a global pandemic. Another study that focused on East and Southeast Asian adults, which was conducted during the COVID-19 pandemic, found that ethnic identity moderated the effects of racial discrimination on anxiety symptoms but not on symptoms of depression [64], and also found that participants with higher ethnic identity exhibited increased symptoms of anxiety. The study also reported that East and Southeast Asian Americans with higher ethnic identity may be more aware of the implications of anti-Asian hate and thus may experience higher psychological distress [64]. These researchers also posited that having lower ethnic identity may be connected to less awareness or understanding of the implications of anti-Asian hate for Asian Americans [64]. In our study, however, having higher ethnic identity among Native Hawaiian, Pacific Islander, and East Asian students significantly decreased the association between COVID-19 related racial discrimination and mental health symptoms. The role that ethnic identity plays in the association between discrimination and mental health may depend on place, time, and social context. As pointed out in previous studies, the differences in the moderating role of ethnic identity among different ethnic subgroups may also be due to the varied evolution and process of identity development among diverse groups of APIDAs [36,65]. Perhaps the exploration and promotion of ethnic-racial socialization among APIDA youth in childhood and early adolescence [66] may influence the development of ethnic identity and its role in mitigating the effects of racial discrimination at later stages in life.

Limitations

This present study should be interpreted in light of some limitations. Due to its cross-sectional and non-probability design, causal inferences cannot be drawn, and the findings may

not generalize to the larger population of APIDAs who reside in various regions of the country. Another limitation is the potential for nonresponse bias, although a 14% response rate is not uncommon for online surveys [67]. The HMS data include groups that have often been omitted from prior studies [67]. However, ethnic subgroups were not fully disaggregated, limiting our ability to highlight each group's unique experiences with discrimination and mental health needs during the pandemic. While APIDA ethnicities were not fully disaggregated, this limitation of the HMS study design does not invalidate the results which provide insights into a point in time in history, in which the confluence of the events of the pandemic, has exacerbated psychological distress in populations that had pre-existing mental health needs.

Future research should also include multiracial individuals, as multiracial and Hispanic Asians comprise 14% and 3% of the total APIDA population, respectively [54]. According to the Pew Research Center, among the total population of APIDAs, 32% of Japanese Americans, 18% of Filipino Americans, and 15% of Korean Americans identify as multiracial [54]. Moreover, each individual ethnic group does not fit into a simple category and, instead, has unique social, political, and economic positions in society, which influences their understanding of ethnic identity and group membership, in addition to their distinctive attitudes, perspectives, and behaviors in response to racial discrimination [36,68].

In the present study, COVID-19 related racial discrimination was measured using a single 'yes' or 'no' question. However, people can experience discrimination in a variety of ways and to certain degrees [45]. While all people may experience discrimination, the extent to which it intrudes on their daily lives can change dramatically [69]. However, the HMS is one of the few datasets that has captured pandemic-related racial discrimination, and, in spite of its limitations, the data is novel and provides important insights into the lives of young APIDA college students

in the first year of the pandemic. Perhaps future research can elaborate on how students experienced discrimination and mental health outcomes during this time, with more sensitive measures that have been applied to other racial/ethnic groups.

For this study, we used a composite score for ethnic identity that was divided into low and high categories. However, there is a lot of variability in the ways in which researchers have measured ethnic identity [33,36,37,41,45], for example, operationalizing race and ethnicity as interchangeable among APIDA samples [36]. In addition to conducting further research on ethnic identity among heterogeneous groups of APIDAs and the different contexts in which they experience discrimination, future research may benefit from the inclusion of scales that measure the multidimensional constructs of ethnic and racial identities, separately, to better capture the complex experiences of diverse communities. For example, this approach would be beneficial to Filipinos and Filipino Americans, whose socio-cultural influences include Spanish and U.S. colonization and whose experiences of racialization in the U.S. have led to diversity in racial and ethnic identification [23,60,66]. Future studies would also benefit from group-specific measures, such as the Colonial Mentality Scale [70], which may contribute to or interact with racial and/or ethnic identification [71] to influence levels of psychological well-being or distress when experiencing racial discrimination.

Conclusion

Despite its limitations, the present study provides evidence of the complex mental health outcomes associated with COVID-19 related racial discrimination among diverse groups of APIDA students in higher education. Although the reasons for discrimination may change, research indicates that institutional and cultural racism have been and will continue to contribute to maintaining racial inequalities in a broad range of societal events that combine to create

inequities in health [69]. The impact of COVID-19 is indefinite, and it will be important to understand whether the repercussions of anti-Asian racism and discrimination continue, escalate, or decrease as the consequences of the pandemic persist [14]. The APIDA population in the U.S. is projected to reach 46 million by 2060 [54]. Within two generations, there will be more than twice as many APIDAs in the United States. Our study has implications for research, educational institutions, and healthcare delivery systems to collaborate with and support the efforts of organizations and grassroots and community-led programs and initiatives focusing on APIDA mental health. Following social identity theory and the role of ethnic identity, researchers need to further examine the various ways that APIDA college students explore and understand their ethnic identity to help mitigate the effects of racial discrimination within a variety of systemic and complex sociocultural contexts.

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