



Profiles of a COVID-19 Syndemic: Anti-Asian Racism, Economic Challenges, and Mental and Physical Health

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Abstract

Background During the COVID-19 pandemic, Asians/Asian Americans have experienced co-occurring threats of anti-Asian racism, economic challenges, and negative mental and physical health symptoms.

Objectives We examined the co-occurrence of COVID-19-related anti-Asian discrimination and collective racism, economic stressors, and mental and physical health challenges for Asians/Asian Americans during the COVID-19 pandemic. We also examined Asian/Asian American subgroups associated with these threats.

Methods Nationally representative data from the 2021 Asian American and Native Hawaiian/Pacific Islander COVID-19 Needs Assessment Project (unweighted $N = 3,508$) were used to conduct a latent profile analysis to identify unique typologies of the co-occurrence of these threats. We also conducted chi-square analyses to investigate subgroup differences by latent profile.

Results We identified five distinct latent profiles: multi-threat impact, low impact, collective racism, health challenges, and economic/health challenges. Forty percent of Asians/Asian Americans were in the multi-threat impact profile, indicating high levels across COVID-19-related threats. Subgroup analyses revealed significant differences in profile membership. East Asians, US-born Asians/Asian Americans, and those aged 25–44 seemed to be particularly affected by the proposed syndemic; results also differed by income.

Conclusion Asians/Asian Americans have experienced co-occurring and interrelated threats during COVID-19 that suggest the presence of a syndemic. Results from our study point to vulnerable Asian/Asian American subgroups and the need for targeted public health efforts to address racism, health challenges, and economic challenges in the context of COVID-19.

Keywords Asian Americans · COVID-19 · Syndemic · Racism · Health status · Financial burden

Introduction

The COVID-19 pandemic disproportionately impacted communities of color by exacerbating pre-existing structural and societal inequities that are rooted in and are symptoms of structural racism [1, 2]. Structural racism refers to the ways society has built racial discrimination into all its systems through overt (e.g., legalization of slavery, Jim Crow laws of racial discrimination; anti-immigration laws) and covert (e.g., race-blind policies that ignore racial disparities or imbalances, such as the G.I. bill) mechanisms [3, 4]. These racially discriminatory systems (e.g., education, healthcare, employment, legal), in turn, reinforce discriminatory beliefs and practices [4]. For Asians/Asian Americans, the pandemic has resulted in the co-occurring and interrelated threats of anti-Asian racism, economic challenges, and negative mental

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and physical health symptoms [5–7], exacerbated by structural factors inherent in national health datasets and data collection practices (e.g., poor representation of the lower income stratum, limited English proficient Asian/Asian American communities [8]) and racialized stereotypes held against Asians/Asian Americans in the USA [9].

Anti-Asian Racism

Anti-Asian racism has occurred throughout US history, notably enacted into laws such as the Chinese Exclusion Act of 1882 and taking root in the mainstream (White) American consciousness as associating Asians/Asian Americans as perpetual foreigners and blaming Asians/Asian Americans for diseases (e.g., “Yellow Peril” in the nineteenth century; SARS 2003 outbreak) [10–13]. These patterns of othering and anti-Asian racism have continued and increased during the COVID-19 pandemic [14, 15], driven in part by government leaders and news media using anti-Asian rhetoric [16–18] and the lack of timely response from the Trump Administration, the Department of Justice, and even the CDC to prevent racialized violence [19]. This othering of Asians/Asian Americans was exemplified by increases in online hate and verbal, physical, and violent assaults [19–26].

Economic Challenges

Asians/Asian Americans were heavily impacted economically by the COVID-19 pandemic. Large proportions of Asian/Asian American businesses and workers are employed in industries such as food, hospitality, and retail, which were most negatively impacted by the pandemic [5, 26]. Subsequently, unemployment rates for Asians/Asian Americans increased dramatically, rising from 2.8% in 2019 to 15% in May of 2020 [27]. Compared to other racial/ethnic groups, Asians/Asian Americans had the highest percentage decline in the number of frontline workers [28]. Food businesses in ethnic Chinese neighborhoods closed at a higher rate compared to food businesses in other neighborhoods [29]. Additionally, Asian/Asian American-owned businesses faced obstacles in obtaining Payment Protection Program (PPP) loans, meant to support small businesses and prevent closing, that resulted in many not receiving assistance [5, 26]. Furthermore, less educated Asians/Asian Americans experienced differential economic challenges. Compared to Whites of equal education levels, Asians/Asian Americans with less education were more likely to lose employment during the pandemic [30].

Mental and Physical Health Challenges

The COVID-19 pandemic impacted the mental health of Asians/Asian Americans. Due to isolation in lockdowns and worry for family members’ and one’s own health, many during the COVID-19 pandemic experienced higher rates of anxiety, depression, and distress [6, 30, 31]. This trend is true for Asians/Asian Americans who also experienced increased rates of negative mental health symptoms [6, 32, 33].

Asians’/Asian Americans’ physical health was also impacted by the COVID-19 pandemic. Although Asians/Asian Americans make up a small proportion of the US population, Asians/Asian Americans have a 2.1 times higher percentage of deaths attributed to COVID-19 compared to non-Hispanic Whites [34]. Data from the US Census Bureau’s Household Pulse Survey show that Asians/Asian Americans are slightly more likely to report poor health status compared to non-Hispanic Whites when adjusting for demographic covariates [35]. Additionally, Asians/Asian Americans experienced increased stress from the COVID-19 pandemic and decreased access to healthcare, both of which are associated with decreased physical health [35–37].

Conceptual Framework

Influenced by Singer’s syndemic approach [38], we use a Syndemic Framework to conceptualize these interrelated and interacting threats faced by Asians/Asian Americans during the COVID-19 pandemic [7]. Syndemic theory describes a synergy of co-occurring and compounding epidemics, examining the social, political, and/or ecological factors that may contribute to the co-occurrence of disease for a certain population group [38, 39]. The COVID-19 pandemic brought attention to the clustering of anti-Asian racism, economic stress, and mental and physical health challenges in the AA population [7]. We theorize these threats interact socially and psychologically, exacerbating the experience of any one single threat, and these conditions come together in the Asian/Asian American population due to structural racism [9]. Structural racism contributes to economic injustice through educational and occupational segregation to low-quality jobs, reduced salary for same work, and reduced rate of promotion for marginalized racial groups [4]. Racism also impacts mental and physical health through economic injustice and social deprivation (e.g., social segregation within workplaces, healthcare), environmental health inequities (e.g., disproportionate exposures to hazards, location of toxic waste

sites), psychosocial trauma, and inadequate health care (e.g., limited access to culturally and/or linguistically appropriate care, discriminatory care) [4, 40, 41]. We also argue that the challenges faced by Asians/Asian Americans distinctly cluster within the population due to diversity of histories, experiences and impacts of immigration and other social policies, and intersectional opportunities and barriers based on subgroup statuses.

Variation Among Asians/Asian Americans

Asians/Asian Americans are not meaningfully included in federal and state data collection practices and are often viewed as a homogenous group [9]. However, Asians/Asian Americans are not a monolith but are a diverse group made up of many ethnicities and cultures, distinct histories of migration and settlement, and differential opportunities—shaped heavily by federal immigration policy and US global politics. Individuals hold multiple identities in addition to race and ethnicity, such as gender, age, income, and immigration, that intersect and alter opportunities and treatment [42]. Disaggregating data, therefore, and examining differences within Asians/Asian Americans is important to further understand the impacts of health inequities, economic inequities, and racism [42–45].

Present Study

Conventional news sources, social media platforms, researchers, and the general public showed an increased attention to Asian/Asian American communities during the pandemic, particularly when deleterious incidents against them occurred. However, there is a continued tendency to see Asians/Asian Americans as having a homogenous response and experience to the pandemic and anti-Asian hate incidents despite the recognition of the heterogeneity among them. Asians/Asian Americans can differ in their contexts and environments that may make them more likely to be direct targets of anti-Asian hate attacks. They can also differ in their social, economic, and health conditions that make them disadvantaged, caused by the isolation and burden of the pandemic. This paper develops profiles to tease out the variability of the pandemic experience among Asians/Asian Americans. We used latent profile analysis to examine the co-occurrence of COVID-19-related anti-Asian discrimination and collective racism, economic stressors, and mental and physical health challenges for Asians/Asian Americans during the COVID-19 pandemic. Profiles were then compared across various groups within the Asian/Asian American racial group to better identify the

heterogeneity within Asian/Asian American communities in response to the pandemic.

Method

Sample

Data for this study come from the Asian American and Native Hawaiian/Pacific Islander COVID-19 Needs Assessment Study [46]. This study was conducted by the Asian American Psychological Association and examined Asian American and Native Hawaiian/Pacific Islander experiences during the pandemic in areas such as mental health, discrimination, healthcare access, and economic impact.

The survey was designed in collaboration with national and community organizations and was offered in online, paper, and over the phone formats. Asian American and Native Hawaiian/Pacific Islander individuals aged 18 years and older were recruited to participate. We targeted recruitment efforts toward five Asian ethnic groups: Chinese, Filipino, Korean, Vietnamese, and South Asian ethnicities (i.e., Indian, Bangladeshi, Nepalese, Pakistani, Sri Lankan, Bhutanese); however, we did not exclude individuals of other Asian ancestry from participation in the survey. The survey was offered in the following languages: Bangla, Chinese (traditional and simplified), English, Hindi, Khmer, Korean, Tagalog, Urdu, and Vietnamese. Potential participants were recruited through community organization events and outreach (e.g., vaccination drives, food deliveries, email lists, flyers, word of mouth; 68% of participants) and through an online Qualtrics panel (32% of participants; offered only in English). Community organization recruitment was targeted in Honolulu, Los Angeles, Chicago, Houston, Portland, Seattle, and Jersey City. In recruitment materials, we explained that the purpose of the study was to learn more about the experiences and needs of Asian American and Pacific Islander communities since the beginning of the COVID-19 pandemic. Ethics approval for this study was received from the Association of Asian Pacific Community Health Organizations (AAPCHO) Institutional Review Board. Informed consent was obtained from participants at the beginning of the survey, and participants were paid via \$10 gift card or equivalent compensation for panel participants. Participants completed the survey from January 18 to April 9, 2021. A total of 3508 respondents who self-identified as Asian for their race, including multiracial individuals, were included in analyses.

Measures

Mental Health

Participants responded to a modified version of the Patient Health Questionnaire-4 (PHQ-4) [46, 47], composed of the two-item Generalized Anxiety Disorder scale (GAD-2) and the two-item Patient Health Questionnaire-2 (PHQ-2) [48], which both ask for symptoms over the last 7 days (rather than 14 days). A sample question includes “Over the last 7 days, how often have you been bothered by the following problems: Feeling nervous, anxious, or on edge.” Response options included the following: *Not at all* (0), *Several days* (1), *More than half the days* (2), and *Nearly every day* (3). To measure psychological distress, we calculated summed scores from the four items.

Health

As a measure of health, participants responded to the following item from the Household Pulse Survey: “Currently, would you say your health in general is excellent, very good, good, fair, or poor?” Response options included (1) *Excellent*, (2) *Very good*, (3) *Good*, (4) *Fair*, and (5) *Poor* [49].

Discrimination

Participants responded to the following multiple-choice item developed with community partners: “How has the COVID-19 pandemic impacted your family’s life?” Participants were able to select *Yes* to as many options as they chose. One possible option was “Facing discrimination.” Participants responded to a second similar multiple-choice item from the Environmental influences on Child Health Outcomes COVID-19 Questionnaire: “What have been your greatest sources of stress from the COVID-19 pandemic?” [50]. Participants were able to select *Yes* to as many options as they chose. One possible option was “Discrimination due to my race/ethnicity.” We used the selection of these two options as a measure of discrimination. We created a summed score ranging from 0 to 2, such that participants were given a score of 1 for each question to which they responded *Yes*.

Collective Racism

Participants responded to questions from the Coronavirus Racial Bias Scale (CRBS), which examines beliefs about how the COVID-19 pandemic has negatively affected people of one’s race/ethnicity [51]. For the present study, we used three CRBS items to approximate participants’ COVID-19-related collective racism. These items include the following: “Has the U.S. become more physically dangerous

for people in your racial/ethnic group because of fear of COVID-19?”; “Since COVID-19, have you seen a change in the amount of cyberbullying of people of your race/ethnicity?”; and “How much does what politicians say (i.e., political rhetoric) about COVID-19 create bias against people of your racial/ethnic group?” Participants responded to items on a 5-point scale, where a higher score indicates more negative impact or racial bias (i.e., 1 = *Much more positive*; 5 = *Much more negative*). We used a summed score of the three CRBS items for the present study.

COVID-19 Economic Stressors

Participants responded to questions regarding how the COVID-19 pandemic had impacted them economically. Four of these items are included in the current study, and they include the following: Loss of employment income—“Have you, or has anyone in your household experienced a loss of employment income since the COVID-19 pandemic since March 13, 2020?” [49]; Unable to afford food—“Why did you not have enough to eat (or not what you wanted to eat)?—Could not afford to buy more food.” [49]; Financial stress—“What have been your greatest sources of stress from the COVID-19 pandemic?—Financial concerns.” [50]; Confidence in Paying Housing—“How confident are you that your household will be able to pay your next rent or mortgage payment on time?” [49]. Response options for the first three items were dichotomous—*Yes/checked* option; *No/did not check* option. Options for Confidence in Paying Housing included (1) *No confidence*, (2) *Slight confidence*, (3) *Moderate confidence*, (4) *High confidence*, and (5) *Payment is/will be deferred*. Responses were dichotomized into high confidence (options 3, 4, 5, and participants who did not have a monthly housing payment) and low confidence (options 1 and 2). To measure economic challenges, we created a summed score of the four items with a range from 0 to 4, such that participants received a score of 1 for each *Yes/Low confidence* response.

Demographic Variables

Participants responded to a variety of demographic questions, including ethnic identity (East Asian, South Asian, Southeast Asian, Multiracial, and Multiethnic), gender identity (man, woman, nonbinary/trans/another gender identity), age (18–24, 25–44, 45–64, 65+ years), household income (< \$25,000, \$25,000–\$49,999, \$50,000–\$74,999, \$75,000–\$99,999, and > \$100,000), and nativity (US born, foreign born). We categorized respondents who identified with more than one racial group as multiracial. Participants who identified with more than one ethnic group were categorized as multiethnic.

Data Analysis

We used the ranking method to create sample weights matching the Asian population estimates from the 2019 US Census American Community Survey (ACS) 1-Year estimates [52]. Sample weights reflect the representative Asian/Asian American population in the USA as of 2019 and account for multiracial Asians/Asian Americans. Data weights were created based on the following variables: Asian ethnicity, nativity (foreign born vs US born), education, household income, gender identity, and age. All analyses used weighted data.

Missing data for demographic and key variables were assessed. There were less than 1.3% missing values in the five key variables included in the latent profile model estimation. We used Mplus to impute missing data into the five key indicators using full information maximum likelihood. Among the demographic variables, household income had the highest number of missing values ($N = 62$; 1.8% missing). To generate the correct parameter estimates in the subgroup analyses, we conducted multiple imputation by chained equations in R, creating 25 imputed datasets [53].

We conducted latent profile analysis to examine clustering on the following indicators: psychological distress, physical health, discrimination, collective racism, and economic challenges. We then conducted chi-square tests of independence for each subgroup to determine if sociodemographic factors were associated with latent profile membership. We conducted post hoc analyses using adjusted residuals. Larger residuals indicate greater contribution to the significant chi-square result [54]; and we applied a Bonferroni correction to adjust the standardized residuals for the total number of cells [55].

Analyses were conducted in R (v4.0.3 in RStudio v1.4.1106) using the “stats” (v. 4.0.3), “dplyr” (v1.0.7), “survey” (v4.1–1), “mice” (v3.14.0), and “nnet” (v7.3–17) packages and Mplus [53, 56, 57].

Results

Indicator Frequencies and Correlations

Table 1 shows the frequencies and descriptive statistics for the individual items that comprise each of the five indicator measures. Table 2 shows the correlations between the five indicators. All five indicators were significantly and positively correlated to each other, with the exception of collective racism and economic stressors, which were not significantly correlated.

Table 1 Frequencies and descriptive statistics of individual items for each measure

Measure Item	# Endorsed (unweighted %)	Mean (SD)
Mental health		
Feeling nervous, anxious or on edge (0–3)		1.18 (0.97)
Not being able to stop or control worrying (0–3)		1.00 (0.94)
Feeling down, depressed or hopeless (0–3)		0.99 (0.94)
Little interest or pleasure in doing things (0–3)		0.92 (0.93)
Physical health		
Health perception (1–5)		2.74 (1.03)
Discrimination		
Impact on family: facing discrimination	1,008 (29%)	
Source of stress: discrimination due to my race/ethnicity	1,105 (32%)	
Collective racism		
US physically dangerous (1–5)		4.07 (0.85)
Change in amount of cyberbullying (1–5)		3.83 (0.89)
Political rhetoric (1–5)		4.04 (0.90)
COVID-19 economic stressors		
Loss of employment income	1,468 (42%)	
Unable to afford food	385 (11%)	
Financial stress	1,516 (43%)	
Confidence in paying housing	350 (10%)	

Latent Profile Analysis

We first tested a variety of latent profile models with two to six latent classes. We used fit indices and interpretability of the profiles to determine the best latent profile model (see Table 3 [58]). Although the 6-class latent model had the lowest AIC, BIC, and SABIC, the smallest profile included only 4 individuals, which disqualified this model as a solution. Based on the Lo-Mendell-Rubin likelihood ratio test, the 2-class model had the best fit, but lacked nuance in its interpretability. Therefore, we selected the 5-class model as the best latent profile model as it had the lowest AIC, BIC, and SABIC (excluding the disqualified 6-class model) and its interpretability best fit our conceptual framework. The average posterior probability associated with each latent profile is presented in Table 4 for the final 5-profile solution.

We then interpreted the five profiles based on each profile’s mean scores on the key indicators (see Fig. 1). The first profile included the largest number of Asians/Asian Americans (41%); individuals categorized into this profile shared above-average scores on all five indicators. We labeled this profile “multi-threat impact” to describe participants dealing with multi-faceted threats of negative mental and physical health symptoms, economic challenges, and anti-Asian discrimination and collective racism. The second profile included 34% of Asians/Asian Americans and was characterized by below-average scores on all five indicators. We labeled this profile “low impact” to describe Asians/Asian Americans who were relatively least impacted by

Table 2 Correlations of measures

	Mental health	Physical health	Discrimination	Collective racism	Economic stressors
Mental health	–				
Physical health	0.324***	–			
Discrimination	0.264***	0.110***	–		
Collective racism	0.192***	0.119***	0.455***	–	
Economic stressors	0.141***	0.136***	0.066***	0.016	–

*** $p < 0.001$

Table 3 Fit indices for latent profile analysis models

Number of classes	AIC	BIC	SABIC	Entropy	Lo-Mendell-Rubin adjusted LRT test value	p-value
2	55,709.55	55,808.16	55,757.32	0.972	3051.95	0.000
3	55,497.48	55,633.06	55,563.16	0.867	219.59	0.0898
4	55,426.53	55,599.09	55,510.12	0.868	81.290	0.4024
5	55,378.81	55,588.34	55,480.31	0.742	58.529	0.4887
6	55,325.40	55,571.91	55,444.81	0.775	64.103	0.3125

AIC, Akaike’s information criterion; BIC, Bayesian information criteria; SABIC, sample-size adjusted BIC; LRT, likelihood ratio test

Table 4 Classification table for 5-profile solution

Profile	n	Average posterior probability associated with each profile				
		Multi-threat impact	Low impact	Collective racism	Health challenges	Economic/health challenges
Multi-threat impact	1438	0.997	0.002	0.000	0.000	0.001
Low impact	1201	0.011	0.856	0.108	0.012	0.012
Collective racism	602	0.009	0.363	0.592	0.025	0.011
Health challenges	161	0.028	0.162	0.139	0.633	0.039
Economic/health challenges	106	0.028	0.219	0.146	0.070	0.538

Values in bold represent the average posterior probability associated with the profile to which participants were assigned

negative health symptoms, economic challenges, and discrimination and collective racism. The third profile grouped together Asians/Asian Americans (17%) with high scores on COVID-19-related collective racism and average to below-average scores on discrimination, mental and physical health, and economic indicators. We labeled this profile collective racism, indicating this group mainly experienced collective racism without the other four indicators during the COVID-19 pandemic. The fourth profile was labeled “health challenges,” as Asians/Asian Americans categorized into this profile (5%) exhibited high scores on both mental and physical health and below-average scores on the other three indicators. Only 3% of Asians/Asian Americans were categorized into the fifth profile, showing the highest scores on economic challenges and relatively high scores on mental and physical health, with below-average scores on discrimination and collective racism. We labeled this profile “economic/health challenges.”

Subgroup Analysis

We conducted subgroup analyses to examine the relationship between sociodemographic factors and each profile. Table 5 presents descriptive statistics on the demographic factors and key indicators for the overall sample and each latent profile. Chi-square statistics are also presented for each sociodemographic factor. The following sociodemographic factors were significantly related to latent profile membership: ethnicity, age, income, and nativity status. Gender was not differentially related to latent profile membership.

Using adjusted residuals, we further investigated which sociodemographic subgroups were most likely to have membership in the five latent profiles. The multi-threat impact profile was characterized by over-represented membership for East Asians and multiethnic

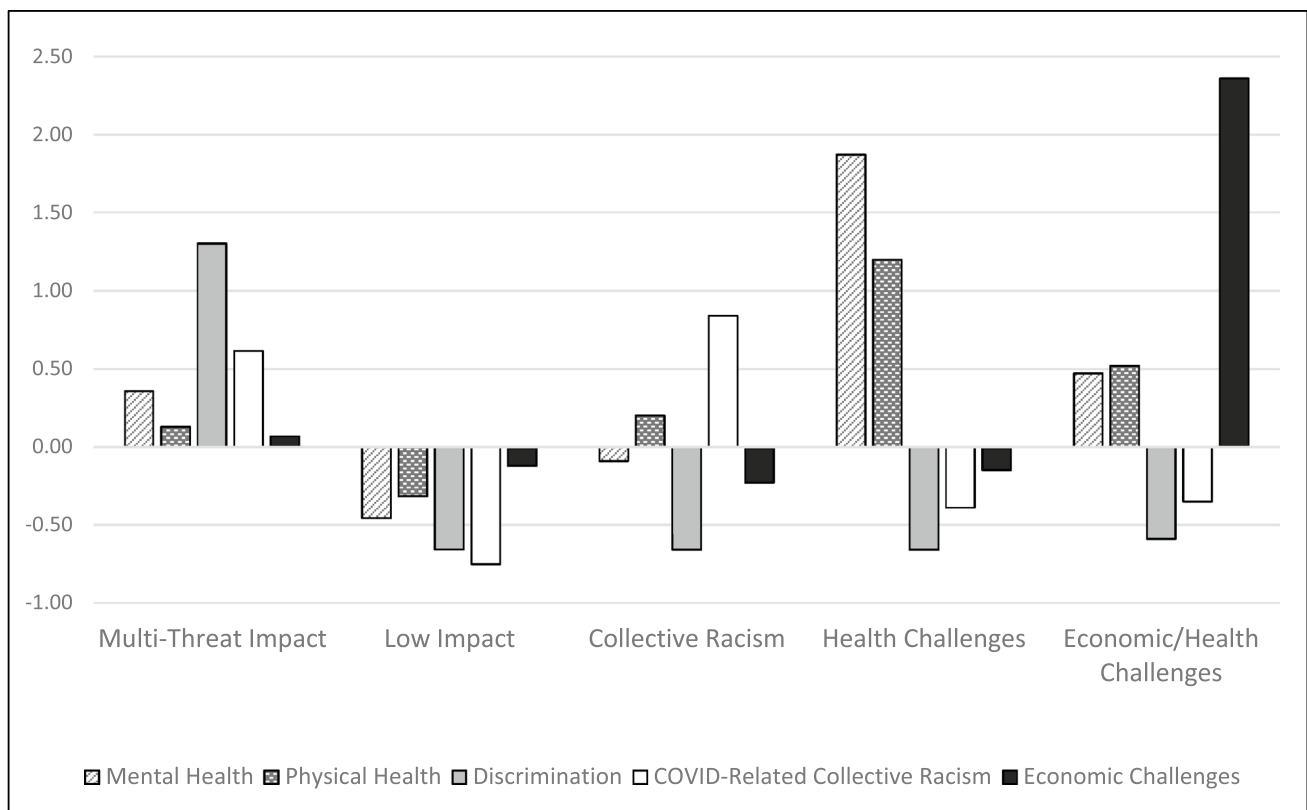


Fig. 1 Standardized means for the indicators by latent profile

Asians/Asian Americans, those aged 25–44, and US-born Asians/Asian Americans. South Asians, those aged 45–64, and foreign-born Asians/Asian Americans were most likely to have membership in the low impact profile. The collective racism profile was characterized by increased membership of multiracial Asians/Asian Americans, those earning a household income of \$100,000 or more, and US-born Asians/Asian Americans. The health challenges profile included larger proportions of young adults (aged 18–24) and Asians/Asian Americans earning a household income less than \$25,000. Overrepresented membership in the economic/health challenges profile included Asians/Asian Americans earning a household income less than \$50,000.

Discussion

In the present study, we confirm that Asians/Asian Americans have faced multiple threats of anti-Asian discrimination and COVID-19-related collective racism, economic stressors, and negative mental and physical health challenges. We identified five latent profiles that describe the co-occurrence of these multiple threats: the multi-threat profile, describing high levels of all

five threats; low impact profile, with low levels on all five indicators relative to the other profiles; collective racism profile; health challenges profile; and economic/health challenges profile. We also identified Asian/Asian American subgroups associated with the co-occurring threats as described in each profile.

The Sinophobic emphasis of COVID-19-related anti-Asian racism may explain why East Asians were the most likely ethnic group to experience the multi-threat profile [59], which described Asians/Asian Americans who experienced high levels on all five threats. Chinese and, as an extension, East Asians have generally experienced the brunt of COVID-19-related anti-Asian racism [60]—including discrimination, collective racism, and economic losses—as government leaders and media have inaccurately paired and implicitly (and explicitly) blamed COVID-19 on China and Chinese [6, 17, 18, 26]. Multiethnic Asians/Asian Americans also had significant high proportions of membership in the multi-threat profile. Not enough research currently exists to understand why this might be the case; perhaps due to memberships in different, potentially conflicting ethnic groups, multiethnic individuals experienced increased social marginalization and less access to supports to help navigate stressors. We encourage more research to further understand multiethnic Asians/Asian Americans' experiences of anti-Asian racism, economic stressors, and health challenges during the

Table 5 Unweighted frequencies, weighted proportions, and weighted means and standard errors for demographic and key indicator variables by latent profiles

Variables	Overall, <i>n</i> (weighted %) <i>N</i> =3,508	Multi-threat impact, <i>n</i> (weighted %) 1438 (40.99%)	Low impact, <i>n</i> (weighted %) 1201 (34.24%)	Collective racism, <i>n</i> (weighted %) 602 (17.16%)	Health challenges, <i>n</i> (weighted %) 161 (4.59%)	Economic/health challenges, <i>n</i> (weighted %) 106 (3.02%)
Ethnicity						
East Asian	1371 (29.31%)	641 (37.20%) ⁺	407 (24.17%) ⁻	246 (31.00%)	45 (21.53%)	32 (16.01%) ⁻
South Asian	463 (22.41%)	65 (8.83%) ⁻	293 (35.74%) ⁺	47 (13.58%) ⁻	37 (28.08%)	21 (25.87%)
Southeast Asian	1174 (28.45%)	495 (31.05%)	381 (25.88%)	209 (28.07%)	54 (28.87%)	35 (37.38%)
Multiracial	272 (16.69%)	96 (16.91%)	82 (12.87%) ⁻	61 (24.53%) ⁺	17 (19.96%)	16 (20.17%)
Multiethnic	228 (3.14%)	141 (6.01%) ⁺	38 (1.35%) ⁻	39 (2.82%)	8 (1.56%)	2 (0.58%)
Chi-square		$F(13.32)=12.3, p<0.001$				
Gender identity						
Man	1328 (47.11%)	473 (44.21%)	538 (51.28%)	218 (43.37%)	54 (36.06%)	45 (56.15%)
Woman	2139 (51.80%)	945 (54.81%)	655 (47.77%)	378 (55.81%)	100 (58.58%)	61 (43.85%)
Nonbinary, trans, other	36 (1.09%)	20 (0.99%)	3 (0.95%)	6 (0.82%)	7 (5.36%)	0 (0.00%)
Chi-square		$F(4.21)=2.09, p=0.076$				
Age						
18–24	1151 (14.01%)	527 (15.35%)	294 (11.18%) ⁻	219 (13.79%)	81 (33.96%) ⁺	30 (17.38%)
25–44	1515 (42.35%)	677 (51.19%) ⁺	496 (37.87%) ⁻	244 (42.91%)	47 (27.47%) ⁻	51 (36.52%)
45–64	560 (28.51%)	161 (22.96%) ⁻	267 (34.82%) ⁺	96 (28.01%)	18 (19.40%)	18 (24.06%)
65 and older	263 (14.30%)	67 (10.50%) ⁻	132 (16.13%)	43 (15.29%)	14 (19.17%)	7 (22.05%)
Chi-square		$F(9.98)=5.26, p<0.001$				
Income						
Less than \$25,000	700 (14.10%)	291 (14.35%)	218 (12.89%)	118 (11.65%)	40 (24.74%) ⁺	33 (36.21%) ⁺
\$25,000 to \$49,999	703 (13.18%)	293 (12.83%)	247 (14.31%)	87 (7.64%) ⁻	37 (21.24%)	39 (29.33%) ⁺
\$50,000 to \$74,999	540 (13.91%)	229 (15.33%)	189 (14.24%)	80 (12.02%)	27 (14.32%)	15 (13.07%)
\$75,000 to \$99,999	444 (12.27%)	186 (14.06%)	156 (12.15%)	73 (11.74%)	20 (10.80%)	9 (7.34%)
\$100,000 and above	1059 (44.55%)	419 (43.43%)	363 (46.42%)	234 (56.96%) ⁺	35 (28.90%) ⁻	8 (14.05%) ⁻
Chi-square		$F(14.77)=4.93, p<0.001$				
Nativity						
US born	1835 (36.41%)	849 (41.97%) ⁺	475 (27.54%) ⁻	365 (46.60%) ⁺	91 (41.41%)	55 (34.69%)
Foreign born	1647 (63.59%)	585 (58.03%) ⁻	708 (72.46%) ⁺	235 (53.40%) ⁻	69 (58.59%)	50 (65.31%)
Chi-square		$F(3.99)=12.49, p<0.001$				
Psychological distress $M \pm SD$ (range 0–12)	3.45 ± 3.16	4.58 ± 0.14	2.01 ± 0.09	3.17 ± 0.16	9.37 ± 0.21	4.93 ± 0.34
Self-rated health $M \pm SD$ (range 1–5)	2.68 ± 1.01	2.81 ± 0.05	2.36 ± 0.04	2.88 ± 0.06	3.89 ± 0.09	3.21 ± 0.14
Discrimination $M \pm SD$ (range 0–2)	0.48 ± 0.73	1.43 ± 0.02	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.05 ± 0.02
COVID-19-related vicarious racism $M \pm SD$ (range 3–15)	11.53 ± 2.18	12.87 ± 0.08	9.89 ± 0.06	13.36 ± 0.06	10.69 ± 0.21	10.76 ± 0.18
Economic challenges $M \pm SD$ (range 0–4)	1.08 ± 0.74	1.13 ± 0.03	0.99 ± 0.02	0.91 ± 0.04	0.97 ± 0.09	2.83 ± 0.08

Raw numbers are unweighted. Weighted percentages are column percentages. Means and standard errors are weighted. ⁺ indicates that subgroup was significantly overrepresented in the latent profile. ⁻ indicates that subgroup was significantly underrepresented in the latent profile

COVID-19 pandemic. The membership of South Asians in the low impact profile, conversely, should not be interpreted as there being no experiences of discrimination in this group during the COVID-19 pandemic. These results must also be interpreted against the backdrop of the historical and contemporary discrimination towards South Asians and Muslim communities (i.e., Islamophobia). Finally, multiracial Asians/Asian Americans were most represented in the collective racism profile, which described an experience with high levels of COVID-19-related collective racism and below-average levels for the other four indicators. There is emerging research examining the mental health, sense of belonging, and racial identities of multiracial Asians/Asian Americans [60–62]. We encourage this emerging research to further understand the varied experiences of multiracial Asians/Asian Americans.

Contrary to much of the previous literature, we found no differences in latent profile membership by gender. Gender differences have been shown to exist in mental health symptoms [63], reporting of anti-Asian hate incidents [64], and pandemic-related stress [65]. However, some studies have found no gender differences in loss of employment rates during COVID-19 [30], or levels of psychological distress across all Asian subgroups [66]. We still encourage future research to include gender as a potential factor of difference in experiences, particularly because of the intersectionality of being Asian/Asian American and a woman often means hyper-sexualization and violence (e.g., the Atlanta spa shootings in 2021) [67]. Additionally, the evidence for gender disparities in mental and physical health as well as economic status is well documented [67–69].

Lower income individuals were more likely to experience economic challenges as well as mental and physical health challenges. Membership in both the economic/health challenges profile and the health challenges profile was associated with Asians/Asian Americans from lower income households. In the general US population, lower income is a significant factor associated with increased anxiety and depression symptoms [70]. This is also true for Asians/Asian Americans: those with less income are additionally experiencing negative mental and physical health symptoms. Furthermore, data from the 2011/2012 California Health Interview Survey (CHIS) show that unemployed Asians/Asian Americans or those looking for employment had higher rates of psychological distress [66]. Similarly, simulations run with National Institute of Mental Health and Social Security Administration data show that increases in employment correlated with mental health improvements [71].

Previous research has found that younger Asians/Asian Americans are more vulnerable to increased negative mental health symptoms [63]. Our study confirms these findings. Younger Asians/Asian Americans (aged 18–24 years) were the most represented age group in the health challenges profile, indicating they experienced the highest levels of negative mental and physical health symptoms. Asians/Asian

Americans aged 25–44 were the most represented in the multi-threat profile, indicating relatively high levels of negative mental and physical health symptoms in addition to high levels on the other three indicators. More research is needed to understand why this middle age group was most vulnerable to experiencing all five threats.

US-born Asians/Asian Americans were significantly more likely to have membership in the multi-threat profile compared to foreign-born Asians/Asian Americans. In accordance with data from the 2002/2003 National Latino and Asian American Study (NLAAS) [72], US-born Asians/Asian Americans experienced high levels of negative mental health symptoms in addition to high levels on all five threat indicators.

Approximately one third of Asians/Asian Americans were represented in the lower-impact profile, a profile that represented lower impacts of different threats relative to other profiles. This profile was overrepresented by South Asians, 45–64 year olds, and those born outside of the US. As we have suggested, the Sinophobic nature of anti-Asian racism during the COVID-19 pandemic may have resulted in lower discrimination profiles for South Asians relative to East and Southeast Asians. Middle-aged adults may be more settled in their careers and thus be better protected from economic-driven threats such as income or job loss or healthcare access issues compared to other age groups. Asians/Asian Americans born outside the US may have access to ethnic community supports that buffer some of the threats exacerbated by the pandemic.

We propose that during the COVID-19 pandemic, Asians/Asian Americans are facing a syndemic composed of anti-Asian hate, health challenges, and economic stressors. Syndemic theory states that syndemics must include the following: (1) two or more diseases clustering together within a population, (2) interaction of these diseases that leads to worse outcomes, and (3) large-scale social forces that explain the clustering of the diseases [40]. We have established through this paper that many Asians/Asian Americans have experienced co-occurring threats of anti-Asian discrimination and collective racism, mental and physical health challenges, and economic stressors. Although we could not test this given the current dataset, we suspect that these co-occurring challenges likely interact and, in doing so, may worsen health and other outcomes in the long-term. Moreover, as suggested by Singer's syndemic theory [40], and as we have proposed elsewhere [7], the profiles that we identified may be explained by large-scale social forces such as structural racism, immigration policies, and histories of colonization, imperialism, and displacement that have impacted Asians/Asian Americans. These larger structural influences have not impacted Asians/Asian Americans uniformly. Intersectionality theory can help to explain how different axes of identity and social status interact to pattern distinct profiles of experiences among Asians/Asian Americans, and provide insight on how public health interventions can be developed to meet the distinct needs of different segments of the Asian/Asian American population [73].

Limitations and Future Research

This study is the first, to our knowledge, to examine the co-occurrence of anti-Asian hate, health challenges, and economic stressors within Asian/Asian American communities during the COVID-19 pandemic. Although a strength of our study was that most of the data were collected through partnerships with Asian/Asian American organizations and networks—which allowed us to recruit Asians/Asian Americans who are often excluded from other research studies due to language and other barriers—we acknowledge that our recruitment methods limit the generalizability of our findings as data weighting does not fully account for sampling bias. We also note several other limitations. Although our dataset was robust enough to allow for subgroup analyses, we did not account for intersectionality. Intersectionality theory argues that individuals hold multiple identities that interact to shape their experiences, particularly structuring experiences of oppression [74]. We acknowledge that intersectionality is essential to understanding Asians/Asian Americans' experiences of these multiple threats. Because individuals hold multiple identities, these sociodemographic subgroups likely interact, which may mean that additional subgroups are at greater risk of these threats. For example, it is possible we would have found gender differences using a more intersectional approach. However, we were limited in our quantitative approach. Future research will benefit from the use of qualitative methods, which are generally best suited to exploring issues of intersectionality. Additionally, as stated previously, we did not examine interactions between the co-occurring threats facing Asians/Asian Americans. Furthermore, our cross-sectional data limits our examination of causality among these co-occurring threats as well as long-term outcomes of the syndemic framework. We encourage future research that investigates the interactions of these threats, examining potential downstream effects of the proposed syndemic, such as chronic health conditions (e.g., diabetes), community and interpersonal violence, and poverty.

Conclusion

We propose a syndemic is occurring among Asians/Asian Americans that encompasses anti-Asian discrimination and collective racism, mental and physical health challenges, and economic stressors. We have established that Asians/Asian

Americans have faced these co-occurring threats and that these threats vary by and are associated with certain Asian/Asian American subgroups. Asian/Asian American communities would benefit from additional health and economic resources, particularly directed toward East Asians, multiethnic, middle-aged (25–44 years), US-born, and lower-income Asians/Asian Americans. It is also necessary to confront the anti-Asian racism present in the USA, for example through education that targets anti-Asian myths and through changes in policies that better protect AA employees.

Author Contribution All authors contributed to the study conception and design. Material preparation and data collection were performed by Rebecca McGarity-Palmer and Anne Saw. Data analysis was performed by Rebecca McGarity-Palmer. The first draft of the manuscript was written by Rebecca McGarity-Palmer and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data Availability De-identified data and materials are available upon request.

Code Availability Code is available upon request.

Declarations

Ethics Approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Association of Asian Pacific Community Health Organizations (AAPCHO) Institutional Review Board (2010-AAPCHO-02N-California-AAPI-COVID19-Needs-Assessment).

Consent to Participate Informed consent was obtained from all individual participants included in the study.

Consent for Publication Not applicable.

Competing Interests The authors declare no competing interests.

References

- Fisher CB, Tao X, Liu T, Giorgi S, Curtis B. “COVID-related victimization, racial bias and employment and housing disruption increase mental health risk among U.S. Asian, Black and Latinx Adults” *Front Public Health*. 2020;9:772236. <https://doi.org/10.3389/fpubh.2021.772236>.
- Liu SR, Modir S. The outbreak that was always here: racial trauma in the context of COVID-19 and implications for mental health providers. *Psychol Trauma Theory Res Pract Policy*. 2020;12(5):439–42. <https://doi.org/10.1037/tra0000784>.
- A. H. Wingfield, “The failure of race-blind economic policy,” *The Atlantic*, Feb. 2017, Accessed: Aug. 08, 2022. [Online]. Available: <https://www.theatlantic.com/business/archive/2017/02/race-economic-policy/516966/>
- Bailey ZD, Krieger N, Agénor M, Graves J, Linos N, Bassett MT. Structural racism and health inequities in the USA: evidence and interventions. *The Lancet*. 2017;389(10077):1453–63. [https://doi.org/10.1016/S0140-6736\(17\)30569-X](https://doi.org/10.1016/S0140-6736(17)30569-X).
- M. K. Chin, L. N. Doan, S. K. Chong, J. A. Wong, S. C. Kwon, and S. S. Yi, “Asian American subgroups and the COVID-19 experience: what we know and still don’t know.,” 2021, <https://doi.org/10.1377/hblog20210519.651079>.
- Lee S, Waters SF. Asians and Asian Americans’ experiences of racial discrimination during the COVID-19 pandemic: impacts on health outcomes and the buffering role of social support. *Stigma Health*. 2021;6(1):70–8. <https://doi.org/10.1037/sah0000275>.
- Saw A, et al. Improving Asian American health during the syndemic of COVID-19 and racism. *Eclin Med*. 2022;45:101313. <https://doi.org/10.1016/j.eclinm.2022.101313>.
- Islam NS, Khan S, Kwon S, Jang D, Ro M, Trinh-Shevrin C. Methodological issues in the collection, analysis, and reporting of granular data in Asian American populations: historical challenges and potential solutions. *J Health Care Poor Underserved*. 2010;21(4):1354–81. <https://doi.org/10.1353/hpu.2010.0939>
- Yi SS, et al. The mutually reinforcing cycle of poor data quality and racialized stereotypes that shapes Asian American health: study examines poor data quality and racialized stereotypes that shape Asian American health. *Health Aff*. 2022;41(2):296–303. <https://doi.org/10.1377/hlthaff.2021.01417>.
- Lee E. The Chinese exclusion example: race, immigration, and American gatekeeping, 1882–1924. *J Am Ethn Hist*. 2002;21(3):36–62.
- M. Stevens, “How Asian American leaders are grappling with xenophobia amid coronavirus,” Apr. 2020, Accessed: Feb. 15, 2022. [Online]. Available: <https://www.nytimes.com/2020/03/29/us/politics/coronavirus-asian-americans.html>
- Power JG. Media dependency, bubonic plague, and the social construction of the Chinese other. *J Commun Inq*. 1995;19(1):89–110. <https://doi.org/10.1177/019685999501900106>.
- Chen JA, Zhang E, Liu CH. Potential impact of COVID-19-related racial discrimination on the health of Asian Americans. *Am J Public Health*. 2020;110(11):e1–4. <https://doi.org/10.2105/AJPH.2020.305858>.
- Center for the Study of Hate & Extremism, “Fact sheet: anti-Asian prejudice March 2021,” 2021a, Accessed: Dec. 20, 2021. [Online]. Available: <https://www.csusb.edu/sites/default/files/FACT%20SHEET-%20Anti-Asian%20Hate%202020%20rev%203.21.21.pdf>
- Center for the Study of Hate & Extremism, “Anti-Asian hate crime reported to police in large U.S. cities: 2021 & 2020.” 2021b. Accessed: Mar. 15, 2022. [Online]. Available: <https://www.csusb.edu/hate-and-extremism-center/data-reports/original-reports-hate-and-terrorism-center-staff>
- Human Rights Watch, “Covid-19 fueling anti-Asian racism and xenophobia worldwide,” *Human Rights Watch*, 2020. <https://www.hrw.org/news/2020/05/12/covid-19-fueling-anti-asian-racism-and-xenophobia-worldwide> (accessed Oct. 21, 2021).
- Kelley A. Attacks on Asian Americans skyrocket to 100 per day during coronavirus pandemic. *The Hill*. 2020;1. <https://thehill.com/changing-america/respect/equality/490373-attacks-on-asian-americans-at-about-100-per-day-due-to/>
- A. Marquardt and J. Hansler, “US push to include ‘Wuhan virus’ language in G7 joint statement fractures alliance,” *CNN Politics*, 2020. <https://www.cnn.com/2020/03/25/politics/g7-coronavirus-statement/index.html> (accessed Oct. 21, 2021).
- Gover AR, Harper SB, Langton L. Anti-Asian hate crime during the COVID-19 pandemic: exploring the reproduction of inequality. *Am J Crim Just*. 2020;45(4):647–67. <https://doi.org/10.1007/s12103-020-09545-1>.
- K. Brantley-Jones and S. Chen, “Violent attacks on elderly Asian Americans in Bay Area leaves community members ‘traumatized,’” *ABC News*, 2021. <https://abcnews.go.com/US/violent-attacks-elderly-asian-americans-bay-area-leaves/story?id=75759713> (accessed Feb. 15, 2022).
- Hahm HC, Ha Y, Scott JC, Wongchai V, Chen JA, Liu CH. Perceived COVID-19-related anti-Asian discrimination predicts post traumatic stress disorder symptoms among Asian and Asian American young adults. *Psychiatry Research*. 2021;303:114084. <https://doi.org/10.1016/j.psychres.2021.114084>.
- Y. Han, “The contagion of anti-Asian discrimination,” *NY City Lens*, May 04, 2020. <https://nycitylens.com/the-contagion-of-anti-asian-discrimination/> (accessed Feb. 15, 2022).
- A. J. Yellow Horse *et al.*, “Stop AAPI Hate national report: 3/19/20 - 6/30/21,” 2021. Accessed: Feb. 15, 2022. [Online]. Available: <https://stopaapihate.org/wp-content/uploads/2021/08/Stop-AAPI-Hate-Report-National-v2-210830.pdf>
- B He, C Ziems, S Soni, N Ramakrishnan, D Yang, and S Kumar (2021) “Racism is a virus: anti-Asian hate and counterspeech in social media during the COVID-19 crisis,” in *Proceedings of the 2021 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, Virtual Event Netherlands, 2021, 90–94. <https://doi.org/10.1145/3487351.3488324>
- Nguyen TT, et al. Exploring U.S. shifts in anti-Asian sentiment with the emergence of COVID-19. *IJERPH*. 2020;17(19):7032. <https://doi.org/10.3390/ijerph17197032>.
- F Tahmasbi *et al.*, “‘Go eat a bat, Chang!’: on the emergence of sinophobic behavior on web communities in the case of COVID-19,” in *Proceedings of the Web Conference 2021*, Ljubljana Slovenia, Apr. 2021, 1122–1133. <https://doi.org/10.1145/3442381.3450024>.
- S. Horsley, “‘Overlooked’: Asian American jobless rate surges but few take notice,” 2020, Accessed: Feb. 11, 2022. [Online]. Available: <https://www.npr.org/2020/10/01/918834644/overlooked-asian-american-jobless-rate-surges-but-few-take-notice>
- Gemelas J, Davison J, Keltner C, Ing S. Inequities in employment by race, ethnicity, and sector during COVID-19. *J Racial and Ethnic Health Disparities*. 2021;9(1):350–5. <https://doi.org/10.1007/s40615-021-00963-3>.
- Yi SS, et al. COVID-19 leads to dramatic changes in the food retail environment in New York City: May–July 2020. *J Immigrant Minority Health*. 2022;24(1):31–7. <https://doi.org/10.1007/s10903-021-01230-7>.
- Kim AT, Kim C, Tuttle SE, Zhang Y. COVID-19 and the decline in Asian American employment. *Res Soc Stratification Mobilit*. 2021;71:100563. <https://doi.org/10.1016/j.rssm.2020.100563>.
- Han RH, Schmidt MN, Waits WM, Bell AKC, Miller TL. Planning for mental health needs during COVID-19. *Curr Psychiatry Rep*. 2020;22:66. <https://doi.org/10.1007/s11920-020-01189-6>.

32. Vahratian A, Blumberg SJ, Terlizzi EP, Schiller JS. Symptoms of anxiety or depressive disorder and use of mental health care among adults during the COVID-19 pandemic — United States, August 2020–February 2021. *MMWR Morb Mortal Wkly Rep.* 2021;70(13):490–4. <https://doi.org/10.15585/mmwr.mm7013e2>.
33. Quach T, Doan LN, Liou J, Ponce NA. A rapid assessment of the impact of COVID-19 on Asian Americans: cross-sectional survey study. *JMIR Public Health Surveill.* 2021;7(6):e23976. <https://doi.org/10.2196/23976>.
34. Yan BW, Hwang AL, Ng F, Chu JN, Tsoh JY, Nguyen TT. Death Toll of COVID-19 on Asian Americans: disparities revealed. *J Gen Intern Med.* 2021;36(11):3545–9. <https://doi.org/10.1007/s11606-021-07003-0>
35. Lee H, Singh GK. Monthly trends in self-reported health status and depression by race/ethnicity and socioeconomic status during the COVID-19 pandemic, United States, April 2020 – May 2021. *Ann Epidemiol.* 2021;63:52–62. <https://doi.org/10.1016/j.annepidem.2021.07.014>.
36. Bambra C, Riordan R, Ford J, Matthews F. The COVID-19 pandemic and health inequalities. *J Epidemiol Community Health.* 2020;74:964–8. <https://doi.org/10.1136/jech-2020-214401>.
37. Lund EM. Even more to handle: additional sources of stress and trauma for clients from marginalized racial and ethnic groups in the United States during the COVID-19 pandemic. *Couns Psychol Q.* 2021;34(3–4):321–30. <https://doi.org/10.1080/09515070.2020.1766420>.
38. M. Singer, *Introduction to syndemics: a critical systems approach to public and community health.* John Wiley & Sons, 2009.
39. Mendenhall E. Syndemics: a new path for global health research. *The Lancet.* 2017;389:889–91. [https://doi.org/10.1016/S0140-6736\(17\)30602-5](https://doi.org/10.1016/S0140-6736(17)30602-5).
40. E. Mendenhall and M. Singer, “What constitutes a syndemic? Methods, contexts, and framing from 2019,” *Current Opinion in HIV and AIDS*, vol. Publish Ahead of Print, 15, 2020, <https://doi.org/10.1097/COH.0000000000000628>.
41. Yoo HC, Gee GC, Takeuchi D. Discrimination and health among Asian American immigrants: disentangling racial from language discrimination. *Soc Sci Med.* 2009;68(4):726–32. <https://doi.org/10.1016/j.socscimed.2008.11.013>.
42. Williams DR, Lawrence JA, Davis BA. Racism and health: evidence and needed research. *Annu Rev Public Health.* 2019;40(1):105–25. <https://doi.org/10.1146/annurev-publhealth-040218-043750>.
43. M. della Cava, “Asian Americans in San Francisco are dying at alarming rates from COVID-19: racism is to blame,” *USA Today*, 2020. Accessed: Feb. 11, 2022. [Online]. Available: <https://www.usatoday.com/in-depth/news/nation/2020/10/18/coronavirus-asian-americans-racism-death-rates-san-francisco/5799617002/>
44. Q. T. Dinh, K. D. Mariategue, and A. H. Byon, “COVID-19 - revealing unaddressed systemic barriers in the 45th anniversary of the Southeast Asian American experience,” *Journal of Southeast Asian American Education and Advancement*, 15, 2. 2020, <https://doi.org/10.7771/2153-8999.1209>
45. R. K. Marcello *et al.*, “Disaggregating Asian race reveals COVID-19 disparities among Asian Americans at New York City’s public hospital system,” *Infectious Diseases (except HIV/AIDS)*, preprint, 2020. <https://doi.org/10.1101/2020.11.23.20233155>.
46. C. Grills *et al.*, “Applying culturalist methodologies to discern COVID-19’s impact on communities of color.,” *Journal of Community Psychology*, 2022. <https://doi.org/10.1002/jcop.22802>
47. Centers for Disease Control and Prevention, “Mental health - Household Pulse Survey - COVID-19,” 2021. <https://www.cdc.gov/nchs/covid19/pulse/mental-health.htm> (accessed Dec. 22, 2021).
48. Staples LG, *et al.* Psychometric properties and clinical utility of brief measures of depression, anxiety, and general distress: the PHQ-2, GAD-2, and K-6. *Gen Hosp Psychiatry.* 2019;56:13–8. <https://doi.org/10.1016/j.genhosppsych.2018.11.003>.
49. U.S. Census Bureau, “Household Pulse Survey technical documentation,” *Census.gov*, 2021. <https://www.census.gov/programs-surveys/household-pulse-survey/technical-documentation.html> (accessed Dec. 21, 2021).
50. Environmental Influences on Child Health Outcomes (ECHO), “COVID-19 questionnaire - adult primary version: ECHO-wide cohort version 01.30.” 2020. [Online]. Available: https://www.phenxtoolkit.org/toolkit_content/PDF/ECHO_Adult_Primary.pdf
51. C. B. Fisher, X. Tao, and T. Yip, “The effects of coronavirus victimization distress and coronavirus racial bias on mental health among AIAN, Asian, Black, and Latinx young adults,” *medRxiv*, 2021b, <https://doi.org/10.1101/2020.08.19.20178343>
52. U.S. Census Bureau, “American Community Survey (ACS).” 2022a. Accessed: Apr. 12, 2022. [Online]. Available: <https://www.census.gov/programs-surveys/acs>
53. S. van Buuren *et al.*, “mice: multivariate imputation by chained equations.” 2021. [R]. Available: <https://cran.r-project.org/web/packages/mice/mice.pdf>
54. D. Sharpe, “Chi-square test is statistically significant: now what?,” *Practical Assessment, Research, and Evaluation*, 20, 8, 2015, <https://doi.org/10.7275/TBFA-X148>
55. T. Pritchard, “Residuals for post-hoc analysis in chi-square,” *Tyler Pritchard*, 2021. <https://tylerpritchard.netlify.app/post/posthoc-chisquare/> (accessed Jul. 26, 2022).
56. R Core Team, “R: a language and environment for statistical computing.” R Foundation for Statistical Computing, Vienna, Austria, 2020. [R]. Available: <https://www.R-project.org/>
57. L. K. Muthén and B. O. Muthén, “Mplus user’s guide,” Muthén & Muthén, Los Angeles, CA, Eighth Edition, 2017 1998.
58. Weller BE, Bowen NK, Faubert SJ. Latent class analysis: a guide to best practice. *J Black Psychol.* 2020;46(4):287–311. <https://doi.org/10.1177/0095798420930932>.
59. M. Borja *et al.*, “Anti-Chinese rhetoric tied to racism against Asian Americans Stop AAPI Hate Report,” *Stop AAPI Hate*, 2020. Accessed: Feb. 11, 2022. [Online]. Available: https://www.asianpacificpolicyandplanningcouncil.org/wp-content/uploads/Anti-China_Rhetoric_Report_6_17_20.pdf
60. Stop AAPI Hate, “Two years and thousands of voices: what community-generated data tells us about anti-AAPI hate,” *Stop AAPI Hate*, 2022. [Online]. Available: <https://stopaaphate.org/wp-content/uploads/2022/07/Stop-AAPI-Hate-Year-2-Report.pdf>
61. M. Chan, “Multiracial identity development: predicting the integration of ethnic/racial identities in multiracial Asian Americans,” *Wake Forest University*, 2018.
62. Franco M, Durkee M, McElroy-Heltzel S. Discrimination comes in layers: dimensions of discrimination and mental health for multiracial people. *Cultur Divers Ethnic Minor Psychol.* 2021;27(3):343–53. <https://doi.org/10.1037/cdp0000441>.
63. Misra S, Wyatt LC, Wong JA, Huang CY, Ali SH, Trinh-Shevrin C, Islam NS, Stella SY, Kwon SC. Determinants of depression risk among three Asian American subgroups in New York City. *Ethn Dis.* 2020;30(4):553–62. <https://doi.org/10.18865/ed.30.4.553>
64. Asian Pacific Policy & Planning Council and Chinese for Affirmative Action, “Stop AAPI Hate receives over 1,100 incident reports of verbal harassment, shunning and physical assault in two weeks,” 2020, Accessed: Dec. 15, 2021. [Online]. Available: http://www.asianpacificpolicyandplanningcouncil.org/wp-content/uploads/Press_Release_4_3_20.pdf
65. Zhang M, Gurung A, Anglewicz P, Baniya K, Yun K. Discrimination and stress among Asian refugee populations during

- the COVID-19 pandemic: evidence from Bhutanese and Burmese refugees in the USA. *J Racial Ethnic Health Disparities*. 2021;9(2):589–97. <https://doi.org/10.1007/s40615-021-00992-y>.
66. Park H, Choi E, Wenzel JA. Racial/ethnic differences in correlates of psychological distress among five Asian-American subgroups and non-Hispanic Whites. *Ethn Health*. 2020;25(8):1072–88. <https://doi.org/10.1080/13557858.2018.1481495>.
 67. Hwang MC, Parreñas RS. The gendered racialization of Asian women as villainous temptresses. *Gend Soc*. 2021;35(4):567–76. <https://doi.org/10.1177/08912432211029395>.
 68. World Health Organization and Calouste Gulbenkian Foundation, “Social determinants of mental health,” World Health Organization, Geneva, 2014. [Online]. Available: https://apps.who.int/iris/bitstream/handle/10665/112828/9789241506809_eng.pdf
 69. Kent JA, Patel V, Varela NA. Gender disparities in health care. *Mount Sinai J Med: A J Trans Personalized Med*. 2012;79(5):555–9. <https://doi.org/10.1002/msj.21336>
 70. C. J. Guerrini *et al.*, “Psychological distress among the U.S. general population during the COVID-19 pandemic,” *Front. Psychiatry*, 12, 642918, 2021, <https://doi.org/10.3389/fpsy.2021.642918>.
 71. Alegria M, et al. Simulations test impact of education, employment, and income improvements on minority patients with mental illness. *Health Aff*. 2017;36(6):1024–31. <https://doi.org/10.1377/hlthaff.2017.0044>.
 72. Sue S, Cheng JKY, Saad CS, Chu JP. Asian American mental health: a call to action. *Am Psychol*. 2012;67(7):532–44. <https://doi.org/10.1037/a0028900>.
 73. S. Misra, S. C. Kwon, A. F. Abraído-Lanza, P. Chebli, C. Trinh-Shevrin, and S.S. Yi, “Structural racism and immigrant health in the United States. *Health Education & Behavior*, 48, 3, 332–341, 2021.:<https://doi.org/10.1177/10901981211010676>
 74. K. W. Crenshaw, “Intersectionality, identity politics and violence against women of color,” *KKF*, 2–3, 2006, <https://doi.org/10.7146/kkf.v0i2-3.28090>

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