Supplementary Online Content

Lee YH, Liu Z, Fatori D, et al. Association of everyday discrimination with depressive symptoms and suicidal ideation during the COVID-19 pandemic. *JAMA Psychiatry*. Published online July 27, 2022. doi:10.1001/jamapsychiatry.2022.1973

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eMethods

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This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Sociodemographic characteristics among the COPE respondents ($N_{respondent}$ = 62,651), stratified by self-reported race and ethnicity.

Categorical variables	Non-Hispanic Another single/More than one population (N=1,258)		Non-Hispanic Asian (N=1,778)		Non-Hispanic Black or African American (N=3,495)		Non-Hispanic White (N=50,705)	
Sex assigned at birth								
Male	408	32.4%	672	37.8%	742	21.2%	17,774	35.1%
Female	838	66.6%	1,098	61.8%	2,726	78.0%	32,644	64.4%
Not male, not female/Prefer not to answer, or skipped/No matching concept	12	1.0%	8	0.4%	27	0.8%	287	0.6%
Born in the United States	982	78.1%	764	43.0%	3,208	91.8%	48,219	95.1%
Employed	811	64.5%	1,243	69.9%	1,893	54.2%	27,015	53.3%
Educational attainment								
Less than college	77	6.1%	47	2.6%	532	15.2%	3,305	6.5%
College or higher	1,181	93.9%	1,731	97.4%	2,963	84.8%	47,400	93.5%
Has health insurance	1,212	96.3%	1,730	97.3%	3,270	93.6%	49,810	98.2%
Owns a home	663	52.7%	989	55.6%	1,513	43.3%	37,871	74.7%
Married/partnered	715	56.8%	1,044	58.7%	1,235	35.3%	33,721	66.5%
Had COVID symptom(s)	81	6.4%	90	5.1%	211	6.0%	2,330	4.6%
Had prepandemic mood disorder diagnosis	77	6.1%	47	2.6%	245	7.0%	2,860	5.6%
Continuous variables								
Age (in years)	49.9	16.9	48.8	16.4	55.8	13.8	60.9	15.5
Number of co-resident	0.5	1.1	0.4	0.9	0.6	1.1	0.3	0.8
Income (in dollars)	90,218.6	63,240.2	99,843.9	65,894.5	53,779.7	48,735.4	99,063.9	57,220.4

eTable 1. Sociodemographic characteristics among the COPE respondents ($N_{respondent}$ = 62,651), stratified by self-reported race and ethnicity (**continued**).

Categorical variables	Hispanic Another single/More than one population (N=119)		Hispanic Asian (N=35)		Hispanic Black (N=75)		Hispanic Race not indicated (N=3,071)		Hispanic White (N=887)	
Sex assigned at birth										
Male	32	26.9%	9	25.7%	21	28.0%	806	26.2%	269	30.3%
Female	87	73.1%	26	74.3%	54	72.0%	2,254	73.4%	615	69.3%
Not male, not female/Prefer not to answer, or skipped/No matching concept	0	0.0%	0	0.0%	0	0.0%	11	0.4%	3	0.3%
Born in the United States	92	77.3%	23	65.7%	57	76.0%	1,548	50.4%	740	83.4%
Employed	85	71.4%	23	65.7%	40	53.3%	1,949	63.5%	593	66.9%
Educational attainment										
Less than college	8	6.7%	0	0.0%	12	16.0%	630	20.5%	84	9.5%
College or higher	111	93.3%	35	100.0%	63	84.0%	2,441	79.5%	803	90.5%
Has health insurance	114	95.8%	34	97.1%	69	92.0%	2,800	91.2%	859	96.8%
Owns a home	43	36.1%	14	40.0%	16	21.3%	1,209	39.4%	469	52.9%
Married/partnered	62	52.1%	20	57.1%	31	41.3%	1,677	54.6%	527	59.4%
Had COVID symptom(s)	9	7.6%	3	8.6%	6	8.0%	305	9.9%	64	7.2%
Had prepandemic mood disorder diagnosis	4	3.4%	0	0.0%	8	10.7%	155	5.0%	41	4.6%
Continuous variables										
Age (in years)	48.3	15.0	44.6	15.8	46.6	12.4	49.1	14.5	48.2	15.8
Number of co-resident	0.5	0.9	0.8	1.1	0.8	1.2	0.8	1.1	0.5	0.9
Income (in dollars)	77,479.0	62,267.8	76,357.1	59,146.3	48,266.7	46,084.8	57,916.0	51,865.7	88,633.0	61,487.4

eTable 2. Distribution of the mean ratings on the Everyday Discrimination Scale (ranging from *0 = Never* to *3 = Almost every day*) by survey timing and self-reported race and ethnicity.

Survey timing	Self-reported race and ethnicity	N	Mean	Median	SD	Min	Max
May 2020	Non-Hispanic Another single/More than one population	1126	0.60	0.44	0.60	0.11	3.00
	Non-Hispanic Asian	1722	0.58	0.44	0.58	0.11	3.00
	Non-Hispanic Black or African American	3295	0.69	0.56	0.69	0.11	3.00
	Non-Hispanic White	31716	0.45	0.33	0.45	0.11	3.00
	Hispanic Another single/More than one population	112	0.70	0.56	0.70	0.11	2.44
	Hispanic Asian	40	0.68	0.67	0.68	0.11	1.56
	Hispanic Black	89	0.97	0.78	0.97	0.11	2.88
	Hispanic Race not indicated	2185	0.61	0.44	0.61	0.11	3.00
	Hispanic White	806	0.55	0.44	0.55	0.11	3.00
June 2020	Non-Hispanic Another single/More than one population	760	0.60	0.44	0.60	0.11	3.00
	Non-Hispanic Asian	1151	0.57	0.44	0.57	0.11	2.78
	Non-Hispanic Black or African American	2590	0.75	0.67	0.75	0.11	3.00
	Non-Hispanic White	24548	0.45	0.33	0.45	0.11	3.00
	Hispanic Another single/More than one population	78	0.59	0.56	0.59	0.11	1.56
	Hispanic Asian	31	0.61	0.33	0.61	0.11	1.89
	Hispanic Black	61	1.11	0.78	1.11	0.11	3.00
	Hispanic Race not indicated	1651	0.65	0.44	0.65	0.11	2.67
	Hispanic White	541	0.61	0.44	0.61	0.11	3.00
July 2020	Non-Hispanic Another single/More than one population	760	0.68	0.56	0.68	0.11	2.78
	Non-Hispanic Asian	1055	0.54	0.44	0.54	0.11	3.00

Non-Hispanic Black or African American	2274	0.73	0.56	0.73	0.11	3.00
Non-Hispanic White	22916	0.47	0.33	0.47	0.11	3.00
Hispanic Another single/More than one population	72	0.72	0.56	0.72	0.11	1.60
Hispanic Asian	21	0.50	0.33	0.50	0.22	0.89
Hispanic Black	70	0.97	0.56	0.97	0.11	3.00
Hispanic Race not indicated	1783	0.65	0.44	0.65	0.11	3.00
Hispanic White	585	0.60	0.44	0.60	0.11	2.67

eTable 3. Distribution of depressive symptom severity (based on the PHQ-9 score) by survey timing.

Survey timing	Level of depressive symptoms severity	N	Prevalence
May 2020	Minimal	34,283	54.0%
	Mild	16,216	25.5%
	Moderate	7,211	11.3%
	Moderately severe	3,683	5.8%
	Severe	2,142	3.4%
	Moderate to severe, 10-27	13,036	20.5%
	Suicidal ideation (item 9 > 0)	4,991	7.9%
June 2020	Minimal	27,494	55.8%
	Mild	12,315	25.0%
	Moderate	5,275	10.7%
	Moderately severe	2,803	5.7%
	Severe	1,414	2.9%
	Moderate to severe, 10-27	9,492	19.3%
	Suicidal ideation (item 9 > 0)	3,735	7.6%
July 2020	Minimal	25,225	55.5%
	Mild	11,164	24.5%
	Moderate	5,013	11.0%
	Moderately severe	2,580	5.7%
	Severe	1,508	3.3%
	Moderate to severe, 10-27	9,101	20.0%
	Suicidal ideation (item 9 > 0)	3,550	7.8%

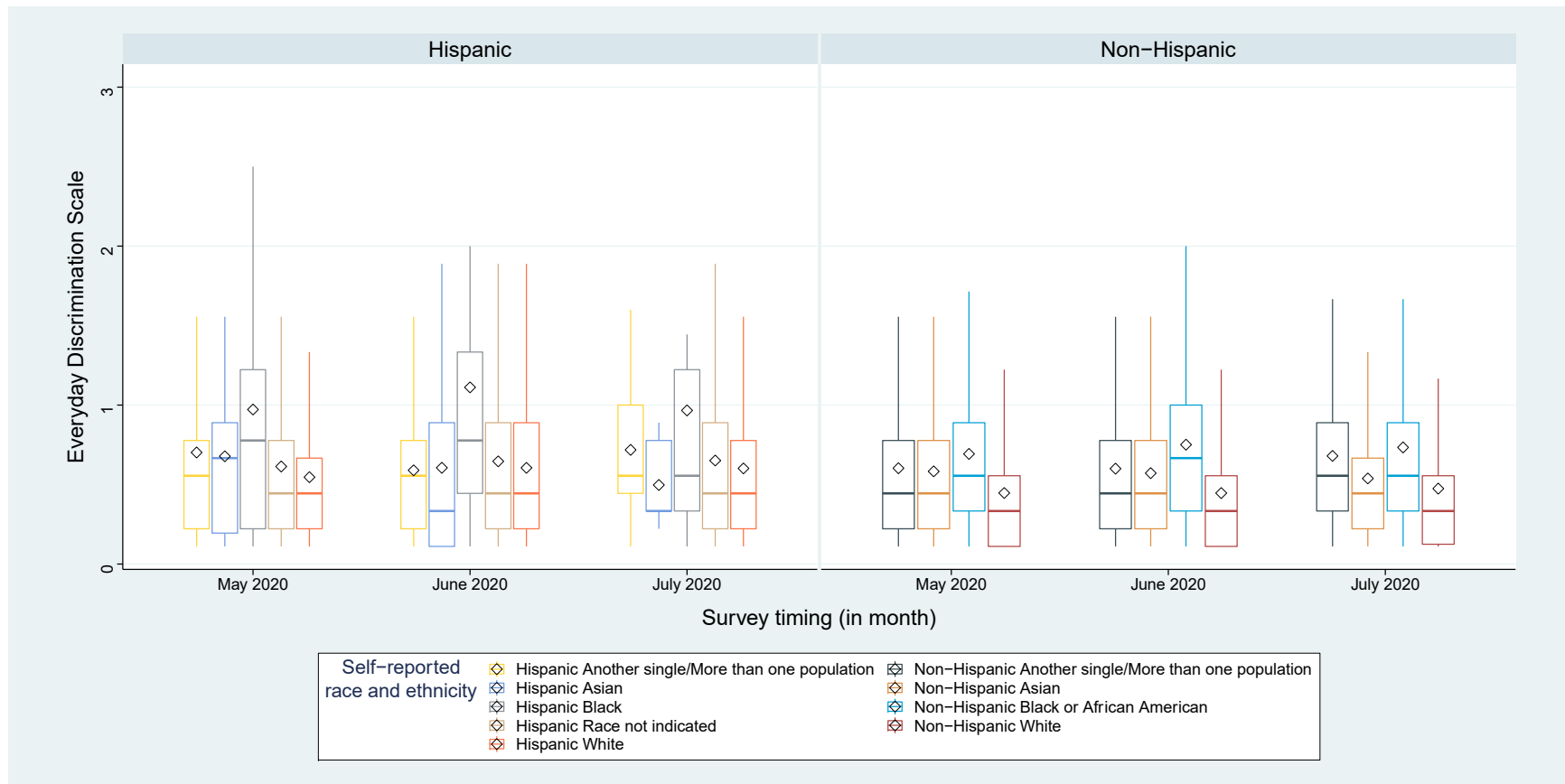**eTable 4**. Variations in the associations of everyday discrimination with moderate to severe depressive symptoms and suicidal ideation by the main reason for discrimination and survey timing. Regression estimates are presented in odds ratio with 95% confidence limits.

Parameters:	Target Outcome and Reason for Discrimination:			
	Moderate to severe depressive symptoms (PHQ-9 score ≥ 10)		Suicidal ideation (PHQ-9 item 9 > 0)	
	Any reason	Race, ancestry, or national origin	Any reason	Race, ancestry, or national origin
Main effect of discrimination	2.589 **** [2.474, 2.710]	2.111 **** [1.996, 2.232]	2.153 **** [2.034, 2.279]	1.818 *** [1.698, 1.947]
Main effect of survey timing	0.870 *** [0.848, 0.893]	0.928 *** [0.894, 0.964]	0.953 * [0.918, 0.989]	0.955 [0.902, 1.011]
Interaction between discrimination and survey timing	0.916 **** [0.892, 0.940]	0.930 **** [0.898, 0.964]	0.994 [0.962, 1.027]	1.014 [0.970, 1.061]
$N_{observation}$	158326	68927	158326	68927
$N_{respondent}$	62502	42006	62502	42006

**** $p < 0.0005$; *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

eTable 5. Variations in the associations of everyday discrimination (modeled as the mean item score) with moderate to severe depressive symptoms and suicidal ideation by the main reason for discrimination and prepandemic mood disorder diagnosis. Regression estimates are presented in odds ratio with 95% confidence limits.

Parameters:	Target Outcome and Reason for Discrimination			
	Moderate to severe depressive symptoms (PHQ-9 score ≥ 10)		Suicidal ideation (PHQ-9 item 9 > 0)	
	Any reason	Race, ancestry, or national origin	Any reason	Race, ancestry, or national origin
Main effect of discrimination	2.684 **** [2.558, 2.816]	2.130 **** [2.010, 2.257]	2.240 **** [2.108, 2.380]	1.877 **** [1.745, 2.018]
Main effect of prepandemic mood disorder diagnosis	4.538 **** [3.843, 5.360]	3.968 **** [3.287, 4.790]	2.677 **** [2.150, 3.334]	2.387 **** [1.833, 3.108]
Interaction between discrimination and prepandemic mood disorder diagnosis	0.636 **** [0.550, 0.735]	0.831 * [0.697, 0.991]	0.719 **** [0.607, 0.853]	0.770 * [0.631, 0.940]
$N_{observation}$	158326	68927	158326	68927
$N_{respondent}$	62502	42006	62502	42006

**** $p < 0.0005$; *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

eFigure 1. Distribution of the mean item score on the Everyday Discrimination Scale (modeled as the mean item score, ranging from *0 = Never* to *3 = Almost every day*) among participants who reported everyday discrimination ($N_{respondent}$ = 35,844), stratified by survey timing and self-reported race and ethnicity.

(a) Mean ratings on the Everyday Discrimination Scale[‡] by survey timing and self-reported race and ethnicity.

[‡] An open diamond shape indicates a mean value for a given stratum of self-reported race and ethnicity at a given survey timing.

(b) Distribution of main reason(s) for everyday discrimination by survey timing and self-reported race and ethnicity[‡].
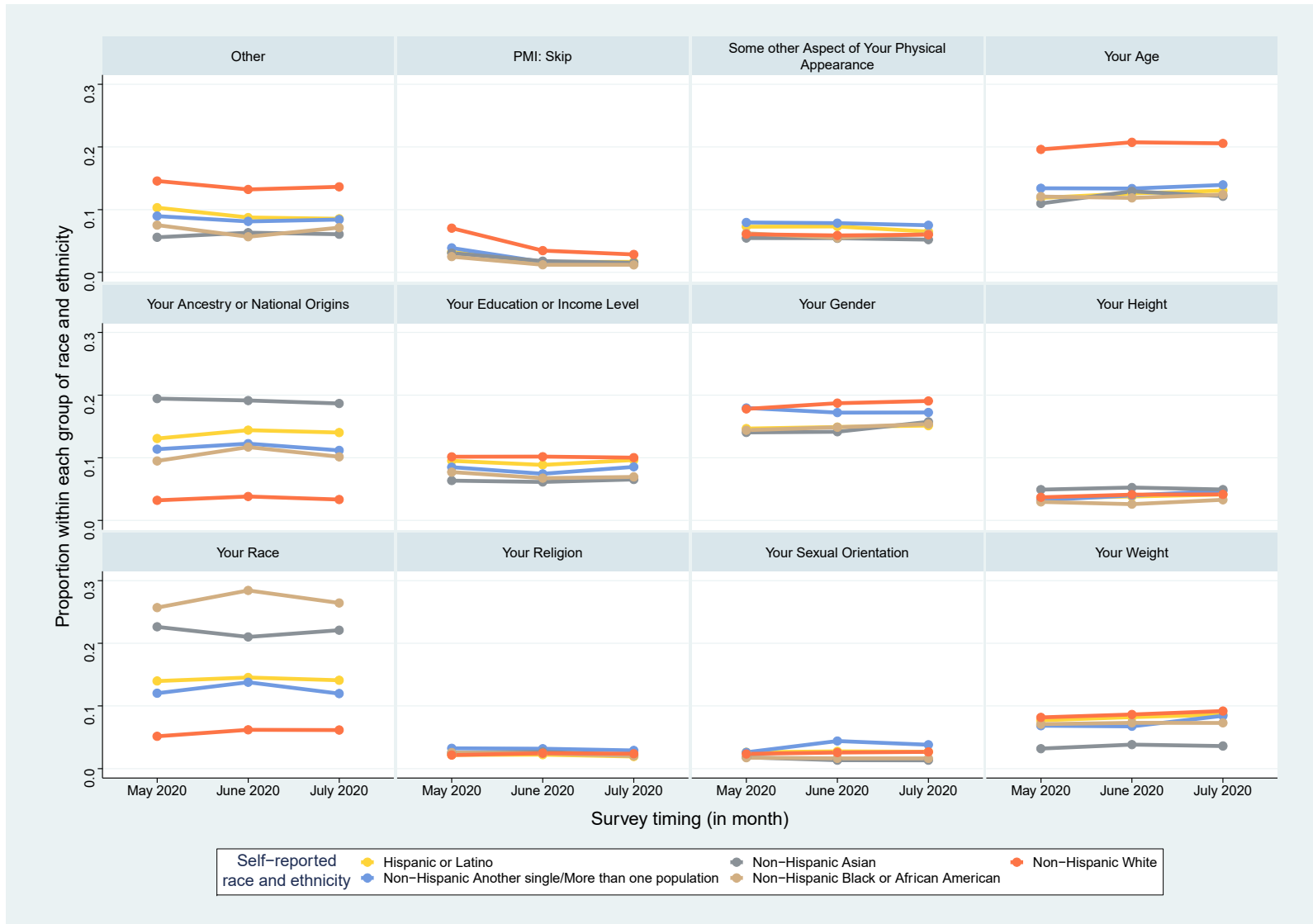
‡We collapsed the five subgroups of participants self-identifying as Hispanic or Latino into a single group due to limited sample size.

eFigure 2. Variations in the associations of everyday discrimination (modeled as the mean item score, ranging from *0 = Never* to *3 = Almost every day*) with moderate to severe depressive symptoms and suicidal ideation by survey timing, estimated from mixed-effects models. Numeric estimates from the mixed-effect logistic regression models can be found in **eTable 4**.

Target outcome: Moderate to severe depressive symptoms (PHQ-9 total score ≥ 10)

(a) Everyday discrimination due to any reason
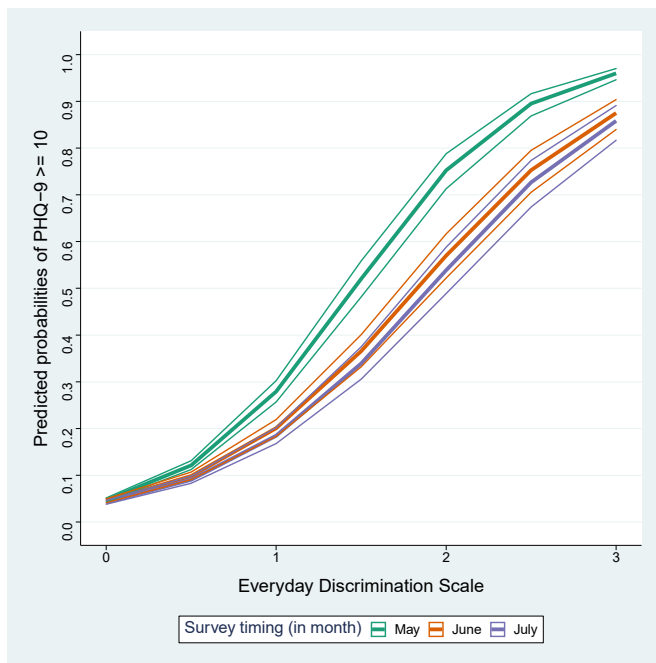
(b) Everyday discrimination due to race, ancestry, or national origin
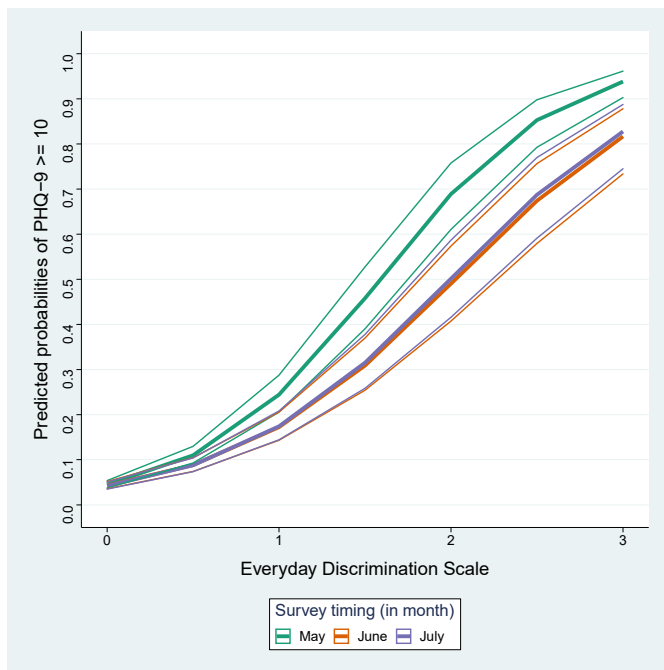
Target outcome: Suicidal ideation (PHQ-9 item 9 > 0)

(c) Everyday discrimination due to any reason
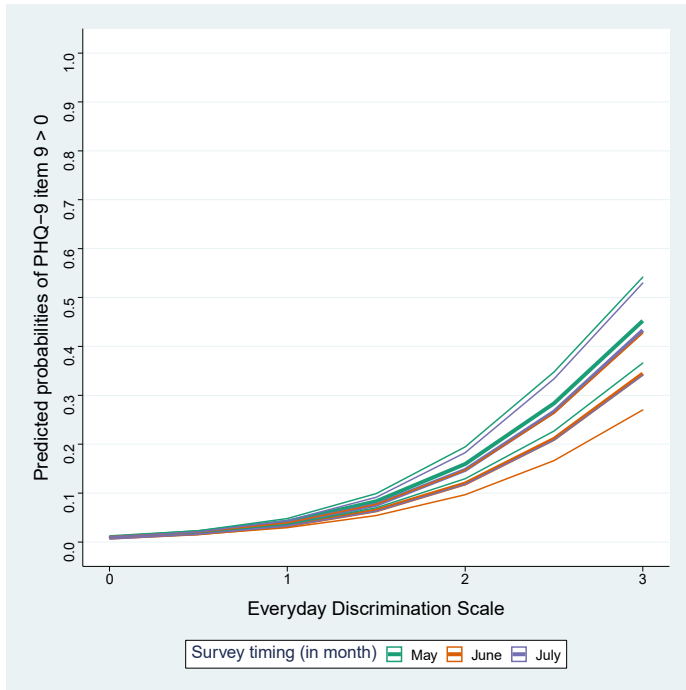
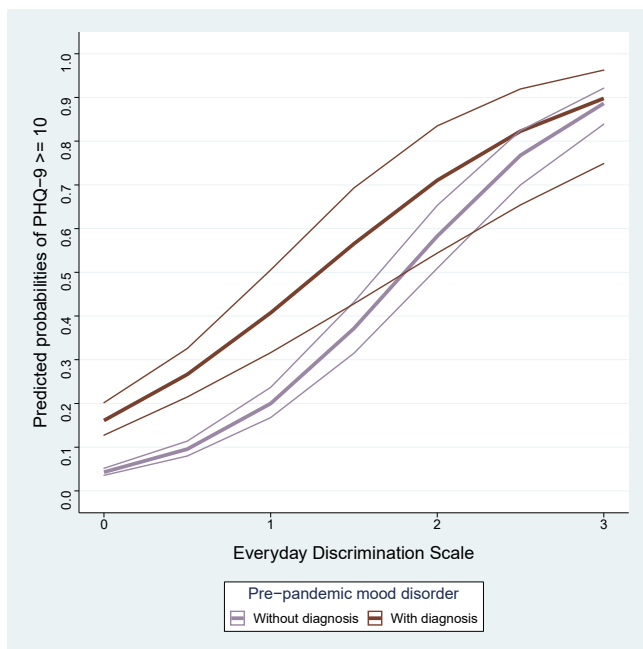(d) Everyday discrimination due to race, ancestry, or national origin
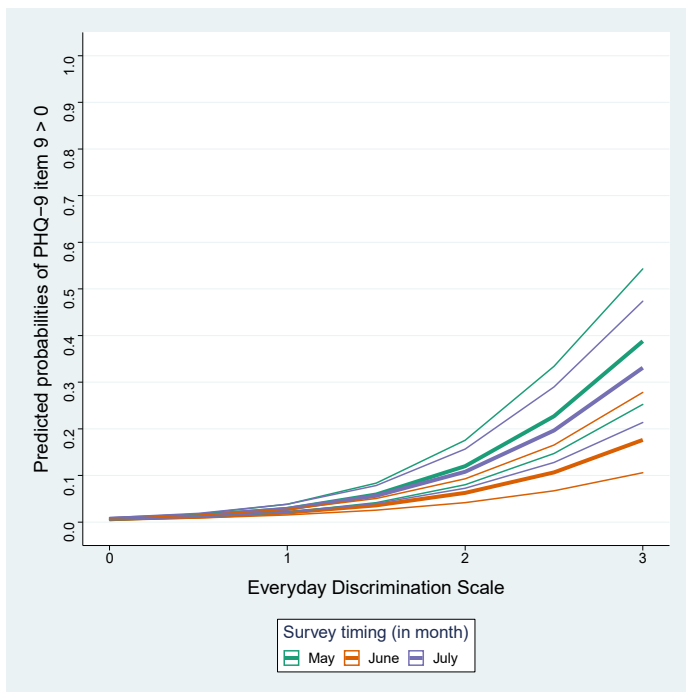
eFigure 3. Variations in the associations of everyday discrimination (modeled as the mean item score, ranging from *0 = Never* to *3 = Almost every day*) with moderate to severe depressive symptoms and suicidal ideation by prepandemic mood disorder diagnosis, estimated from mixed effect models. Numeric estimates from the mixed-effect logistic regression models can be found in **eTable 5**.

Target outcome: Moderate to severe depressive symptoms (PHQ-9 total score ≥ 10)

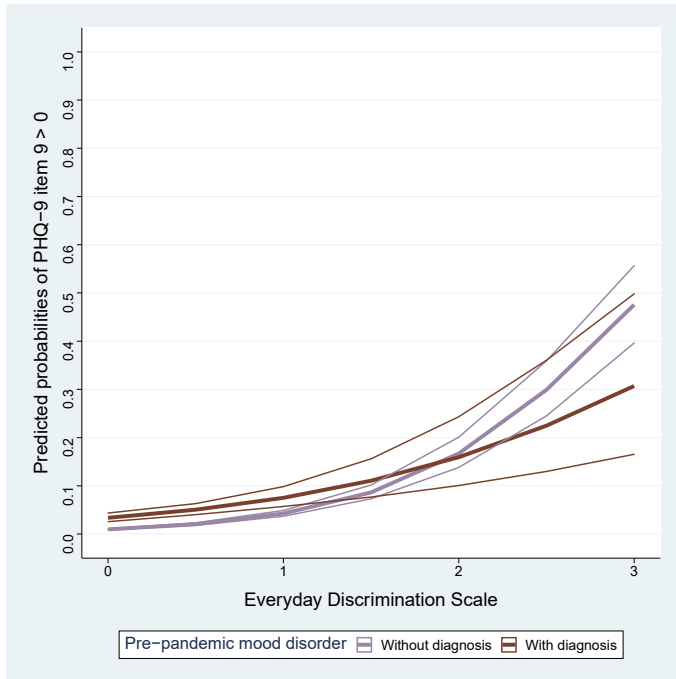(a) Everyday discrimination due to any reason
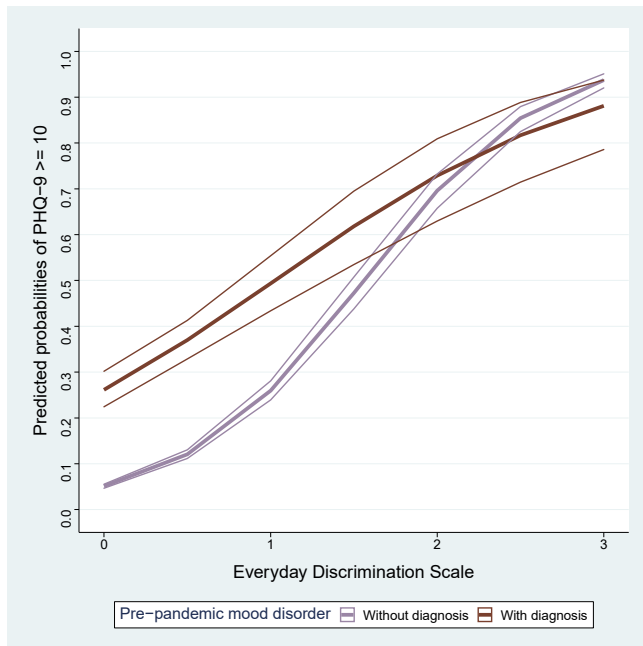
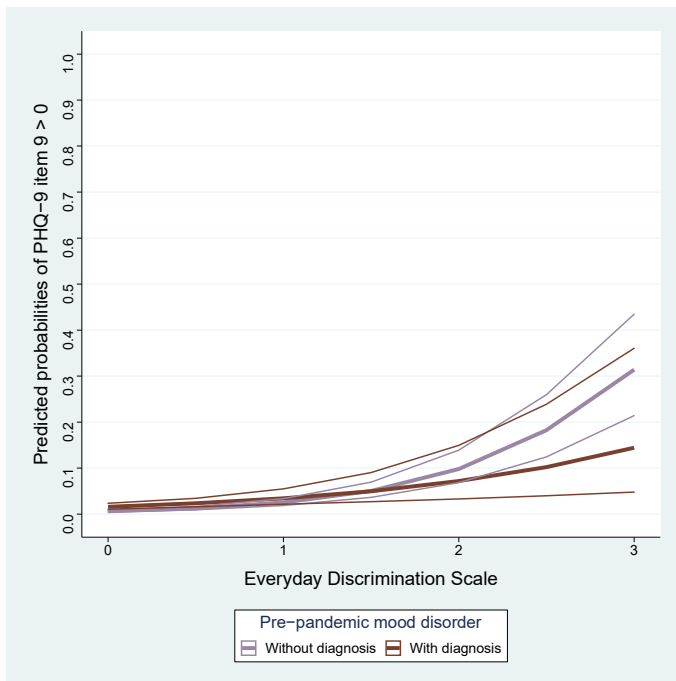(b) Everyday discrimination due to race, ancestry, or national origin

<u>Target outcome: Suicidal ideation (PHQ-9 item 9 > 0)</u>

(c) Everyday discrimination due to any reason

(d) Everyday discrimination due to race, ancestry, or national origin

eMethods.

Cohort description

To date, the *All of Us* Research Program (hereafter, AoU) has enrolled more than 400,000 participants, of which more than 80% are individuals from communities that have been underrepresented in biomedical research, such as people identifying as Asian, Black or African American, Hispanic or Latino race and ethnicity, LGBTQ+ sexual orientation and gender identities, and those with less than high school education or household incomes at the federal poverty level (1). The diversity of the AoU cohort provides a unique opportunity to examine the impact of discrimination on mental health outcomes and its potential variations across sociodemographic and environmental contexts (2). However, the AoU Research Program currently administers the consent form and questionnaires in either English or Spanish, potentially limiting participation by those with limited proficiency in those languages.

Extraction of prepandemic mood disorder diagnosis

In the *All of Us* Research Program, electronic health records (EHRs) were available from a subset of participants who authorized linkage of electronic health records by signing the HIPAA Authorization for Research EHR/Part 2 Supplement Form (3,4). In the current study, we used these linked EHRs to establish whether respondents had a prepandemic history of mood disorder. Participants were considered as cases if they had two or more qualifying diagnostic codes (identified based on Systematized Nomenclature of Medicine (SNOMED) code 46206005) within one year prior to January 21st, 2020—the date of the first reported COVID-19 case in the United States (5). Of 62,551 participants in the study sample, 40,438 (64.6%) had linked EHRs, and those who did not meet the criteria or, to be conservative, did not have linked EHRs were considered as non-cases.

eReferences

1. All of Us Research Program Investigators, Denny JC, Rutter JL, Goldstein DB, Philippakis A, Smoller JW, et al. The "All of Us" Research Program. N Engl J Med. 2019 Aug 15;381(7):668–76.

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