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Howell, Jennifer L
Losee, Joy E
et al.

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Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Culture, COVID-19, and collectivism: A paradox of American exceptionalism?

Gregory D. Webster [a,*], Jennifer L. Howell [b], Joy E. Losee [c], Elizabeth A. Mahar [a], Val Wongsomboon [a]

[a] Department of Psychology, University of Florida, USA
[b] Psychological Sciences, University of California, Merced, USA
[c] Department of Psychology, University of Dayton, USA

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ABSTRACT

Do geographic differences in collectivism relate to COVID-19 case and death rates? And if so, would they also replicate across states within arguably the most individualistic country in the world—the United States? Further still, what role might the U.S.'s history of ethnic strife and race-based health disparities play in either reinforcing or undermining state-level relations between collectivism and COVID-19 rates? To answer these questions, we examined archival data from 98 countries (Study 1) and the 48 contiguous United States (Study 2) on country/state-level collectivism, COVID-19 case/death rates, relevant covariates (per-capita GDP, population density, spatial dependence), and in the U.S., percent of non-Whites. In Study 1, country-level collectivism *negatively* related to both cases ($r = -0.28$) and deaths ($r = -0.40$) in simple regressions; however, after controlling for covariates, the former became non-significant ($r_p = -0.07$), but the latter remained significant ($r_p = -0.20$). In Study 2, state-level collectivism *positively* related to both cases ($r = 0.56$) and deaths ($r = 0.41$) in simple regressions, and these relationships persisted after controlling for all covariates except race, where a state's non-White population dominated all other predictors of COVID-19 cases ($r_p = 0.35$) and deaths ($r_p = 0.31$). We discuss the strong link between race and collectivism in U.S. culture, and its implications for understanding COVID-19 responses.

1. Introduction

> America's individualistic framework is deeply unsuited to coping with an infectious pandemic. Right now, one of the most important things Americans can do is deploy measures like social distancing and self-quarantining. … This requires a radical shift in Americans' thinking from an individual-first to a communitarian ethos—and it is not a shift that is coming easily to most.

Meghan O'Rourke, essayist and critic for *The Atlantic* (March 12, 2020)

As the epigraph illustrates, the prevailing folk wisdom in the U.S. is that its culture of individualism poses a serious obstacle to quelling COVID-19 transmission because many Americans view quarantining, social-distancing, and even mask-wearing as threats to individual freedom, self-reliance, and personal liberty. Indeed, "rugged individualism"—a term coined by Great Depression-era President Herbert Hoover—is a common catchphrase to describe American culture. Despite ranking first out of 195 countries in the Global Health Security Index, which assesses countries' preparedness to manage disease outbreaks (Johns Hopkins Center for Health Security, 2019), by July 2020 (the time of data collection), the U.S. was among the top countries in COVID-19 cases and deaths, both overall and per capita (Johns Hopkins University, 2020). By March 9, 2021, the U.S. had recorded nearly 29 million COVID-19 cases and nearly 525,000 deaths (Centers for Disease Control and Prevention [CDC], 2021b, March).

How did this happen? On one hand, folk wisdom and anecdotal observation may be right: The U.S.'s fiercely individualistic culture may be a substantial contributor in preventing people from heeding advice to secure their communities from infection, whereas collectivist cultures—either within the U.S. or internationally—might take more communal approaches to health security, whereby acting to contain the contagion eclipses individual freedom. Indeed, behaviors that can prevent COVID-19's spread (e.g., wearing masks, staying home) only work

* Corresponding author at: Department of Psychology, University of Florida, P.O. Box 112250, Gainesville, FL 32611-2250, USA.
E-mail address: gdwebs@ufl.edu (G.D. Webster).

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effectively when practiced collectively.

On the other hand, in addition to individualism, America's culture is defined by a long history of ethnic strife and racial discrimination. As a direct result of systemic and interpersonal racism, Black, Indigenous, and People of Color (BIPOC) Americans have substantially less access to affordable quality health care than White Americans do (Dovidio et al., 2008; Maina, Belton, Ginzberg, Singh, & Johnson, 2018). As a result, BIPOC often experience poorer health outcomes, including being disproportionately affected by COVID-19, a phenomenon often referred to as racial/ethnic health disparities (CDC, 2020a, June). For example, regarding COVID-19 rate ratios in the U.S., as of mid-February 2021, BIPOC had 1.3–1.9 times as many cases—and 2.3–2.4 times as many deaths—per capita as non-Hispanic Whites (CDC, 2021a, February). Thus, both individualism and racial health disparities likely contribute to America's ongoing COVID-19 disaster.

1.1. Culture and individualism–collectivism

Human personality and social behavior vary across and within cultures, and cultural contexts often shape how people perceive, think about, and act in their social world (Heine, 2010). Among the most-studied cross-cultural phenomena have been individual differences in individualism–collectivism (Kim, Triandis, Kâğitçibaşi, Choi, & Yoon, 1994; Triandis, 1995), which vary considerably across countries (Oyserman, Coon, & Kemmelmeier, 2002). Cultures that prioritize individualism tend to embrace competition, self-reliance, self-enhancement, personal achievement, status hierarchies, and wealth inequality, whereas those that prioritize collectivism tend to do the opposite, embracing cooperation, communal living, modesty, and group- or family-based accomplishments (e.g., Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Triandis, 1989).

Whereas some research assesses individual differences in individualism and collectivism as separate constructs (e.g., Biddlestone, Green, & Douglas, 2020; Germani, Buratta, Delvecchio, & Mazzeschi, 2020), most research—including the current work—views them as occupying opposite ends of the same spectrum (i.e., bipolar individualism–collectivism). And although some cross-cultural research assigns cultures to binary categories for ease of comparison (e.g., U.S. vs. China; Kim, Schimmack, Cheng, Webster, & Spectre, 2016), individualism–collectivism should generally be treated as a continuous construct. Moreover, both *intra*cultural and *inter*cultural variability exist (Oyserman, Coon, & Kemmelmeier, 2002). People with more collectivist orientations exist within individualist cultures. And countries with extreme individualist orientations (e.g., the U.S.) may contain regions or states with collectivist orientations (e.g., California). For example, Vandello and Cohen (1999) developed a scale to assess collectivism in the 50 United States based on eight behavioral indicators. Their 50-state collectivism index correlated positively with people's collectivism attitudes and state-level poverty, population density, percentage of non-Whites, historical prevalence of slavery, and racial and sexual inequality.

1.2. Pathogens and individualism–collectivism

Individualism–collectivism may be especially important in relation to human pathogens, both as a consequence of pathogen prevalence and as a contributing factor to its spread. For example, according to Fincher, Thornhill, Murray, and Schaller (2008), modern cultural differences in individualism–collectivism were likely influenced by the presence of pathogens in humans' evolutionary past. They argue: "collectivism (in contrast to individualism) serves an antipathogen defence function, and thus is more likely to emerge and persist within populations that historically have been characterized by a greater prevalence of pathogens" (Fincher, Thornhill, Murray, & Schaller, 2008, pp. 1279–1280). To test their claim, Fincher, Thornhill, Murray, and Schaller (2008) collected cross-cultural data from nearly 100 countries regarding their pathogen prevalence and four measures of individualism–collectivism. These data supported their claim: Counties with higher pathogen prevalence had higher collectivism and lower individualism scores. Fincher, Thornhill, Murray, and Schaller (2008) also noted that because many pathogens (e.g., malaria, yellow fever) are more abundant in tropical and subtropical climates than temperate ones, cultures should tend to be more collectivist nearer to the equator, which was the case.

A survey of 1000 Americans found that self-reported collectivism positively correlated with perceived vulnerability to Ebola during the 2014 outbreak, which in turn positively related to latent xenophobia (e.g., restrictive immigration policy support; Kim, Sherman, & Updegraff, 2016). Vandello and Cohen's (1999) U.S. state-level collectivism index moderated the positive association between perceived vulnerability to Ebola and xenophobia; it was stronger for people from states with lower collectivism scores (Kim, Sherman, & Updegraff, 2016). Thus, although collectivism among *individuals* related to increased perceived vulnerability, and hence increased xenophobia, collectivism among U.S. *states* diminished the individual-level vulnerability–xenophobia link.

Because collectivistic cultures are more likely to comply with and adhere to social norms (Kim, Triandis, Kâğitçibaşi, Choi, & Yoon, 1994), individualism–collectivism can indirectly contribute to people's susceptibility to COVID-19. For example, self-reported collectivism related positively to perceived worries and concerns about COVID-19 infection risk in a sample of nearly 1200 young adult Italians (ages 18–29 years; Germani, Buratta, Delvecchio, & Mazzeschi, 2020). Similarly, self-reported individualism related negatively to social distancing intentions and collectivism related positively to the same in a primarily Anglo-American sample of over 700 people (Biddlestone, Green, & Douglas, 2020).

At least four recent works have focused on geographic connections between COVID-19 and collectivism. First, using Vandello and Cohen's (1999) collectivism index, multilevel modeling of COVID-19 case rates at the county level and collectivism at the state level showed a significantly positive association: States with higher collectivism scores had counties with higher caseloads (Messner & Payson, 2020). Second, another study examined the durations of U.S. counties' frontier experiences (1790–1890) as a creative measure of individualism (Bian, Li, Xu, & Foutz, 2020). For example, U.S. counties that established towns and cities quickly, and thus became more urban and population-dense, were considered more collectivistic, whereas those that remained more rural for longer times were considered more individualistic (Bian, Li, Xu, & Foutz, 2020). During the COVID-19 pandemic, more individualistic U.S. counties engaged in less social distancing, as assessed by people's mobility (e.g., via traffic patterns and smartphone tracking; Bian, Li, Xu, & Foutz, 2020); however, people in more rural counties often travel greater distances simply out of necessity to access vital resources. As an ancillary exercise, this study also examined country-level associations, showing that Hofstede's (1991) individualism scores related positively to increased mobility and higher growth rates for COVID-19 cases and deaths (Bian, Li, Xu, & Foutz, 2020). Third, research has examined country-level individualism as a moderator of change-over-time in COVID-19 cases and deaths, but only after controlling for county-level childhood vaccination policies, and no main effect of individualism was reported (Berg, Yu, Salvador, Melani, & Kitayama, 2020). Fourth, research has examined collectivism as a covariate of growth curves of COVID-19 cases and deaths, but never in isolation, and in a small sample of 35 countries (Salvador, Berg, Yu, San Martin, & Kitayama, 2020). Importantly, none of these geographic-oriented studies accounted for spatial dependence in their data (Ward & Gleditsch, 2008)—a key limitation that the present research addresses.

1.3. Racism and COVID-19 in the United States

BIPOC Americans are disproportionately negatively affected by COVID-19 (CDC, 2020a, June). For example, recent research that controlled for poverty levels in 10 major U.S. cities spanning 158 counties found that counties with higher non-White populations had

eight to nine times the COVID-19 case and death rates (respectively) as counties with Whiter populations (Adhikari et al., 2020). Centuries of systemic racism have almost certainly contributed to this ongoing tragedy, and race-based health disparities in the U.S. are historically pervasive and persistent (Dovidio et al., 2008). Thus, racial and ethnic demographics are likely pivotal to understanding links between COVID-19 and individualism–collectivism, especially in the U.S.

1.4. The present research

The present work's rationale was to understand (a) the relations between individualism–collectivism and COVID-19 cases and deaths, (b) whether these relations differ between countries and U.S. states, and (c) how racial/ethnic demographics also relate to COVID-19 rates in the U.S., which has a cultural history of race-based health disparities. Specifically, we examine worldwide associations between collectivism and COVID-19 rates in 98 countries (Study 1) and then focus on the same associations in the contiguous 48 United States (Study 2), where we also examine race/ethnicity. In both studies, we also examine population density and economic resources (via gross domestic product [GDP] per capita), which appear to be key correlates in pathogen transmission and treatment (Fincher, Thornhill, Murray, & Schaller, 2008) and health in general (Pickett & Wilkinson, 2015). Given the literature reviewed above, we had two sets of hypotheses:

- Hypothesis 1(H1): Consistent with prior geographic research, collectivism should negatively relate to COVID-19 cases (H1a) and deaths (H1b).
- Hypothesis 2(H2): Consistent with recent U.S. research, in Study 2, the percent of non-White people in each state should relate positively to COVID-19 cases (H2a) and deaths (H2b).

Data, code, and online supplemental materials for both studies can be found here: https://osf.io/zbnar.

2. Study 1: COVID-19 and collectivism around the world

In Study 1, we examined the associations between collectivism and COVID-19 cases/deaths in 98 countries, and whether these links persisted after controlling for relevant correlates, such as spatial dependence and per-capita GDP.

2.1. Method

2.1.1. Sample and measures

2.1.1.1. Collectivism. We obtained cross-cultural collectivism scores from Fincher, Thornhill, Murray, and Schaller (2008), who compiled individualism–collectivism data from four prior studies for 98 countries or territories. These data included (a) Hofstede's (2001) estimates of individualism for 75 geographic regions based on the values and attitudes from over 100,000 IBM employees worldwide,[1] (b) Suh, Diener, Oishi, and Triandis's (1998) creation of an individualism measure for 57 regions based on both Hofstede's estimates and cross-cultural psychologist Harry C. Triandis's numerical ratings of these regions,[2] (c) Gelfand, Bhawuk, Nishii, and Bechtold's (2004) behavioral "in-group collectivism practices" from 57 regions based on 17,370 worldwide responses to their Global Leadership and Organizational Behavior Effectiveness (GLOBE) Research Program, and (d) Kashima and Kashima's (1998) binary linguistic measure of collectivism based on the acceptability omitting first- and second-person pronouns in spoken languages from 70 regions.

To create a composite of these four individualism–collectivism measures, we standardized (z-scored) each one and then reverse-scored (i.e., $z \times -1$) Hofstede's (2001) and Suh, Diener, Oishi, and Triandis's (1998) individualism assessments so that higher scores reflected greater collectivism for all four measures and examined correlations among them (see online supplemental materials, Table S1). All four measures were positively inter-correlated (mean correlation = 0.81, $\alpha = 0.94$). For ease of interpretability across studies, we averaged the z-scores and then linearly transformed them (mean $z \times 20 + 50$), yielding a collectivism composite score with a mean ≈ 50 and an $SD \approx 20$ (see Vandello & Cohen, 1999, p. 282).

2.1.1.2. COVID-19 data. We obtained COVID-19 cases and deaths data (per 100,000 people) from the global tracking map of the New York Times (2020, July) on July 16, 2020 for 98 countries or regions.[3]

2.1.1.3. Population density. Because COVID-19 spreads among humans in close contact, we obtained population density data for each country from Wikipedia,[4] which aggregated primary data from the United Nations and each country's official estimates.

2.1.1.4. Gross domestic product per capita. We also gathered per-capita GDP data from the World Bank (2020), taking the mean of the last 10 years of available data (2010–2019) for each country.

2.1.2. Data analysis

Because COVID-19 cases and deaths, population density, and per-capita GDP were all positively skewed count variables, we natural-log-transformed them to normalize their distributions prior to analyses (Adhikari et al., 2020; McClelland, 2014). And because geographic data routinely violate the independence-of-errors assumption of general linear models, we corrected for spatial dependence by using spatial regression (Ward & Gleditsch, 2008). Spatial regression involves creating a spatial lag variable for the outcome and adding it as a covariate to regression models. In the present study, we created a binary adjacency matrix that reflected which countries shared land or water borders (or were reasonably close in proximity) to create the spatial lag variable (see OSF link for supplemental materials). Spatial regression offers more-optimal and less-biased estimates than clustering countries by continents and using either aggregation or multilevel modeling (Ward & Gleditsch, 2008).

2.2. Results and discussion

Table S2 shows the means, *SD*s, and bivariate correlations for all variables.

Because log population density significantly related to no other variable ($|r|s \leq 0.18$), we ran subsequent regressions without controlling for it as a covariate to preserve model parsimony. Specifically, we ran two sets of multiple regressions for each log-transformed COVID-19 outcome—cases and deaths (Table 1).

[1] Of these 75, 68 were from Fincher, Thornhill, Murray, and Schaller's (2008) account of Hofstede's (2001) data and 7 were from an updated website listing Geert Hofstede's data (Clearly Cultural, 2009).

[2] We omitted Suh, Diener, Oishi, and Triandis's (1998) score for Northern Ireland because COVID-19 data were aggregated at the UK level.

[3] For countries for which the New York Times reported "<1" for COVID-19 deaths per 100,000 people, we obtained the same data from the Washington Post (2020, July), but accurate to one decimal place (e.g., "0.5"). Both newspapers cite the Center for Systems Science and Engineering at Johns Hopkins University as a primary data source.

[4] https://en.wikipedia.org/wiki/List_of_countries_and_dependencies_by_population_density.

2.2.1. Cases

Collectivism negatively related to COVID-19 cases across countries ($r = -0.28$, 95% CI [−0.45, −0.08]; Table 1, Model 1; Fig. S1, top). Thus, more collectivistic cultures had lower COVID-19 case counts, without controlling for other factors (H1a). Controlling for spatial dependence (by adding the spatial lag to the model) only slightly diminished the negative association between cases and collectivism ($r_p = -0.24$ [−0.42, −0.04]; Table 1, Model 2). In contrast, controlling for per-capita GDP reduced the cases—collectivism link to non-significance ($r_p = -0.07$ [−0.27, 0.14]; Table 1, Model 3). Because GDP per capita was itself a significant positive correlate of COVID-19 cases ($r_p = 0.21$ [0.01, 0.40]), a country's resources per person appeared to play a larger role than its collectivism score.

2.2.2. Deaths

Collectivism also negatively related to COVID-19 death across countries ($r = -0.40$ [−0.55, −0.21]; Table 1, Model 1; Fig. S1, bottom). More collectivistic cultures had fewer COVID-19 deaths, without controlling for other factors (H1b). Controlling for spatial dependence slightly diminished the negative association between deaths and collectivism ($r_p = -0.31$ [−0.48, −0.12]; Table 1, Model 2). Controlling for GDP per capita (which was not significant) further diminished the deaths—collectivism link, which remained significant ($r_p = -0.20$ [−0.39, −0.00]; Table 1, Model 3), albeit barely ($p = 0.049$). Thus, even after controlling for spatial dependence and available resources, collectivism related to lower death rates.

3. Study 2: COVID-19 and collectivism in the United States

We sought to replicate Study 1's effects *within* a country by examining the *state*-level collectivism and COVID-19 cases/deaths in the U.S. On one hand, we should expect the same negative associations in the U.S.; the communal-action aspects of collectivism should reduce COVID-19 caseloads and deaths. Or inversely, states with the highest individualism might be more inclined to disregard health advisories and preserve personal freedom (e.g., refusal to wear masks or socially distance). On the other hand, we might also expect some "American exceptionalism" because the U.S. had the highest individualism score in Study 1. Specifically, being in a more-collectivist state in the most-individualistic country in the world might not necessarily produce the same COVID-19 outcomes because state-level collectivism in the U.S. might be confounded with other key factors, especially race/ethnicity. Recall that Vandello and Cohen's (1999) state-level collectivism index correlated positively with percentage of non-Whites, historical slavery prevalence, and racial inequality. An undeniable aspect of American exceptionalism is the centuries-long thread of racism that is woven into the very fabric of the American cultural tapestry. From the genocide of indigenous Americans to the enslavement of generations of Africans to the ongoing systemic persecution of non-Whites, racial and ethnic strife pervades American culture. Given that BIPOC Americans are disproportionately affected by COVID-19 (CDC, 2020a, June), we also examined the percent of non-White residents in each state as a predictor of cases and deaths.

3.1. Method

3.1.1. Sample and measures

3.1.1.1. Collectivism. We measured collectivism using Vandello and Cohen's (1999, p. 283) 50-state collectivism index, which is a composite measure of eight behavioral indicators ($\alpha = 0.71$): percentage living alone (reverse-scored), ratio of carpooling to work or driving alone, ratio of divorce to marriage rate (reverse-scored), percentage of elderly people living alone (reverse-scored), percentage of households with grandchildren in them, percentage of people with no religious affiliation (reverse-scored), average percentage of Libertarian votes over the last four presidential elections (reverse-scored), and percentage of self-employed people (reverse-scored). Vandello and Cohen's (1999) standardized (*z*-scored) each indicator before summing them, and then multiplied summed scores by 20 and added 50 to them, yielding a collectivism index with a mean ≈ 50 and an *SD* ≈ 20. Although this index is over 20 years old, similar state-level personality measures showed high rank-order stability from 1999 to 2015 (Elleman, Condon, Russin, & Revelle, 2018).

The two newest states—Alaska and Hawaii—posed potential problems in terms of analyses and generalizability. First, because travel and proximity appear to be important in spreading COVID-19, shared borders are key, and both states are unique in that they border no other states. Second, Alaska and Hawaii's no-neighboring-states status makes assessing spatial dependency challenging, and so both states are often simply excluded from such analyses (Ward & Gleditsch, 2008). Third, Alaska is an extreme outlier regarding population density (0.49 people/km^2). For example, Alaska's landmass is larger than any two European countries combined (excluding Russia), yet its population is only slightly larger than Luxembourg's. Fourth, Hawaii is a unique outlier on multiple fronts (see Vandello & Cohen, 1999, "Hawaii as a Special Case" p. 282, "Examining Outliers" p. 289), including being (a) the only island state (easier to contain COVID-19 spread), (b) the only state never to have had a White majority (and one of only five "majority minority" states), and (c) an outlier on the collectivism index with a score of 91, which is 19 points (≈ 1 *SD*) larger than the next-highest score of 72. For these reasons, we chose to exclude Alaska and Hawaii from analyses to focus on generalizing any collectivism–COVID-19 findings to the 48 contiguous United States. Fig. 1 shows a map of Vandello and Cohen's (1999) collectivism index by state.

3.1.1.2. COVID-19 data. We obtained COVID-19 cases and deaths data (per 100,000 people) from the CDC (2020b, July) on July 16, 2020 for the 48 contiguous United States. Fig. 2 shows maps for COVID-19 cases (top) and deaths (bottom).

3.1.1.3. Population density. We obtained population density data for each state from Wikipedia,[5] which reproduced 2013 population density estimates from the U.S. Census Bureau.

3.1.1.4. Gross domestic product per capita. We also gathered per-capita GDP data from each state via Wikipedia,[6] which reproduced estimates from the U.S. Bureau of Economic Analysis of the U.S. Department of Commerce. We took the mean of the last eight years of available per-capita GDP data (2011–2018) for each state.

3.1.1.5. Percentage of non-White population. We obtained the percentage of people in each state that were "White alone, not Hispanic or Latino" according to the United States Census Bureau's (2020) July 1, 2019 estimates. We then subtracted each of these percentages from 100% to get the percentage of non-Whites in each state.

3.1.2. Data analysis

Because COVID-19 cases and deaths, population density, and GDP per capita data were all positively skewed count variables, we again natural-log-transformed them to normalize their distributions prior to analyses (Adhikari et al., 2020; McClelland, 2014). And because geographic data routinely violate the independence-of-errors assumption, we again corrected for spatial dependence by using spatial

[5] https://simple.wikipedia.org/wiki/List_of_U.S._states_by_population_density.

[6] https://en.wikipedia.org/wiki/List_of_U.S._states_and_territories_by_GDP_per_capita.

Table 1
Study 1: country-level regression results.

Variable	COVID-19 cases (log rate per 100,000)						COVID-19 deaths (log rate per 100,000)					
	b	*t*	*p* ≤	r_p	95% CI		*b*	*t*	*p* ≤	r_p	95% CI	
					LL	UL					LL	UL
Model 1												
Collectivism composite	−0.026	−2.84	0.005	−0.28	−0.45	−0.08	−0.029	−4.25	0.001	−0.40	−0.55	−0.21
Model 2												
Collectivism composite	−0.018	−2.45	0.016	−0.24	−0.42	−0.04	−0.018	−3.20	0.002	−0.31	−0.48	−0.12
Spatial lag (cases or deaths)	0.772	8.33	0.001	0.65	0.52	0.75	0.605	6.87	0.001	0.58	0.42	0.70
Model 3												
Collectivism composite	−0.006	−0.64	0.522	−0.07	−0.27	0.14	−0.014	−2.00	0.049	−0.20	−0.39	−0.00
Spatial lag (cases or deaths)	0.686	6.89	0.001	0.58	0.43	0.70	0.573	6.13	0.001	0.53	0.37	0.67
GDP (log per capita)	0.272	2.11	0.037	0.21	0.01	0.40	0.102	1.04	0.303	0.11	−0.10	0.30

Note. $N = 98$ countries.

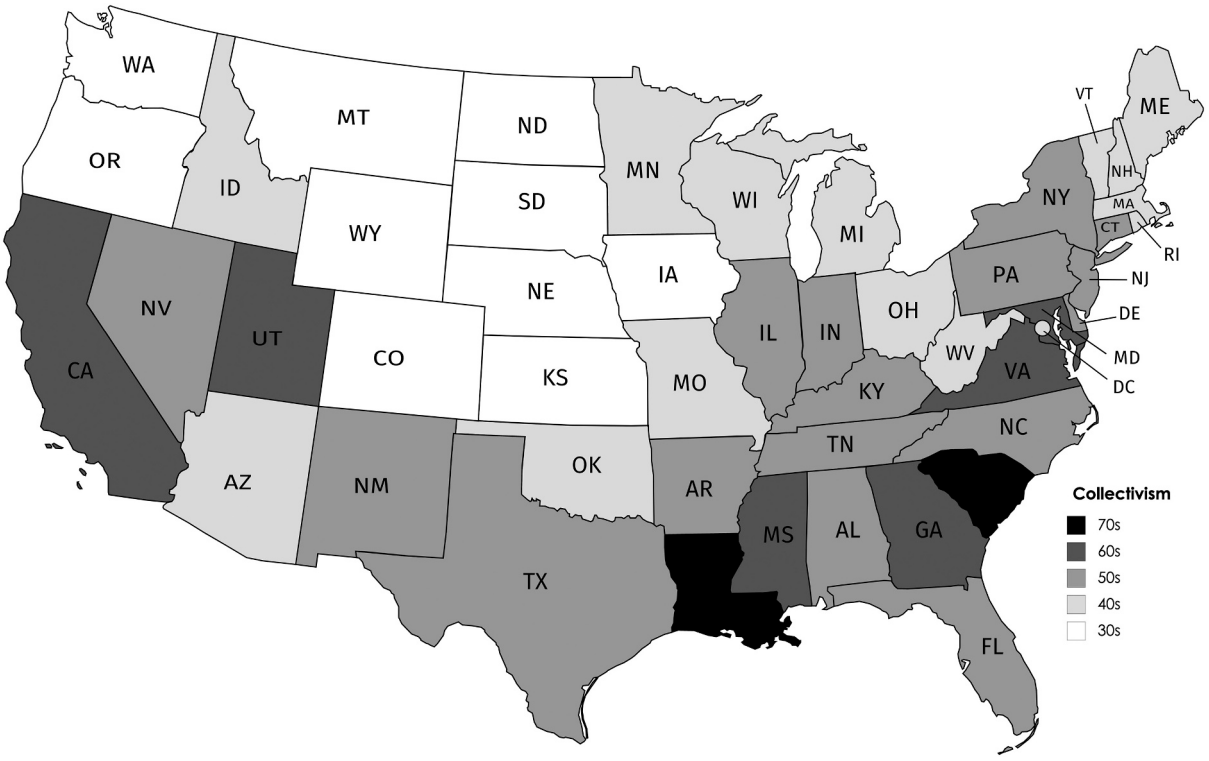

Fig. 1. Study 2: collectivism in the 48 contiguous United States.

regression (Ward & Gleditsch, 2008). In Study 2, we created a binary adjacency matrix that reflected which states shared land or water borders to create the spatial lag variable (see OSF link for supplemental materials).

3.2. Results and discussion

Table S3 shows the means, *SD*s, and bivariate correlations for all variables. We again ran two sets of multiple regression models for each log-transformed COVID-19 outcome—cases and deaths (Table 2).

3.2.1. Cases

In contrast to Study 1's results, collectivism *positively* related to COVID-19 cases across the contiguous U.S. ($r = 0.56$, 95% CI [0.33, 0.73]; Table 2, Model 1; Fig. S2, top). Thus, more collectivistic states in the U.S. had substantially *higher* COVID-19 case counts, without controlling for other factors (no support for H1a). Controlling for spatial dependence slightly diminished the positive association between cases and collectivism ($r_p = 0.41$ [0.14, 0.63]; Table 2, Model 2). Controlling for per-capita GDP, which positively related to COVID-19 cases, slightly increased the cases—collectivism link ($r_p = 0.50$ [0.24, 0.69]; Table 2, Model 3), suggesting a small suppression effect (MacKinnon, Krull, & Lockwood, 2000). Further controlling for population density, which was not a significant covariate, slightly diminished the cases—collectivism link ($r_p = 0.43$ [0.15, 0.65]; Table 2, Model 4). Finally, adding percent non-White to the model, which was a positive correlate of cases ($r_p = 0.35$ [0.06, 0.59]; H2a), diminished the cases—collectivism link to non-significance ($r_p = 0.23$ [−0.08, 0.50]; Table 2, Model 5). When including all five predictors simultaneously (Table 2, Model 5), percent non-White was the sole significant correlate of COVID-19 cases in the 48 states.

3.2.2. Deaths

In contrast to Study 1's results, collectivism *positively* related to COVID-19 deaths across the contiguous U.S. ($r = 0.41$, 95% CI [0.14, 0.63]; Table 2, Model 1; Fig. S2, bottom). Thus, more collectivistic states in the U.S. had substantially *higher* COVID-19 death counts, without controlling for other factors (no support for H1b). Controlling for spatial dependence diminished the positive association between cases and

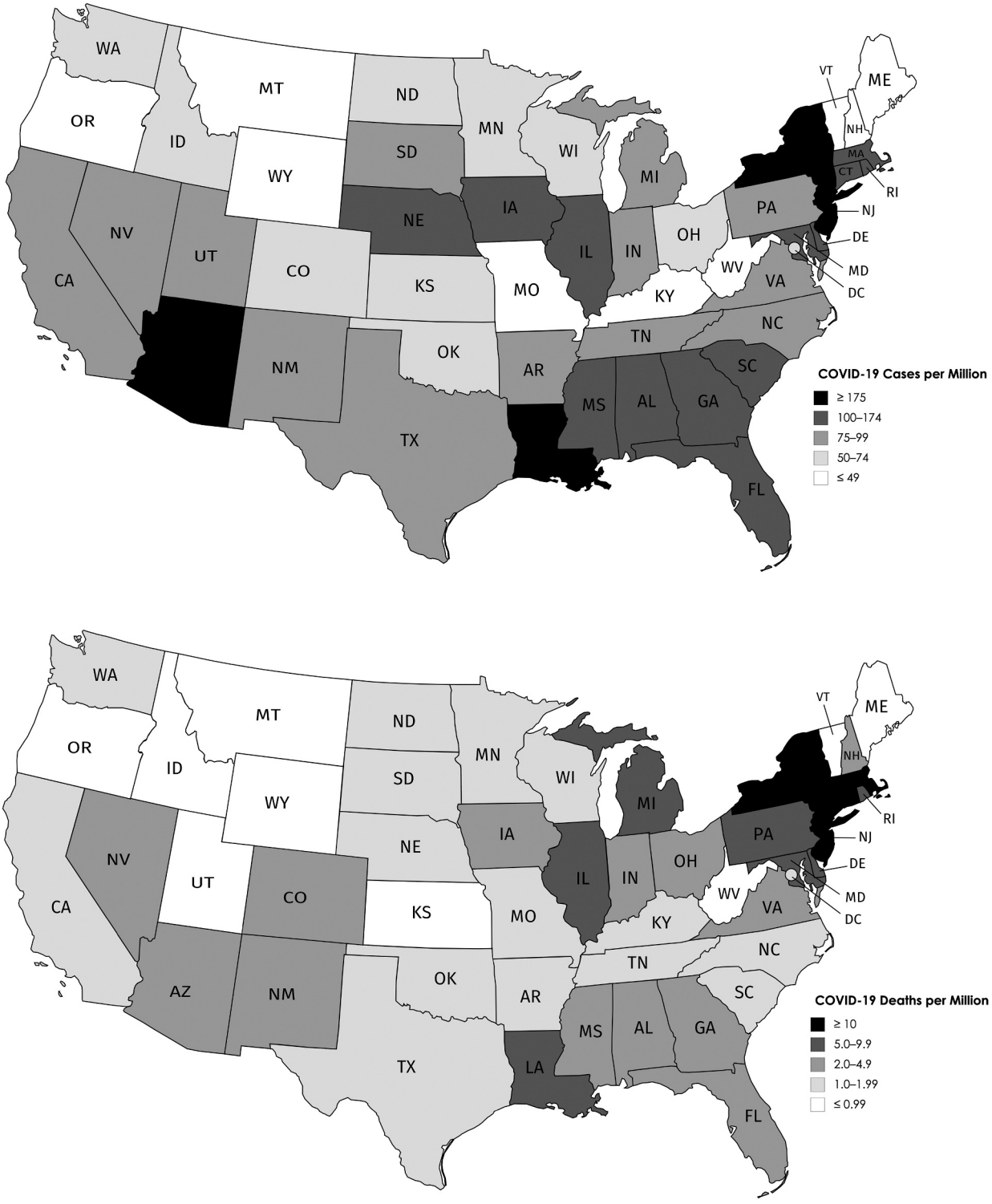

Fig. 2. Study 2: COVID-19 cases (top) and deaths (bottom) in the 48 contiguous United States as of July 16, 2020.

collectivism ($r_p = 0.32$ [0.03, 0.56]; Table 2, Model 2). Controlling for per-capita GDP, which positively related to COVID-19 deaths, slightly increased the deaths—collectivism link ($r_p = 0.45$ [0.17, 0.66]; Table 2, Model 3), suggesting a slight suppression effect (MacKinnon, Krull, & Lockwood, 2000). Further controlling for population density, which was a significant positive covariate, further diminished the deaths—collectivism link ($r_p = 0.30$ [0.00, 0.55]; Table 2, Model 4), which remained significant, albeit barely ($p = 0.049$). Finally, adding percent non-White to the model, which was a positive correlate of deaths ($r_p = 0.31$ [0.00, 0.56]; H2b), diminished the deaths—collectivism link to non-significance ($r_p = 0.08$ [−0.23, 0.37]; Table 2, Model 5). When including all five predictors simultaneously (Table 2, Model 5), every predictor but collectivism was at least a marginally significant correlate of COVID-19 deaths in the contiguous U.S. (i.e., r_ps ≥ 0.29, $ps \leq 0.058$).

3.2.3. Summary

Models 1–4 suggest that collectivism is indeed an important—but positive—correlate of COVID-19 cases and deaths in the U.S. that

Table 2
Study 2: state-level regression results.

Variable	COVID-19 Cases (log rate per 100,000)						COVID-19 Deaths (log rate per 100,000)					
	b	*t*	$p \leq$	r_p	95% CI		*b*	*t*	$p \leq$	r_p	95% CI	
					LL	UL					LL	UL
Model 1												
Collectivism composite	0.033	4.63	0.001	0.56	0.33	0.73	0.038	3.06	0.004	0.41	0.14	0.63
Model 2												
Collectivism composite	0.024	3.05	0.004	0.41	0.14	0.63	0.023	2.24	0.030	0.32	0.03	0.56
Spatial lag (cases or deaths)	0.609	2.52	0.015	0.35	0.06	0.58	0.769	5.00	0.001	0.60	0.37	0.76
Model 3												
Collectivism composite	0.029	3.83	0.001	0.50	0.24	0.69	0.032	3.32	0.002	0.45	0.17	0.66
Spatial lag (cases or deaths)	0.519	2.27	0.028	0.32	0.03	0.57	0.614	4.19	0.001	0.53	0.28	0.72
GDP (log per capita)	1.002	2.75	0.009	0.38	0.10	0.61	1.794	3.33	0.002	0.45	0.18	0.66
Model 4												
Collectivism composite	0.026	3.10	0.003	0.43	0.15	0.65	0.022	2.03	0.049	0.30	0.00	0.55
Spatial lag (cases or deaths)	0.459	1.93	0.061	0.28	−0.02	0.54	0.389	2.24	0.030	0.32	0.03	0.57
GDP (log per capita)	0.883	2.28	0.028	0.33	0.03	0.57	1.534	2.89	0.006	0.40	0.12	0.63
Population density (log)[a]	0.058	0.90	0.373	0.14	−0.17	0.42	0.230	2.21	0.033	0.32	0.02	0.56
Model 5												
Collectivism composite	0.014	1.55	0.129	0.23	−0.08	0.50	0.006	0.50	0.622	0.08	−0.23	0.37
Spatial lag (cases or deaths)	0.347	1.51	0.140	0.23	−0.08	0.50	0.507	2.87	0.006	0.41	0.12	0.63
GDP (log per capita)	0.623	1.63	0.110	0.24	−0.06	0.51	1.167	2.16	0.036	0.32	0.01	0.57
Population density (log)	0.075	1.21	0.233	0.18	−0.13	0.46	0.198	1.95	0.058	0.29	−0.02	0.54
Percent non-White	0.013	2.46	0.018	0.35	0.06	0.59	0.016	2.09	0.043	0.31	0.00	0.56

Note. $N = 48$ U.S. states, excluding Alaska and Hawaii.

remained robust even after controlling for three key covariates (i.e., spatial dependence, per-capita GDP, population density). Nevertheless, Model 5 suggests that a state's racial-ethnic makeup trumps collectivism in predicting COVID-19 case and death rates. Simply put, collectivism was important, but less so after race was considered. This is likely due in part to the shared variance between state-level collectivism and percent non-White ($r = 0.58$ [0.36, 0.74], Table S3). Both collectivism and percent non-White "competed" to explain overlapping variance in COVID-19 cases and death rates, and the latter dominated the former. These findings suggest that race and collectivism in the U.S. are statistically—and likely historically—interrelated. These findings also support the primacy of systemic racial inequality as one possible explanation for America's exceptionally high COVID-19 cases and deaths. Researchers should assess *both* variables at the state level because systemic racial health disparities appear to undercut any effects of collectivism on COVID-19.

4. General discussion

4.1. Theoretical implications

Overall, our results generally supported established evolutionary and social psychological theories on collectivism, American racism, and pathogen prevalence, but also presented an apparent paradox regarding the bivariate links between collectivism and COVID-19 cases/death across countries (negative) and among U.S. states (positive). First, largely consistent with a pathogen-prevalence perspective on the emergence of cross-cultural differences in collectivism (Fincher, Thornhill, Murray, & Schaller, 2008), COVID-19 rates were lower among cultures (countries) with higher collectivism scores (Study 1; H1); however, the inverse was true among U.S. states (Study 2). Second, Study 1's findings also generally corroborate social psychological perspectives on collectivist cultures, which tend to comply with requests and social norms (Cialdini, Wosinska, & Barrett, 1999; Kim, Triandis, Kâğitçibaşi, Choi, & Yoon, 1994), and such compliance behaviors (e.g., wearing masks, social distancing) may be crucial to reducing COVID-19 transmission. Third, supporting social psychological accounts of racial health disparities in the U.S. (Dovidio et al., 2008), states with greater percentages of non-Whites had disproportionately higher COVID-19 cases and deaths (H2)—even after controlling for relevant covariates, including collectivism, which was reduced to non-significance in these models.

Fourth, extremely individualistic countries, such as the U.S., may be more culturally permissive of ingroup favoritism, outgroup discrimination, or both (Brewer, 1999; Whitley Jr. & Webster, 2019). And given the overlap between BIPOC populations in the U.S. and Vandello and Cohen's (1999) collectivism index, perhaps it is unsurprising that state-level differences in non-White percentages trumped state-level differences in collectivism. Thus, collectivism alone may hold *some* promise to understanding the U.S.'s explosive COVID-19 rates, but only when *ignoring* what appear to be pivotal race-based health disparities, which may reflect both collectivism as well as disparities in access to healthcare and systemic racism.

4.2. Limitations

The present studies have multiple limitations. First, although some temporal precedence can be established because the collectivism scores were assessed before the advent of COVID-19, our data remain correlational, and as such, causal relations cannot be established empirically (Kenny, 2004).

Second, because the data were archival (Cramer, 2007), we were limited to using collectivism measures developed by others that had not anticipated their use with COVID-19 data. Although both measures showed acceptable-to-good internal consistency, their psychometric properties have not been thoroughly vetted (Donnellan, Trzesniewski, & Lucas, 2011). This also limited our statistical power because we had no control over sample sizes. We would have liked to have explored possible interaction effects but doing so with continuous variables was unwarranted given limited power (McClelland & Judd, 1993). Nevertheless, archival data can provide a valuable resource for studying cross-cultural phenomena (Van de Vliert, 2011) based on individual differences.

Third, we caution readers to avoid the ecological fallacy (Robinson, 1950; Selvin, 1958), where analyses of aggregated groups—countries and states—are falsely generalized to their constituent parts—people. The ecological fallacy can also apply to making generalizations about states based on data from countries, which may also contribute to the discrepant findings for collectivism between countries and U.S. states. Another possible explanation for the discrepant findings is Simpson's (1951) paradox, whereby the statistical relation between two variables can be in different directions across different units of analysis (Kievit,

Frankenhuis, Waldorp, & Borsboom, 2013), such as COVID-19 cases/death being negative across countries but positive among U.S. states, or even positive among states but negative across people. In addition, individual differences individualism–collectivism appear to vary considerably, not only across countries but also across ethnic groups within diverse countries, such as the U.S. (Oyserman, Coon, & Kemmelmeier, 2002). Thus, although we wish to generalize about people's individual differences in collectivism and COVID-19 susceptibility, we can only do so for the 98 countries and 48 states we sampled, while acknowledging the abovementioned limitations.

Fourth, we chose to examine an ongoing pandemic using only a single snapshot of cumulative cases and deaths as of July 16, 2020. Future studies may wish to focus on how race, ethnicity, and individualism–collectivism affect not only accumulated COVID-19 statistics, but also their nonlinear growth trajectories over time, including covariates that account for rates of social distancing and mask-wearing compliance as well as for governmental stay-at-home orders and re-opening advisories (using latent growth curve modeling and interrupted time-series designs; Shadish, Cook, & Campbell, 2002).

Fifth, in Study 1, we limited our examination of Hofstede's (2001) multiple cultural dimensions to individualism for three reasons. First, Study 1 sought to use the country-level composite index of collectivism developed by Fincher, Thornhill, Murray, and Schaller (2008), which included only Hofstede's (2001) individualism cultural dimension. Second, we wished to make Studies 1 and 2 comparable in their focus on collectivism (vs. other possible cultural dimensions). Third, because other cultural dimensions were not available at the U.S. state level, we used Vandello and Cohen's (1999) collectivism measure in Study 2. Future research should consider examining other cultural dimensions' possible relations to COVID-19 case and death rates.

4.3. Implications and future directions

Behavioral science can play a key role in responding to the COVID-19 pandemic (Van Bavel et al., 2020). Because health beliefs and social-distancing behaviors relate positively to agreeableness, conscientiousness, and neuroticism—and negatively to extraversion, psychopathy, and Machiavellianism (Blagov, 2020; Nowak et al., 2020)—future research should examine person- or region-level personality measures in conjunction with individual differences in collectivism (Rentfrow, 2010).

Trust in government appears to play a key role in people's COVID-19 behaviors. For example, New Zealanders trusted their politicians more and were more satisfied with their government post-lockdown versus pre-lockdown (Sibley et al., 2020). In contrast, because some Americans believe in COVID-19 conspiracy theories, assessing these beliefs as a covariate or moderator may be important. For example, Americans who believed that COVID-19 was a hoax were less likely to take preventative actions (e.g., avoiding crowds, washing hands), whereas those who believed it was a human-made virus were more likely to engage in self-centered prepping behaviors (e.g., stocking food, wearing masks; Imhoff & Lamberty, 2020). Further still, because collective narcissism (a) predicts beliefs in in-group conspiracy theories (Cichocka, Marchlewska, Golec de Zavala, & Olechowski, 2016) and (b) is a key aspect of nationalism (Cichocka & Cislak, 2020), future research should consider controlling for it when assessing country-level collectivism.

The notion of collective shame or shaming, which appears to vary across cultures and ingroups (Brown, González, Zagefka, Manzi, & Čehajić, 2008; Gunn & Wilson, 2011; Piff, Martinez, & Keltner, 2012), may also be pivotal to understanding why some groups (e.g., East Asians, U.S. Democrats) appear to be more compliant with mask-wearing requests than others. Finally, studying bicultural individuals—especially people who may switch orientations between individualist and collectivist cultures (e.g., international college students; Hong, Morris, Chiu, & Benet-Martínez, 2000)—may help elucidate the dynamic interplay between collectivism and COVID-19 susceptibility.

One country that has enjoyed low COVID-19 case and death rates to date is South Korea, which instituted a rigorous test-and-trace program during the earliest days of the COVID-19 outbreak (Park, Choi, & Ko, 2020). Although South Korea has adopted many Western cultural aspects into its own (e.g., consumerism, free-market capitalism), it remains a highly collectivist culture (Fincher, Thornhill, Murray, & Schaller, 2008), where duty to family and country are often deeply respected. South Korea's acceptance of and compliance with its government's extensive test-and-trace program were likely emblematic of its collectivist leanings, and such measures are likely easier to implement in collectivist cultures than ones reliant on "rugged individualism." Nevertheless, to institute such a thorough tracing program requires citizens to sacrifice much of their personal privacy (Park, Choi, & Ko, 2020), an act that would likely be far more difficult to implement in individualistic countries whose citizens prize privacy and personal freedom above others' health and well-being.

Study 2's results showing the effects that state-level demographic differences in race and ethnicity have on COVID-19 cases and death rates in the U.S. highlights the need to address race-based health disparities in the U.S. Given the U.S.'s past and present history of systemic racism that pervades nearly every aspect of American culture, that BIPOC Americans have been unfairly and disproportionately affected by the COVID-19 pandemic is shocking but not surprising. Government officials and policy makers should consider the following three paths toward bridging the race-based health gap. First, direct and sustained investment in healthcare education and infrastructure is needed in urban neighborhoods and rural communities so that BIPOC can easily access hospitals and health clinics without having to bike or bus across town or take a day off to travel from outlying rural areas. Second, people who work in medical outreach and communications need to actively earn and maintain the trust of those they serve in BIPOC communities. Only time and authentic efforts to understand specific BIPOC needs can help overcome decades of justifiable skepticism (e.g., Tuskegee syphilis study). Third, U.S. public policy should expand—not curtail—affirmative action so that more BIPOC can join healthcare professions at the highest levels, so that the people providing medical aid and advice will be more representative of the diverse communities that they serve. Only by pursuing an active antiracist agenda (e.g., Kendi, 2019) can the U.S. hope to reduce race-based health disparities, promote health equity, and thus be better prepared for the next pandemic.

4.4. Conclusions

On a bivariate basis, and even after controlling for some relevant covariates, country-level collectivism related negatively to COVID-19 cases and deaths, whereas U.S. state-level collectivism related positively to the same. The percentage of non-White people in each U.S. state positively predicted COVID-19 cases and deaths, even after controlling for all covariates, and reduced collectivism effects to non-significance. These findings supported (a) evolutionary explanations of cultural collectivism related to pathogen prevalence and (b) socio-cultural perspectives on collectivism related to complying with prevailing social norms (e.g., mask wearing, social distancing). Our findings also suggest that individual differences in collectivism and raced-based health disparities are intertwined in the U.S., where a state's racial–ethnic composition overruns any effects collectivism may have on COVID-19 outcomes. We hope that this work will inspire future researchers to examine individualism–collectivism dynamics in multiple geographic contexts.

CRediT authorship contribution statement

Gregory D. Webster: Conceptualization, Methodology, Formal analysis, Data curation, Writing – original draft, Visualization, Supervision. **Jennifer L. Howell:** Writing – review & editing. **Joy E. Losee:** Writing – review & editing. **Elizabeth A. Mahar:** Writing – review &

editing. **Val Wongsomboon:** Writing – review & editing.

Declaration of competing interest

We have no known conflicts of interest to disclose.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2021.110853.

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