

# Cultural influence on COVID-19 cognitions and growth speed: The role of collectivism

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## Abstract

Major challenges faced by humans often require large-scale cooperation for communal benefits. We examined what motivates such cooperation in the context of social distancing and mask wearing to reduce the transmission intensity of the coronavirus pandemic (COVID-19). We hypothesized that collectivism, a cultural variable characterizing the extent that individuals see themselves in relation to others, contributes to people's willingness to engage in these behaviors. Consistent with preregistered predictions, across three studies ( $n = 2864$ ), including a U.S. nationally representative sample, collectivist orientation was positively associated with intentions, positive beliefs, norm perceptions, and policy support for the preventive behaviors. Further, at a country level, more collectivist countries showed lower growth rates in both COVID-19 confirmed cases and deaths. Together, these studies demonstrate the role of collectivism in reducing COVID-19 transmission, and highlight the value of considering culture in public health policies and communications.

## KEYWORDS

collectivism, COVID-19, culture, mask, social distancing, social norms

## 1 | INTRODUCTION

Since the outbreak of 2019 coronavirus pandemic (COVID-19), public health organizations have recommended several nonpharmaceutical practices (e.g., social distancing and mask wearing) that have proved effective at reducing infectious contacts between people (Wang et al., 2020). What factors influence people's beliefs, intentions,

and policy support related to these preventive behaviors? The focus of the current investigation is on the role of individualism-collectivism (I-C), a cultural construct that reflects the extent to which people and societies value relationships and working together to achieve collective goals (Hofstede, 1980). Although I-C was originally conceptualized to refer to societal characteristics, it has also been used to distinguish between people with collectivistic and individualistic dispositions within the same society (Kim et al., 1994). One of the most widely used participant-level measures for I-C is the self-construal scale (Singelis, 1994), which reflects the way that individuals view themselves as being separate from (i.e., independent, or individualist self-construal) or connected to (i.e., interdependent, or collectivist self-construal) their social environment.

Theory and empirical evidence suggest that people with stronger collectivist cultural construals may hold more favorable intentions, beliefs, perceived social norms, and policy support related to behavioral prevention practices due to higher tendencies for cooperation and norm observation. First, prior studies highlighted that collectivism is a strong predictor of cooperative behavior (Marcus & Le, 2013). Collectivists tend to take the interests of others more strongly into account, rather than focusing predominantly on their own individual interests (Utz, 2004). Second, collectivists show higher sensitivity to social norms (Jacobson, 2010). As perceived social norms are a key contributor to attitudes and behaviors (Ajzen, 1985), collectivists could hold more favorable cognitions for prevention practices as a result of societal norms.

Since the onset of COVID-19, a number of studies have shown the positive roles of collectivism in (1) individuals' preventive behaviors (Cho et al., 2022; Lu et al., 2021), as well as (2) societal-level outcomes such as case mortality rates (Rajkumar, 2021). Few studies, however, have examined people's cognitions surrounding COVID-19 preventive behaviors and policies using representative samples. According to the Theory of Planned Behavior, cognitions such as beliefs and norms play a major role in shaping individuals' behavioral intentions (Ajzen, 1985). As such, the current study adds to this growing literature by examining the role of collectivism in shaping people's norms and beliefs surrounding COVID-19 preventive behaviors. We aimed to examine people's cognitions on a set of key health behaviors that were recommended by health experts at the time of study design and data collection (February–July 2020; Chinazzi et al., 2020; Eikenberry et al., 2020). As such, we focused on the following preventive behaviors in the current study: social distancing, mask wearing, and vaccination. In addition, given that collectivism is considered one of the motivators for prosocial behaviors (Batson et al., 2011), we included COVID-related prosocial behaviors (e.g., offer to help friends and family who are financially struggling) as outcome measures in this current study.

## 1.1 | Overview of the studies

We conducted three studies between April and July 2020 to investigate the link between cultural collectivism and people's cognitions related to the prevention behaviors, as well as one study to examine the link between collectivism and COVID-19 growth rate at the country level. Study 1 ( $n = 846$ ) examined the link between collectivism and cognitions surrounding social distancing. Study 2 ( $n = 844$ ; preregistered) investigated the association between collectivism and cognitions surrounding social distancing and prosocial behaviors. Study 3 ( $n = 1063$ ; preregistered) included an U.S. nationally representative sample and demonstrated that collectivism was associated with more positive cognitions surrounding social distancing, mask wearing, and vaccination. Finally, Study 4 utilized publicly available datasets to test the hypothesis that COVID-19 growth rate will be higher in individualist countries compared to collectivist countries. Data and analysis code to reproduce results for these studies can be found at <https://osf.io/4rudk>.

## 2 | STUDY 1

Study 1 examined the relationship between participants' collectivism and their cognitions related to social distancing.

## 2.1 | Study 1 methods

### 2.1.1 | Participants

One thousand one hundred three U.S. participants were recruited from Amazon Mechanical Turk (Mturk) between April 4th and sixth, 2020 as part of a larger research project about COVID-19 message framing effects (see Supporting Information S1 for Study 1 details as well as a note on study time frame in the context of the COVID-19 pandemic). Each participant provided informed consent, and this study was approved by the Institutional Review Board at the University of Pennsylvania. Two hundred and thirty-eight participants were excluded according to criteria specified prior to data analysis (<https://osf.io/xwbhu>). An additional 19 participants were excluded for having no variance in the I-C measure. A final sample of 846 participants recruited through Mturk were included in the current study. See Table S1 for demographic information of the participants.

### 2.1.2 | Measures

Measures used in Study 1 as well as the following studies were summarized in Table S2.

### 2.1.3 | Statistical analysis

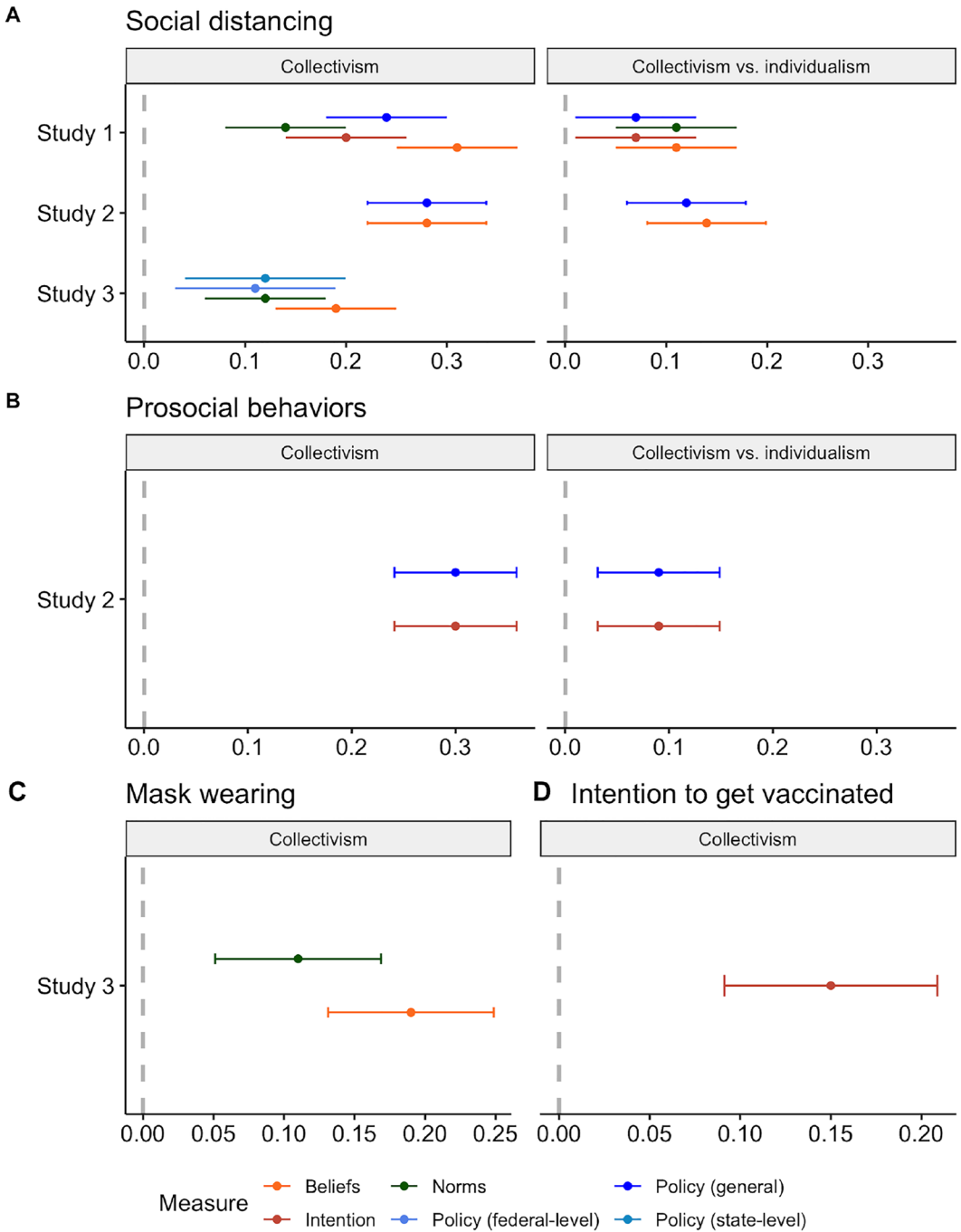
We estimated four ordinary least square (OLS) regression models to separately investigate the associations between participant-level collectivism and each of the following outcomes: (1) social distancing intentions, (2) beliefs, (3) norm perceptions and (4) policy support. Demographic variables (age, gender, race, education, and political orientation) were included as covariates. Although not central to our current investigation, we also investigated the role of individualism in the outcome variables (See Supporting Information S1).

Given that I-C is conceptualized as one dimension at the societal level, we also computed a composite collectivism-individualism measure following prior literature (Li et al., 2018; Ma et al., 2012; Steel et al., 2018). The composite measure was calculated by subtracting the individualist self-construal ratings from the collectivist ratings. Higher scores on this composite measure therefore reflect a higher level of collectivism relative to levels of individualism. We also estimated four OLS models to examine the association between this combined collectivism-individualism score and social distancing intentions, beliefs, norm perceptions and policy support, controlling for age, gender, race, education, and political orientation.

For Study 1 and all following studies, all continuous predictors were mean-centered and scaled by 1 standard deviation. Multiple comparisons were corrected using the Benjamini–Hochberg procedure (Benjamini & Hochberg, 1995). Data were analyzed using the R statistical toolbox (Version 3.6.3; R Core Team, 2013), and all figures were constructed using the R package *ggplot2* (Version 2.2.1; Wickham, 2016).

## 2.2 | Study 1 results

Overall, participants showed high levels of social distancing behavioral intention, norm perception, beliefs, and policy support (Table S3). See Table S4 for bivariate correlations between these variables. Despite overall high levels of cognitions favorable to social distancing, we observed significant individual variance that was associated with individual-level collectivism. As shown in Figure 1a and Table 1, after controlling for demographic variables, greater collectivism was positively associated with intentions, beliefs, descriptive norm perceptions, and public policy support. Robustness checks showed that these results remained statistically significant without the covariates (Table S6). Parallel exploratory analyses using individualism as a predictor can be found in the Table S7.



**FIGURE 1** Regression coefficient plots showing the standardized coefficients of I-C measures (collectivism and the composite score) predicting cognitions surrounding (a) social distancing, (b) prosocial behaviors, (c) mask wearing, and (d) vaccination. Error bars indicate 95% confidence interval.

Further, we estimated parallel models in which individualism and collectivism were combined into a single dimension (i.e., a composite measure in which individualist self-construal score was subtracted from collectivist self-construal score; Li et al., 2018; Ma et al., 2012; Steel et al., 2018) to examine how the relative strength of

**TABLE 1** Study 1 ordinary least square model results of linking participant-level collectivism and cognitions surrounding social distancing, controlling for age, gender, race, education, political orientation, and experimental condition.

	Intentions	Beliefs	Descriptive norms	Policy support
(Intercept)	0.29*** [0.12, 0.45]	0.24** [0.08, 0.41]	-0.05 [-0.22, 0.12]	0.29*** [0.13, 0.46]
Collectivism	0.20*** [0.13, 0.26]	0.31*** [0.24, 0.37]	0.14*** [0.08, 0.21]	0.24*** [0.17, 0.30]
R <sup>2</sup>	0.13	0.14	0.09	0.16

Note: See Supporting Information S1 for details on the experimental conditions. All continuous predictors are mean-centered and scaled by 1 standard deviation. *p* values for the collectivism measure were adjusted. \*\*\**p* < 0.001; \*\**p* < 0.01; \**p* < 0.05.

collectivism is related to the outcome variables. The composite collectivism-individualism measure was positively associated with social distancing intentions, beliefs that social distancing is effective, norm perceptions, and support for policies that enforce social distancing (Figure 1a; Table S8). Robustness checks showed that these results were similar without covariates (Table S9). These results demonstrated that on average, individuals who are relatively more collectivist than individualist have more positive social distancing cognitions and policy support.

In addition, for Study 1 as well as the following studies, we (1) examined whether the link between collectivism and cognition is moderated by cognition type (Table S20); and (2) calculated the effect sizes of collectivism in predicting each DV (Table S22).

### 3 | STUDY 2

Study 2 was a preregistered study aimed to replicate Study 1 findings on social distancing.<sup>1</sup> We also examined how collectivism relates to people's intentions to cooperate by helping others (here termed '*prosocial intentions*') and supporting public policies aimed at helping vulnerable groups (here termed '*prosocial policy support*').

#### 3.1 | Study 2 methods

##### 3.1.1 | Participants

Study 2 was conducted between April 30th and 2 May 2020 with 1011 participants recruited from Mturk. Forty-nine participants were excluded according to pre-specified exclusion criteria in the survey. Seven additional participants were excluded for having no variance in the I-C self-construal measure. A final sample of 955 participants were included in Study 2. See Supporting Information S1 for participant demographics (Table S1), measures used in Study 2 (Table S2), sample size calculation, and exclusion criteria.

##### 3.1.2 | Statistical analysis

Similar to Study 1, and consistent with our preregistration, we estimated four OLS regression models to separately investigate the association between collectivism and social distancing beliefs, social distancing policy support, prosocial behavior intention, and prosocial policy support.

As in Study 1, we constructed a composite measure to examine to what extent the relative strength of collectivism (as opposed to individualism) is associated with the outcome variables by subtracting the individualism score from the collectivism score. We estimated four OLS regression models to examine the association between this composite

score and social distancing beliefs, social distancing policy support, prosocial behavior intention, and prosocial policy support.

As stated in the preregistration, for each of the models above, we would first test if condition, age, gender, race, and job status change were significantly associated with the respective DV. If so, they would be included as covariates in the model. We also conducted robustness checks with models with no covariates (see Tables S13–S14).

### 3.2 | Study 2 results

Overall, Study 2 participants reported high levels of social distancing beliefs, social distancing policy support, and prosocial policy support, as well as moderate prosocial intentions (Table S2). See Table S10 for bivariate correlations between these variables. First, with regard to social distancing cognitions, the results of Study 2 replicated Study 1 findings; collectivism was positively associated with (1) the beliefs that social distancing is effective at preventing the spread of COVID-19, and (2) support for policies that enforce social distancing (Figure 1a; Table 2). Further, relatively higher collectivism compared to individualism was positively associated with beliefs that social distancing is effective and support for policies that enforce social distancing (Figure 1a, Table S12). These findings replicated Study 1 and added further evidence that people's propensity for collectivism (relative to individualism) is positively associated with beliefs that social distancing is effective in preventing COVID-19 and support for social distancing government policies. Robustness checks showed that these results remained statistically significant without the covariates (Tables S13–S14). Parallel exploratory analyses using individualism as a predictor can be found in the Table S15.

Second, our results demonstrated that collectivist orientations were positively associated with prosocial intentions and policy support (Figure 1b; Table 2). Further, the relative collectivism-individualism score was positively associated with prosocial behavioral intention and policy support (Figure 1b, Table S12). In other words, people who have relatively higher collectivist tendencies also reported higher levels of prosocial intentions and policy support. Robustness checks show that these results were also statistically significant without the covariates (Tables S13–S14). Therefore, Study 2 replicated Study 1 findings on the link between collectivist self-construals and cognitions related to social distancing, and showed that people with higher collectivist self-construal had higher intentions to cooperate during the pandemic.

## 4 | STUDY 3

One limitation regarding both Study 1 and Study 2 is that participants were recruited through Mturk, and may not represent the population they are sampled from (Walters et al., 2018). As such, the main aim of Study 3 (preregistered at <https://osf.io/b9ryx/>) is to replicate findings from Studies 1 and 2 on social distancing in a U.S. nationally representative sample, and additionally examine cognitions related to mask wearing and vaccination.

**TABLE 2** Study 2 ordinary least square model results of linking collectivism with cognitions surrounding social distancing and prosocial behaviors, controlling for demographic variables.

	Social distancing		Prosocial behaviors	
	Beliefs	Policy support	Intention	Policy support
(Intercept)	0.00 [-0.10, 0.11]	0.01 [-0.10, 0.12]	-0.33*** [-0.43, -0.22]	0.00 [-0.11, 0.10]
Collectivism	0.28*** [0.22, 0.35]	0.28*** [0.21, 0.34]	0.30*** [0.24, 0.36]	0.30*** [0.24, 0.36]
R <sup>2</sup>	0.11	0.11	0.19	0.13

Note: All continuous predictors are mean-centered and scaled by 1 standard deviation. Statistics on the controlled variables can be found in Table S11. \*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ .

## 4.1 | Study 3 methods

### 4.1.1 | Participants

Study 3 was conducted between May 26th and 11 June 2020. This study included a sample of 1074 participants representative of U.S. adults 18 years or older, collected by the Social Science Research Solutions (SSRS) opinion panel. See Supporting Information S1 for details on participant demographics (Table S1) as well as sample size calculation. To obtain a nationally representative sample, people are invited to an initial SSRS survey because their household was randomly chosen from a list of addresses or randomly generated phone numbers in the United States. Data were collected through online surveys. For participants who do not have access to the internet, they took our survey via phone interviews and answered the same questions. This sample included residents from each U.S. state. Survey weights were developed by SSRS and were used to ensure that participants matched the U.S. population on key demographic variables (parallel analyses using unweighted sample are included in the Table S18).

### 4.1.2 | Measures

In Study 1 and Study 2, we measured both collectivism and individualism orientations in the participants, and found that collectivism is an overall stronger predictor for all outcome variables. As such, we focused exclusively on collectivism and did not examine individualism in Study 3 due to survey space limitations in the nationally representative survey. See Table S2 for measures used in Study 3.

### 4.1.3 | Weight construction

For all analyses, the Study 3 sample was weighted to correct for known biases due to sampling and non-response. Sample weights were provided by SSRS. According to SSRS, survey data are weighted to account for systematic nonresponse along known parameters such as age, race, gender, region, and education.

### 4.1.4 | Statistical analysis

Similar to Study 1 and Study 2, and consistent with the primary hypotheses outlined in the preregistration for Study 3, we estimated seven OLS models to investigate the association between participant-level collectivism and cognitions related to social distancing, mask wearing, and vaccination. Consistent with the preregistration, for each OLS model, we first tested if race, state, education, age, political party, and gender were significantly associated with each DV.<sup>2</sup> The variables significantly associated with the DV were included as covariates in the model associated with the respective DV. We also tested the robustness of each model without covariates and found similar results (Table S19).

## 4.2 | Study 3 results

### 4.2.1 | Social distancing cognitions

Similar to Study 1 and Study 2, participants generally reported positive cognitions related to social distancing (Table S3). See Table S16 for bivariate correlations between these variables. Replicating the findings from Studies 1 and 2, collectivism was positively associated with beliefs that social distancing is effective and that social distancing is approved by family and friends (Figure 1a, Table 3). These results demonstrated that participants with higher collectivist self-construals tended to report stronger beliefs that social distancing is effective and that social distancing is approved by family and friends.

**TABLE 3** Study 3 ordinary least square model results of linking collectivism with cognitions surrounding social distancing, mask wearing, and vaccination, controlling for demographic variables.

	Social distancing				Mask wearing		
	Beliefs	Injunctive norm	Federal policy support	State policy support	Beliefs	Injunctive norm	Vaccination Intention
(Intercept)	0.09 [-0.45, 0.62]	0.16 [-0.38, 0.71]	0.73 [-0.31, 1.86]	0.47 [-0.11, 1.05]	0.10 [-0.44, 0.65]	-0.17 [-0.72, 0.38]	0.16 [-0.38, 0.70]
Collectivism	0.20*** [0.14, 0.26]	0.13*** [0.07, 0.19]	0.12** [0.04, 0.20]	0.12** [0.04, 0.20]	0.20*** [0.14, 0.26]	0.12*** [0.06, 0.18]	0.18*** [0.12, 0.24]
R <sup>2</sup>	0.20	0.16	0.32	0.35	0.21	0.19	0.18

Note: See Supporting Information S1 for covariate selection criteria. Statistics on the controlled variables can be found in Table S17. *p* values for the collectivism measure were adjusted. All continuous predictors are mean-centered and scaled by 1 standard deviation. \*\*\**p* < 0.001; \*\**p* < 0.01; \**p* < 0.05.

In Study 3, we differentiated between state-level and federal-level policy support, and examined whether collectivism was positively associated with both levels of policy support. The results indicated that collectivism was positively associated with both federal- and state-level policy support (Figure 1a, Table 3). These findings replicated the results from Studies 1 and 2, suggesting that individuals who report higher levels of collectivism also report stronger support for policies that enforce social distancing at both state and federal levels. Parallel analyses that did not include covariates showed similar results (Table S19).

#### 4.2.2 | Mask wearing cognitions

Consistent with our hypothesis, collectivism was positively associated with beliefs that mask wearing is effective and that mask wearing is approved of by family and friends (Figure 1c, Table 3). Individuals with higher collectivist self-construals expressed stronger beliefs that mask wearing is effective and approved of by family and friends (i.e., injunctive norm perceptions). Parallel analyses that did not include covariates showed similar results (Table S19).

#### 4.2.3 | Vaccine intention

Consistent with our hypothesis, collectivism was positively associated with people's intention to get vaccinated if COVID-19 vaccines were available (Figure 1d, Table 3). Together, Study 3 findings suggest that people with higher collectivist self-construal had more positive cognitions related to social distancing, mask wearing, and vaccination. They were also more likely to support public policies enforcing social distancing and mask wearing.

## 5 | STUDY 4

Study 4 combined several publicly available datasets to investigate the association between country-level collectivism and the country-level growth rate of COVID-19 in 69 countries.

### 5.1 | Study 4 methods

#### 5.1.1 | Data

Numbers of newly confirmed COVID-19 cases and deaths in each country were downloaded from an open data repository hosted by the European Centre for Disease Prevention and Control (<https://github.com/owid/covid-19-data>).



Our results were based on data up until 20 Nov 2020. We examined the growth rate of the COVID-19 for the first 30 days. For confirmed cases, we included countries with at least 15 days of data, starting with at least 100 reported confirmed cases as 'day 1' (Berg et al., 2020; Salvador et al., 2020). For deaths, we included countries with at least 15 days of data, starting with at least 5 reported deaths as 'day 1'.

Data for the primary independent variable, country-level collectivism, were obtained from the Hofstede Insights Cultural Dimensions Website (<https://www.hofstede-insights.com/product/compare-countries/>). At the societal level, individualism and collectivism are conceptualized on the same dimension, where collectivism describes societies in which individuals form into strong, cohesive groups. On the other hand, countries that score low in collectivism are characterized by loose ties between individuals, and that everyone is expected to look after his or her immediate family.

We also included data that might plausibly be related to either individualism and COVID-19 growth rate, and thus might render the relation between individualism and COVID-19 growth rate spurious. These measures include demographic factors, GDP, political regimes, etc. See Supporting Information S1 for details on covariate variables.

## 5.1.2 | Statistical analysis

### *Estimating growth rate*

The growth rate of COVID-19 confirmed cases and death were estimated using an exponential growth model ( $\log[y] = a \times e^{t \times t}$ ) where the  $y$  variable represents the total number of confirmed cases or death, respectively, and  $t$  refers to the day since 'day 1'. Seven countries were excluded for having bad model fits when estimating growth rate (bad model fit defined as adjusted  $R^2 < 0.30$ ). For confirmed cases, the first day in which cumulative confirmed cases was at least 100 was set as 'day 1' (Berg et al., 2020). For deaths, the first death in which cumulative deaths was at least 5 was set as 'day 1'.

### *Linking collectivism with growth rate*

We estimated two OLS models to separately examine the role of collectivism in the growth rate of COVID-19 confirmed cases and deaths. Both models included aforementioned control variables, due to their theoretical and empirical relevance to COVID-19 growth rate. All continuous predictors were grand mean-centered and standardized. For each model, we checked that the residuals are normally distributed.

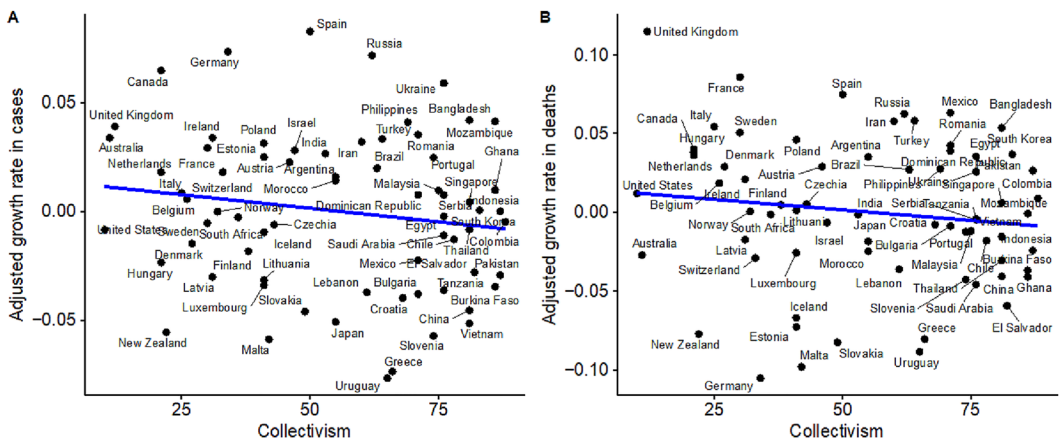
## 6 | STUDY 4 RESULTS

### 6.1 | Collectivism and growth rate of confirmed cases

We first constructed an ordinary least squares regression model to examine the relation between country-level collectivism and the growth rate of COVID-19 confirmed cases, controlling for demographic and economic factors such as population and GDP (see Supporting Information S1 for details). There was a significant negative association between collectivism and growth rate in confirmed cases ( $b = -0.02$ ,  $t(51) = -2.30$ , 95% CI =  $[-0.038, -0.003]$ ,  $p = .03$ ; Figure 2a; Table 4). This finding suggests that more collectivist countries tended to have lower growth rates in confirmed COVID cases, whereas more individualist countries tended to have a higher growth rate in confirmed cases in the first thirty.

### 6.2 | Collectivism and growth rate of confirmed deaths

In addition to confirmed cases, we also investigated the relation between country-level collectivism and the growth rate of COVID-19 confirmed deaths. Similar to growth rate of confirmed cases, our analysis suggested a significant



**FIGURE 2** Scatter plots showing the associations between country-level collectivism and growth rates in COVID-19 (a) confirmed cases and (b) deaths. Control variables include: population, population density, population median age, diabetes prevalence, GDP, healthcare spending per GDP, democracy index, masculinity, uncertainty avoidance, long-term orientation. The blue lines indicate OLS model fits. Shaded area indicates 95% confidence interval.

**TABLE 4** OLS model results linking country-level collectivism and COVID-19 growth rates in confirmed cases and deaths in Study 4.

	Growth rate (cases)	Growth rate (deaths)
(Intercept)	0.12*** [0.11, 0.12]	0.11*** [0.10, 0.12]
Collectivism	-0.02* [-0.04, -0.003]	-0.02* [-0.04, -0.0004]
$R^2$	0.54	0.56

Note: All continuous predictors are mean-centered and scaled by 1 standard deviation. Statistics on the controlled variables can be found in Table S21. \*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ .

negative association between collectivism and growth rate in confirmed deaths ( $b = -0.02$ ,  $t(51) = -2.01$ , 95% CI =  $[-0.04, -0.0004]$ ,  $p = .045$ ; Figure 2b; Table 4). This finding suggests that more collectivist countries tended to have lower growth rates in confirmed COVID deaths, whereas more individualist countries tended to have a higher growth rate in confirmed deaths in the first 30 days.

## 7 | GENERAL DISCUSSION

Many challenges faced by humans require large-scale cooperation for long-term communal benefits at the expense of short-term self-interest. In the case of the COVID-19 pandemic, we are currently relying on large-scale cooperative behaviors (e.g., social distancing, mask wearing, and vaccination) to limit transmission (Shook et al., 2020; Van Bavel et al., 2020). What motivates people's cooperative behavior in these social dilemmas? Across three studies, we demonstrated that collectivism, a cultural variable that characterizes the extent to which people and society value relationships and working together to achieve collective goals, was positively associated with (1) intentions to practice social distancing, prosocial behavior, and get COVID-19 vaccinations; (2) beliefs that social distancing and mask wearing are effective at preventing the spread of the disease, (3) normative perceptions that social distancing and mask wearing are both commonly practiced and approved by others;

and (4) support for public policies that enforce social distancing and support vulnerable populations. In addition, collectivism at a country level was negatively associated with the growth rate of both confirmed COVID cases and deaths.

Prior studies have demonstrated that collectivist cultural orientation is associated with higher levels of cooperation (van Dijk et al., 2013), such as environmental protection and consumer choice (Arnocky et al., 2007; Mancha & Yoder, 2015; Wu et al., 2019), but fewer studies have examined effects of collectivism on health-relevant cognitions in a nationally representative sample. The current studies demonstrated that a collectivist cultural tendency is also associated with support for cooperative prevention behaviors in the context of COVID-19. Moreover, we observed positive associations between collectivism and prosocial behavioral intentions as well as policy support. Taken together, these findings provide converging evidence that collectivist cultural construal contributes to prosocial behavior and cooperation in real-world social dilemmas, where these behaviors often bring larger benefits to the community compared to each participating individual.

In sum, our results demonstrated that individuals with predominantly collectivistic self-construal generally showed beliefs, perceived norms, and intentions more favorable to COVID-19 preventive behaviors. These findings point to the importance of considering culture when designing public policies and public health persuasion campaigns during crises like the COVID-19 pandemic that can put self-interest at odds with the common good.

## AUTHOR CONTRIBUTIONS

All authors developed the study concept, contributed to the study design, and participated in data collection. Rui Pei, Danielle Cosme, Bradley D. Mattan, and Emily B. Falk performed the data analysis and interpretation. Rui Pei and Emily B. Falk drafted the manuscript, and all other authors provided critical revisions. All authors approved the final version of the manuscript for submission.

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## CONFLICT OF INTEREST STATEMENT

We report no conflict of interest.

## AUTHOR POSITIONALITY STATEMENT

R. Pei identifies as East Asian woman, D. Cosme identifies as White woman from the U.S., M. E. Andrews is a Black mixed-race woman who grew up in the mid-atlantic U.S., East Africa, and Western Europe, B. D. Mattan identifies as White man from rural Midwestern U.S., J. Carreras-Tartak identifies as a Latinx man from Puerto Rico, and E. B. Falk identifies as White woman from the U.S.

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## ENDNOTES

- <sup>1</sup> See preregistration at: <https://osf.io/abe8c>.
- <sup>2</sup> Although we had proposed to include current job status as a potential covariate in the analysis, our collected sample included a large amount of missing value for this variable ( $n = 452$ ). We therefore did not include job status as a potential covariate in the main analyses. Parallel analyses that included job status as a covariate showed similar findings (Table S15).

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## SUPPORTING INFORMATION

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