

# The Impact of COVID-19 on Americans' Attitudes toward China: Does Local Incidence Rate Matter?

Qian He<sup>1</sup> , Ziye Zhang<sup>1</sup>, and Yu Xie<sup>1</sup> 

## Abstract

*Linking local COVID-19 and population statistics to a U.S.-based survey we recently conducted, we examine the spatial variation in the impact of COVID-19 on Americans' attitudes toward China. The research strategy capitalizes on differential local COVID-19 incidence rates as varying dosages of COVID-19 impact across local contexts in the United States. Our results reveal negative yet heterogeneous effects of the ongoing COVID-19 pandemic on Americans' attitudes toward China. We find that greater local exposure to COVID-19 is associated with a lower level of trust in Chinese and a less favorable attitude toward China. These findings lend consistent support to behavioral immune system theory by bridging the literature on contextual variations in public attitudes, with broader implications for U.S.-China relations.*

## Keywords

China, context effects, COVID-19, public attitudes

Subsequent to the worldwide outbreak of the COVID-19 pandemic has been a sharp rise in negative attitudes toward China in many countries (Silver, Devlin, and Huang 2020b). This is also true in the United States, the country that has suffered the largest numbers of confirmed COVID-19 infection cases and COVID-19-related deaths (World Health Organization 2020b). The impact of COVID-19 on Americans' minds has been deep, as millions of Americans have lost loved ones, jobs, worry-free lifestyles, and freedom of movement and activity to this protracted pandemic. Given the origin of the pandemic outbreak in Wuhan, a city in central China, China has been blamed for spreading the virus to the world. Attribution of the pandemic outbreak to

China's failure to contain the virus has also been propelled by the fact that the Chinese government first knew about the virus in November 2019 but did not inform the rest of the world until late December 2019 (World Health Organization 2020a). Along with others, many opinion influencers, such as Donald

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<sup>1</sup>Princeton University, Princeton, NJ, USA

### Corresponding Authors:

Qian He, Center on Contemporary China, Princeton University, 357 Wallace Hall, Princeton, NJ 08544, USA.

Email: qianhe@princeton.edu

Yu Xie, Center on Contemporary China, Princeton University, 188 Wallace Hall, Princeton, NJ 08544, USA.

Email: yuxie@princeton.edu

Trump, the U.S. president from 2016 to 2020, called COVID-19 “the Chinese virus,” further fueling the association in many people’s minds between the pandemic and China. As a result, hostility against China and the Chinese in the United States has been escalating. Hundreds of confrontational or discriminatory incidents toward Chinese and other Asian Americans in the United States have been reported (Gover, Harper, and Langton 2020; Tessler, Choi, and Kao 2020). Is COVID-19 really linked to Americans’ worsened attitudes toward China?

Mass media have already given us clues as to why Americans’ attitudes toward China would be affected by COVID-19. It has been reported that the Chinese local governments withheld vital information regarding Wuhan’s outbreak until it was too late for other countries to take preventative measures (e.g., Barnes 2020; Feng and Cheng 2020; Morello 2020). Opinion surveys reveal that most Americans generally agree that China should be held partially responsible for the pandemic outbreak in the United States (Silver, Devlin, and Huang 2020a).

Research on pandemics similarly suggests a link between COVID-19 and negative attitudes toward China. Studies of past infectious disease pandemics have offered many examples of negative attitudes toward various groups believed to be responsible for the outbreak. A line of psychological research long devoted to understanding humans’ psychological reactions to infectious pathogens focuses on what is called the “behavioral immune system” (Schaller and Park 2011). In this literature, researchers have found that pathogen-threat perceptions often activate people’s social avoidance attitudes/behaviors toward those who are potentially “sick,” as self-protection (Taylor 2019). Thus, the rise in negative attitudes toward Chinese or China may result from pathogen-induced aversive responses due

to the fact that the COVID-19 pandemic originated in China. Furthermore, recent developments in cognitive social psychology have shown us that attitudes are quite malleable and responsive to contextual stimuli (Schwarz 2007; Schwarz and Sudman 2012). A study of local COVID-19 infection rates and public opinion toward China would help advance our knowledge concerning how a public health crisis can also shape public attitudes toward foreign national groups, with important implications for international relations.

The main premise of this study is that individual Americans’ exposure to COVID-19 and their associated threat perceptions vary markedly across local contexts, which could, in turn, trigger varying attitudes toward Chinese or China. Capitalizing on this idea, we develop a research strategy to identify the dosage effect of COVID-19, operationalized as differential local COVID-19 incidence rates, on attitudes toward China. More concretely, we conduct a national-level quantitative study of attitudes toward Chinese and China by supplementing our U.S.-based survey, conducted in August 2020, with local COVID-19 statistics and population characteristics. We measure attitudes toward Chinese by the respondents’ trust in Chinese and examine whether contextual variations in cumulative COVID-19 incidence rates within local county clusters adversely predict this trust, netting out a host of individual- and community-level confounders. We conduct placebo tests with three control groups—Japanese, Indians (i.e., South Asian Indians), and Americans—to capture the potentially varying extents to which stereotypes directed toward Chinese have spilled over to other groups. To further assess the broader implications for U.S.-China relations, we extend our analysis to examine whether COVID-19 dosage variations similarly predict Americans’ (un)favorable attitudes toward China as a country.

Our empirical results consistently support the hypothesis that local COVID-19 incidence rates strongly predict Americans' perceptions of Chinese as being less trustworthy, at both aggregate and individual levels. Placebo tests reveal that this COVID-19 effect is particularly strong with regard to trust in Chinese, relative to trust in Japanese, Indians, and Americans. Besides the key findings on trust in Chinese, we also find a similar dosage effect of COVID-19 on Americans' unfavorable attitudes toward China. These findings suggest that the effects of the ongoing COVID-19 pandemic on Americans' attitudes toward China are profound yet heterogeneous.

#### COVID-19 AND ATTITUDES TOWARD CHINA IN THE UNITED STATES

As of July 2021, there have been more than 194 million confirmed COVID-19 cases worldwide, with 34 million in the United States (World Health Organization 2020b). Almost two years after the United States' first COVID-19 case, this country stands as the world's frontrunner in terms of total confirmed cases and deaths from the global pandemic, with these figures still increasing. To the best of our existing knowledge, the novel coronavirus emerged from Wuhan, China, in November 2019 (Holshue et al. 2020). However, China did not officially inform other countries about its increasing number of COVID-19 infections until human-to-human transmissions went out of control in late December. The delay in information sharing by China has caused many people in many countries, especially in the United States, to blame China for its inadequate efforts in stopping the virus from spreading abroad.

As the COVID-19 pandemic has evolved, surveys and news reports in many Western countries have reported that their citizens tend to hold China

accountable for the pandemic. A 14-country survey conducted in the summer of 2020 by the Pew Research Center suggested that most respondents in each of the 14 surveyed countries viewed China unfavorably (Silver et al. 2020b). In particular, 73 percent of Americans held unfavorable views toward China, while more than 50 percent thought that China was responsible for spreading the virus (Silver et al. 2020a). Negative views of China and the Chinese are also ubiquitous across a broad spectrum of U.S. news outlets and social media platforms. For example, the *Wall Street Journal* (*WSJ*) published an article with the headline "China Is the Very Sick Man of Asia," which triggered the Chinese authorities to expel three *WSJ* reporters from China (Mead 2020). Some other reports called into question the official numbers of COVID-19 cases and deaths reported by the Ministry of Health of the People's Republic of China (Kisa and Kisa 2020). Scholars have expressed similar concerns that Chinese local authorities could have intentionally underreported actual figures and delayed transparent information sharing, severely limiting countries, like the United States, from taking timely mitigation strategies (Khosrawipour et al. 2020; Zhao et al. 2020).

With infected cases and deaths from the disease increasing, there were frequent reports of hostile attitudes and behaviors toward Chinese and other Asians across the United States (Gover et al. 2020; Tessler et al. 2020). When the first COVID-19 case occurred in the United States, businesses in New York City's Chinatown suddenly lost up to 70 percent of their regular sales (Chen, Zhang, and Liu 2020). Over half of Chinese Americans have perceived health-related Sinophobia—xenophobic attitudes toward persons of Chinese ancestry—since the onset of the U.S. pandemic, online and in person (Cheah et al. 2020).

Moreover, many Chinese and other Asians were verbally abused, spat at, and attacked by infuriated Americans (Cohen 2020). In some ways, these attitudes and behaviors are reminiscent of an old perception of Chinese as carriers and spreaders of diseases, perpetuating long-standing “yellow peril” stereotypes (Chen et al. 2020).

Historically, there were similar instances of aversive perceptions and behaviors toward minority groups during past infectious-disease pandemics. For instance, the bubonic plague (1347–51), which killed 25 percent of the European population, prompted collective violence against Jews, who were accused of poisoning wells and food supplies (Cohn 2012). Similarly, the more recent Ebola outbreak (2014–15) resulted in the shunning of individuals from the affected African countries, or individuals of African descent in general, in the United States (Fischer et al. 2019). What those incidences share in common is that groups widely considered to have inflicted collective sufferings were stigmatized, marginalized, or even sanctioned by the public, a pattern that has been the subject of a line of psychological research. Notably, behavioral immune system theory suggests that, in response to perceived health threats, people tend to develop negative perceptions or aggressive behaviors toward the infected population (Schaller and Park 2011; Taylor 2019). This response is due to pathogen-induced reactions that activate group-based aversive perceptions and aggressive behaviors against those deemed to be at high risk for disease transmission (Weiner 1995; Corrigan et al. 2003).

The theoretical logic of behavioral immune system theory also applies for understanding the relationship between COVID-19 and attitudes toward Chinese and China. Like those past incidences, during the COVID-19 pandemic, Americans have also tended to develop negative

emotions toward China. These negative emotions partly reflect Americans’ fears of contracting “the Chinese virus,” as behavioral immune system theory readily predicts. Thus, for many Americans, it is considered “safer” to avoid contact with Chinese from China and Asian Americans in general, many of whom have been mistakenly treated as Chinese during the pandemic due to their similar phenotypic appearance (Gover et al. 2020; Rzymiski and Nowicki 2020; Tessler et al. 2020). But there is potentially more to the pathogen-induced aversive responses observed in the American public. The United States is potentially perceived to have disproportionately borne adverse consequences resulting from failures to act by the Chinese authorities. This could also trigger less favorable public attitudes toward the Chinese government or China. Because the latter perception might differ by individuals’ political ideology regardless of COVID-19, it is essential to purge those ideological factors in assessing the relationship between COVID-19 and attitudes toward China.

Hence, while both the media and the psychological literature suggest a strong link between COVID-19 and negative attitudes toward Chinese and China, in the absence of randomized experiments, proving it to be causal is difficult. For instance, it is hard to find a good instrumental variable that affects Americans’ attitudes toward Chinese/China only via local COVID-19 outbreaks, and this assumption itself is hardly empirically verifiable. In this study, we resort to a dosage design. In a nutshell, while it is not possible to have a group of Americans who are unaffected by COVID-19 as controls, the extent to which Americans are affected by COVID-19 varies substantially by locality. Thus, we explore regional variations in local COVID-19 incident rates and test the hypotheses that Americans living in more affected

communities tend to have more negative attitudes toward Chinese and China.

Utilizing the contextual variations in the intensity of COVID-19 enables us not only to consider the possible causal relationship between COVID-19 and negative attitudes toward Chinese and China but also to understand how public opinion is embedded in social contexts in general. Research in survey methodology in the past few decades has established that public attitudes are generally context sensitive and responsive to changes in environment (Schwarz 2007). While cognitive social psychologists have studied how contexts affect attitudes, existing studies mostly deal with manipulated contextual variations *within* survey environments by varying questionnaire designs or experiment-induced contextual stimuli (Schwarz and Sudman 2012). So far, different contextual stimuli emerging from regional variations in the real world remain understudied. Our research shows how Americans' contextual public health environment—that is, their local COVID-19 incidence rate—affects their attitudes toward Chinese and China.

#### **SPATIAL VARIATIONS IN COVID-19 OUTBREAKS AND ATTITUDES TOWARD CHINA**

Recent findings suggest that most Americans have limited direct knowledge about other countries and thus sometimes do not have firm opinions about people in these countries (Xie and Jin 2021). When asked by survey researchers about their attitudes toward China, respondents form their opinion from their personal understanding of the questions. Schwarz and his associates (Schwarz 2007; Schwarz and Sudman 2012) have called such responses “context sensitive.” If we extend Schwarz's context from questionnaire manipulation to local social context, we expect that respondents' expressed

attitudes toward China may vary by the geographical disparities of COVID-19 severity. To illustrate, let us assume that one mechanism for the negative impact of COVID-19 on attitudes toward China and Chinese is the psychological association between COVID-19 and China. That is, COVID-19 triggers negative feelings toward China and Chinese. When COVID-19 outbreaks are more severe locally, this association is made more salient, as individuals are more aware of negative consequences of COVID-19 and may perceive Chinese and China less favorably.

This reasoning thus implies that individuals' China-threat perceptions may grow with the increasing local severity of COVID-19, which could, in turn, provoke negative attitudes toward Chinese and China. Specifically, we hypothesize that if individuals view Chinese negatively because of this pandemic, residents of harder-hit areas could be less likely to trust Chinese than their counterparts in less-hard-hit areas (Hypothesis 1). Examining trust in Chinese potentially characterizes the prevailing negative emotions toward this group observed in the United States by drawing upon group-based social judgments, which usually reflect implicit risk assessments for interpersonal interactions. The potential divides between individuals who trust Chinese and those who do not may result in differential inclinations to deal with Chinese across various dosages of local COVID-19 outbreaks.

Furthermore, we analogously anticipate that residents of harder-hit areas will also hold less favorable attitudes toward China as a nation (Hypothesis 2). We additionally investigate Americans' perceptions of China as the country where the novel coronavirus originated. This is motivated by the fact that the United States has arguably been both the most harmed country (by the standards of cumulative cases and deaths)

and the country where the strongest anti-China sentiments have surfaced amid the global pandemic. As some analysts have already speculated, the COVID-19 pandemic might precipitate a new turning point in shifting U.S.-China relations (Haass 2020). Thus, inspecting ordinary Americans' attitudes toward China could generate valuable insights into one of the world's most vital bilateral international relationships nowadays. In the next section, we will detail the various data sources and analytical approaches we utilize to test the two hypotheses.

## DATA AND ANALYTIC STRATEGY

### Data

The main data set for this analysis comes from a nationwide online survey fielded in mid-August 2020, when the COVID-19 outbreak in the United States was evolving at a relatively stable rate compared with the prior and subsequent months. While this internet-based survey was primarily intended to understand Americans' life experiences during the COVID-19 pandemic, it encompassed a small public-opinion module to understand public attitudes toward several Asian national groups, given the pandemic's origin in China. We additionally merged various public data sets for local county-level COVID-19 cases and population characteristics with this survey data set. Our primary analytic sample comprises 1,793 adult participants from 50 U.S. states and Washington, D.C., whom we recruited as a nationwide probability sample using the online survey platform

KnowledgePanel by Ipsos. The target population consisted of non-institutionalized adults aged 18 and older residing in the United States, with a sample response rate of 79 percent.<sup>1</sup> Our survey's key strengths include the availability of 1,641 unique five-digit zip codes for all the respondents' locations, granular assessments of their China-related attitudes amid the pandemic, and rich information on sociodemographic backgrounds.<sup>2</sup>

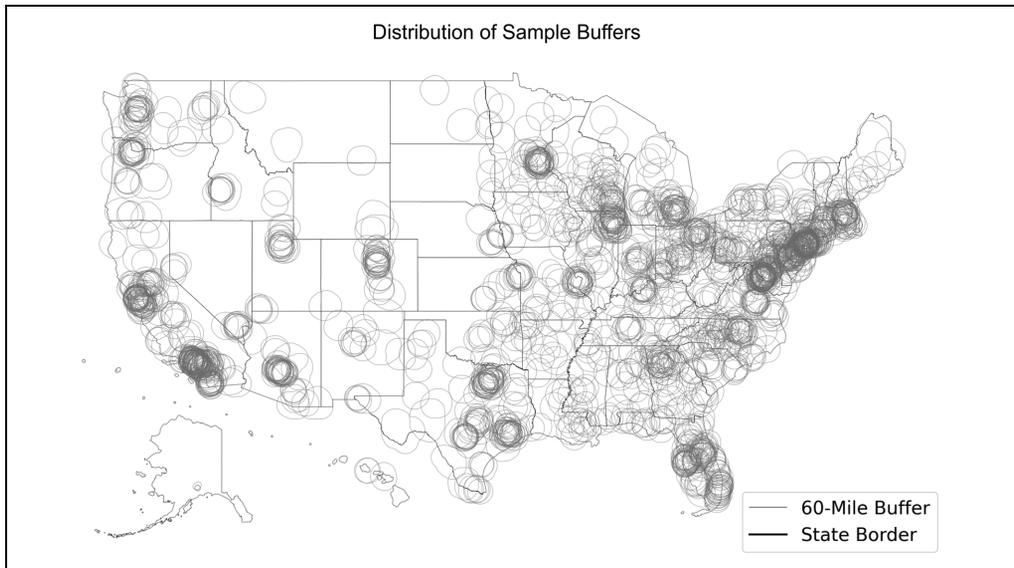
*Key explanatory variable.* Consistent with Hypothesis 1, we aim to capture the respondents' local COVID-19 outbreaks as varying COVID-19 dosages that potentially predict their variable attitudes toward Chinese/China. Considering that individuals' attitudes toward China might reflect local epidemic stimuli, both spatial and temporal variations can be vital to understanding such attitudes. We use the survey respondents' residential zip codes to link individual-level attitudes to the local spatial-temporal variations in COVID-19 severity.

We derived the contextual measure of local COVID-19 outbreaks, our key explanatory variable, by harmonizing two public data sets with our survey. We obtained the county- and day-specific cumulative counts of COVID-19 cases in the United States (*New York Times* 2020) for all survey participants' personal survey-completion dates (i.e., August 12–18, 2020). We additionally acquired the county-level population counts as of 2019 (U.S. Census Bureau 2020). Using these two data sets, we constructed the county- and day-specific COVID-19

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<sup>1</sup>Ipsos followed American Association for Public Opinion Research (AAPOR) standards for reported response rates. The survey's target population consisted of non-institutionalized adults ages 18 and older residing in the United States. The survey was fielded between August 12 and August 18, 2020. The survey company originally fielded 2,389 randomly sampled households with at least one eligible adult, and the sample reached 1,880 observations by the end date (79 percent response rate).

<sup>2</sup>Residential zip codes are supplied by KnowledgePanel as part of the respondents' personal profiles. The five-digit zip codes fully protect the individuals' privacy as they do not involve personally identifiable addresses.



**Figure 1.** Distribution of Sample Buffers

incidence rates, which are interpretable as cumulative cases per 100 persons within the local county. The county-level cumulative COVID-19 incidence rates then form the fundamental building blocks for characterizing the local COVID-19 dosages mapped to individuals' residential locations.

The construction of the ultimate indicator of local COVID-19 dosage additionally involves specifying the range/level of geographic aggregation, which must reconcile conceptual validity with data limitations. A primary difficulty in matching the COVID-19 severity of the respondents' five-digit zip codes to that of residential counties is that one zip code may border several neighboring counties, so we should not simply impute county-level statistics to the zip code level. Thus, we constructed respondent-centered geographic units, called county clusters, according to respondents' residential locations. Recent transportation statistics show that over 3.3 million Americans commute at least 50 miles each way per day. However, most Americans' daily travel

distances are within a total of 100 miles (U.S. Department of Transportation 2017). We have accordingly tested multiple alternative definitions for county clusters between 20- and 100-mile buffers. We adopt a 60-mile buffer in part because we believe it is sufficiently large to circumscribe the geographic range of daily activities and information flows for most Americans. Moreover, the results yielded from the 60-mile buffer are bounded between the extremely low and extremely high estimates based on alternative radiuses, which could help avoid under- or overestimates. Our sensitivity analyses further warrant that the core findings are highly robust to all the alternative radius specifications. Therefore, throughout this analysis, we consistently use the average cumulative incidence rates in the individualized county cluster buffers to capture varying intensities of local COVID-19 infections.

*Dependent variables.* This analysis mainly considers two binary outcomes. The first outcome is individual-level "trust in Chinese." Specifically, our survey asked,

“Generally speaking, would you say that Chinese people can be trusted, or that you cannot be too careful in dealing with them?” We requested that survey participants choose the response that was closer to their opinion out of two given choices. The first choice, “Most Chinese people can be trusted,” indicates a trustful attitude toward Chinese; the second choice, “You can never be too careful in dealing with Chinese people,” reflects participants’ distrustful attitudes toward this group.<sup>3</sup>

We examine individuals’ (un)favorable attitudes toward China as the second dependent variable. One survey question asked, “Do you have a favorable or unfavorable opinion of China?” with four possible answers: “very favorable,” “somewhat favorable,” “somewhat unfavorable,” and “very unfavorable.” We coded the first two items as generally “favorable” attitudes toward China and the latter two as “unfavorable” attitudes.<sup>4</sup> This particular survey item has appeared widely in reports and studies on attitudes toward China. Thus, we can benchmark our latest results against prior findings on this topic (Wang et al. 2021; Xie and Jin 2021).

*Controls related to the outcome variables.* We use “trust in Americans” as a control

variable when predicting trust in Chinese, to capture individual-level unobserved heterogeneities in social trust of *any* group, and to conduct placebo tests. We also employ trust in two more Asian groups to conduct placebo tests: Japanese and Indians.<sup>5</sup> For reference groups for placebo tests, we chose Japanese, Indians, and Americans because these groups should be known to ordinary American respondents and they vary sufficiently in their similarity with Chinese. To ensure higher inter-item comparability, the questions on group-based trustworthiness perceptions presented the same wordings and binary-choice sets, except that they considered different national groups.

*Other attitudes toward China.* To capture individuals’ assessments of how China handled the COVID-19 pandemic and explain their trust in Chinese further, we tailored two questions to inspect China-related attitudes. One question was, “In your opinion, how responsible is China for the COVID-19 outbreak in the U.S.?” The four possible response items were “completely responsible,” “mostly responsible,” “somewhat responsible,” and “not at all responsible,” which are specified as separate categories in the analysis. The second question asked people whether they “find the official COVID-19 statistics from China trustworthy,” to gauge potential concerns over the transparency of COVID-19 figures reported by the Chinese authorities. We consistently control for “very trustworthy,” “moderately trustworthy,” “not very trustworthy,” and “not at all trustworthy” to reflect the fine-grained

<sup>3</sup>Behavioral measures of trust, as often seen in trust games, ask people whether they will trust someone in anticipation of reciprocal exchanges. In that case, to trust means to take a risky action in exchange for potential gains when the other party actually honors the trust. This behavioral definition of trust reflects cognitive and normative components of trust in people’s actions, whereas we tailor our trust questions here to highlight the cognitive dimension of trust (see also Dunning, Fetchenhauer, and Schlösser 2019).

<sup>4</sup>We also conducted sensitivity checks using the four-category measure of favorability toward China as an alternative dependent variable, yielding qualitatively similar results (see Appendix Table A3).

<sup>5</sup>Because we asked respondents’ opinions about Indians (i.e., South Asian Indians) in parallel with their opinions of Chinese and Japanese, it is unlikely that they would misunderstand the referenced group as “American Indians.”

gradients in trust in the Chinese official statistics.

*Local socioeconomic contexts.* We also employ the 2018 American Community Survey (ACS) (pooled five-year cross-sectional surveys for 2014–18) to characterize the county cluster-level socioeconomic contexts (U.S. Census Bureau 2019). We include in our analysis the local averages in education, income, and urban population share to remove potential confounding due to variations in local socioeconomic conditions (Phelan, Link, and Tehranifar 2010). This is because county clusters with less educated or poorer residents may have higher COVID-19 incidence rates and lower trust in Chinese, which could confound the results. We consider local urban population share for a similar reason. To net out these place-based confounders, we control for average percentages of respondents (1) with a high-school diploma, (2) with some college, and (3) with a bachelor's degree or above, as well as (4) average income per capita and (5) urban population share.

*Potential ideological and behavioral confounders.* Our analysis nets out a host of ideological and behavioral confounders that might correlate with local COVID-19 severity and public attitudes operating at individual and county cluster levels, respectively. At the individual level, we control for respondents' self-identified political ideology, including “liberal” (reference group), “moderate/middle of the road,” “conservative,” and “unknown/refused to answer.” To the degree that respondents' social-distancing behaviors are relevant to their knowledge of local COVID-19 outbreaks, we consider the frequency of going out in public during the week preceding their surveying, coded as “several times a day” (reference group), “once a day,” “several times in the past week,” “once in the past week,”

or “never.” Similarly, to rule out community-level partisan divides as alternative explanations, we additionally control for the county cluster-level proportion of Trump voters in the 2016 U.S. presidential election (MIT Election Data and Science Lab 2018) and county cluster-level frequency of engaging in masking behavior during in the COVID-19 pandemic (*New York Times* and Dynata 2020).<sup>6</sup>

*Other demographic controls.* Apart from the aforementioned variables, we consider gender, age, age squared, current marital status, and homeownership status. Notably, we also include respondents' race/ethnicity and highest educational attainment in the analysis as prior studies frequently found that racial minorities and the less educated generally had lower social trust (Alesina and La Ferrara 2002; Smith 2010). We use the self-identified racial-ethnic categories, including non-Hispanic whites (reference group), non-Hispanic blacks, Hispanics, and others.<sup>7</sup> Our educational categories consistently distinguish individuals without a high school diploma (reference group) from those with a high school diploma, with some college, and finally, with a bachelor's degree or above.

### **Analytic Strategy**

The current study consists of three main steps. We first characterize the sample with a descriptive summary and the aggregated percentages of trust in Chinese, Japanese, Indians, and Americans across county cluster incidence-rate

<sup>6</sup>Specified as proportions of county cluster residents who never/rarely/sometimes/frequently wear masks.

<sup>7</sup>One limitation of our data set is that survey participants who were Asians were put into the residual racial-ethnic category called “others” without further differentiation.

quartiles. We then predict trust in Chinese by estimating a series of logistic regression models highlighting the role of COVID-19 incidence, as proxied by varying county cluster-level incidence rates. In predicting trust in Chinese (Hypothesis 1), we estimate a series of nested binary logistic regression models as shown by Equation (1):

$$\log\left(\frac{\Pr(Y_{ij}=1)}{1-\Pr(Y_{ij}=1)}\right)=\alpha+\beta_1IR_{ij}+\beta_2\text{Trust\_A}_{ij}+\beta_3\text{Local\_Context}_i+\beta_4X_{ij}+\beta_5A_{ij} \quad (1)$$

where  $i$  refers to the county cluster and  $j$  refers to the survey participant. Accordingly,  $Y_{ij}$  denotes one's trust in Chinese, and  $\log\left(\frac{\Pr(Y_{ij}=1)}{1-\Pr(Y_{ij}=1)}\right)$  is the log odds of trusting Chinese.  $IR_{ij}$  stands for the cumulative COVID-19 incidence rate for the  $j$ th survey participant from the  $i$ th county cluster. Its corresponding coefficient,  $\beta_1$ , is of central interest to this study. As discussed, we control for  $\text{Trust\_A}$  (trust in Americans) to capture individual-level unobserved heterogeneities in general social trust. We use  $\text{Local\_Context}$  (county cluster contexts) similarly to remove potential confounding from locally concentrated socioeconomic disadvantages and ideological divides. Finally,  $X$  denotes the full set of demographic controls, and  $A$  represents the two variables measuring China-related attitudes. The overarching aim for the second step is to assess whether the local incidence rate indeed predicts trustworthiness perceptions and sensitivity to demographic and attitudinal controls. We conduct supplementary placebo regression analyses predicting trust in Japanese, Indians, and Americans to examine potential stereotypical perceptions overflowing to these groups.

$$\log\left(\frac{\Pr(F_{ij}=1)}{1-\Pr(F_{ij}=1)}\right)=\alpha+\beta_1IR_{ij}+\beta_2Y_{ij}+\beta_3\text{Local\_Context}_i+\beta_4X_{ij}+\beta_5A_{ij} \quad (2)$$

The last step of our analysis examines individuals' favorable attitudes toward China ( $F_{ij}$ ), again using heterogeneous COVID-19 dosages ( $IR_{ij}$ ) as the key predictor. We summarize the full model setup in Equation (2). In brief, this third step is similar to (1), but we include  $Y_{ij}$  (trust in Chinese), the primary outcome in Step 2, as a mediating variable. This last step serves to test Hypothesis 2, which evaluates the broader implications of COVID-19 for U.S.-China relations and tests the generalizability of the findings on trust.

## RESULTS

### *Descriptive Summary*

We begin by providing a summary of key variables in our primary analytic sample, presented in Table 1. Reflecting the U.S. general population, our analytic sample is demographically diverse. Racially, 75 percent were non-Hispanic whites, 7 percent were non-Hispanic blacks, 10 percent were Hispanic, and the remaining 8 percent fell into "other" races (with Asians included).<sup>8</sup> In terms of respondents' educational distribution, 6, 26, 26, and 42 percent of the sample respondents, respectively, had attained an education of less than high school, high school,

<sup>8</sup>We compared the percentage distributions across race/ethnicity in our survey and those in the American Community Survey (ACS) from 2019. The two samples compared well in terms of subtotal percentages combining non-Hispanic whites, non-Hispanic blacks, and Hispanics (both 92 percent). Admittedly, one limitation of our data is that we do not know the exact percentage for Asians. An inference from ACS 2019 suggests the figure is around 6 percent (see Appendix Table A7).

**Table 1.** Descriptive Summary of the Main Analytic Sample

Variable	Average	<i>SD</i>
Demographic characteristics		
Race and ethnicity (%)		
Non-Hispanic whites	75	
Non-Hispanic blacks	7	
Hispanics	10	
Others	8	
Educational attainment (%)		
Less than high school	6	
High school diploma or equivalent	26	
Some college	26	
Bachelor's degree or above	42	
Male (%)	51	
Age (years; min: 18 years old; max: 91 years old)	54.40	(16.58)
Currently married (%)	63	
Homeowner (%)	80	
Self-identified political ideology (%)		
Liberal	27	
Moderate/middle of the road	32	
Conservative	37	
Unknown/refused	4	
Frequency of going out in public during the preceding week (%)		
Several times a day	17	
Once a day	17	
Several times	40	
Once	22	
Never	4	
Key predictor: County cluster COVID-19 incidence rate		
Cumulative COVID-19 cases per 100 persons (min: 0.08; max: 4.30)	1.56	(.68)
Two outcomes of interest (%)		
Trust in Chinese	67	
Seeing China favorably	22	
Trust in three control groups (%)		
Trust in Japanese	84	
Trust in Indians	80	
Trust in Americans	77	
Attitudes toward China		
Belief that the Chinese official COVID-19 statistics are not trustworthy (%)		
Very trustworthy	2	
Moderately trustworthy	24	
Not very trustworthy	43	
Not at all trustworthy	32	
Belief that China is responsible for the COVID-19 outbreak in the United States (%)		
Not at all responsible	14	
Somewhat responsible	36	
Mostly responsible	24	
Completely responsible	26	

*(continued)*

**Table 1. (continued)**

Variable	Average	SD
Indicators for county-cluster socioeconomic contexts		
Local proportion with high school diploma (%)	24	
Local proportion with some college (%)	24	
Local proportion with bachelor's degree or above (%)	19	
Local per capita income (in 10,000 U.S. dollars)	3.10	(.60)
Local proportion urban population (%)	63	
Indicators for county cluster ideological contexts		
Local proportion Trump voters in the 2016 presidential election (%)	45	
County cluster residents' masking behaviors in the COVID-19 pandemic (%)		
Local frequency of wearing masks: never	5	
Local frequency of wearing masks: rarely	5	
Local frequency of wearing masks: sometimes	9	
Local frequency of wearing masks: frequently	18	
Total number of observations	1,803	

Note: Standard deviations in parentheses (when applicable).

some college, and a bachelor's degree or above. Across the county clusters, 24, 24, and 19 percent of residents, respectively, had attained a high school diploma, some college, and at least a bachelor's degree.<sup>9</sup> The mean per capita income for sampled county clusters was \$31,000, and the mean percentage of respondents living in urban areas was 63 percent. On average, about 45 percent of local county cluster residents voted for Trump in 2016. Apart from the key covariates, approximately half of the respondents were male, with the average age being 54 years old (the youngest was 18 and the oldest 91), 62.5 percent

being married, and 80.0 percent being homeowners.

The two outcomes of interest reveal that Americans' attitudes toward Chinese people are overall more positive than their attitudes toward China as a country: 67 percent of our survey participants indicated trust in Chinese, but only 22 percent viewed China as a country through a favorable lens. Our key predictor, the county cluster-level cumulative COVID-19 incidence rate, with the average being 1.6 percent and the standard deviation being 0.7, suggests large contextual disparities in the severity of local COVID-19 outbreaks. Across the four nationalities referenced in the survey questionnaire, trustworthiness was much lower for Chinese than for the other three national groups. Whereas only 67 percent of participants trusted Chinese, 77 percent trusted Americans. Interestingly, the participants expressed trust of the other two Asian national groups at higher proportions (80 percent for Indians; 84 percent for Japanese).

Overall, the respondents held negative views regarding how China handled the

<sup>9</sup>A comparison of our sample with ACS 2019 indicated that our respondents were slightly more educated than the U.S. general population. But this is a common problem for samples yielded from online survey platforms due to exclusion of the "offline" population and often does not bias the conclusion (Hays, Liu, and Kapteyn 2015). Online surveys were indeed a compromised, yet the most feasible, survey mode due to health concerns about conducting in-person surveys amid the COVID-19 pandemic. Nonetheless, the person weights in our data set served to adjust for the overrepresentation of more educated persons.

COVID-19 pandemic. The majority (86 percent) of survey participants thought that China was at least partially responsible for the COVID-19 outbreak in the United States (“completely responsible,” 26 percent; “mostly responsible,” 24 percent; “somewhat responsible,” 36 percent), with only 14 percent holding China “not at all responsible.” Furthermore, approximately 75 percent of the respondents were skeptical of China’s official COVID-19 statistics to varying extents (“not at all trustworthy,” 32 percent; “not very trustworthy,” 43 percent), leaving only just over a quarter believing China’s reported COVID-19 figures (“very trustworthy,” 2 percent; “moderately trustworthy,” 24 percent).

### **Aggregate Percentages Indicating Trust in Chinese**

Figure 2 presents the aggregate-level descriptive statistics for the relationship between respondents’ trust in each of the four groups—Chinese, Japanese, Indians, and Americans—and local COVID-19 severity. The *x*-axis shows the four different quartiles of local county cluster COVID-19 incidence rates, and the *y*-axis indicates the percentages of respondents indicating trust in the people of the four nations (range: 0–100). We also include an inset on a *y*-scale of 60 to 100 to provide a more detailed visual representation of the results.

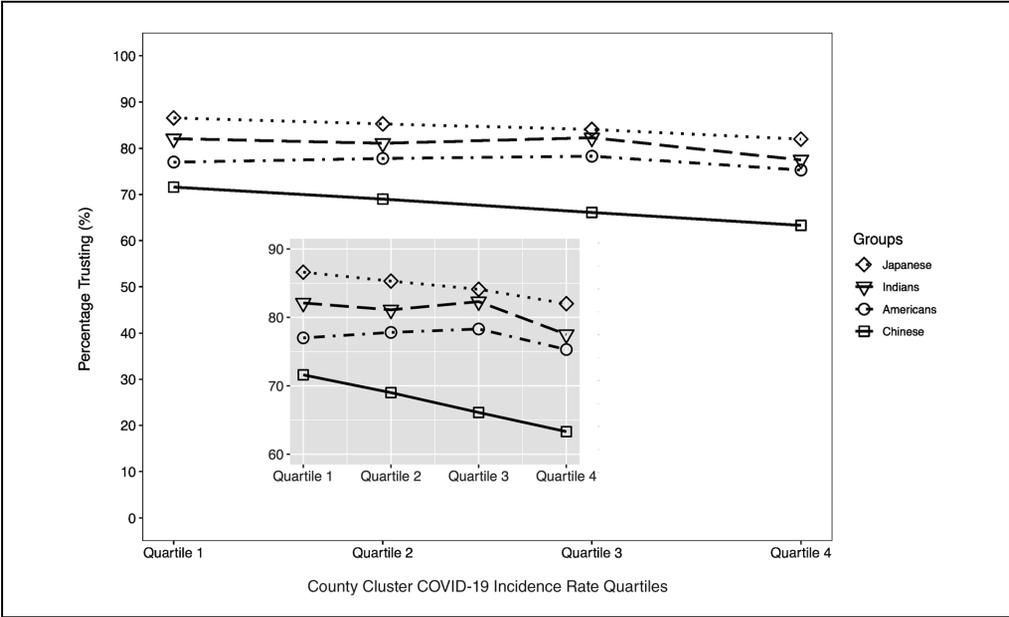
While each generally trends downward, clear patterns emerge in these four countries’ curves. First, the percentage trusting Chinese declines steadily as local areas become harder hit by COVID-19, supporting Hypothesis 1. In addition, there is also a negative, but less steep, downward slope for trust in Japanese. For Indians and Americans, however, the decline in trust is non-monotonic. These inter-ethnic differences suggest that Americans consider Chinese to be associated more closely with Japanese than

with Indians (see also Lee and Ramakrishnan 2020).

### **Trust in Chinese**

The descriptive results in Figure 2 may be misleading if certain characteristics, be they at the individual or contextual level, are associated both with local COVID-19 incidence rate and with attitudes toward Chinese. To rule out potential confounders that may distort the observed association, we conduct a multivariate analysis including relevant covariates that we collected in the survey. In Table 2, we present the results from logistic regression models predicting whether or not a respondent perceives Chinese people as trustworthy.<sup>10</sup> Our baseline model (Model 1) considers the local COVID-19 incidence rate, trust in Americans, various local contexts, individual-level ideology, and social-distancing behaviors. Echoing Hypothesis 1, Model 1 demonstrates a substantial and highly statistically significant ( $p < .001$ ) local COVID-19 dosage effect. To highlight, when the cumulative incidence rate in a local county cluster increases by one confirmed case per 100 persons, the average person’s odds of trusting Chinese decline by 31 percent (i.e.,  $1 - \exp^{(-0.37)} = 0.31$ ). This substantial COVID-19 dosage effect suggests that exposure to a more severely infected local context indeed strengthens distrustful attitudes toward Chinese. Furthermore, local socioeconomic disadvantages generally predict lower trust in Chinese. For example, the percentage of the population in a local area with no more than a high school education has a strong negative association with trust in Chinese. As anticipated, respondents who generally trust

<sup>10</sup>To ensure better representativeness of the U.S. general population, we applied individual-based weights in the subsequent regression analyses.



**Figure 2.** Percentages Trusting Different Groups: By Quartiles of County Cluster COVID-19 Incidence Rates  
*Note:* Quartile 1 & Quartile 4 indicate the least & the most severe local coronavirus outbreaks, respectively.

Americans also have higher odds of trusting Chinese, indeed 10 times higher, than those who do not trust Americans.

To inspect how individual-level demographic factors might attenuate the effect of local COVID-19 incidence rate, we further include in Model 2 the demographic controls, including race/ethnicity, highest educational attainment, gender, age, age squared, marital status, and homeownership status. Our key coefficient of interest remains robust. This model also shows that better-educated respondents tend to trust Chinese more, consistent with the literature on the positive relationships between educational attainment and generalized trust (Huang, van den Brink, and Groot 2011; Oskarsson et al. 2017). Meanwhile, the results suggest a lack of racial and ethnic differences in trusting Chinese to begin with.

We further incorporate COVID-19-related attitudes toward China to

understand their mediating role for the reduced-form effect of local COVID-19 dosage on trust in Chinese. It turns out that the two COVID-19-related attitudes toward China reduce the odds of trusting Chinese by 7 percent, and both of them strongly predict lower trust in Chinese: The belief that the Chinese official statistics on COVID-19 are “not at all trustworthy” reduces the odds of trust in Chinese by as much as 79 percent, while the belief that China should be held completely responsible for the U.S. outbreak reduces these trust odds by almost 80 percent. This model provides consistent evidence for trust gradients along the response categories for both attitudes, with increasingly negative beliefs corresponding to increasingly lower trust in Chinese. Also, after China-related attitudes are taken into account, non-Hispanic blacks emerge to hold significantly lower trust of Chinese people relative to non-Hispanic whites.

**Table 2.** Logistic Regression Models Predicting Trust in Chinese

Variable	Model 1	Model 2	Model 3
<b>County cluster COVID-19 incidence rate</b>			
Cumulative COVID-19 cases per 100 persons	-.37** (.13)	-.37** (.13)	-.28* (.14)
Trust in Americans (ref. distrust in Americans)	2.66* ** (.17)	2.67*** (.17)	2.90*** (.19)
<b>Self-identified political ideology (ref. liberal)</b>			
Moderate/middle of the road	-.94*** (.20)	-.87*** (.21)	-.58** (.21)
Conservative	-1.44*** (.20)	-1.42*** (.21)	-.80*** (.22)
Unknown/refused	-1.13* (.46)	-1.10* (.47)	-.67 (.54)
<b>Frequency of going out in public during the preceding week (ref. several times a day)</b>			
Once a day	.53* (.23)	.54* (.23)	.39 <sup>†</sup> (.24)
Several times	.39 <sup>†</sup> (.20)	.36 <sup>†</sup> (.20)	.31 (.21)
Once	.11 (.22)	.14 (.22)	-.06 (.23)
Never	-.31 (.33)	-.20 (.34)	-.58 <sup>†</sup> (.34)
<b>Key demographic characteristics</b>			
<b>Race and ethnicity (ref. non-Hispanic whites)</b>			
Non-Hispanic blacks		-.41 (.28)	-.80** (.31)
Hispanics		-.18 (.23)	-.15 (.23)
Others		-.38 (.28)	-.29 (.29)
<b>Educational attainment (ref. less than high school)</b>			
High school diploma or equivalent		.12 (.29)	.15 (.31)
Some college		.67* (.30)	.68* (.32)
Bachelor's degree or above		.58* (.29)	.48 (.31)
<b>Attitudes toward China</b>			
<b>How trustworthy are the Chinese official COVID-19 statistics? (ref. very trustworthy)</b>			
Moderately trustworthy			-1.09 (.68)
Not very trustworthy			-1.31 <sup>†</sup> (.68)
Not at all trustworthy			-1.56* (.69)

(continued)

**Table 2. (continued)**

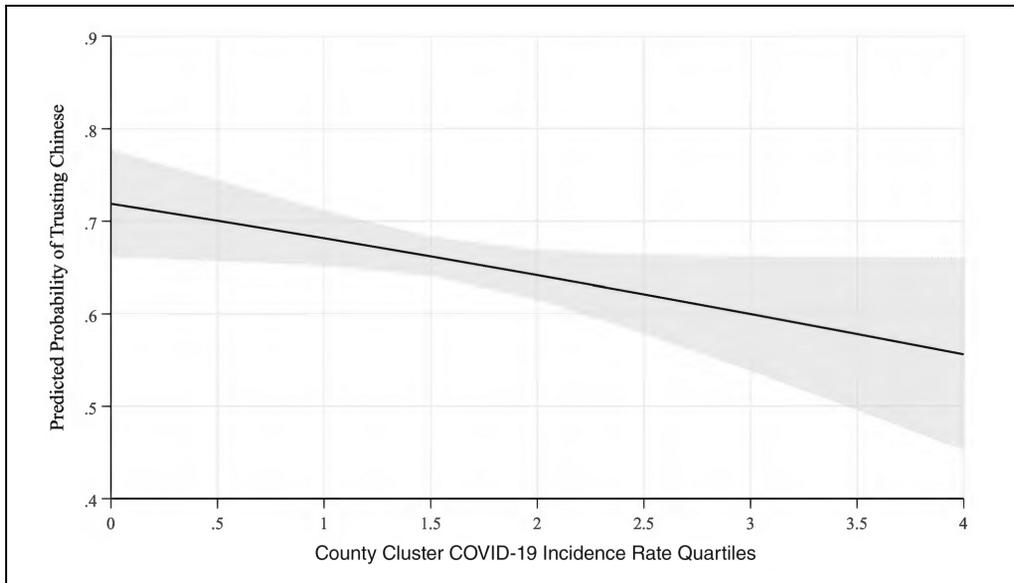
Variable	Model 1	Model 2	Model 3
How responsible is China is for the COVID-19 outbreak in the United States? (ref. not at all responsible)			
Somewhat responsible			-.14 (.27)
Mostly responsible			-1.24*** (.28)
Completely responsible			-1.60*** (.30)
County Cluster socioeconomic contexts			
Local proportion with high school diploma	-5.86 <sup>†</sup> (3.19)	-5.82 <sup>†</sup> (3.25)	-5.71 (3.48)
Local proportion with some college	-7.37* (3.44)	-7.76* (3.55)	-7.03 <sup>†</sup> (3.67)
Local proportion with bachelor's degree or above	-3.62 (5.09)	-5.60 (5.32)	-6.76 (5.27)
Local per capita income (in 10,000 U.S. dollars)	.14 (.45)	.22 (.47)	.32 (.46)
Local proportion urban population	.15 (.65)	.36 (.70)	.30 (.69)
Local proportion Trump voters in the 2016 presidential election	-.70 (1.39)	-.72 (1.40)	-.33 (1.43)
County cluster residents' mask-wearing behaviors in the COVID-19 pandemic			
Local frequency of wearing masks: never	-5.23 (4.77)	-5.66 (4.83)	-8.31 (5.18)
Local frequency of wearing masks: rarely	12.17* (5.79)	12.51* (5.93)	15.17* (6.59)
Local frequency of wearing masks: sometimes	2.05 (4.21)	2.19 (4.21)	1.06 (4.68)
Local frequency of wearing masks: frequently	-4.64 (3.05)	-5.11 <sup>†</sup> (3.06)	-5.52 <sup>†</sup> (3.29)
Constant	4.04* (1.85)	4.30* (1.90)	5.51** (2.08)
Observations	1,803	1,803	1,803
Pseudo $R^2$	.241	.254	.307

Note: Weighted analysis. We also control for gender, age, marital status, and homeownership status (not shown). Standard errors in parentheses. Ref. = reference.

<sup>†</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

In summary, Models 1 through 3 consistently support Hypothesis 1 that trust in Chinese is negatively associated with higher COVID-19 incidence rates in local areas. Figure 3 illustrates this negative relationship in terms of predicted probabilities of trusting Chinese based on Model 3. For an individual from a county

cluster where the cumulative COVID-19 incidence rate is 0.5 percent, the predicted probability of trusting Chinese is 0.70 (95 percent confidence interval [CI]: [0.66, 0.74]). As the incidence rate increases to 3.5 percent, the probability drops to 0.58 (95 percent CI: [0.50, 0.66]). In addition, we check the robustness of our key finding



**Figure 3.** Predicted Probabilities of Trusting Chinese by County Cluster COVID-19 Incidence Rates  
*Note:* The shaded areas indicate the 95% confidence intervals.

using various alternative county cluster radiuses (see Appendix Figure A1). Different radius operationalizations (ranging from 20 miles to 100 miles) yield similar key findings: The worse the local COVID-19 outbreak is, the less residents tend to trust people from China.

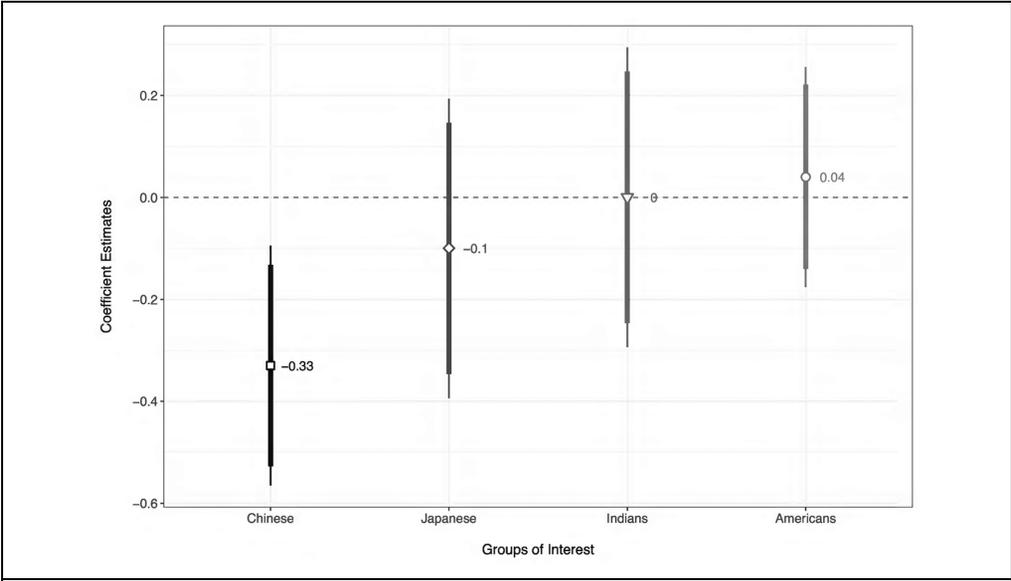
Echoing the aggregate-level descriptive findings, we conducted placebo regression analyses for trust in Japanese, Indians, and Americans.<sup>11</sup> Figure 4 displays the coefficient estimates of the key variable from the placebo tests based on models analogous to Model 3 of Table 2. While differences in estimated coefficients for these three placebo groups conform to prior expectations, it is evident that the local COVID-19 dosage effect is statistically significant only for Chinese.

<sup>11</sup>In conducting the placebo test for Americans, unlike the two placebo tests for Indians and Japanese, we did not include the control variable “trust in Americans,” which cannot appear on both sides of the regression equation.

### **Attitudes toward China**

To further gauge the implications for U.S.-China relations and to examine the generalizability of the earlier findings about trust in Chinese, we further evaluate the COVID-19 dosage effect on individuals' favorable attitudes toward China. Results are presented in Table 3, with three models sequentially including other variables beyond the local COVID-19 dosage. Moreover, in predicting favorable attitudes toward China this time, we further consider “distrust in Chinese” as a mediating variable.

Model 1 controls for local COVID-19 incidence rate, individual characteristics, and various place-based contexts, except for China-related attitudes. The effect of COVID-19 dosage on favorable attitudes toward China holds true, whereby one more confirmed case per 100 local persons reduces the odds of viewing China favorably by about 26 percent on average. This local COVID-19 effect on individuals' favorable attitude toward China is



**Figure 4.** Placebo Regression Models Predicting Trust in Each Group: Coefficient Estimates for County Cluster COVID-19 Incidence Rates (with Confidence Intervals)  
Note: The thicker and thinner lines indicate the 90% and 95% confidence intervals, respectively.

consistent with the earlier estimate for trust in Chinese (see Model 1 in Table 2). This model also reveals that, in contrast to non-Hispanic blacks’ overall tendency to trust Chinese people less (compared with non-Hispanic whites), their level of favorable attitude toward China, as a country, is relatively higher.

Models 2 and 3 sequentially assess how distrust and blaming emotions might help explain the local COVID-19 dosage effect. Model 2 controls for distrust in Chinese and distrust in China’s official statistics. These two covariates not only weaken the earlier dosage effect (now  $p < .10$ , though the odds of thinking China favorably declines by only 3 percent), they also effectively increase the explained variation in terms of pseudo  $R$  squared by about 22 percent. In addition, the distrust variables and the belief in the need to hold China accountable all significantly predict viewing China less favorably ( $p < .001$ ). Moreover, the gradients

in favorable attitudes toward China are highly consistent with the varying levels of trust in Chinese official statistics and the varying strengths of blaming emotions directed toward China’s failure in containing the virus. On average, people who find Chinese official statistics “not at all trustworthy” and those who believe that China is “completely responsibility” for the pandemic have 94 percent and 83 percent lower odds of viewing China favorably compared with those who do not hold a negative attitude at all, respectively.

In brief, we find similar results in our survey for the respondents’ attitudes toward China as those for their trust toward China. It is worth noting that both sets of results hold robust after controlling for potential individual-level and placebo-based confounders, including divides in political ideology, social-distancing behaviors, urbanicity, and local socioeconomic characteristics. We broadly interpret the findings to reflect the respondents’

**Table 3.** Logistic Regression Models Predicting Seeing China Favorably.

Variable	Model 1	Model 2	Model 3
<b>County cluster COVID-19 incidence rate</b>			
Cumulative COVID-19 cases per 100 persons	-.30* (.13)	-.26 <sup>†</sup> (.14)	-.22 (.14)
<b>Self-identified political ideology (ref. liberal)</b>			
Moderate/middle of the road	.00 (.17)	.24 (.18)	.42* (.19)
Conservative	-.95*** (.19)	-.41 <sup>†</sup> (.21)	-.06 (.21)
Unknown/Refused	-1.02* (.41)	-.72 (.46)	-.45 (.51)
<b>Frequency of going out in public during the preceding week (ref. several times a day)</b>			
Once a day	.00 (.23)	-.29 (.26)	-.40 (.27)
Several times	-.20 (.20)	-.38 <sup>†</sup> (.23)	-.40 <sup>†</sup> (.23)
Once	-.27 (.22)	-.48 <sup>†</sup> (.24)	-.58* (.24)
Never	.11 (.37)	-.10 (.44)	-.30 (.44)
<b>Key demographic characteristics</b>			
<b>Race and ethnicity (ref. non-Hispanic whites)</b>			
Non-Hispanic blacks	1.15*** (.23)	1.08*** (.27)	1.01*** (.28)
Hispanics	.33 (.21)	.30 (.24)	.36 (.24)
Others	.46 <sup>†</sup> (.25)	.74** (.28)	.79** (.30)
<b>Educational attainment (ref. less than high school)</b>			
High school diploma or equivalent	-.21 (.28)	-.21 (.29)	-.25 (.30)
Some college	-.19 (.28)	-.18 (.29)	-.30 (.30)
Bachelor's degree or above	-.11 (.27)	-.10 (.29)	-.30 (.30)
<b>Attitudes toward China</b>			
Distrust in Chinese (ref. trust in Chinese)		-1.07*** (.19)	-.91*** (.21)
<b>How trustworthy are the Chinese official COVID-19 statistics? (ref. very trustworthy)</b>			
Moderately trustworthy		-1.01 <sup>†</sup> (.53)	-1.04 <sup>†</sup> (.53)
Not very trustworthy		-2.41*** (.54)	-2.37*** (.53)
Not at all trustworthy		-3.04*** (.55)	-2.75*** (.55)

(continued)

**Table 3. (continued)**

Variable	Model 1	Model 2	Model 3
How responsible is China is for the COVID-19 outbreak in the United States? (ref. not at all responsible)			
Somewhat responsible			-.57** (.20)
Mostly responsible			-1.11*** (.24)
Completely responsible			-1.79*** (.30)
County cluster socioeconomic contexts			
Local proportion with high school diploma	-11.09*** (3.23)	-10.66** (3.47)	-11.67** (3.65)
Local proportion with some college	-7.46* (3.63)	-5.15 (3.56)	-5.36 (3.67)
Local proportion with bachelor's degree or above	-8.57 <sup>†</sup> (4.91)	-9.25 <sup>†</sup> (5.46)	-10.27 <sup>†</sup> (5.60)
Local per capita income (in 10,000 U.S. dollars)	.54 (.42)	.63 (.46)	.71 (.47)
Local proportion urban population	-.46 (.65)	-.41 (.69)	-.35 (.71)
Local proportion Trump voters in the 2016 presidential election	1.31 (1.18)	2.70* (1.26)	3.08* (1.33)
County cluster residents' mask-wearing behaviors in the COVID-19 pandemic			
Local frequency of wearing masks: never	2.31 (4.79)	4.84 (5.62)	3.35 (5.57)
Local frequency of wearing masks: rarely	-1.81 (5.48)	-4.17 (5.66)	-.49 (5.71)
Local frequency of wearing masks: sometimes	2.22 (4.35)	.96 (4.71)	1.34 (4.93)
Local frequency of wearing masks: frequently	.07 (2.94)	.09 (3.10)	.95 (3.14)
Constant	4.70* (1.87)	5.55** (2.01)	6.04** (2.09)
Observations	1,796	1,796	1,796
Pseudo $R^2$	.106	.225	.251

Note: Weighted analysis. We also control for gender, age, marital status, and homeownership status (not shown). Standard errors in parentheses. Ref. = reference.

<sup>†</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

psychological association between their local community's suffering and the origin of COVID-19: Chinese in China. The varying degrees of beliefs that Chinese people are not trustworthy and that China is responsible for COVID-19 outbreaks in the United States substantially explain this local COVID-19 contextual variation.

Admittedly, one limitation of this study is that we did not collect data on respondents' media consumption habits. Yet, we suspect that additionally considering media exposure is unlikely to alter our core findings. Other studies (Prior 2013; Bail et al. 2018; Bridgman et al. 2020; Simonov et al. 2020) have reliably

shown that media exposure is strongly correlated with ideological divides and social-distancing behaviors, both of which are considered in the present analysis. Moreover, we fielded the survey in mid-August 2020, when COVID-19 incident rates in the United States were evolving steadily relative to prior and subsequent months, so we are confident these findings should hold for much of the year 2020. However, multiple waves of new outbreaks since then may have weakened the mental association between COVID-19 and China in the United States over time. To the extent that adverse attitudes toward Chinese/China were potentially strongest in the earlier phases of the pandemic, our results may serve as more conservative estimates for the initial public opinion shocks.

## **DISCUSSION AND CONCLUSION**

Previous studies have suggested that infectious-disease pandemics tend to trigger social-avoidance attitudes and/or behaviors toward those deemed to be sick or threatening (Schaller and Park 2011; Taylor 2019). Linking survey data to multiple public data sets, we consistently find that local COVID-19 outbreaks are strongly associated with how people in the United States view China and Chinese. Our analysis highlights the role of local incidence rate within individuals' residential county clusters, the spatially varying dosage of the COVID-19 outbreak, as a meaningful predictor of their attitudes toward China. Our results strongly support the hypotheses that residents of harder-hit communities generally trust Chinese people less and hold a less favorable attitude toward China as a country than peers living in less impacted communities. Placebo tests with three control groups further indicate that the COVID-related trust erosion is present only for Chinese, not for Japanese, Indians, or Americans.

This study makes three significant contributions. First, while Americans' hostile attitudes and behaviors toward Chinese and Chinese Americans in the United States have been reported to be on the rise since the onset of the pandemic, few studies have systematically examined the underlying public opinion. This study explores a unique form of anti-Chinese sentiment: perceptions of this group being less trustworthy in the American public's eyes. We have reliably shown that Americans' distrust of Chinese, as well as their unfavorable attitudes toward China, has become highly prevalent among those with greater community-level exposure to COVID-19. Moreover, Americans' distrust of Chinese significantly predicts their less favorable attitudes toward China. Thus, this study coherently indicates that Americans' attitudes toward China and Chinese are contextual in the COVID-19 era.

Second, we empirically validate behavioral immune system theory by investigating local contextual variations in public attitudes. Studies of behavioral immune system theory have indicated that pandemics often activate individuals' risk-evading responses to perceived threats, but evidence for the contextual heterogeneities of such responses is still scarce (Schaller and Park 2011; Taylor 2019). Meanwhile, we have also advanced knowledge about contextual variations in attitudes by illustrating how the local social environments in which individuals' daily lives are embedded influence their perceptions (Schwarz 2007; Schwarz and Sudman 2012). By exploiting spatial variations in epidemiological shocks from COVID-19 and situating attitudes within the local contexts, we have bridged the existing literature that has previously been separated along these two lines.

Third, the study renders broader implications for the escalating interracial

and interethnic tensions in the United States. The pandemic has reinforced intergroup boundaries between the American mainstream and certain Asian ethnic groups in light of popular media coverage. Our results consistently indicate that the pandemic has negatively impacted Americans' perception of Chinese in China and, potentially, Chinese Americans as well. However, it remains to be seen whether mainstream negative feelings toward ethnic Chinese will persist beyond this protracted pandemic.

Despite all these contributions, this study undeniably has several shortcomings. Although we have clarified the relationship between local COVID-19 incidence and Americans' attitudes toward China, we do not know the cognitive-emotional mechanisms accounting for this relationship. We do not have longitudinal data for the respondents before the outset of the COVID-19 pandemic, so we cannot study within-person changes over time. Recall that former President Trump launched a trade war with China in 2018, escalating U.S.-China tensions. Exposure to social media and trade war-related information may have also reinforced the public's deteriorating perceptions of China prior to COVID-19. We call for future studies to thoroughly examine these issues. At the minimum, we hope this study has demonstrated that individuals' attitudes are indeed susceptible to local social environments and will stimulate other researchers' interest in studying local contextual variations in public opinion.

### ORCID iDs

Qian He  <https://orcid.org/0000-0001-6321-2244>  
 Yu Xie  <https://orcid.org/0000-0002-3240-8620>

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## BIOS

**Qian He** is a postdoctoral research associate at the Center on Contemporary China, Princeton University. She obtained her PhD in sociology from the University of Wisconsin-Madison. She studies public opinion, social stratification, and immigration.

**Ziye Zhang** is a postdoctoral research associate at the Center on Contemporary China, Princeton University. He obtained his PhD in regional science from Cornell University. His research applies data science methods to address urban housing, transportation, and environmental problems.

**Yu Xie** is Bert G. Kerstetter '66 University Professor of Sociology and the Princeton Institute for International and Regional Studies. His main areas of interest are social stratification, demography, statistical methods, Chinese studies, and sociology of science.