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Learning from Experience? COVID-19 Conspiracy Theories and Their Implications for Democratic Discourse. Online Appendix: Methodological Details

ADDITIONAL INFORMATION, INCLUDING DISAGGREGATED RESULTS USING INDIVIDUAL SURVEY ITEMS instead of conspiracy indices, is available upon request from the authors.

A1. DETAILS ABOUT THE DATA

A1.1. Survey Data. One poll was of registered voters rather than citizens. Results remain robust to excluding this week in the analyses.

We use weights provided by YouGov based on gender, age, race, education, news interest, and 2016 presidential election turnout.

A1.2. COVID-19 Incidence Data. The Microsoft data do not include COVID-19 incidence information for several New York City–based congressional districts. For these districts, we used county-level COVID-19 case and fatality data from the New York State Department of Health; we converted it to the congressional district level using a population-based crosswalk adjusting for uninhabitable terrain and topographical suitability for construction (Ferrara, Testa, and Zhou 2021).

Since population varies across congressional districts, we normalize the incidence variables per 10,000 district residents, using population data from the 2019 American Community Survey. We collected census data at the congressional district level for all states except North Carolina, for which congressional district–level data are not available for post-2019 districts. For North Carolina, we collected ZIP code–level data from the American Community Survey and converted it to the congressional district level using a crosswalk from the Department of Housing and Urban Development (Office of Policy Development and Research n.d.).

A1.3. Hospital Data. We use data from the American Hospital Association (AHA) 2019 annual survey to construct a per-capita measure of the number of hospital beds in each congressional district, to serve as a control variable in the analyses. AHA data are provided at the ZIP code level; we converted them to congressional district level using the HUD/USPS crosswalk.

A2. DETAILS ABOUT CONSPIRACY INDICES

A2.1. Question Wording. Wording for the nine items used to construct the three conspiracy indices is as follows. Six items are introduced with the question "Do you think the following statements are true or not true?" with response options of "Definitely true," "Probably true," "Probably not true," and "Definitely not true." These six items are (with dates that they were asked following the text): (1) "The US is concealing the true scale of its coronavirus deaths" (March 7 and 14, 2020); (2) "The coronavirus is a man-made epidemic" (March 7 and 14, 2020); (3) "The coronavirus is a hoax" (March 7, 14, 21; November 21, 2020); (4) "The threat of the coronavirus is being exaggerated for political reasons" (March 7, 14, 21; November 21, 2020); (5) "The coronavirus is a fraud perpetrated by the deep state" (March 14, 2020); and (6) "The coronavirus is a foreign plot to attack the world" (March 14, 2020). In the primary specification for the indices, these items were binarized so that "Definitely true" and "Probably true" were treated as 1, and "Probably not true" and "Definitely not true" were treated as 0. Appendix section A2.3 provides results using indices in which the underlying items were not collapsed to binary variables.

The text of the seventh item is: "Do you believe the virus responsible for COVID-19 spread naturally or do you believe it was released either by accident or on purpose as a weapon?" Response options are: "Spread naturally," "Released by accident," and "Released on purpose." This question was asked only on May 23, 2020. The bioweapon variable takes a value of 1 if a respondent selected "Released on purpose" and 0 otherwise.

The text of the final item, from which two variables were constructed, is: "Do you think the government is accurately reporting the number of people who have died from the coronavirus or do you think more people have died from the virus or fewer people have died from the virus?" Response options are: "More people have died," "The government numbers are accurate," "Fewer people have died," and "Don't know." This item was asked in 2020 on April 11 and 25; May 2, 9, 16, 23, and 30; June 6 and 13; and August 15 and 22. The overreporting variable takes as a 1 any respondent who said "Fewer people have died" and 0 otherwise; the underreporting variable takes as a 1 any respondent who said "More people have died" and 0 otherwise.

A2.2. Correlation Matrix. The correlation matrix below is calculated using the raw survey items with the full set of response options. Blank values below the diagonal occur because some items were not asked on the same survey wave, so correlations cannot be calculated.

Table A1. Correlation matrix using raw items, YouGov polls, March–November 2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conceal (1)	--								
Manmade (2)	0.108	--							
Hoax (3)	0.026	0.359	--						
Threat (4)	–0.207	0.356	0.498	--					
Deep state (5)	–0.049	0.453	0.541	0.646	--				
Foreign plot (6)	–0.043	0.543	0.490	0.465	0.635	--			
Bioweapon (7)							--		
Underreporting (8)							–0.263	--	
Overreporting (9)							0.284	–0.466	--

The correlation matrix in table 2 is calculated using the binarized versions of items as detailed in table 1.

Table A2. Correlation matrix using binarized items, YouGov polls, March–November 2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conceal (1)	--								
Manmade (2)	0.117	--							
Hoax (3)	0.052	0.260	--						
Threat (4)	–0.126	0.291	0.347	--					
Deep state (5)	–0.013	0.351	0.414	0.505	--				
Foreign plot (6)	0.077	0.454	0.355	0.268	0.446	--			
Bioweapon (7)							--		
Underreporting (8)							–0.156	--	
Overreporting (9)							0.178	–0.466	--

A2.3. Alternative Specification for Conspiracy Indices. As a robustness check, we repeated the analyses without first binarizing the six survey items used to construct the conspiracy indices. In this specification, "Definitely true" was treated as 1, "Probably true" was treated as 2/3, "Probably not true" was treated as 1/3, and "Definitely not true" was treated as 0. The mean value for Republicans (Democrats) on the first index is 0.46 (0.07), on the second index 0.45 (0.27), and on the third index 0.17 (0.66).

The results are substantively unchanged using this alternative specification for the conspiracy indices, as illustrated in the figures below. Figures A1, A2, and A3 correspond to figures 2, 3, and 4, respectively, in the paper.

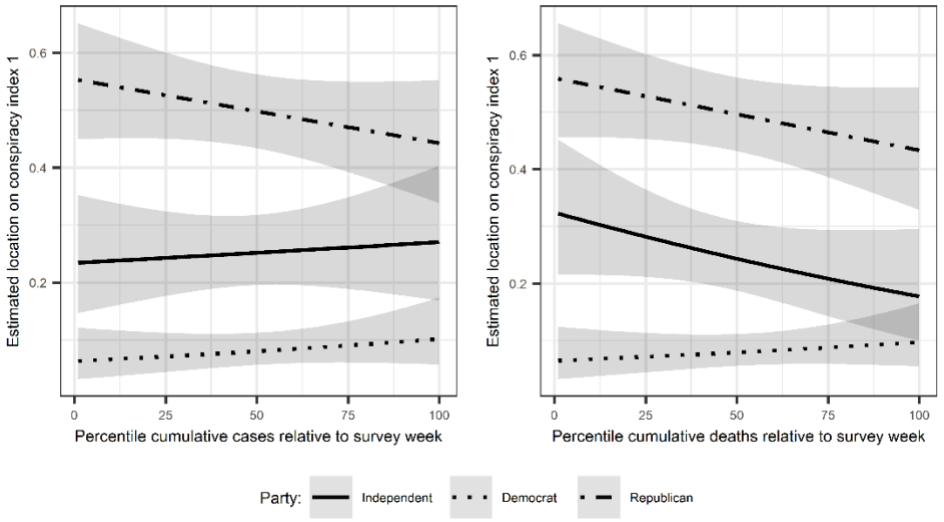

Figure A1. Estimated point locations with confidence intervals for conspiracy index 1 using non-binarized items, YouGov polls, March–November 2020.

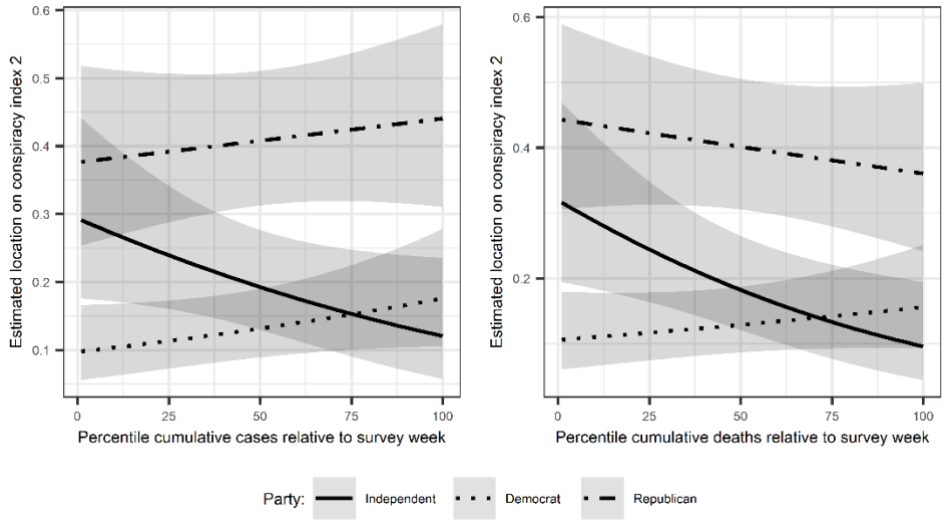

Figure A2. Estimated point locations with confidence intervals for conspiracy index 2 using non-binarized items, YouGov polls, March–November 2020.

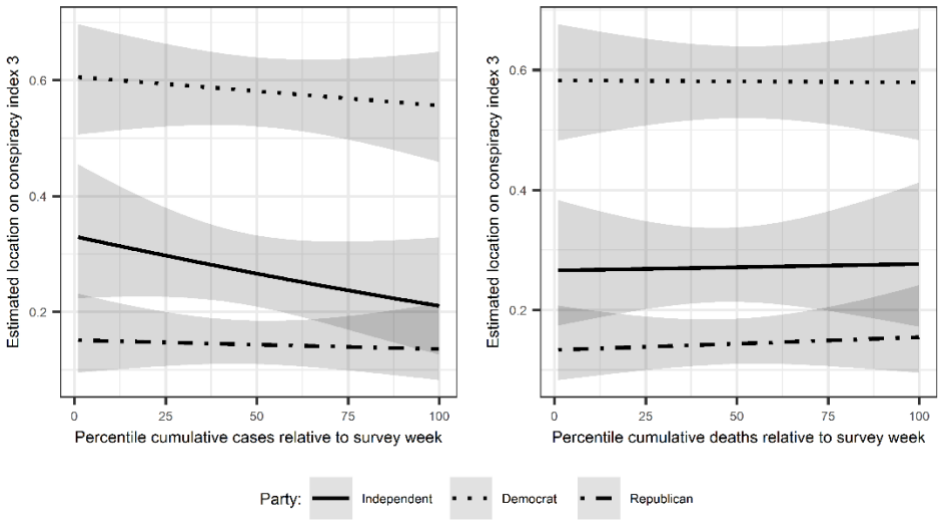

Figure A3. Estimated point locations with confidence intervals for conspiracy index 3 using non-binarized items, YouGov polls, March–November 2020.

A3. RESULTS USING COVID-19 TRENDS (LAST 30 DAYS) MEASURES

In addition to cumulative COVID-19 case and fatality measures, we constructed measures of cases and fatalities in the 30 days before the respondent was interviewed in order to account for varying *trends* in local coronavirus incidence. The logic was as follows: Imagine that a pair of residents in two congressional districts with identical cumulative COVID-19 incidences are interviewed on October 1, 2020. They might perceive the coronavirus differently if most of their community's cases and fatalities came in the spring of 2020 versus if cases and fatalities spiked in September 2020. The measures of COVID-19 cases and fatalities in the last 30 days were designed to accommodate this source of variation in attitudes about the pandemic.

The results are presented below. Figures A4, A5, and A6 correspond to figures 2, 3, and 4, respectively, in the paper, with percentile COVID-19 cases and fatalities in the last 30 days replacing percentile cumulative COVID-19 cases and fatalities in the regressions. The results are highly similar to those using the latter measure of COVID-19 incidence.

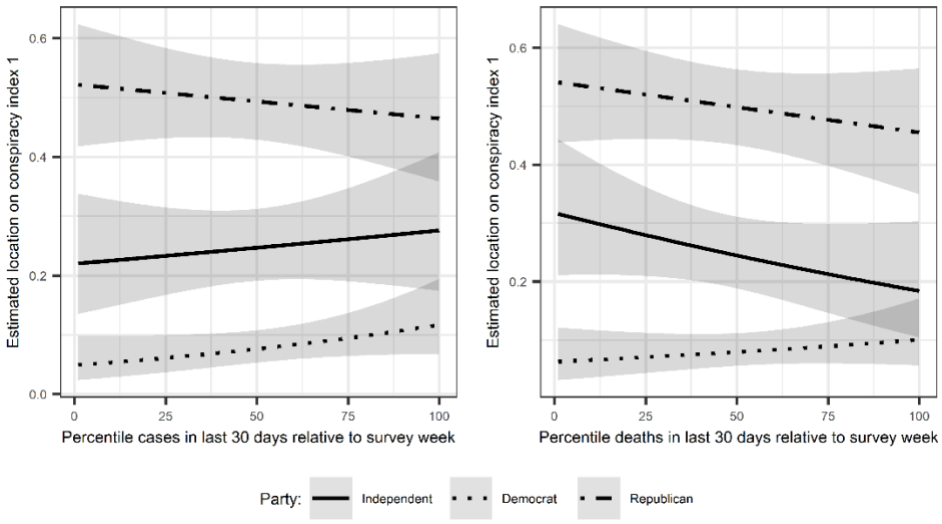

Figure A4. Estimated point locations with confidence intervals for conspiracy index 1 using COVID-19 trend data, YouGov polls, March–November 2020.

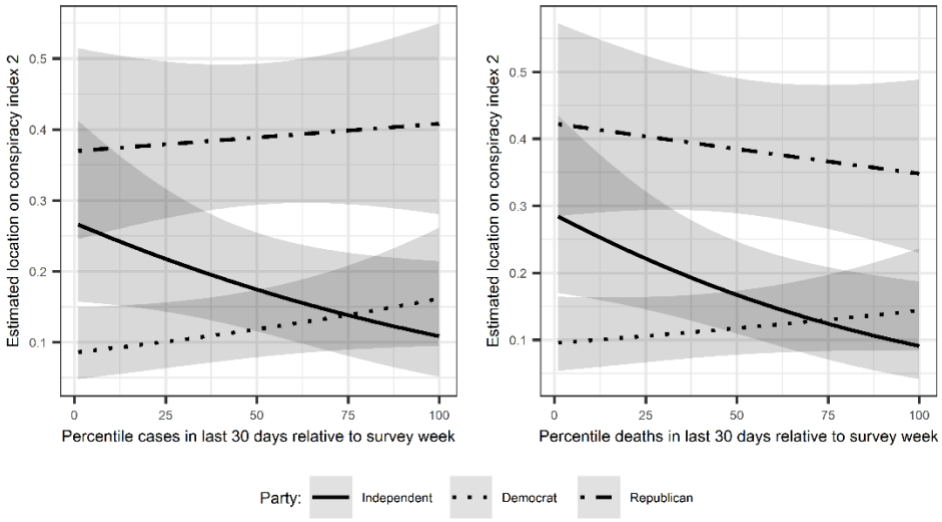

Figure A5. Estimated point locations with confidence intervals for conspiracy index 2 using COVID-19 trend data, YouGov polls, March–November 2020.

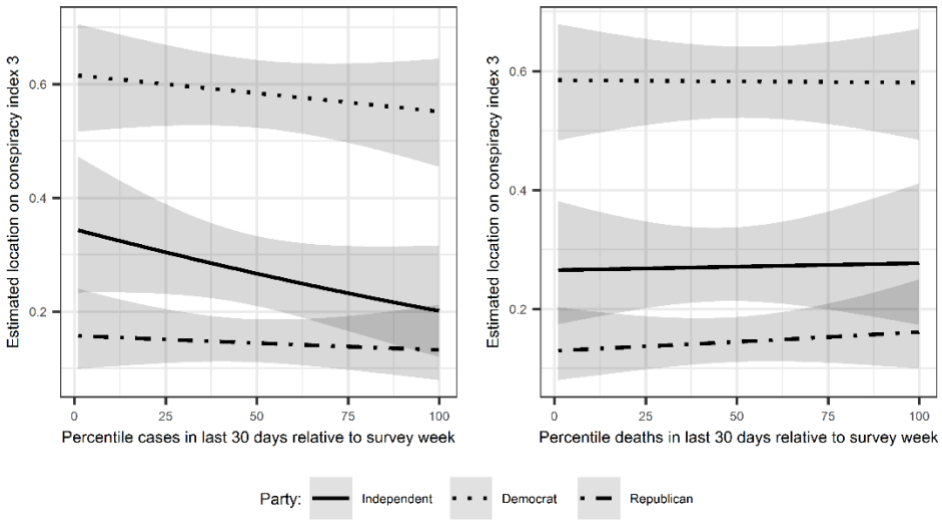

Figure A6. Estimated point locations with confidence intervals for conspiracy index 3 using COVID-19 trend data, YouGov polls, March–November 2020.

A4. RESULTS USING ALTERNATIVE SPECIFICATIONS FOR COVID-19 INCIDENCE

A4.1. Covid-19 Incidence Relative to Census Region Average. As an alternative to the percentile-based COVID-19 case and fatality measures, we constructed measures of COVID-19 cases and fatalities relative to the weekly average cumulative case and fatality counts in the census region of each congressional district. (We used census region rather than state because several states have only one congressional district.) Results using this alternative COVID-19 incidence specification are presented below in figures A7, A8, and A9, which correspond to figures 2, 3, and 4, respectively, in the paper. Due to the long right tail on the case and fatality distributions, these graphs have been trimmed at the 95th percentile of cases and fatalities for ease of interpretation and so as not to attempt to make inferences from scant data.

Across the three conspiracy indices, the results appear generally consistent with the results using the percentile-based measures of COVID-19 in the paper. In the broadest terms, independents exhibit a slight negative relationship between local COVID-19 incidence and endorsement of COVID-19 conspiracy theories, whereas Republicans exhibit an inconsistent relationship, and Democrats exhibit little variation in conspiracy endorsement across the range of COVID-19 incidence.

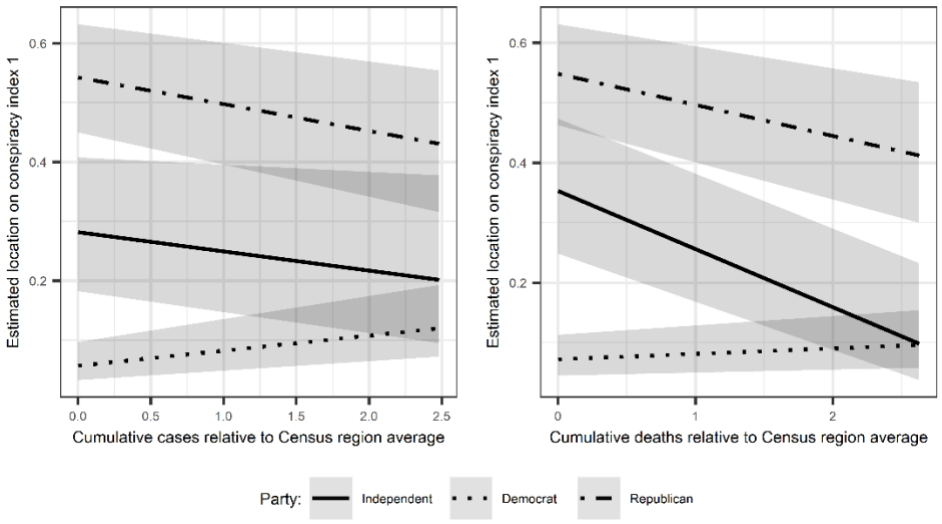

Figure A7. Estimated point locations with confidence intervals for conspiracy index 1 using COVID-19 incidence data relative to Census region average, YouGov polls, March–November 2020.

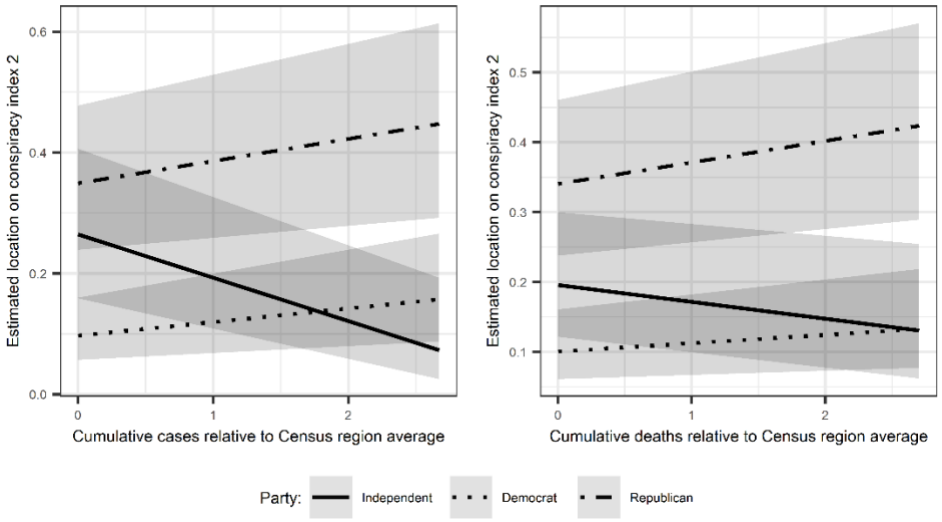

Figure A8. Estimated point locations with confidence intervals for conspiracy index 2 using COVID-19 incidence data relative to Census region average, YouGov polls, March–November 2020.

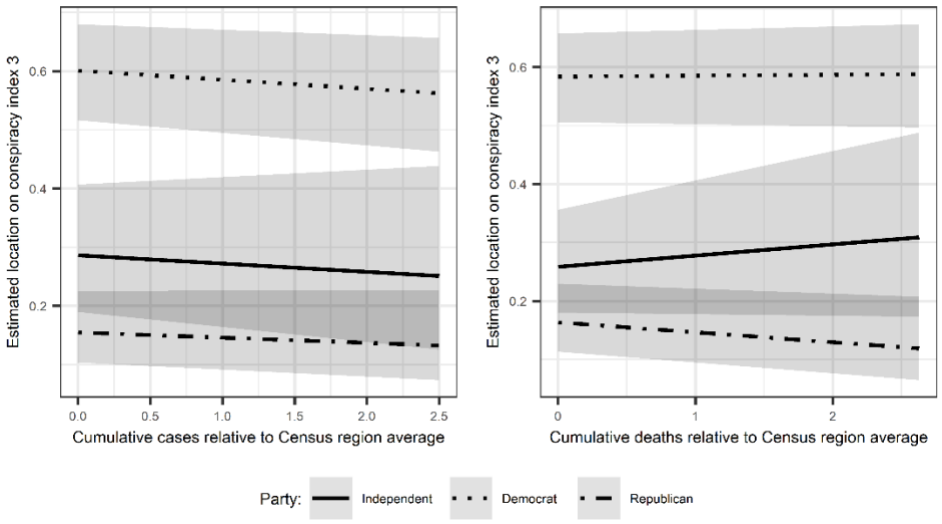

Figure A9. Estimated point locations with confidence intervals for conspiracy index 3 using COVID-19 incidence data relative to Census region average, YouGov polls, March–November 2020.

A4.2. Raw COVID-19 Incidence. As a final alternative to the percentile-based COVID-19 case and fatality measures presented in the paper, we present results using the raw cumulative case and fatality data, trimmed at the 95th percentile as above. The evidence is somewhat more equivocal about whether independents' attitudes shift with greater exposure to local COVID-19 cases and fatalities.

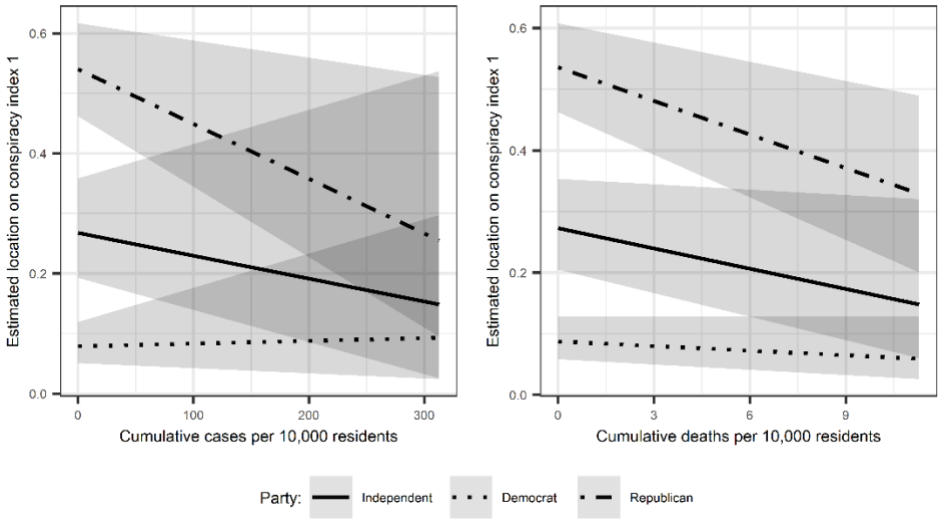

Figure A10. Estimated point locations with confidence intervals for conspiracy index 1 using raw COVID-19 incidence data, YouGov polls, March–November 2020.

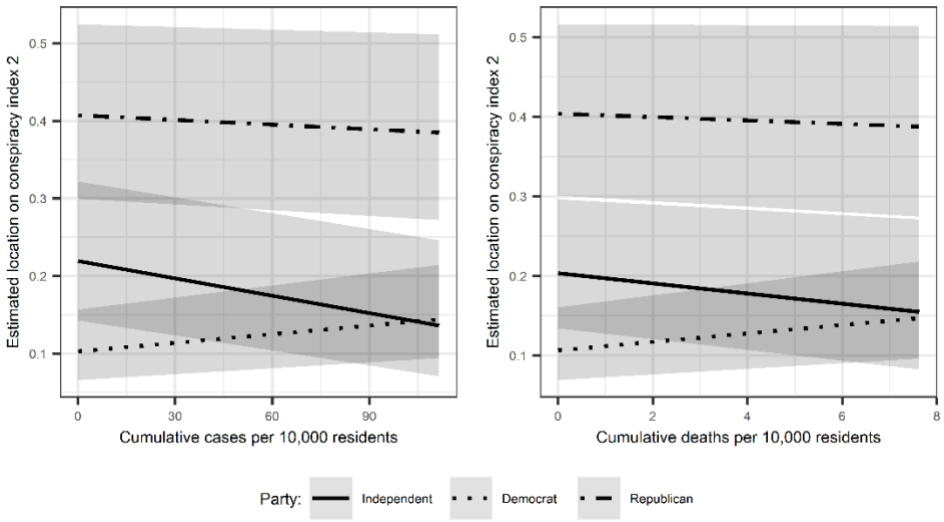

Figure A11. Estimated point locations with confidence intervals for conspiracy index 2 using raw COVID-19 incidence data, YouGov polls, March–November 2020.

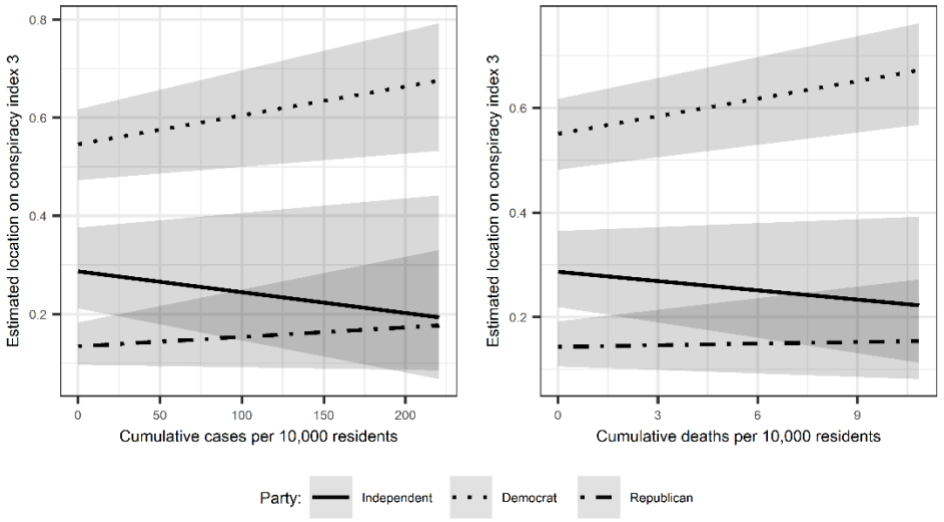

Figure A12. Estimated point locations with confidence intervals for conspiracy index 3 using raw COVID-19 incidence data, YouGov polls, March–November 2020.

A5. EXPLORATION OF GEOGRAPHIC VARIATION IN REPUBLICANS' ATTITUDES

A reader suggested that confounding could occur if COVID-19 incidence was greater in localities with more staunchly Trump-supporting Republicans; that is, there could be a geographic variation in Trump support (not captured by Republicanism) that could correlate with cases and fatalities. This question merits additional attention, but at present we see no reason to believe that this confounding is driving our results.

Our data include an item worded, “How much do you think Donald Trump cares about the needs and problems of people like you?” It correlates strongly with popular polling data on Trump approval at the time of the survey. This item shows little evidence that Trump support among Republicans varies much across census regions. Among Republicans, 85.7 percent (85.4 percent) of Midwesterners, 83.1 percent (82.1 percent) of Northeasterners, 86.8 percent (86.2 percent) of Southerners, and 86.4 percent (85.0 percent) of Westerners responded “a lot” or “some.” Looking at only those who responded “a lot,” the percentages are 63.4 percent (58.5 percent) in the West, 65.6 percent (61.8 percent) in the South, 58.3 percent (54.7 percent) in the Northeast, and 61.9 percent (58.1 percent) in the Midwest. The numbers outside parentheses are unweighted; the numbers inside parentheses are weighted.

APPENDIX REFERENCES

Ferrara, Andreas, Patrick Testa, and Liyang Zhou. 2021. “New Area- and Population-Based Geographic Crosswalks for US Counties and Congressional Districts, 1790–2020.” http://dx.doi.org/10.2139/ssrn.4019521.

Office of Policy Development and Research. n.d. “HUD USPS Zip Code Crosswalk Files.” https://www.huduser.gov/portal/datasets/usps_crosswalk.html, accessed August 9, 2021.