The Design of Disease Maps Shapes Perceptions of Threat and Public Policy Preferences*

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Abstract

Choropleth disease maps have become the main tool for communicating information about the geography of health threats to the public. These maps have the potential to shape perceptions of threat, preferences about policy, and perhaps even behavior, but they are unfortunately often poorly designed and misleading. In a large survey of residents of the U.S. state of Georgia conducted in June 2020, we randomly assigned respondents to view one of two maps produced in the spring of 2020 by the Georgia Department of Public Health. The first is a map of county-level COVID case counts, which generated the false perception that the COVID threat was concentrated almost exclusively in the Atlanta metro area. The second is a map of the case rate per 100,000 people, which clarified that the virus was widespread in much of Georgia. Those who saw the second map were less likely to consider the virus as an urban problem, and more likely to perceive it as a concern for Georgia and its economy. Moreover, respondents from non-metro areas who saw the case rate map were more concerned that they, their friends, or community members might contract the virus. Respondents who saw the case rate map also expressed greater support for policies aimed at mitigating the virus – an effect driven by self-identified Republicans, who were far more skeptical about public health measures to mitigate the spread of the virus in general.

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At least since John Snow's 1854 depiction of cholera in London, maps have been an important analytical tool for epidemiology researchers. In the era of COVID-19, disease maps are now ubiquitous for the general public as well. In a representative sample of 1,751 residents of the U.S. state of Georgia that we fielded in June of 2020, 67 percent of respondents reported that they had consulted a choropleth COVID map produced by the Georgia Department of Health. It is likely that the information conveyed by such maps shapes individuals' perceptions about the risks posed by the virus, and influences their behavioral response, including support for and compliance with policies designed to limit the spread of the virus.

For this reason, good map design is important. From classic works like Jenks (1963) and Tobler (1973) to contemporary contributions like MacEachren (1995) and Brewer (2015), geographers have developed a set of best practices for designing disease maps. Yet, these design principles are often ignored Walter and Birnie (1991). According to Mark Monmonier Monmonier (1991), every map tells a story, and sometimes that story is misleading. This was true of some very prominent COVID maps produced by U.S. state governments and updated daily on their web pages as the COVID pandemic was spreading in the spring and summer of 2020.

The left-hand column of Figure 1 reproduces county-level maps of COVID case counts featured on the Georgia Department of Public Health COVID dashboard from mid March to mid May, 2020. County-level maps of case counts convey very little useful information, since they are almost indistinguishable from maps of population density. Atlanta-area counties displayed more COVID cases simply because they contain more people. Moreover, by using equal intervals to form breaks between color categories, Georgia's mapping approach created the false impression of stasis and urban concentration of the COVID threat, even as the virus was spreading and hospitals were overwhelmed in one of the nation's most severe outbreaks in rural Southwest Georgia.[1]

After experiencing growing criticism from public health experts, the Georgia Department of Public Health partially relented. While still featuring the misleading raw case count maps exclusively on its dashboard, it started to include a link to an alternative per capita case map as well on April 12, 2020. This mapping approach is reproduced in the right-hand column of Figure 1. These maps allow viewers to better assess the geography of the COVID threat in Georgia on a given day, and for frequent

[1] "Days After a Funeral in a Georgia Town, Coronavirus Hit Like a Bomb", New York Times March 30, 2020.

website visitors, its evolution over time.

In a survey administered to a representative sample of Georgia residents between June 12 and June 19, 2020, respondents were randomly selected to be shown either the raw case count map displayed at the bottom left of Figure 1 or the case rate map displayed at the bottom right. They were then asked a variety of questions about 1) their understanding of the geography of the virus, 2) their level of concern about the virus, 3) appropriate public policy responses, and 4) appropriate individual behaviors. We examine within-county differences in survey responses between those who saw the raw case count map and those who saw the case rate map.

We contribute to a growing experimental literature aimed at understanding how people interact with and learn from maps. Existing studies use small samples to explore, for example, the impact of different aggregation techniques or break-points on map-reading accuracy Brewer and Pickle (2010), or whether some ways of displaying darker and lighter colors are more intuitive to users than others Schiewe (2019). We take this literature in a new direction by randomly assigning actual current disease maps used by public health authorities to a large representative sample in the midst of a pandemic. This approach maximizes both internal and external validity, and yields insights about the ways in which seemingly innocuous design decisions might shape perceptions and beliefs about public health.

Results

The Geography of the Virus

In the United States, the COVID-19 pandemic first emerged in large, dense cities like New York, Detroit, and New Orleans. Images on nightly news featured overrun hospitals and long lines of people seeking testing in large cities. A strong initial perception emerged that the dangers of the virus were limited to dense places that relied on public transportation. However, it subsequently became clear that viral spread was facilitated by large, tightly packed indoor gatherings such as bars, concerts, and church services, which are just as likely to occur in rural areas.

During the period when our survey was in the field, the virus was spreading rapidly in rural Georgia, especially in the Southwest of the state, where a large outbreak was traced to a funeral service in the town of Albany. As can be seen in the right-hand column of Figure 1, cases per 100,000 were higher in much of rural Georgia than in the metro area of Atlanta. However, the Georgia Department of Public Health published county-level case count maps that generated the false impression that cases were concentrated in metro Atlanta.

We asked respondents if the virus was "mostly an urban problem, mostly a rural problem, or both". Among those who were randomly assigned to view a raw case map, 53.2 percent believed the virus was either "mostly an urban problem" or "somewhat more urban than rural". Among those who viewed the case rate map, only 44.5 percent had this belief. These patterns are robust to estimating probit models with a number of individual-level covariates and county fixed effects (see supplementary materials for more details). The inclusion of county fixed effects implies that we compare the responses of individuals living *within* the same county who were randomly assigned to a different map treatment. The substantive treatment effect is similar to that described above, with a p-value below .001. Figure 2 demonstrates that this treatment effect is roughly similar for those living in Atlanta and those living outside Atlanta.

A growing literature suggests that, in the United States, political partisanship is an important driver of attitudes and behaviors about the virus (Allcott et al., 2020; Barrios and Hochberg, 2020; Kushner Gadarian et al., 2020; Makridis and Rothwell, 2020). Figure 3 breaks the effect down by partisanship instead of geography. It reveals a partisan cleavage in perceptions of the virus. Self-identified Republicans were far more likely than Democrats or independents to perceive the virus as an urban problem. However, and importantly, all three groups were less likely to consider the virus as an urban problem after viewing the case rate maps. This pattern has important policy implications. First, it suggests that at least part of the partisan divide in risk perception and in behavior may be influenced by the sources used by people to gather information (see also Bursztyn et al., 2020). Second, it indicates that, at least in some cases, providing the public with more (and, more accurate) information can correct previously incorrect beliefs.

Concerns about the Virus

Next, we examine the impact of map design on the level of respondents' concerns about the virus. We asked respondents to use a slider ranging from 1 to 10 to communicate how worried they were about different aspects of the virus. First, we asked questions not specific to the respondent's residential location: How worried are you about the spread of infection in Georgia? How worried are you about the economic impact of the virus? For these questions, we anticipated a higher level of concern among those who saw the case rate map regardless of the individual's residential location.

We then presented respondents with a set of questions for which we anticipated that the treatment effects would be location-specific. We elicited participants' level of concern about becoming infected, about a member of their family, church, or friends becoming infected, and about the spread of the virus in their county. For these questions, we anticipated the treatment effect to be concentrated among respondents living in counties that were presented with the lightest color in the raw case map – that is, counties other than metro Atlanta or Dougherty County.[2] In these mostly rural counties, the raw case map conveyed a low case prevalence, but the case rate map told a very different story.

Figure 4 displays group means and 95 percent confidence intervals for the 10-point scale for each separate question. OLS models and tests of statistical significance are presented in the supplementary materials. Regardless of geography, relative to the case count map, respondents who saw the case rate map were substantially more worried about the spread of the virus in Georgia. The difference was over one half of a point on the 10-point scale. This effect is roughly the same as the extent to which women were more worried than men – another important difference in COVID attitudes identified in the recent literature (Galasso et al., 2020). Those who saw the rate map also reported being more worried about the economy in both urban and rural counties, but this effect was substantively smaller and not statistically significant at conventional levels. We suspect that this was due to a ceiling effect, since over 80 percent of respondents classified themselves as a "10" on the worry scale along the economic dimension.

Turning to individual-specific worry about contracting the virus, we identify a clear map treatment effect. However, as expected, this was true only for respondents residing in the non-metro counties, where maps told substantially different stories. Among respondents living outside of metro Atlanta (around half of the sample), those who saw the rate map expressed substantially greater concerns about becoming infected. The effect size – a little under a half a point – is similar if we focus on concerns about friends, family, or church members becoming infected, or concerns about the rest of the county.

In the supplementary materials, we examine models with county fixed effects, which

[2]Dougherty County is home to Albany, where a large outbreak was traced to a funeral. Dougherty is the only non-Atlanta county that was not in the lowest color category in the DHS case map. Note that we only have 13 respondents from Dougherty County in our sample.

compare the responses of individuals living within the same county but were randomly shown a different type of map. Even with this more stringent comparison, our results remain unchanged. The bottom three panels of Figure 4 further document that residents of rural Georgia were substantially less worried than metro Atlanta residents when they saw the case map, but that this difference vanished among the group that saw the rate map.

In Figure 5, we consider the potential for maps to have a differential effect depending on respondents' political preferences. Except for worries about the economy, Republicans were clearly less worried, and Democrats more worried, than independents. In line with existing research (Allcott et al., 2020; Barrios and Hochberg, 2020), partisan differences were large and statistically significant even in models with county fixed effects. Yet, despite this partisan divide, when asked about concerns over the spread of the virus in Georgia, respondents who saw the rate map were more worried than those who saw the count map, regardless of their political preference. In our regression models, the overall impact of seeing a case rate map was similar in magnitude to the estimated difference between independents and Republicans. As discussed before, this pattern highlights the importance of providing the public with accurate and more meaningful information.

The bottom three panels of Figure 5 display results for individual-specific and local concerns. If anything, the map treatment effect is slightly larger for self-identified Republicans. However, this pattern is likely driven to some extent by the relative prevalence of Republicans in rural Georgia, where the difference in the information conveyed by the two types of maps was strongest. When controlling for county fixed effects, the difference in the treatment effect between Democrats and Republicans is not quite statistically significant.[3]

Summing up, Figures 4 and 5 suggest that, by increasing the level of concerns about the virus among non-urban Georgia residents and among Republicans, rate maps completely eliminated geographic differences in levels of concern about local infection. Perhaps surprisingly, they even led to a reduction in partisan differences.

[3]The lack of significance in these more stringent models may also be due to the low variation we are left with when controlling for county fixed effects.

Policy Preferences

Having verified that rate maps can influence individuals' concerns over the infection, we next examine whether they have the potential to shape respondents' views towards policies aimed to contain the spread of the virus. At the time our study was in the field, Georgia's Republican Governor, Brian P. Kemp, had recently implemented a controversial push to make Georgia the first state to open a broad set of businesses, including gyms, restaurants, and tattoo parlors. We asked respondents whether they supported the move to open non-essential businesses, and whether they would support a move to close those businesses once again had the spread of the virus increased. We also asked them to consider a trade-off between opening businesses and protecting lives, and whether risks were greater for opening businesses too fast or too slow.

Using factor analysis, we generated an index out of these four items, with higher values reflecting attitudes in favor of more cautious reopening of businesses. The index has a mean of zero and standard deviation of .88, with substantial polarization across parties. Reflecting polarized views, Democrats and Republicans were one full standard deviation apart (means of .4 and -.48 respectively).

There is a small but statistically significant difference in policy preferences between individuals assigned to the two different map treatments, with those who saw the case rate map expressing greater trepidation about Georgia's reopening. The difference in the overall sample is around one tenth of a standard deviation.

We do not find evidence of a difference in the size of the treatment effect between metro Atlanta and the rest of the state, but there are striking different effects with respect to partisanship. As shown in Figure 6, which displays means and confidence intervals of the policy scale by partisan group, the map treatment effect was largely driven by Republicans. By moving the policy preferences of Republicans in the direction of independents and Democrats, the rate maps had a subtle *depolarizing* effect. The substantive effect size is not trivial; this shift in preferences among Republicans is similar to the difference between men, who favored faster reopening, and women, who favored slower reopening. The implications of this finding may be particularly relevant at a time when actual or perceived polarization between partisan voters is at historically high levels.[4] Our findings indicate that simply providing more accu-

[4]While some authors have argued that the overall distribution of ideology in the US has not changed much since the 1970s (Fiorina et al., 2006; Fiorina and Abrams, 2008; Desmet and Wacziarg, 2020), many others have emphasized that ideological and especially affective polarization between partisans has dramatically increased (Abramowitz and Saunders, 2008; Iyengar et al., 2012; Mason, 2014; Gentzkow, 2016; Abramowitz, 2018; Boxell et al., 2020).

rate information, which partly corrects misperceptions, might lead to at least some convergence in views, thereby counteracting polarization.

Behavior

Finally, we examine whether map design had an impact on respondents' beliefs about appropriate behavior in the face of the virus. We asked them how important it is to wash hands more frequently, reduce contact with family and friends, wear a mask in public, and limit trips to the store. We also asked how willing respondents were to risk their own health by patronizing local businesses. Again, we used factor scores to create an index, which takes on higher values as the individual sees the importance of more cautious behaviors. We found no evidence of a map treatment effect on either the index or on responses to individual questions.

Discussion

Maps have always played a powerful role in shaping perceptions and understandings of the world, especially when it comes to infectious disease. Given the power in the hands of mapmakers, great care should be taken in making design decisions. Our survey experiments indicate that the design of disease maps indeed shapes beliefs about the spatial incidence of disease, the threat of the disease to individuals and communities, as well as preferences over policies aimed at combating its spread.

Our study has high external validity, since it was conducted in the midst of a pandemic, using actual disease maps that were currently available to study participants. Indeed, a super-majority of our study participants reported that they had consulted the maps created by the Georgia DPH. In the period leading up to our study, the Georgia DPH, as well as local newspapers who published links to or screenshots of its maps, featured only the case count maps, which conveyed the message that COVID was an overwhelmingly urban problem, with little change in spatial disease incidence over time. Our study indicates that this likely led individuals outside the Atlanta area to perceive lower levels of threat and to support faster reopening, than would have been the case had DPH published more meaningful case rate maps.

The use of case count maps might also be a subtle facilitator of the extreme political polarization surrounding measures to combat COVID that has occurred in the United States. Well before the pandemic, partisan voting patterns in the United States had come to be highly correlated with population density (Rodden, 2019). The false impression that COVID was an overwhelmingly urban phenomenon may have led Republican voters to believe that measures to combat the spread of the disease would only benefit urban Democrats, while imposing costs on the entire economy.

In our sample, Republicans were far less concerned about the public health impact of the virus than Democrats, while both groups were equally concerned about its economic impact. As a result, policy preferences about opening businesses were starkly polarized. Respondents across the party spectrum became more concerned about the spread of the virus when confronted with the case rate maps for risks faced by Georgia as a whole. But, perceptions of individual and local risks as well as the policy preferences of Republicans who saw the case rate map moved slightly in the direction of Democrats, whose policy preferences were instead unaltered by the map treatment.

In sum, better maps might not only convey valuable information to rural residents about the risks of becoming infected, but can also help combat geographic and partisan polarization about virus response.

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Figures

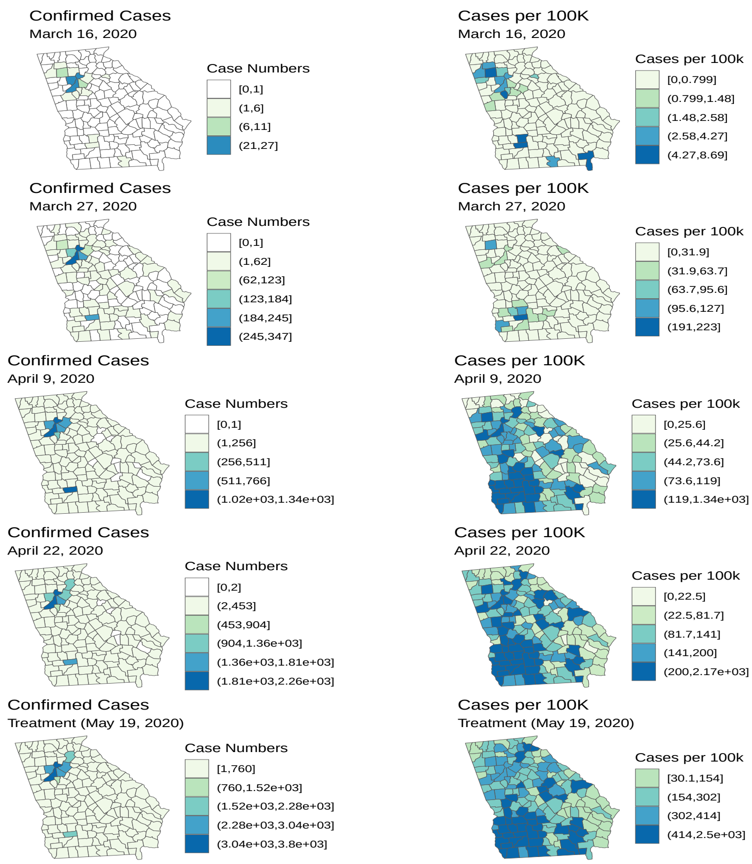


Figure 1. Maps on the left are county-level case count maps, reproduced as they appeared on the Georgia DPH web page on various dates. Maps on the right are case rate maps constructed using the approach adopted by the DPH beginning on April 12. The bottom two maps were those used in our study.

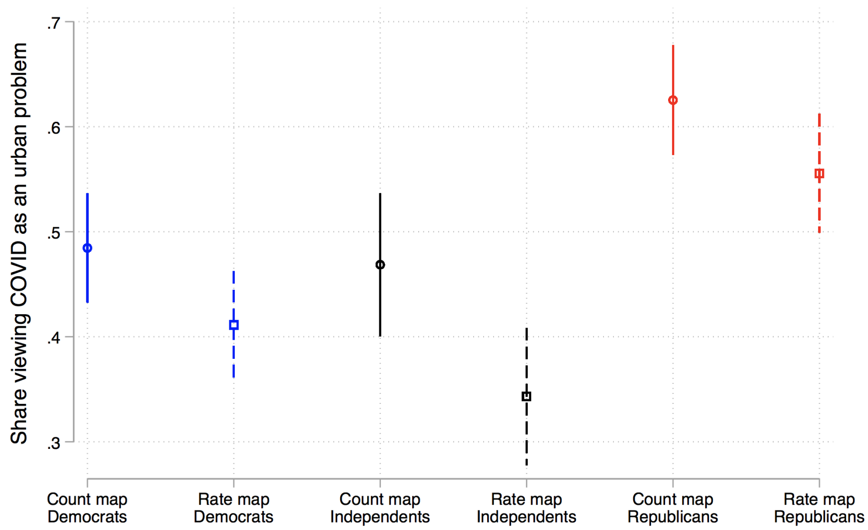
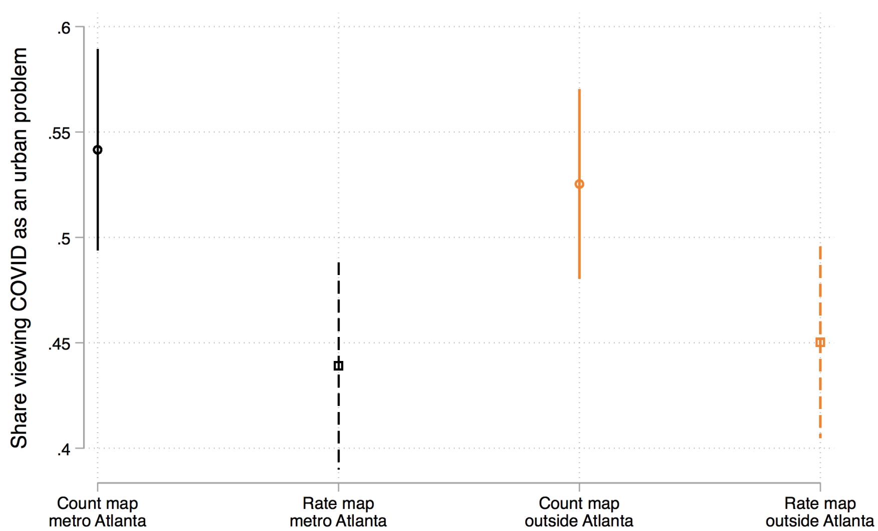


Figure 2. These are within-group means and 95 percent confidence intervals for a dummy variable that takes on the value 1 for those reporting that COVID was ”mostly an urban problem” or ”somewhat more urban than rural.”



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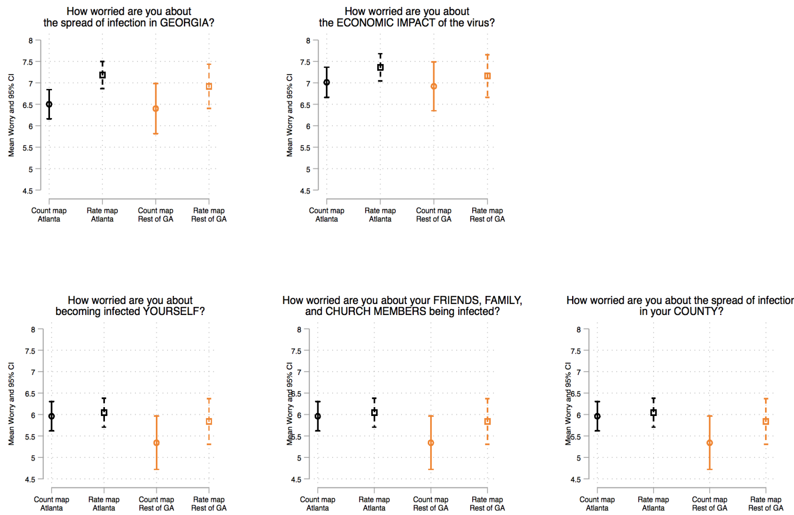

Figure 4. These are means and 95 percent confidence intervals for the 1-10 scale of self-reported ”worry” for those who saw the case map and those who saw the rate map. Respondents from Atlanta and Dougherty County are on the left, and those from the rest of Georgia are on the right.

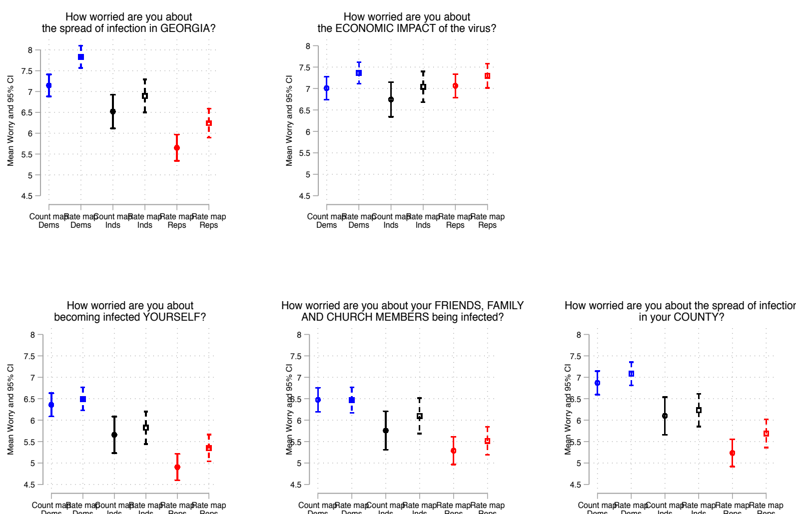

Figure 5. These are means and 95 percent confidence intervals for the 1-10 scale of self-reported ”worry” for those who saw the case map and those who saw the rate map. Democrats are on the left (blue font), independents are in the middle (black font), and Republicans are on the right (red font)

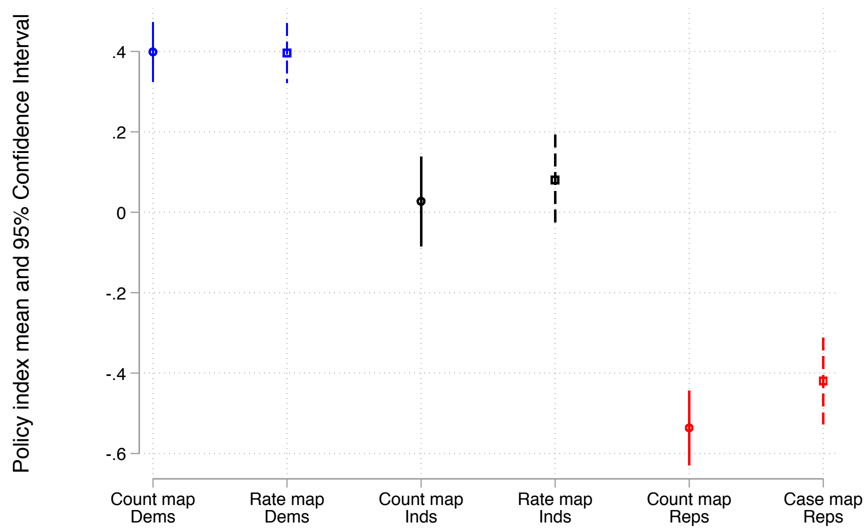

Figure 6. These are means and 95 percent confidence intervals for the policy scale among those who saw the case map and those who saw the rate map. Higher numbers are associated with greater skepticism about reopening. Democrats are on the left (blue font), independents are in the middle (black font), and Republicans are on the right (red font).

Appendix

Materials and Methods

Our survey was fielded through a survey firm called Dynata using the Qualtrics platform, and included 1,751 Georgia residents, selected to be representative of the Georgia population on age, gender, region, and rural versus urban residence.

We ended up with observations from 109 counties. Respondents were randomly assigned to see either the case map or the rate map. In addition to the simple comparisons of means presented above, we also estimated probit models (when the dependent variable was the binary indicator for perception of COVID as an "urban problem") and OLS models (when the dependent variable was a numerical scale). The key independent variable was a dummy variable that took the value 0 if the respondent viewed the case count map, and 1 if she viewed the rate map. This variable was also interacted with indicators for partisanship and geography in order to test for heterogeneous effects of the treatment.

We estimated models that included county fixed effects, so as to control for county-specific factors that might have affected survey response. Because we did not have within-county balance on possible confounders in many of the smaller counties, we also included a set of control variables, including partisanship (dummy variables for Democrats, Republicans, and independents), a 7-point scale of self-described left-right ideology, an indicator of whether the respondent described their neighborhood as "urban", age, gender, race, and an indicator for whether the respondent had a family member living in an assisted living facility. Details of these models are included in the supplementary information.

Survey Sample

Our survey was approved by the institutional review boards of Stanford and Harvard universities, was fielded by a survey firm called Dynata using the Qualtrics platform, and included a total of 1,751 Georgia residents aged 18 or older who consented and completed the survey, whose geographic location was recorded matching the participant's IP address to a location database, and that location fell within the Georgia boundaries. After interviewing several survey firms, we chose Dynata because of their ability to reach a sufficiently large number of individuals in Georgia. We worked with the survey firm to obtain a sample of the Georgia population that was as representative as possible given the constraints of internet polling. Above all, due to disparities in internet access, respondents in online samples tend to be relatively more educated and likely to live in metropolitan areas than the general population. Because we were interested in possible heterogeneous effects of our map treatment in metropolitan Atlanta versus the rest of the state, we instructed Dynata to obtain the largest possible sample of voters outside Atlanta. Responses were recorded between June 10 and June 23, 2020.

In Table S1, we include the percent of the (over 18) population accounted for by various population groups based on the 5-year estimates from the American Community Survey for Georgia released December 10, 2020, and contrast those with our sample. Our sample is quite similar to the ACS with respect to race, gender, income, and age, although ours has slightly smaller shares of minority respondents and very wealthy respondents. As is often the case with online samples, our sample is relatively more educated than the snapshot of the Georgia population taken in the most recent ACS. Our sample is especially lacking in Georgia residents who did not complete high school.

Moreover, even though we attempted to obtain the largest possible non-metro sample, 46.5 percent of our sample came from the four largest Atlanta-area counties, whereas these counties accounted for only 33 percent of the population of Georgia in 2019. The counties that were colored in the raw case map treatment—six Atlanta-area counties plus Dougherty County in the Southwest—accounted for around 39 percent of the Georgia population, but a little over half of our sample. This over-representation of Atlanta is not a problem for our analysis, however, since our main goal was to have a sufficiently large sample size to explore map treatment effects in both types of places. It is helpful that the sample is divided roughly in half between the counties that appeared to have significant COVID outbreaks in the the raw case map and those that did not.

We asked respondents about their partisan identification with the same 7-point scale that has become standard in survey research: "strong Democrat, moderate Democrat, independent but lean toward Democrats, independent, independent but lean toward Republicans, moderate Republican, strong Republican." If we classify self-described moderate partisans and independents who lean toward a party as partisans, our sample is composed of 41 percent Democrats,36 percent Republicans, and 23 percent independents. Georgia does not collect information on voter registration by party, but this partisan breakdown is consistent with Georgia's very close recent elections. It is also relatively similar to other large surveys like the 2018 Cooperative Congressional Election Survey, which had a Georgia sample less than one third the size of ours, and a somewhat larger Democratic advantage in party identification than in our sample (46 percent self-identified Democratic and 36 percent Republican).

Balance on Covariates Between Treatment Groups

Respondents were randomly assigned to view one of two maps, and the main analysis in our paper is based on comparisons of survey responses between the two treatment conditions. Thus, we are not especially concerned with small demographic differences between the ACS and our sample. However, it would be a concern if our randomization had somehow failed, creating systematic differences between the treatment groups on potential confounding variables. In Table S2, we present a balance table. The first column provides means and standard errors on a wide variety of variables for the group that saw the raw case map, and the second column provides the same information for those who saw the case rate map. The third column provides the difference between the two. It is clear that there are no substantial differences on any relevant covariates between the two treatment conditions.

The Geography of the Virus

In Table S3, we report marginal effects of probit models, where the dependent variable is a dummy variable for whether the respondent reported a perception that COVID was an urban problem. We report a simple model without covariates, a model with covariates, and a model with covariates and county fixed effects.

In Table S4, we present models that explore heterogeneous effects according to whether the respondent resided in one of the counties with a dark color in the raw case map (metro Atlanta and Dougherty County) or in the rest of Georgia. It demonstrates that the treatment effect was similar in both areas. Those who saw the rate map were less likely to view COVID as an urban problem.

In Table S5, we present models that explore heterogeneous effects according to the respondent's self-reported partisanship. We see that the treatment effect is relatively similar for Democrats and Republicans, and if anything, a bit larger for independents.

Concerns about the Virus

In Table S6 through S10, we present results of OLS models in which the dependent variable is the self-reported level of concern about the virus along several different dimensions: the spread of infection in Georgia, the economic impact of the virus, concern about the respondent personally contracting the virus, concern about friends and family contracting the virus, and concerns about the spread of infection in the county.

The largest treatment effects were for the question about Georgia. Only for the question about "friends and family" do we fail to find significant treatment effects.

Next, in Tables S11 through S15, we explore heterogeneous effects according to geography. These tables clarify that the overall treatment effects found in Tables S8 through S10 are driven by respondents living outside of metro Atlanta and Dougherty County— that is to say, respondents living in counties that were in the lowest color category in the simple case count map. As expected, when it comes to individuals' concerns about becoming infected, as well as concerns about their friends and family members and residents of their county becoming infected, the map treatment only had a significant effect in the counties where the two maps told different stories.

In Tables S16 through S20, we explore heterogeneous effects by self-reported party. In Table S16, we see that the treatment effect for concern about the spread of the virus in Georgia as a whole is roughly similar for Democrats and Republicans. Table S17 documents that the the same is true for concerns about the economy, although as mentioned in the main text, these results are attenuated by ceiling effects, especially for Republicans, whose level of concern was close to the maximum in both treatment conditions.

In Table S18, we see that the impact of the map treatment on respondents' concern about contracting the virus was driven by Republicans, whose overall level of concern was initially substantially lower than Democrats and independents. In Tables S19 and S20, we see a similar partisan difference in the treatment effect for the level of concern about friends and family, as well as for concern about the spread of the virus in the respondent's county.

Policy Preferences

Tables S21 through S23 present results of OLS models in which the dependent variable is a policy preference scale derived from a series of four questions about government policy responses to COVID: we elicited respondents' support for re-opening businesses, as well as their support for closing them again in the event of future virus spikes. A third question asked respondents to consider the trade-off between saving lives and opening businesses, and a fourth question asked whether it was more dangerous to open business too slowly or too quickly. The eigenvalue for the principal component is 1.97, and only .05 for the second factor. We use the principal component to generate our policy preference scale, which gets larger as respondents become more supportive of restrictions. In Tables S21 through S23, we see that respondents who saw the case rate map became more supportive of restrictions, and we see that this effect was driven by Republican respondents, who were initially much more skeptical about restrictions.

Behavior

Tables S24 through S26 present results of OLS models in which the dependent variable is a factor score derived from a series of questions about the importance of various individual behaviors to combat the spread of COVID. Specifically, we asked respondents how important it is to wash hands more frequently, reduce contact with family and friends, wear a mask in public, and limit trips to the store. We also asked how willing respondents were to risk their own health by patronizing local businesses. The eigenvalue for the principal component was 1.66, and only .01 for the second.

We see no hint of a map treatment effect in any of the models presented in Tables S24 through S26. It is worth noting, however, that as in other studies, we see evidence of strong partisan, ideological, and geographic differences in beliefs about behavior. In our sample, Democrats believe it is more important to take individual measures to combat the spread of the virus, as do ideological liberals and urban residents. In contrast to questions about the geography of the virus, worry about the virus, and policy preferences, the map treatments had no impact on beliefs about appropriate behavior.

Table 1. Shares of Various Demographic Groups, American Community Survey Versus our Survey Sample

	Georgia ACS	Our Georgia sample
Race:		
White	55.5	59.5
Hispanic	8	5.0
Black	30.9	27.0
Asian	4.1	4.5
Gender:		
Male (over 18)	47.9	45.7
Female (over 18)	52.1	54.3
Income:		
Less than $20,000	10.4	15.9
$20,000-$35,000	12.3	14.7
$35,000-$50,000	12	14.2
$50,000-$75,000	18	18.1
$75,000-$100,000	14.1	14.2
More than $100,000	33.3	22.3
Age:		
18 to 24	12.8	14.0
25 to 34	18.2	18.6
35 to 44	17.4	17.5
45 to 54	17.8	18.4
55 to 64	15.9	16.1
65 and over	17.8	15.3
Highest education level:		
Did not complete high school	13.2	2.9
High school degree	28.4	18.4
Some college	22.6	24.2
College degree	25.2	35.2
Advanced degree	10.6	18.9
Regional:		
Core Atlanta counties	33	46.5
Counties colored on case map	38.7	51.2

Table 2. Balance on Covariates between Map Treatment Conditions

Variable	(1) Raw Case Map	(2) Case Rate Map	(3) Difference
White	0.602	0.588	-0.015
	(0.490)	(0.493)	(0.023)
Hispanic	0.050	0.049	-0.001
	(0.219)	(0.216)	(0.010)
African American	0.255	0.285	0.030
	(0.436)	(0.452)	(0.021)
Asian	0.045	0.046	0.001
	(0.207)	(0.209)	(0.010)
male	0.466	0.447	-0.018
	(0.499)	(0.498)	(0.024)
Less than 20, 000	0.143	0.175	0.032*
	(0.350)	(0.380)	(0.017)
20, 000−34,999	0.156	0.138	-0.019
	(0.363)	(0.345)	(0.017)
35, 000−49,999	0.137	0.147	0.010
	(0.344)	(0.355)	(0.017)
50, 000−74,999	0.187	0.175	-0.011
	(0.390)	(0.380)	(0.018)
75, 000−99,999	0.141	0.143	0.002
	(0.348)	(0.350)	(0.017)
Over 100, 000	0.225	0.221	-0.004
	(0.418)	(0.415)	(0.020)
Age 18-24	0.141	0.140	-0.001
	(0.348)	(0.347)	(0.017)
Age 25-34	0.196	0.176	-0.019
	(0.397)	(0.381)	(0.019)
Age 35-44	0.156	0.194	0.038**
	(0.363)	(0.396)	(0.018)
Age 45-54	0.189	0.180	-0.009
	(0.392)	(0.384)	(0.019)
Age 55-64	0.159	0.164	0.005
	(0.366)	(0.370)	(0.018)
Age 65 or over	0.160	0.146	-0.014
	(0.367)	(0.353)	(0.017)
Did not finish high school	0.028	0.029	0.001
	(0.165)	(0.168)	(0.008)
High school degree	0.177	0.192	0.015
	(0.381)	(0.394)	(0.019)
Some college	0.241	0.243	0.002
	(0.428)	(0.429)	(0.020)
College degree	0.346	0.359	0.012
	(0.476)	(0.480)	(0.023)
Advanced degree	0.201	0.176	-0.025
	(0.401)	(0.381)	(0.019)
Atlanta counties	0.470	0.460	-0.010
	(0.499)	(0.499)	(0.024)

Table 3. Perception of COVID as an Urban Problem, Marginal Effects from Probit Models

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map	-0.0879***	-0.0873***	-0.0898***
	(0.0238)	(0.0244)	(0.0256)
Republican		0.145***	0.147***
		(0.0355)	(0.0373)
Democrat		0.0567*	0.0658*
		(0.0342)	(0.0358)
Ideology		0.00609	0.00704
		(0.00939)	(0.00996)
Urban resident		0.0727**	0.0910***
		(0.0333)	(0.0353)
Age		0.00324	0.00242
		(0.00834)	(0.00883)
Male		0.163***	0.170***
		(0.0242)	(0.0255)
African American		-0.0880***	-0.0929***
		(0.0313)	(0.0332)
Relative in assisted living		0.0855**	0.106***
		(0.0356)	(0.0369)
Observations	1,751	1,737	1,691

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Perception of COVID as an Urban Problem, Heterogeneous Effects by Geography, Marginal Effects from Probit Models

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County
Rate map, Atlanta Metro and Dougherty	-0.101***	-0.0922***	-0.0934***
	(0.0329)	(0.0339)	(0.0342)
Rate map, rest of Georgia	-0.0738**	-0.0818**	-0.0847**
	(0.0339)	(0.0347)	(0.0382)
Atlanta Metro and Dougerty	0.00825	-0.00568	0.0373
	(0.0335)	(0.0347)	(0.370)
Republican		0.145***	0.146***
		(0.0355)	(0.0373)
Democrat		0.0571*	0.0659*
		(0.0342)	(0.0358)
Ideology		0.00589	0.00710
		(0.00941)	(0.00996)
Urban resident		0.0747**	0.0911***
		(0.0335)	(0.0353)
Age		0.00315	0.00246
		(0.00835)	(0.00883)
Male		0.163***	0.170***
		(0.0242)	(0.0255)
African American		-0.0886***	-0.0932***
		(0.0314)	(0.0332)
Relative in assisted living		0.0859**	0.106***
		(0.0356)	(0.0369)
Observations	1,751	1,737	1,691

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Perception of COVID as an Urban Problem, Heterogeneous Effects by Party, Marginal Effects from Probit Models

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Democrats	-0.0737**	-0.0813**	-0.0839**
	(0.0372)	(0.0378)	(0.0394)
Rate map, Independents	-0.128***	-0.138***	-0.128**
	(0.0480)	(0.0488)	(0.0517)
Rate map, Republicans	-0.0714*	-0.0599	-0.0698
	(0.0399)	(0.0407)	(0.0433)
Republican	0.158***	0.107**	0.118**
	(0.0437)	(0.0476)	(0.0499)
Democrat	0.0160	0.0277	0.0432
	(0.0437)	(0.0468)	(0.0487)
Ideology		0.00590	0.00685
		(0.00939)	(0.00996)
Urban resident		0.0721**	0.0903**
		(0.0333)	(0.0353)
Age		0.00345	0.00269
		(0.00834)	(0.00884)
Male		0.164***	0.170***
		(0.0242)	(0.0255)
African American		-0.0872***	-0.0921***
		(0.0314)	(0.0332)
Relative in assisted living		0.0871**	0.107***
		(0.0356)	(0.0370)
Observations	1,751	1,737	1,691

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Level of Concern about the Virus in Georgia

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map	0.600***	0.614***	0.651***
	(0.139)	(0.133)	(0.138)
Republican		-0.350*	-0.287
		(0.198)	(0.205)
Democrat		0.402**	0.509***
		(0.189)	(0.195)
Ideology		-0.303***	-0.290***
		(0.0520)	(0.0539)
Urban resident		0.329*	0.329*
		(0.183)	(0.193)
Age		0.0833*	0.100**
		(0.0453)	(0.0472)
Male		-0.634***	-0.661***
		(0.134)	(0.140)
African American		0.0889	0.0507
		(0.173)	(0.181)
Relative in assisted living		0.108	0.159
		(0.195)	(0.201)
Constant	6.453***	7.528***	7.347***
	(0.0945)	(0.304)	(0.315)
Observations	1,630	1,617	1,617
R-squared	0.011	0.103	0.158

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7. Level of Concern about the Impact of the Virus on the Economy

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map	0.295**	0.317**	0.321**
	(0.123)	(0.123)	(0.127)
Republican		0.365**	0.410**
		(0.182)	(0.188)
Democrat		0.186	0.248
		(0.174)	(0.179)
Ideology		-0.136***	-0.127***
		(0.0475)	(0.0492)
Urban resident		0.166	0.114
		(0.168)	(0.177)
Age		0.103**	0.119***
		(0.0421)	(0.0436)
Male		-0.262**	-0.293**
		(0.124)	(0.129)
African American		-0.180	-0.222
		(0.160)	(0.167)
Relative in assisted living		-0.228	-0.215
		(0.182)	(0.187)
Constant	6.968***	7.102***	7.001***
	(0.0858)	(0.280)	(0.290)
Observations	1,725	1,711	1,711
R-squared	0.003	0.019	0.082

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8. Level of Concern about Contracting the Virus

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map	0.283**	0.300**	0.263**
	(0.134)	(0.130)	(0.134)
Republican		-0.242	-0.205
		(0.193)	(0.200)
Democrat		0.258	0.331*
		(0.183)	(0.188)
Ideology		-0.321***	-0.312***
		(0.0499)	(0.0517)
Urban resident		0.237	0.166
		(0.177)	(0.186)
Age		0.125***	0.132***
		(0.0444)	(0.0461)
Male		-0.390***	-0.406***
		(0.131)	(0.136)
African American		0.179	0.126
		(0.168)	(0.175)
Relative in assisted living		0.482**	0.482**
		(0.192)	(0.197)
Constant	5.659***	6.507***	6.452***
	(0.0939)	(0.295)	(0.305)
Observations	1,722	1,708	1,708
R-squared	0.003	0.080	0.138

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9. Level of Concern about Friends and Family Members

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map	0.182	0.205	0.152
	(0.142)	(0.139)	(0.144)
Republican		-0.190	-0.176
		(0.208)	(0.216)
Democrat		0.312	0.361*
		(0.196)	(0.202)
Ideology		-0.262***	-0.241***
		(0.0537)	(0.0555)
Urban resident		0.0808	0.0173
		(0.190)	(0.201)
Age		0.0109	0.0257
		(0.0475)	(0.0496)
Male		-0.464***	-0.516***
		(0.141)	(0.146)
African American		-0.280	-0.390**
		(0.180)	(0.188)
Relative in assisted living		0.251	0.318
		(0.206)	(0.212)
Constant	5.870***	7.048***	6.970***
	(0.0986)	(0.317)	(0.329)
Observations	1,692	1,678	1,678
R-squared	0.001	0.050	0.104

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10. Level of Concern about County

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map	0.309**	0.331**	0.339**
	(0.139)	(0.134)	(0.138)
Republican		-0.174	-0.112
		(0.199)	(0.206)
Democrat		0.435**	0.533***
		(0.189)	(0.194)
Ideology		-0.329***	-0.319***
		(0.0514)	(0.0531)
Urban resident		0.352*	0.243
		(0.183)	(0.193)
Age		0.0314	0.0506
		(0.0456)	(0.0474)
Male		-0.543***	-0.569***
		(0.135)	(0.140)
African American		0.143	0.131
		(0.173)	(0.180)
Relative in assisted living		0.115	0.116
		(0.196)	(0.202)
Constant	6.091***	7.303***	7.163***
	(0.0969)	(0.303)	(0.314)
Observations	1,704	1,690	1,690
R-squared	0.003	0.092	0.150

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11. Level of Concern about the Virus in Georgia, Heterogeneous Effects by Geography

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County
Rate map, Atlanta Metro and Dougherty	0.680***	0.674***	0.684***
	(0.194)	(0.186)	(0.188)
Rate map, rest of Georgia	0.519***	0.551***	0.613***
	(0.199)	(0.192)	(0.203)
Atlanta Metro and Dougerty	0.102	-0.0607	
	(0.189)	(0.184)	
Republican		-0.348*	-0.286
		(0.198)	(0.206)
Democrat		0.402**	0.508***
		(0.190)	(0.195)
Ideology		-0.304***	-0.290***
		(0.0522)	(0.0540)
Urban resident		0.329*	0.329*
		(0.185)	(0.193)
Age		0.0825*	0.0998**
		(0.0454)	(0.0473)
Male		-0.632***	-0.660***
		(0.135)	(0.140)
African American		0.0892	0.0513
		(0.173)	(0.181)
Relative in assisted living		0.107	0.158
		(0.195)	(0.201)
Constant	6.400***	7.564***	7.350***
	(0.136)	(0.323)	(0.315)
Observations	1,630	1,617	1,617
R-squared	0.013	0.103	0.158

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12. Level of Concern about the Impact of the Virus on the Economy, Heterogeneous Effects by Geography

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County
Rate map, Atlanta Metro and Dougherty	0.351**	0.352**	0.343**
	(0.172)	(0.172)	(0.173)
Rate map, rest of Georgia	0.240	0.285	0.296
	(0.176)	(0.177)	(0.186)
Atlanta Metro and Dougerty	0.0929	0.117	
	(0.172)	(0.174)	
Republican		0.369**	0.410**
		(0.182)	(0.188)
Democrat		0.180	0.248
		(0.174)	(0.179)
Ideology		-0.132***	-0.128***
		(0.0476)	(0.0493)
Urban resident		0.139	0.113
		(0.170)	(0.177)
Age		0.104**	0.119***
		(0.0421)	(0.0437)
Male		-0.267**	-0.292**
		(0.125)	(0.129)
African American		-0.174	-0.221
		(0.160)	(0.167)
Relative in assisted living		-0.230	-0.216
		(0.182)	(0.187)
Constant	6.920***	7.029***	7.003***
	(0.124)	(0.298)	(0.290)
Observations	1,725	1,711	1,711
R-squared	0.004	0.020	0.082

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 13. Level of Concern about Contracting the Virus, Heterogeneous Effects by Geography

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County
Rate map, Atlanta Metro and Dougherty	0.0840	0.0762	0.0902
	(0.187)	(0.182)	(0.183)
Rate map, rest of Georgia	0.496***	0.539***	0.463**
	(0.192)	(0.186)	(0.197)
Atlanta Metro and Dougerty	0.619***	0.472**	
	(0.187)	(0.184)	
Republican		-0.243	-0.210
		(0.193)	(0.200)
Democrat		0.249	0.334*
		(0.183)	(0.188)
Ideology		-0.315***	-0.310***
		(0.0499)	(0.0517)
Urban resident		0.201	0.168
		(0.178)	(0.186)
Age		0.130***	0.134***
		(0.0444)	(0.0461)
Male		-0.410***	-0.414***
		(0.132)	(0.136)
African American		0.181	0.120
		(0.168)	(0.175)
Relative in assisted living		0.480**	0.485**
		(0.192)	(0.197)
Constant	5.341***	6.240***	6.440***
	(0.134)	(0.313)	(0.305)
Observations	1,722	1,708	1,708
R-squared	0.010	0.083	0.139

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14. Level of Concern about Friends and Family Members, Heterogeneous Effects by Geography

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County
Rate map, Atlanta Metro and Dougherty	-0.0491	-0.0469	-0.0732
	(0.198)	(0.195)	(0.197)
Rate map, rest of Georgia	0.425**	0.469**	0.408*
	(0.202)	(0.199)	(0.210)
Atlanta Metro and Dougerty	0.495**	0.404**	
	(0.197)	(0.196)	
Republican		-0.195	-0.182
		(0.207)	(0.215)
Democrat		0.308	0.366*
		(0.196)	(0.202)
Ideology		-0.257***	-0.239***
		(0.0537)	(0.0555)
Urban resident		0.0585	0.0188
		(0.191)	(0.201)
Age		0.0152	0.0284
		(0.0476)	(0.0496)
Male		-0.482***	-0.527***
		(0.141)	(0.146)
African American		-0.279	-0.396**
		(0.180)	(0.188)
Relative in assisted living		0.251	0.321
		(0.206)	(0.212)
Constant	5.616***	6.820***	6.949***
	(0.141)	(0.336)	(0.329)
Observations	1,692	1,678	1,678
R-squared	0.005	0.052	0.106

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 15. Level of Concern about County, Heterogeneous Effects by Geography

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Atlanta Metro and Dougherty	0.251	0.238	0.256
	(0.194)	(0.187)	(0.189)
Rate map, rest of Georgia	0.381*	0.436**	0.434**
	(0.198)	(0.191)	(0.202)
Atlanta Metro and Dougerty	0.542***	0.376**	
	(0.193)	(0.189)	
Republican		-0.172	-0.115
		(0.199)	(0.206)
Democrat		0.425**	0.535***
		(0.189)	(0.194)
Ideology		-0.322***	-0.318***
		(0.0514)	(0.0532)
Urban resident		0.305*	0.244
		(0.184)	(0.193)
Age		0.0364	0.0518
		(0.0456)	(0.0475)
Male		-0.560***	-0.572***
		(0.135)	(0.140)
African American		0.150	0.128
		(0.173)	(0.180)
Relative in assisted living		0.113	0.117
		(0.196)	(0.202)
Constant	5.811***	7.080***	7.154***
	(0.139)	(0.323)	(0.314)
Observations	1,704	1,690	1,690
R-squared	0.010	0.095	0.150

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 16. Level of Concern about the Virus in Georgia, Heterogeneous Effects by Party

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Democrats	0.687***	0.701***	0.757***
	(0.211)	(0.208)	(0.215)
Rate map, Independents	0.376	0.436	0.429
	(0.282)	(0.281)	(0.291)
Rate map, Republicans	0.589***	0.628***	0.669***
	(0.224)	(0.222)	(0.231)
Republican	-0.868***	-0.439*	-0.397
	(0.244)	(0.257)	(0.266)
Democrat	0.628***	0.277	0.355
	(0.240)	(0.252)	(0.259)
Ideology		-0.304***	-0.291***
		(0.0521)	(0.0540)
Urban resident		0.323*	0.321*
		(0.184)	(0.194)
Age		0.0836*	0.101**
		(0.0453)	(0.0473)
Male		-0.634***	-0.661***
		(0.134)	(0.140)
African American		0.0930	0.0542
		(0.174)	(0.182)
Relative in assisted living		0.110	0.163
		(0.196)	(0.201)
Constant	6.520***	7.612***	7.450***
	(0.192)	(0.325)	(0.337)
Observations	1,630	1,617	1,617
R-squared	0.070	0.104	0.158

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 17. Level of Concern about the Impact of the Virus on the Economy, Heterogeneous Effects by Party

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Democrats	0.353*	0.347*	0.382*
	(0.193)	(0.193)	(0.198)
Rate map, Independents	0.295	0.377	0.398
	(0.255)	(0.257)	(0.264)
Rate map, Republicans	0.234	0.245	0.201
	(0.205)	(0.205)	(0.214)
Republican	0.319	0.429*	0.504**
	(0.228)	(0.242)	(0.250)
Democrat	0.263	0.201	0.256
	(0.225)	(0.237)	(0.243)
Ideology		-0.135***	-0.127***
		(0.0476)	(0.0493)
Urban resident		0.166	0.115
		(0.168)	(0.177)
Age		0.103**	0.118***
		(0.0421)	(0.0437)
Male		-0.262**	-0.293**
		(0.125)	(0.129)
African American		-0.179	-0.221
		(0.160)	(0.167)
Relative in assisted living		-0.231	-0.221
		(0.183)	(0.188)
Constant	6.745***	7.073***	6.965***
	(0.179)	(0.301)	(0.311)
Observations	1,725	1,711	1,711
R-squared	0.006	0.020	0.083

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 18. Level of Concern about Contracting the Virus, Heterogeneous Effects by Party

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Democrats	0.136	0.163	0.152
	(0.205)	(0.203)	(0.208)
Rate map, Independents	0.165	0.224	0.229
	(0.274)	(0.273)	(0.281)
Rate map, Republicans	0.444**	0.506**	0.418*
	(0.220)	(0.217)	(0.227)
Republican	-0.753***	-0.377	-0.295
	(0.245)	(0.258)	(0.266)
Democrat	0.700***	0.288	0.370
	(0.242)	(0.252)	(0.258)
Ideology		-0.322***	-0.312***
		(0.0499)	(0.0517)
Urban resident		0.239	0.166
		(0.177)	(0.187)
Age		0.125***	0.133***
		(0.0444)	(0.0461)
Male		-0.388***	-0.405***
		(0.132)	(0.136)
African American		0.175	0.123
		(0.168)	(0.175)
Relative in assisted living		0.492**	0.488**
		(0.192)	(0.197)
Constant	5.658***	6.544***	6.467***
	(0.194)	(0.319)	(0.329)
Observations	1,722	1,708	1,708
R-squared	0.045	0.081	0.138

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 19. Level of Concern about Friends and Family Members, Heterogeneous Effects by Party

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Democrats	-0.00898	-0.00851	0.0288
	(0.218)	(0.217)	(0.224)
Rate map, Independents	0.342	0.483*	0.399
	(0.292)	(0.292)	(0.302)
Rate map, Republicans	0.228	0.273	0.137
	(0.234)	(0.232)	(0.243)
Republican	-0.468*	-0.0859	-0.0492
	(0.259)	(0.275)	(0.285)
Democrat	0.718***	0.559**	0.545**
	(0.256)	(0.268)	(0.276)
Ideology		-0.260***	-0.240***
		(0.0537)	(0.0555)
Urban resident		0.0891	0.0241
		(0.190)	(0.201)
Age		0.00978	0.0247
		(0.0476)	(0.0496)
Male		-0.464***	-0.517***
		(0.141)	(0.146)
African American		-0.290	-0.396**
		(0.180)	(0.188)
Relative in assisted living		0.255	0.316
		(0.206)	(0.212)
Constant	5.758***	6.910***	6.847***
	(0.204)	(0.342)	(0.354)
Observations	1,692	1,678	1,678
R-squared	0.028	0.051	0.105

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 20. Level of Concern about County, Heterogeneous Effects by Party

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Democrats	0.213	0.237	0.273
	(0.211)	(0.208)	(0.214)
Rate map, Independents	0.131	0.235	0.198
	(0.283)	(0.282)	(0.290)
Rate map, Republicans	0.454**	0.499**	0.508**
	(0.226)	(0.223)	(0.232)
Republican	-0.866***	-0.300	-0.260
	(0.252)	(0.264)	(0.272)
Democrat	0.770***	0.435*	0.497*
	(0.247)	(0.258)	(0.264)
Ideology		-0.329***	-0.320***
		(0.0514)	(0.0532)
Urban resident		0.353*	0.240
		(0.183)	(0.193)
Age		0.0318	0.0517
		(0.0456)	(0.0474)
Male		-0.542***	-0.568***
		(0.135)	(0.140)
African American		0.140	0.130
		(0.174)	(0.180)
Relative in assisted living		0.124	0.123
		(0.197)	(0.202)
Constant	6.101***	7.349***	7.229***
	(0.198)	(0.328)	(0.338)
Observations	1,704	1,690	1,690
R-squared	0.057	0.093	0.150

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 21. Policy Preference Factor Score

	(1)	(2)	(3)
VARIABLES	Simple	With covariates	With covariates and County FE
Rate map	0.0789*	0.0668*	0.0869**
	(0.0430)	(0.0379)	(0.0388)
Republican		-0.361***	-0.357***
		(0.0560)	(0.0577)
Democrat		0.199***	0.214***
		(0.0531)	(0.0544)
Ideology		-0.123***	-0.125***
		(0.0146)	(0.0150)
Urban resident		0.0454	0.0588
		(0.0516)	(0.0541)
Age		0.0264**	0.0323**
		(0.0128)	(0.0133)
Male		-0.163***	-0.156***
		(0.0381)	(0.0393)
African American		0.0803	0.0762
		(0.0490)	(0.0508)
Relative in assisted living		-0.194***	-0.170***
		(0.0557)	(0.0569)
Constant	-0.0382	0.489***	0.455***
	(0.0299)	(0.0860)	(0.0885)
Observations	1,677	1,664	1,664
R-squared	0.002	0.239	0.294

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 22. Policy Preference Factor Score, Heterogeneous Effects by Geography

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Atlanta Metro and Dougherty	0.0935	0.0694	0.0802
	(0.0601)	(0.0530)	(0.0531)
Rate map, rest of Georgia	0.0629	0.0642	0.0947*
	(0.0614)	(0.0541)	(0.0570)
Atlanta Metro and Dougerty	0.0508	-0.0351	
	(0.0599)	(0.0532)	
Republican		-0.362***	-0.357***
		(0.0560)	(0.0577)
Democrat		0.200***	0.214***
		(0.0532)	(0.0545)
Ideology		-0.123***	-0.125***
		(0.0146)	(0.0150)
Urban resident		0.0509	0.0589
		(0.0521)	(0.0541)
Age		0.0260**	0.0324**
		(0.0128)	(0.0133)
Male		-0.161***	-0.157***
		(0.0382)	(0.0393)
African American		0.0794	0.0758
		(0.0490)	(0.0508)
Relative in assisted living		-0.194***	-0.169***
		(0.0557)	(0.0569)
Constant	-0.0641	0.510***	0.454***
	(0.0427)	(0.0913)	(0.0886)
Observations	1,677	1,664	1,664
R-squared	0.003	0.240	0.294

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 23. Policy Preference Factor Score, Heterogeneous Effects by Party

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Democrats	-0.00234	0.0206	0.0243
	(0.0605)	(0.0592)	(0.0604)
Rate map, Republicans	0.117*	0.124**	0.154**
	(0.0644)	(0.0629)	(0.0653)
Rate map, Independents	0.0531	0.0593	0.0971
	(0.0806)	(0.0792)	(0.0815)
Republican	-0.563***	-0.391***	-0.383***
	(0.0715)	(0.0741)	(0.0761)
Democrat	0.372***	0.219***	0.250***
	(0.0709)	(0.0729)	(0.0744)
Ideology		-0.123***	-0.125***
		(0.0146)	(0.0150)
Urban resident		0.0457	0.0588
		(0.0517)	(0.0541)
Age		0.0264**	0.0323**
		(0.0128)	(0.0133)
Male		-0.163***	-0.157***
		(0.0381)	(0.0393)
African American		0.0784	0.0741
		(0.0490)	(0.0508)
Relative in assisted living		-0.192***	-0.167***
		(0.0558)	(0.0570)
Constant	0.0273	0.493***	0.449***
	(0.0565)	(0.0928)	(0.0954)
Observations	1,677	1,664	1,664
R-squared	0.195	0.240	0.295

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 24. Behavior Factor Score

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map	0.0116	0.0145	0.0231
	(0.0403)	(0.0385)	(0.0395)
Republican		-0.0793	-0.0730
		(0.0568)	(0.0585)
Democrat		0.115**	0.144***
		(0.0538)	(0.0552)
Ideology		-0.101***	-0.0979***
		(0.0148)	(0.0152)
Urban resident		0.107**	0.109**
		(0.0526)	(0.0552)
Age		0.0595***	0.0606***
		(0.0131)	(0.0136)
Male		-0.194***	-0.204***
		(0.0388)	(0.0400)
African American		0.0595	0.0587
		(0.0497)	(0.0516)
Relative in assisted living		-0.157***	-0.148**
		(0.0565)	(0.0578)
Constant	-0.00563	0.248***	0.217**
	(0.0281)	(0.0868)	(0.0896)
Observations	1,743	1,729	1,729
R-squared	0.000	0.101	0.163

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 25. Behavior Factor Score, Heterogeneous Effects by Geography

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Atlanta Metro and Dougherty	0.0446	0.0324	0.0329
	(0.0563)	(0.0538)	(0.0540)
Rate map, rest of Georgia	-0.0229	-0.00464	0.0119
	(0.0576)	(0.0551)	(0.0578)
Atlanta Metro and Dougerty	-0.0136	-0.0486	
	(0.0563)	(0.0543)	
Republican		-0.0796	-0.0727
		(0.0569)	(0.0586)
Democrat		0.116**	0.144***
		(0.0539)	(0.0552)
Ideology		-0.102***	-0.0980***
		(0.0148)	(0.0153)
Urban resident		0.111**	0.109**
		(0.0531)	(0.0553)
Age		0.0590***	0.0605***
		(0.0131)	(0.0136)
Male		-0.192***	-0.203***
		(0.0389)	(0.0401)
African American		0.0588	0.0590
		(0.0498)	(0.0516)
Relative in assisted living		-0.157***	-0.148**
		(0.0565)	(0.0579)
Constant	0.00134	0.276***	0.218**
	(0.0403)	(0.0921)	(0.0896)
Observations	1,743	1,729	1,729
R-squared	0.001	0.101	0.163

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 26. Behavior Factor Score, Heterogeneous Effects by Party

VARIABLES	(1) Simple	(2) With covariates	(3) With covariates and County FE
Rate map, Democrats	-0.00380	0.0154	0.0112
	(0.0615)	(0.0603)	(0.0616)
Rate map, Republicans	-0.00252	-0.000886	0.0330
	(0.0657)	(0.0642)	(0.0667)
Rate map, Independents	0.0268	0.0367	0.0293
	(0.0811)	(0.0799)	(0.0821)
Republican	-0.170**	-0.0610	-0.0748
	(0.0727)	(0.0758)	(0.0778)
Democrat	0.258***	0.125*	0.153**
	(0.0716)	(0.0738)	(0.0753)
Ideology		-0.101***	-0.0978***
		(0.0148)	(0.0153)
Urban resident		0.107**	0.109**
		(0.0527)	(0.0553)
Age		0.0594***	0.0606***
		(0.0131)	(0.0136)
Male		-0.194***	-0.204***
		(0.0388)	(0.0401)
African American		0.0593	0.0584
		(0.0498)	(0.0517)
Relative in assisted living		-0.158***	-0.147**
		(0.0566)	(0.0579)
Constant	-0.0463	0.238**	0.214**
	(0.0570)	(0.0934)	(0.0962)
Observations	1,743	1,729	1,729
R-squared	0.050	0.101	0.163

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1