# Local news availability does not increase pro-social pandemic response

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**Abstract**

The response to the COVID-19 pandemic in the United States has been notably partisan. However, recent evidence suggests that people have also been directing more attention to local newspapers during this period. Given that local newspapers promote pro-social civic behavior, such as turning out to vote, it is possible that this increase in attention is helping communities to adopt necessary social distancing behavior. To test this possibility, I combine data from Google on mobility in thousands of American counties with counts of the number of newspapers available in each county, as well as county-level pandemic and demographic features, to model changes in staying at home and traveling for retail and recreation purposes. I find that even though behavior change is correlated with local newspaper availability, the association disappears when controlling for additional pandemic and demographic features. The lack of an effect persists even when applying covariate balancing propensity score weighting. The lack of a causal effect of local news availability on social distancing uptake suggests that local news is limited in its ability to undo the politicization of national issues.

One of the central elements of the global response to the COVID-19 pandemic has been the need for people around the world to change their day-to-day behaviors in an attempt to reduce physical contact with others. This push, regularly referred to as 'social distancing', has been codified across the United States through governors' stay-at-home orders, which have established guidelines for essential travel and work. However, these orders, their enforcement, and the perception of their necessity have differed across localities, in part based on partisan differences in the perceived threat posed by the virus [1–5]. These partisan

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differences are likely the product of differing messaging from partisan media outlets and political elites [2, 4, 6, 7]. Even so, the highly localized impacts of the pandemic have led to bigger gains in attention directed to local newspapers than those for nationally-oriented outlets and partisan outlets [8]. This behavior makes sense, given that Americans trust local news outlets over national news outlets when it comes to providing information they can use [9]. But, are these levels of trust and attention leading to increases in pro-social responses to COVID-19, such as staying home more or traveling less? In other words, is this observed increase in turning to local news leading to a less partisan response to COVID-19?

Such a positive effect of turning to local news seems possible because of the well documented pro-social effects of local news availability and coverage on community civics. For example, newspaper closures lead to declines in the rates at which people contact public officials, boycott products or services, join civic groups, and act as an officer for the groups to which they belong [10]. Similarly, the disappearance of local newspapers leads to less accountability of local governments [11]. Exacerbating the accountability issues, declines in local political news have been associated with declines in the political knowledge necessary to evaluate politicians and reductions in voter turnout [12, 13]. In all of these examples, local newspapers promote pro-social behavior by making it easier for the mass public to learn about politics. The same could be true about COVID-19 and how best to respond, given that it is also an unfamiliar topic for which there is a large information asymmetry between elites and the mass public.

In contrast, partisan media exacerbate political and social dysfunction. Partisan media function to create echo chambers that reinforce politically motivated reasoning and prime partisan identities, both of which increase polarization [14]. These polarizing effects also spread through interpersonal discussion between viewers and non-viewers of partisan media [15], making the effects of partisan media widely transmissible. The effects of such polarization do extend to pro-social health behavior. During the 2009 H1N1 swine flu outbreak, Republicans who watched Fox News were less concerned about the virus, which likely led to decreased vaccination rates [16]. In the case of COVID-19, by presenting the pandemic in political terms and downplaying health risks, partisan media could produce dangerous behavioral differences between partisans that could exacerbate the virus's impact.

To test the effect of local news on the adoption of pro-social responses to COVID-19, I take advantage of differences in news availability between counties. By leveraging this variation in the volume of local newspapers available in a county, I generate an estimate of the effect of local news access on changes in travel for retail and recreation and time spent at home for thousands of American counties. While there appears to be a statistically significant relationship while controlling for

pandemic-related features, such as the number of cases in a county, this relationship disappears when adding controls for demographic and political covariates. The effect also fails to appear when applying covariate balancing propensity score weighting. These results point towards an inability on the part of local newspapers to break through existing partisan differences in the response to COVID-19.

# Data and Methods

## Data

I collected mobility data from Google's COVID-19 Mobility Reports [17]. These reports, published for a set of countries and regions, compare how the number of trips and time spent in different types of locations have changed compared to a baseline period from January 3 to February 6, 2020. Each report includes measures for locations classified as recreation or retail, groceries or pharmacies, parks, transit stations, work, and residential. Certain counties did not generate enough data, so Google did not report any values in those cases. The data used in this study came from the reports published on April 2, 2020 for each state. The measures in these reports reflect behavior changes for March 29, 2020.[1]

I combined these mobility data with counts of the number of newspapers operating in each county. These counts were based on the University of North Carolina at Chapel Hill's School of Media and Journalism's Center for Innovation and Sustainability in Local Media's proprietary database of newspapers [18]. These data were originally collected in 2018 and verified using a variety of trade sources.[2]

*The New York Times* originally published the data about the number of cases and deaths in each county I used in this study [19]. Similarly, *The New York Times* also originally published the data about the statewide stay-at-home-orders and the dates they were issued used in this study [20].

I turned to the 2018 American Community Survey (ACS), accessed through the tidycensus package in R, to collect county demographic measures. I combined these with data about food access from the Department of Agriculture [21] and 2012 population density estimates from ESRI [22]. Finally, I also operationalized the partisan lean for each county as each county's 2016 vote share for Hillary Clinton.

[1] Additional reports have been published reflecting changes for April 5, 2020.

[2] More information about the database and how it was constructed can be found on their website.

## Methods

In order to estimate the relationship between local news availability and changes in mobility behavior during the COVID-19 pandemic, I estimated a series of linear models for the 'Retail & recreation' and 'Residential' mobility data. The simplest of these models regressed the change from baseline, reported in percentage-point units, for the given category of location on the number of newspapers published in a county. I followed these models with those additionally controlling for three COVID-19 related features: the number of cases on March 29$^{th}$, the number of deaths on March 29$^{th}$, and whether or not a county was under a statewide stay-at-home order on March 29$^{th}$. To account for further additional demographic and structural covariates, I also estimated models with additional covariates, including those for the racial composition of the county, the county's education level, poverty levels, internet access, food access, population density, and partisan lean. Since some of these covariates are likely confounders related to both local news availability and the response to the pandemic, I estimated a final set of models using covariate balancing propensity score weighting [23]. This approach provides a stronger causal estimate of the effect of newspaper availability on change in mobility behavior. In all cases, the independent variables were centered and standardized and standard errors were clustered within states.

# Results

The simplest models find the expected relationship between the volume of local newspapers available and pro-social behaviors, decreases in retail and recreation travel and increases in spending time at home, to be significant. A one-standard-deviation increase in the number of newspapers available in a county is associated with a 0.51 percentage point increase (95% CI = (0.23, 0.78), p = 0.00036) in the percentage change from baseline in staying at home. Alternatively, the same one-standard-deviation increase in the number of newspapers is associated with a 3.21 percentage point decrease (95% CI = (-4.70, -1.72), p = $2.42 \times 10^{-5}$) in the percentage change from baseline in travel for recreation or retail purposes. Model details can be found in Column 1 of Tables 1 and 2.

However, we should reasonably expect county-wide movement behavior during the COVID-19 pandemic to be affected by the severity of any outbreak in the county. As such, the second set of models I estimated included controls for the number of cases and deaths related to COVID-19 in each county on March 29$^{th}$, as well as an indicator for whether the county's governor had issued a state-wide stay-at-home order and for how long such an order had been in place. Even with these controls, there is still evidence to suggest that the expected relation-

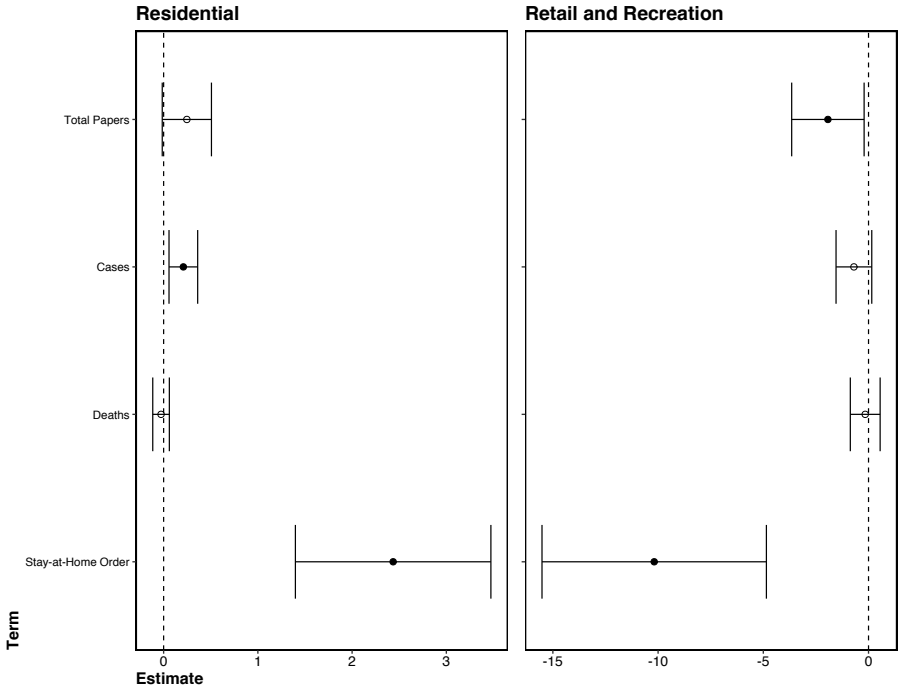


Figure 1: Regression estimates for relationship between total papers in a county and COVID-19 related covariates. All predictors centered and standardized. Standard errors clustered within states.

ship between the volume of local news and pro-social behavior adoption holds. As we can see in Figure 1, the one-standard-deviation change in newspaper count produces only a marginally significant change in the percentage change from baseline for staying at home (b = 0.24, 95% CI = (-0.018, 0.49), p = 0.069). However, the relationship between newspaper count and travel for recreation or retail purposes is still significant and in the expected direction (b = -2.07, 95% CI = (-3.74, -0.40), p = 0.015). The associated model details can be found in Column 2 of Tables 1 and 2.

Do these relationships hold while controlling for county demographic features, such as partisan lean? To answer this question, I re-estimated the models, now including controls for county demographic and structural features. Results from these models are visualized in Figure 2. The features added to this model include operationalizations of other explanations for COVID-19 related behavior, including a county's political lean and income levels. With these additional covariates, the significant relationship disappears for both staying at home (b = 0.057, 95% CI = (-0.18, 0.29), p = 0.64) and retail or recreation related travel (b =

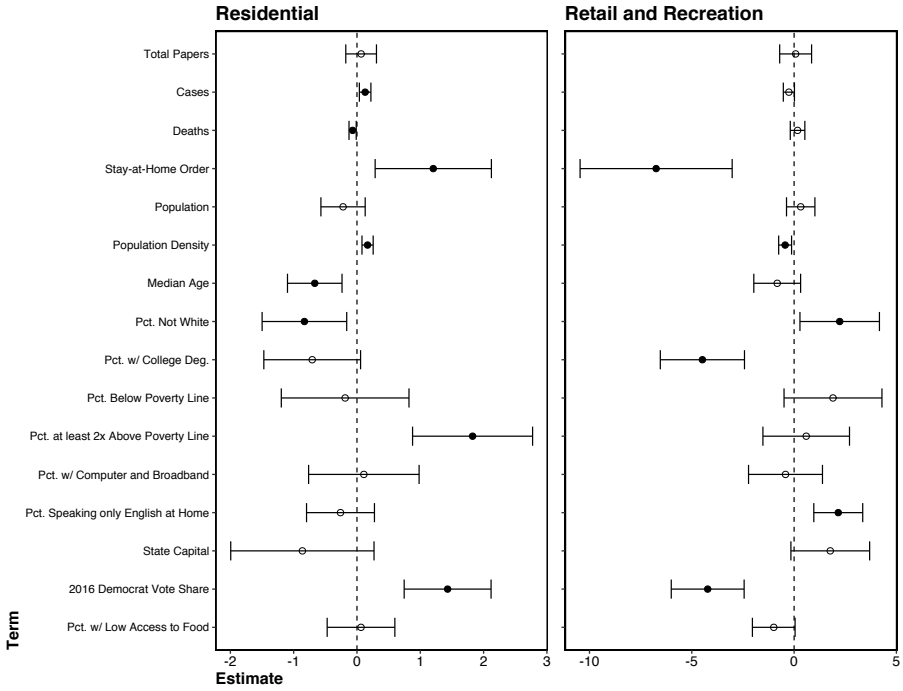


Figure 2: Regression estimates for relationship between total papers in a county with COVID-19 and demographic related covariates. All predictors centered and standardized. Standard errors clustered within states.

-0.0043, 95% CI = (-0.75, 0.74), p = 0.99). Full model specifications are in Column 3 of Tables 1 and 2.

Instead, what we see in both contexts is that a few factors have strong relationships with changes in behavior. In the case of staying at home, the most important are the affluence of the county as proxied by the share of residents living at least two times above the poverty line (b = 1.82, 95% CI = (0.87, 2.77), p = 0.00018), and the county's partisan lean (b = 1.44, 95% CI = (0.75, 2.12), p = $4.59 \times 10^{-5}$). These results align with the observations made elsewhere about the influence of partisanship in responding to the threat of the virus [1], as well as evidence that staying at home during the crisis is made feasible by having more disposable income [24].

In regard to recreation and retail related travel, the factors with the strongest significant relationships to changed behavior are the existence of a stay-at-home order (b = -10.21, 95% CI = (-18.62, -1.80), p = 0.017), the share of the county with a college degree (b = -4.28, 95% CI = (-6.35, -2.21), p = $5.10 \times 10^{-5}$), and the county's partisan lean (b = -4.29, 95%

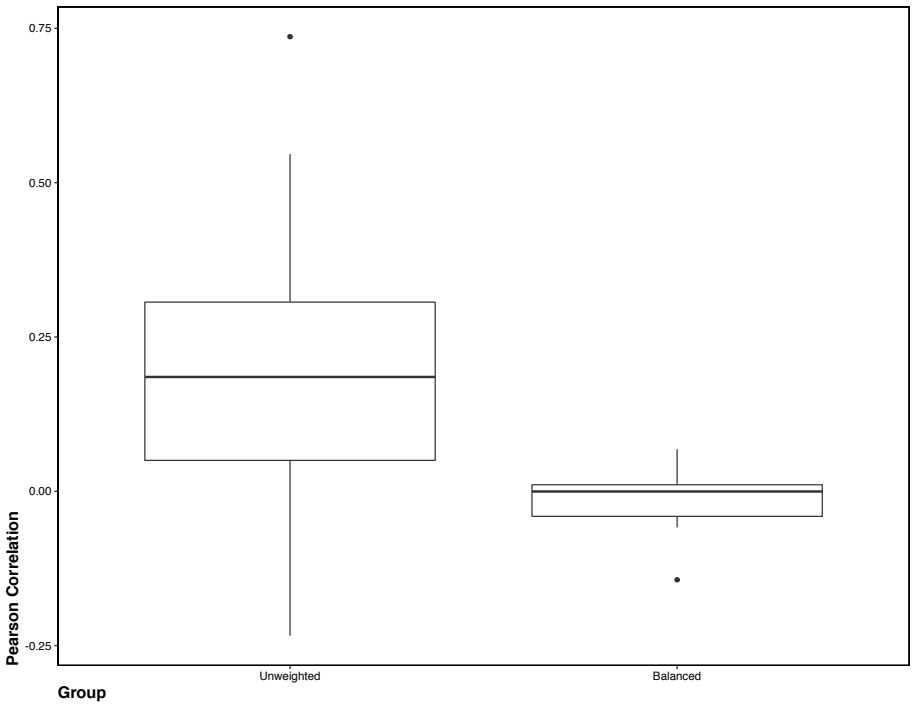


Figure 3: Correlation between covariates and treatment with and without propensity score weighting.

CI = (-6.05, -2.52), p = $2.14 \times 10^{-6}$). These results are, again, in line with expectations. The relationships between change in behavior and the existence of a stay-at-home order, the share of the population with a college degree, and the county's partisan lean all fit popular assumptions about the response to the pandemic.

Even so, the model specifications in Column 3 of Tables 1 and 2 are likely biased by confounding. Covariates like a county's education and income levels are likely to be related to both the treatment, newspaper availability, and the outcomes, change in behavior. To account for this possibility, I conducted covariate balance propensity score weighting. Following [25] and [26], I generated weights based on all observed covariates. This procedure reduced the average correlation between each covariate and treatment (One-sided Wilcox Test: W = 80, p = 0.037), as seen in Figure 3.

Having run the procedure, I re-estimated the models, this time using the weights output from the propensity score model. Addressing potential confounding, these results are more consistent estimates of the effect of local news availability on behavior change than those produced in earlier models. Yet, as we can see in Figure 4, the estimated

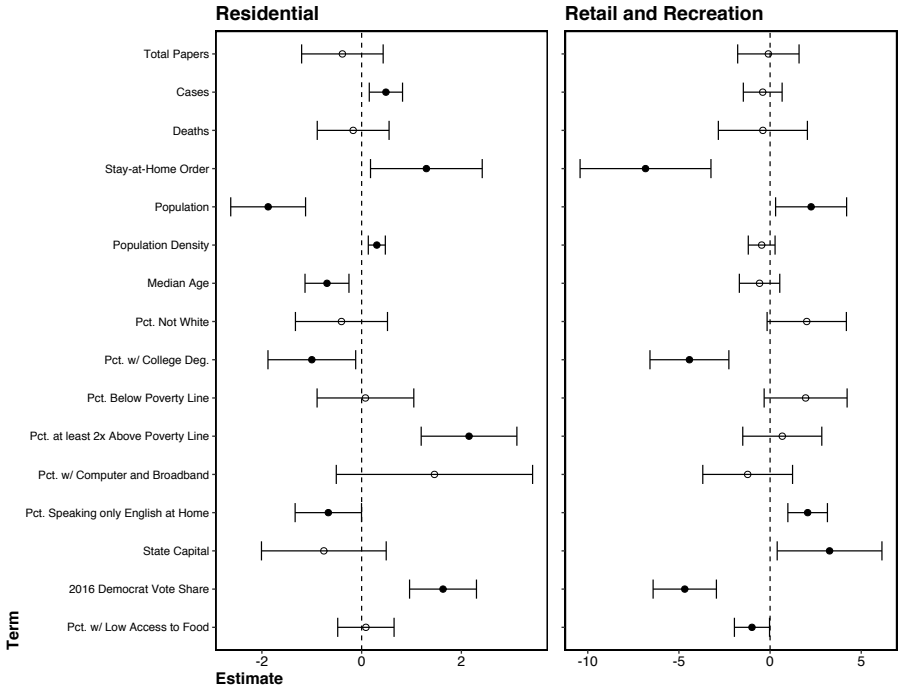


Figure 4: Regression estimates after propensity score weighting. Note that total papers is not significant in either case. All predictors centered and standardized. Standard errors clustered within states.

effects remain statistically insignificant for both staying at home (b = -0.51, 95% CI = (-1.38, 0.36), p = 0.25) and traveling for retail or recreation purposes (b = -0.24, 95% CI = (-2.24, 1.76), p = 0.81). Given that both analyses are sufficiently powered – power estimates indicate that the chance of a false negative is approximately 0 in both cases – the most likely conclusion is that there is no significant effect of local newspaper availability on travel behavior. Full model specifications are reported in Column 4 of Tables 1 and 2.

Of course, my operationalization of the treatment variable as the count of newspapers in a county makes a few assumptions about the nature of the hypothesized treatment effect. However, I also estimated all of the same models with two additional operationalizations of news availability. In the first, I used the standardized and centered log count of newspapers. In the second, I used a binary indicator coded to 1 if a county had any newspaper at all. As shown in Tables S1-S4, these operationalizations do not lead to substantively different conclusions. Local news availability has no significant effect on behavior change in either context.

## Discussion

While there may be behavioral changes leading people to direct more attention to local news outlets, such behavior does not seem to be producing pro-social effects as we would hope. Even though there are significant correlations between the number of local newspapers in a county and a county's percentage-point change in retail and recreation travel and time spent at home, such associations disappear when accounting for pandemic features, such as the number of cases, and demographic features, such as income levels, education levels, and partisan lean.

These results are normatively concerning because they suggest that the pro-social impact of local news may be limited. While local news promotes healthy civic engagement, such as by promoting voter turnout [12, 13], it does not appear to be counteracting the partisan response to the COVID-19 pandemic. The partisan difference in response to COVID-19 is likely due to differences in how partisan media and elites from both parties framed the severity of the virus [6, 7]. As such, these results point towards a substantial limitation for local news to promote pro-social behavior in politically polarized contexts. The implications of such a limitation are concerning, given the possibility of partisan media and elites politicizing essential civic issues, such as voting by mail [27]. If local news is unable to provide essential information early enough, the mass public is likely to be further split along partisan lines.

However, it is important to consider the limitations of this study. Causal inference with observational data is notoriously difficult. However, one of the principal concerns with regression estimates in such cases is that unobserved confounders will account for observed significant relationships. In this case, though, the relationship disappears just controlling for observed confounders and covariates. Even when applying covariate balancing propensity score weighting to generate more consistent estimates of the treatment effect, I find no evidence of any link between local news availability and the adoption of pro-social behaviors.

Similarly, this analysis cannot account for whether increased newspaper volume is associated with county residents giving more attention to the local news. I assume that it does, but if this assumption is wrong it breaks the causal link between news availability and behavior change. Furthermore, increased attention to local news may manifest in attention directed specifically to reporting on basic facts about the spread of the virus and not information about how and why to socially distance. Similarly, local news may not be adequately addressing the information needs of community members during this time, a condition that has been identified in pre-COVID-19 reporting [28, 29].

Additionally, Google's own reports note that in some cases, the change in behavior reported is based on limited data. In these cases, we should assume that the estimates could change dramatically if more data could

have been collected during the baseline window. Furthermore, counties with fewer newspapers are also more likely to be missing outcome observations, especially in regards to staying at home. This association could bias results and pose a threat to validity. However, I do find similar null results between cases with two substantially different degrees of missingness. As more data, especially that from additional sources, becomes available, these results should be tested to see if they replicate.

Altogether, these limitations are relatively minor. The analyses presented here are sufficiently powered, take into account a reasonable set of potential confounders, and ultimately apply appropriate methods for causal inference. I find that, when controlling for pandemic and county demographic features, the relationship between local newspaper volume and behavior change is effectively zero in both the case of travel for retail or recreation purposes and time spent at home. By comparison, partisanship has a much larger effect in both cases.

As America continues to deal with the fallout of the COVID-19 pandemic, it will face new challenges to the regular social and civic functioning of the country. Local news could play an important role in the management and response to these specific challenges, given its ability to inform and mobilize members of the mass public. However, assuming that local news are providing sufficient coverage of the pandemic and providing information on the recommended responses, the evidence presented here indicates that local news coverage is not sufficient to undo the politicization and polarization of issues and behavior. Future research should extend this finding by considering the issue from an audience perspective — *who is responsive to local news?* — and from a production perspective — *how can local news outlets better position their work to lead to pro-social outcomes?* Developing behavioral insights in these specific areas could help develop a more robust and healthy information environment, undermining the pessimistic implications of this study.

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Table 1: Regression estimates for models estimating change in staying at home. All predictors centered and standardized unless otherwise noted. Standard errors clustered within states.

| | *Dependent variable*: $\Delta$ Stay at Home | | | |
|---|---|---|---|---|
| | *No Weighting* | | | *Weighting* |
| | (1) | (2) | (3) | (4) |
| Total Papers | $0.505^{***}$ | $0.236^{*}$ | 0.057 | $-0.509$ |
| | (0.141) | (0.130) | (0.120) | (0.442) |
| Cases | | $0.207^{***}$ | $0.129^{***}$ | $0.553^{***}$ |
| | | (0.079) | (0.048) | (0.197) |
| Deaths | | $-0.029$ | $-0.070^{**}$ | $-0.330$ |
| | | (0.044) | (0.029) | (0.326) |
| Stay-at-Home Order (binary) | | $2.145^{**}$ | 0.702 | 0.492 |
| | | (0.929) | (0.747) | (0.772) |
| Days since Order | | $-0.161$ | $-0.265$ | $-0.443$ |
| | | (0.400) | (0.384) | (0.415) |
| Population Size | | | $-0.224$ | $-1.901^{***}$ |
| | | | (0.183) | (0.419) |
| Population Density | | | $0.169^{***}$ | $0.271^{***}$ |
| | | | (0.047) | (0.098) |
| Median Age | | | $-0.691^{***}$ | $-0.799^{***}$ |
| | | | (0.228) | (0.253) |
| Pct. Not White | | | $-0.863^{**}$ | $-0.384$ |
| | | | (0.342) | (0.487) |
| Pct. w/ College Degree | | | $-0.688^{*}$ | $-1.246^{***}$ |
| | | | (0.379) | (0.461) |
| Pct. Below Povtery Level | | | $-0.199$ | 0.111 |
| | | | (0.522) | (0.521) |
| Pct. at least 2x Above Poverty Level | | | $1.819^{***}$ | $2.270^{***}$ |
| | | | (0.485) | (0.501) |
| Pct. w/ Computer and Broadband | | | 0.095 | $1.848^{*}$ |
| | | | (0.442) | (1.120) |
| Pct. Speak only English at Home | | | $-0.226$ | $-0.623^{*}$ |
| | | | (0.285) | (0.376) |
| Pct. w/ Low Access to Food | | | 0.075 | 0.166 |
| | | | (0.275) | (0.284) |
| State Capital (binary) | | | $-0.805$ | $-1.190^{*}$ |
| | | | (0.592) | (0.642) |
| 2016 Clinton Vote Share | | | $1.436^{***}$ | $1.719^{***}$ |
| | | | (0.349) | (0.346) |
| Constant | $12.029^{***}$ | $11.051^{***}$ | $11.054^{***}$ | $10.564^{***}$ |
| | (0.333) | (0.504) | (0.426) | (0.659) |
| Observations | 1,584 | 1,370 | 1,343 | 1,343 |
| $R^2$ | 0.013 | 0.062 | 0.165 | 0.259 |
| Adjusted $R^2$ | 0.012 | 0.058 | 0.154 | 0.249 |
| Residual Std. Error | 5.642 (df = 1582) | 5.462 (df = 1364) | 5.167 (df = 1325) | 0.111 (df = 1325) |
| *Note:* | | | | $^{*}$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01 |

Table 2: Regression estimates for models estimating change in travel for retail or recreation purposes. All predictors centered and standardized unless otherwise noted. Standard errors clustered within states.

| | *Dependent variable*: Δ Travel for Retail or Recreation | | | |
|---|---|---|---|---|
| | *No Weighting* | | | *Weighting* |
| | (1) | (2) | (3) | (4) |
| Total Papers | −3.212*** | −2.069** | −0.004 | −0.239 |
| | (0.759) | (0.853) | (0.379) | (1.021) |
| Cases | | −0.718* | −0.264** | 0.015 |
| | | (0.435) | (0.119) | (0.628) |
| Deaths | | −0.177 | 0.163 | −1.206 |
| | | (0.380) | (0.192) | (1.148) |
| Stay-at-Home Order (binary) | | −13.274** | −10.210** | −11.494*** |
| | | (6.368) | (4.288) | (4.195) |
| Days since Order | | −1.828 | −1.971 | −2.451 |
| | | (2.571) | (1.603) | (1.611) |
| Population Size | | | 0.263 | 1.704* |
| | | | (0.373) | (0.975) |
| Population Density | | | −0.447*** | −0.483 |
| | | | (0.141) | (0.320) |
| Median Age | | | −0.913 | −0.725 |
| | | | (0.597) | (0.583) |
| Pct. Not White | | | 2.060** | 1.893* |
| | | | (0.949) | (1.077) |
| Pct. w/ College Degree | | | −4.280*** | −4.107*** |
| | | | (1.054) | (1.165) |
| Pct. Below Povtery Level | | | 1.973 | 2.022* |
| | | | (1.236) | (1.169) |
| Pct. at least 2x Above Poverty Level | | | 0.586 | 0.662 |
| | | | (1.074) | (1.078) |
| Pct. w/ Computer and Broadband | | | −0.516 | −1.508 |
| | | | (0.909) | (1.377) |
| Pct. Speak only English at Home | | | 2.332*** | 2.285*** |
| | | | (0.540) | (0.525) |
| Pct. w/ Low Access to Food | | | −0.927* | −0.951* |
| | | | (0.538) | (0.503) |
| State Capital (binary) | | | 2.125** | 6.256*** |
| | | | (0.936) | (2.006) |
| 2016 Clinton Vote Share | | | −4.288*** | −4.826*** |
| | | | (0.902) | (0.873) |
| Constant | −38.469*** | −32.555*** | −33.512*** | −32.672*** |
| | (1.478) | (2.463) | (1.902) | (1.920) |
| Observations | 2,589 | 2,148 | 2,104 | 2,104 |
| $R^2$ | 0.039 | 0.136 | 0.377 | 0.390 |
| Adjusted $R^2$ | 0.038 | 0.134 | 0.372 | 0.385 |
| Residual Std. Error | 16.580 (df = 2587) | 15.649 (df = 2142) | 13.378 (df = 2086) | 0.289 (df = 2086) |
| *Note:* | | | | *p<0.1; **p<0.05; ***p<0.01 |