




LETTER

The Effect of Fox News on Health Behavior during COVID-19

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(Received 22 November 2020; revised 26 July 2021; accepted 5 August 2021; published online 31 July 2023)

Abstract

In the early weeks of the 2020 coronavirus (COVID-19) pandemic, the Fox News Channel advanced a skeptical narrative that downplayed the risks posed by the virus. We find that this narrative had significant consequences: in localities with higher Fox News viewership—exogenous due to random variation in channel positioning—people were less likely to adopt behaviors geared toward social distancing (e.g., staying at home) and consumed fewer goods in preparation (e.g., cleaning products, hand sanitizers, and masks). Using original survey data, we find that the effect of Fox News came not merely from its long-standing distrustful stance toward science, but also due to program-specific content that minimized the COVID-19 threat. Taken together, our results demonstrate the significant impact that misinformation in media coverage can exert on viewers' beliefs and behavior, even in high-stakes situations.

Keywords: COVID-19; public health; media effects; Fox News Channel

Edited by: Jeff Gill

1. Introduction

The effects of media messaging on beliefs and behavior is a topic of substantial academic research (for a recent review, see DellaVigna and La Ferrara 2015). While empirical studies have documented many instances of media effects, they typically do so in contexts where the stakes are low, that is, where accepting and following the information promulgated by the media has little impact on consumers' well-being.¹ Yet, during the coronavirus (COVID-19) pandemic, citizens exposed to media coverage of the virus have had a strong incentive to obtain accurate information to inform their actions and help protect themselves and their families and fight the disease's spread.

Nonetheless, in the 2 months before COVID-19 reached the United States, the hosts of leading shows on Fox News Channel (FNC) repeatedly expressed openly skeptical views of the threat posed by the virus (Abutaleb *et al.* 2020; Badger and Quealy 2020; Peters and Grynbaum 2020). Programs on FNC frequently downplayed COVID-19 as akin to a “normal flu,” ridiculed the “flu panic” and accused those raising alarm as cynically inflating the virus threat to use it as a “political weapon” against President Trump.²

This paper explores whether the beliefs and behavior of viewers were influenced by FNC's skeptical coverage. Or did people rather, when push came to shove, rely on other sources of information and take

¹One exception is La Ferrara, Chong, and Duryea (2012)'s study on fertility choices.

²Supplementary Figure S.2 provides a comparison of FNC to CNN and MSNBC's use of these terms and highlights the differences in coverage (see Section S.2 of the Supplementary Material [SM] for further details).

the precautionary steps recommended by most scientists and health experts? Given the importance of behavioral responses such as self-isolation in reducing COVID-19 growth rates, estimating the effect of media coverage on the public's behavior is of obvious import.

We provide empirical evidence on the impact of FNC's slanted coverage using channel position as an instrument for viewership, and analyze rich, granular data on social distancing and pandemic-related purchases. The channel position instrument allows us to compare COVID-19-related behavior in otherwise similar counties with different levels of FNC viewership. The treatment effects that our instrument identifies are driven by marginal viewers who view more FNC (relative to other channels) when the FNC's channel position is lower in the cable lineup.³ Since there is limited over-time variation in channel position, our instrument does not allow us to disentangle the effects of (mis)information communicated in FNC during the pandemic from longer-term effects of cumulative FNC viewership in the pre-pandemic years on COVID-19-related behavior. To help assess these mechanisms and alleviate concerns related to ecological inference, we also utilize an original survey of 1,480 U.S. respondents from early April 2020.

Our findings highlight several key patterns. In localities with higher exposure to FNC programs, residents were less likely to adopt behaviors geared toward social distancing and prepare less in terms of purchasing COVID-19-related protective goods or for staying at home for a lengthy period. The analysis of the survey data suggests that these effects were not just due to FNC's long-standing skeptical stance toward science, but also due to program-specific content that minimized the COVID-19 threat.

This research contributes to the small but rapidly growing literature on the social and political aspects of COVID-19. Allcott *et al.* (2020) document that conditional on other observables, Republicans engaged in fewer self-isolation actions in response to COVID-19. Egorov *et al.* (2020) find stronger social distancing in Russian cities with higher ethnic fractionalization and xenophobia. Gollwitzer *et al.* (2020) document a correlation between 2016 Presidential election voting and COVID-19 health outcomes, and between conservative media consumption and social distancing. On media influence, Bursztyrn *et al.* (2020) find evidence that viewership of particular Fox News shows has been associated with different COVID-19 health outcomes. Most closely related is a working paper by Simonov *et al.* (2020), which also employs the channel position instrument to show a relationship between Fox News viewership and stay-at-home behavior.

Our study offers a unique contribution to this nascent body of work by considering a broader range of behavioral outcomes, including procurement of COVID-19-related protective goods. Furthermore, we combine insights on the causal effect of FNC viewership on pandemic-related behaviors and health outcomes together with original survey data that shed some light on the mechanisms underlying these effects and alleviate concerns related to erroneous ecological inference. Taken together, we demonstrate the important impact that media coverage can exert on behavior even in high-stakes circumstances, and highlight the fact that such impact is not exclusively driven by a lengthy accumulation of exposure to biased media. Rather, the results suggest that consumers are reactive to misinformation in real-time coverage and act upon it in a consequential manner.

2. Empirical Approach

Despite clear differences in the way different media outlets reported about the pandemic, estimating the impact of a specific channel's coverage on the response of its viewers to COVID-19 poses an empirical challenge on two fronts. First, audiences of different news outlets vary across a range of characteristics such as ideology, education, and socioeconomic status. Such non-random selection means that typical observational studies cannot isolate the effect of watching one news channel over another on the beliefs and behaviors of their viewers. Second, even if media effects are detected, it is hard to ascertain the mechanism of influence. The effect could be event-specific information that shapes viewers' behavior, or

³While we note that our instrument and treatment are both continuous, the quantity identified by our instrument is closely related to the complier (or local) average treatment effect in the binary treatment, binary instrument case.

instead it could be the result of accumulating exposure to the channel's long-standing stance distrustful of science and scientific expertise (Feldman *et al.* 2012; Hmielowski *et al.* 2014; Huertas and Kriegsman 2014).

To get around the first problem, we use channel position as an instrumental variable (IV), an approach first proposed by Martin and Yurukoglu (2017). In using this IV, we exploit the fact that a channel's position in the cable system lineup is exogenously determined, and that on average, viewers zapping through channels tend to spend more time watching programs in channels that are earlier in the lineup (see Sections 1 and 2 of the SM for details). Two key identifying assumptions underlying an IV analysis are relevance and exogeneity. Relevance implies that the channel position should be related to viewership. To test for this, we estimate the first-stage equation as

$$V_i = \alpha + \gamma_s + \gamma Z_i + \beta \mathbf{X}_i + \eta_i, \quad (1)$$

where V_i is FNC average viewership (ratings) in January and February 2020, the instrument Z_i is the FNC channel position in the system lineup in locality i , \mathbf{X}_i 's include covariates that account for pre-determined locality characteristics as well as CNN and MSNBC viewership, γ_s are state fixed effects, and η_i is the error term. Depending on the aggregation level of the outcome (discussed below), locality i refers to a zip code or a county.

Supplementary Figure S.1 shows the first-stage relationship, showing that the channel position in the cable system's lineup, our instrument, is associated with higher FNC viewership.⁴ Exogeneity implies that the channel position should not be correlated with other factors, besides viewership, that would influence the behavioral and health outcomes under study. A series of empirical checks suggest that the instrument is, indeed, exogenous to a range of predetermined location characteristics.⁵

To estimate the FNC effect on adherence to social distancing measures and preparedness for the pandemic over the period of study (February 1 to April 30, 2020), we leverage county-level data that capture a range of relevant behavioral outcomes and employ two-stage least squares (2SLS) regression:

$$Y_{it} = \alpha + \gamma_s + \rho \hat{V}_i + \beta \mathbf{X}_i + \epsilon_{it}, \quad (2)$$

where Y_{it} is the time-varying outcome measure of interest (discussed below) and \hat{V}_i are the fitted values from the first stage. Under the assumptions stated above, ρ captures the local average treatment effect. We also present results from reduced-form regressions (RF), where the outcome is directly regressed on the instrument:

$$Y_{it} = \alpha + \gamma_s + \delta Z_i + \beta \mathbf{X}_i + \epsilon_{it}. \quad (3)$$

Section S1 of the SM provides further details on the estimating equations.

We focus on the following pandemic-related behaviours. First, we use measures of individuals' degree of mobility based on mobile phone device locations provided by SafeGraph. These data measure the time people spent outside their home as well as the distance travelled in each point in time, aggregated to the county level. To assess the steps people have taken to prepare for the pandemic, we supplement the analysis with transaction-level shopping data obtained from Decadata, aggregated to the zip-code level. Specifically, we focus on the purchase of COVID-19-related goods, including face masks, hand sanitizer, cleaning products, toilet paper, and face tissues. The health-related outcomes we analyze—number of COVID-19-related cases and deaths per county and date—are based on data published by the Center for Systems Science and Engineering at Johns Hopkins University. We combine these data with information on zip-code-level channel positions and Nielsen's county-level viewership ratings for each of the main cable news channels (FNC, CNN, and MSNBC) in the first months of the pandemic.

⁴The first-stage F -statistic is 12.48 with a coefficient of -0.103 ($SE = 0.029$). These estimates suggest that a one-standard-deviation increase in FNC position induces a 10% decrease in the channel's viewership.

⁵We assess whether our instrument is systematically correlated with a jurisdiction's predetermined characteristics, which could be correlated with COVID-19 responses or outcomes. These estimates are reported in Supplementary Table S.1.

The main cable news channels differ not only in their reporting on COVID-19, but also in their broader ideological leanings and editorial stance. Pertinently, FNC has long promoted views generally distrustful of both science and scientific expertise (Feldman *et al.* 2012; Hmielowski *et al.* 2014; Huertas and Kriegsman 2014). To tease out whether FNC's influence was limited to the cumulative effect of its science-skeptical editorial stance or whether viewers' behavior mirrored the specific COVID-19 content they saw on certain shows on the channel, we fielded an original survey of 1,480 U.S. respondents. The survey, administered in early April 2020, focused on three dimensions of threat posed by COVID-19: behavior, beliefs, and policy preferences. Section S.3 of the SM provides detailed information on construction of the behavioural measures and Section S.4 of the SM provides more information on the survey, sample, and the questionnaire.

3. Results

Figure 1 reports the main results. Each panel shows a coefficient plot with the point estimates and corresponding confidence intervals from separate regressions for each day, covering our study period from February 1 to April 30, 2020. Panels a and b show daily effects of 2SLS estimates at the county level. Panel c provides weekly RF estimates at the zip-code level. All regressions are weighted by population size.⁶

Figure 1a shows the FNC effect on the average time people spent away from home per day. It is important to stress that in the analyses below, the treatment variable is the additional time viewers spent watching FNC as induced by our instrument, that is, the channel position in the cable lineup. The figure indicates that starting early March, residents in locations with higher FNC viewership spent more time away from home than residents of locations with lower viewership. Similarly, panel (b) documents that residents in localities with higher FNC viewership also traveled farther away from home as compared to respondents residing in localities with lower FNC viewership. Together, these outcomes suggest that an exogenous shift in FNC viewership causes residents to practice, on average, less social distancing. We further investigate the significance of these results by moving from a repeated cross-sectional approach to a panel analysis where we estimate an RF effect for each date in the same regression. In this alternative specification, the daily coefficients on FNC position for the period of March 15 to April 30 are jointly significant (F -statistics=24.2). Panel (c) examines the effect on purchases of COVID-19-related products. Holding all else constant, higher FNC exposure is associated with spending relatively less money on these products.

To put these results in perspective, the estimates imply that a one-standard-deviation decrease in the instrument (38 positions in the lineup) increases FNC ratings by about 0.1 ratings points. A 0.1 increase in rating points equals roughly 11 minutes per week of (additional) FNC viewership for the average household, a 5% increase above the mean viewership duration. Our estimates imply that such a one-standard deviation decrease in the channel position leads to an average increase of 3.5 minutes in the time spent outside per day (based on an average coefficient of 1.2 for the treated period), of 0.3 km in the distance traveled per day (based on average coefficient of 0.6 for the treated period), and a decrease of 106\$ in spending on COVID-19-related products per week.

In light of the general decrease in mobility and increase in COVID-19-related expenditures over the study period (Supplementary Figures S.3 and S.4), these findings imply that residents of localities with higher FNC viewership were less inclined to reduce mobility and increase spending on COVID-19-related products. Overall, these patterns are consistent with the notion that these residents were, on average, less likely to be alarmed by the impending threat of the virus and to adapt their behavior accordingly.

⁶See the SM for estimating equations and further details.

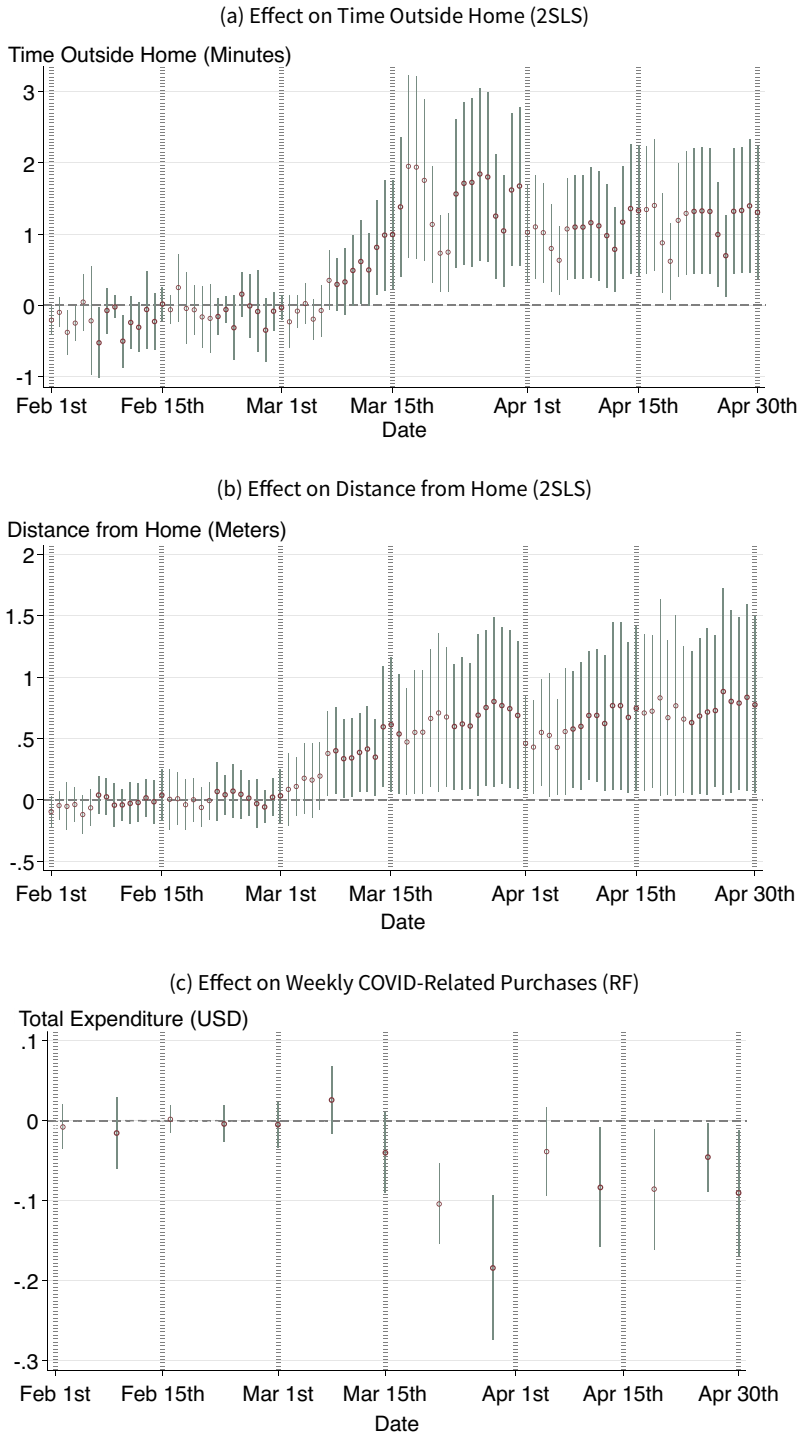


Figure 1. Fox News effect on mobility and COVID-19 outcomes.

Notes: Each panel shows a series of coefficient plots with 95% confidence intervals from regressions of the effect of Fox News Channel viewership on the standardized outcomes. (a,b) Two-stage-least squares (2SLS) regressions for daily outcomes, with standardized viewership instrumented with channel position ($N = 3033$ counties). (c) Reduced-form (RF) regressions with weekly outcome regressed on standardized channel position ($N = 581$ zip codes, 10 states). Regressions include demographic and cable-system controls, described in Section 5.3 of the SM. Standard errors are clustered by state.

Next, we examine whether FNC viewership has had an aggregate impact on the incidence of contracting COVID-19 and on death rates from the virus. Again, we use channel position in the cable box as an instrument for FNC viewership using county-level data. The daily outcome is the number of new cases per county over the last 7 days. We do not find a statistically significant effect of Fox News exposure on infections or on deaths (Supplementary Figure S.23). While the coefficients are consistently positive, the large confidence intervals do not preclude a zero effect of Fox News viewership on these outcomes. Similar results are also found when looking at *per capita* cases and deaths (Supplementary Figure S.24), as well as when extending the study period to June 2020 (Supplementary Figure S.25).

We conduct a series of tests to assess the robustness of the behavioral results. These tests are reported in the SM and include a replication of our main analysis at the zip-code level with county fixed effects (Supplementary Figure S.8), testing the results' sensitivity to specification and sample changes (Supplementary Figures S.10–S.12), including controls for county-level employment composition (Supplementary Figure S.36) or emergency measures (Supplementary Figure S.36), and using the conservative uncertainty estimates proposed in Lee *et al.* (2022) (Supplementary Figure S.37). We also provide reassuring evidence from a set of placebo tests on 2019 mobility (Supplementary Figure S.15) seasonal flu, instead of COVID-19 (Supplementary Figure S.26), viewing other cable news networks (Supplementary Figure S.22) and employment composition (Supplementary Table S.6). Turning to heterogeneity, we find similar effect sizes when we split the sample by levels of schooling (Supplementary Figures S.17 and S.18) and by levels of poverty (Supplementary Figures S.19 and S.20). When splitting the sample by partisan leanings of the county's residents prior to the launch of Fox News, we find similar patterns for mobility (Supplementary Figure S.15) but stronger effects in Republican leaning counties with respect to purchases of COVID-19-related goods (Supplementary Figure S.26). Lastly, using additional data on TV viewership for a sample of Americans from the American Time Use Survey, we find that the FNC channel position does not have an effect on total TV watched (Supplementary Figure S.33), but that counties above the median of TV watching time exhibit a slightly stronger FNC effect compared to those below the median (Supplementary Figure S.34).

To go beyond aggregate behavioral measures and understand how Fox News affects individual attitudes and beliefs, we turn to individual-level survey outcomes. As described in detail in Section S4 of the SM, we measure (i) the timing since respondents modified their behavior due to COVID-19; (ii) whether respondents believe that Hydroxychloroquine, the drug endorsed by President Trump, is an effective treatment for COVID 19; and (iii) whether respondents prefer the government to prioritize public health risks over harm to the economy.

Figure 2 shows the associations of these outcomes with viewership of the three main cable news channels. The underlying regressions adjust for respondents' sociodemographic characteristics. Based on those self-reported survey data, several associations are of note: Respondents who watch FNC are slower to adopt behavioral changes in response to COVID-19 (-0.122 on the timing of change index; $p < 0.05$, always two-sided tests), with smaller and insignificant effects from viewership of CNN and MSNBC; FNC viewers are also 12.4 percentage points more likely to believe that Hydroxychloroquine is an effective treatment against COVID-19 (an increase of 46.8% above the baseline rate; $p < 0.01$); and finally, FNC viewers are a lot more likely to prioritize economic activity over protections of public health (a difference of 0.22, or 65% above the baseline rate; $p < 0.01$). For the latter two outcomes, the views of FNC viewers are significantly different from those of respondents that follow other cable news channels.⁷

The individual-level survey results complement the analysis of the behavioural outcomes and alleviate some concerns related to ecological inference based on aggregate measures. Together, they indicate that FNC viewers are more skeptical of the risk posed by COVID-19 than respondents who do not watch Fox News, and suggest that the FNC effect on self-reported attitudes also translated into observable behavior.

⁷A more indirect channel of influence is also plausible: Viewers who had, through past exposure to FNC, become more conservative in their political leanings may have been more receptive to Trump's repeated touting of the drug's effectiveness.

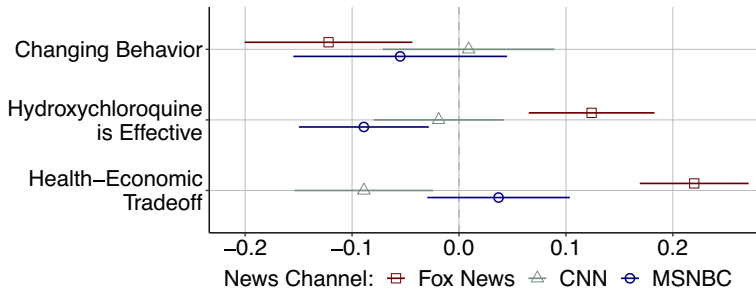


Figure 2. COVID-19-related behavior, beliefs and preferences, by channel viewership.

Notes: Plot shows coefficients along with 95% confidence intervals from regressions of stated survey outcome on news channel viewership, controlling for individual covariates and clustering standard errors by state. Outcomes are self-reported changing of behavior, belief in the effectiveness of Hydroxycloquine as a COVID-19 treatment, and a view on whether the government should focus more on public health relative to economic harms. See Section S6 of the SM for full details.

Next, we seek to shed light on the mechanisms potentially responsible for these effects. A first possible mechanism is partisanship. If Fox News influences its viewers to become Republicans (DellaVigna and Kaplan 2007; Martin and Yurukoglu 2017) and Republicans follow their leadership's more skeptical approach to the threat posed by COVID-19, or if people watch Fox News because it expresses political views matching their own (Stroud 2011), we may be capturing a Republican, rather than a Fox News (mis)information, effect. If pre-COVID-19 differences in partisanship were the sole driver of the results, we would expect that the FNC effects would substantially diminish when we control for respondents' partisan preferences.⁸ Yet, for all three survey outcomes, Supplementary Table S.4 shows that this is not the case. When we include controls for viewers' partisan leanings,⁹ the coefficients for FNC viewership only decrease by about 25%–30% and remain statistically significant at the 5% or 10% level. Perhaps a stronger test of this conjecture is obtained when we substitute the self-reported party ID measure with Republican vote share in past presidential elections. Again, the pattern is similar: For the behavioural outcomes, Supplementary Figure S.27 shows that all results are robust to controlling for (polynomials of) the Republican vote share in the 1996, 2012, and 2016 U.S. presidential elections. Similarly, while we find that FNC viewership influences political ideology and partisanship as reported in the Gallup survey (Supplementary Figure S.28), the FNC effect on COVID-19-related outcomes remains robust to adding those political variables as controls (Supplementary Figure S.29) and interactions (Supplementary Figure S.30). At a minimum, these results are consistent with the idea that pre-COVID-19 differences in partisanship are not the sole driver of the Fox News effect.

The behavioral effects of FNC could be a result of another mechanism, namely the cumulative effect of watching Fox News. Anecdotal and statistical research has documented that Fox News coverage is often antagonistic to science and to the scientific establishment (Feldman *et al.* 2012; Hmielowski *et al.* 2014; Huertas and Kriegsman 2014). This long-run effect on views toward science, in turn, may have led FNC viewers to shun public health instructions by officials and public health experts. A third potential mechanism we explore is the influence of FNC's specific messaging on coronavirus. That is, the differences in COVID-19-related attitudes and behavior may reflect FNC's coverage of the pandemic itself. The specific messaging from programs that promoted a skeptical stance toward the threat posed by the virus would then directly persuade viewers and lead to lower adherence to social distancing among them.

⁸One must note though that if watching FNC conditions viewers' responses to messages from health policy experts in indirect ways that we do not account for, the coefficient on FNC viewership would not necessarily capture the full COVID-19 (mis)information effect of FNC.

⁹The Party ID question used five response options: strong Democrat, lean Democrat, Independent, lean Republican, and strong Republican. We coded Republicans (Democrats) as either strong or lean.

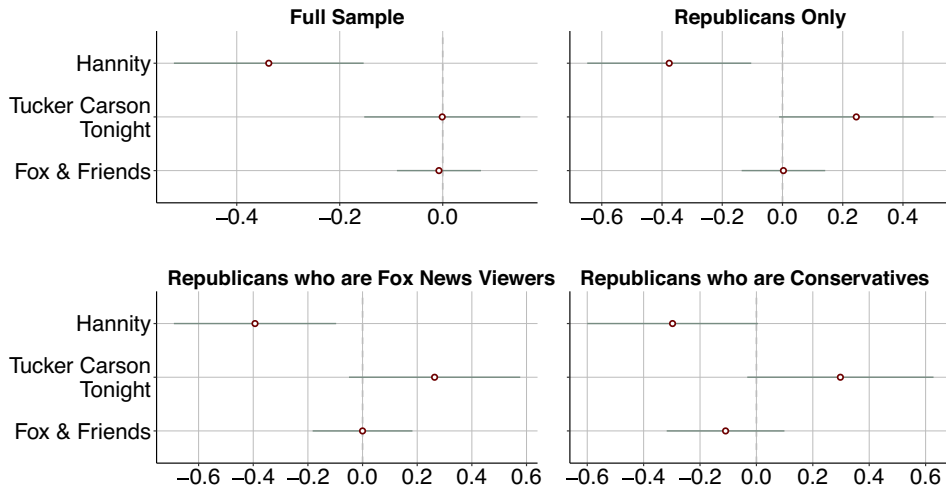


Figure 3. Effects on COVID-19 responses, by Fox News Program.

Notes: Plot shows coefficients along with 95% confidence intervals from regressions of self-reported social distancing measures on viewership of the associated shows, controlling for individual covariates and clustering standard errors by state. Lower values mean less social distancing.

We investigate mechanisms 2 and 3 as follows. Note that if pre-existing differences in, or cumulative effects on, attitudes were driving the results (mechanism 2), we would expect that COVID-19 attitudes and behaviors would not vary across viewers of different shows. That is, different Fox News shows that were similar in their political stance before the pandemic would have the same effect on viewer's behavior with respect to COVID-19, independent of differences in their reporting on the virus. We can take first steps toward exploring this implication using our survey data, where we asked FNC respondents which shows they usually watched. Specifically, we use these data to compare viewers that watch Hannity, Tucker Carlson Tonight, and Fox & Friends. While these shows differ somewhat in both content and audience, all three shows share a strong conservative political slant. However, their coverage of the threat posed by COVID-19, particularly during the early phase of the pandemic, differed markedly. Whereas Hannity had been minimizing the risks, Tucker Carlson had stressed the potential for a pandemic and its harmful impact (Bursztyn *et al.* 2020). The editorial line in Fox & Friends was in between the other two programs in terms of how it described the threat posed by COVID-19.

The results of this comparison are reported in Figure 3. Each panel shows the differences in the self-reported behavioral outcome (adopting of social-distancing measures), for a different subset of survey respondents (full sample, Republicans, Republicans who regularly watch FNC, and Conservative Republicans). While these results are, of course, correlational, the panels show that Fox News viewers of the three shows responded very differently to COVID-19. Hannity viewers were far less likely to adapt social-distancing behaviors than those who did not watch Hannity (-0.33 , $p = 0.001$, about one half a standard deviation). In contrast, with Fox & Friends or Tucker Carlson Tonight, there is no such difference. Subsetting the sample to Republicans, or to Republicans who are conservative and/or regular viewers of Fox, does not change the sign or magnitude of the effect associated with Hannity viewership. Indeed, in some of these subsets, viewers of Tucker Carlson Tonight were somewhat more likely to adopt social-distancing measures than non-viewers (albeit not all of these differences are statistically significant at the 5% level). The corresponding analysis for the other two survey outcomes—beliefs regarding the effectiveness of Hydroxycloquine, and preferences regarding the policy prioritization of the economy versus public health—is discussed in Supplementary Table S.5.

While none of these tests allow us to pinpoint the exact quantitative contribution of the three mechanisms, overall, the evidence provides support for the hypothesis that COVID-19-specific messaging (mechanism 3) underlies at least part of the attitudinal and behavioral responses of FNC viewers. The

longer-term effects of Republican partisanship (mechanism 1) and general skepticism toward scientists and elites (mechanism 2) likely added to this effect.

4. Discussion

Our IV analysis and survey results provide evidence of the substantial impact media coverage has had on beliefs, preferences, and behavior in the context of COVID-19. We find that higher Fox News viewership led to lower compliance with social-distancing measures and lower investment in preparedness. However, we find no evidence that these shifts in behavior significantly affected infections or mortality. Our survey data suggest that the impact of Fox News is not merely related to the network's long-standing partisan stance or its skepticism toward scientific evidence. Rather, the specific messaging in shows with regard to the threat posed by COVID-19 likely contributed to the observed behavioral changes.

Crucially, this impact of FNC's coverage took place in circumstances in which viewers had a strong vested interest in obtaining and adhering to accurate information. Our study thus casts doubt on the notion that the "marketplace of ideas"—a competitive media environment—is sufficiently effective in weeding out misinformation. Rather, widening political polarization poses the threat that biased media coverage of key developments, even those related to a major public health crisis, can have lasting consequences for the beliefs and behaviors of its audience.

Supplementary Material. For supplementary material accompanying this paper, please visit <https://doi.org/10.1017/pan.2023.21>.

Data Availability Statement. Replication code for this article is available in Ash *et al.* (2023) at <https://doi.org/10.7910/DVN/ABOTUG>.

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