**Mask-wearing increased after a government recommendation:
A natural experiment in the U.S. during the COVID-19 pandemic**

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Abstract

On April 3 2020, the U.S. Centers for Disease Control and Prevention (CDC) recommended that all Americans wear face masks to prevent the spread of COVID-19. The announcement came during the fielding of a large, nationally-representative survey ($N = 3,933$) of Americans' COVID-19-related knowledge, attitudes, and behaviors, providing an opportunity to measure the impact of the CDC's recommendation on public reported mask wearing and buying behavior. The study found significant increases in reported mask wearing (+12 percentage points) and mask buying (+7 points). These findings indicate the speed with which government recommendations can affect the adoption of protective behaviors by the public. The results demonstrate the importance of national leadership and communication during a public health crisis.

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Mask-wearing increased after a government recommendation:

A natural experiment in the U.S. during the COVID-19 pandemic

The current coronavirus pandemic (COVID-19) has caused dramatic increases in morbidity, mortality, and economic strain. Because a vaccine is not currently available, individual preventive behaviors are the front line of defense against the spread of the disease. The recommendations of experts are a key source of information for the public (Covello, MacCallum, & Pavlova, 2012; Peters, 2014), and their recommendations can be effective in correcting misinformation (Vraga & Bode, 2017). Thus, understanding how the public responds to the recommendations of experts and government sources is crucial for guiding ongoing public communication efforts. Further, the effects of government agencies' recommendations—and the agencies' corresponding credibility—illustrate the importance of national leadership and clear guidance in times of crisis. In this paper, we examine how a recommendation by the U.S. Centers for Disease Control and Prevention (CDC) that the public should wear protective masks influenced Americans' mask-wearing behavior.

Prior research has shown that people say they would be willing to enact a wide range of behaviors to prevent the spread of an influenza pandemic if, hypothetically, public health officials asked them to. For example, Blendon and colleagues (2008) found that most Americans said they would avoid air travel (93%), avoid public events (92%), or postpone personal events such as parties or funerals (79%) if public health officials recommended it. Despite this evidence that Americans are *willing* to follow official recommendations, it is unclear how *actual* behaviors differ from hypothetical scenarios, how large these effects are, and how quickly they can take hold.

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In this study, we measure self-reported mask wearing during a pandemic before and after the U.S. Centers for Disease Control and Prevention (CDC) recommended that all Americans start wearing face masks to help prevent contracting or spreading COVID-19. We use the timing of the recommendation to assess a natural experiment of whether and how the American public responded to a preventive recommendation by the U.S. government. Our findings advance understanding of behavioral responses among the public to a government health communication in times of crisis, and provide a valid estimate of the *size* of the effect observed in the real world.

On the evening of April 3, 2020, the U.S. Centers for Disease Control and Prevention (CDC) announced new recommendations that all Americans wear face masks. President Trump mentioned this recommendation in his nationally televised public address on the evening of April 3, although some news outlets reported on the probable recommendation beforehand. News outlets began reporting on the actual recommendation late that same evening, and discussion of it in news and social media expanded quickly throughout the day on April 4.

The CDC recommendation to wear masks came after a series of mixed messages from different sources in the preceding weeks. For instance, the U.S. Surgeon General tweeted that masks are not effective, and the World Health Organization decided *not* to recommend that everyone should wear masks (Jingnan, 2020; Sample, 2020). The CDC recommendation seemed to provide clarity and a consistent narrative, based on new knowledge that the virus can spread via asymptomatic individuals, and that the risk of infection could be reduced if wearing masks or other face coverings were widely adopted (Jingnan, 2020).

This breaking news and ensuing coverage occurred while we were fielding a large, nationally-representative survey that measured COVID-19-related knowledge, attitudes, and behaviors, providing an opportunity to test the effect of the government's recommendations as a

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natural experiment. That is, how did reported mask buying and mask wearing change from the days before the CDC's official recommendation to the days immediately after?

Method

Participants

A national sample of respondents in the United States ($N = 4,493$) was recruited by Climate Nexus Polling (April 3-7, 2020), which utilized several market research panels in the U.S. and recruited respondents using stratified sampling methods. Compensation for participants depended on the specific market research panel and respondents' preferences (e.g., cash, gift cards, reward points). Quotas were set to match census parameters for sex, race, age, education, income, and geographic region, and sampling weights were used to account for any small deviations from census parameters. Weighted and unweighted sample demographic breakdowns are available in Supplementary Table 1. This research was approved by the Yale University and George Mason University institutional review boards.

Criteria for handling data exclusions were set before analysis. A total of 560 respondents were not included in analyses because they dropped out of the study soon after starting, did not reach the demographic section of the survey, were not living in the United States, were under 18 years old, or completed the survey in less than 28% of the median response time. After dropping these respondents, the final sample of 3,933 was retained for the following analyses ($n_{\text{April 3}} = 1,740$, $n_{\text{April 4}} = 1,745$, $n_{\text{April 5}} = 292$, $n_{\text{April 6}} = 154$, $n_{\text{April 7}} = 2$).

Materials and Procedure

Respondents were asked diverse questions, including questions about their media consumption, trust in various sources for information about COVID-19, personal values, political beliefs, and which disease-preventive actions they had taken as a result of the COVID-19

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pandemic. To measure individuals' behaviors, we asked "Which, if any, of the following actions have you taken because of the spread of the coronavirus?" (*Yes* = 1; *No, I prefer not to* = 0; *No, I'm not able to* = 0; *Don't know* = missing; *Does not apply to me* = missing). Respondents reported whether or not they had performed each of 27 behaviors, 23 of which were chosen specifically because they help prevent the contraction and spread of COVID-19 (e.g., bought protective masks; worn a mask in public to help protect yourself or others from getting sick; more frequently washed your hands with soap and water; kept at least 6 feet away from other people outside your home; stayed home instead of going to work, school, or gatherings). All survey questions used in this study and corresponding variable codes are available in the Supplementary Information. The Supplementary Information also details the primary results of this study when using alternate coding and adjustment methods.

To increase confidence that the CDC recommendation was responsible for any observed change in mask-related behavior, it is necessary to establish that (a) mask-related behavior was not already increasing at a similar rate prior to the CDC recommendation, and also that (b) other preventive behaviors did not similarly increase at the same time. To accomplish the first, we assessed day-to-day change from before the recommendation to immediately after (April 3rd to April 4th), which can reveal whether observed changes in the following days (once the information had been widely disseminated to, and consumed by, the public) is atypical. To accomplish the second, we assessed the degree to which other COVID-19 preventive behaviors changed across the same time period.

We used regression analyses to compare the likelihood of mask-related preventive behaviors between April 3 and April 4 (i.e., change from the day before to immediately after the recommendation; $n = 3,485$). Similarly, we used regression analyses to compare the likelihood of

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taking/engaging in mask-related preventive behaviors between this initial time period (April 3-4) and the days that followed (April 5-7; $n = 448$). To rule out differences in sample characteristics based on when respondents completed the survey, as well as differences in the spatial trajectory of the spread of the virus, we tested whether the samples significantly differed in demographic breakdown (sex, age, race/ethnicity, income, education), political party, geographic region, and whether respondents believed their community was currently being harmed by COVID-19 (see Results section). Data and analysis code are available on our Open Science Framework project page at <https://osf.io/8th6x/>.

Results

First, we examined the unadjusted mean differences in reported mask buying and mask wearing. From April 3 to 4, there was no significant change in reported mask buying (+2 percentage points, 95% CI[-2, 5]) or mask wearing (+2 pts, 95% CI[-2, 5]). However, once the CDC recommendation had been disseminated for at least one full day (i.e., comparing the April 3-4 period to the April 5-7 period), there were large increases in reported mask wearing (+21pts, 95% CI[16, 27]; 48% to 69%) and mask buying (+16 pts, 95% CI[11, 21]; 43% to 59%). However, tests for sample differences between time periods show that the samples significantly differed by income, race/ethnicity, political party, and geographic region (Table 1). Thus, to get a more accurate estimate of effect size, we controlled for these differences in all of the following analyses. Importantly, there was no difference across time periods in respondents' perceptions of whether their community was currently being harmed by COVID-19. This gave us more confidence in the internal validity of comparing results from the different time periods (April 3-4 vs. April 5-7).

Table 1. Sample characteristics and balance tests for differences across treatment groups

Variable	April 3-4	April 5-7	Sig. Diff.?
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<i>N</i>	3,485	448	
Age	<i>M</i> = 47	<i>M</i> = 46	N
Sex			N
Male	47%	44%	
Female	53%	56%	
Education			N
Less than high school	3%	5%	
High school	27%	24%	
Some college	41%	41%	
College degree or higher	29%	31%	
Income			Y
Less than \$50,000	50%	57%	
\$50,000-\$99,999	34%	30%	
\$100,000 or more	16%	14%	
Race/Ethnicity*			Y
Person of color	29%	84%	
White, non-Hispanic	72%	16%	
Political Party			Y
Republican	39%	23%	
Democrat	43%	54%	
Independent	11%	12%	
No party	6%	9%	
Region			Y
Northeast	20%	13%	
Midwest	22%	14%	
West	19%	28%	
South	39%	45%	
Coronavirus harm timing*			N
They are being harmed right now	55%	53%	
Other	46%	47%	

Note: *Variable was dichotomized because of low sample sizes for select response options. Sig. Diff. = Significant difference. Y = Yes, N = No. Tests of significance were assessed at a $p < .05$ alpha level.

Results controlling for income, race/ethnicity, political party, and geographic region showed there was no significant change from April 3 to 4 in reported mask buying (+2 pts, 95% CI[-2, 5]) or mask wearing (0 pts, 95% CI[-3, 4]). Again, however, once the CDC recommendation had been disseminated for at least one day, there were large increases in reported mask wearing (+12 pts, 95% CI[7, 18]; 49% to 61%) and mask buying (+7 pts, 95% CI[2, 13]; 44% to 51%)¹.

¹To ensure sample differences in the different time periods were appropriately balanced, and that corresponding results did not depend on the method used, we reran analyses using entropy balancing (Hainmueller, 2012). Results were nearly identical for both mask wearing (+13 pts, 95% CI[7, 18]), mask buying (+8 pts, 95% CI[2, 13]), and other preventive behaviors (see Supplementary Table 6). For ease of communication and likely higher familiarity with regression-based covariate adjustment among readers, we use multiple regression in the main text.

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Z-tests indicated that the change between the April 3-4 period and the April 5-7 period was significantly larger for mask wearing ($Z = 3.58, p < .001$) and marginally larger for mask buying ($Z = 1.67, p = .096$), compared to the changes in those behaviors between April 3 and April 4. Further, the increase in mask wearing after the CDC recommendation was significantly larger than the increase in 18 of the 22 other preventive behaviors we measured, and descriptively larger than the increase in the other four (see Figure 1; also see Supplementary Table 3).

As an additional robustness check, we examined whether other behaviors increased more rapidly over the same time period. For example, were people simply paying closer attention to the news about COVID-19 in the days following the CDC recommendation to wear masks? Results show that, if anything, there was a significant *decrease* in attention to the news from the day before to the day after the recommendation ($b = -.06, 95\% \text{ CI}[-.10, -.02]$), but no difference in news attention in the days that followed ($b = .03, 95\% \text{ CI}[-.03, .09]$).

Figure 1. Changes in Americans' COVID-19 preventive behaviors before and after the CDC recommendation that all Americans wear masks.

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Note: Error bars represent 95% confidence intervals.

Next, we examined whether the increases in mask wearing and mask buying behaviors were larger for people with more trust in various sources of information, and also whether the increases were larger for people who were paying closer attention to news about COVID-19. The increase in mask wearing was significantly larger for people who reported more trust in infectious disease experts ($b = .07$, $SE = .03$), $p = .023$, 95% CI[.01, .14] and marginally larger for people with more trust in the CDC ($b = .06$, $SE = .03$), $p = .068$, 95% CI[-.00, .12], but did not vary based on people's reported levels of trust in President Trump ($b = .00$, $SE = .02$), $p = .946$, 95% CI[-.04, .05], or their attention to news about COVID-19 ($b = .01$, $SE = .04$), $p = .758$, 95% CI[-.06, .09]. Among people who reported that they strongly trust infectious disease experts ($n = 2,042$), for example, there was a 17 percentage point increase in mask wearing in the days following the official recommendation (95% CI [10, 25]). In contrast, increases in mask buying were mostly consistent regardless of people's trust in infectious disease experts ($b = .04$, $SE = .03$), $p = .248$, 95% CI[-.03, .10], the CDC ($b = .04$, $SE = .03$), $p = .166$, 95% CI[-.02, .10], or President Trump ($b = -.02$, $SE = .02$), $p = .499$, 95% CI[-.06, .03], and was also consistent across different levels of attention to news about COVID-19 ($b = -.06$, $SE = .04$), $p = .123$, 95% CI[-.14, .02].

It is important to note that using the timing of the CDC recommendation to separate the two time periods we compare is imperfect. That is, after the CDC recommendation, people likely did not hear about it simultaneously or from the same sources. To provide additional context and corroborating evidence, we examined Google Trends news, web, and YouTube searches over the same time period our survey was in the field.

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Results showed that news, web, and YouTube searches for “face mask” all peaked on April 4—the day after the CDC recommendation. Over this same time period, searches for “social distancing,” “hand washing,” and other preventive behaviors did not show the same spike in interest, further suggesting that the CDC recommendation and the ensuing news coverage increased interest and consumption of information related to masks specifically, rather than an increase in searches about preventive behaviors in general (Figure 2).

Figure 2. Google Trends over time in news, web, and YouTube searches.

Note: Date range corresponds to the dates our survey was fielded. Scores of 100 represent peak interest over the chosen time period, whereas a score of 50 represents half the interest. For more information about Google Trends, or to explore other search terms, see trends.google.com.

Discussion

In our national survey, which straddled the release of the CDC recommendation to wear masks, we observed a large increase (12 percentage points) in reported mask wearing, which, when extrapolated to the U.S. population, represents many millions of American adults. The effect of the CDC recommendation was greater among those who have more trust in the CDC and infectious disease experts as sources of information about COVID-19. Consistent with previous research (Druckman, 2001), these results suggest that efforts made by government agencies and scientists to cultivate rapport with and trust from the public improve the likelihood that their recommendations are heeded in times of crisis.

A descriptively smaller but significant increase (7 percentage points) was also observed in mask buying over the same time period. Given that people who have masks can immediately start wearing them, and others can make their own (or use alternatives such as scarves or other clothing), this smaller effect may reflect the increased difficulty in buying masks, which takes more time and effort (and was impossible in some cases).

This study has limitations that should be noted. First, the political and social landscape around COVID-19 is changing rapidly and showing signs of increasing partisan division (van der Linden, Panagopoulos, & Kerr, 2020). Thus, although the current study demonstrates the large and immediate impact government recommendations can have, other important factors, such as social norms, changes in risk perceptions, and cues from elites, including the media (Dryhurst et al., 2020; Goldberg et al., 2020; Van Bavel et al., 2020), are likely to have increasing influence over mask-wearing behavior.

An additional limitation is that, although we found larger increases in mask wearing among people who reported stronger trust in infectious disease experts and the CDC, any

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variables strongly correlated with trust in these entities could theoretically moderate the results as well. For example, greater trust in these entities can reflect differences in political partisanship or socio-economic status. Despite this limitation, the current results are consistent with experimental research showing that credible sources are more influential than sources that are not as credible in the relevant topic area (Druckman, 2001).

Further, given the quickly-changing social and political landscape and trajectory of the pandemic, it is not known how long this increase in mask wearing will last and whether repeated recommendations will have the same effect. Previous research on other topics suggests that the durability of similar messaging effects depends on how strongly people formed their initial attitude towards the message (Chong & Druckman, 2010), whether the recommendation is repeated (Carnahan et al., 2020), and whether people consume information that bolsters or competes with the recommendation—via conversation with others or via additional media consumption (Chong & Druckman, 2013; Druckman & Nelson, 2003; Dryhurst et al., 2020; Goldberg et al., 2019).

Finally, our measure of mask wearing (and other preventive behaviors) is another limitation. First, we rely on self-reports. Thus, our measure is susceptible to bias depending on whether respondents see particular preventive behaviors as (un)favorable to their image. It is worth noting that respondents were assured their responses were anonymous, but even anonymous responses may be subject to social desirability bias. Further, because we did not anticipate the timing of the government recommendation and widespread advice from experts that everyone wear a mask—even if just a cloth face covering (e.g., scarf, bandana, home-made mask)—we did not specifically ask respondents about cloth face coverings. We therefore do not

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know if respondents considered cloth face coverings or home-made masks when reporting whether or not they bought or wore a mask.

Despite these limitations, our findings provide evidence that official recommendations in times of crisis can have large and immediate effects on the health behaviors of the public and provide a robust estimate of the size of those effects in a real crisis. These findings provide a rare glimpse into the speed with which recommendations from trusted officials can begin to affect the health behaviors of the American public, and point to the importance of consistent, credible national leadership in times of crisis.

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Supplementary Information

Supplementary Table 1

Demographic characteristics of this sample (Total $N = 3,933$).

Variable	Weighted (%)	Unweighted (%)
Age		
18-29	19	18
30-39	34	38
50-64	27	25
65+	20	19
Sex		
Male	49	47
Female	51	53
Race/Ethnicity		
White, non-Hispanic	62	65
Black, non-Hispanic	12	13
Hispanic/Latino	17	16
Other or 2+ races, non-Hispanic	8	7
Education		
Less than high school	9	3
High school	29	26
Some college	29	41
Bachelor's degree or higher	33	29
Political Party		
Democrat	44	44
Independent	11	11
Republican	38	37
No party/Not interested	7	7

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Supplementary Table 2

Measurement and coding for all variables used in the analyses.

Variable	Measure	Coding
Preventive behaviors	<p>Question stem: <i>“Which, if any, of the following actions have you taken because of the spread of the coronavirus?”</i></p> <p>[27 separate items]</p> <ul style="list-style-type: none"> - More frequently washed your hands with soap and water - Bought protective masks - Worn a mask in public to help protect yourself or others from getting sick - More frequently covered your mouth and nose with a tissue when coughing or sneezing - More frequently coughed or sneezed into your elbow or shoulder - More frequently cleaned or disinfected your home or workspace - Stopped shaking hands with people - Stopped hugging and kissing close friends or relatives - Limited your use of public transportation, buses, or trains - Limited your use of ridesharing services (e.g., taxi, Lyft, Uber) - Kept at least 6 feet away from other people outside your home - Stayed home instead of going to work, school, or other regular activities - Avoided places where many people gather, like shopping centers, markets, movie theaters, or sporting events - Reduced your attendance at church, temple, mosque, or other place of worship - Avoided family or personal events, such as parties, wedding ceremonies, or funeral services - Avoided getting together with family and friends - Sought mental health counseling - Called or checked in on friends, family, or neighbors - Made preparations to stay at home if you or a family member are sick - Stopped traveling outside my local area - Applied for unemployment insurance - Stocked up on items such as food, household supplies, or prescription medications - Purchased a gun and/or ammunition - Worked from home - Chosen to keep children at home or away from others (e.g., playgrounds) - Avoided restaurants - More frequently used hand sanitizer 	<p>Yes = 1 No, I prefer not to = 0 No, I'm not able to = 0* Don't know = missing* Does not apply to me = missing</p> <p>*Tables S3-S5 report the results when using alternate coding for these two response options.</p>
Day respondent completed the survey (for analyses within the initial time period: April 3 and April 4)	Coded from timestamp automatically recorded by Qualtrics survey software	April 3 = 0; April 4 = 1
Day respondent completed the survey (for analyses between time periods: April 3-4 to April 5-7)	Coded from timestamp automatically recorded by Qualtrics survey software	April 3-4 = 0; April 5-7 = 1
Sex	Are you...?	Male = 1; Female = 2

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Age	What is your age?	Open response
Income	We would like to get an estimate of your total HOUSEHOLD income in the past 12 months before taxes. Was it...?	Under \$50,000 = 1; \$50,000-\$99,999 = 2; \$100,000 or more =3
Education	What is the highest level of school you have completed?	Less than high school = 1; High school = 2; Some college = 3; Bachelor's degree or higher =4
Race/Ethnicity	Are you Spanish, Hispanic, or Latino? (Yes; No); Please choose one or more race(s) that you consider yourself to be (White; Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian or other Pacific Islander; Some other race)	White, Non-Hispanic = 1; Person of color = 2
Political party	Generally speaking, do you think of yourself as... (Republican; Democrat; Independent; Other; No party / not interested in politics); [If "Independent" or "Other"] Do you consider yourself closer to the... (Republican Party; Democratic Party; Neither)	Coded into dummy variables with Independents as the reference group
Region	What U.S. State do you live in? Or do you live in a U.S. Territory or other country?	Coded into dummy variables representing regions Northeast, Midwest, South, and West with South as the reference group
Source Trust	How much do you trust or distrust the following organizations or people as a source of accurate information about the coronavirus? [Infectious disease experts; The U.S. Centers for Disease Control (CDC); President Trump]	Strongly distrust = 1, Somewhat distrust = 2, Somewhat trust = 3, Strongly trust = 4
Attention to COVID-19 news	How closely have you been following news about the coronavirus?	Not at all closely = 1, Not too closely = 2, Fairly closely = 3, Very closely = 4

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Supplementary Table 3

Results for each behavior in each comparison period (i.e., April 3 vs April 4; April 3-4 vs April 5-7) when coding responses to the behavior items corresponds to those stated in Table S1. “Yes” = Yes (1), “No, I prefer not to” = No (0), “No, I’m not able to” = No (0), “Don’t know” = missing, “Does not apply to me” = missing. This coding and the results below correspond with the results reported in the main text.

Preventive Behaviors	April 3 vs April 4 <i>b</i> [95% CI]	April 3-4 vs April 5-7 <i>b</i> [95% CI]
Hand washing	.01 [-.00, .03]	.04 [.02, .07]*
Mask buying	.02 [-.02, .05]	.07 [.02, .13]
Mask wearing	.00 [-.03, .04]	.12 [.07, .18]
Tissue use for coughing/sneezing	.00 [-.02, .02]	.04 [.01, .07]*
Cough/sneeze into elbow	.00 [-.02, .03]	.04 [.00, .07]*
Disinfect home/workspace	-.03 [-.05, -.01]	.06 [.02, .09]*
Stopped shaking hands	.00 [-.02, .02]	.04 [.01, .07]*
Stopped hugging/kissing	-.02 [-.04, .00]	.06 [.03, .10]
Limit public transportation	.01 [-.02, .04]	.05 [.01, .09]*
Limit ridesharing (taxis, Lyft, Uber)	.02 [-.02, .05]	.06 [.01, .10]
Maintain 6ft from others	.00 [-.02, .02]	.03 [.00, .06]*
Stayed home school/work/other	-.03 [-.05, .00]	.03 [-.01, .07]*
Avoid crowded places	.01 [-.01, .03]	.00 [-.03, .04]*
Reduced visiting place of worship	.02 [-.00, .04]	.04 [.01, .08]*
Avoid personal events	.01 [-.02, .03]	.01 [-.02, .04]*
Avoid being with family/friends	-.01 [-.03, .02]	.02 [-.02, .05]*
Prepare to stay at home	.01 [-.01, .04]	.05 [.02, .09]*
Stopped traveling outside local area	.01 [-.01, .04]	.01 [-.02, .05]*
Stocked up on food/supplies/medication	-.02 [-.05, .01]	.04 [-.01, .08]*
Worked from home	-.06 [-.10, -.02]	-.04 [-.10, .02]*
Kept children home	.02 [-.01, .06]	.05 [.01, .10]
Avoided restaurants	.01 [-.01, .03]	.00 [-.03, .03]*
Used hand sanitizer	.00 [-.02, .03]	.02 [-.02, .06]*

Note: *Increase in mask wearing was significantly larger than increase in corresponding preventive behavior over the same time period.

GOVERNMENT RECOMMENDATION TO WEAR MASKS

Supplementary Table 4

Results for each behavior in each comparison period (i.e., April 3 vs April 4; April 3-4 vs April 5-7) when using an alternative coding method. In this method, the responses to the behavioral items were coded as: “Yes” = Yes (1), “No, I prefer not to” = No (0), “No, I’m not able to” = missing, “Don’t know” = missing, “Does not apply to me” = missing.

Preventive Behaviors	April 3 vs April 4 <i>b</i> [95% CI]	April 3-4 vs April 5-7 <i>b</i> [95% CI]
Hand washing	.00 [-.01, .01]	.02 [-.00, .03]*
Mask buying	-.01 [-.05, .03]	.07 [.01, .13]
Mask wearing	-.02 [-.05, .02]	.10 [.05, .16]
Tissue use for coughing/sneezing	-.00 [-.02, .01]	.01 [-.01, .04]*
Cough/sneeze into elbow	-.01 [-.01, .02]	.01 [-.01, .04]*
Disinfect home/workspace	-.02 [-.04, -.01]	.03 [.01, .06]*
Stopped shaking hands	.00 [-.02, .02]	.02 [-.00, .04]*
Stopped hugging/kissing	-.03 [-.05, -.01]	.04 [.01, .07]*
Limit public transportation	-.01 [-.03, .01]	.04 [.01, .07]*
Limit ridesharing (taxi, Lyft, Uber)	.01 [-.01, .04]	.04 [.00, .07]*
Maintain 6ft from others	.00 [-.01, .02]	.02 [-.00, .04]*
Stayed home school/work/other	-.00 [-.02, .01]	.03 [.00, .05]*
Avoid crowded places	.02 [.00, .03]	-.00 [-.03, .02]*
Reduced visiting place of worship	.01 [-.01, .03]	.02 [-.01, .04]*
Avoid personal events	.00 [-.01, .02]	-.02 [-.05, .00]*
Avoid being with family/friends	-.01 [-.03, .01]	.01 [-.02, .03]*
Prepare to stay at home	.00 [-.01, .02]	.02 [-.01, .04]*
Stopped traveling outside local area	-.00 [-.02, .02]	.01 [-.02, .04]*
Stocked up on food/supplies/medication	-.02 [-.05, .00]	.02 [-.02, .06]*
Worked from home	.02 [-.01, .05]	.04 [.00, .08]
Kept children home	-.01 [-.04, .01]	.03 [-.01, .06]*
Avoided restaurants	-.01 [-.03, .01]	-.02 [-.04, .01]*
Used hand sanitizer	.01 [-.02, .03]	.01 [-.02, .05]*

Note: *Increase in mask wearing was significantly larger than increase in corresponding preventive behavior over the same time period.

GOVERNMENT RECOMMENDATION TO WEAR MASKS

Supplementary Table 5

Results for each behavior in each comparison period (i.e., April 3 vs April 4; April 3-4 vs April 5-7) when using an alternative coding method. In this method, the responses to the behavioral items were coded as: “Yes” = Yes (1), “No, I prefer not to” = No (0), “No, I’m not able to” = No (0), “Don’t know” = No (0), “Does not apply to me” = missing.

Preventive Behaviors	April 3 vs April 4 <i>b</i> [95% CI]	April 3-4 vs April 5-7 <i>b</i> [95% CI]
Hand washing	.01 [.01, .03]	.06 [.03, .08]*
Mask buying	.01 [-.02, .05]	.08 [.03, .13]
Mask wearing	.01 [-.03, .04]	.12 [.07, .17]
Tissue use for coughing/sneezing	-.00 [-.03, .02]	.06 [.02, .09]*
Cough/sneeze into elbow	-.00 [-.03, .02]	.05 [.02, .09]*
Disinfect home/workspace	-.03 [-.05, -.01]	.07 [.04, .11]
Stopped shaking hands	.00 [-.02, .02]	.05 [.02, .08]*
Stopped hugging/kissing	-.02 [-.05, .01]	.08 [.04, .12]
Limit public transportation	.01 [-.02, .04]	.07 [.03, .11]
Limit ridesharing (taxi, Lyft, Uber)	.01 [-.03, .04]	.07 [.02, .11]
Maintain 6ft from others	.00 [-.02, .02]	.03 [-.00, .06]*
Stayed home school/work/other	-.03 [-.06, .00]	.03 [-.01, .07]*
Avoid crowded places	.01 [-.02, .03]	-.01 [-.03, .04]*
Reduced visiting place of worship	.01 [-.01, .04]	.05 [.01, .09]*
Avoid personal events	.01 [-.01, .04]	.02 [-.01, .06]*
Avoid being with family/friends	-.01 [-.03, .02]	.02 [-.01, .06]*
Prepare to stay at home	.01 [-.01, .04]	.05 [.02, .09]*
Stopped traveling outside local area	.01 [-.02, .03]	.03 [-.00, .07]*
Stocked up on food/supplies/medication	-.02 [-.05, .01]	.05 [.00, .09]*
Worked from home	-.06 [-.10, -.02]	-.02 [-.08, .04]*
Kept children home	.02 [-.02, .05]	.07 [.02, .12]
Avoided restaurants	.01 [-.01, .03]	.00 [-.03, .04]*
Used hand sanitizer	-.00 [-.03, .02]	.03 [-.01, .07]*

Note: *Increase in mask wearing was significantly larger than increase in corresponding preventive behavior over the same time period.

GOVERNMENT RECOMMENDATION TO WEAR MASKS

Supplementary Table 6

Results for each behavior in each comparison period (i.e., April 3 vs April 4; April 3-4 vs April 5-7) when using another covariate adjustment method (i.e., entropy balancing; Hainmueller, 2012). Coding of behavior items corresponds to those stated in Table S1 and the main text.

Preventive Behaviors	April 3 vs April 4 <i>b</i> [95% CI]	April 3-4 vs April 5-7 <i>b</i> [95% CI]
Hand washing	.02 [-.00, .03]	.04 [.02, .06]*
Mask buying	.01 [-.03, .05]	.08 [.02, .13]
Mask wearing	.01 [-.03, .04]	.13 [.07, .18]
Tissue use for coughing/sneezing	.00 [-.02, .02]	.04 [.01, .07]*
Cough/sneeze into elbow	.01 [-.01, .03]	.04 [.00, .07]*
Disinfect home/workspace	-.03 [-.05, -.01]	.06 [.02, .09]*
Stopped shaking hands	.01 [-.01, .03]	.04 [.01, .07]*
Stopped hugging/kissing	-.02 [-.05, .00]	.06 [.02, .10]*
Limit public transportation	.01 [-.02, .04]	.05 [.01, .09]*
Limit ridesharing (taxis, Lyft, Uber)	.01 [-.02, .04]	.06 [.01, .10]*
Maintain 6ft from others	.00 [-.02, .02]	.03 [.00, .06]*
Stayed home school/work/other	-.02 [-.05, .00]	.03 [-.01, .07]*
Avoid crowded places	.01 [-.01, .03]	.00 [-.04, .03]*
Reduced visiting place of worship	.02 [-.00, .04]	.04 [.01, .08]*
Avoid personal events	.01 [-.01, .03]	.01 [-.03, .04]*
Avoid being with family/friends	-.01 [-.03, .01]	.02 [-.02, .05]*
Prepare to stay at home	.01 [-.01, .04]	.05 [.02, .09]*
Stopped traveling outside local area	.01 [-.01, .03]	.01 [-.02, .05]*
Stocked up on food/supplies/medication	-.03 [-.06, .01]	-.04 [-.01, .08]*
Worked from home	-.08 [-.12, -.04]	-.04 [-.10, .02]*
Kept children home	.03 [-.01, .06]	.05 [.01, .09]*
Avoided restaurants	.01 [-.01, .03]	-.00 [-.03, .03]*
Used hand sanitizer	.01 [-.02, .03]	.02 [-.03, .06]*

Note: *Increase in mask wearing was significantly larger than increase in corresponding preventive behavior over the same time period.