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Research Article

To shop or shelter? Issue framing effects and social-distancing preferences in the COVID-19 pandemic

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Abstract: As a result of SARS-CoV-2, the virus that causes coronavirus disease (COVID-19), U.S. federal, state, and local governmental officials have struggled to coordinate consistent, coherent messaging for citizens to social-distance. The pandemic presents an important context for examining alternative communication frames employed by governments. This study presents results from an artefactual survey experiment in which public-health information regarding COVID-19 was transmitted to a panel of U.S. adult respondents via alternative issue frames and messengers. The findings highlight the importance of delivering consistent messages to the public. Public-health frames positively influence citizen preferences for avoiding unnecessary travel. Conversely, economic frames appear to have the opposite effect, increasing the preference to make unnecessary trips to shop. However, federal messengers appear to strengthen the framing effect relative to expert messengers.

Keywords: Messenger effect, Issue framing, COVID-19, Bayesian inference, Experiment

Supplements: Open data, Open materials, Preregistered

SARS-CoV-2, the virus that causes coronavirus disease (COVID-19), has exposed a lack of governmental capacity and preparedness for pandemics within the United States and around the globe since its emergence in December 2019 (Babiker, Ahmed, Charlie, Charles, & Jeannette, 2020). Besides the much-publicized failures to make enough tests and medical supplies available, U.S. federal, state, and local governmental officials have struggled to coordinate a consistent, coherent message for citizens to social-distance. President Donald Trump has quarreled with governors and belittled the media.[1] Federal health agency experts have been sidelined or contradicted.[2] Some states, such as Florida and Texas, have appeared to prioritize the economic consequences of the pandemic.[3] In households across the country, citizens are being exposed daily to contradictory arguments from various messengers on the need to shelter vs. preserve the economy (Kushner, Shana, Sara, & Thomas, 2020).

This study presents results from an artefactual survey experiment in which public-health information regarding COVID-19 was transmitted to a panel of U.S. adult respondents via alternative issue frames and different government messengers. Research in political science, psychology and public administration has identified framing effects, in which recipients draw differing conclusions about an issue or policy based on receiving substantively distinct "frames" or considerations (Aarøe, 2011; Belardinelli, Paolo, Nicola, Mariafrancesca, & Ileana, 2018; Dogan, Ebru, Jan, & Linda, 2014; Chong & Druckman, 2007b; Gross, 2008). These effects are not well-understood in the context of federalism and crisis communications, in which many

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messengers might compete to be heard, and authority and responsibility for policies is diffused across units and levels of government (Chong & Druckman, 2007a; Vlaev, Ivo, Dominic, Paul, & Ara Darzi, 2016). Following prior research (Hafner, Rebecca, David, & Daniel, 2019), this online experiment utilized two manipulations - altering substantive economic vs. public-health frames and contrasting authoritative and expert messengers - to examine U.S. citizens' intention to practice greater social distancing in the midst of the COVID-19 pandemic. The findings highlight the importance of delivering consistent messages to the public. Within the current deluge of information about the virus, public-health frames positively influence citizen preferences for avoiding unnecessary travel. Conversely, economic frames appear to have the opposite effect, increasing the preference to make unnecessary trips to shop. However, federal messengers strengthen the framing effect while expert messengers negatively moderate it.

The Communication Frames Surrounding Social Distancing

The impacts of alternative "frames" on the citizenry's policy preferences have a rich intellectual history across the social sciences (Battaglio, R. Paul, Jr., Paolo, Nicola, & Paola, 2018; Chong & Druckman, 2007a; Gross, 2008; Zaller & R, 1992; Tversky & Kahneman, 1981). Broadly, citizens have been found highly susceptible to framing-effects in their health choices (Gallagher & Updegraff, 2012), and political preferences (Sniderman & Theriault, 2004); this extends to both equivalency framing, in which the wording of two essentially identical questions causes individuals to be more or less risk-averse (Olsen, 2015; Tversky & Kahneman, 1981) as well as issue emphasis framing, where highlighting separate considerations prompts a change in citizen preferences (Chong & Druckman, 2007a). This study focuses on the latter use of issue framing, which is commonplace in public policy and administrative contexts (Lodge & Taber, 2013). Politicians, think-tanks, activists, and the media constantly attempt to frame policy issues - known as communication frames - in ways which highlight specific elements for consideration (e.g. personal liberties vs. public safety, economy vs. environment) while minimizing others (Druckman, 2001a; Nelson, Oxley, & Clawson, 1997). A framing effect is believed to occur through a dual process, with changes in the cognitive importance of issue-specific-considerations and message content mediating the effect and personal beliefs moderating it (Slothuus, 2008). For this process to occur, an individual must be either presented with a new frame, or they must be able to retrieve specific considerations from long-term memory -- accessibility, for instance, due to recent exposure to specific communication frames (Druckman, 2004). At some level, individuals are thought to draw from available beliefs in memory to evaluate (consciously or unconsciously) the relevance or applicability of a frame (Chong & Druckman, 2007a). When frames present opposing considerations, they are more motivated to reconcile these differences (Chong & Druckman, 2007a; Slothuus, 2008).

The COVID-19 pandemic presents an important context for examining alternative communication frames employed by governments (Utych & Fowler, 2020; Van Bavel et al., 2020). While scientists around the globe have scrambled to find new detection and treatment methods, government officials have had both an ethical obligation and political imperative to engage with the public (Bernheim, 2016; Everett, Jim, Clara, Vladimir, William, & Molly, 2020; Leach, 2020). On a daily basis since early March, millions of Americans have watched sometimes dueling press conferences in which varying levels of governmental officials and health experts have provided updated contagion and fatality figures, announced new travel or social-distancing directives and guidelines and, often times, speculation about when sheltering and business-closing orders may be lifted (Jordan, Yoeli, & Rand, 2020).

In political science and communication studies, frames around specific issues or events are identified (typically through media coverage), linked to specific attitudes (disposition toward the economic or health implications of a disaster), and inductively coded (Aarøe, 2011; Chong & Druckman, 2007a; Gross, 2008; Slothuus, 2008). The two major governmental frames surrounding COVID-19 have involved highlighting the potential public-health or economic consequences of specific courses of action (Cinelli, Matteo, Walter, Alessandro, Carlo, Emanuele, Ana, Paola, Fabiana, & Antonio; 2020). Officials with the U.S. Centers for Disease Control and Prevention (CDC), the White House Coronavirus (COVID-19) Task Force, and other health care experts have tended to convey a public-health-oriented message centered on hand-washing, cleaning surfaces, wearing masks, and social-distancing. President Trump, along with some state and local elected officials, have also regularly emphasized the economic dimension of the crisis. In some cases, these messengers

have implied that higher fatalities would be acceptable over greater economic losses, as well as deviated from expert guidance on when business and travel restrictions could be eased. In summary, U.S. citizens have likely encountered both issue frames repeatedly since the pandemic was declared a national emergency on March 13, 2020, making them accessible, with varying assessments of applicability to the situation. Based on national media discourse, these opposing considerations have likely been placed in competition with each other in the minds of most receivers. Drawing from the issue framing literature, we first test whether these alternative frames influence citizens' preference for social-distancing:

Framing Hypothesis (H1): A pro-public-health issue frame will be positively associated with social-distancing preference.

Framing effects can be moderated by partisan identification or ideology, as well judgements about the credibility of the messenger (Achen & Bartels, 2017; Chong & Druckman, 2007a; Druckman, Fein, & Leeper, 2012; Slothuus, 2008). The second component of the analysis considers the role of messengers as moderators of the message (Druckman, 2001b). The tendency of individuals to alter how they process information based on characteristics of the person delivering the message has been widely studied in behavioral economics, psychology, and marketing (Dolan, P., Hallsworth, Halpern, King, Metcalfe, & Vlaev, 2012; Maclean, Buckell, & Marti, 2019; Kassin, 1983; Wood, Solomon, & Englis, 2005). These literatures have amassed evidence which suggests we are more likely to comply with directives when they come from authoritative sources (Hofling, C., Brotzman, Dalrymple, Graves, & Pierce, 1966), from people who are similar to us (Durantini, Marta, Dolores, Amy, Allison, & Jeffrey, 2006; Karlan & Appel, 2011), those viewed as experts (Webb & Sheeran, 2006), or messengers we find more likable (Cialdini & Cialdini, 1993). The gist of this research is that people tend to be heavily influenced by who communicates the message, and not just what it entails (Dolan et al., 2012).

For instance, those who share a Republican partisan identity with the messenger (the President) could disproportionately be willing to take greater risks by traveling outside the home for unnecessary household goods when receiving an economic frame. This expectation is informed by evidence that Republican governors and governors from states with more Trump supporters have been slower to adopt social distancing policies, generally on the grounds of protecting the economy (Adolph, C., Amano, Bang-Jensen, & Fullman, 2020). However, the President also occupies a position of authority and leadership, and it is possible that in times of national emergency an authoritative messenger who communicates empathy can also cut through partisan-based identification or animus (Pfattheicher, Stefan, Laila, Robert, Claudia, & Michael, 2020).

Conversely, governmental institutions - and by default, the scientists, policy analysts, or managers who represent them - are increasingly mistrusted by the public (Hamilton & Safford, 2020). For instance, belief in the scientific consensus on anthropogenic climate change has been shown to be biased by partisan motivated reasoning (Bolsen & Druckman, 2018). Recent research has examined whether ideology affects trust in scientific agencies during a pandemic (Hamilton & Safford, 2020). And examinations of the (in)accuracy of expert predictions have fueled broader - sometimes unqualified - popular criticisms of the value of expertise (Liu, Stoutenborough, & Vedlitz, 2017; Tetlock, 2017). In the context of COVID-19, there is a lack of evidence about how messages from various types of authoritative or expert actors may change attitudes, opinions or behavior (Kushner et al., 2020; Utych & Fowler, 2020). In a study which informed this design, Hafner and colleagues (2019) found that varied governmental and expert messengers did not impact pro-environmental consumer purchases (Hafner et al., 2019). Nevertheless, "messenger effects" were prominently highlighted by the UK government's initial "MINDSPACE" report (Dolan et al., 2012), the subsequent creation of that government's Behavioral Insights Team (Team, 2010), and a broader public administrative interest in developing practical insights into ways to "nudge" citizen health behavior (Vlaev et al., 2016).

Consistent with the literature on messenger effects, we examine whether the perceived expertise or authority of the messenger is likely to influence the social-distancing preferences of citizens (avoiding unnecessary travel). Drawing from media coverage and official executive orders, the experiment uses four distinct aggregate or individual actor types: the CDC and a university-based public health professor, representing expert messengers; and President Trump and state and local governmental officials representing authoritative messengers. Specifically, we test whether authoritative and expert messengers moderate the effect of issue frames on social-distancing. The expectation is that authoritative messengers positively moderate the

public-health framing effects compared with no messenger. A secondary expectation is that expert messengers will be more easily dismissed, and negatively moderate this framing effect.

Framing-Authority Messenger Hypothesis (H2a): Authoritative messengers (relative to no messengers) will positively moderate the effect of the public-health issue frame on social-distancing preferences.
Framing-Expert Messenger Hypothesis (H2b): Expert messengers (relative to no messengers) will negatively moderate the effect of the public-health issue frame on social-distancing preferences.

Research Design

An online survey experiment was conducted over 24 hours on March 30-31, 2020. CloudResearch, formerly TurkPrime, was used to recruit U.S.-based respondents over two waves (morning and evening) timed to attract respondents from as wide a geographic swath of the country as possible. CloudResearch is an online platform designed for scientific research which presents some advantages over using Amazon Mechanical Turk for experiments, such as the ability to construct panels with closer demographic similarities to the general population (Chandler, Jesse, Cheskie, Aaron, Jonathan, & Leib, 2019). Quotas for gender, race, and ethnicity were used to attempt to achieve similarity to the U.S. adult population. Because CloudResearch utilizes dozens of other market research platforms with their own "opt-in" participant pools, payments to participants varied depending on quota needs. In this case, 1,403 participants were paid $2.38 on average to complete the survey, which took approximately 6.5 minutes. CloudResearch employs internal verification protocols within panels to guard against inattentive and potentially fraudulent responses (bots and repeat respondents), and respondents who finished the survey abnormally quickly (two standard deviations from the mean) were also rejected (dropping 45 responses). As a second layer of screening, Qualtrics also uses Google's invisible reCAPTCHA V3 verification program to flag potential bots and RelevantID to create a duplicate score indicating whether a respondent has likely taken the exam more than once. This flagged an additional 12 responses which were dropped, producing a sample of N=1,346. Randomization was assessed two ways. First, the outcome (whether to shop) was regressed on a treatment-group assignment measure both with and without covariates, which found no discernable differences in the coefficients for the treatment groups. Second, randomization inference (permutation) tests were conducted using Stata's 'ritest' package with each covariate individually used as a stratum (Heß, 2017). These tests (with p-values for treatment assignment reported by strata in Table 1) also found no discernable evidence of effects resulting from randomization alone.

Participants were presented with a hypothetical scenario in which either the CDC, the President, state and local government officials, or a public-health expert from Johns Hopkins University delivered either a public-health or economic frame and social-distancing guidelines in a televised press conference. As previously discussed, these messengers were selected from media coverage because they represent contrasting degrees of authority (in the case of the President and state and local officials) and expertise (CDC and the JHU expert). Although the online environment of this study is artefactual, we argue it depicts common messengers and frames which have appeared on a continual basis. It also reflects a choice (whether to shop unnecessarily) which respondents must routinely consider.

Respondents were randomly assigned to one of 10 groups (2 x 5 factorial design). Power calculations were conducted using G*Power (ANOVA F-Test for 10 groups, assuming an error rate of .05, statistical power of 95%, and estimated effect size of .1), which indicated that a total sample size of 1,302 was needed. Sensitivity calculations given the sample size (N=1,346) indicated a minimum detectable effect of .098.

Participants

The sample was representative of the population in terms of gender (53.7% female) and political party affiliation (32.2% Republican, 39.8% Democrat), but less so in terms of race (80% white, 13% black), ethnicity (9% Hispanic), and education (27.5% had a bachelor's degree, while 17.6% had a graduate degree). The modal income category were respondents who self-identified earnings of "less than $30,000" (22.9%), while those reporting incomes of "$105,00 or more" comprised 19.5% of the sample. Nearly 59% of respondents were between 18-44 years of age. In the midst of the largest drop in employment since the Great Recession of 2008-09, 30.5% of respondents indicated they had experienced a "loss of employment" as a result of the pandemic.

When the study commenced on March 30, 29 states had implemented "stay at home" executive orders for their citizens, covering roughly 251 million Americans (about 76% of the population). Of the respondents, 79.1% indicated their state had done so.

Table 1. Descriptive Statistics and Randomization Inference (N=1,346)

Vars.	*Proportion*		*Min.*	*Max.*	
Outcome					
No Shopping	.74		0	1	
Treatments					
CDC	.191		0	1	
President	.211		0	1	
State	.191		0	1	
Expert	.204		0	1	
Control	.201		0	1	
Health Frame	.465		0	1	
Econ Frame	.533		0	1	
Covariates					*Randomization Treatment*
Shelter	.791		0	1	p=.5
Job Loss	.305		0	1	p=.44
White	.786		0	1	p=.4
Male	.469		0	1	p=.4
Republican	.323		0	1	p=.43
	Mean	*S.D.*	*Min.*	*Max.*	
Education	2.99	1.4	1	5	p=.31
Gov. Support	71.97	24.68	0	100	p=.41

Notes: p-values reflect probability of a treatment assignment effect based on permutation tests for each covariate

Procedure

Respondents were asked to consider a scenario in which they "have enough food and supplies to last several more days, but [have] run out of an essential ingredient for tonight's dinner." They were then told that:

> *"Grocery and retail stores nearby have remained open and relatively well-stocked with goods. However, they have been busier than usual, making it difficult to practice social distancing (staying at least six feet away from others). You have two options:*
>
> *"Option A is to go shopping today.*
> *"Option B is to wait to go shopping until your food or household supplies have been exhausted."*

Before making this choice, respondents were then presented with an image and message from either the CDC, President Trump during a March press conference, state and local officials (New York Gov. Andrew Quomo and a panel of local officials), a health expert from Johns Hopkins University (from a panel testifying before Congress in March), or a control group with no identified messenger. The message said:

> "*In a televised press conference, [officials from the U.S. Centers for Disease Control and Prevention (CDC)/President Donald Trump/your state's governor and local officials/a leading public health expert from Johns Hopkins University] state[s] that coronavirus disease 2019 (COVID-19) is mainly spread through person-to-person contact. Transmission can occur within 10*

minutes of being within six feet of an infected person, and may not produce symptoms for five to eight days. Therefore, citizens are urged to avoid close contact with one another. They also share the following information:"

Respondents in the control group received the same text but with the messenger text and image omitted. Thus, they were told "coronavirus disease 2019 (COVID-19) is mainly spread through person-to-person contact. Transmission can occur within 10 minutes of being within six feet of an infected person, and may not produce symptoms for five to eight days. Therefore, citizens are urged to avoid close contact with one another." All participants were then randomly assigned to receive one of two messages about the impacts of social distancing:

Economic Issue Frame: "If citizens generally choose to shop more, it is less likely that employers and workers will be as financially hurt by reduced consumer spending. Given this information, which option are you likely to choose?"
Public Health Issue Frame: "If citizens generally choose to shop less and practice greater social distancing, it is likely that hospitals will be more able to handle COVID-19 cases and fewer citizens will die. Given this information, which option are you likely to choose?"

Respondents were then required to choose either Option A (to shop) or Option B (to wait). Both frames were chosen to represent "gains" frames as opposed to frames depicting lost economic activity or lives, in part to minimize any potential negative effects for respondents but also because the health psychology literature has identified gains framing as more effective for changing behavior (Covey, 2014; Webb & Sheeran, 2006). The survey protocol was reviewed for any potential harm to human-subjects by the Indiana University Human Subjects Office and granted an institutional review board (IRB) "exempt" status.

Analytic Method

Responses across the 10 groups were pooled and both frequentist and Bayesian logistic regression models are estimated to test hypotheses. Predictive margins and marginal effects are calculated, and Bayesian estimation is used to make the interpretation of results more intuitive.

The option of whether to delay shopping (dichotomously coded '1' for delay or '0' for shopping) was used as the dependent variable in the analysis. Dichotomous measures for whether respondents received the health or economy frames were created, as well as for each of the messengers (CDC, President, state and local officials, health expert), with the two baseline control groups (those who received health or economic frames but no messenger) as the reference category.

To test the messenger-framing hypotheses (H2a-b), interaction terms for the messenger and framing manipulations were also included. Because all participants received either the public-health or the economic issue framing treatment, the economic frame was utilized as the reference group. Bayesian interval hypothesis testing here is used to assess the probability that both the direct effect of the frame and interactive framing-messenger effects are positive or negative.

To help with precision of the estimates and account for important demographic characteristics, questions about socio-economic-status, partisan identification, and other factors were asked at the beginning of the survey and included as covariates in model estimation. To control for citizen attitudes toward governmental involvement in crisis coordination (gov. support), respondents were asked to answer (along a four-point scale) to what extent they felt the federal government, state governments or local governments "should be completely responsible, mostly responsible, somewhat responsible, or not at all responsible for coordinating the response to pandemics." These responses were then summed and rescaled between 0-100, akin to recent research which captured similar measures of pro-governmental attitudes (Baekgaard & Serritzlew, 2016). Other controls were also created from respondents' self-reported race (% white), gender (% male), party identification (% Republican), education level (five-point scale), the presence of a shelter order in their state, and whether they had experienced a job loss.

Results

The proportion of respondents indicating a preference for social-distancing increased from 69.1% among those receiving the economic frame to 79.9% for those receiving the public-health frame. Results from a Pearson's chi-square test finds evidence for a main framing effect on preference to avoid unnecessary shopping 〖(X)〗^2=20.305, p=0.000).

Results for logit models both with and without interaction terms are reported in Table 2. In Model 1, the pro-public-health frame appears to have a positive, direct effect on preference for social distancing (H1). This model also finds no evidence of a direct messenger effect. However, each messenger group along with the control group also received one of the two issue frames, so we cannot disentangle the framing effects from the effects (or lack thereof) from a specific messenger. Model 2 reports the interactive model results of message frame and varied messengers (H2a-b).

Table 2. Logit Regression Models for Choice to Not Shop

	Model 1		*Model 2*	
Parameters	*Coef. (p)*	*C. I. (95%)*	*Mean (p)*	*C. I. (95%)*
CDC	.128 (.54)	-.282; .54	.218 (.414)	-.305; .742
President	-.126 (.52)	-.515; .261	-.185 (.46)	-.675; .304
State	-.071 (.73)	-.472; .329	.08 (.76)	-.428; .59
Expert	-.159 (.42)	-.55; .231	.169 (.52)	-.34; .678
Health Frame	.58 (.000)	.323; .838	.844 (.005)	.256; 1.43
CDC*H. Frame	--	--	-.24 (.578)	-1.09; .608
Pres*H. Frame	--	--	.148 (.722)	-.667; .964
State*H. Frame	--	--	-.399 (.344)	-.399; .427
Expert*H. Frame	--	--	-.791 (.05)	-1.59; .0001
Covariates				
Shelter	.055 (.72)	-.252; .363	.046 (.77)	-.263; .356
Job Loss	.028 (.84)	-.245; .301	.033 (.81)	-.241; .307
Male	-.663 (.000)	-.92; -.407	-.671 (.000)	-.928; -.413
Gov. Support	.007 (.002)	.002; .012	.007 (.003)	.002; .012
White	.449 (.004)	.145; .754	.446 (.004)	.14; .751
Education	.06 (.191)	-.03; .151	.058 (.207)	-.032; .149
Republican	-.051 (.72)	-.328; .225	-.052 (.713)	-.33; .225
Obs.		1,346		1,346
Prob > X^2		.0000		.0000
Pseudo R^2		.0439		.0483

Interpreting models with interaction terms means that the coefficients of the direct effect cannot be considered in isolation, but rather in combination with the interaction terms (Berry, Golder, & Milton, 2012). For instance, the symmetric nature of the interaction model means that the marginal effect of the frame is conditioned on the messenger, and vice versa. Figure 1 presents predictive margins plots for both the public-health framing with either the President (left) or university expert (right) as the messenger. The predictive margins tell us the probability of not shopping conditioned on specific treatments and controlling for covariates in the model. We see the probability of choosing to not shop under the health frame drops from .793 when the president is the messenger to .712 when the expert is the messenger. Thus, we observe a significant decline in the effect of the health frame when the expert is the messenger.

[Figure 1 here]

Another way to interpret these results is by using Bayesian interval hypothesis testing to assess the probability of observing any positive or negative effect. Bayesian logit models with and without interaction term were estimated (model results reported in the Appendix) with the Bayesian interval test probabilities reported in Table 3. The key difference between a Bayesian interval test and a Null Hypothesis Significance Test (NHST) is that the NHST only indirectly tells us anything about the parameter of interest, θ, via a p-value influenced decision to reject or fail to reject the null, P(Data|H_0). A Bayesian approach allows us to say something directly about the probability of a parameter, P(θ|Data), by using Bayes theorem and priors for θ. Thus, posterior probabilities let us quantify changes in the probability of observing a positive framing effect based on changes in the messenger, rather than discarding this information via failure to reject a null (Kruschke, 2014).

Determining the probability of an effect for frames in an interactive model requires calculating the joint posterior probability of the effect given a specific frame and a specific messenger. In summary, we find a 97.6% chance that a pro-public-health frame has a positive effect on preference for social distancing when the messenger is the CDC, and a 99.9% chance of a positive framing effect when the President is the messenger. When the messenger is state and local government officials, the chance of observing a positive effect drops to 93.9%, and it falls to 57.6% when the university expert is the messenger. In other words, the probability of observing any positive effect of public-health messaging drops from a near certainty when the messenger is the President to essentially a coin-flip when the messenger is a university expert.

Table 3. Bayesian Interval Hypothesis Tests for Social-Distancing Preference ($P > 0$)

	Public-Health Frame	Economic Frame
Frame X CDC	.976	.025
Frame X President	.999	.0002
Frame X State/Local Officials	.939	.063
Frame X Academic Expert	.576	.578
Frame X Control	.547	.769

This result runs somewhat contrary to expectations (H2a-b), in that both federal messengers appear more likely to strengthen the effect of a pro-public-health message relative to the control group, while expert actors appear to weaken it. Conversely, when federal messengers - irrespective of their elected or administrative roles - present pro-economic frames, they are more likely to have a negative effect on social-distancing preferences. This could be because respondents may generally possess "intuitive federalism" and assign primary responsibility for pandemic response to the federal government (Schneider & Jacoby, 2013). In this case, they may give greater weight to considerations when delivered by the more "appropriate" governmental actor. It is also possible that a lack of familiarity with the generic state and local messengers or a general distrust of academic "experts" produces the weaker evidence. Either way, the findings illustrate how a Bayesian approach can inform future research on interactive effects.

Across the models, differences in race and gender appear to also matter. White respondents were more likely to express a social-distancing preference, controlling for other factors. Males, especially, were less likely to report a pro-social-distancing preference. While beyond the substantive focus of this study, these findings suggest greater attention needs to be paid to why communities of color and males appear to be disproportionately bearing the health costs of COVID-19.

Discussion and Conclusion

The analysis suggests the use of the pro-health frame generally had a positive effect -- in tandem with a presidential messenger -- on respondents' preference to avoid unnecessary social activity. Conversely, the use of a pro-economic frame had a negative effect on the preference of respondents for social-distancing. Effective public messaging during emergencies may be shaped by the type of messenger. But clearly, the message matters.

This study demonstrates how public-health versus economic issue frames differentially influence the preferences of individuals to avoid unnecessary social interaction. However, the results must be replicated, and there are many limitations and shortcomings with this study that warrant additional investigation. For instance, it does not address whether linkages exist between preferences for social-distancing and intent to do so. The experimental design does not utilize a control group with no message frame, in part because of the cost to sufficiently power such an experiment, but also because this may be a less-common scenario (COVID-19 information with no public-health or economic framing). However, the design also does not offer a completely accurate picture of the information environment the public encounters. While intended to capture a realistic choice the vast majority of citizens must consider routinely, the experiment was conducted roughly two weeks after the first "stay-at-home" orders began and in the midst of a unique saturation of recommendations, directives, and misinformation concerning the pandemic. These contrasting messages likely interact. While the lack of a messenger effect mirrors the results from the previous study which inspired this one (Hafner, Elmes, and Read 2019), it is possible the unique context surrounding the pandemic and the tsunami of conflicting information signals plays a confounding role in this result. Even though respondents were required to pass an attention check to remain in the sample, it is possible that the conflicting governmental messengers which respondents have likely encountered in the real world muted any potential effect this study might have identified under 'normal' conditions. Studies which interact different frames and extend into other types of health activities should be conducted (Kushner et al., 2020).

The study also does not directly consider the role of partisan identity, which has been found to influence the interpretation of performance information in other health-care and environmental policy contexts (Baekgaard & Serritzlew, 2016; Deslatte, 2020). The relationship between partisan identification, ideology, and pro-health behaviors in the COVID-19 pandemic is attracting significant scholarly attention across a range of disciplines (Adolph et al., 2020; Everett et al., 2020; Hamilton & Safford, 2020; Van Bavel et al., 2020). One emerging narrative from media coverage is that Republican residents are more likely to be treated to mixed messages from GOP leaders and less willing to engage in social-distancing behaviors. However, there are likely many other economic, geographic, and cultural variables which influence this result. The hyper-partisan nature of American political discourse and resulting distrust of scientific and administrative expertise will also continue to be a highly salient and normatively important topic for ongoing inquiry.

Notes

1. https://www.vanityfair.com/news/2020/03/media-orgs-wrestle-with-covering-trumps-campaign-rally-covid-19-briefings
2. https://www.politico.com/news/2020/03/18/white-house-coronavirus-officials-testimony-135806
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Appendix

Figures. Predictive Margins of Public-Health Framing w/ President and Expert Messengers

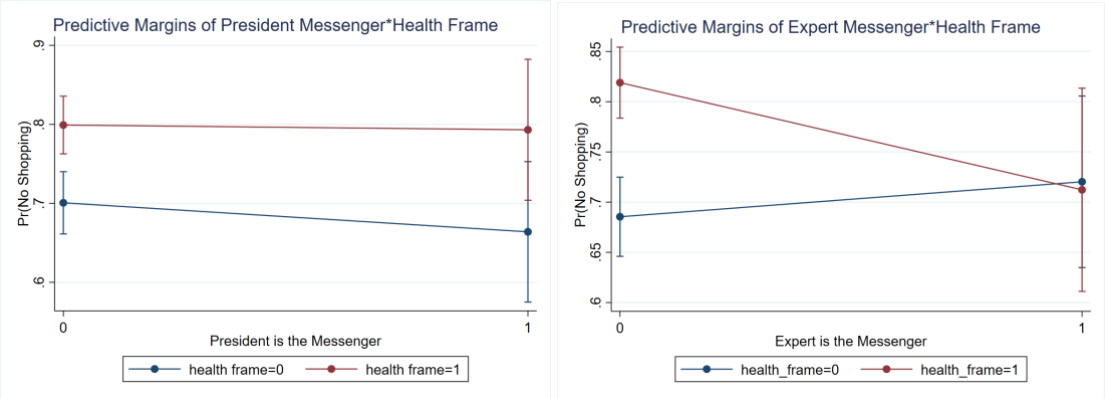

Figure 1. The marginal effect of a public-health frame is .105; however the predictive margin of a health frame declines when the expert is the messenger.

Appendix. Bayesian Logit Models

Bayesian logit models were estimated with uniform, flat priors.

Table 2. Bayesian Logistic Regression Model for Choice to Not Shop

	Model 1		*Model 2*	
Parameters	*Posterior Mean (MCSE)*	*Cred. Interval (95%)*	*Posterior Mean (MCSE)*	*Cred. Interval (95%)*
CDC	.129 (.002)	-.288; .544	.217 (.004)	-.31; .747
President	-.132 (.002)	-.527; .257	-.19 (.003)	-.688; .301
State	-.074 (.002)	-.481; .334	.078 (.004)	-.442; .595
Expert	-.163 (.002)	-.558; .232	.169 (.004)	-.35; .686
Health Frame	.588 (.001)	.331; .847	.85 (.006)	.252; 1.45
CDC*H. Frame	--	--	-.23 (.007)	-1.09; .638
Pres*H. Frame	--	--	.16 (.007)	-.673; .998
State*H. Frame	--	--	-.391 (.007)	-1.24; .45
Expert*H. Frame	--	--	-.795 (.007)	-1.6; .015
Covariates				
Shelter	.052 (.002)	-.261; .361	.041 (.001)	-.27; .346
Job Loss	.031 (.001)	-.241; .306	.036 (.001)	-.238; .313
Male	-.671 (.001)	-.93; -.414	-.68 (.001)	-.94; -.422
Gov. Support	.007 (.000)	.002; .013	.007 (.000)	.002; .012
White	.453 (.002)	.145; .756	.448 (.001)	.134; .754
Education	.061 (.001)	-.029; .153	.059 (.001)	-.032; .151
Republican	-.051 (.001)	-.329; .228	-.049 (.001)	-.328; .23
MCMC Iterations		220,000		220,000
Burn-in		20,000		20,000
Obs.		1,346		1,346
Acceptance Rate		.439		.441
Efficiency		.054		.032