Global Behaviors, Perceptions, and the Emergence of Social Norms at the Onset of the COVID-19 Pandemic

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Abstract

We conducted a large-scale survey covering 58 countries and over 100,000 respondents between late March and early April 2020 to study beliefs and attitudes towards citizens' and governments' responses at the onset of the COVID-19 pandemic. Most respondents reported holding normative beliefs in support of COVID-19 containment measures, as well as high rates of adherence to these measures. They also believed that their government and their country's citizens were not doing enough and underestimated the degree to which others in their country supported strong behavioral and policy responses to the pandemic. Normative beliefs were strongly associated with adherence, as well as beliefs about others' and the government's response. Lockdowns were associated with greater optimism about others' and the government's response, and improvements in measures of perceived mental well-being; these effects tended to be larger for those with stronger normative beliefs. Our findings highlight how social norms can arise quickly and effectively to support cooperation at a global scale.

1 Introduction

At the onset of the COVID-19 pandemic, individuals were called upon to adopt a variety of individually costly behaviors intended to help reduce the spread of COVID-19 and thereby benefit others and society more broadly. These included washing hands more frequently, wearing face masks, avoiding social gatherings, closing businesses, caring for their children as schools close, and staying at home (Dowd et al., 2020; Hollingsworth et al., 2011). Although media attention often focused on failures to adhere to COVID-19 abatement measures, and some measures were controversial (Webster et al., 2020), a variety of sources suggest that people largely adhered to the measures requested of them (Benítez et al., 2020; Hoeben et al., 2021; Collis et al., 2021; Chan et al., 2020; Clark et al., 2020; Pedersen and Favero, 2020), and that their combined efforts meaningfully slowed the spread of the virus (Courtemanche et al., 2020; Dave et al., 2021; Chernozhukov et al., 2021). The early stages of the COVID-19 pandemic therefore provides a striking example of rapid cooperation to overcome a public goods dilemma at a global scale.

In this paper, we investigate whether social norms played a primary role in motivating this widespread and rapid adherence to COVID-19 containment measures. That is, we explore whether this behavioral adherence was accompanied by feelings that one should adhere, and that adherence was expected by others (Fehr and Fischbacher, 2004a; Bicchieri, 2005, 2016). To do so, we use data from a large-scale international survey of COVID-19 behaviors, beliefs, and attitudes that we developed and distributed at the onset of the pandemic. Participants were recruited globally through online snowball sampling, beginning on March 20, 2020. By April 7, 2020, the last date included in our analyses, the survey garnered over 110,000 participants in 175 countries. It was—to our knowledge—the first large-scale survey of its kind, and offers unique insights into people's self-reported behaviors, motivations, and experiences at the early and accelerating phase of the COVID-19 pandemic.

Consistent with others' findings (Collis et al., 2021; Clark et al., 2020; Pedersen and Favero, 2020; Barari et al., 2020), respondents in our survey overwhelmingly reported adhering to a variety of COVID-19 containment measures, including avoiding social gatherings, washing hands more frequently, and staying home from work. Social norms appear to have played an important role in motivating this high level of adherence. In our survey, we asked individuals two sets of questions related to social norms. The first assessed their first-order injunctive beliefs–what they believed people *should* do–regarding eschewing social gatherings, avoiding handshakes, closing businesses, and stay-at-home orders. These questions were phrased, e.g., "What do you think: should people in your country cancel their participation at social gather-

ings because of the coronavirus right now?" The second set of questions assessed their second-order injunctive beliefs–what they believed others believed people should do. These questions were phrased e.g., "How many of 100 people in your country do you think believe that participation at social gatherings should be cancelled because of the coronavirus right now?"

We find that participants report having very high first-order injunctive beliefs. For instance, over three-quarters reported believing that businesses should be closed. For other behaviors, injunctive beliefs were even higher. People's second-order injunctive beliefs were, while lower than first-order beliefs, still high–always over 50%.

If social norms indeed played a role in motivating adherence to COVID-19 containment measures, then we would make the following two predictions (Fehr and Fischbacher, 2004a; Bicchieri, 2005, 2016). First, first-order and second-order beliefs should be correlated with each other. Indeed, we find that they are correlated, $r = .2$. Second, these beliefs should be correlated with behavior. Again, this is what we find. Both sets of beliefs were associated with adherence to containment measures, even in regressions that controlled for both at once. A one standard deviation increase in our first-order and second-order injunctive beliefs scales is associated with a 0.270 and 0.144 standard deviation increase in the likelihood of reporting compliance with at least one COVID-19 containment measure, respectively. These results are robust to controlling for a battery of covariates, including perceptions of one's own risk from COVID-19. Moreover, the magnitude of the correlations with containment measures was as large or larger for injunctive beliefs as it was for other covariates.

Although respondents report high rates of adherence with containment measures themselves, nearly 60% report being dissatisfied with others' adherence. They express similar dissatisfaction with their governments' response to the pandemic: only 9% of respondents report that their government's response was too extreme. We find that those who had internalized social norms were most dissatisfied. A one standard deviation increase in our first-order injunctive beliefs scale was associated with a 0.078 and 0.101 standard deviation increase in reporting dissatisfaction with others' response and the government, respectively. Once governments do respond with lockdowns, we find that both first-order and second-order injunctive beliefs increase, though our estimates are noisy and not statistically distinguishable from zero. We also find that dissatisfaction with others' response and the government response falls, and that it falls most for those with higher first-order injunctive beliefs.

Finally, we investigate the relationship between social norms and government responses on individuals' reports of their mental well-being. Our survey included both a widely-used depression scale known as the PHQ-8 (Kroenke et al., 2001), and a scale we developed to capture anxieties and worries specific to the COVID-19 pan-

demic, with items such as, "I am nervous when I think about current circumstances" and "I am worried about my health". We correlate these scales with dissatisfaction of others' responses, dissatisfaction with the government response, as well as measures of trust in government, and find that both measures of mental well-being are negatively correlated with dissatisfaction with others' response, dissatisfaction with government response, and distrust of government. Changes in perceptions of others' and the government's response were strongest for those with higher first-order injunctive beliefs.

We expand on this analysis with a detailed case study of the effect of the U.K. government's lockdown on March 23, 2020, finding that in the days following the lockdown, individuals' perceptions of others' response and the government's response improved, as did their well-being. (Note, however, that in this case study, we do not find evidence of moderation via first-order injunctive beliefs.)

The current research makes three primary contributions. First, we provide evidence that social norms can, in a relatively short span of time, arise all over the world, to motivate what ultimately proved to be a global effort to mitigate the pandemic. Although, as we will shortly discuss, there are many well-documented cases demonstrating the role of norm enforcement in motivating contributions to public goods, none to our knowledge show that such social norms can arise so quickly and at such a large scale.

Second, we contribute to the ongoing debate on the impact of lockdowns on mental well-being. While some have found negative impacts of lockdowns on mental well-being (Brodeur et al., 2021; Sibley et al., 2020; Möhring et al., 2021; Giuntella et al., 2021), our paper finds positive effects. This perhaps highlights the importance of considering a counterfactual in which, in the absence of lockdowns, individuals would have been more concerned about COVID-19, at least early in the pandemic.

Our third contribution is the data themselves, which constitute a large-scale survey of attitudes, beliefs, and behaviors, with substantial coverage early in the pandemic. We have made our survey data publicly available at https://osf.io/zgfjc/ and hope that it serves as a public good for other researchers.

The paper proceeds as follows. In Sec. 2, we discuss the potential role of social norms for encouraging adherence to COVID-19 containment measures. In Sec. 3, we discuss the methods by which we developed and distributed our survey. In Sec. 4 we discuss each of the above results in turn. Finally, in Sec. 5, we discuss the contribution of our research in more detail, as well as key limitations to our findings.

2 Social Norms and Adherence to COVID-19 Containment Measures

In a pandemic, individuals are called upon to take actions like washing hands more frequently, avoiding social gatherings, and adhering to school closures, store closures, and stay-at-home orders (Dowd et al., 2020; Hollingsworth et al., 2011). Such actions benefit the individual somewhat by mitigating the risk from the disease, but, for many individuals–e.g., those at lower risk from the disease, or whose livelihood is at stake– these actions may, on net, be costly. However, such actions have major benefits for society as whole: They help to reduce the infection rate, keep hospitals from being overwhelmed, and reduce mortality rates (Hollingsworth et al., 2011). This situation mirrors that of other large-scale public goods dilemmas which can be combated via costly personal actions. For instance, when it comes to combating climate change, individuals can take individually costly actions like flying less or paying more for electric vehicles and green energy. The reduced carbon emissions from these actions benefit all of us.

Humans are unique in their ability to use social norms to ameliorate public good dilemmas like pandemics and climate change (Akerlof, 1976; Ostrom, 1990; Bicchieri, 2005, 2016; Boyd, 2017; Henrich and Muthukrishna, 2021; Boyd and Richerson, 2021), using them when, for example, encouraging hygiene (Munger and Harris, 1989; Nalbone et al., 2005; Gauri et al., 2018), constructing and maintaining communal infrastructure (Ostrom, 1990; Boyd and Richerson, 2021), encouraging peaceful coexistence (Ellickson, 1986; Leeson, 2007), conserving common resources (Acheson, 1988), going to war (Leeson, 2007; Mathew and Boyd, 2011; Henrich and Muthukrishna, 2021; Boyd and Richerson, 2021), and protecting individual property rights (Ellickson, 1986; Leeson, 2007).

Social norms are diverse, both in theory and in practice (Nowak, 2006; Gelfand et al., 2011; Gelfand, 2012; Gelfand et al., 2017; Harrington and Gelfand, 2014; Bicchieri, 2016; Henrich and Muthukrishna, 2021). At their core, social norms have in common a desired but individually costly behavior like wearing a mask or staying at home, which is expected of individuals, and incentivized via sanctions or rewards (Fehr and Fischbacher, 2004a; Bicchieri, 2005, 2016; Boyd, 2017). Such sanctions or rewards are often meted out by 'third parties,' so called because even individuals who are not directly impacted by a norm violation will typically sanction the violation. When punishing is itself costly, this requires that it too is incentivized, for instance via 'higher-order' punishment, which is when those who fail to punish when expected to are themselves punished, e.g., via ostracizing (Henrich and Muthukrishna, 2021; Boyd and Richerson, 2021). Norms are sustained in equilibrium so long

as interactions amongst individuals involved are repeated and reputations conveyed across interactions with sufficiently high likelihood (see, for instance, Kandori, 1992; Panchanathan and Boyd, 2004; Nowak, 2006), and the behavior is sufficiently observable (Rand et al., 2014; Yoeli et al., 2013; Bicchieri et al., 2020). There are also some additional criteria that help norms be sustained in equilibrium, e.g., due to their coordinated nature, they should be categorical (Hoffman et al., 2020) and unambiguous (Yoeli and Rand, 2020).

Social norms have deeply shaped our psychology (Bicchieri, 2005; Boyd, 2017; Henrich and Muthukrishna, 2021; Boyd and Richerson, 2021). Humans intuitively engage in third-party punishment even at a very young age (McAuliffe et al., 2015), carrying over these intuitions into anonymous laboratory environments (Fehr and Fischbacher, 2004b; Henrich and Muthukrishna, 2021). Often, people are not aware of the role that social norms play, and for example report getting "a warm glow," believing they are "doing the right thing" when engaging in the desired behavior, or feeling "it is wrong" when someone fails to do so. That is, the very preferences or beliefs that lead people to engage in normative behaviors are learned or 'culturally evolved' in response to the social rewards and punishments in place due to social norms (Henrich and Muthukrishna, 2021).

Although individuals may not be aware of the role social norms play in motivating their behavior, social norms will often leave tell-tale signs of their role in shaping preferences and beliefs. Psychologists and economists employ a multitude of experimental and survey measures–incentivized and not–for uncovering their role (Fehr and Fischbacher, 2004b; Gelfand et al., 2011; Paluck and Shepherd, 2012; Krupka and Weber, 2013; Jordan et al., 2016; Henrich and Muthukrishna, 2021). In this study, we employ relatively straightforward measures of first-order injunctive beliefs and second-order injunctive beliefs. The former is one way of measuring the degree to which individuals have themselves internalized the social norm. The latter gets at the degree to which they view the behavior as expected, and can be a powerful predictor of norm compliance (Jachimowicz et al., 2018).

Because of the importance of social norms in motivating contributions to public goods, many behavioral interventions, or 'nudges,' used to promote contributions to the public good can be understood as engaging some aspect of people's psychology related to social norms (Rand et al., 2014; Bicchieri et al., 2020; Prentice and Paluck, 2020; Williamson and Thulin, 2021). For instance, communicating descriptive norms is a common and often-effective nudge used to encourage behaviors ranging from resource conservation to reduced alcohol consumption (Cialdini, 1987; Sheeran et al., 1999; Borsari and Carey, 2003; Goldstein et al., 2008; Gelfand and Harrington, 2015; Bicchieri and Dimant, 2019), that likely works by communicating that the desired

behavior is indeed expected (Elster, 1989; Muldoon et al., 2014; Rand et al., 2014). Of course, human social norms are not the only tool available when combating public good dilemmas. We also have more formal institutions–laws, police, courts, etc.–that can be called upon to enforce desired behaviors. As we will later discuss, these institution also play an important role in shaping people's attitudes, beliefs, and behaviors during the COVID-19 pandemic. These institutions, however, are not entirely divorced from norms. Indeed, they often depend, at some level, on norms (Acemoglu and Robinson, 2012). For instance, if a U.S. President violates the Emoluments Clause of the U.S. Constitution, we depend on members of the U.S. Senate to enforce the clause, and on other voters to vote out members of the Senate who do not do so. No formal institution exists to punish voters who fail to do so. Instead, we must rely on social norms.

There are many reasons to think that social norms would play an important role in motivating COVID-19 containment measures like avoiding social gatherings, washing hands more often, maintaining two meters (six feet) of distance from others, or staying at home. As already stated, these are individually costly actions whose benefits accrue to the group–precisely the kinds of behaviors humans often use social norms to encourage. Most of the required behaviors, such as avoiding social gatherings, maintaining sufficient distance from others, or staying at home, are relatively observable. (The key exception is probably handwashing, but even this is somewhat observable in some contexts.) Thus, it is conceivable that these behaviors would be sustained as social norms. Moreover, early in the pandemic, other more formal institutions had not yet had a chance to respond, and there did not yet exist fines or laws requiring containment measures. This left a void for social norms to fill. That said, social norms can take a long time to change (for a case study, see Tankard and Paluck, 2017), so it is not necessarily the case that they could be harnessed sufficiently quickly to fill this void and motivate the kind of rapid behavior change necessary at the beginning of a pandemic.

If social norms did play a role in motivating people to adopt new behaviors to help contain COVID-19, then we might expect to see their imprint in a number of ways. We make the following key predictions following from our perspective on social norms and the COVID-19 pandemic, most of which will be borne out in our upcoming analyses:

1. Measures of the strength of social norms–e.g., first order and second order injunctive beliefs–should be positively correlated with COVID-19 containment behaviors.

2. Social norms would also be expected to increase people's expectations of others,

meaning they will be more disappointed in others' behavior if they have more strongly internalized the social norm. The most direct way to provide evidence for this is to test whether our measure of first-order beliefs moderates people's disappointment in others' compliance.

3. People's expectations of others might extend to governments as well. That is, they might also be more disappointed in the government's response to COVID-19 if they hold higher first-order beliefs. Again, we can test for this by estimating whether our measure of first-order beliefs moderates people's disappointment in their government.

4. Finally, we also explore whether people who internalized the norm (i.e., those with higher first-order beliefs) will react most positively to government lockdowns. Specifically, we consider the effect that government lockdowns had on respondents' perceptions of others' response, the government's response, and also their own mental well-being–how concerned they were about COVID-19 and how negative their experiences were. In addition to the main effect of government lockdowns on these survey measures, we will explore whether first-order injunctive beliefs moderate the effect of lockdowns on these measures. We expect lockdowns to have a larger effect on perceptions of others' and the government's reaction for those with high first-order injunctive beliefs. However, the effect of social norms on people's proximate sense of well-being–the feelings and thoughts that they consciously experience–is unclear. Even their effect on baseline (pre-lockdown) well-being is unclear. Internalizing norms might have made people more anxious about COVID-19. In this case we would expect those with high first-order injunctive beliefs to be more worried and have a more negative experience of the pandemic. At the same time, compliance with norms can sometimes be associated with positive emotions such as "warm glow" (Andreoni, 1990).

In the subsequent section, we outline the methods used to test these predictions in the context of the early and accelerating phases of the COVID-19 pandemic.

3 Methods

We conducted a global online survey at the onset of the COVID-19 pandemic. The survey was conducted through the Qualtrics survey platform and contained 58 total items, including 3 scales (23 total items), and 8 demographic measures. The complete

survey instrument is available at `https://osf.io/zgfjc`. Our primary analyses employ items measuring self-reported adherence with COVID-19 containment measures (5 items), first-order injunctive beliefs (4 items), second-order injunctive beliefs (4 items), perceptions of sufficient government response (3 items), perceptions of sufficient public response (1 item), and two mental health scales (13 total items). We use other items such as demographics as control measures, as described below. We obtained exempt IRB review (#E-2065) from MIT.

We posted our first call for participants via social media on March 20, 2020, which ultimately produced nearly 1.4 million impressions on Twitter and accounted for 31,211 clicks on the landing page (`www.covid19-survey.org`). We amplified this first call via our personal social media accounts, and also mobilized a broad range of individuals engaged in traditional media (journalists, TV hosts or anchors from national and international media outlets) along with social media influencers (ranging from entrepreneurs, to comedians and accounts of online cat communities), broader engagements from a host of international and national NGOs (including various United Nations initiatives such as the UN's Sustainable Development Solutions Network and the World Values Survey Association network) along with University- and Alumni Networks. We provide a list of the handles of accounts for which we were able to obtain the retweet information on `https://bit.ly/3gAZgO9`.

The link to our survey was shared widely, both through our own outreach efforts and organic multiplication through a variety of channels. We identified a further 1,105 original tweets promoting the survey to a combined follower count of 5,601,915 followers. There were at least a further 14,404 retweets of these calls to participate from other users. The survey also appeared in a large number of popular media outlets, including *El País* (Spain), *Frankfurter Allgemeine Zeitung* (Germany), *Tribune de Geneve, Le Matin, 20Min and 24heures* (Switzerland), and the *Jakarta Globe* (Indonesia), among many others.

Ultimately, between March 20th and April 7th 2020, the landing page was accessed by 391,476 different users, of whom more than 110,000 individuals from 175 countries completed the survey. Our original call thus accounts for just 7.9% of the direct clicks to the landing page; the bulk of traffic was due to broader dissemination. Indeed, a referrer analysis based on Google Analytics data suggests that 27.5% of referrals came through Twitter and a further 22.8% of landing page clicks were referrals via Facebook. This constitutes only an incomplete list: there are at least 350 other referrers, and a further 37.4% of visits are not identifiable (e.g., because of browser privacy settings), a challenge that is common to data collected through online platforms (e.g., Awad et al. 2018).

We note that our resulting sample should not be viewed as representative, and

that it is possible that individuals who were more concerned about the COVID-19 pandemic were disproportionately more likely to take or share this survey. To account for this possibility, we provide further analysis of our dissemination in Appendix B and discuss the limitations of our sampling strategy toward the end of the manuscript.

In this article, we report results from the 58 countries in which at least 200 people participated, corresponding to a sample of 108,075 individuals (see Table S1 for breakdown of participants by country; see Figs. S8 and S9 for replications of our main analyses in which we include all countries in which at least 100 people participated). At the launch of the survey, on March 20th, there had been 240,000 confirmed COVID-19 cases and 9,900 people deaths attributed to COVID-19 (Dong et al., 2020). Two and a half weeks later, on April 7th, confirmed cases and deaths had increased four and five-fold, respectively. The 58 countries included in our sample accounted for 92% of all known COVID-19 cases globally, and 93% of deaths. Within our sample and study period, 13 countries switched from no stay-at-home requirements to nationwide lockdowns (Hale et al., 2021). Our data thus capture global public attitudes in the early and accelerating phases of the COVID-19 pandemic, before, during, and after many governments made challenging and consequential policy decisions.

In the analyses presented below, we re-weight observations to improve their representativeness at the country level, based on respondents' gender, age, income, and education; however, our results are qualitatively similar without weights (see Table S2 and S3). All underlying data and code to reproduce our findings are available at the following repository: `https://osf.io/3sn2k`.

4 Results

We next present key results from this study. We begin by discussing respondents' first-order and second-order injunctive beliefs. We then discuss behaviors (i.e., people's adherence to COVID-19 abatement measures), satisfaction with others' adherence and government response, and mental well-being; for each we also discuss the relationship with respondents' first-order injunctive beliefs, and, when appropriate, with their second-order injunctive beliefs. (For the motivation behind these analyses, please see our predictions at the end of Sec. 2.)

4.1 Normative Beliefs

A large majority of respondents hold first-order injunctive beliefs that it is important for others to engage in protective behaviors (1, Panel B, dark gray bars): 97% believe

that people in their country should cancel their participation in social gatherings because of COVID-19; 92% say people should not shake each other's hands; 77% think that all shops other than particularly important ones, such as supermarkets, pharmacies, post offices, and gas stations, should be closed; and 81% support a general curfew that only excepts grocery shopping, necessary family trips, and the commute to work. Moreover, 70% of respondents think that risky behaviors should be financially punished. In Panel A of Fig. S1, we present mean first-order beliefs across all questions, by country. The mean first-order belief is above 70% in nearly every country included in our analyses.

Respondents' second-order injunctive beliefs (their beliefs about what others believe should be done) are somewhat lower, but still quite high. Specifically, respondents estimate that 67% of their fellow citizens believe that social gatherings should be cancelled, 74% of people in their country support avoiding handshakes, 63% of people believe stores should be closed, and 55% are in favor of curfews. In Panel B of Fig. S1, we present the mean second-order belief across all questions, by country. Second-order beliefs are more spread out, but above 60% for roughly three-quarters of the countries included in our analyses.

For both first-order and second-order beliefs, we form scales to use in our upcoming analysis. For first-order beliefs, we form our scale by summing subjects' affirmative responses to our questions. That is, a participant who responded in the affirmative that they believed people should cancel participation in social events and that risky behaviors should be financially punished, but not for the remaining questions would receive a first-order injunctive belief score of 2. For second-order beliefs, we form our scale by averaging subjects' responses across all second-order injunctive belief questions. For both scales, we normalize the scale so that the mean and standard deviation are 0 and 1, respectively.

We first test the hypothesis that respondents internalized the social norm more strongly (i.e., their first-order injunctive beliefs should be higher) when they believed others expect compliance (i.e., their second-order injunctive beliefs are higher) (Fehr and Fischbacher, 2004a; Bicchieri, 2005, 2016). Consistent with this hypothesis, we find that first-order and second-order injunctive beliefs are correlated. In particular, the unconditional correlation of our measures of first and second-order injunctive beliefs is 0.20, and this correlation is 0.12 ($p < 0.001$) in weighted regressions with country and date fixed-effects effects and controls for the severity of COVID-19.

It is noteworthy that respondents' second-order injunctive beliefs are substantially lower than their first-order injunctive beliefs–between 14 percentage points and 30 percentage points lower. What should we make of this pattern? One possible interpretation is that respondents underestimate others' injunctive beliefs. Such

underestimates might be the result of, for example, media attention, which tended to focus on those who disagreed with containment measures. If this interpretation is true, then this gap between first-order and second-order injunctive beliefs might have led individuals to reduce their own adherence (Bursztyn et al., 2018; Jachimowicz et al., 2018). However, there is another possibility, namely that subjects who participated in our survey were more concerned about COVID-19 than the average person in their country, because they were more motivated to attend to information pertaining to the survey, and were more interested to provide their opinion about the then-rapidly spreading pandemic.

4.2 Behavior

We document broad adherence to COVID-19 containment measures at the onset of the COVID-19 pandemic (see Fig. 1, Panel A). Globally, 87% of respondents reported that they did not attend any social gatherings in the past week at the time they were surveyed; 82% washed their hands more frequently than a month earlier; 90% said that they would immediately inform people around them if they experienced COVID-19 symptoms; 67% reported keeping a distance of at least 2 meters (6 feet) to other people; and 76% said that they stayed home in the past week (SI Figure 4 presents the country-level averages). People also planned to maintain these behaviors. For example, while 42% of respondents reported that they would leave their home in the next 5 days to buy food, only 19% said that they would go to work, and 45% of respondents indicated that they would not leave their home for any reason in the subsequent 5 days. In panel C of Fig. S1, we present the mean of self-reported adherence to all containment measures, by country. It is above 70% in nearly every country included in our analyses. These results are in line with prior work revealing the broad adherence to COVID-19 protective measures for Italy (Barari et al., 2020), and other countries around the world (Allcott et al., 2020; Andersen, 2020; Kushner Gadarian et al., 2020).

We use responses to these questions to create a self-reported prevention behaviors index, summing respondents' responses, then normalizing the result so that its mean and standard deviation is 0 and 1, respectively.

We next tested two predictions related to social norms: That people should be more likely to adhere to the norm when they internalize this norm themselves (their first-order injunctive beliefs are high), and that they should be more likely to adhere when they believe that others expect compliance (their second-order injunctive beliefs are high). To test this hypothesis we estimate the following equation:

$$beh\_index_{ict} = \alpha_0 + \alpha_1 FoB_{ict} + \alpha_2 SoB_{ict} + \alpha_3 X_{ict} + \delta_c + \theta_t + \epsilon_{ict}$$

where beh_index_{ict} is the index combining four different measures of adherence to preventative behavior. FoB_{ict} and SoB_{ict} are our measures of first-order and second-order injunctive beliefs, respectively. X_{ict} are time-varying control variables (including individual level characteristics and controls for country-level changes and levels in COVID-19 cases and deaths), δ_c and θ_t are country and day fixed effects, respectively.

Table 1: Relationship Between Self-Reported Prevention Behaviors and First- and Second-Order Beliefs

	Self-reported behavior index			
	(1)	(2)	(3)	(4)
First-order belief index	0.301***	0.270***	0.270***	0.272***
	(0.031)	(0.027)	(0.027)	(0.027)
Second-order belief index	0.260***	0.144***	0.140***	0.136***
	(0.032)	(0.025)	(0.022)	(0.023)
Age			-0.415	-0.421
			(0.240)	(0.238)
Income bracket			0.022*	0.023*
			(0.011)	(0.010)
Education bracket			0.042**	0.043**
			(0.013)	(0.014)
Own health			0.027	0.027
			(0.022)	(0.022)
Confirmed COV-19 cases per capita				0.085**
				(0.031)
Lagged confirmed COV-19 cases per capita				0.005
				(0.026)
Confirmed COV-19 deaths per capita				-0.080***
				(0.014)
Lagged confirmed COV-19 deaths per capita				0.115
				(0.067)
Constant	-0.099	-0.093***	0.098	0.098
	(0.052)	(0.001)	(0.085)	(0.084)
Country-age-gender FE	No	Yes	Yes	Yes
Observations	108075	107863	102163	102163

Notes. This table shows four different regressions of our index of self-reported adherence to COVID-19 prevention behaviors on first-order and second-order injunctive beliefs. The table presents standardized beta coefficients. Standard errors are clustered by country and show in parentheses. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

As predicted, both sets of injunctive beliefs are associated with adherence to

containment measures, even in regressions that controlled for both at once. A one standard deviation item increase in our first-order injunctive beliefs scale is associated with a 0.270 (SE = 0.027, $p < 0.001$) increase in the self-reported prevention behaviors index, and and a one standard deviation increase in our second-order belief scale is associated with a 0.144 (SE = 0.025, $p < 0.001$) increase in the self-reported prevention behaviors index. These results are robust to controlling for a battery of covariates. Moreover, the magnitude of the correlations is as large or larger than for other covariates, including, importantly, those related to one's own risk from COVID-19 (see Tbl. 1).

4.3 Satisfaction with Others' Adherence and Government Response

Fifty-eight percent of respondents perceived that the reaction of their country's public to the COVID-19 outbreak had been insufficient. Respondents held similarly pessimistic beliefs about their governments. Globally, just 9% of respondents believed that the response of their country's government had been too extreme (see Fig. 1, Panel C). This pattern holds robustly across different social groups: When splitting the sample based on country, gender, median income, and median age, there is not a single socio-economic stratum in which a majority of individuals thought that the government reaction had been "somewhat extreme" or "too extreme" (see Figure S4). Indeed, many respondents believed that their government's actions were not sufficient, with 42% of respondents across the 58 countries holding such beliefs. In addition, a substantial proportion of respondents (36%) indicated that they did not trust their government's handling of COVID-19, and 34% even stated that they believed their government had not been truthful about COVID-19. Taken together, these results highlight that at the onset of the COVID-19 pandemic, a substantial number of respondents believed that their citizens' and government's response was insufficient.

We also tested the relationship between first-order injunctive beliefs and dissatisfaction with others and the government's response by estimating the following equation:

$$y_{ict} = \alpha_0 + \alpha_1 FoB_{ict} + \alpha_2 SoB_{ict} + \alpha_3 X_{ict} + \delta_c + \theta_t + \epsilon_{ict}$$

where y_{ict} indicates respondents' satisfaction in others' response or the government's response. FoB_{ict} and SoB_{ict} are our measures of first order and second order injunctive beliefs, respectively. X_{ict} are time-varying control variables (including individual

level characteristics and controls for country-level changes and levels in COVID-19 cases and deaths), δ_c and θ_t are country and day fixed effects, respectively.

Unsurprisingly, those who had most strongly internalized social norms (and thus had relatively high first-order injunctive beliefs) were more dissatisfied both with others' response and the government's response: a one standard deviation-item increase in our first-order injunctive beliefs scale is associated with a 0.288 (SE = 0.017, $p < 0.001$) and 0.273 (SE = 0.017, $p < 0.001$) standard deviation increase in dissatisfaction with others' response and the government's response, respectively (see Tbl. 2).

4.4 Mental Well-being

We next test the effects on mental well-being, which we assessed using two measures: one, the PHQ-8, is a widely-used depression index (see Kroenke et al. 2001; $\alpha = .86$),[1] while the second contained items we developed to capture anxieties and worries specific to the COVID-19 pandemic, with items including, "I am nervous when I think about current circumstances," and "I am worried about my health" ($\alpha = .58$); we subsequently refer to this scale as the COVID-Brief Anxiety Inventory "CBAI" or just the "worries index".[2] Further details on the contents and construction of the scale appear in Appendix C.9.

We regress these two measures of mental well-being on our first-order injunctive beliefs scale, as well as four variables that capture respondents' views of their fellow citizens and government during the COVID-19 pandemic: (a) the perception of an insufficient public response; (b) the perception of an insufficient government response; (c) a lack of trust in their government; and (d) the perception that their government is untruthful. We use the following regression equation to estimate the effects:

$$mh_{ict} = \beta_0 + \beta_1 perc_{ict} + \beta_2 X_{ict} + \delta_c + \theta_t + \epsilon_{ict}$$

where mh_{ict} is the first-order belief or mental health outcome of interest for individual i on day t in country c, $perc_{ict}$ is the standardized value of the perception of others. We subsequently report standardized coefficients to enable comparisons with prior research. This means that the coefficient can be interpreted as the change in

[1] The PHQ-8 is the PHQ-9 but without the suicide item.

[2] We note that lower alpha levels more commonly occur when survey items are translated to many languages and used cross-culturally (see, e.g., Szabo et al., 1997), as was the case in our research. Furthermore, analyses reveal that a one-factor loading including all items is the most efficient solution (all items loaded on one factor with an eigenvalue above 1).

Table 2: Relationship Between Judgments' of Others' and the Government's Response and First-order Injunctive Beliefs

	(1) Public reaction insufficient	(2) Gov't reaction insufficient
First-order belief index	0.288***	0.273***
	(0.017)	(0.017)
Age	-0.094	0.000
	(0.140)	(0.062)
Income bracket	0.025*	0.011
	(0.011)	(0.008)
Education bracket	0.022	0.021
	(0.013)	(0.017)
Own health	-0.030	-0.069***
	(0.016)	(0.013)
Confirmed COV-19 cases per capita	-0.054	-0.046
	(0.042)	(0.037)
Lagged confirmed COV-19 cases per capita	0.004	-0.022
	(0.042)	(0.028)
Confirmed COV-19 deaths per capita	-0.070	0.001
	(0.052)	(0.022)
Lagged confirmed COV-19 deaths per capita	-0.054	-0.029
	(0.081)	(0.082)
Constant	0.028	-0.014
	(0.050)	(0.025)
Country-age-gender FE	Yes	Yes
Observations	102163	102157

Notes. This table shows two different regressions of the perception of an insufficient public or government response on first-order injunctive beliefs. The table presents standardized beta coefficients. Standard errors are clustered by country and show in parentheses. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

the dependent variable, in standard deviations of this variable, associated with an increase in the independent variable by one standard deviation.

We find that respondents who had internalized norms of adherence (those with higher first-order injunctive beliefs) had higher depression scores ($\beta = 0.042$, SE=0.019,

$p < .001$; see Fig. 2, Panel A; and Table S4) and higher worries scores ($\beta = 0.336$, SE=0.031, $p < 0.001$).

We further find that perceptions of an insufficient public response are not significantly related to the PHQ-8 ($\beta = .036$, $SE = .022$, $p = .101$) but are related to higher values on the CBAI ($\beta = .140$, $SE = .020$, $p < .001$). Similarly, perceptions of an insufficient government response are not significantly related to the PHQ-8 ($\beta = .048$, $SE = .036$, $p = .180$) but are related to higher values on the CBAI ($\beta = .183$, $SE = .019$, $p < .001$). In addition, a lack of trust in the government's response is related to both higher values on the PHQ-8 ($\beta = .090$, $SE = .027$, $p = .001$) and CBAI ($\beta = .093$, $SE = .018$, $p < .001$), similar to perceptions of the government being untruthful (PHQ-8: $\beta = .083$, $SE = .029$, $p = .005$; CBAI: $\beta = .079$, $SE = .017$, $p < .001$).

Respondents' first-order injunctive beliefs, pessimistic beliefs about their fellow citizens' and government's response to COVID-19 are thus all associated with lower mental well-being, particularly in terms of their anxieties specific to the COVID-19 pandemic (as measured by the CBAI). We note that these results are in line with prior research which found that trusting other citizens and the government are important predictors of well-being (Helliwell, 2006; Helliwell and Huang, 2008); indeed, this relationship may be amplified given the particularly high levels of uncertainty likely to occur at the onset of the COVID-19 pandemic (Kay et al., 2009).

We also study the relationship between perceptions of the government and the general public with our measures of mental health using the same specification. We find that perceptions of an insufficient public response are not significantly related to the PHQ-8 ($\beta = .036$, $SE = .022$, $p = .101$) but are related to higher values on the CBAI ($\beta = .140$, $SE = .020$, $p < .001$; see Figure 2, Panel A; and Table S4). Similarly, perceptions of an insufficient government response are not significantly related to the PHQ-8 ($\beta = .048$, $SE = .036$, $p = .180$) but are related to higher values on the CBAI ($\beta = .183$, $SE = .019$, $p < .001$). In addition, a lack of trust in the government's response is related to both higher values on the PHQ-8 ($\beta = .090$, $SE = .027$, $p = .001$) and CBAI ($\beta = .093$, $SE = .018$, $p < .001$), similar to perceptions of the government being untruthful (PHQ-8: $\beta = .083$, $SE = .029$, p=.005; CBAI: $\beta = .079$, $SE = .017$, $p < .001$).

4.5 The Effects of Government Lockdowns

Our sampling time period covered the onset of the COVID-19 pandemic in which government policies became increasingly stringent (Hale et al., 2021; Cheng et al., 2020). One particularly salient government response was the institution of nationwide lock-

downs ("stay-at-home" orders) in many countries during our survey period. We explore whether these policy changes were related to respondents' normative beliefs, as well as their views of their fellow citizens' and government's response, government beliefs, and whether they improved mental well-being.

In this subsection, we explore this question using daily individual data, exploiting time variation in country-level lockdown announcements (Hale et al., 2021), thus comparing individuals in the same country over time (see Figure 2, Panel B; and Table S5, Panel A). We consider subjects' first-order and second-order injunctive beliefs, as well as four variables that capture respondents' views of their fellow citizens and government during the COVID-19 pandemic: (a) the perception of an insufficient public response; (b) the perception of an insufficient government response; (c) a lack of trust in their government; and (d) the perception that their government is untruthful. We regress these variables on a dummy indicating whether a government lockdown was in place at the time the respondent participated in the survey, using the following equation:

$$y_{ict} = \gamma_0 + \gamma_1 lockdown_{ict} + \gamma_2 X_{ict} + \delta_c + \theta_t + \epsilon_{ict}$$

where y_{ict} for individual i on day t in country c is the outcome of interest and $lockdown_{ict}$ is an indicator variable that is equal to one after a country implemented a lockdown.

We find that lockdowns are associated with a variety of (short-term) positive effects. Their estimated effect on first-order injunctive beliefs is positive ($\beta = .08$, $SE = .047$, $p = .09$), as is the effect on second-order injunctive beliefs ($\beta = .15$, $SE = .11$, $p = .18$), though we note that these coefficients are not statistically significant within commonly accepted thresholds. We also find that as a country announced a nationwide lockdown, respondents were less likely to view their government as not being truthful ($\beta = -.115$, $SE = .056$, $p = .045$), less likely to view the government's reaction as insufficient ($\beta = -.165$, $SE = .068$, $p = .018$), and reported lower values on the CBAI ($\beta = -.091$, $SE = .044$, $p = .043$). While these effects are statistically significant using commonly used thresholds, we urge caution in their interpretation given that they do not meet more stringent significance thresholds which have been proposed recently (Benjamin et al., 2018) and which may take on particular importance in the context of a pandemic (Enserink and Kupferschmidt, 2020). In addition, we find no statistically significant effect of lockdown announcements around the world on the perceived sufficiency of public response ($\beta = -.034$, $SE = .064$, $p = .594$), trust in government ($\beta = -.090$, $SE = .067$, $p = .183$), or the PHQ-8 ($\beta = .108$, $SE = .112$, $p = .340$).

We further find significant interactions between first-order injunctive beliefs and

a lockdown on a variety of these measures. To assess the importance of these interactions we estimate the following equation:

$$y_{ict} = \gamma_0' + \gamma_1' lockdown_{ict} + \gamma_2' lockdown_{ict} \times FoB_{ict} + \gamma_3' FoB_{ict} + \gamma_4' X_{ict} + \delta_c + \theta_t + \epsilon_{ict}$$

where FoB is the standardized sum of all first-order beliefs. Significant interaction effects (γ_2') include perceived insufficient reaction of the government ($\beta = -.078$, $SE = .034$, $p = 0.027$) and not trusting the government ($\beta = -.101$, $SE = 0.056$, $p = .079$). However, we do not find significant interaction effects for the PHQ-8 ($\beta = -.005$, $SE = .026$, $p = 0.827$) and CBAI ($\beta = -.029$, $SE = .050$, $p = .557$). That is, those who most strongly internalized normative beliefs reacted most positively to the lockdowns when it came to satisfaction with their government's response, and to trust in their government.

We also explored whether, in line with prior theory (Kay et al., 2009), individuals were more likely to rely on their governments to cope with the arising uncertainty if they placed greater trust in them. To assess the importance of trust in governments, we estimate the following equation:

$$y_{ict} = \gamma_0^+ + \gamma_1^+ lockdown_{ict} + \gamma_2^+ lockdown_{ict} \times trust_c + \gamma_3^+ trust_c + \gamma_4^+ X_{ict} + \delta_c + \theta_t + \epsilon_{ict}$$

where $trust_c$ is a standardized country-level measure of trust based on the latest available (pre-pandemic) data from Gallup.[3] We find that lockdowns had a stronger effect on respondents' views of the public and their government in countries where citizens placed a greater amount of confidence in the government before the onset of the COVID-19 pandemic (see Table S8) than in other countries. Respondents in these countries indicated greater trust in the government (interaction effect: $\beta = -.223$, $SE = .066$, $p = .001$) and greater sufficiency of the public response (interaction effect: $\beta = -.301$, $SE = .110$, $p = .008$) after lockdowns were put in place than

[3]While we cannot test this directly since we are missing true pre-pandemic measures, we draw on the 2018 Gallup World Poll which assessed "confidence in the national government," as well as two measures of mental well-being (extent of worries and depression respondents experienced the day before). When using the same set of control variables as in our analysis here (i.e., country and date fixed effects, and age, gender, education and health), we find statistically significant but weak effects: respondents who replied "yes" to the confidence question indicated .008 standard deviations lower levels of worries and .004 standard deviations lower levels of depression (see Table S6). These effects are several magnitudes smaller than what we find during the onset of the COVID-19 pandemic: we find in our data that a one standard deviation increase in trust in the government is related to a decrease in the CBAI by .093 standard deviations and the PHQ-8 by .090 standard deviations (see Table S4). These results provide suggestive evidence that trust in government was particularly important to mental well-being during the onset of the COVID-19 pandemic, in comparison to before the COVID-19 pandemic.

those in other countries. In terms of respondents' mental well-being, we find that while the interaction effects are directionally consistent with this view—displaying lower values on the depression ($\beta = -.207$, $SE = .122$, $p = .090$) as well as the CBAI ($\beta = -.129$, $SE = .070$, $p = .069$)–they are not statistically significant within commonly used thresholds. That is, nationwide lockdown announcements had larger effects on respondents' views of the public and their government in countries where citizens placed greater confidence in the government before the onset of the COVID-19 pandemic than in other countries, while these effects were less consistent in terms of respondents' mental well-being.

4.6 Case study: Effect of Government Lockdown in the UK

We next provide a more granular view of one specific policy change in Panels C, D, and E of Figure 2 and Table S5, Panel B. On the evening of March 23, 2020, Prime Minister Boris Johnson announced a nationwide lockdown in the United Kingdom (UK), allowing us to conduct a within-country event study to further illuminate the effects of lockdown announcements on beliefs and mental well-being. Among the countries for which we have dense day-on-day samples needed for this type of analysis—Brazil, Germany, Sweden, the US, and the UK—the UK is the only country that, within our study period, went from virtually no stay-at-home requirements to a complete lockdown overnight. Against this backdrop, we estimate a difference-in-differences model, comparing changes in perceptions in the UK before versus after the lockdown announcement to changes in these other four countries. We implement this by estimating the same regression as for the main sample with the restricted sample.

We note that the estimates of this sudden shift in the UK's policy may be different from the effects we document across countries in general, particularly given that—as Figure 1B demonstrates—perceptions about the UK government's reaction to the COVID-19 pandemic were at the far-left end of the spectrum (i.e., very few people in our sample believed that the government reaction was too extreme). In addition, the UK's policy response to COVID-19 for a short while involved pursuing a strategy of herd immunity, which may have resulted in higher levels of anxiety. The lockdown announcement brought the UK's policy response in line with the responses of other peer group countries that had responded earlier and stronger to the crisis.

We find that the nationwide lockdown announcement in the UK was associated with less pessimistic views about the public and government response, and better mental well-being. Specifically, we find that the UK lockdown announcement, relative to other countries, was associated with higher first-order injunctive beliefs ($\beta = .132$,

$SE = .118$, $p = .263$) and second-order injunctive beliefs ($\beta = .543$, $SE = .141$, $p < .001$). We also find that the UK lockdown announcement was associated with a lower perceived insufficient response of the public ($\beta = -.408$, $SE = .074$, $p < .001$) and the government ($\beta = -.487$, $SE = .047$, $p < .001$). Respondents also viewed the government as more truthful ($\beta = -.157$, $SE = .046$, $p = .001$), displayed greater trust in the government's response ($\beta = -.275$, $SE = .045$, $p < .001$) and, crucially, display lower values of depression ($\beta = -.105$, $SE = .041$, $p = .010$) and CBAI ($\beta = -.180$, $SE = .046$, $p < .001$). In this case, we did not find a positive interaction between first-order injunctive beliefs and mental well-being. Indeed, the interaction between first-order injunctive beliefs and the lockdown was negative (CBAI: $\beta = -0.210$, $SE = .085$, $p = .015$; PHQ-8: $\beta = -0.096$, $SE = .095$, $p = .313$; see Figure S3).

In terms of respondents' views, the increase in trust in the government (.223 standard deviations) and greater sufficiency of the public response (.301 standard deviations) associated with the lockdown announcement in the cross-country analysis is about half the size as the increase in trust in the government (.487 standard deviations) and greater sufficiency of the public response (.408 standard deviations) associated with the lockdown announcement in the UK. In terms of respondents' mental well-being, the decrease in the CBAI (.091 standard deviations) associated with the lockdown announcement in the cross-country analysis is similarly roughly half the size of the decrease in the CBAI (.180 standard deviations) associated with the lockdown announcement in the UK. In addition, in the UK, we find that the lockdown announcement was also associated with a decrease on the PHQ-8 (.105 standard deviations), though we do not replicate this effect in our cross-country data, which may arise in part because this relationship is dependent on high levels of pre-COVID government trust, as discussed above. In related research, these magnitudes are similar to the effect of direct cash transfers on self-reported worries in a sample of Kenyan individuals (.13 standard deviations; see Haushofer and Shapiro 2016), and somewhat smaller than the effects of targeted mental health interventions (typically between .20 and .30 standard deviations; see Cuijpers et al. 2013) as well as the cross-sectional association between self-reported health and the worries and depression indices within our sample (.163 standard deviations and .269 standard deviations, respectively; see Table S7).

Taken together, these results suggest that timely and decisive government action–i.e., imposing a nationwide lockdown—was consistently associated in both the cross-country analysis as well as the within-country event study with more favorable views of the public and government response. For mental well-being outcomes, our cross-country analysis provides weak evidence, and our within-country event study stronger

evidence, that these outcomes also improved. However, we note that the within-country event study was based on a major policy shift in the UK, which should not be treated as representative of the rest of the world, but rather as a case study of what occurred in one particular country.

4.7 Robustness Checks and Limitations

We conducted several analyses to assess the robustness of our findings. First, we examined the robustness of our results to different permutations over different sets of control variables. To address basic sample composition over our specifications, all contain a particular set of baseline control variables we consider essential (e.g., country fixed effects and date fixed effects, self-reported health, and current daily and lagged COVID-19 cases and deaths per capita in the country of residence). On top of this, we permutated over 128 different combinations of additional control variables. As shown in Figures S5-S7, the majority of specifications have p-values below the .05 threshold, and our main specification (highlighted in red) commonly lies somewhere in the middle of the distribution of coefficients. We further evidence the robustness of our findings by showing that, as we include more control variables and thus explain a larger share of the variation in the dependent variable, the absolute size of our effect grows (see Figure S8).[4] These results provide some confidence in our estimates and provide a rationale for choosing a specification with an exhaustive set of control variables.

Second, we address potential concerns arising from the composition of our sample.[5] One possibility, as noted above, is that participants in our survey were more concerned about COVID-19 than a representative survey might capture. To evaluate whether this is the case, we conducted a survey sampled to be representative in terms of age, sex, and ethnicity via Prolific (Peer et al., 2017; Palan and Schitter, 2018), with 1,000 participants each in both the US and UK on March 28 and 29, i.e.,

[4]This is a test in the spirit of Oster (2019), which shows that, under some assumptions, a positive relationship between the absolute size of coefficients and the associated regression R-squared indicates that omitted variables exert a downward bias on the coefficient of interest.

[5]We note that one challenge in evaluating the composition of our sample is the lack of existing datasets to compare our sample to. That is, to the best of our knowledge, there exist no representative cross-country datasets covering mental well-being and trust in government during the crucial time period when governments around the world increased the stringency of their actions to stop the spread of COVID-19. We compiled the information we were able to attain about the timelines of different cross-country representative surveys (see Figure S9) which shows that as far as we know, no representative survey data spanned the onset of the COVID-19 pandemic—when global policy stringency increased threefold from .2 to the maximum of .6—with robust cross-country representative coverage.

on dates overlapping with the main sample. We restrict our comparison group in the main survey to respondents in the US and UK who completed the survey on the same dates, and compared responses on self-reported measures assessing preventive behaviors (e.g., whether individuals sheltered-in-place), which we argue approximate individuals' concerns about COVID-19. We find only very small differences in self-reported preventative behavior across both samples (see Table S8), highlighting that at least for the US and UK, our survey captured a similar level of concern about COVID-19 as a representative survey did.

We also used the Prolific survey as an opportunity to assess the possibility that responses to our survey were driven by social desirability bias. We did this by incorporating a list experiment in this representative survey: a random half of participants (the control group) were presented with a list of four protective measures (e.g., handwashing), and asked how many of them they favored, while the other half of participants (the treatment group) were presented with the same list of four measures, plus one additional item: whether they think there should be a curfew in their country. Respondents in the control group on average agreed with 2.91 statements, while respondents in the treatment group agreed with 3.64 items. The average difference in statements agreed with between the control and treatment group is thus 0.73, which very closely mirrors the share of respondents who, when asked directly, agree that there should be a curfew in their country (0.74 in the representative sample; 0.71 in the main sample). These results suggest that social desirability bias did not play an important role.

Another possibility is that our survey attracted particularly neurotic individuals who may have experienced heightened levels of worries or depression (Jylhä and Isometsä, 2006), and are both more likely to have experienced emotional distress (Kroencke et al., 2020; Modersitzki et al., 2021) and to have sheltered-in-place during the COVID-19 pandemic (Chan et al., 2020; Götz et al., 2020). To ascertain the distribution of personality traits in our sample, we accessed and compared the participants in our dataset that reported living in the UK to the BBC Lab Dataset (Ebert et al., 2020; Jokela et al., 2015), which contains Big Five personality data for 588,014 UK residents measured between November 2009 and April 2011. As Figure S7 exhibits, the distributions show considerable overlap for most personality traits; if anything, our sample is somewhat more conscientious, less extroverted, and less neurotic than the sample in the BBC Lab Data. This analysis provides some evidence against the possibility that–at least in the UK–we attracted particularly neurotic people into the sample.

In addition, we explored whether potential selection into our sample is likely to make a difference, that is, we conducted analyses to explore whether the effect of the

lockdown varies by demographic characteristics and personality traits. Our analysis reveals no systematic differences across a range of variables, including age, gender, education, income, marital status, and most personality traits (see Table S9). The exception to this pattern is the personality trait openness to new experience, where we find that treatment effects are smaller for people with higher openness scores. These analyses provide some evidence to suggest that even if there were selection on demographic characteristics and personality traits in our sample, they are unlikely to account for our treatment effect estimates.

Despite these reassuring results, we note that our findings should be viewed within the constraint that our sample was not recruited to be representative for each country, which we were unable to do given the tight timeline necessary to field the survey in time to capture the effects of lockdown announcements. As described above, we took steps to diversify the sources of our sample, are able to ascertain bounds around the representativeness in the UK and US, and show the limited impact of potential selection effects. At the same time, it is possible that selection biases continue to occur in our data, for example affecting the representation of political orientation, which has been closely tied to COVID-related attitudes and behaviors in the US (Bursztyn et al., 2020; Pennycook et al., 2020; Gollwitzer et al., 2020). However, while the link between political partisanship and pandemic behavior is particularly prominent in the US, this is not necessarily the case elsewhere, and the global nature of our sample makes it unlikely that our findings would be severely impacted by this potential confound. We encourage future research that seeks to evaluate the effectiveness of governmental interventions around the world during the COVID-19 pandemic to use representative samples to better estimate such sampling biases, which can in turn further inform the interpretation of our results.

5 Discussion

In this paper, we reported results from a large-scale, international survey of COVID-19 attitudes and behaviors at the onset of the pandemic. We find rapid, widespread adoption of normative beliefs associated with COVID-19 containment behaviors: The vast majority of respondents across virtually every country in our sample believed that people in their country should cancel their participation in social gatherings, should not shake each other's hands, should close shops other than particularly important ones, should impose a strict curfew, and that non-adherence should be financially punished. Most respondents also believe that the majority of others hold these beliefs as well. Moreover, these normative beliefs were strongly associated with adherence to these behaviors.

These findings provide a striking example of how quickly social norms can arise, and motivate meaningful behavior change in the service of solving large-scale public good dilemmas. While there is ever-growing evidence of the importance of social norms for permitting humans to cooperate at a large scale (Ostrom, 1990; Bicchieri, 2005, 2016; Boyd, 2017; Henrich and Muthukrishna, 2021; Boyd and Richerson, 2021), our study stands out for two reasons. First, it demonstrates just how quickly social norms can arise. Our survey was administered just a few weeks after the first mentions of COVID-19 in national news sources (Taylor, 2020), and before the peak of the first wave of the COVID-19 pandemic in most countries. Yet, we found that the vast majority of our participants already held high first-order and second-order injunctive beliefs, and were complying with COVID-19 containment measures. These findings suggest that social norms can be effective at promoting contributions to public goods even in rapidly changing environments.

Second, our study demonstrates that social norms can support cooperation at a truly global scale. High first-order injunctive beliefs, second-order injunctive beliefs, and behavioral adherence were not concentrated in a small number of places. Rather, in nearly all countries included in our analyses, participants reported very high first-order beliefs and self-reported adherence. Even second-order beliefs, though more variable, were quite high in most countries. The ability of norms to operate on a global scale is not only of theoretical interest, but also of practical importance, suggesting that social norms can play a role in ameliorating global-scale public good dilemmas like climate change.

Consistent with others' writings (Acemoglu and Robinson, 2012), social norms in our setting appear to be complements to more formal means of motivating desired behaviors, namely government lockdowns. Those who most strongly internalized social norms were also the most supportive of increased government response, and improved their opinion of government response more when their government instituted a lockdown.

Our study also offers an opportunity to consider not only the influence of social norms on behavior, but also on people's proximate experiences–the beliefs and feelings they were conscious of, which we aimed to capture using our PHQ-8 and CBAI measures of mental well-being. Theoretically, social norms can have both a positive and negative net effect on people's mental well-being since they can motivate them to act by causing them to be proud or to experience 'warm glow' (and thus have a positive influence on their mental well-being), by motivating people to act by causing them to be anxious about COVID-19 as well as them being seen as non-compliant, or to experience shame if they fail to comply—all of which could have a negative influence on their perceived well-being. We find more evidence of the latter

in our data: Those who internalized social norms more strongly also appear to have felt more anxious and depressed. These results are consistent with others' findings (e.g., DellaVigna et al., 2012), though we emphasize that norms need not always be associated with negative emotions and experiences.

Although our paper focused on the role of social norms in motivating behavior and shaping respondents' beliefs and experiences, we highlight that our findings on mental well-being are noteworthy in their own right. Whereas others have noted the negative effects of the pandemic and lockdowns on well-being (e.g., Brodeur et al., 2021; Sibley et al., 2020; Möhring et al., 2021; Giuntella et al., 2021), our results suggest that lockdowns also had a positive effect. That is, they reduced depression and anxiety on average for our respondents, and particularly strongly for those who had internalized social norms of adherence to COVID-19 containment behaviors. There are, however, a number of ways to contextualize these findings. First, note that our study considers the effects of lockdowns relatively early in the pandemic. It is possible that the longer lockdowns lasted, the more negative their impact on mental well-being may become (though, for a contrasting perspective, see Lara Aknin and Dunn 2021), or that some people will react negatively to lockdowns (as Fazio et al. 2021 found for individuals who most strongly supported fining those who failed to adhere to abatement measures). Differences could also arise as a function of how concerned people are about COVID-19, with those who are particularly vested in the pandemic's effects (such as parents) responding particularly strongly to lockdowns (Möhring et al., 2021). Lockdowns could also have other negative effects, e.g., leading to hostility towards immigrants (Bartos et al., 2020). Finally, we note that, like us, Sibley et al. (2020) found that lockdowns increased trust in government.

We also recognize that social norms were likely only one contributing factor to participants' pessimism about others' and the governments' response, which could also stem from broader worries about labor market consequences. That is, it is possible that participants intuited that others might not be able to comply with containment measures because doing so would make it challenging to make a living. Similarly, their pessimism reflected a concern that if others did not comply, this would have dire consequences for their own livelihoods.

The main limitation of our study is our sampling methodology. As discussed in Sec. 3, we attempted to make our results as informative of the general population as possible, but we must nonetheless caution against making claims about the general population based on our study. Participants in the study may well have differed from the general population, e.g., in how tech savvy they are, or how concerned they are about COVID-19–factors that may well have skewed their responses in ways that we cannot control for.

We end with a note of gratitude for the rapid, global collaboration behind this very project which mirrors our findings. Dozens of volunteers, listed in the acknowledgements, came together to translate a survey within hours into 70+ languages in order to cover the rapidly unfolding, and often messy, events as they were happening in March 2020. Thousands of people shared our call to participate, and over one hundred thousand participants graciously donated their time so we may learn more about what was going on in their own surroundings, and in their own minds, during this time.

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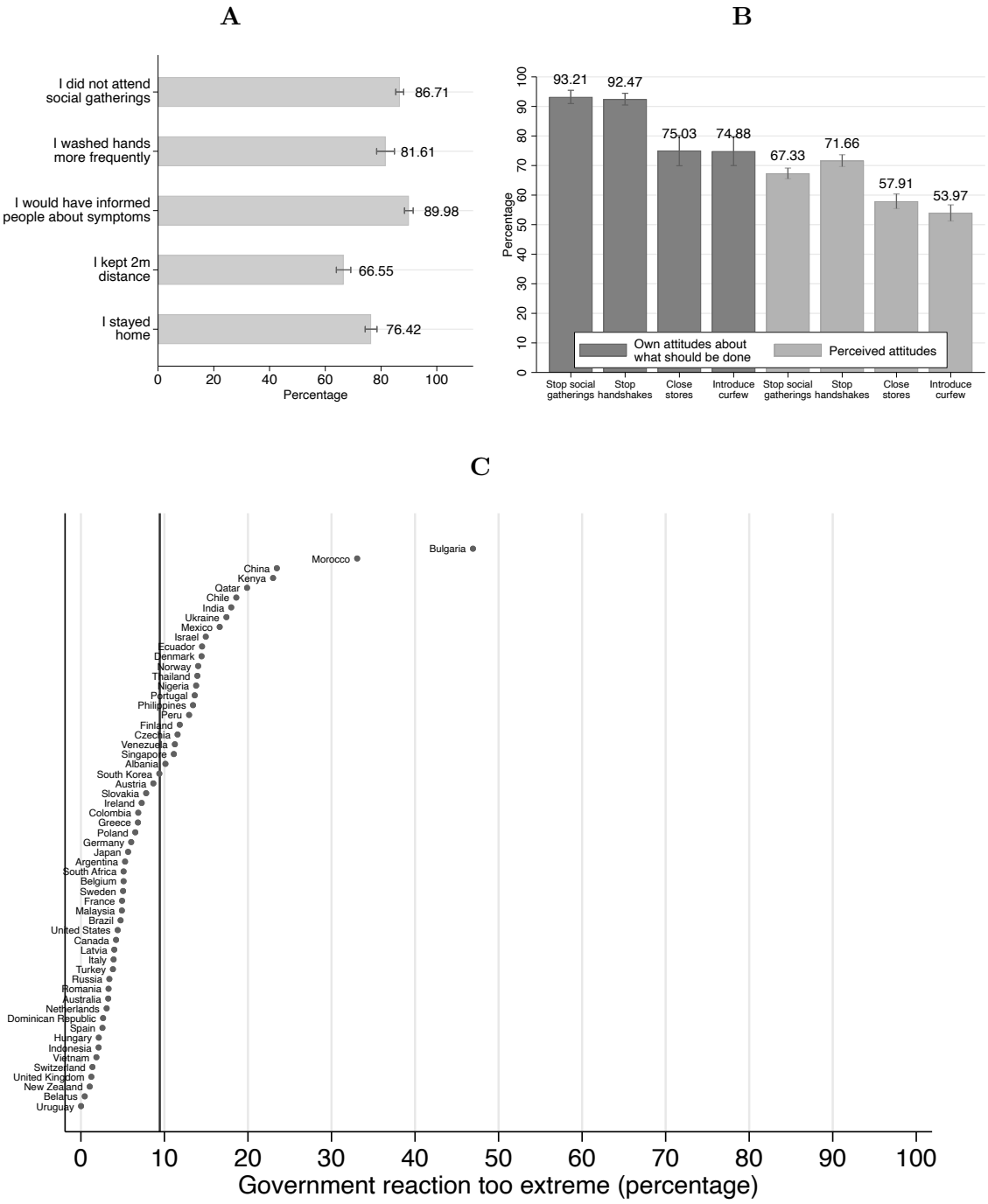
Conflict of Interest Statement

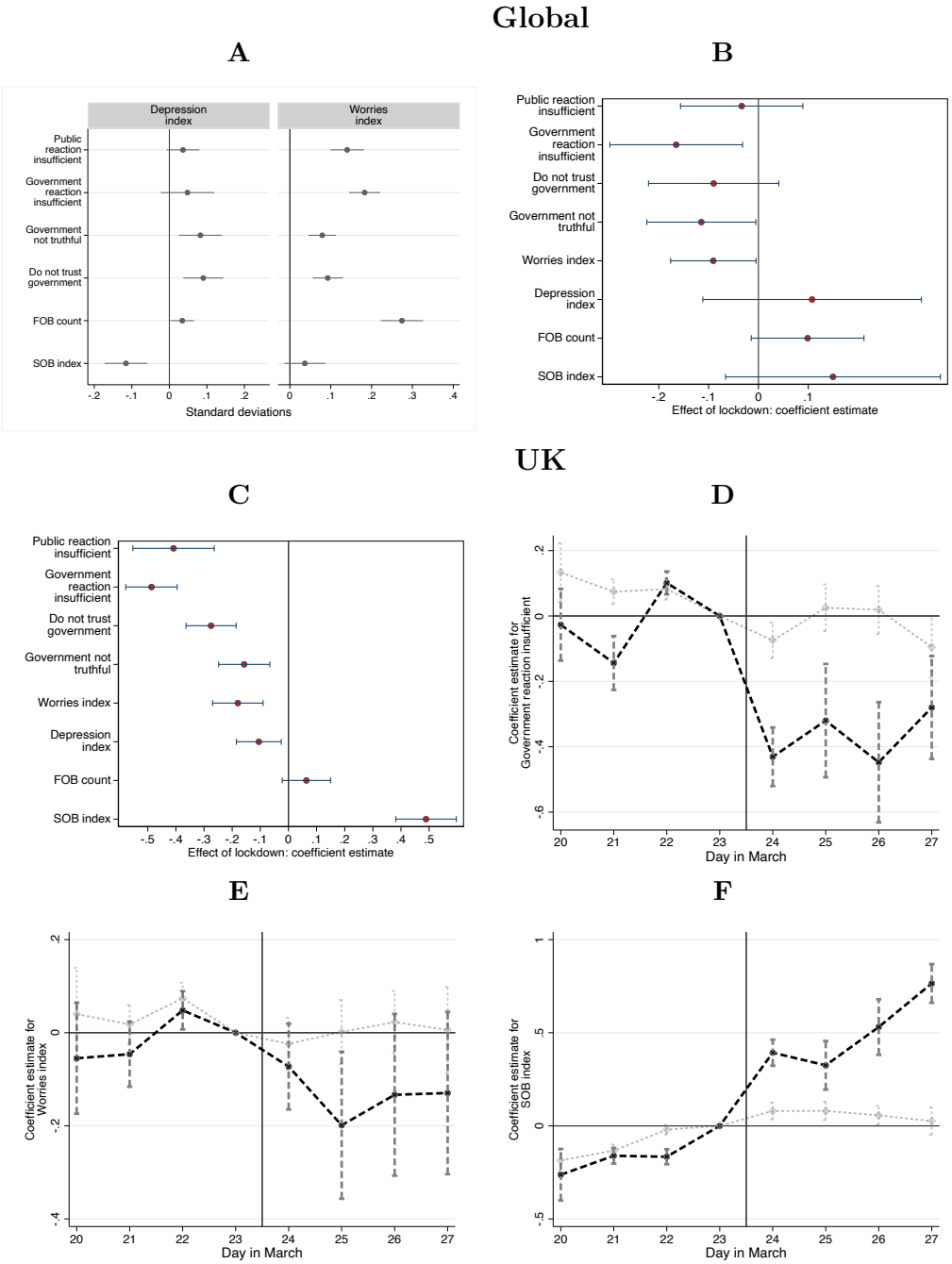
The authors declare no competing interests.

Figure 1: Behaviors and Beliefs at the Onset of the COVID-19 Pandemic



Notes: This figure shows descriptive statistics of personal and perceptions of societal reactions to COVID-19. Panel **A** presents self-reported engagement in protective behavior. Panel **B** contrasts respondents' attitudes and perceived attitudes of compatriots about protective behaviors and policies. Panel **C** shows the share of respondents who think that the government action has been excessive by country. Respondents from countries with at least 200 responses are included (see Figs. S8 and S9 in the appendix for results when the threshold is 100 observations). Responses are weighted to be representative at the country level in terms of age, gender, income, and education. Panel A and B are further weighted by country population to account for different country sizes. Panel C displays weighted country averages.

Figure 2: Effects of Government Response at Onset of COVID-19 Pandemic



Notes: Panel **A** depicts the individual-level weighted pairwise relationship between the variables indicated in the figure heading and row, controlling for respondents' age, gender, education, health as well as country and date fixed effects. The regressions in Panel **B** are estimated using the individual-level weighted data, controlling for country and day fixed effects; the independent variable is an indicator of whether the country implemented a lockdown ("stay at home" policy). Standard errors in Panel **A** and **B** are clustered by country. The regressions in Panel **C** are estimated using the individual-level data from the UK and a set of control group countries. The regressions control for country-by-education-by-gender fixed effects and date fixed effects. The independent variable is an indicator variable taking the value 1 for respondents participating from the UK after the 23 March 2020. Panels **D**, **E** and **F** illustrate the impact of the UK lockdown announcement among respondents from the UK compared to the average time trend among participants from control group countries on perceptions of sufficiency of the government response, the CBAI and the second-order beliefs. Standard errors in Panels C-F are clustered by country-age-gender. All figures show standardized beta coefficients.

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Christopher Roth, Assistant Professor, Department of Economics, Warwick University, UK. Survey design, survey implementation, translation and maintenance, write-up.

Marc Witte, Research Associate, Institute of Labor Economics (IZA), Bonn, Germany. Survey design, maintenance, data preparation, data analysis, results preparation, write-up.

Erez Yoeli, Research Scientist, MIT, US. IRB Application, survey design, survey implementation, translation and maintenance, analysis, write-up.

B Survey Dissemination

The call for participation was initially posted on Twitter via 10 social media accounts of the team members of this project on March 20, 2020. On Twitter, these accounts combine around 22,266 followers with the call being retweeted directly by 2,193 users. The call to participate produced nearly 1.4 million impressions on Twitter and accounted for 31,211 clicks on the landing page `www.covid19-survey.org`.

In addition to our call for participation, we identified at least a further 1,105 original tweets promoting the survey to a combined follower count of 5,601,915 followers. There were at least a further 14,404 retweets of these calls to participate from other users. Unfortunately, we cannot extract or identify each tweet due to limitations on the Twitter search feature—for example, Twitter only allows us to identify the 100 most recent retweets per tweet. This leaves us with data on just 5,191 or 36% of the retweets we identified. The combined number of followers of accounts behind these retweets stands at an additional 14,460,460 followers.

Among the social media influencers that were mobilized are a broad range of individuals engaged in traditional media (journalists, TV hosts or anchors from national and international media outlets) along with social media influencers (ranging from entrepreneurs, to comedians and accounts of online cat communities), broader engagements from a host of international and national NGOs (including various United Nations initiatives such as the UN's Sustainable Development Solutions Network and

the World Values Survey Association network) along with University- and Alumni Networks. We provide a list of the handles of accounts for which we were able to obtain the retweet information on `https://bit.ly/3gAZgO9`. We emphasize that this is only a subset of the actual tweets and retweets that we were able to download using various Twitter features ex-post.

While Twitter provides us at least with some data on dissemination, it was only one of many sources for recruitment. Out of the 391,476 different unique landing page visitors, a referrer analysis based on Google Analytics data suggests that only 27.5% of referrals were due to users clicking the link on Twitter. Note that our survey was featured in the media, including the Spanish El Pais and the German Frankfurter Allgemeine Zeitung, along with newspapers Tribune de Geneve, Le Matin, 20Min and 24heures (Switzerland) and the Jakarta Globe (Indonesia), among many others. In addition, our survey was also spread through additional means, including via mailing lists and WhatsApp groups, and was distributed by several NGOs and companies.

C Data Dictionary

The survey instrument is provided in the Appendix. This document provides a description of the variables that can be found in the data file on our OSF page (`https://osf.io/3sn2k/`). We also indicate below which variables were derived measures and how they have been computed. Derived variables are created in the accompanying do-file and not part of the main dataset.

C.1 Meta-information

The survey collection software Qualtrics provides the following meta information:

`StartDate` – for confidentiality reasons, we do not provide the exact start time but only the date on which a participant took the survey. Dates are coded based on the time of interview recorded in GMT time zone.

`ResponseID` – Unique ID for an individual survey attempt.

`Duration` – This variable measures the number of seconds the respondent took to fill out the survey.

`UserLanguage` – This variable captures the ISO language code for the language in which the survey was taken.

`CountryofLiving` – This variable indicates the country in which a respondent lives.

`iso2c` – ISO 3166 alpha-2 country code

`year` – year that survey was taken

`month` – month that survey was taken
`day` – day that survey was taken
`region` – region
`continent` – continent

C.2 Past Behaviors

To what extent do the following statements describe your behavior for the past week? [0 = Does not apply at all; 100 = Applies very much]

- `beh_stayhome` I stayed at home.
- `beh_socgathering` I did not attend social gatherings.
- `beh_distance` I kept a distance of at least two meters to other people.
- `beh_tellsymp` If I had exhibited symptoms of sickness, I would have immediately informed the people around me.
- `beh_handwash` I washed my hands more frequently than the month before.

As a derived variable we generate the `beh_index`, which is the sum of the above five `beh_*` dummies pertaining to protective behaviors. This variable is then standardized.

C.3 Future Behaviors

- `leavehome` Do you need to leave your home in the next 5 days? [0 = No; 1 = Yes]
- What are the reasons for you to leave your home (check all that apply)? Please try to be as honest as possible. Your answers will be kept confidential. [0 = did not check; 1 = checked]
  - `leavehome_reason_work` Going to work
  - `leavehome_reason_pet` Walking a pet
  - `leavehome_reason_physical` Doing physical activity (e.g. exercising, jogging)
  - `leavehome_reason_food` Procuring food for yourself or family

  - `leavehome_reason_pharmacy` Going to the pharmacy
  - `leavehome_reason_hospital` Going to the hospital / receiving medical treatments
  - `leavehome_reason_care` Taking care of dependents
  - `leavehome_reason_friends` Meeting friends or relatives
  - `leavehome_reason_tired` Getting tired of being inside of the house
  - `leavehome_reason_bored` Getting bored
  - `leavehome_reason_adrenaline` Getting some adrenaline (from breaking the law)
  - `leavehome_reason_freedom` Exercising my freedom
  - `leavehome_reason_other` Other

As derived variables, we distinguish "good" and "bad" reasons for leaving the house:

- `leavehome_bad` This variable is the sum of all "bad" reasons to leave the home, which is leaving the house to: visit friends, because one is bored, for the adrenaline, and to exercise one's freedom.
- `leavehome_good` This variable is the sum of all "good" reasons to leave the home, which is leaving the house to: go to work, walk a pet, get exercise, procure food, go to the pharmacy, the hospital, or to care for somebody else.

C.4 Personal attitudes about coronavirus measures

- `fob_social` - What do you think: should people in your country cancel their participation at social gatherings because of the coronavirus right now? [No = 0; Yes = 1]
- `fob_handshake` - What do you think: should people in your country not shake other people's hands because of the coronavirus right now? [No = 0; Yes = 1]
- `fob_stores` - What do you think: should all shops in your country other than particularly important ones, such as supermarkets, pharmacies, post offices, and gas stations, be closed because of the coronavirus right now? [No = 0; Yes = 1]

- `fob_curfew` - What do you think: should there be a general curfew in your country (with the exception of grocery shopping, necessary family trips, and the commute to work) because of the coronavirus right now? [No = 0; Yes = 1]

We refer to these variables as "first-order beliefs". As a derived variable, we construct the weighted average country-level beliefs about coronavirus attitudes (first-order beliefs), meaning that we generate the weighted average of respondents per country agreeing with each of the beliefs above. We use within-country weights (`weight`) to account for selection on age, gender, education, and income (see Section 3 below for further details on weight construction).

- `m_fob_social` - the country-level average of `fob_social` [min 0; max 100]
- `m_fob_handshake` - the country-level average of `fob_handshake` [min 0; max 100]
- `m_fob_stores` - the country-level average of `fob_stores` [min 0; max 100]
- `m_fob_curfew` - the country-level average of `fob_curfew` [min 0; max 100]

C.5 Perception of others' beliefs about coronavirus measures

- `sob_social` - How many of 100 people in your country do you think believe that participation at social gatherings should be cancelled because of the coronavirus right now? [slider ranging from 0 to 100 — initiated at 0]
- `sob_handshake` - How many of 100 people in your country do you think believe that one should not shake other people's hands because of the coronavirus right now? [slider ranging from 0 to 100 — initiated at 0]
- `sob_stores` - How many of 100 people in your country do you think believe that all shops in your country other than particularly important ones, such as supermarkets, pharmacies, post offices, and gas stations, should be closed because of the coronavirus right now? [slider ranging from 0 to 100 — initiated at 0]
- `sob_curfew` - How many of 100 people in your country do you think believe there should be a general curfew in your country (with the exception of grocery shopping, necessary family trips, and the commute to work) because of the coronavirus right now? [slider ranging from 0 to 100 — initiated at 0]

We refer to these variables as "second-order beliefs".

Misperceptions: Differences between first- and second-order attitudes As derived variables, we construct individual-level misperceptions. We construct our misperception measures by taking the difference between people's beliefs about others' attitudes, minus the weighted average of actual attitudes of other respondents ($diff\_ind\_X =$ `m_fob_X` $-$ `m_fob_X`). We do this for four dimensions: (i) cancellation of social gatherings, (ii) appropriateness of hand-shakes, (iii) store closures, (iv) a general curfew. The resulting misperception variables are:

- `diff_ind_social` - Difference between first- and second order attitudes regarding social gatherings. [min -100; max 100]
- `diff_ind_handshake` - Difference between first- and second order attitudes regarding hand shaking. [min -100; max 100]
- `diff_ind_stores` - Difference between first- and second order attitudes regarding store closures. [min -100; max 100]
- `diff_ind_curfew` - Difference between first- and second order attitudes regarding curfew. [min -100; max 100]

We use the z-score transformation of the sum of all four misperception items to construct our misperception index (`misperception_index`). Higher values indicate higher levels of misperceptions.

C.6 Financial sanctioning of risky behaviors

- `financialpunishment` - What do you think: should risky behaviors, which might enable further spread of the coronavirus, be financially punished? [0 = No; 1 = Yes]
- Which fines should be enforced for the following risky behaviors (amount in your country currency)?
  - `financialpunish_1`: Participation at social gatherings (amount in country currency) [value as entered by respondent, numerical values only]
  - `financialpunish_2`: Going out despite exhibiting symptoms of coronavirus [value as entered by respondent, , numerical values only]

C.7 Case predictions

- `infect_now` - Without looking it up, what is your estimate of the number of people in your country who are currently infected? [value as entered by respondent]

- `infect_onemonth` - How many people in your country do you think will be infected 1 month from now? [value as entered by respondent]

We also use the log of case growth as a derived variable:
`log_case_growth = log((infect_onemonth-infect_now)/infect_now)`

C.8 Perceptions of government/public response & efficacy

- `perceivedreaction` - Do you think the reaction of your country's government to the current coronavirus outbreak is appropriate, too extreme, or not sufficient? [5-point scale; 1 = The reaction is much too extreme; 2 = The reaction is somewhat too extreme; 3 = The reaction is appropriate; 4 = The reaction is somewhat insufficient; 5 = The reaction is not at all sufficient]

- `govtrust` - How much do you trust your country's government to take care of its citizens? [5-point scale; 1 = Strongly distrust; 2 = Somewhat distrust; 3 = Neither trust nor distrust; 4 = Somewhat trust; 5 = Strongly trust]

- `govfact` - How factually truthful do you think your country's government has been about the coronavirus outbreak? [5-point scale; 1 = Very untruthful; 2 = Somewhat untruthfu; 3 = Neither truthful nor untruthful; 4 = Somewhat truthful; 5 = Very truthful]

- `react_pub_appr` - Do you think the reaction of your country's public is appropriate, too extreme, or not sufficient? [5-point scale; 1 = The reaction is much too extreme; 2 = The reaction is somewhat too extreme; 3 = The reaction is appropriate; 4 = The reaction is somewhat insufficient; 5 = The reaction is not at all sufficient]

- `perceivedeffectivnes` - What do you think: How effective are social distancing measures (e.g., through a general curfew) to slow down the spread of the coronavirus? [5-point scale; 1 = Not at all effective; 2 = Not effective; 3 = Neither effective nor ineffective; 4 = Effective; 5 = Very effective]

For the analysis, we generate dummies of all measures of the perceptions of government and public response and efficacy described above. Those equal 1 if the individual's response is above the midpoint of the Likert scale, and 0 if it is below the midpoint. When the data is collapsed at the country-level, it can then be interpreted as the share of respondents who gave a response above the midpoint.

C.9 Worries battery

- `mh_anxiety_1` - I am nervous when I think about current circumstances. [5 point scale; same for all items in this battery; 1 = Does not apply at all; 2 = Somewhat does not apply; 3 = Neither applies nor does not apply; 4 = Somewhat applies; 5 = Strongly applies]
- `mh_anxiety_2` - I am calm and relaxed. [reverse coded]
- `mh_anxiety_3` - I am worried about my health.
- `mh_anxiety_4` - I am worried about the health of my family members.
- `mh_anxiety_5` - I am stressed about leaving my house.

As a derived variable, we generate the "worries index" (`mh_index`), which is the z-scored sum of the 5 worries questions questions above. Higher values indicate higher levels of worries.

C.10 Depression questionnaire (PHQ9)

The data includes responses eight questions from the commonly used PHQ9 depression questionnaire (Kroenke et al., 2001) (without the suicide question). Higher values indicate higher levels of depression.

How often have you been bothered by the following over the past 2 weeks?

- `PHQ9_1` - Little interest or pleasure in doing things? [4 point scale; same for all items in this battery; 1 = Not at all; 2 = Several days; 3 = More than half the days; 4 = Nearly every day]
- `PHQ9_2` - Feeling down, depressed, or hopeless?
- `PHQ9_3` - Trouble falling or staying asleep, or sleeping too much?
- `PHQ9_4` - Feeling tired or having little energy

- PHQ9_5 - Poor appetite or overeating?
- PHQ9_6 - Feeling bad about yourself — or that you are a failure or have let yourself or your family down?
- PHQ9_7 - Trouble concentrating on things, such as reading the newspaper or watching television?
- PHQ9_8 - Moving or speaking so slowly that other people could have noticed? Or so fidgety or restless that you have been moving a lot more than usual?

Derived variable: The "depression index" (phq9_index) is the z-scored sum of the 8 PHQ9 questions above.

C.11 Personality Battery

The data also includes a ten item version of the Big-Five personality questionnaire (Gosling et al., 2003).

To which extent do the following questions apply to you? I see myself as ...

- personality_b5_1 - Extroverted, enthusiastic [7 point scale; same for all items in this battery; 1 = Disagree strongly; 2 = Disagree moderately; 3 = Disagree a little; 4 = Neither agree nor disagree; 5 = Agree a little; 6 = Agree moderately; 7 = Agree strongly]
- personality_b5_2 - Critical, quarrelsome
- personality_b5_3 - Dependable, self-disciplined
- personality_b5_4 - Anxious, easily upset
- personality_b5_5 - Open to new experiences, complex
- personality_b5_6 - Reserved, quiet
- personality_b5_7 - Sympathetic, warm
- personality_b5_8 - Disorganized, careless
- personality_b5_9 - Calm, emotionally stable
- personality_b5_10 - Conventional, uncreative

C.12 Personal Information

- `age` - Age in years (2020 - year of birth).
- `educ` - How many years of education did you complete? [numerical value provided by participants]
- `income` - What is your monthly household income, before tax, in your country's currency? [numerical value provided by participants]
- `marital_status` - What is your marital status? [1 = married/co-habitating, 2 = single/divorced]
- `hhmember` - How many people live in your household? [numerical value provided by participants]
- `gender` - Which gender do you identify with? [1 = Male; 2 = Female; 3 = Other]
- `health` - How healthy are you? [1 = poor; 2 = fair; 3 = good; 4= excellent]
- `Comorbidities` - How many of the following conditions do you have: cardiovascular diseases, diabetes, hepatitis B, chronic obstructive pulmonary disease, chronic kidney diseases, and cancer? [values ranging from 0 to 5 or more]

Derived variables:

- `age_yr` - Age in years (2020- year of birth).
- `age_yr_bin` - categorical variables subdividing individuals into five year bin groups.

C.13 Merged external data

C.13.1 John's Hopkins Data

We merge the JHU COVID19 data introduced in (Dong et al., 2020). The data are matched to each countries ISO2 letter country code and merged to individual respondents based on the date on which a respondent took the survey. This implies that the variables are varying within-country over time.

The variables are:

- `covid_confirmed` - confirmed cases in country on date respondent participated

- `covid_death` - confirmed COVID19 deaths in country on date respondent participated
- `covid_recovered` - patients recovered from COVID19 in a country on date respondent participated
- `l1covid_confirmed` - confirmed cases in country on one day prior to date that respondent participated
- `l1covid_death` - confirmed COVID19 deaths in country one day prior to date respondent participated
- `l1covid_recovered` - patients recovered from COVID19 in a country one day prior to date respondent participated
- `l2covid_confirmed` - confirmed cases in country two days prior to the day that respondent participated
- `l2covid_death` - confirmed COVID19 deaths in country two days prior to date on which respondent participated
- `l2covid_recovered` - patients recovered from COVID19 in a country two days prior to date on which respondent participated

C.13.2 Oxford COVID-19 Policy tracker

We merged the Oxford COVID-19 Policy tracker introduced in (Hale et al., 2021). This data tracks government policy relating to COVID-19 responses. The data is described in detail in (Hale et al., 2021). The data, being a country-by-day panel, is merged based on the date at which a respondent took the survey and thus reflects the policy landscape at the date the person took the interview.

For the purposes of our analysis, we further constructed some derived statistics separately. We leverage the data from (Hale et al., 2021) that is up to date as of April 6th. The data is a country-by-daily data set capturing the different measures countries adopted to constrain the spread of COVID-19. We focus on the main subcomponents S1-S6, capturing government actions grouped as: S1 School closures, S2 Workplace closures, S3 Cancellation of public events, S4 Closure of public transportation, S5 Public information, and S6 Restrictions on internal movement.

The data distinguishes between general country-wide restrictions versus targeted ones. In addition, the data also distinguishes between recommendations versus

requirements. We construct restrictions indices that are specific to our sample-countries and time window, and do not use the stringency index that is provided by (Hale et al., 2021). This is because for the sample period under consideration, from March 20 to April 5, 2020, most countries had already adopted quite stringent measures with regard to international travel and public information campaigns. As a result, these and a few other sub-components add little variation.

Instead, we use the (Hale et al., 2021) data to create a set of indicator variables that capture whether a country applied measures in a specific domain S1-S6 that are general, i.e., apply to the country as a whole. Similarly, we also use a robustness measure that constructs an index based on transformed indicator variables capturing whether restrictions in the domain S1-S6 are general and are mandatory. Using these sets of dummy variables, we then construct the first principal component of the data for the set of countries in our estimations and for the time period under considerations.

Table 3 presents the factor loadings for the first three principal components for the measures S1-S6 that are coded as applying countrywide (but are not necessarily mandatory). We observe that the first principal component is positively loaded with little weight being placed on the Public Information component. This is not surprising as most countries had ongoing public information efforts by March 20th, 2020 (the day our data collection began).

Table 3: Principal components to our construction of a COVID-19 country restriction index: general-country wide (but not necessarily mandatory) measures

	Comp1	Comp2	Comp3	Unexplained
General recommended/mandated School closures	0.407	-0.050	0.889	0.020
General recommended/mandated Workplace closures	0.451	-0.199	-0.388	0.329
General recommended/mandated Public event cancelation	0.425	0.207	-0.126	0.479
General recommended/mandated Public transport closure	0.400	-0.334	-0.159	0.458
General recommended/mandated Public information	0.222	0.892	-0.077	0.094
General recommended/mandated Restrictions internal movement	0.491	-0.086	-0.107	0.357

Table 4 presents the factor loadings for the first three principal components constructed on the dummy variables capturing general and mandated policy changes. Naturally, information campaigns do not have a "mandatory" dimension. As such, this feature, that already added little variation, is dropped. As before, we observe positive loading on all subcomponents.

We use these two first principal components to study the impact of country-level policy changes on perceptions at the individual level.

Table 4: Principal components to construction COVID-19 country restriction index: general and mandatory restrictions

	Comp1	Comp2	Comp3	Unexplained
General mandated School closures	0.400	0.613	0.681	0.000
General mandated Workplace closures	0.476	-0.010	-0.252	0.393
General mandated Public event cancelation	0.436	0.347	-0.565	0.220
General mandated Public transport closure	0.412	-0.672	0.373	0.130
General mandated Restrictions internal movement	0.503	-0.228	-0.118	0.319

C.14 Further external data

We used two external data sets for our analysis that we cannot include for proprietary reasons.

First, we use data from Gallup to measure confidence in government. This data is collected through the Gallup World Polls. Many universities have institutional subscriptions to the data. For licensing reasons, we are unable to post that data on the OSF. It is available from Gallup and measures the share of respondents in a country that respond "yes" to the question "Do you have confidence in national government?" (see *https://www.gallup.com/analytics/232838/world-poll.aspx*).

Second, we use data collected by the British Broadcast Service too compare personality traits in our sample to other, more general samples. This data can be accessed at *https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=7656*.

D Weight Construction

This section describes the construction and use of weights included with the survey data. The included weights correct for differences in income, education, age, and gender between survey respondents and the general population in each country. For countries that lack data on one of the dimensions, the weights correct for the available dimensions. We use data on the population structure from the United Nations statistical agency to construct the weights.[6] To weight by income, we use data from the Gallup World Poll.[7]

Table 5 displays the age bins used for reweighting for each gender to account for the population structure. This definition means that we cannot construct weights

[6]The data can be accessed here: *http://data.un.org/Data.aspx?d=POP&f=tableCode%3A22* .

[7]We use the latest available wave of data for each country.

for respondents who indicate 'other' as gender. To construct income weights, we use country-level income quintiles. Finally, we use three education categories to construct weights: less than 8 years of education, between nine and 14 years of education, and 15 and more years of education.

Table 5: Age bins used for reweighting

Age bin
18 - 19
20 - 24
25 - 29
30 - 34
35 - 39
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65+

These age bins are then used to construct weights based on the frequency of observations in the survey data according to the following formula:

$$j\_weight_{ibc} = \frac{weight\_\texttt{jb} \cdot N_c}{N_{jb}} \tag{1}$$

where j_weight_{ibc} is the weight for individual i in bin b, for category j (age-gender, income, education), and country c. $weight_{jb}$ is the fraction of the population in bin b of category j. N_{jb} is the number of individuals in our survey in bin b and N_c is the number of observations in country c. Intuitively, this formula put more weight on individuals in in bins with few observations and individuals in larger bins.

To construct aggregate individual-level weights, we multiply the weights in different categories.[8]

$$weight_{ijbc} = \Pi_{j \in (educ,inc,ag)} j\_weight_{ibc} \tag{2}$$

We also construct weights that account for the differential sample size across countries (weighting all countries equally) by dividing the weights by the number of observations in our sample.

[8]This implicitly assumes independence of distributions of the different categories.

$$weight\_sample_{ijbc} = weight_{ijbc}/N_c \tag{3}$$

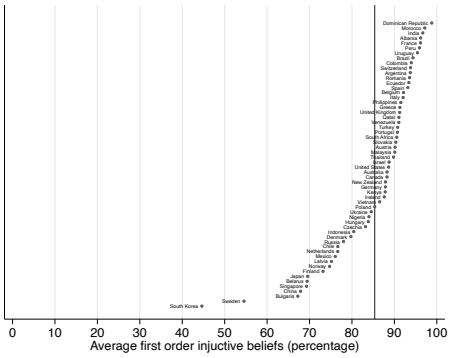
D.1 Included weight variables

- `weight_sample` - weights to reweight individuals within country weighting all countries equally.
- `weight` - weight to reweight individuals within country.
- `ag_weight` - age-gender weights based on UN population data.
- `no_ag_weights` - dummy indicating missing age-gender weights.
- `educ_weight` - education weights based on GALLUP World Poll education data.
- `no_educ_weights` - dummy indicating missing education weights.
- `inc_weight` - income weights based on GALLUP World Poll income data.
- `no_inc_weights` - dummy indicating missing income weights.
- `N_country` - number of respondents in country of respondent.

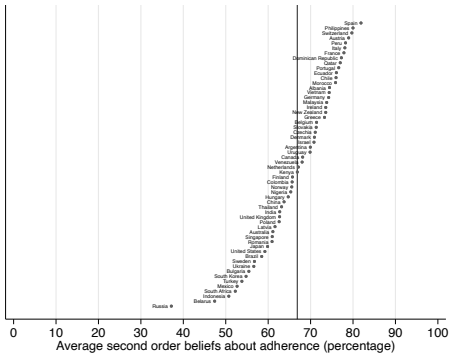
Figures

Figure S1: Distribution of Average First and Second Order Beliefs and Adherence by Country

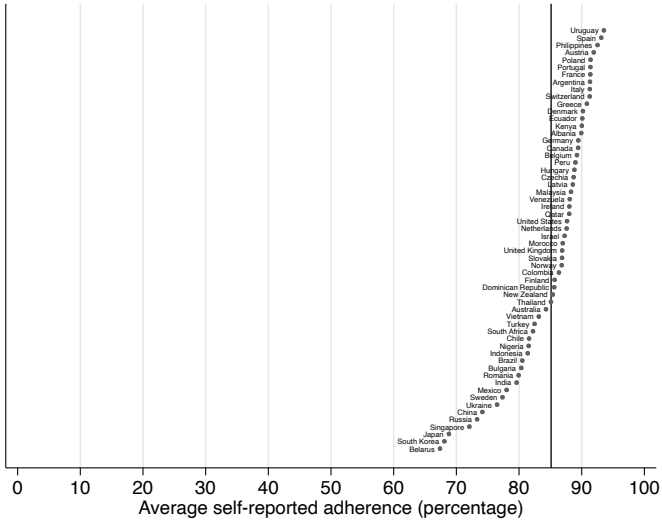
A: Average first order beliefs



B: Average second order beliefs

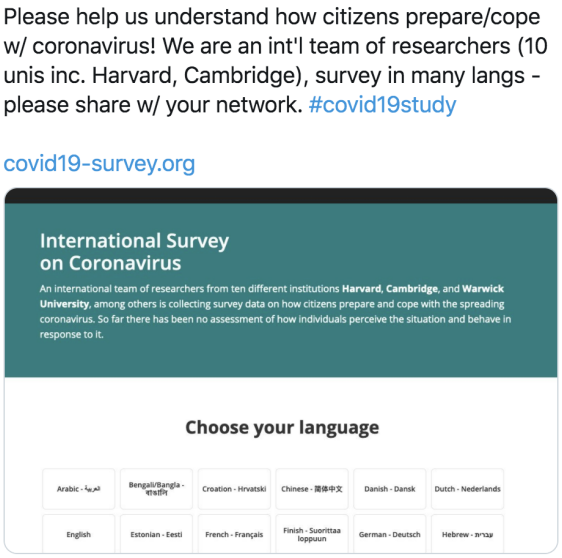


C: Average self-report adherence



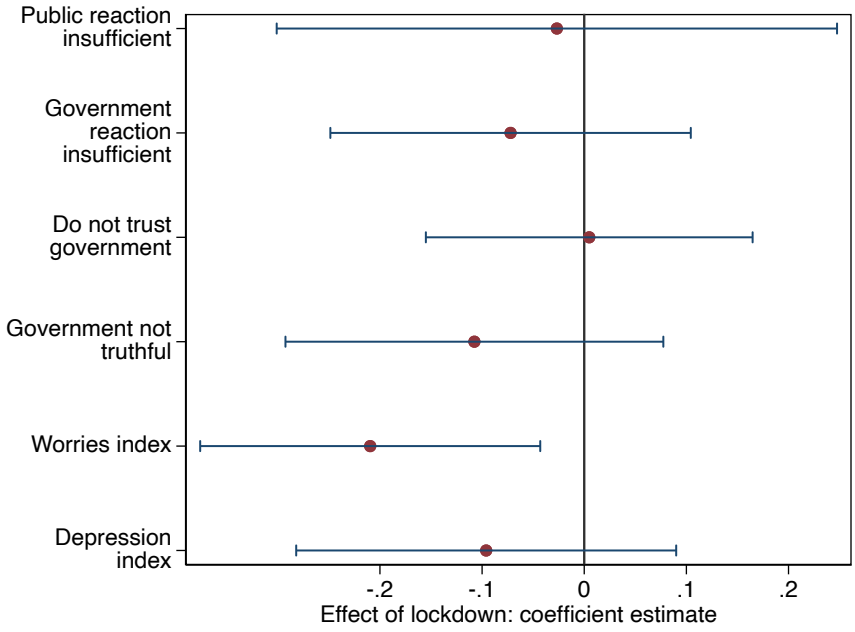
Notes: This figure displays the distribution of first order beliefs (Panel A), second order beliefs (Panel B), and self-reported adherence (Panel C) across countries included in the main analysis. First and order beliefs are averaged across support for avoiding social gatherings, handshakes, going to stores, and curfews. Self-reported adherence is averages across social gatherings, hand washing, telling symptoms, social distancing, and staying at home. Country level averages are constructed using population weights.

Figure S2: Survey Launch Tweet



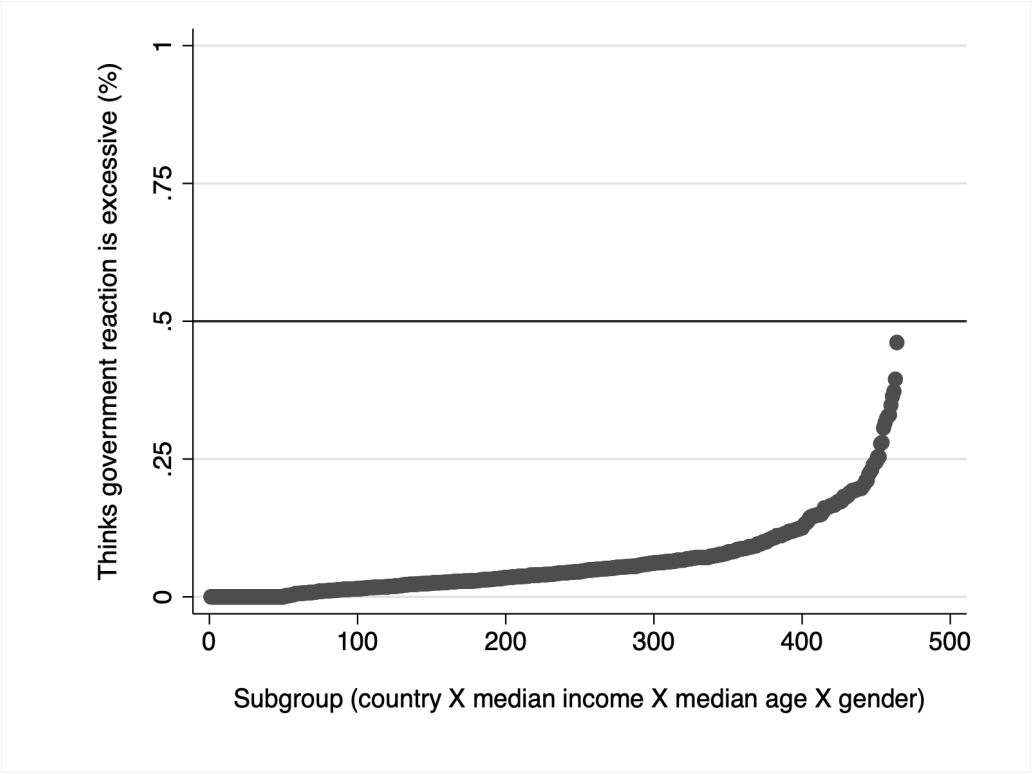
Notes: Survey launch announcement went live on March 20, 2020. The initial tweet generated around 1.5 million impressions.

Figure S3: Moderation of Respondents' Response to the U.K. Lockdown by First-order Injunctive Beliefs



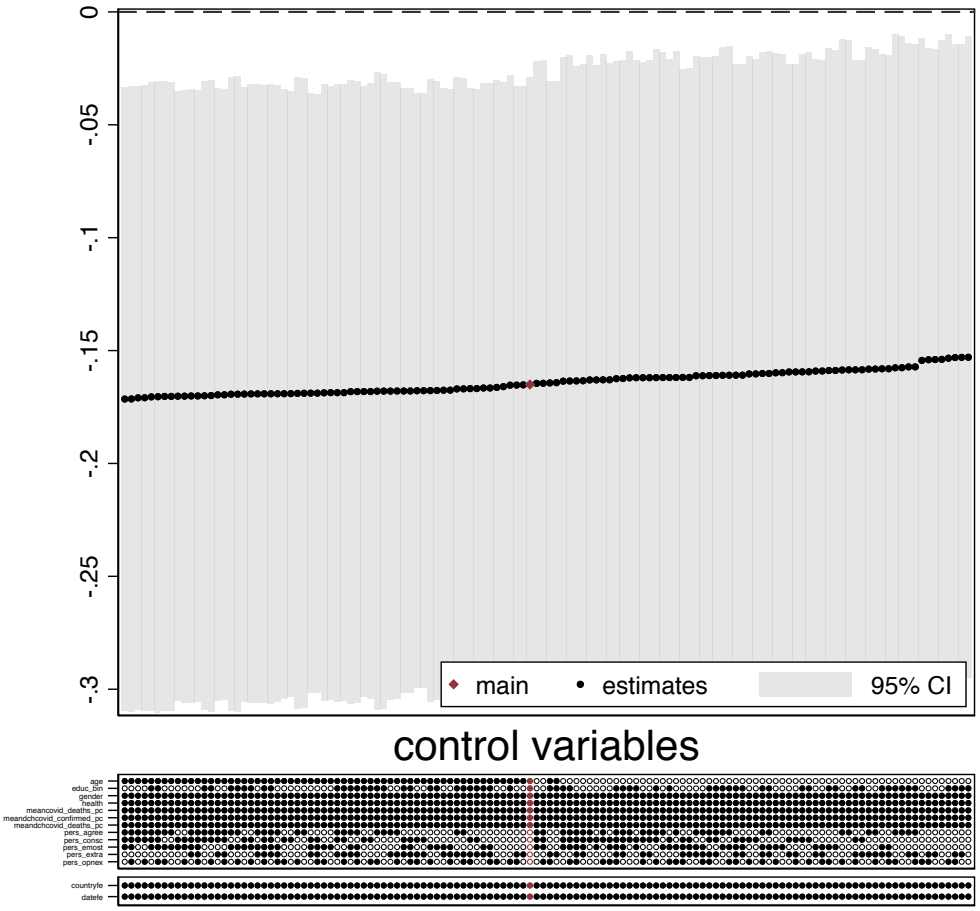
Notes: The regressions in this figure are estimated using the individual-level data from the UK and a set of control group countries. The regressions control for country-by-education-by-gender fixed effects and date fixed effects. The independent variable is an indicator variable taking the value 1 for respondents participating from the UK after the 23 March 2020, interacted with the first-order injunctive beliefs index. The coefficients and standard errors presented are for the interaction effect between first-order injunctive beliefs and the lockdown variable.

Figure S4: Average Perceptions of Government Response by Subgroup



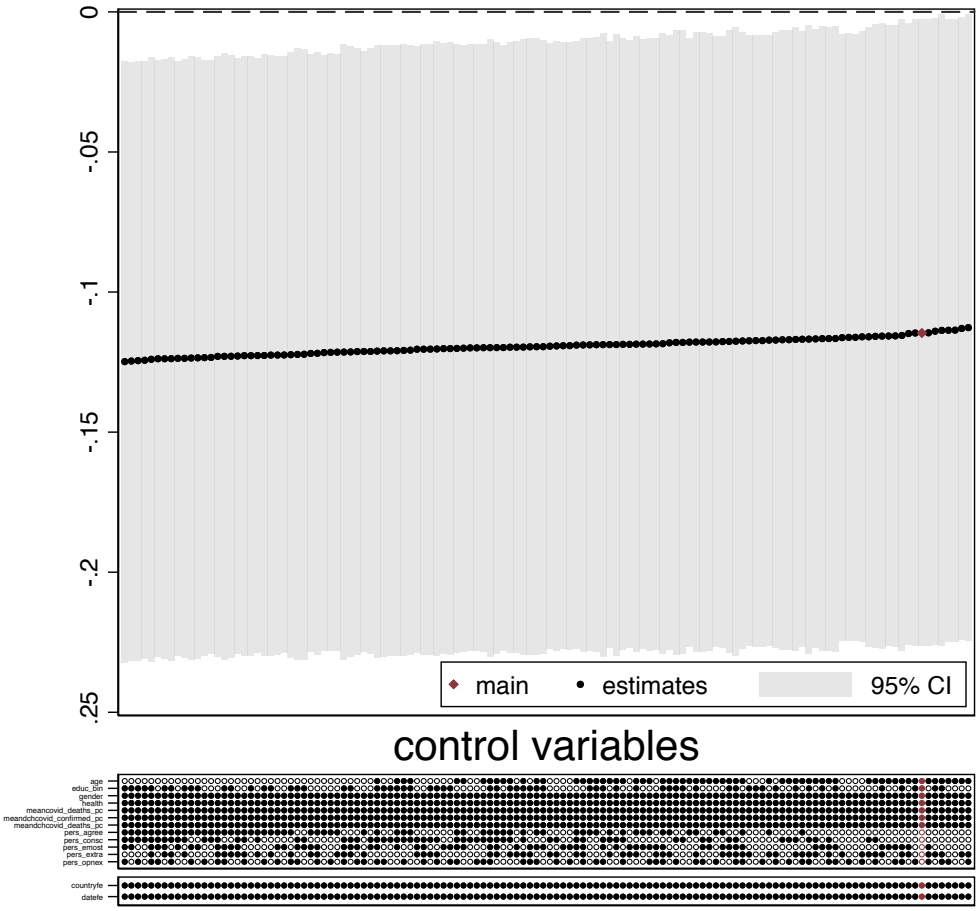
Notes: This figure shows subgroup-level averages of whether the government response to the COVID-19 pandemic is perceived to be excessive. The sample includes respondents from countries for which we have at least 200 responses (N=108,075). To produce the figure, we first split the sample into 464 subgroups based on country, gender, median age and median income. We then calculate average perceptions in each subgroup, order the subgroups by their average perception, and plot these values in the figure.

Figure S5: Coefficient Stability Plot for Treatment Effect on "Government Reaction Insufficient"



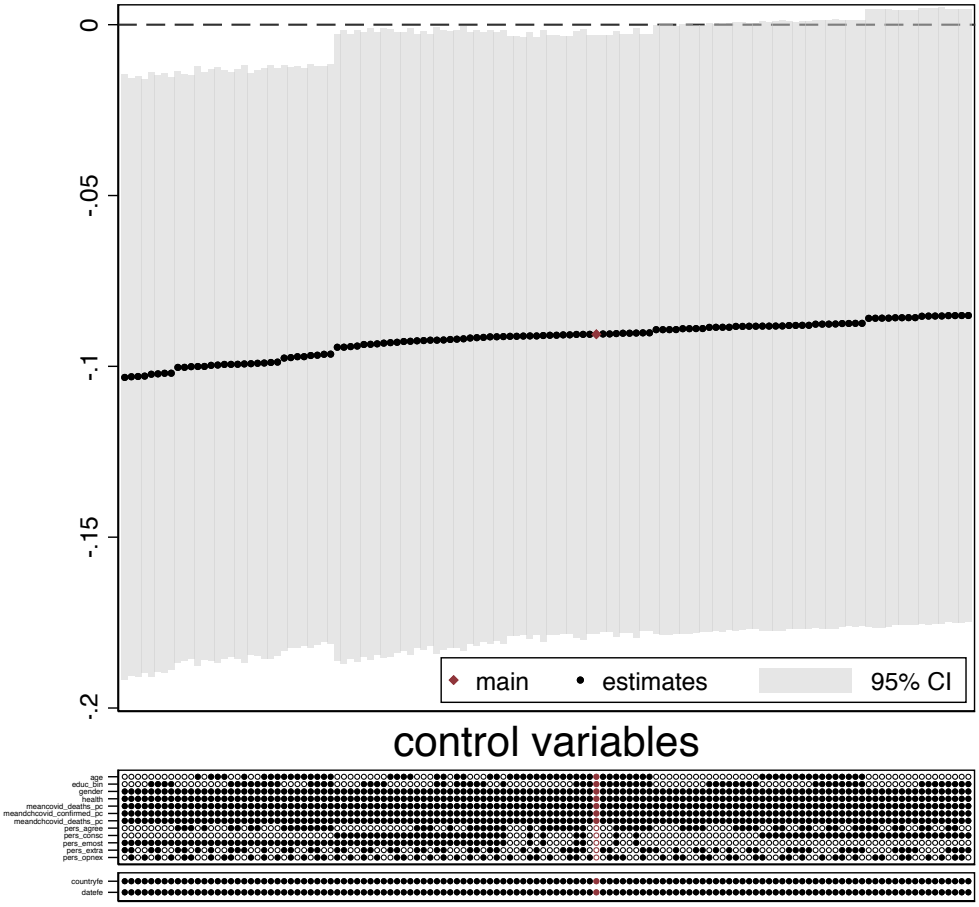
Notes: This figure shows robustness of our OLS lockdown estimates for the outcome "Government reaction insufficient" under every possible combination of our seven sets of individual-level controls (age, education bin, big five personality measures: agreeableness, conscientiousness, extraversion, neuroticism, openness to experience), for a total of 128 different specifications. All regressions include gender, health, current daily and lagged COVID-19 cases and deaths per capita in the country of residence as well as country and date fixed effects as controls. We cluster standard errors at the country level and report 95 percent confidence intervals for each model. The specification reported in the main paper is colored red. All estimates are statistically significant at the $p < .05$ level.

Figure S6: Coefficient Stability Plot for Treatment Effect on "Government Not Truthful"



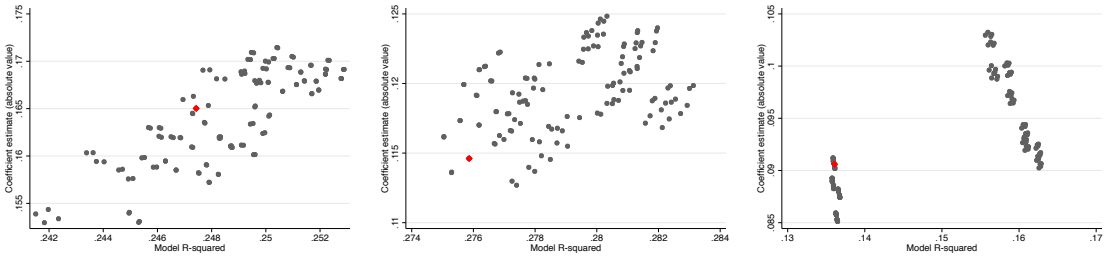
Notes: This figure shows robustness of our OLS lockdown estimates for the outcome "Government not truthful" under every possible combination of our seven sets of individual-level controls (age, education bin, big five personality measures: agreeableness, conscientiousness, extraversion, neuroticism, openness to experience), for a total of 128 different specifications. All regressions include gender, health, current daily and lagged COVID-19 cases and deaths per capita in the country of residence as well as country and date fixed effects as controls. We cluster standard errors at the country level and report 95 percent confidence intervals for each model. The specification reported in the main paper is colored red. All estimates are significant at the $p < .05$ level.

Figure S7: Coefficient Stability Plot for Treatment Effect on Worries Index



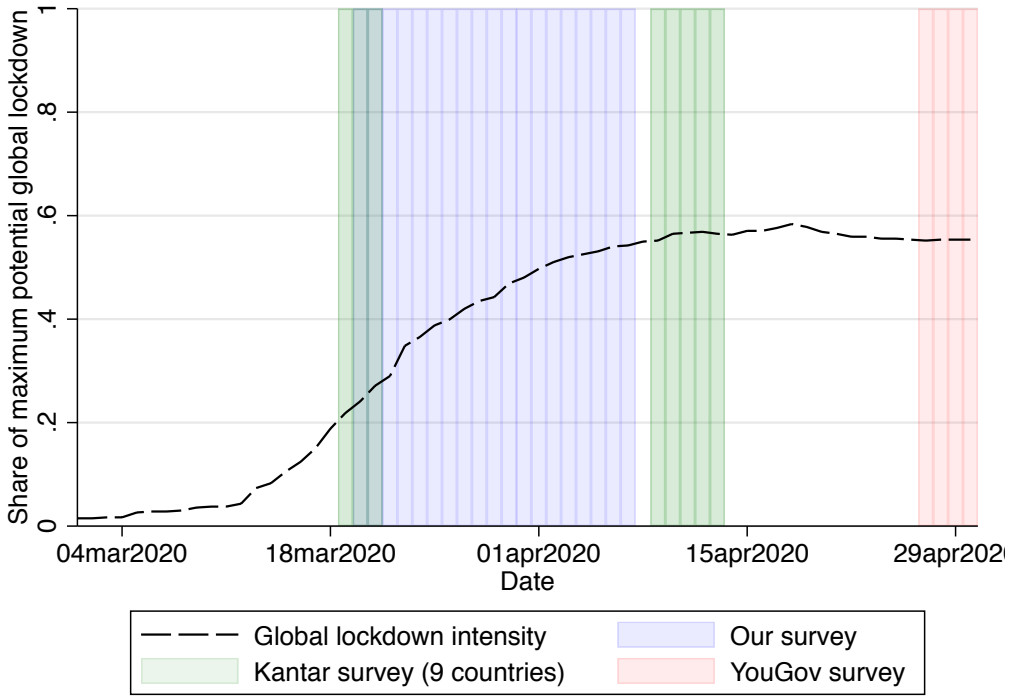
Notes: This figure shows robustness of our OLS lockdown coefficients for the worries index outcome under every possible combination of our seven sets of individual-level controls (age, education bin, big five personality measures: agreeableness, conscientiousness, extraversion, neuroticism, openness to experience), for a total of 128 different specifications. All regressions include gender, health, current daily and lagged COVID-19 cases and deaths per capita in the country of residence as well as country and date fixed effects as controls. We cluster standard errors at the country level and report 95 percent confidence intervals for each model. The specification reported in the main paper is colored red. The majority of estimates are significant at the $p < .05$ level.

Figure S8: Relationship between Model R-Squared and Specification



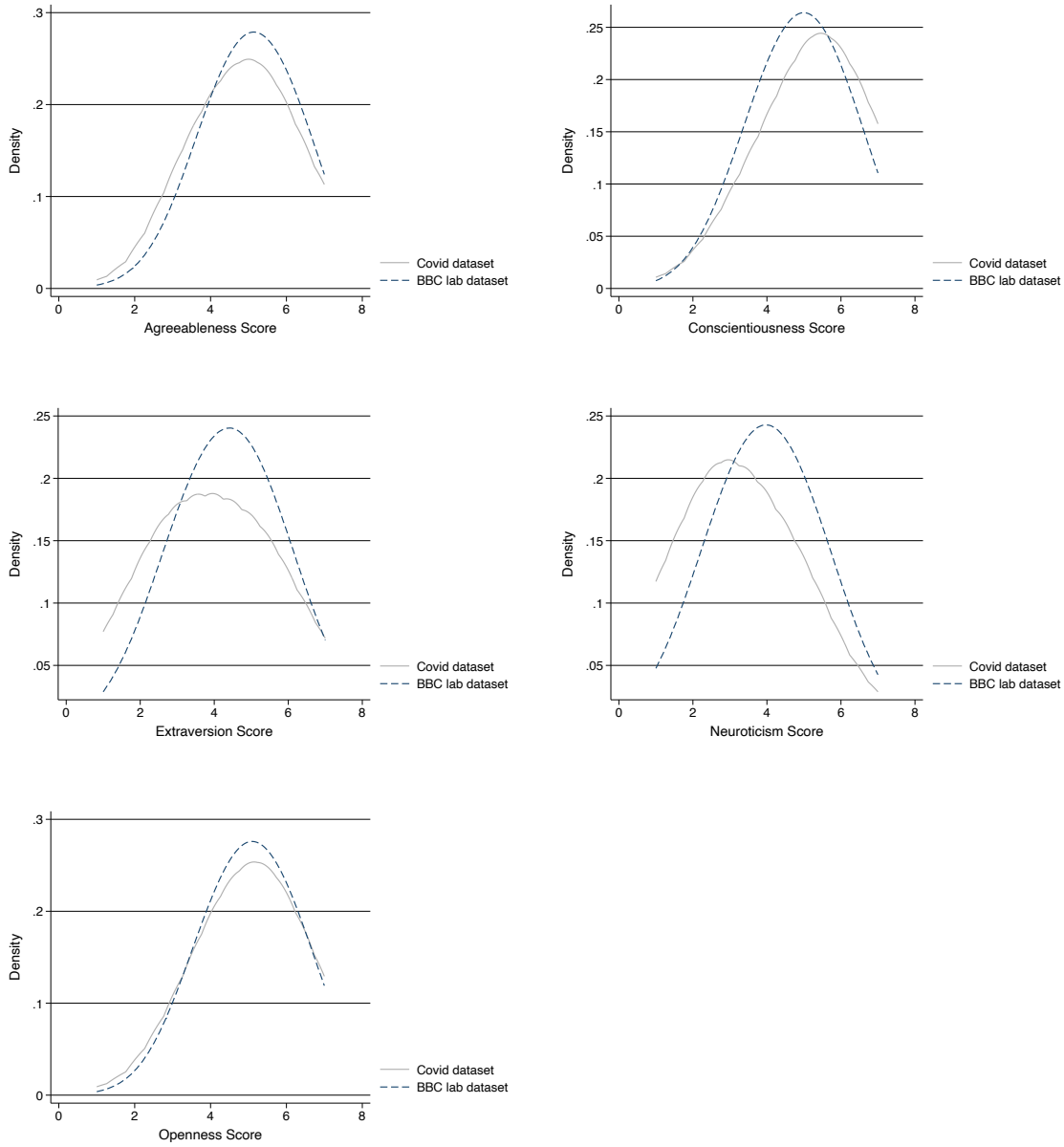
Notes: This figure shows three scatterplots of the absolute value of the lockdown coefficient (y-axis) and the model R-squared (x-axis) for the three outcomes "Government reaction insufficient" (left), "Government not truthful" (middle), and the worries index (right). The absolute value of the lockdown coefficient and variable and the R-squared result from the same OLS estimates shown in the previous figures, namely a regression of the respective outcome on the lockdown variable and every possible combination of our seven sets of individual-level controls (age, education bin, big five personality measures: agreeableness, conscientiousness, extraversion, neuroticism, openness to experience), for a total of 128 different specifications. All regressions include gender, health, current daily and lagged COVID-19 cases and deaths per capita in the country of residence as well as country and date fixed effects as controls. We cluster standard errors at the country level. The specification reported in the main paper is colored red.

Figure S9: Overview of Available Cross-Country Surveys Which Included Focal Dependent Variables



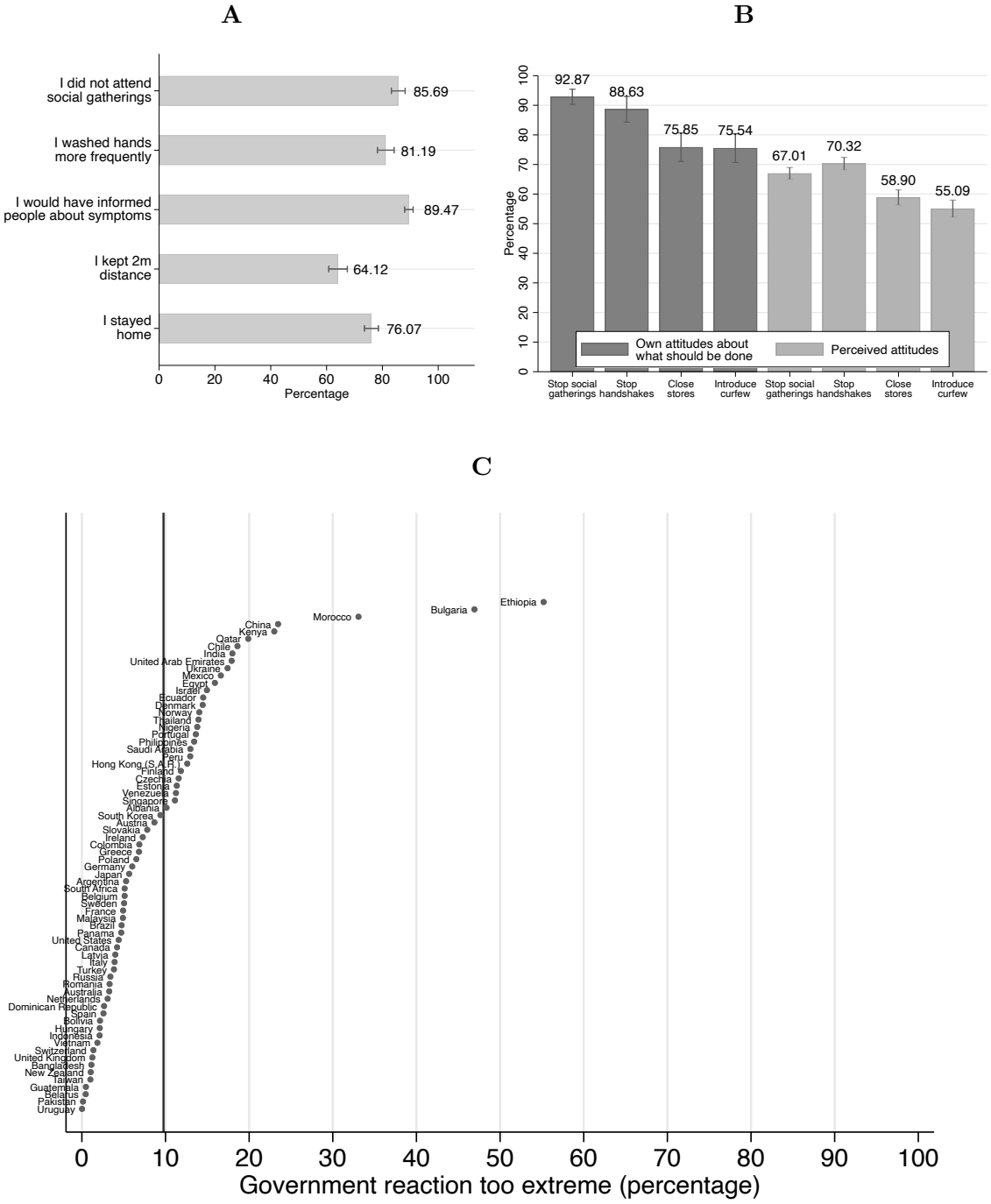
Notes: This figure shows the share of global lockdown policies over time. A share of 1 would indicate that every single country in the world has implemented the most stringent lockdown policy. The dates shaded in blue are our survey dates, while the dates shaded in grey indicate other survey efforts. Beyond the indicated YouGov and Kantar surveys, Gallup fielded surveys throughout March, but only in six countries (Finland, Malta, Norway, Portugal, Slovenia, Sweden), making it unsuitable for our cross-country analysis.

Figure S10: Comparison of Personality Distribution between our UK Sample and the BBC Lab Dataset



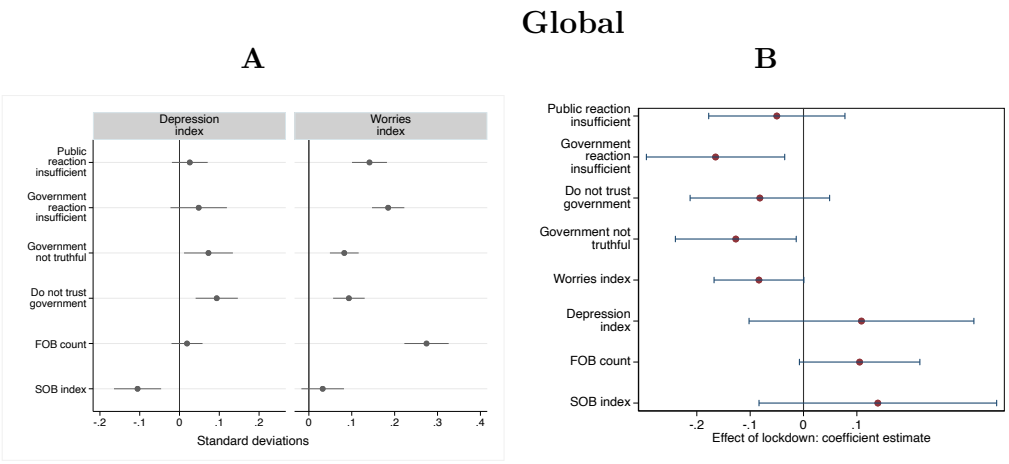
Notes: This figure exhibits the distribution of personality in the BBC Lab Dataset (dashed blue line; N = 493,059) and the British subsample of our dataset (grey line; N = 11,285). Kernel density plots (Epanechnikov, bandwidth = 1.0) are shown for each of the Big Five personality traits.

Figure S11: Behaviors and Beliefs at the Onset of the COVID-19 Pandemic, threshold 100 observations



Notes: This figure shows descriptive statistics of personal and perceptions of societal reactions to COVID-19. Panel **A** presents self-reported engagement in protective behavior. Panel **B** contrasts respondents' attitudes and perceived attitudes of compatriots about protective behaviors and policies. Panel **C** shows the share of respondents who think that the government action has been excessive by country. Respondents from countries with at least 100 responses are included. Responses are weighted to be representative at the country level in terms of age, gender, income, and education. Panel A and B are further weighted by country population to account for different country sizes. Panel C displays weighted country averages.

Figure S12: Effects of Government Response at Onset of COVID-19 Pandemic, threshold 100 observations



Notes: Panel **A** depicts the individual-level weighted pairwise relationship between the variables indicated in the figure heading and row, controlling for respondents' age, gender, education, health as well as country and date fixed effects. The regressions in Panel **B** are estimated using the individual-level weighted data, controlling for country and day fixed effects; the independent variable is an indicator of whether the country implemented a lockdown ("stay at home" policy). Standard errors in Panel **A** and **B** are clustered by country. All figures show standardized beta coefficients. Countries with at least 100 observations are included.

Tables

Table S1: List of Participants by Country

	(1) Country Obs.	Percent
Brazil	11608	10.74
United States	11476	10.62
United Kingdom	11285	10.44
Germany	10207	9.44
Sweden	5867	5.43
Switzerland	4204	3.89
Belarus	3674	3.40
Russia	3408	3.15
Mexico	3332	3.08
Turkey	2868	2.65
Canada	2845	2.63
France	2788	2.58
Spain	2328	2.15
Peru	2045	1.89
Italy	1866	1.73
Colombia	1857	1.72
Indonesia	1607	1.49
Ukraine	1456	1.35
Netherlands	1424	1.32
Qatar	1276	1.18
Austria	1089	1.01
India	997	0.92
Australia	949	0.88
Argentina	907	0.84
Vietnam	858	0.79
Romania	809	0.75
Finland	795	0.74
Philippines	750	0.69
Ireland	711	0.66
Albania	702	0.65
Latvia	677	0.63
Venezuela	661	0.61
Slovakia	610	0.56
Japan	579	0.54
Belgium	576	0.53
Portugal	558	0.52
Dominican Republic	554	0.51
Chile	549	0.51
South Africa	549	0.51
Malaysia	533	0.49
Denmark	508	0.47
Poland	487	0.45
Singapore	418	0.39
Israel	407	0.38
China	403	0.37
Kenya	389	0.36
Morocco	382	0.35
New Zealand	363	0.34
Greece	353	0.33
Bulgaria	333	0.31
Thailand	309	0.29
Ecuador	303	0.28
Norway	303	0.28
South Korea	295	0.27
Czechia	263	0.24
Nigeria	243	0.22
Uruguay	243	0.22
Hungary	239	0.22
Total	108075	100.00

Table S2: Correlation Between Perceptions and Mental Well-Being Indices (without weights)

	Depression index						Worries index					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Fig 2b												
Public reaction insufficient	0.041***						0.142***					
	(0.007)						(0.013)					
Government reaction insufficient		0.085***						0.170***				
		(0.009)						(0.014)				
Government untruthful			0.099***						0.095***			
			(0.010)						(0.012)			
Don't trust government				0.110***						0.089***		
				(0.009)						(0.013)		
FOB count					0.035**						0.227***	
					(0.010)						(0.011)	
SOB index						-0.064***						-0.002
						(0.009)						(0.011)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 cases per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Observations at the individual level. Controlling for respondents' age, gender, education, health as well as country and date fixed effects. Standard errors are clustered on country level. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

Table S3: Difference-in-Differences Studying Impact of Policy Change (without weights)

	Public reaction insufficient	Government reaction insufficient	Do not trust government	Government not truthful	Worries index	Depression index
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Fig 2c						
Lockdown (stay at home)	-0.029	-0.136***	-0.127***	-0.101**	-0.068*	0.001
	(0.045)	(0.029)	(0.031)	(0.033)	(0.030)	(0.025)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 cases per capita	Yes	Yes	Yes	Yes	Yes	Yes
Mean confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Observations at the individual level. Controlling for respondents' age, gender, education, health as well as country and date fixed effects. Standard errors are clustered on country level. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

Table S4: Relationship between variables

	Depression index						Worries index					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Fig 2b												
Public reaction insufficient	0.036						0.140***					
	(0.022)						(0.020)					
Government reaction insufficient		0.048						0.183***				
		(0.036)						(0.019)				
Government untruthful			0.083**						0.079***			
			(0.029)						(0.017)			
Don't trust government				0.090**						0.093***		
				(0.027)						(0.018)		
FOB count					0.034*						0.274***	
					(0.016)						(0.026)	
SOB index						-0.116***						0.037
						(0.028)						(0.025)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 cases per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Observations at the individual level. Controlling for respondents' age, gender, education, health as well as country and date fixed effects. Standard errors are clustered on country level. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

Table S5: Difference-in-Differences Studying Impact of Lockdown Announcement

	Public reaction insufficient	Government reaction insufficient	Trust government	Government truthful	Worries index	Depression index	FOB count	SOB index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Fig 2c								
Lockdown (stay at home)	-0.034	-0.165*	-0.090	-0.115*	-0.091*	0.108	0.099	0.150
	(0.063)	(0.068)	(0.067)	(0.056)	(0.044)	(0.112)	(0.058)	(0.110)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes		
Δ confirmed Covid19 cases per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Fig 2d								
After 23 March x UK	-0.399**	-0.543***	-0.294*	-0.117	-0.067	0.112	0.132	0.543***
	(0.143)	(0.108)	(0.124)	(0.147)	(0.152)	(0.129)	(0.118)	(0.141)
Δ Confirmed Covid19 cases per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ Confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Confirmed Covid19 cases per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-education FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-age-gender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Observations at the individual level. Controlling for respondents' age, gender, education, health as well as country and date fixed effects. Standard errors are clustered on country level. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

Table S6: Gallup

	Experienced worry yesterday		Experienced depression yesterday		Life today	
	(1)	(2)	(3)	(4)	(5)	(6)
Confidence in	-0.054***	-0.008***	-0.016***	-0.004*	0.068***	0.059***
national government	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.01)
Day FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Age	No	Yes	No	Yes	No	Yes
Gender	No	Yes	No	Yes	No	Yes
Education level	No	Yes	No	Yes	No	Yes
Health	No	Yes	No	Yes	No	Yes
Observations	1628065	1541462	1628065	1541462	1598326	1521408

Notes: This table shows six OLS regressions of three mental well-being dependent variables on a "confidence in the national government" indicator as well as different sets of control variables. The outcome variables are 1) an indicator variable on whether the respondent experienced worries yesterday, (2) an indicator variable on whether the respondent experienced depression yesterday, and (3) a ten-step variable on how satisfied with their life satisfaction respondents are today (1- worst life, 10- best life). The models shown in the odd columns control for day and country fixed effects, while the models shown in the even columns additionally control for the respondent's age, gender, education level and health. The displayed coefficients are standardized beta coefficients. Standard errors are clustered by country and are show in parentheses. Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

Table S7: Multivariate OLS Regression of Demographic Variables on Outcomes

	Public reaction insufficient	Government reaction insufficient	Trust government	Government truthful	Worries index	Depression index	FOB count	SOB index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	-0.005	-0.055**	-0.020	0.013	-0.010	-0.228***	0.014	0.096***
	(0.015)	(0.017)	(0.016)	(0.019)	(0.019)	(0.020)	(0.015)	(0.022)
Female	0.039	-0.010	-0.027	0.017	0.236***	0.265***	0.108**	0.096*
	(0.031)	(0.022)	(0.029)	(0.018)	(0.032)	(0.026)	(0.033)	(0.038)
Income	0.006***	0.016***	-0.003*	-0.004***	-0.000	-0.003	0.008***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Education level	0.042**	0.030	0.025	-0.028	0.027	0.004	0.034	0.001
	(0.015)	(0.020)	(0.027)	(0.021)	(0.019)	(0.015)	(0.034)	(0.017)
Own health	-0.051**	-0.087***	-0.072***	-0.040	-0.163***	-0.269***	-0.052***	0.042**
	(0.016)	(0.014)	(0.013)	(0.022)	(0.018)	(0.019)	(0.014)	(0.013)
Confirmed COV-19	-0.085	0.058	0.177*	0.155	0.046	-0.099*	-0.055	-0.146*
cases per capita	(0.069)	(0.062)	(0.085)	(0.091)	(0.064)	(0.040)	(0.065)	(0.059)
Confirmed COV-19	-0.100	-0.023	-0.040	-0.008	-0.046	0.041	-0.043	-0.017
deaths per capita	(0.077)	(0.024)	(0.034)	(0.043)	(0.027)	(0.028)	(0.035)	(0.025)
Lagged confirmed	-0.030	-0.058	-0.050	-0.077	-0.028	0.007	-0.098*	0.016
COV-19 cases per capita	(0.065)	(0.043)	(0.037)	(0.051)	(0.073)	(0.029)	(0.040)	(0.037)
Lagged confirmed	-0.004	-0.003	-0.057	-0.071	0.029	-0.015	0.053	0.077
COV-19 deaths per capita	(0.080)	(0.071)	(0.054)	(0.063)	(0.050)	(0.029)	(0.041)	(0.070)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows seven multivariate OLS regressions of the outcome listed in the respective column header on a list of individual-level socio-demographic covariates. In all regressions, we further control for country fixed effects and date fixed effects, as well as current daily and lagged COVID-19 cases and deaths per capita in the country of residence. The displayed coefficients are standardized beta coefficients. Standard errors are clustered by country and are show in parentheses. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

Table S8: Comparison of Representative to Main Survey

	Prolific survey	Main survey	Δ
beh_stayhome	88.93	88.78	0.150
beh_socgathering	96.28	97.56	-1.277
beh_tellsymp	95.28	94.59	0.699
beh_distance	92.15	90.16	1.989
beh_handwash	92.60	92.12	0.474

Notes. This table shows the difference between individuals in the prolific sample in the US and UK and respondents to the main survey in the US and UK during the time of the Prolific data collection (March 29 to March 30). Differences between samples are all smaller than 2 percentage points.

Table S9: Heterogeneity of Treatment Effects

	Government reaction insufficient (1)	Government not truthful (2)	Worries index (3)
Heterogeneous effects			
Lockdown (stay at home) × Female	-0.042	-0.031	0.026
	(0.07)	(0.06)	(0.06)
Lockdown (stay at home) × Age	0.019	-0.024	-0.068
	(0.03)	(0.04)	(0.04)
Lockdown (stay at home) × Education level	-0.020	0.063	0.019
	(0.04)	(0.04)	(0.04)
Lockdown (stay at home) × Income	0.007	0.001	-0.009
	(0.02)	(0.02)	(0.01)
Lockdown (stay at home) × Married	0.010	0.017	0.009
	(0.03)	(0.03)	(0.03)
Lockdown (stay at home) × Agreeableness	0.033	-0.015	-0.088
	(0.03)	(0.03)	(0.05)
Lockdown (stay at home) × Conscientiousness	-0.000	-0.033	-0.038
	(0.03)	(0.03)	(0.02)
Lockdown (stay at home) × Emotional stability	-0.027	0.042	-0.113
	(0.03)	(0.02)	(0.07)
Lockdown (stay at home) × Extraversion	-0.025	-0.015	0.012
	(0.03)	(0.03)	(0.03)
Lockdown (stay at home) × Openness to experiences	-0.102*	-0.087*	-0.071
	(0.04)	(0.04)	(0.06)
Δ Confirmed Covid19 cases per capita	Yes	Yes	Yes
Δ Confirmed Covid19 deaths per capita	Yes	Yes	Yes
Confirmed Covid19 cases per capita	Yes	Yes	Yes
Confirmed Covid19 deaths per capita	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Day FE	Yes	Yes	Yes

Notes: Observations at the individual level. Controlling for respondents' age, gender, education, health as well as country and date fixed effects. All outcome variables are standardized. Standard errors are clustered on country level. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

Table S10: The Moderating Effect of Pre-Pandemic Confidence in Government on Outcomes

	Government reaction insufficient	Government not truthful	Do not trust government	Public reaction insufficient	Worries index	Depression index	FOB count	SOB index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lockdown (stay at home)	-0.208**	-0.161*	-0.203**	-0.185*	-0.136*	0.001	0.161**	0.256*
	(0.067)	(0.067)	(0.066)	(0.089)	(0.053)	(0.097)	(0.054)	(0.096)
Lockdown (stay at home) × gov conf. (Gallup)	-0.083	-0.094	-0.230***	-0.306**	-0.085	-0.208+	0.129*	0.213*
	(0.052)	(0.073)	(0.065)	(0.111)	(0.066)	(0.123)	(0.063)	(0.090)
Observations	107666	107655	107660	107672	107672	107672	107672	107672
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 cases per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes. + $p < 0.1$, * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.

Table S11: Detailed anxieties

	Item 1: "I am nervous when I think about current circumstances"						Item 2: "I am worried about my health"						Item 3: "I am worried about the health of my family members"						Item 4: "I feel stressed about leaving my house"					
Public reaction insufficient	0.128***						0.084***						0.113***						0.112***					
	(0.021)						(0.021)						(0.016)						(0.030)					
Government reaction insufficient		0.158***						0.118***						0.154***						0.141***				
		(0.027)						(0.023)						(0.013)						(0.031)				
Government untruthful			0.106***						0.054*						0.057**						0.030			
			(0.028)						(0.024)						(0.017)						(0.033)			
Don't trust government				0.105***						0.052*						0.075***						0.057*		
				(0.024)						(0.022)						(0.016)						(0.027)		
FOB count					0.187***						0.216***						0.230***						0.223***	
					(0.026)						(0.028)						(0.034)						(0.030)	
SOB index						0.013						0.066*						0.054**						-0.019
						(0.029)						(0.025)						(0.020)						(0.025)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes																
Δ confirmed Covid19 cases per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ confirmed Covid19 deaths per capita	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Observations at the individual level. Controlling for respondents' age, gender, education, health as well as country and date fixed effects. Standard errors are clustered on country level. * $p < 0.05$,** $p < 0.01$,*** $p < 0.001$.