Factors Associated With Concern, Behaviour & Policy Support in Response to SARS-CoV-2

Nichola J Raihani¹ & Lee de Wit²

1. Department of Experimental Psychology, 26 Bedford Way, University College
London, London. WC1H 0AP.

2. Department of Psychology, Downing Street, Cambridge, University of Cambridge,
CB2 3EB.

For correspondence: n.raihani@ucl.ac.uk

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Abstract

SARS-CoV-2 is a novel coronavirus that results in a disease known as COVID-19. Given that no vaccine is currently available, or likely to be available in the near term, slowing the spread of the virus relies on radical behaviour change at a mass scale. Understanding the factors associated with behaviour change and support for different policy measures is therefore critical. Here, we present data collected in two waves in the UK and the USA (March 12th and 24th) exploring (i) subjective concern about the health impacts of COVID-19 for self, for family and for society; (ii) the factors associated with compliance with several preventive behavioural measures; and (iii) support for policy measures to reduce the spread of the virus. Concern about the societal impacts of COVID-19 varied along partisan lines, with political conservatives being relatively less concerned than political liberals about the impacts for society. People who reported being more concerned also reported adopting more preventive behaviours and supported a greater number of policies. Concern for self and family was a stronger predictor than societal concern for behaviour change and policy support, and most strongly predicted the increase in both these measures from March 12th to 24th. Political conservatives in both countries supported fewer policies, an effect that could be partially mediated by the negative effect of political conservatism on societal concern. These findings suggest concern for self and family outweighs concern for society in

31 motivating behaviour change needed to curb the spread of COVID-19, and that concern for
32 society varies along political lines.

34 **Introduction**

35 Stopping the spread of SARS-CoV-2 represents an unprecedented challenge that requires
36 analysis at multiple different levels. A critical level at which we need to understand this
37 challenge is in terms of human behaviour, and in particular people's propensity to engage in
38 behaviours that are likely to slow the spread of the virus. Behaviour change is likely to hinge
39 on people's attitudes and concerns about the health impacts of COVID-19, but subjective
40 concern could manifest at different levels. On a narrow scale, people might be concerned
41 for their own health, or for the health of family or close friends. At a broader scale, people
42 might also be concerned about the health impacts for others in society. Although concern at
43 these different scales is likely to be correlated, we might still expect to see broad scale
44 patterns in the extent to which individuals report being concerned about the impacts at a
45 narrow scale (self & family) relative to a broader scale (society). Specifically, relative concern
46 for society might vary with political ideology¹: previous research has shown that liberals
47 express more compassion towards more universal entities (society), whilst conservatives
48 tend to focus on more well defined and closely associated entities (their family) ².
49 Understanding whether this difference in the expanse of moral concern is evident in
50 attitudes and behaviour in response to the coronavirus could help us to better understand
51 how this topic might become polarized, and could help to focus on messaging that might be
52 effective across political divides.

54 Another aim of this study is to determine the link between subjective concern at different
55 scales, and the willingness to take preventive action and to support policies aimed at
56 decelerating the spread of the coronavirus. Recent work has suggested that concern for
57 others (rather than concern for self) might be more likely to prompt behaviour change in
58 the context of this pandemic^{3,4}. These findings suggest that societal concern might be a
59 stronger predictor of self-reported behaviour change and support for further policy
60 measures in the current study. This study provides an additional cross sectional and
61 longitudinal test of that assumption.

This paper provides data from two surveys from politically similar countries (the US and UK) at two time points in March 2020, 12 days apart. We measured people's level of concern, and self-reported engagement with a range of mitigation behaviours, political affiliation, trust in science on other salient topics, and a more general measure of pro-sociality (using a modified Dictator Game, described below). The data enable us to address the following questions:

- 1) Does the focus of concern about the health impacts of COVID-19 differ for individuals with different political affiliations, and more specifically is societal concern lower for political conservatives?
- 2) Is engagement in coronavirus mitigation behaviour predicted by individual differences in the level of concern, and is concern at an individual, family or society level most important?
- 3) Is the change in behaviours adopted or policy support from March 12th to March 24th better predicted by narrow or broad concern?

Methods

Transparency note: The analyses presented in this paper were not pre-registered. We have checked all the main results for robustness to alternative specifications and assumptions and we report any sensitivities and alterations to the main findings in the text below.

Participants

This project was approved by the UCL Ethics Board (project 3720-002). Data were collected in two waves: wave one on 12th March 2020 and wave two on 24th March 2020. We recruited two online samples, from the UK and the US respectively. For the UK sample, we used Prolific Academic (<http://www.prolific.ac>) to recruit a nationally representative sample of 739 participants. We recalled 655 of these participants for wave two, and had complete paired responses for 582 individuals. For the US sample, we used Amazon Mechanical Turk (MTurk; <https://www.mturk.com>) to recruit 1,242 participants. We successfully recalled 852 participants for wave 2, and obtained complete paired responses for 640 participants. For the US sample, we applied the criteria that workers should have an approval rate of more than 75 % and be based in the US.

Exclusion criteria:

We used the website www.getipintel.net to identify bot, proxy and VPN submissions to our survey. As recommended, we excluded any submission from a participant where the probability of the IP Address being fraudulent was 0.99 or more. This resulted in 11 exclusions from the UK data and 149 exclusions from the US data. We subsequently removed data points from any participant who completed the entire survey in less than 200 seconds to exclude participants who were not paying sufficient attention to the questions (13 subjects excluded from UK wave 1 sample; 124 participants from US wave 1 sample). Our key results are robust to these exclusions. We finally reduced the dataset such that we had complete responses for all participants for all categories included in our analyses. For wave 1, we therefore had complete responses from 698 UK participants and from 931 US participants. All data, code and materials are available at <https://osf.io/pu3jr/>.

	UK	USA
Females	361 (51.7 %)	467 (50.2 %)
Age 18-34	195 (27.9 %)	384 (41.2 %)
Age 35-54	255 (36.5 %)	421 (45.2 %)
Age 55+	248 (35.5 %)	126 (13.5 %)
Political Ideology	42.8 ± 1.14	43.3 ± 1.09
Health Issue	128 (18.3 %)	168 (18.0 %)
Total	698	931

Table 1. Characteristics of sample for UK and USA in wave 1 of data collection. Table shows data from participants who provided complete responses.

The characteristics of the sample for wave 1 are shown in Table 1. Participants rated their political ideology using a slider scale from 0-100 (0 = Labour / Democrat, 100=Conservative /

Republican), initialised at 50. In the UK, we also obtained information on participants' stance on Brexit – and our analyses are robust to using 'Leave Vote' as a proxy for political conservatism. In analyses below, we use the continuous measure of political ideology to ensure that results are comparable across the UK and the US. All analyses below are restricted to participants for whom we have a complete set of responses.

Survey

Wave 1: In Wave 1, we administered a survey aimed at elucidating (i) concerns about COVID-19; (ii) behaviours taken in response to this threat and (iii) support for a range of policy measures. Participants completed these sections of the survey in a randomised order (counter-balanced between subjects), with the exception that the modified Dictator Game (described below) always occurred at the end of the survey. These survey measures are discussed in turn below.

(i) Subjective concern about the health impacts of COVID-19: We asked participants to report, using three slider scales (0-100, initialised at mid-way point) their subjective concern about the health impacts of COVID-19 with respect to (i) their own health; (ii) the health of family members or close friends; and (iii) the health of other members of society. Each measure of subjective concern was set as the response term in a separate linear model with the explanatory terms: 'Age', 'Gender', 'Political Ideology', 'Underlying Health Issue'. Underlying health issue was a binary term (1/0) denoting whether the participant reported having a serious underlying health issue that affected their day-to-day life and which was unlikely to go away in the short term.

(ii) Validating measures of subjective concern

We validate the measures of concern for society in two main ways. First, we obtained an additional measure of societal concern with respect to the impacts of anthropogenic climate change. Since belief that climate change is both occurring and man-made varies with political ideology (see supplementary information), we also obtained a measure of climate scepticism (Likert Scale 1-5, with higher values indicating increasing scepticism) to differentiate between belief in anthropogenic climate change and concern about its societal impact. We set climate concern as the response term in a linear model with 'Age', 'Gender',

‘Political Ideology’ and ‘Climate Scepticism’ as explanatory terms. We also checked the robustness of the relationship to climate concern using a subset of data by excluding climate sceptics and only including participants who ‘Agreed’ or ‘Strongly Agreed’ that climate change is real and man-made. Since the results of this model were not qualitatively different, we do not report them here.

Second, we obtained a measure of general prosocial tendency using a modified Dictator Game⁵ (Kahneman et al. 1986). In the standard Dictator Game, one participant is given a sum of money and can choose how much (if any) to send to an anonymous partner. Since this is a non-strategic game (the recipient cannot refuse or respond to the dictator’s offer), Dictator Game donations can be used as a proxy for prosocial preferences (see⁶ for evidence that Dictator Game giving predicts real-world prosociality). In our study, the Dictator Game was presented in the form of a bonus prize (£100 / \$100) that the participant was told they might win, if they were randomly selected from the participant pool. Participants were told that they could decide how much of this prize they would like to donate to a worldwide charity (the Red Cross) in the event that they won (0-100 %, in 10 % increments). Our assumption is that larger donations are a proxy for increased prosocial tendency and that prosocial tendency would also be reflected in a higher relative concern for society. We test this in an analysis, including age and gender controls. As is typical in Dictator Game donation data⁷, responses were highly skewed. As such we converted ‘Donation’ to a three-level ordinal categorical variable (1 = donated nothing, 2 = donated up to half of the endowment, 3 = donated half or more) and set as the response term in a cumulative link model, with ‘Self & Family concern’, ‘Society concern’, ‘Age’ and ‘Gender’ included as explanatory terms.

(iii) Preventive behaviours: We asked participants to select from a list of 10 behaviours how many they had newly adopted, or were now doing more frequently, as a precaution against catching or transmitting COVID-19. Stockpiling groceries was included in this list but we do not include it as a preventive behaviour in our analyses. We also included a blank text box for participants to enter any health-related behaviours not included on our list. We were interested in the extent to which narrow or broad levels of concern predicted the number of preventive behaviours adopted. To this end, we created a new variable called ‘Self & Family concern’ which is the mean concern for self and for family members for each participant.

This variable is a proxy for narrow concern, whereas concern for society maps onto broad concern. The number of preventive behavioural measures was summed and set as the response term in a linear model. We included the following explanatory terms: 'Age', 'Gender', 'Political Ideology', 'Self & Family Concern', 'Society Concern' and 'Underlying Health Issue'.

(iii) Support for policy measures: We asked participants to indicate how many of 9 (UK) or 8 (US) policy measures they do or would support. The number of policies supported was set as the response term in a linear model, with 'Age', 'Gender', 'Self & Family concern', 'Society concern' and 'Political Ideology' set as explanatory variables. The number of policy measures offered differed in the two countries because we also included 'Delaying Brexit by extending the transition period until COVID-19 is under control' as a potential policy option for the UK participants.

Statistical approach

We use an information theoretic approach with multi-model averaging (using the package MuMIn⁸ in R Version 3.6.3). Under this approach, we define a single global model containing all terms of interest. This global model is then compared to all possible subsets of that model, and a top model set is produced which contains the best model (the model with the smallest AICc value) and all models within 2 AICc units of that model^{9,10}. Estimates, standard errors and confidence intervals are produced by averaging over this top model set, which accounts for the uncertainty in defining the effect size when many models have similar levels of support. Continuous input variables were standardized and binary input variables were centered¹¹. This allows effect sizes within a model to be more easily compared since they are on the same scale. We report full model-averaged estimates and confidence intervals, which are conservative (compared to conditional estimates which calculate effect sizes only for models where the term was present).

Wave One Results

(i) Subjective concern about the health impacts of COVID-19:

Summary statistics for concern about the health impacts for (i) self, (ii) family and friends, and (iii) society in the UK and the US are shown in Table 2. In general, people were most

concerned about the impacts for family and friends, and least concerned about the impacts for self. Figures 1 shows the subjective concern for (i) self, (ii) friends and family and (iii) society as a function of political ideology, in both the UK and the US.

Concern for self: In the UK, the strongest predictors of concern for self were age, gender and having an underlying health issue (Table 3). Older people and people living with a serious underlying health issue were more concerned, as expected (Table 3). Women were also more concerned about the health impacts of COVID-19 than men in the UK. In the US, having an underlying health issue was the strongest positive predictor of concern for personal health. We detected no effect of political ideology on concern for self in the UK or the US (Table 3).

Concern for family: Females were more concerned than males about the health impacts for family in the UK. In the US, the trend was in the same direction but the support yielded by the model was not conclusive (Table 4). In the US (but not the UK) having an underlying health issue positively predicted concern for family health. There was no meaningful effect of political ideology on concern for family health in the UK or in the US.

Concern for society: Political conservatives were less concerned for society in both the UK and the US (Table 5; Figure 1). Women were also more concerned than men about the health impacts for society in both countries.

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	UK		USA	
	March 12 th	March 24 th	March 12 th	March 24 th
Own Health	50.5 ± 1.17 t = -12.8, df=581, p < 0.001	62.9 ± 1.12	51.7 ± 1.26 t = -5.78, df=639, p < 0.001	57.4 ± 1.25
Family & Friends' Health	69.9 ± 1.08 t = -12.3, df=581, p < 0.001	81.1 ± 0.81	66.6 ± 1.13 t = -9.07, df=639, p < 0.001	74.5 ± 1.10
Society Health	61.9 ± 0.96 t = -13.3, df=581, p < 0.001	73.6 ± 0.88	65.6 ± 1.05 t = -6.51, df=639, p < 0.001	71.1 ± 1.00
Preventive Behaviours	2.97 ± 0.09 t = -35.0.3, df=581, p < 0.001	6.82 ± 0.10	3.2 ± 0.09 t = -22.0, df=639, p < 0.001	5.59 ± 0.10
Policies Supported	3.93 ± 0.10 t = -33.3, df=581, p < 0.001	7.28 ± 0.08	3.89 ± 0.09 t = -23.4, df=639, p < 0.001	5.95 ± 0.08

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236 **Table 2.** Concern about the health impacts of COVID-19 for (i) self, (ii) friends and family and
 237 (iii) society at large in the UK and the USA on March 12th and March 24th.

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Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK Wave 1				
<i>Intercept</i>	50.6	1.05	(48.6, 52.7)	
Health Issue (present)	11.9	2.73	(6.56, 17.3)	1.00
Age	4.98	2.21	(0.63, 9.32)	1.00
Gender (F)	4.61	2.10	(0.49, 8.73)	1.00
Political Ideology	2.79	2.61	(-2.32, 7.90)	0.68
USA Wave 1				
<i>Intercept</i>	54.7	1.02	(52.7, 56.7)	
Health Issue (present)	13.4	2.67	(8.17, 18.6)	1.00
Age	3.46	2.32	(-1.10, 8.03)	0.87
Political Ideology	0.77	1.60	(-2.38, 3.91)	0.35
Gender (F)	0.62	1.47	(-2.69, 3.51)	0.32

Table 3. Concern for Own Health in the UK and the US, Wave 1. Model-averaged estimates, standard errors and confidence intervals are shown. Here and in all subsequent tables: Gender: 0=male, 1=female; Health Issue: 0=absent, 1=present; Brexit: 0=Leave, 1=Remain. Political Ideology: increasing values = more conservative. Effects with confidence intervals excluding zero are highlighted in bold.

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Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK Wave 1				
<i>Intercept</i>	69.8	0.98	(67.9, 71.7)	
Gender	6.45	1.96	(2.61, 10.3)	1.00
Health Issue	3.73	2.93	(-2.02, 9.47)	0.80
Age	0.29	1.05	(-1.78, 2.35)	0.20
Political Ideology	-0.26	1.01	(-2.23, 1.72)	0.19
US Wave 1				
<i>Intercept</i>	68.4	0.91	(66.6, 70.1)	
Health Issue	6.36	2.37	(1.72, 11.0)	1.00
Gender	2.52	2.18	(-1.76, 6.80)	0.73
Political Ideology	-1.57	0.65	(-5.36, 2.21)	0.58
Age	0.05	0.65	(-1.21, 1.32)	0.12

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248 **Table 4.** Concern for Friends' and Family's Health. Model-averaged estimates, standard
 249 errors and confidence intervals are shown.

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Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK Wave 1				
<i>Intercept</i>	62.3	0.88	(60.6, 64.0)	
Gender (F)	7.26	1.75	(3.81, 10.7)	1.00
Political Ideology	-4.78	1.80	(-8.30, -1.26)	1.00
Age	0.84	1.54	(-2.17, 3.87)	0.47
US Wave 1				
<i>Intercept</i>	66.8	0.84	(65.1, 68.4)	
Health Issue	5.39	2.20	(1.07, 9.71)	1.00
Political Ideology	-4.06	1.70	(-7.39, -0.73)	1.00
Gender (F)	3.60	1.70	(0.28, 6.93)	1.00
Age	0.50	1.21	(-1.88, 2.87)	0.34

Table 5. Concern for Society Health. Model-averaged estimates, standard errors and confidence intervals are shown.

Figure 1. Subjective concern for self, family and society in the UK and the US, as a function of political ideology. Conservatism was converted to a 5-level categorical variable for ease of visualisation. 1= 0-20, 2=21-40, 3=41-60, 4=61-80, 5=81-100 (higher values = increasing conservatism).

(ii) *Validating measures of subjective concern*

Political conservatism was also associated with reduced concern about the negative societal impacts of climate change in the UK and the US (Table 6). These results are robust to controls for the belief that climate change is both real and man-made, and qualitatively similar results are also obtained when running analyses on a reduced subset of the data including only people who stated that they believed that climate change is both real and

man-made. Donation size in both countries was also positively predicted by societal concern, and not by concern for self and family and, indeed, was the strongest predictor of donation size in both places (Table 7).

Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK Wave 1				
<i>Intercept</i>	73.8	0.68	(72.5, 75.1)	
Climate Scepticism	-23.9	1.42	(-26.6, -21.1)	1.00
Political Ideology	-6.29	1.48	(-9.17, -3.39)	1.00
Gender (F)	2.98	1.37	(0.29, 5.66)	1.00
Age	1.48	1.61	(-1.68, 4.64)	0.61
US Wave 1				
<i>Intercept</i>	70.6	0.76	(69.1, 72.1)	
Climate Scepticism	-23.2	1.77	(-26.7, -19.8)	1.00
Political Ideology	-12.8	1.77	(-16.2, -9.28)	1.00
Age	-3.66	1.54	(-6.69, -0.63)	1.00
Gender (F)	0.91	1.44	(-1.91, 3.73)	0.46

Table 6. Concern about the negative societal impacts of climate change. Model-averaged estimates, standard errors and confidence intervals are shown.

Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK				
Intercept 0 1	-0.85	0.08	(-1.01, -0.68)	
Intercept 1 2	0.48	0.08	(0.33, 0.63)	
Society concern	0.44	0.15	(0.14, 0.74)	1.00
Age	0.07	0.12	(-0.17, 0.30)	0.38
Gender	0.06	0.12	(-0.17, 0.30)	0.38
Self&Family concern	-0.01	0.08	(-0.16, 0.14)	0.12
USA				
Intercept 0 1	-0.35	0.07	(-0.48, -0.21)	
Intercept 1 2	1.05	0.08	(0.90, 1.19)	
Society concern	1.01	0.13	(0.75, 1.27)	1.00
Gender (F)	0.01	0.06	(-0.11, 0.12)	0.22
Age	0.00	0.06	(-0.11, 0.12)	0.21

Table 7. Factors predicting donation size (wave 1). Model-averaged estimates, standard errors and confidence intervals are shown.

(ii) Preventive behaviours:

Participants who reported being more concerned about the health impacts of COVID-19 also reported adopting more preventive behavioural measures, with concern for self and family having a larger effect than concern for society in both countries (Table 8). There was no effect of political ideology on preventive measures in either country.

Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK Wave 1				
<i>Intercept</i>	2.98	0.07	(2.83, 3.12)	
Self&family concern	1.60	0.20	(1.20, 2.00)	1.00
Society concern	0.64	0.20	(0.24, 1.04)	1.00
Age	-0.04	0.10	(-0.24, 0.16)	0.28
Political Ideology	0.01	0.07	(-0.13, 0.16)	0.20
US Wave 1				
<i>Intercept</i>	3.20	0.07	(3.06, 3.34)	
Self&Family concern	0.84	0.21	(0.44, 1.24)	1.00
Society concern	0.64	0.21	(0.23, 1.04)	1.00
Political Ideology	-0.23	0.17	(-0.56, 0.01)	0.84
Gender (F)	0.05	0.11	(-0.10, 0.46)	0.30
Age	-0.01	0.06	(-0.33, 0.23)	0.15

Table 8. Predictors of number of special measures taken to prevent spreading COVID-19.

Model-averaged estimates, standard errors and confidence intervals are shown.

(iii) Support for policy measures: Support for policy measures was predicted by political

ideology, with political conservatives supporting fewer measures in both countries. In both the UK and the US, the effect of political ideology on policy support was mediated by concern for society (UK: estimate = -0.003 ± 0.001 , $p=0.007$; US: estimate = -0.002 ± 0.001 , $p = 0.021$), but a direct effect of political ideology on policy support still existed in both countries, with political conservatives supporting fewer policy measures (UK: estimate = -0.005 ± 0.003 , $p = 0.052$; US: -0.006 ± 0.002 , $p = 0.003$). We note that the effect of political ideology on number of policies supported is substantially weakened in the UK sample, when

298 'delaying Brexit by extending the transition period' is not included in the number of policies
299 individuals could support.

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301 Concern for self and family also predicted support for policy measures in both countries
302 (Table 9). In the US, but not the UK, concern for society was associated with support for a
303 larger number of policies. Nevertheless, this effect was smaller than the effect associated
304 with concern for self and family. In the UK, older participants tended to support fewer
305 policies.

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312 Figure 2. Preventive measures taken as a function of concern for self & family and concern
 313 to society, in the UK and the US. Concern was converted to a 5-level categorical variable for
 314 ease of visualisation. 1= 0-20, 2=21-40, 3=41-60, 4=61-80, 5=81-100 (higher values =
 315 increasing concern).

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Figure 3. Number of policies supported in UK and US, as a function of concern for self & family and concern for society. Concern was converted to a 5-level categorical variable for ease of visualisation. 1= 0-20, 2=21-40, 3=41-60, 4=61-80, 5=81-100 (higher values = increasing concern).

Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK Wave 1				
Intercept	3.99	0.08	(3.84, 4.14)	
Self&Family concern	2.08	0.21	(1.66, 2.49)	1.00
Age	-0.70	0.16	(-1.00, -0.39)	1.00
Political Ideology	-0.37	0.16	(-0.68, -0.06)	1.00
Society concern	0.17	0.22	(-0.26, 0.59)	0.53
Gender (F)	-0.07	0.13	(-0.31, 0.18)	0.40
US Wave 1				
Intercept	3.84	0.07	(3.70, 3.97)	
Political Ideology	-0.48	0.14	(-0.76, -0.21)	1.00
Self&Family concern	1.22	0.20	(0.83, 1.62)	1.00
Society concern	0.59	0.20	(0.19, 0.98)	1.00
Gender (F)	0.13	0.15	(-0.05, 0.50)	0.57
Age	-0.12	0.15	(-0.49, 0.06)	0.54

Table 9. The number of policies aimed at slowing the spread of COVID-19 that people do or would support (Wave 1). Model-averaged estimates, standard errors and confidence intervals are shown.

Wave 2 Results:

All measures of concern increased from wave 1 to wave 2, both in the UK and the USA (all paired t-tests, $p < 0.001$, Table 2). For all three measures, the increase in concern was larger in the UK than in the US (2-sample t-tests, all $p < 0.005$). The average number of preventive behaviours taken as well as the total number of policies supported also increased from wave 1 to wave 2 in both countries (Table 2). The increase in number of preventive behaviours was most strongly predicted by the change in concern for self and family (Table 10). In the USA, people who reported having an underlying health issue had a smaller change in number of behaviours adopted from wave 1 to wave 2 adopting, and older participants showed a larger uptake of preventive behaviours. Although we observed a significant increase in concern for society in both countries, this did not predict the uptake of additional preventive behaviours.

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342 In both the UK and the US, the number of policies supported increased significantly from
343 wave 1 to wave 2 (Table 2). The increase in policy support was predicted by increased
344 concern for self and family in both countries. In the US (but not the UK) there was also a
345 smaller effect of increased concern for society in predicting the increased numbers of
346 policies supported (Table 11).

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Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK				
Intercept	3.85	0.11	(3.64, 4.07)	
Increased self&family concern	0.99	0.22	(0.56, 1.41)	1.00
Age	-0.54	0.23	(-0.98, -0.10)	1.00
Political Ideology	-0.20	0.24	(-0.67, 0.27)	0.60
Health Issue	-0.01	0.12	(-0.24, 0.22)	0.16
USA				
Intercept	2.39	0.11	(2.18, 2.59)	
Increased self&family concern	1.08	0.26	(0.57, 1.59)	1.00
Health Issue	-0.75	0.29	(-1.33, -0.18)	1.00
Age	0.43	0.21	(0.01, 0.85)	1.00
Increased society concern	0.20	0.27	(-0.32, 0.73)	0.53
Political Ideology	0.05	0.14	(-0.22, 0.32)	0.26
Gender	0.04	0.13	(-0.21, 0.30)	0.25

Table 10. Factors affecting change in number of preventive behaviours adopted from wave 1 to wave 2.

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Parameter	Estimate	Unconditional SE	Confidence Interval	Relative Importance
UK				
Intercept	3.35	0.10	(3.16, 3.53)	
Increased self&family concern	1.47	0.22	(1.04, 1.89)	1.00
Age	0.16	0.20	(-0.24, 0.55)	0.54
Health Issue	-0.15	0.24	(-0.62, 0.31)	0.48
Increased society concern	0.09	0.18	(-0.27, 0.44)	0.34
Political Ideology	0.01	0.09	(-0.15, 0.18)	0.16
USA				
Intercept	2.06	0.08	(1.90, 2.22)	
Increased self&family concern	0.92	0.18	(0.51, 1.32)	1.00
Increased society concern	0.57	0.20	(0.17, 0.98)	1.00
Age	0.15	0.18	(-0.21, 0.51)	0.56
Political Ideology	-0.11	0.17	(-0.44, 0.22)	0.47
Gender	0.08	0.15	(-0.21, 0.38)	0.41
Health Issue	-0.11	0.20	(-0.50, 0.28)	0.40

Table 11. Factors affecting change in number of policies supported from wave 1 to wave 2.

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Discussion

This study provides one of the first tests of the level of concern that best predicts people's engagement with behaviours required to stem the spread of the coronavirus. A key finding from our study is that concern at broad and narrow scales varies with political ideology, with political conservatives being less concerned about the impacts at a societal scale in both countries. This finding aligns with previous work showing that the expanse of moral concern varies across the political spectrum^{1,2}. This result is important in understanding how this crisis might become polarized along partisan lines, as it suggests that different responses to this crisis are not simply due to people's group identity as liberals or conservatives, but could be driven by more subtle differences in the ambit of moral concern that is associated with liberal and conservative ideology. It should be noted however that whilst a linear model fit predicted the relationship between society concern and political ideology in the US and UK, there appears to be some non-linearity in this relationship in the US (Figure 1), such that people in the middle of the political spectrum consistently reported lower levels of concern (for self, family and society) than those at the liberal or conservative extreme. We did not anticipate this finding and did not explore it statistically, but future work could further test how this unexpected effect differs across economic and social dimensions to conservative ideology^{12,13}, rather than a simple one-dimensional axis. These different (economic and social) dimensions to political ideology are highly correlated in the US and UK¹⁴, but collapsing across them here might be masking a more complex relationship.

In addition to political leaning, another clear individual difference predicting societal concern in the US and UK was gender. Indeed, gender also predicted more concern at the level of self and family in the UK. This was not a predicted relationship, but could be explained by higher levels of empathy in females¹⁵, or differing levels of sensitivity to pathogens which manifests as disgust and has been proposed to function to reduce disease vulnerability in females¹⁶. Other work also hints at large-scale differences in moral concerns and preferences between males and females, particularly with respect to saving female lives and for intervening to prevent harm to others¹⁷. It is interesting to note that this difference in levels of concern at an individual level mirrors a wider narrative in society, with various

reports arguing that female leaders may have responded to this crisis more effectively than male leaders^{18–20}.

Self-reported concern at narrow and broad scales both predict preventive behaviours taken to slow the transmission of COVID-19. However, in both countries, narrowly framed concern in terms of self and one’s family more strongly predicted preventive behaviour change, compared to more broadly framed concern in terms of society. This was evident in the cross-sectional analysis of wave 1 in which concern for self and family was a better predictor of the number of policies that people would support to reduce the spread of the virus. In the UK, narrow concerns predicted the number of policies supported, and broader societal concerns did not. In the US, both narrow and broad concerns predicted the number of policies supported, but the effect of narrow concern was larger. Longitudinally, the increase in narrow concern was also the strongest predictor of change in behaviour and support for policies from wave 1 to wave 2 in both countries. Together these results indicate that concern for society does play a role in informing behaviour change and policy support, but that this effect is consistently smaller than more narrowly-framed concern. These results are potentially important for future efforts to encourage people to maintain behaviours and support policies to stop the spread of the virus, as they suggest that engaging with people’s concerns for themselves and their family might be most effective.

This interpretation is potentially inconsistent with a recent study finding that prosocially framed messages result in a larger increase in intended behaviour change compared to a self-interested message³ (and see other work in the context of vaccination decisions²¹). While these studies emphasise the promise of prosocially-framed messages, other studies (including ours) have yielded contradictory results. One study on vaccination decisions found that concern for others did not reduce vaccine hesitancy²² (see also²³), and another study exploring concern about climate change found that framing climate change in terms of effects on others (‘harm/care’) increased concern among political liberals but not conservatives²⁴. This latter result is potentially important for interpreting the findings of Jordan and colleagues³ because Amazon Mechanical Turk (the participant recruitment platform used) samples are known to contain more political liberals than nationally representative samples^{25,26}. If politically liberal participants are more responsive to

prosocially-framed messages, then a liberal bias in recruitment would result in an over-estimation of the magnitude of the effect in a more politically representative sample. Our own data also shows evidence of this liberal bias, but we believe this to be less of a problem for our conclusions because our inferences rely on within-subject correlations.

Nevertheless, we acknowledge that the picture appears to be quite mixed with respect to whether emphasising societal harm and benefits will outperform alternative framings when it comes to promoting pro-social behaviour in the context of the current pandemic. Answering this question has urgent, real-world implications and clearly having better measures of behaviour, and ideally measures that do not only rely on self-report, could advance this debate. One difficulty acknowledged by the authors of the prosocial messaging study³ is the potential for demand characteristics (and desirability bias) to have shaped participants' responses. Moreover, it is unclear how self-reported intentions in this study might correspond to real-world behaviour change (and previous work indicates caution is warranted in assuming that intentions will map directly onto behaviours^{27,28}). Although our data suffers from some of the same shortcomings it is less obvious how demand characteristics would impact the differences in the relationship between narrow and broad concerns and behaviour and policy support in this study. Indeed, our validation of the societal concern measure suggest a degree of confidence in the measure. Specifically, our finding that donation size in a modified Dictator Game was predicted by societal concern, but not concern for self and family, suggests that societal concern is a reasonable proxy for 'generalised' prosocial behaviour that has predictive validity in a different context and in the direction that would be expected. Determining whether prosocially or personally framed messages are likely to have the largest impact on changing behaviour is evidently not simply an abstract theoretical debate, but a critical question for how to frame messages correctly. Getting this right will be crucial in the weeks and months to come.

Summary of results

- Concern for society varies across the political spectrum, decreasing with political conservatism.
- Concern for self & family and concern for society are respectively associated with behaviour change, but narrow concern is consistently more important.

- Support for policy measures also more strongly predicted by narrow concern than by broad concern.
- The increase in the number of preventive behaviours adopted, and policies supported, from March 12th to March 24th are both more strongly predicted by increases in narrow rather than broad concern over the same time period.
- Overall, these results are consistent with the idea that narrow concern currently plays a stronger role than broad concern in shaping behaviours and attitudes towards COVID-19 in the US and UK. Broad concerns might be effective, but they might also be polarizing, and they might be less effective than narrowly framed messages.

References

1. Graham, J., Haidt, J. & Nosek, B. A. Liberals and conservatives rely on different sets of moral foundations. *Journal of Personality and Social Psychology* **96**, 1029–1046 (2009).
2. Waytz, A., Iyer, R., Young, L., Haidt, J. & Graham, J. Ideological differences in the expanse of the moral circle. *Nat Commun* **10**, 1–12 (2019).
3. Jordan, J., Yoeli, E. & Rand, D. Don't get it or don't spread it? Comparing self-interested versus prosocially framed COVID-19 prevention messaging. (2020) doi:10.31234/osf.io/ynuq7x.
4. Heffner, J., Vives, M. L. & FeldmanHall, O. *Emotional responses to prosocial messages increase willingness to self-isolate during the COVID-19 pandemic*. <https://osf.io/qkxvb> (2020) doi:10.31234/osf.io/qkxvb.
5. Kahneman, D., Knetsch, J. L. & Thaler, R. Fairness as a Constraint on Profit Seeking: Entitlements in the Market. *The American Economic Review* **76**, 728–741 (1986).
6. Peysakhovich, A., Nowak, M. A. & Rand, D. G. Humans display a 'cooperative phenotype' that is domain general and temporally stable. *Nat Commun* **5**, 4939 (2014).
7. Engel, C. Dictator games: a meta study. *Experimental Economics* **14**, 583–610 (2011).

- 481 8. Bartoń, K. *MuMIn: Multi-Model Inference*. (2018).
- 482 9. Burnham, K. P. & Anderson, D. *Model selection and multi-model inference*. (Springer-
- 483 Verlag, 2002).
- 484 10. Grueber, C. E., Nakagawa, S., Laws, R. J. & Jamieson, I. G. Multimodel inference in
- 485 ecology and evolution: challenges and solutions. *Journal of Evolutionary Biology* **24**,
- 486 699–711 (2011).
- 487 11. Gelman, A. Scaling regression inputs by dividing by two standard deviations. *Statistics in*
- 488 *medicine* **27**, 2865–2873 (2008).
- 489 12. Feldman, S. & Johnston, C. Understanding the Determinants of Political Ideology:
- 490 Implications of Structural Complexity. *Political Psychology* **35**, 337–358 (2014).
- 491 13. Claessens, S., Fischer, K., Chaudhuri, A., Sibley, C. G. & Atkinson, Q. D. The dual
- 492 evolutionary foundations of political ideology. *Nature Human Behaviour* 1–10 (2020)
- 493 doi:10.1038/s41562-020-0850-9.
- 494 14. Azevedo, F., Jost, J. T., Rothmund, T. & Sterling, J. Neoliberal Ideology and the
- 495 Justification of Inequality in Capitalist Societies: Why Social and Economic Dimensions of
- 496 Ideology Are Intertwined. *Journal of Social Issues* **75**, 49–88 (2019).
- 497 15. Christov-Moore, L. *et al.* Empathy: Gender effects in brain and behavior. *Neuroscience &*
- 498 *Biobehavioral Reviews* **46**, 604–627 (2014).
- 499 16. Tybur, J. M., Lieberman, D. & Giskevicius, V. Microbes, mating, and morality: Individual
- 500 differences in three functional domains of disgust. *Journal of Personality and Social*
- 501 *Psychology* **97**, 103–122 (2009).
- 502 17. Awad, E. *et al.* The Moral Machine experiment. *Nature* **563**, 59 (2018).
- 503 18. Mahdawi, A. The secret weapon in the fight against coronavirus: women | Arwa
- 504 Mahdawi. *The Guardian* (2020).

- 505 19. Burnell, E. Women lead many of the nations dealing best with coronavirus – proof a
506 level playing field can help us all | The Independent. *The Independent* (2020).
- 507 20. Fincher, L. H. Women leaders are doing a great job at handling the pandemic. So why
508 aren't there more of them? - CNN. *CNN* (2020).
- 509 21. Betsch, C., Böhm, R., Korn, L. & Holtmann, C. On the benefits of explaining herd
510 immunity in vaccine advocacy. *Nat Hum Behav* **1**, 1–6 (2017).
- 511 22. Amin, A. B. *et al.* Association of moral values with vaccine hesitancy. *Nat Hum Behav* **1**,
512 873–880 (2017).
- 513 23. Betsch, C. & Böhm, R. Moral values do not affect prosocial vaccination. *Nature Human*
514 *Behaviour* **2**, 881 (2018).
- 515 24. Feinberg, M. & Willer, R. The Moral Roots of Environmental Attitudes. *Psychol Sci* **24**,
516 56–62 (2013).
- 517 25. Berinsky, A. J., Huber, G. A. & Lenz, G. S. Evaluating Online Labor Markets for
518 Experimental Research: Amazon.com's Mechanical Turk. *Political Analysis* **20**, 351–368
519 (2012).
- 520 26. Levay, K. E., Freese, J. & Druckman, J. N. The Demographic and Political Composition of
521 Mechanical Turk Samples. *SAGE Open* **6**, 215824401663643 (2016).
- 522 27. Carrington, M. J., Neville, B. A. & Whitwell, G. J. Why Ethical Consumers Don't Walk
523 Their Talk: Towards a Framework for Understanding the Gap Between the Ethical
524 Purchase Intentions and Actual Buying Behaviour of Ethically Minded Consumers. *J Bus*
525 *Ethics* **97**, 139–158 (2010).
- 526 28. Hassan, L. M., Shiu, E. & Shaw, D. Who Says There is an Intention–Behaviour Gap?
527 Assessing the Empirical Evidence of an Intention–Behaviour Gap in Ethical Consumption.
528 *J Bus Ethics* **136**, 219–236 (2016).

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