Hume/John/Sanders/Stockdale (JBPA 2021 - Nudge in the time of coronavirus: Compliance to behavioral messages during crisis):

Appendices

Appendix A: Outcome scales

Compliance with guidelines

Items on this scale were based on Weinberg (2020) and amended to cover official and unofficial guidelines in place in the UK at the time of the study, and to include seven response levels rather than five. The scale was as follows:

Please indicate how often you intend to do the following activities in the next week. Please be completely honest - your responses are anonymous.

Scale from 'never' (1) to 'always' (7) plus I don't know (items were reverse coded where necessary).

- Using the NHS for non-critical illnesses
- Working from home unless essential to do otherwise
- Following hygiene precautions like washing hands for 20 seconds
- Social distancing from others apart from those in your household
- Volunteering for the NHS
- Only going outside to exercise once a day, to collect essential food and medicine or care for a vulnerable person
- Stockpiling food and other household goods
- Travelling to see friends and family
- Wash hands more frequently and for longer than normal

- Inform others if you develop symptoms of COVID-19 no matter how mild
- Exercising close to your house (i.e. not travelling to exercise)
- Disinfect frequently touched objects and surfaces

Intention to leave the house

Items were developed based on a scale by Barari et al., 2020 and amended for the UK context. The 5-point scale was created by the authors for this study to ascertain the frequency of actions. The scale was as follows:

Do you intend to leave the home in the next 5 days?

- Yes
- No
- I'm not sure

(If Yes/Not sure) What are the reasons that you will leave your home in the next 5 days? Please be completely honest - your responses are anonymous.

Scale from 'Not at all in the next 5 days' (1) to 'Multiple times a day in the next 5 days' (5) plus I don't know.

- Going to work
- Walking a pet
- Doing physical activity
- Getting food for yourself or household
- Going to the pharmacy
- Going to the hospital / to receive medical treatment
- Meeting friends or relatives
- For a change of scenery

- Boredom / just to leave the house
- Getting an adrenaline rush (from breaking the law)
- Exercising my freedoms
- Taking care of a dependent or someone who is vulnerable
- Other (please specify)

Appendix B: Regression tables

Intended compliance with the regulations

This section provides regression tables for the analysis used in the paper, as well as a range of alternative specifications. Table 1 gives the results for our preferred outcome and treatment specification, which is the proportion of times that a respondent answered either 'always'/'almost always' or 'never'/'almost never' (for reverse-coded items) to the items in the compliance scale. Treatment assignment is coded as a factor variable with six levels, where the reference category is those who were assigned to both the control (nudge) and control (plus) conditions.

We present four models in the table, which are (1) model using wave 1 (immediate post-treatment) data and treatment allocation only; (2) wave 1 data with covariates; (3) wave 2 data with covariates; and (4) a panel specification using wave 1 and wave 2 data (with the item-level sample mean imputed for wave 2 non-responders), clustered at the level of the individual.

Table 2 presents the same four models, but with the treatment coded as a 3 x 2 factorial, to assess the interaction effects, while Table 3 and Table 4 repeat the above analysis but with the outcome coded as a continuous variable from 1 to 7.

Intention to leave home

In this section we present regression tables for the second outcome: how frequently the respondent intended to leave home. Table 5 presents models for our preferred treatment

specification (coded as a six-level factor), with the outcome coded as either a binary (set to 1 if they intended to leave the house at all, and 0 otherwise) and as a continuous variable, with six levels corresponding to the range of frequencies of leaving the house in the scale, from ‘never’ (1) to ‘2-3 times a day’ (6). This outcome has been averaged across the items in the scale and normalized to be between 0 and 1 for ease of graphical presentation. ‘Don’t know’ responses were imputed with the sample mean for that item. The table presents four models, corresponding to (1) a binary outcome and no covariates; (2) a binary outcome with covariates; (3) a continuous outcome and no covariates; and (4) a continuous outcome with covariates. Table 6 gives the same four models with the treatment specified as a 2 x 3 factorial.

	W1 (clean)	W1 (covariates)	W2 (covariates)	W1/W2 panel (covariates)
(Intercept)	0.75***	0.73***	0.33***	0.75***
	(0.01)	(0.01)	(0.01)	(0.01)
Control + Plus	0.00	0.00	−0.02	−0.01
	(0.02)	(0.02)	(0.01)	(0.01)
Norm + Control	0.02	0.02	−0.02+	−0.00
	(0.02)	(0.02)	(0.01)	(0.01)
Norm + Plus	0.01	0.01	−0.01	−0.00
	(0.02)	(0.02)	(0.01)	(0.01)
Beneficiary + Control	−0.01	−0.00	−0.00	−0.00
	(0.02)	(0.02)	(0.01)	(0.01)
Beneficiary + Plus	0.03+	0.04*	0.01	0.02+
	(0.02)	(0.02)	(0.01)	(0.01)
Wave 2				−0.45***
				(0.01)
Covariates	No	Yes	Yes	Yes
R_2	0.00	0.04	0.01	0.65
Adj. R^2	0.00	0.03	−0.00	0.65
Num. obs.	1480	1476	1246	2722
RMSE	0.19	0.18	0.13	0.16
N Clusters				1475

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$. Covariates are age, gender and ethnicity.

Table 1: Analysis of intended compliance with guidelines, with treatments coded separately

	W1 (clean)	W1 (covariates)	W2 (covariates)	W1/W2 panel (covariates)
(Intercept)	0.75***	0.73***	0.33***	0.75***
	(0.01)	(0.01)	(0.01)	(0.01)
Nudge: Norm	0.02	0.02	−0.02+	−0.00
	(0.02)	(0.02)	(0.01)	(0.01)
Nudge: Beneficiary	−0.01	−0.00	−0.00	−0.00
	(0.02)	(0.02)	(0.01)	(0.01)
Plus	0.00	0.00	−0.02	−0.01
	(0.02)	(0.02)	(0.01)	(0.01)
Norm x Plus	−0.01	−0.01	0.02	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Beneficiary x Plus	0.04	0.04	0.02	0.03*
	(0.02)	(0.02)	(0.02)	(0.02)
Wave 2				−0.45***
				(0.01)
Covariates	No	Yes	Yes	Yes
R_2	0.00	0.04	0.01	0.65
Adj. R^2	0.00	0.03	−0.00	0.65
Num. obs.	1480	1476	1246	2722
RMSE	0.19	0.18	0.13	0.16
N Clusters				1475

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$. Covariates are age, gender and ethnicity.

Table 2: Analysis of intended compliance with guidelines, with factorial treatments

	W1 (clean)	W1 (covariates)	W2 (covariates)	W1/W2 panel (covariates)
(Intercept)	6.17***	6.08***	5.14***	6.14***
	(0.04)	(0.05)	(0.03)	(0.04)
Control + Plus	0.00	−0.00	−0.03	−0.02
	(0.06)	(0.06)	(0.03)	(0.04)
Norm + Control	0.04	0.04	−0.04	−0.00
	(0.06)	(0.06)	(0.03)	(0.04)
Norm + Plus	0.02	0.01	−0.07+	−0.03
	(0.07)	(0.06)	(0.04)	(0.04)
Beneficiary + Control	−0.00	0.00	−0.04	−0.02
	(0.06)	(0.06)	(0.04)	(0.04)
Beneficiary + Plus	0.09	0.09	−0.03	0.04
	(0.06)	(0.06)	(0.04)	(0.04)
Covariates	No	Yes	Yes	Yes
R_2	0.00	0.03	0.01	0.47
Adj. R^2	−0.00	0.02	0.01	0.47
Num. obs.	1480	1476	1246	2722
RMSE	0.70	0.69	0.36	0.56
N Clusters				1475

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$. Covariates are age, gender and ethnicity.

Table 3: Analysis of intended compliance with guidelines, with treatments coded separately, and continuous outcome

	W1 (clean)	W1 (covariates)	W2 (covariates)	W1/W2 panel (covariates)
(Intercept)	6.17***	6.08***	5.14***	6.14***
	(0.04)	(0.05)	(0.03)	(0.04)
Nudge: Norm	0.04	0.04	−0.04	−0.00
	(0.06)	(0.06)	(0.03)	(0.04)
Nudge: Beneficiary	−0.00	0.00	−0.04	−0.02
	(0.06)	(0.06)	(0.04)	(0.04)
Plus	0.00	−0.00	−0.03	−0.02
	(0.06)	(0.06)	(0.03)	(0.04)
Norm x Plus	−0.02	−0.03	0.01	−0.01
	(0.09)	(0.09)	(0.05)	(0.06)
Beneficiary x Plus	0.09	0.09	0.04	0.07
	(0.09)	(0.09)	(0.05)	(0.06)
Covariates	No	Yes	Yes	Yes
R_2	0.00	0.03	0.01	0.47
Adj. R^2	−0.00	0.02	0.01	0.47
Num. obs.	1480	1476	1246	2722
RMSE	0.70	0.69	0.36	0.56
N Clusters				1475

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$. Covariates are age, gender and ethnicity.

Table 4: Analysis of intended compliance with guidelines, with factorial treatments and continuous outcome

	Binary (clean)	Binary (covariates)	Continuous (clean)	Continuous (covariates)
(Intercept)	0.68***	0.73***	0.17***	0.19***
	(0.03)	(0.03)	(0.01)	(0.01)
Control + Plus	−0.03	−0.04	−0.01	−0.01
	(0.04)	(0.04)	(0.01)	(0.01)
Norm + Control	−0.03	−0.04	−0.01	−0.01
	(0.04)	(0.04)	(0.01)	(0.01)
Norm + Plus	−0.03	−0.03	−0.02	−0.02
	(0.04)	(0.04)	(0.01)	(0.01)
Beneficiary + Control	−0.08+	−0.08+	−0.02	−0.02
	(0.04)	(0.04)	(0.01)	(0.01)
Beneficiary + Plus	−0.08+	−0.09*	−0.02*	−0.03*
	(0.04)	(0.04)	(0.01)	(0.01)
Covariates	No	Yes	No	Yes
R_2	0.00	0.02	0.00	0.02
Adj. R^2	0.00	0.01	0.00	0.02
Num. obs.	1480	1476	1480	1476
RMSE	0.48	0.48	0.13	0.13

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$. Covariates are age, gender and ethnicity.

Table 5: Analysis of intention to leave the house, with treatments coded separately

	Binary (clean)	Binary (covariates)	Continuous (clean)	Continuous (covariates)
(Intercept)	0.68***	0.73***	0.17***	0.19***
	(0.03)	(0.03)	(0.01)	(0.01)
Nudge: Norm	−0.03	−0.04	−0.01	−0.01
	(0.04)	(0.04)	(0.01)	(0.01)
Nudge: Beneficiary	−0.08+	−0.08+	−0.02	−0.02
	(0.04)	(0.04)	(0.01)	(0.01)
Plus	−0.03	−0.04	−0.01	−0.01
	(0.04)	(0.04)	(0.01)	(0.01)
Norm x Plus	0.03	0.04	0.00	0.00
	(0.06)	(0.06)	(0.02)	(0.02)
Beneficiary x Plus	0.03	0.03	0.00	0.00
	(0.06)	(0.06)	(0.02)	(0.02)
Covariates	No	Yes	No	Yes
R_2	0.00	0.02	0.00	0.02
Adj. R^2	0.00	0.01	0.00	0.02
Num. obs.	1480	1476	1480	1476
RMSE	0.48	0.48	0.13	0.13

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$. Covariates are age, gender and ethnicity.

Table 6: Analysis of intention to leave the house, with factorial treatments

Appendix C: Pre-registration text submitted to OSF:

https://osf.io/mzyj9/?view_only=f85f707c010e4002bb3f0d27625d2cb7

C.1 Hypotheses

H1: Participants who viewed either the identifiable victim or classic social norm message would subsequently report a greater intention to comply with public health guidelines than those participants in the control group.

H2: Participants who are asked to complete a self-persuasion task will subsequently report a greater intention to comply with public health guidelines than those who do not complete a self-persuasion task.

We will also examine, through an interaction, whether some social norm nudges are more susceptible to reflective thinking (through self-persuasion) than others. We do not have a strong prior opinion as to whether there will be a difference and, if so, what that difference will be.

C.2 Design plan

C.2.1 Study type

Experiment - A researcher randomly assigns treatments to study subjects, this includes field or lab experiments. This is also known as an intervention experiment and includes randomized controlled trials.

C.2.2 Blinding

For studies that involve human subjects, they will not know the treatment group to which they have been assigned.

C.2.3 Is there any additional blinding in this study?

No response

C.2.4 Study design

The project is a randomised survey experiment involving two rounds of randomisation and is a between subjects design.

The steps are as follows (see also flow diagram):

1) All participants will complete initial questions on their awareness of COVID-19, level of concern and adherence to guidelines.

2) They will then be randomly allocated to one of 3 social norm conditions:

Control: Mock up of a news article with information on COVID-19 guidelines.

Classic social norm (T1): Mock up of a news article with true figures about adherence to elements of the public health guidelines.

Identifiable victim (T2): Mock up of a news article with a story about someone who is vulnerable to COVID-19.

3) Participants will then be randomly allocated to complete a self-persuasion task or will see no task.

4) All participants will complete the final questionnaires on intentions to adhere to guidelines.

See "Testing the effectiveness of social norm messages in affecting adherence to public health guidelines", 2020 for the flow diagram of the study.

C.2.5 Randomization

Qualtrics survey software will randomly allocate participants to conditions (keeping groups roughly even in size) using simple randomisation techniques. This will occur twice: once to allocate to a social norm mock news article and once to allocate to a self-persuasion task or not.

C.2.6 Sampling Plan

C.2.7 Existing Data

Registration prior to creation of data

C.2.8 Explanation of existing data

N/A

C.2.9 Data collection procedures

Participants will be recruited through Prolific. Prolific is a dedicated online experiment platform with 70,000 participants internationally, including UK representative samples and is considered one of the more robust platforms for this type of research (Palan & Schitter, 2018; Peer et al., 2017). Participants will be paid £0.75 for a 7 minute study which is deemed 'fair' by Prolific. Participants must be based in the UK (given public health guidelines differ between countries the focus here is on the UK) and be aged over 18 years old (due to restrictions on Prolific Academic for recruiting participants).

C.2.10 Sample size

Approx. 1,500 participants is the target sample size.

C.2.11 Sample size rationale

Our goal was to establish reasonable power given time and financial constraints.

C.2.12 Stopping rule

Prolific will remove the advert for the study when the desired number of participants are recruited.

C.3 Variables

C.3.1 Manipulated variables

The initial manipulation is in social norms message, people will see either:

1) A control (information on health guidelines)

2) A 'classic' social norm (statistics on adherence to health guidelines)

3) A identifiable beneficiary message (a quote from a vulnerable person about how they are coping with COVID-19)

The second manipulation is in self-persuasion (Nudge Plus):

1) Self-persuasion written task

2) No self-persuasion written task

C.3.2 Measured variables

Initial measures:

- Understanding of COVID-19 (several true or false questions)
- Level of concern for self and the country (measured separately on a scale of 1-4, 1 being ‘not at all concerned’ and 4 being ’very concerned’ there is a 5th ‘I don’t know’ option).
- Level of concern questions (multiple questions on a scale from 1-7, 1 being ‘strongly disagree’ and 7 being ‘strongly agree’).
- Length of time expecting to follow social distancing and public health guidelines (options are ‘another week’ another 2 weeks’ ‘another month’ ‘a few more month’ ‘more than 6 months more’ and ‘I don’t know’.
- Adherence to public health guidelines (multiple questions on a scale from 1-7, 1 being ‘never’ and 7 being ‘always’ with an additional option to select ‘I don’t know).

Endline measures:

- Do you need to leave the home in the next 5 days? (Yes, No, I’m not sure).
- What are the reasons that you will leave your home in the next 5 days (check all options that apply)
- Please indicate how often you intend to do the following activities next week (multiple questions on a scale of 1-7, 1 being ‘never’ and 7 being ‘always’ with an additional ‘I don’t know’ option

Demographics (e.g. age, gender)

C.3.3 Indices

We will generate mean scores for the measures which include multiple items including adherence, intention to adhere, knowledge of COVID-19 and level of concern. In places this will require the reverse coding of some items.

C.4 Analysis Plan

C.4.1 Statistical models

We will use regression analysis.

We will regress the intention to adhere to guidelines on a vector of baseline adherence to guidelines for each of the social norms (control, classic social norm, identifiable victim) and each of the nudge plus interventions (self-persuasion, no self-persuasion). We will also run an interaction using the same models but adding the interaction between social norm and nudge plus condition.

C.4.2 Transformations

A dummy code for intention to go out in the next 5 days (with not going out as the reference) and gender (with male as the reference) may be created.

C.4.3 Inference criteria

We will use the standard $p<0.05$ criteria for determining if the results are significantly different from those expected if the null hypothesis were correct. We will also use R-squared and effect sizes.

C.4.4 Data exclusion

We will include a manipulation check to ensure that people have read the written information. This will consist of 4 questions and participants will be removed if they get 2 or more incorrect. Outliers will be included in the analysis.

C.4.5 Missing data

If a subject does not complete a questionnaire their data will be removed from the analysis.

C.4.6 Exploratory analysis

We may look at differences in demographic traits (particularly age and gender) and how these affect intentions to adhere.

Level of concern and understanding for the COVID-19 virus may also affect intentions to adhere (and current adherence).

Appendix D: Covid-19 context

Date (2020)	The UK lockdown (2020)	COVID-19 study	New COVID-19cases (and deaths)
Feb	The Government advises on a range of social distancing restrictions as well as self-isolation and quarantine for those with symptoms.		
10-Feb	Strengthened powers are issued to quarantine people against their will if necessary.		
01-Feb	Matt Hancock warns that over 70s would be asked to 'self-isolate' within weeks.		
16-Mar	Boris Johnson advises against 'nonessential' travel and contact with others – this is just a suggestion at this point.		
20-Mar	Boris Johnson orders all pubs, cafes, restaurants, bars and gyms to close and the Chancellor announces the taxpayer will meet 80% of the wages of employees.		
23-Mar	Boris Johnson announces a nationwide lockdown granting strengthened powers to enforce social distancing (many of which come into effect on 26 May). People are only allowed to leave the house for set reasons and 1.5 million people are told to 'shield' themselves. This is not currently a legal requirement but is widely adhered to from the get go.		

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Date (2020)	The UK lockdown (2020)	COVID-19 study	New COVID-19cases (and deaths)
25 March (26 March police's powers come into effect)	The Coronavirus Act 2020 was passed granting powers related to the 23 March announcement.		
05-Apr	Queen makes a rare broadcast about COVID-19.		
09-Apr		Pilot goes live and is closed	4,852 (1,116)
10 April – 13 April	Easter weekend		
Apr-11		Pilot goes live and is closed	3,577 (843)
15-Apr	There is growing speculation about an exit plan and Keir Starmer calls for the Government to publish one.		
16-Apr	Dominic Raab announces lockdown will be in place for "at least the next three weeks".		
22-Apr	In a Commons statement Matt Hancock tells MPs that "we are at the peak" although says that social distancing cannot yet be relaxed.		
23-Apr		Wave 1 goes live	5,143 (682)
24-Apr		Wave 1 is closed	4,973 (1,010)

Continued on next page

Date (2020)	The UK lockdown (2020)	COVID-19 study	New COVID-19cases (and deaths)
27-Apr	Boris Johnson makes his first public statement since his return to work following hospitalisation with COVID-19. He says that the UK is in a "moment of maximum risk" but suggests that "we are not beginning to turn the tide".		
07-May		Wave 2 goes live	3,767 (579)
09-May		Wave 2 is closed	2,150 (275)
10-May	After speculation over previous days, Boris Johnson announces his three-step plan to get out of lockdown (the first of which take effect on 13 May).		
10-May	The UK updates its message from "stay at home, protect the NHS, save lives" to "stay alert, control the virus, save lives".		
13-May	People can meet with one person outside the home, providing they remain in a public outdoor space and social distance.		
22-May	The Daily Mirror and The Guardian publish articles relating to Dominic Cummings' (Senior Advisor to Prime Minister, Boris Johnson) alleged breach of the Government's lockdown rules back in March by traveling from London to Durham.		

Continued on next page

Date (2020)	The UK lockdown (2020)	COVID-19 study	New COVID-19 cases (and deaths)
24-May	The Observer and Sunday Mirror allege that Dominic Cummings made a second trip Durham in April.		
25-May	After mounting pressure, Dominic Cummings gives a press conference about his alleged breach of lockdown rules.		
25-May	Boris Johnson outlines plans to open outdoor markets and car showrooms from 1 June and other non-effectual shops from 15 June.		
28-May	Boris Johnson announces that people can meet in groups of 6 outdoors (from 1 June).		
30-May	Those shielding can now leave the house (from 1 June).		
01-Jun	Schools and nursery start phased opening.		

Table 7: The UK COVID-19 context at the time of the research