You Must Stay at Home! The Impact of Commands on Behaviours During COVID-19

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Abstract

"You Must Stay at Home!" This is how the UK Prime Minister announced lockdown in March 2020. Many countries implemented similarly assertive messages. Research, however, suggests that authoritative language can backfire by inciting psychological reactance (i.e., feelings of anger arising from threats to one's autonomy). In a series of three studies, we therefore tested whether commanding, versus control and non-commanding messages, influence several cognitive and affective indicators of reactance, intentions to comply with COVID-19 recommendations, and the compliance behaviour itself. Although people found commanding messages threatening and felt angry and negative toward them, these messages impacted only intentions, but there was no evidence of behavioural reactance. Overall, our research constitutes the most comprehensive examination of cognitive-affective and behavioural indicators of reactance regarding commands to date and offers new insights into both reactance theory and COVID-19 communication.

Keywords: COVID-19, reactance, spillovers, spillunders, policy.

You Must Stay at Home! The Impact of Commands on Behaviours During COVID-19

On 23rd March 2020, UK Prime Minister Boris Johnson exclaimed "You must stay at home!" to announce lockdown (BBC, 2020). Although such authoritative language may seem necessary to convey the seriousness of the situation and convince people to comply with governmental recommendations, research indicates that assertive messages can negatively impact behaviour by evoking psychological reactance (Brehm, 1966; Rosenberg & Siegel, 2018). Experts have warned that reactance—rather than the widely publicized and critiqued behavioural fatigue—may in fact be the main threat to compliance with social distancing measures (Sibony, 2020). There has not, however, been any empirical investigation into whether the type of messages that governments have been using to enforce lockdown can backfire. In the present research, we therefore investigated how commanding messages impact compliance with COVID-19 behavioural recommendations. Because researchers have neglected whether messages aimed at enhancing the compliance might influence other activities not directly relevant to COVID-19, such as leisure, and because psychological reactance is known to evoke emotional mechanisms that shape various behaviours (Rosenberg & Siegel, 2018), we also explored potential "spillover" and "spillunder" effects of the messages (Dolan & Galizzi, 2015; Krpan, Galizzi, & Dolan, 2019). These variables and the corresponding analyses are, however, presented in Supplementary Materials (SM; pp.22-31 & 79-88), given that they generally yielded null effects. We next overview previous research on reactance theory to develop our hypotheses.

Psychological Reactance

Psychological reactance theory posits that, if people's freedom of action has been undermined, a motivational state of reactance marked by anger will be activated, thus prompting them to restore their freedom by undertaking the forbidden or discouraged behaviours (Miron &

Brehm, 2006). The main assumption of the theory is that reactance effects occur when a behaviour that a person can typically freely undertake, such as going out, is suddenly restricted: for example, by telling them they must stay at home (Brehm & Brehm, 2013).

Crucially, psychological reactance depends on how the restriction on behaviour is communicated to people (Rosenberg & Siegel, 2018). This can be through language that is either commanding (e.g., “must”) or creates an impression of free choice (e.g., “may”). One of the most robust findings from the literature is that using commanding compared to non-commanding language instigates reactance (Rains, 2013; Rosenberg & Siegel, 2018). For example, commanding (vs. non-commanding) health messages were perceived as less persuasive and decreased people’s intention to undertake the targeted health behaviours (Miller, Lane, Deatrick, Young, & Potts, 2007; Quick & Considine, 2008). Based on the previous findings regarding the consequences of message language, we therefore predict the following:

Hypothesis 1: A commanding message will reduce compliance with COVID-19 behavioural recommendations compared to either a control or a non-commanding message.

It is also important to address the mechanisms behind the hypothesized effects of commands on COVID-19 compliance. In a meta-analysis involving 20 studies and 4942 participants, Rains (2013) found that reactance is typically experienced as anger, and this emotional state contributes to its undesirable behavioural effects. We therefore predict the following:

Hypothesis 2: People receiving a commanding message (vs. a control or a non-commanding message) will be less compliant with COVID-19 behavioural recommendations due to experiencing more anger.

Overview of the Present Research

The first study we conducted to test the hypotheses generally yielded null effects. Study 1 is therefore relegated to SM (pp.5-88), whereas the main measures assessed in that study are outlined in Table 1 for informative purposes. The table also overviews measures from the main Studies 2 and 3 that are presented in the article. These studies drew on the insights from Study 1 to gain a more nuanced understanding of when reactance to commanding (vs. control and non-commanding) messages might occur. We considered two main possibilities behind the failure to detect reactance in Study 1. One is that our measures were not sufficiently sensitive. For example, in previous relevant research, reactance was captured via intentions (Rosenberg & Siegel, 2018), whereas our study focused on actual behaviours. A second possibility is that reactance does not occur regarding COVID-19 messages, in which case it would be important to understand why, given that message-related reactance has been documented in other health domains (Miller et al., 2007).

To address the first possibility, across Studies 2-3 we measured all important indicators of reactance (Table 1) we could identify in the literature (Rosenberg & Siegel, 2018). Next to assessing the main dependent variables that tap into behaviour (actual *compliance* and *intentions* to comply, Table 1), we measured several cognitive or affective indicators of reactance. These included *general anger* as in Study 1, but also *anger* specifically directed toward messages, *negative thoughts* experienced upon reading the messages, and *autonomy threat* (Dillard & Shen, 2005; Rosenberg & Siegel, 2018). Moreover, we assessed *hostility toward the present study* (Table 1), given that reactance can also manifest itself as hostility toward the source of threat (Nezlek & Brehm, 1975; Rains, 2013)—in this case the study in which participants took part.

Table 1

Conditions and Key Variables from the Present Research

Variable/Condition	Study	Description
Conditions		
a) Control COVID-19	1, 2, 3	Participants were given a list of six recommendations concerning COVID-19: staying at home unless undertaking essential activities; washing hands often; avoiding meeting friends/family members from other households; avoiding the hoarding of groceries and/or household goods; keeping two or more meters apart from others when outside; and disinfecting goods/packages brought into the household. All people were asked to select one recommendation regarding which they thought they could further improve.
b) Non-commanding COVID-19	1, 3	Same as in the control condition. In addition, participants received a message prompting them to comply with the recommendation they selected. In this and other conditions, the messages targeted the self-selected recommendation because previous research showed that many people tend to comply with COVID-19 recommendations (Barari et al., 2020; Fetzer et al., 2020), and by focusing on the "weak" behaviour we aimed to avoid potential ceiling effects. The message specifically stated we would like to know whether participants would be willing to do their best and try to practise the selected recommendation as much as possible. We told them that they are not obliged to do so and then asked them to indicate whether they are intending to practise the recommendation on that day and over the next two days or not.
c) Commanding COVID-19	1, 2, 3	Same as in the control condition. In addition, participants received a message prompting them to comply with the recommendation they selected. They were told that, on that day and over the next two days, they ABSOLUTELY MUST practise the selected recommendation as much as they can and comply with it under every circumstance. Then, they were prompted to confirm that they read and understood the text.
d) Non-commanding Plus Benefit to Others COVID-19	1	Same as in the non-commanding condition. In addition, the following text was added: "Your actions will help the NHS and ensure that the vulnerable people stay safe and have access to resources they need." We based this text on similar appeals used in the media (e.g., BBC, 2020).
e) Commanding Plus Benefit to Others COVID-19	1	Same as in the commanding condition, plus the text regarding the NHS described in the condition above.
f) Control General Health	2	Same as in the control for COVID-19, with the only difference being that the following six behavioural recommendations were used: engaging in regular physical activity; eating a variety of vegetables and fruits; eating low calorie foods; sleeping no less than 7-8 hours per night; avoiding alcoholic drinks (i.e., drinking no more than 2 units of alcohol per day); and quitting smoking.
g) Commanding General Health	2	Same as the control for general health, plus the message described in the commanding COVID condition.
Main Dependent Variables: Intentions and Behaviour		
1. Compliance with Self-selected Recommended Behaviour	1, 3	How often participants engaged in the behaviour described under the recommendation they selected.
2. Compliance with Other Recommended Behaviours	1, 3	How often participants engaged in the behaviours from the recommendations they did not select.

3. Intentions to Comply with Self-selected Recommended Behaviour	2, 3	Participants' intentions to comply (today and over the next 2 days) with the behavioural recommendation they selected.
4. Intentions to Comply with Other Recommended Behaviours	3	Participants' intention to comply (today and over the next 2 days) with the remaining behavioural recommendations they did not select.
Cognitive or Affective Indicators of Reactance		
5. General Anger	1, 2, 3	How generally angry participants currently felt.
6. Message Anger	3	How angry toward the messages participants currently felt.
7. Autonomy Threat	2, 3	To what extent the messages threatened participants' autonomy.
8. Message Negative Thoughts	3	To what extent the messages evoked negative thoughts.
9. Hostility Toward the Present Study	3	To what extent participants felt hostile toward the study (i.e., they felt the study was useless).
Moderators		
10. Uncertainty toward COVID-19	2, 3	To what extent participants generally experienced uncertainty regarding the COVID-19 situation.
11. Societal Consequences	2, 3	Whether participants felt their choices regarding COVID-19 recommendations could impact society.
12. Right to Restrict Freedom	2, 3	To what extent people thought the government/policy makers had the right to restrict their freedom.
13. Impact on Health	3	To what extent people thought COVID-19 could impact health more seriously than other illnesses.
14. Lacking Control	3	To what extent participants felt they lacked the sense of control regarding the COVID-19 situation.
15. Desensitized toward COVID-19	3	Whether people were indifferent to COVID-19 due to being exposed to too much information about it.
16. Perception of Free Choice	3	Whether they felt they were given enough free choice regarding their behaviours during the pandemic.
17. Importance of Free Choice	3	Whether participants thought they should be allowed to freely choose their actions during the pandemic.
18. Aversion to Freedom Restrictions	3	To what extent participants felt bothered by their freedom being restricted during the COVID-19 pandemic.
19. Compliance Demandingness	3	Whether they thought that complying with the COVID-19 recommendations was too demanding.
20. Government Seriousness	3	Whether participants thought the government was taking COVID-19 seriously enough.
21. Freedom Threat	3	Whether participants felt that COVID-19 behavioural recommendations threatened their freedom.

Note. Variables 1 and 2 were scored on a scale from 0 (Never) to 4 (Very often). Variables 3, 4, 5, and 9 were scored on a scale from 0 (Not at all) to 10 (Completely). Variables 6-8 were scored on a scale from 1 (Strongly disagree) to 7 (Strongly agree). Variables 10-21 were scored on a scale from 0 (Not at all) to 10 (To a great degree). Full description of all conditions and variables is available in Supplementary Materials (pp.8-48, and 89-131).

To address the second possibility behind the failure to initially detect reactance, we measured all relevant variables that should, according to reactance theory, determine the likelihood of reactance (Brehm & Brehm, 2013; Rains & Turner, 2007; Rosenberg & Siegel, 2018), and may therefore moderate the impact of commanding (vs. control or non-commanding) language on variables indicative of this phenomenon. Reactance should occur if acting freely is important to people (Variable 17, Table 1); if they are averse to someone attempting to restrict their freedom (Variables 12 & 18; Table 1); if they feel that their freedom is being threatened or eliminated (Variables 16 & 21, Table 1); if the behaviours in question are too demanding (Variable 19, Table 1) or do not have serious (e.g., life-threatening) consequences (Variables 11, 13, and 20; Table 1); and if people feel they have control over their actions (Variable 14; Table 1) or are not uncertain regarding the situation (Variable 10; Table 1). We also measured whether people were desensitised to COVID-19 (Variable 15; Table 1), given that we considered they may fail to experience reactance toward commanding language because they are generally exposed to too much COVID-related information in the media. Finally, in Study 2 we manipulated commanding versus control messages regarding general health as one of the domains where reactance has been frequently documented (Rosenberg & Siegel, 2018) to understand whether the effects would differ compared to COVID-19-related messages.

Overall, the general approach in Studies 2-3 was to first test whether the commanding (vs. control or non-commanding) condition would impact any of the behavioural or cognitive-affective indicators of reactance tested. In Study 2, we also probed whether the effects of COVID-19-related messages on these variables were different than the effects of messages regarding general health. For any of the significant effects of the commanding (vs. control or non-commanding) COVID-19 messages on intentions or behaviour, we then aimed to further test the mediating role of the cognitive-affective variables. We next probed the potential moderators of the impact of commanding (vs. control or non-commanding) COVID-19 conditions on reactance variables. Finally, we meta-analysed any main effects of message language on dependent variables that were probed in more than one study.

Method

Participants

In Study 2, which had only one part, out of 1763 UK participants recruited, 1719 passed the inclusion criteria and were included in analyses (Male=622; Female=1091; Other=6; M_{age}=41.127; SD_{age}=13.105). There were therefore 427, 433, 433, and 426 participants in the health control, COVID-19 control, health commanding, and COVID-19 commanding conditions (Table 1), respectively. In Study 3, which had two pats, out of 2112 UK participants recruited for part 1, 1969 were included in analyses because they completed both parts and passed the inclusion criteria (Male=632; Female=1331; Other=6; *M*age=37.045; *SD*=12.879). There were therefore 662, 658, and 649 participants in the control, commanding, and non-commanding conditions (Table 1), respectively. In both studies, the inclusion criteria involved passing seriousness checks at the end of the study (Aust, Diedenhofen, Ullrich, & Musch, 2013), correctly answering instructed-response items (Meade & Craig, 2012), and participants allowing us to use their data (SM, pp.132-135). For both studies, sample size was determined based on meeting a high power (.90) to detect small effects (Cohen's $f^2 \leq 0.02$; Cohen, 1988). Detailed power analyses are available in SM (pp.142-146). The data were collected via Prolific.co on 22 June 2020 (Study 2), and between 29 September and 5 October 2020 (Study 3).

Study Design, Procedure, and Measures

The study design involved a between-subjects variable (*message language*) consisting of four conditions in Study 2 and three conditions in Study 3 (Table 1). For part 1, procedures in both studies were similar. All participants first answered the consent form, after which we measured two covariates—age and gender (male vs. female vs. other)—given their links to compliance with COVID-19 recommendations (Galasso et al., 2020; Levkovich, 2020). Thereafter, participants were randomly allocated to one of the message language conditions and read the corresponding messages (see Table 1 and SM, pp.89-93 & 103-106). Then they received the questions measuring *compliance intentions*, *cognitive-affective indicators of reactance*, and the *moderator* variables (Table 1). Finally, at the end of part 1, participants answered the seriousness check and whether they allowed us to use their data.

In Study 3, which also had part 2, participants were contacted on the third day after completing part 1. They first received the consent form, and then responded to the questions measuring their *compliance* with behavioural recommendations (Table 1). In the end, they answered the seriousness check and whether they allowed us to use their data. Study materials and all variables are detailed in SM (pp.89-135) and available via OSF (https://osf.io/a2jnb/).

Results

All analyses reported in this section were computed using linear regression models. The data and analysis codes that produced the results can be accessed via OSF (https://osf.io/a2jnb/).

Influence of Messages on Reactance Variables and Comparison Between COVID-19 and General Health

Regression models testing the impact of messages on reactance variables in Studies 2 and 3 are presented in Tables 2 and 3, whereas the means and 95% CIs for the variables are reported in Tables 4 and 5. To minimise the chance of Type I Error, the effects were deemed significant only if they passed the false discovery rate (FDR; Benjamini & Hochberg, 1995) correction (SM, pp.142-146). Overall, the analyses showed that, whereas the commanding condition influenced various cognitive-affective indicators of reactance compared to the other conditions, it impacted intentions in line with reactance theory only relative to the non-commanding condition but failed to change behaviour, which is inconsistent with Hypothesis 1.

More specifically, concerning the cognitive-affective indicators of reactance regarding COVID-19, in both Studies 2 (Table 2: Model 3) and 3 (Table 3: Model 5), participants experienced higher autonomy threat in the commanding (vs. control) COVID-19 condition. Moreover, in Study 3 (Table 3: Model 5), the commanding (vs. non-commanding) condition also increased this variable. Interestingly, in either of the studies, the commanding (vs. control) condition did not influence general anger, whereas in Study 3 participants in the commanding (vs. non-commanding) condition had higher anger, but the effect size was small (Table 2: Model 5; Table 3: Model 6). In contrast, in Study 3 the commanding (vs. both control and non-commanding) condition increased message specific anger, and the effect sizes were more substantial (Table 3: Model 7). Finally, in this study the commanding (vs. control and non-commanding) condition also increased message negative thoughts (Table 3: Model 8). No significant effects were obtained regarding hostility toward the present study (Table 3: Model 9).

Concerning the variables capturing COVID-related intentions and behaviour, in Study 3 (Table 3: Model 3) participants in the commanding (vs. non-commanding) condition had lower intentions to comply with the self-selected recommended behaviour, in line with Hypothesis 1. In Studies 2 (Table 2: Model 1) and 3 (Table 3: Model 3), however, the commanding (vs. control) condition increased the intentions, which would not be expected based on Hypothesis 1. The effects regarding the intentions to comply with other recommended behaviour (Table 3:

Model 3), and regarding the actual compliance behaviours (Table 3: Models 1 and 2) were not significant. Overall, all significant effects reported in Tables 2 and 3 concerning cognitive-affective variables and intentions remained significant despite covariates (SM, pp.201-204).

Table 2

The Effects of Commanding (vs. Control) COVID-19 Messages and Commanding (vs. Control) General Health Messages on Reactance Variables in Study 2

DV = Intentions to Comply with Self-selected Recommended Behaviour						
Model 1: COVID-19 Messages - Commanding (baseline) vs. Control						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	6.134	0.144	5.851 – 6.416	42.607	<.001	1.059
Control COVID-19	-0.861	0.203	-1.259 – -0.463	-4.242	<.001	0.010
Control Health	-1.258	0.203	-1.657 – -0.859	-6.182	<.001	0.022
Commanding Health	-0.744	0.203	-1.141 – -0.346	-3.667	<.001	0.008
Model 2: General Health Messages - Commanding (baseline) vs. Control						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	5.390	0.143	5.110 – 5.670	37.749	<.001	0.831
Control Health	-0.514	0.203	-0.912 – -0.117	-2.538	.011	0.004
Control COVID-19	-0.117	0.202	-0.513 – 0.279	-0.580	.562	<0.001
Commanding COVID-19	0.744	0.203	0.346 – 1.141	3.667	<.001	0.008
DV = Autonomy Threat						
Model 3: COVID-19 Messages - Commanding (baseline) vs. Control						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	4.710	0.068	4.576 – 4.844	69.144	<.001	2.788
Control COVID-19	-2.146	0.096	-2.334 – -1.958	-22.367	<.001	0.292
Control Health	-2.512	0.096	-2.700 – -2.323	-26.087	<.001	0.397
Commanding Health	0.209	0.096	0.021 – 0.397	2.179	.029	0.003
Model 4: General Health Messages - Commanding (baseline) vs. Control						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	4.919	0.068	4.787 – 5.052	72.805	<.001	3.091
Control Health	-2.721	0.096	-2.909 – -2.533	-28.373	<.001	0.469
Control COVID-19	-2.355	0.096	-2.542 – -2.168	-24.647	<.001	0.354
Commanding COVID-19	-0.209	0.096	-0.397 – -0.021	-2.179	.029	0.003
DV = General Anger						
Model 5: COVID-19 Messages - Commanding (baseline) vs. Control						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	2.272	0.117	2.043 – 2.501	19.467	<.001	0.221
Control COVID-19	-0.298	0.164	-0.620 – 0.025	-1.811	.070	0.002

Control Health	-0.492	0.165	-0.816 – -0.169	-2.985	.003	0.005
Commanding Health	-0.048	0.164	-0.371 – 0.274	-0.294	.769	<0.001
Model 6: General Health Messages - Commanding (baseline) vs. Control						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	f^2
(Constant)	2.224	0.116	1.997 – 2.451	19.210	<.001	0.215
Control Health	-0.444	0.164	-0.766 – -0.122	-2.703	.007	0.004
Control COVID-19	-0.249	0.164	-0.571 – 0.072	-1.523	.128	0.001
Commanding COVID-19	0.048	0.164	-0.274 – 0.371	0.294	.769	<0.001

Note. Models 1 & 2 R^2 = .023; Models 3 & 4 R^2 = .432; Models 5 & 6 R^2 = .007. In Models 2-6, all 1719 participants were used in statistical analyses, and in Models 1 & 2, 1718 participants were used because 1 participant did not select a behaviour on which they wanted to focus regarding compliance. In Models 1, 3, and 5, the commanding COVID-19 language condition is the reference category, and in Models 2, 4, and 6 the commanding general health condition is the reference. Given that the study had 4 conditions, each regression model contains 3 dummy variables. However, key analyses testing the effects of commanding (vs. control) COVID-19 messages and commanding (vs. control) general health messages on the reactance variables are highlighted in grey. f^2 refers to Cohen's f^2 effect size (Cohen, 1988): effects ≤0.02 are considered small.

Table 3

The Effects of Commanding (vs. Control and Non-commanding) COVID-19 Messages on Reactance Variables in Study 3

Model 1: DV = Compliance with Self-selected Recommended Behaviour						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	f^2
(Constant)	1.830	0.057	1.718 – 1.942	32.091	<.001	0.580
Control	0.036	0.080	-0.121 – 0.194	0.454	.650	<0.001
Non-commanding	0.205	0.081	0.047 – 0.363	2.547	.011†	0.004
Model 2: DV = Compliance with Other Recommended Behaviours						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	f^2
(Constant)	3.017	0.024	2.970 – 3.064	126.233	<.001	8.130
Control	-0.004	0.034	-0.070 – 0.062	-0.126	.899	<0.001
Non-commanding	0.008	0.034	-0.059 – 0.074	0.226	.821	<0.001
Model 3: DV = Intentions to Comply with Self-selected Recommended Behaviour						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	f^2
(Constant)	5.737	0.117	5.508 – 5.967	49.006	<.001	1.225
Control	-0.576	0.165	-0.900 – -0.252	-3.484	.001	0.006
Non-commanding	0.640	0.166	0.314 – 0.965	3.852	<.001	0.008
Model 4: DV = Intentions to Comply with Other Recommended Behaviours						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	f^2
(Constant)	7.768	0.081	7.609 – 7.927	96.052	<.001	4.707
Control	-0.089	0.114	-0.312 – 0.135	-0.777	.437	<0.001
Non-commanding	0.133	0.115	-0.092 – 0.358	1.161	.246	0.001
Model 5: DV = Autonomy Threat						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	f^2

(Constant)	4.506	0.059	4.389 – 4.622	75.852	<.001	2.926
Control	-1.653	0.084	-1.818 – -1.489	-19.711	<.001	0.198
Non-commanding	-1.592	0.084	-1.758 – -1.427	-18.890	<.001	0.182
Model 6: DV = General Anger						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	2.742	0.103	2.540 – 2.943	26.717	<.001	0.363
Control	-0.008	0.145	-0.292 – 0.277	-0.052	.959	<0.001
Non-commanding	-0.504	0.146	-0.790 – -0.219	-3.463	.001	0.006
Model 7: DV = Message Anger						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	3.514	0.062	3.393 – 3.635	56.851	<.001	1.644
Control	-1.070	0.087	-1.241 – -0.898	-12.254	<.001	0.076
Non-commanding	-1.175	0.088	-1.347 – -1.003	-13.391	<.001	0.091
Model 8: DV = Message Negative Thoughts						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	3.488	0.065	3.360 – 3.616	53.373	<.001	1.449
Control	-0.607	0.092	-0.788 – -0.426	-6.580	<.001	0.022
Non-commanding	-0.853	0.093	-1.035 – -0.671	-9.198	<.001	0.043
Model 9: DV = Hostility Toward the Present Study						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	2.498	0.099	2.303 – 2.694	25.119	<.001	0.321
Control	-0.178	0.140	-0.454 – 0.097	-1.269	.205	0.001
Non-commanding	-0.079	0.141	-0.356 – 0.197	-0.562	.574	<0.001

Note. Model 1 R^2 = .004; Model 2 R^2 = <.001; Model 3 R^2 = .027; Model 4 R^2 = .002; Model 5 R^2 = .202; Model 6 R^2 = .008; Model 7 R^2 = .101; Model 8 R^2 = .044; Model 9 R^2 = .001. In models 2, 3, and 4, 1963 participants were used in statistical analyses because 6 participants did not select a behaviour on which they wanted to focus regarding compliance. In Model 1, 1779 participants were used because 6 participants did not select a focus behaviour, and the remaining 184 participants selected the option "Does not apply to me" in relation to the DV. In all other models, all 1969 participants were used. Symbol † indicates results that stopped being significant after the FDR correction was applied. In all models, the commanding condition is the reference category. f^2 refers to Cohen's f^2 effect size (Cohen, 1988): effects ≤0.02 are considered small.

Table 4

Mean (M) and 95% Confidence Intervals (CI) for the Reactance Dependent Variables Used in Study 2: Intentions to Comply with Self-selected Recommended Behaviour (DV1), Autonomy Threat (DV2), and General Anger (DV3)

	DV1 (0-10)		**DV2 (1-7)**		**DV3 (0-10)**	
Condition	***M***	**95% CI**	***M***	**95% CI**	***M***	**95% CI**
Control Health	4.876	4.606 – 5.146	2.198	2.088 – 2.309	1.780	1.563 – 1.997
Control COVID	5.273	4.961 – 5.586	2.564	2.436 – 2.692	1.975	1.757 – 2.192
Command. Health	5.390	5.127 – 5.654	4.919	4.774 – 5.065	2.224	1.976 – 2.472

Command. COVID	6.134	5.855 – 6.413	4.710	4.564 – 4.857	2.272	2.043 – 2.502

Note. Numbers in parentheses next to DVs indicate the possible range of values for each DV. Command. = Commanding Condition.

Table 5

Mean (M) and 95% Confidence Intervals (CI) for the Reactance Dependent Variables Used in Study 3

	Control Condition		**Commanding Language**		**Non-commanding Language**	
Variable	***M***	**95% CI**	***M***	**95% CI**	***M***	**95% CI**
DV1 (0-4)	1.867	1.753 – 1.980	1.830	1.719 – 1.941	2.036	1.925 – 2.146
DV2 (0-4)	3.012	2.967 – 3.058	3.017	2.969 – 3.065	3.024	2.977 – 3.072
DV3 (0-10)	5.162	4.922 – 5.401	5.737	5.519 – 5.956	6.377	6.145 – 6.609
DV4 (0-10)	7.679	7.519 – 7.839	7.768	7.610 – 7.926	7.901	7.743 – 8.060
DV5 (1-7)	2.852	2.739 – 2.966	4.506	4.383 – 4.628	2.913	2.799 – 3.028
DV6 (0-10)	2.734	2.533 – 2.935	2.742	2.531 – 2.952	2.237	2.044 – 2.431
DV7 (1-7)	2.445	2.332 – 2.558	3.514	3.375 – 3.654	2.339	2.230 – 2.449
DV8 (1-7)	2.881	2.755 – 3.006	3.488	3.351 – 3.624	2.635	2.512 – 2.758
DV9 (0-10)	2.320	2.133 – 2.508	2.498	2.300 – 2.697	2.419	2.219 – 2.620

Note. DV1 = Compliance with Self-selected Recommended Behaviour, DV2 = Compliance with Other Recommended Behaviours; DV3 = Intentions to Comply with Self-selected Recommended Behaviour; DV4 = Intentions to Comply with Other Recommended Behaviours; DV5 = Autonomy Threat; DV6 = General Anger; DV7 = Message Anger; DV8 = Message Negative Thoughts; DV9 = Hostility Toward the Present Study. Numbers in parentheses next to DVs indicate the possible range of values for each DV.

In addition, we probed whether the effects for the health messages in Study 2 would be different than for the COVID-19 messages. As shown in Table 2, the findings for general health were comparable. Participants experienced higher autonomy threat in the commanding (vs. control) condition (Table 2: Model 4) but had higher intentions to comply with the self-selected recommended behaviour (Table 2: Model 2). Although the effect on general anger was significant, it was in the same direction as for the COVID-19 messages (Table 2: Models 5 & 6). The significant effects were robust to covariates (SM, pp.201-202). To more precisely investigate whether the effects differed between the COVID-19 versus general health domains, we conducted moderation analyses where message (commanding vs. control) was used as the independent variable, and message domain (COVID-19 vs. health) as the moderator (Table 6). The effects regarding anger and intentions did not differ, whereas the effects regarding autonomy threat were different between the two domains, given that the interaction was significant (Table 6: Model 2). Nevertheless, because the influence of the commanding (vs. control) messages on autonomy threat was highly significant and in the same direction in both domains (Table 2: Models 3-4), the main conclusion from the analyses is that it is unlikely that commanding messages impact reactance-related variables only for general health but not for COVID-19.

Table 6

The Effects of Message (Commanding vs. Control) × Message Domain (COVID-19 vs. General Health) Interaction on Reactance Variables in Study 2

Model 1: DV = Intentions to Comply with Self-selected Recommended Behaviour						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	6.134	0.144	5.851 – 6.416	42.607	<.001	1.059
Message	-0.861	0.203	-1.259 – -0.463	-4.242	<.001	0.010
Message Domain	-0.744	0.203	-1.141 – -0.346	-3.667	<.001	0.008
Message × Message Domain	0.346	0.287	-0.216 – 0.909	1.207	.227	0.001
Model 2: DV = Autonomy Threat						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	4.710	0.068	4.576 – 4.844	69.144	<.001	2.788
Message	-2.146	0.096	-2.334 – -1.958	-22.367	<.001	0.292
Message Domain	0.209	0.096	0.021 – 0.397	2.179	.029	0.003
Message × Message Domain	-0.575	0.136	-0.841 – -0.309	-4.237	<.001	0.010
Model 3: DV = General Anger						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	***f*²**
(Constant)	2.272	0.117	2.043 – 2.501	19.467	<.001	0.221
Message	-0.298	0.164	-0.620 – 0.025	-1.811	.070	0.002
Message Domain	-0.048	0.164	-0.371 – 0.274	-0.294	.769	<0.001
Message × Message Domain	-0.146	0.232	-0.602 – 0.309	-0.630	.529	<0.001

Note. Model 1 R^2 = .023; Model 2 R^2 = .432; Model 3 R^2 = .007. For Message, commanding message is the reference category, and for Message Domain, COVID-19 is the reference category. Key interaction terms probing whether the impact of commanding vs. control messages on dependent variables differed between COVID-19 vs. general health are highlighted in grey. f^2 refers to Cohen's f^2 effect size (Cohen, 1988): effects ≤0.02 are considered small.

Cognitive-Affective Indicators of Reactance as Mediators of Effects on Intentions

In this section, we examine whether the cognitive-affective indicators of reactance from Studies 2 and 3 (Table 1) mediated the three significant effects of COVID-19 messages on intentions reported in the previous section—the effects of commanding (vs. control) conditions in Studies 2 and 3, and the effect of commanding (vs. non-commanding) condition in Study 3. We did not probe mediated effects for the non-significant effects on intentions and behaviour to be consistent with Hypothesis 2, which implied using mediation analyses to understand the mechanism behind significant effects of COVID-19 commands on compliance. Parallel mediation analyses (i.e., with all potential mediators included in the analyses together), percentile-bootstrapped with 20,000 samples, were conducted using the Process package (Model 4; Hayes, 2018). To determine significance, 99% CIs were used to minimise chances of Type I Error, given that each mediation analysis included several regression models, as presented in Table 7 (for a full analyses output, see SM, pp.207-218).

We first discuss the findings regarding the mediation for commanding versus non-commanding condition in Study 3. The analyses showed that both autonomy threat (a_1b_1=0.492, 99% CI=[0.218, 0.784]) and message anger (a_2b_2=0.412, 99% CI=[0.164, 0.678]) contributed to explaining lower behavioural intentions in the former condition, given that participants exposed to commands (vs. control) had higher autonomy threat and message anger (Table 7: Models 4 & 6), and that the two mediators negatively predicted the intentions (Table 7: Model 9). The results remained significant despite covariates (SM, pp.216-218). Overall, this finding is consistent with Hypothesis 2, given that one of the anger components we measured contributed to explaining reactance effects, but it also provides additional insights given that another cognitive-affective indicator of reactance—autonomy threat—was established as an important mediator.

Parallel mediation analyses computed to examine the mechanism behind higher behavioural intentions in the commanding versus control condition (Studies 2 and 3) produced a more complex picture, given that "inconsistent mediation" was obtained (MacKinnon, Fairchild, & Fritz, 2007, p. 602). Indeed, although mediated effects were significant for autonomy threat (Study 2: a_3b_3=0.852, 99% CI=[0.544, 1.196]; Study 3: a_4b_4=0.511, 99% CI=[0.222, 0.810]) and message anger (Study 3: a_5b_5=0.375, 99% CI=[0.146, 0.626]), these effects were in the opposite direction to the main effect and indicated that the commanding (vs. control) condition indirectly lowered behavioural intentions. This is because the commanding condition increased autonomy threat and message anger (Table 7: models 2, 4, 6), and these variables negatively predicted the compliance intentions (Table 7: model 3 & 9). The results remained significant despite covariates (SM, pp.208-210). This finding suggests that commanding language, compared to control, evokes message anger and autonomy-threat that undermine intentions, consistent with Hypothesis 2 and the obtained mediated effect of the commanding (vs. non-commanding) conditions on intentions. Because the commanding language condition, however, contained explicit instructions prompting participants to change their behaviour, whereas the control condition did not, it is plausible that these instructions overcame the negative reactance effect. The same conclusion applies to the impact of commanding (vs. control) general health messages on the behavioural intentions (SM, pp.210-213).

Table 7

Linear Regression Models for Parallel Mediation Analyses in Studies 2 and 3

Linear Regression Models for Parallel Mediation Analysis in Study 2						
Model 1: Impact of Commanding (baseline) vs. Control Condition on General Anger						
Variable	***b***	***SE b***	**99% CI**	***t***	***p***	***f^2***

(Constant)	2.272	0.117	1.971 – 2.573	19.466	<.001	0.221
Control COVID-19	-0.293	0.165	-0.717 – 0.131	-1.782	.075	0.002
Control Health	-0.492	0.165	-0.918 – -0.067	-2.985	.003	0.005
Commanding Health	-0.048	0.164	-0.472 – 0.376	-0.294	.769	<0.001

Model 2: Impact of Commanding (baseline) vs. Control Condition on Autonomy Threat

Variable	*b*	*SE b*	99% CI	*t*	*p*	f^2
(Constant)	4.710	0.068	4.534 – 4.886	69.131	<.001	2.788
Control COVID-19	-2.144	0.096	-2.392 – -1.897	-22.330	<.001	0.291
Control Health	-2.512	0.096	-2.760 – 2.263	-26.082	<.001	0.397
Commanding Health	0.209	0.096	-0.038 – 0.457	2.179	.029	0.003

Model 3: Commanding (baseline) vs. Control Condition and the Two Mediators (Anger and Autonomy Threat) as Predictors of the Intentions to Comply with Self-selected Recommended Behaviour

Variable	*b*	*SE b*	99% CI	*t*	*p*	f^2
(Constant)	7.977	0.276	7.267 – 8.687	28.954	<.001	0.490
Control COVID-19	-1.709	0.228	-2.296 – -1.122	-7.506	<.001	0.033
Control Health	-2.250	0.237	-2.862 – -1.637	-9.478	<.001	0.052
Commanding Health	-0.660	0.200	-1.175 - -0.145	-3.306	.001	0.006
General Anger	0.012	0.030	-0.066 – 0.091	0.400	.689	<0.001
Autonomy Threat	-0.397	0.052	-0.532 – -0.263	-7.618	<.001	0.034

Linear Regression Models for Parallel Mediation Analysis in Study 3

Model 4: Impact of Commanding (baseline) vs. Non-commanding and Control Conditions on Autonomy Threat

Variable	*b*	*SE b*	99% CI	*t*	*p*	f^2
(Constant)	4.521	0.059	4.368 – 4.674	76.140	<.001	2.958
Non-commanding	-1.604	0.084	-1.821 – -1.387	-19.044	<.001	0.185
Control	-1.667	0.084	-1.883 – -1.451	-19.901	<.001	0.202

Model 5: Impact of Commanding (baseline) vs. Non-commanding and Control Conditions on General Anger

Variable	*b*	*SE b*	99% CI	*t*	*p*	f^2
(Constant)	2.748	0.103	2.483 – 3.013	26.706	<.001	0.364
Non-commanding	-0.507	0.146	-0.883 – -0.131	-3.473	.001	0.006
Control	-0.010	0.145	-0.384 – 0.365	-0.068	.946	<0.001

Model 6: Impact of Commanding (baseline) vs. Non-commanding and Control Conditions on Message Anger

Variable	*b*	*SE b*	99% CI	*t*	*p*	f^2
(Constant)	3.526	0.062	3.366 – 3.685	56.944	<.001	1.654
Non-commanding	-1.185	0.088	-1.412 – -0.959	-13.493	<.001	0.093
Control	-1.080	0.087	-1.306 – -0.855	-12.367	<.001	0.078

Model 7: Impact of Commanding (baseline) vs. Non-commanding and Control Conditions on Message Negative Thoughts

Variable	*b*	*SE b*	99% CI	*t*	*p*	f^2
(Constant)	3.495	0.065	3.326 – 3.663	53.367	<.001	1.453
Non-commanding	-0.856	0.093	-1.096 – -0.617	-9.218	<.001	0.043

Control	-0.611	0.092	-0.849 – -0.373	-6.614	<.001	0.022

Model 8: Impact of Commanding (baseline) vs. Non-commanding and Control Conditions on Hostility Toward the Present Study

Variable	*b*	*SE b*	99% CI	*t*	*p*	f^2
(Constant)	2.495	0.100	2.237 – 2.752	25.012	<.001	0.319
Non-commanding	-0.071	0.141	-0.436 – 0.294	-0.503	.615	<0.001
Control	-0.177	0.141	-0.540 – 0.186	-1.257	.209	0.001

Model 9: Commanding (baseline) vs. Non-commanding and Control Conditions and the Five Mediators as Predictors of the Intentions to Comply with Self-selected Recommended Behaviour

Variable	*b*	*SE b*	99% CI	*t*	*p*	f^2
(Constant)	8.491	0.226	7.909 – 9.074	37.560	<.001	0.722
Non-commanding	-0.276	0.172	-0.719 – 0.167	-1.604	.109	0.001
Control	-1.497	0.174	-1.946 – -1.049	-8.610	<.001	0.038
Autonomy Threat	-0.307	0.062	-0.466 – -0.148	-4.975	<.001	0.013
General Anger	0.054	0.029	-0.020 – 0.128	1.894	.058	0.002
Message Anger	-0.347	0.076	-0.544 – -0.151	-4.567	<.001	0.011
Message Negative Thoughts	-0.041	0.059	-0.193 – 0.111	-0.692	.489	<0.001
Hostility	-0.060	0.025	-0.126 – 0.006	-2.351	.019	0.003

Note. Model 1 R^2 = .007; Model 2 R^2 = .432; Model 3 R^2 = .056; Model 4 R^2 = .205; Model 5 R^2 = .008; Model 6 R^2 = .103; Model 7 R^2 = .044; Model 8 R^2 = .001; Model 9 R^2 = .130. In parallel mediation analysis for Study 2 (Models 1-3), 1718 participants were used because 1 participant did not select a behaviour on which they wanted to focus regarding compliance. In parallel mediation analysis for Study 3 (Models 4-9), 1963 participants were used because 6 participants did not select a behaviour on which they wanted to focus regarding compliance. In all models, the commanding condition regarding COVID-19 is the reference category. Given that Study 2 (Models 1-3) had 4 conditions, each regression model contains 3 dummy variables. However, the focus of the mediation analysis is on the COVID-19 conditions, and the health conditions are not considered. Overall, the key pathways that yielded significant mediated effects are highlighted in grey. f^2 refers to Cohen's f^2 effect size (Cohen, 1988): effects ≤0.02 are considered small.

Moderation Analyses

To examine whether the commanding (vs. control or non-commanding) COVID-19 conditions interacted with any of the moderators (Table 1) in influencing reactance variables, we first computed the interaction effects using linear regressions and then examined the patterns of significant interactions using the Johnson-Neyman technique (Hayes, 2018; Esarey & Sumner, 2018; Johnson & Fay, 1950). The interaction effects were deemed significant only if they passed the FDR (Benjamini & Hochberg, 1995) correction (SM, pp.142-146). Twenty-one initially significant interactions emerged (two in Study 2 and 19 in Study 3). Nineteen of them, however (all in Study 3), did not pass the FDR correction and are therefore reported in SM (pp.157-200).

The two moderation analyses that remained significant despite FDR and covariates (SM, pp.147-156) are reported in Table 8, and the interaction patterns are further presented in Figure 1. For both interactions, the moderator in question was societal consequences, and the interaction patterns indicated that the differences between the commanding versus control conditions regarding compliance intentions and autonomy threat were becoming smaller as the moderator scores increased (Figure 1). These patterns are broadly consistent with reactance theory, according to which people should feel it is more justified for someone to restrict their behaviour when the negative consequences of this behaviour for society could potentially be severe, in which case the type of language used to communicate behavioural restrictions (e.g., commanding or non-commanding) should therefore be less relevant (Rosenberg & Siegel, 2018). Despite the broadly consistent interaction patterns, however, as aforementioned the direction of influence of the commanding (vs. control) condition on the compliance intentions was inconsistent with reactance theory, given that commands would be expected to decrease compliance intentions.

Table 8

Influence of Interaction between Commanding versus Control COVID-19 Conditions and Societal Consequences (SC) on Intentions to Comply with Self-selected Recommended Behaviour (Model 1) and Autonomy Threat (Model 2) in Study 2

Model 1: DV = Intentions to Comply with Self-selected Recommended Behaviour						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	f^2
(Constant)	4.346	0.415	3.532 – 5.161	10.466	<.001	0.064
Control COVID-19	-2.415	0.556	-3.505 – -1.325	-4.345	<.001	0.011
Control Health	-1.077	0.522	-2.100 – -0.053	-2.063	.039	0.002
Commanding Health	-0.477	0.537	-1.529 – 0.576	-0.888	.375	<0.001
SC	0.255	0.056	0.145 – 0.364	4.562	<.001	0.012
Control COVID-19 * SC	0.246	0.076	0.097 – 0.394	3.240	.001	0.006
Control Health * SC	0.061	0.079	-0.094 – 0.216	0.771	.441	<0.001
Commanding Health * SC	0.013	0.078	-0.140 – 0.167	0.170	.865	<0.001

Model 2: DV = Autonomy Threat						
Variable	***b***	***SE b***	**95% CI**	***t***	***p***	**f^2**
(Constant)	5.233	0.206	4.830 – 5.636	25.462	<.001	0.379
Control COVID-19	-2.750	0.275	-3.290 – -2.211	-10.001	<.001	0.058
Control Health	-3.234	0.258	-3.741 – -2.728	-12.523	<.001	0.092
Commanding Health	-0.242	0.266	-0.763 – 0.279	-0.912	.362	<0.001
SC	-0.074	0.028	-0.129 – -0.020	-2.696	.007	0.004
Control COVID-19 * SC	0.087	0.038	0.013 – 0.160	2.309	.021	0.003
Control Health * SC	0.114	0.039	0.037 – 0.190	2.909	.004	0.005
Commanding Health * SC	0.062	0.039	-0.014 – 0.138	1.597	.110	0.001

Note. Model 1 R^2 = .112. Model 2 R^2 = .436. In Model 1, 1718 participants were used in statistical analyses because 1 participant did not select a behaviour on which they wanted to focus regarding compliance. In Model 2, all 1719 participants were used in statistical analyses. SC = Societal Consequences. The commanding COVID-19 language condition is the reference category. Given that Study 2 had four conditions, the regression models contain dummy variables for COVID-19 and general health conditions. However, the interactions with general health conditions are not of interest in the present research, and the key analyses testing the interaction terms between the commanding versus control COVID-19 condition and societal consequences are highlighted in grey. f^2 refers to Cohen's f^2 effect size (Cohen, 1988): effects ≤0.02 are considered small.

Meta-Analysis

Random-effects meta-analysis (Table 9) examining the impact of commanding (vs. other) conditions on reactance variables probed in more than one study (including Study 1) was tested using "esci" (Cumming & Calin-Jageman, 2016). As indicated in Table 9, autonomy threat and intentions to comply with self-selected recommended behaviour were generally higher in the commanding (vs. control) condition, whereas other variables yielded no significant differences.

Table 9

Random-effects Meta-Analysis Probing the Impact of Commanding (Vs. Other) Conditions on Reactance Variables Tested in More Than One Study

	Commanding vs. Control			**Commanding vs. Non-commanding**		
Variable	**M_{diff}**	**95% CI**	***p***	**M_{diff}**	**95% CI**	***p***
DV1 (0-4)	-0.039	-0.198 – 0.119	.626	0.022	-0.344 – 0.387	.907
DV2 (0-4)	-0.014	-0.053 – 0.025	.481	0.013	-0.027 – 0.053	.525
DV3 (0-10)	-0.686	-0.960 – -0.413	<.001	-	-	-
DV4 (0-10)	-0.055	-0.292 – 0.182	.649	-0.218	-0.785 – 0.348	.450
DV5 (1-7)	-1.897	-2.380 – -1.415	<.001	-	-	-

Note. DV1 = Compliance with Self-selected Recommended Behaviour, DV2 = Compliance with Other Recommended Behaviours; DV3 = Intentions to Comply with Self-selected Recommended Behaviour; DV4 = General Anger; DV5 = Autonomy Threat. M_{diff} = Mean Difference. For "Commanding vs. Control", M_{diff} refers to the difference in means regarding control minus commanding condition. For "Commanding vs. Non-commanding", M_{diff} refers to the difference in means regarding non-commanding minus commanding condition. Numbers in parentheses next to DVs indicate the possible range of values for each DV.

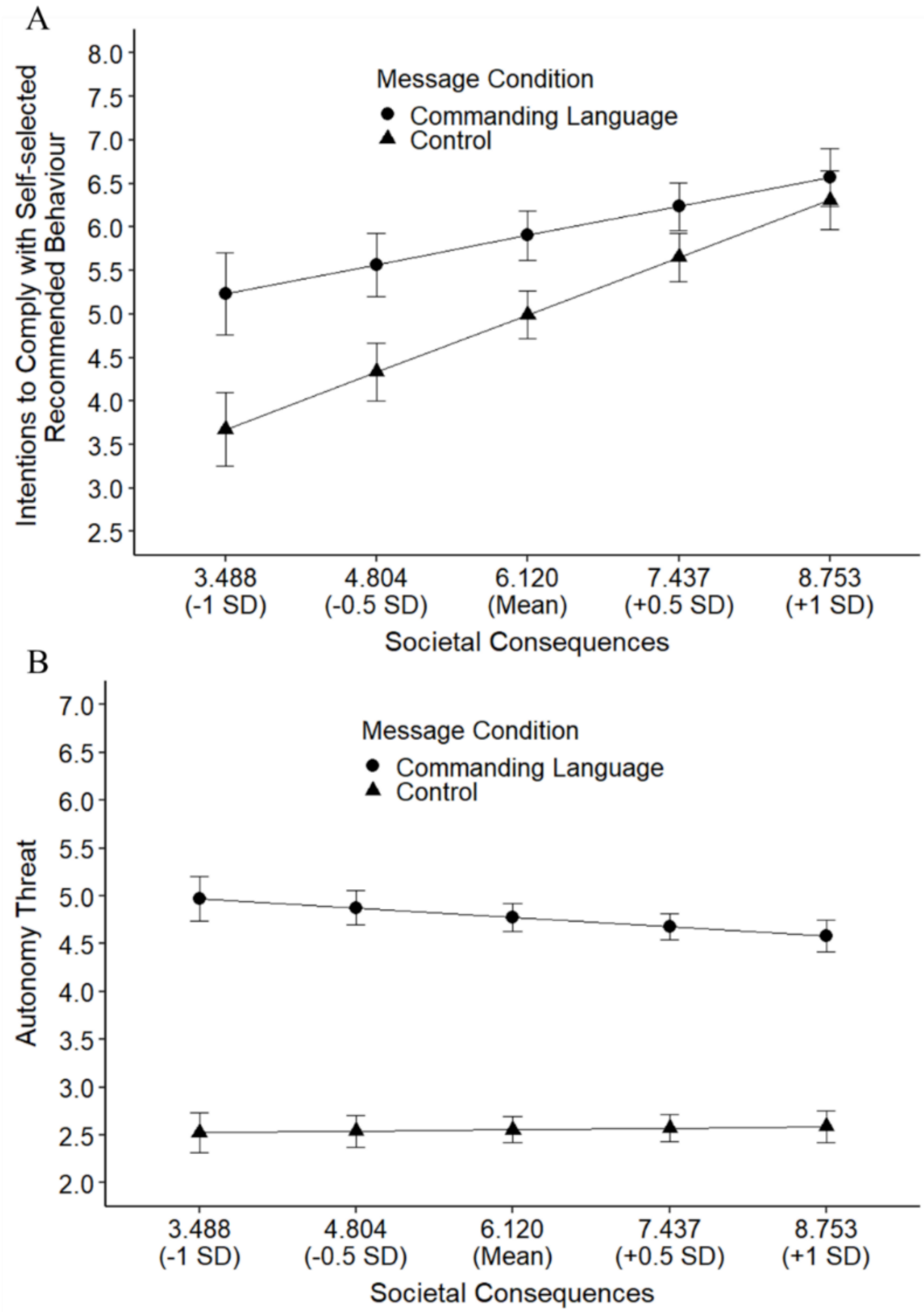

Figure 1. The influence of commanding versus control COVID-19 condition on intentions to comply with self-selected recommended behaviour (Panel A) and autonomy threat (Panel B) at different levels of societal consequences (Study 2). Moderator levels in the figures were selected arbitrarily for effective visualization; detailed output of the Johnson-Neyman analyses depicting the interaction patterns is available in Supplementary Materials (pp.147-156). Error bars correspond to the 95% CIs.

General Discussion

The present research investigated psychological reactance toward commanding messages regarding COVID-19. Because our studies constitute arguably the most comprehensive examination of reactance theory concerning message language to date, here we discuss the findings in relation to the theory. We showed that commanding condition (vs. control or non-commanding) influenced compliance intentions and several cognitive-affective indicators of reactance. In this regard, there are two main insights that go beyond previous research.

First, a cognitive-affective measure may be more likely to capture reactance if it is phrased in relation to the messages rather than generally. Indeed, whereas we detected robust reactance effects for measures phrased concerning the messages (message anger, autonomy threat, and message negative thoughts), this was not the case for general anger not directed specifically at the messages. On a conceptual level, these findings indicate that reactance-related cognitive and affective states are experienced specifically in relation to the messages rather than as general states. Whereas previous studies to our knowledge did not address this subtle distinction, it may have important implications for how reactance influences decision making. For example, we know that emotions (e.g., anger) induced in one context can influence people's decisions in other contexts (Andrade & Ariely, 2009). In that regard, if commanding (vs. other) messages evoke general emotions, it would be plausible that they may impact decisions on topics not targeted by the messages. If, however, these emotions are message specific, then it is plausible that they may shape only decisions that have direct relevance to the messages, but not other decisions. We encourage researchers to attempt to test this premise more directly in future research.

The second main insight of the present research is that, whereas commanding messages decreased intentions to comply with self-selected recommended behaviour versus non-commanding messages, they increased the intentions compared to control, which would not be expected based on reactance theory. Previous research on reactance, however, generally compared commanding and non-commanding messages but failed to probe a control condition where no behavioural instructions were given. The present research therefore indicates that, even if people may feel threatened in response to the type of commanding messages regarding COVID-19 we used in the present research, they may be more likely to intend to comply with the recommended behaviours than if given no behavioural prompts.

Concerning the influence of messages on actual behaviour, which has not been previously tested in the context of reactance evoked via commanding language (Rosenberg & Siegel, 2018), we did not find evidence that commanding versus other conditions would impact COVID-19 compliance, either in individual studies or after meta-analysing the behavioural effects tested in more than one study. One of the main conclusions of the present research is therefore that, even if commanding messages influence intentions and cognitive-affective variables that have implications for behaviour, they may not be sufficiently strong to convincingly change behaviour that people undertake over several days after receiving the messages. This finding is in line with previous research on intention-behaviour gap, especially given that intentions are less likely to spawn behaviours that require self-control, such as COVID-19 compliance (Sheeran & Webb, 2016; Wallace, Paulson, Lord, & Bond Jr, 2005).

In relation to the psychological mechanisms we examined, the present research showed that the negative influence of commanding (vs. non-commanding) messages on compliance intentions is explained by autonomy threat and message anger. This is aligned with reactance theory, even if the theorizing more comprehensively focused on anger as the core mechanism (Rosenberg & Siegel, 2018). Moreover, although we observed that commands (vs. control) had a negative indirect effect on compliance intentions via autonomy threat and message anger, their actual effect on the intentions was positive. The most plausible explanation is therefore that the commanding (vs. control) condition did activate reactance regarding compliance intentions, but the explicit prompts to change the behaviour that were given only in this condition, but not in control, overcame the negative reactance effect. Finally, concerning moderation analyses, out of all potential moderators of the influence of commanding (vs. other) messages we tested, only two significant interactions involving societal consequences were robust. This moderator also produced the largest number of significant interactions if other initially significant interactions that did not pass the FDR correction are considered (SM, pp.157-200). Whereas this suggests that societal consequences may be the main moderator of messages on reactance, our research generally indicates that further theoretical and empirical work needs to be done to uncover the most important moderators, given that we failed to detect consistent moderation effects.

Limitations

One of the main limitations of this research concerns ecological validity (Coolican, 2009). The messages we tested were not officially published by the government, and it is possible that people did not react to them as they would to official governmental communication. Most previous studies investigating reactance regarding commanding messages were, however, conducted in ecologically non-valid settings (Rosenberg & Siegel, 2018); this has not been an obstacle to detecting reactance. It is thus unlikely that the absence of evidence of behavioural effects in our research can be attributed to ecological validity. Another limitation is that, despite the large sample sizes, we did not recruit participants representative of the UK population. For example, it is possible that the participants we tested differed from the general population on personality traits such as conscientiousness and agreeableness that shape compliance with COVID-19 recommendations (e.g., Clark, Davila, Regis, & Kraus, 2020), and that their responses to our messages may have therefore been different to some degree. It is thus not given the present findings would generalize across the population. Nevertheless, it is important to point out that online participants tend to be reasonably representative of the general population in terms of psychological characteristics (e.g., McCredie & Morey, 2019; Mullinix, Leeper, Druckman, & Freese, 2015; Redmiles, Kross, & Mazurek, 2019), thus suggesting that generalizability may not be a major limitation of the present research.

Conclusion

Overall, although people experienced more anger and negative thoughts toward commanding (vs. control or non-commanding) messages and found them threatening to their autonomy, there was no convincing evidence that these messages would hinder COVID-19 compliance behaviours. In fact, commands increased the intentions to comply compared to control. When communicating COVID-19 policies to the public, policy makers may therefore be better off using either commanding or non-commanding language relative to no behavioural prompts to increase people’s intentions, but it will be crucial for them to provide appropriate support that could translate these intentions to behaviour.

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