



Can We Communicate Autonomy Support and a Mandate? How Motivating Messages Relate to Motivation for Staying at Home across Time during the COVID-19 Pandemic

Nicole Legate & Netta Weinstein

To cite this article: Nicole Legate & Netta Weinstein (2021): Can We Communicate Autonomy Support and a Mandate? How Motivating Messages Relate to Motivation for Staying at Home across Time during the COVID-19 Pandemic, Health Communication, DOI: [10.1080/10410236.2021.1921907](https://doi.org/10.1080/10410236.2021.1921907)

To link to this article: <https://doi.org/10.1080/10410236.2021.1921907>



Published online: 05 May 2021.



Submit your article to this journal [↗](#)



Article views: 15





View related articles [↗](#)



View Crossmark data [↗](#)



Can We Communicate Autonomy Support and a Mandate? How Motivating Messages Relate to Motivation for Staying at Home across Time during the COVID-19 Pandemic

Nicole Legate ^a and Netta Weinstein ^b

^aDepartment of Psychology, Illinois Institute of Technology; ^bSchool of Psychology and Clinical Language Sciences, University of Reading

ABSTRACT

A multi-wave study across two months tested changes in motivation for staying at home at the beginning of the COVID-19 outbreak in the UK and US in 683 living-alone older adults (mean age = 53 years), those that might experience greater psychological costs of being isolated for long periods of time. The study was focused on changes in two types of motivation: *autonomous motivation*- finding importance in the task of staying at home, and *controlled motivation*- staying at home because of felt pressure or choicelessness, as autonomous motivation predicts effective behavior change better than controlled motivation, especially long-term. Predictions grounded in self-determination theory (SDT) tested whether three motivating aspects of messages to stay at home from governmental and public health agencies, physicians, the news, and family and friends predicted changes in these motivations across time. Perceiving messages to stay at home as controlling predicted increases in controlled motivation and decreases in autonomous motivation over two months. Conversely, perceiving messages to stay at home as autonomy supportive predicted increases in autonomous motivation over two months. Results for mandated orders to stay at home were intriguing: they related to increases in both controlled *and* autonomous motivations over time. Exploratory analyses revealed that increases in autonomous motivation over time predicted actual time spent at home reported at Wave 2, whereas increases in controlled motivation did not relate. Discussion focuses on contributions to theory and public health messaging about behavioral change.

The COVID-19 pandemic poses an enormous challenge: How can we motivate citizens to drastically change their lives by staying at home for the good of their own and public health? Messages to stay at home have been widespread. Public health agencies (e.g., Anderson et al., 2020; World Health Organization, 2020), healthcare systems such as the National Health Service in the UK (Calvo et al., 2020), news outlets (Showkat & Gull, 2020), and family and friends are all potential sources of information. It is understood that curbing the spread of COVID-19 requires communicating about the need for social distancing strategies with immediacy and firmness and based on solid evidence (Lancet Respiratory Medicine, 2020; Rasmussen & Goodman, 2018).

Self-determination theory (SDT; Ryan & Deci, 2000, 2017) offers a framework to understand the impacts on motivation when making requests for behavior change. SDT distinguishes between *autonomous motivation*- self-endorsed and volitional, and *controlled motivation*- driven by internal or external pressure or coercion (Ryan & Deci, 2000). From the perspective of SDT, socialized behaviors, including those concerned with health maintenance, are often energized through controlled motivation that predominantly represents influence by others. For example, in the case of preventing virus transmission, one might self-isolate only if it is required, or because of fear of shaming glances when failing to do so. As individuals gain a richer understanding of *why* they should behave, they internalize (i.e., take in or embrace) the value of doing so and

a perception it is personally important (for example, to protect their own or public health). Extensive research shows that autonomous or internalized motivation predicts effective behavioral change in the short and long term (e.g., Pelletier & Sharp, 2008; Silva et al., 2011; Vancampfort et al., 2016; Williams et al., 2002), whereas controlled motivation tends to undermine behavior, especially in the long-term once direct pressure has been removed (e.g., Grant et al., 2011; Koestner et al., 2008; Ryan et al., 2008).

Considering the implications for long-term behavior, it is important to understand how messages to stay at home during the COVID-19 pandemic shape these forms of motivation, as recent research finds that intermittent social distancing will likely be needed for years (Kissler et al., 2020). Requests for behavior change vary in how much they motivate people to internalize the value of behavior change (Ryan & Deci, 2017). *Autonomy-supportive* messages help bring the requested behavior in line with individuals' own values and beliefs by giving people a sense of choice over their behavior, acknowledging their perspective, and providing a rationale for change. By contrast, *controlling* messages provide external reasons for behavior by shaming, threatening, and coercing. Because they increase autonomous motivation, autonomy-supportive ways of communicating about behavior change increase desired behavior, especially in the long term (Ryan et al., 2008). On the other hand, controlling messages increase controlled motivation that results in lower behavior change, or worse, backlash

whereby people engage in the prohibited behavior even *more* (Legault et al., 2011).

Perhaps one of the more nuanced and misunderstood ideas within SDT is that autonomy support is synonymous with permissiveness and restrictions are synonymous with control (Deci & Ryan, 2012). On the face of it, some might assume that mandates, among other restrictions, would undermine autonomous, and increase controlled, motivation as restrictions quite definitionally restrict freedom. For example, the view posited by reactance theory sees restricting freedom of behavior as fundamentally threatening and liable to elicit a backlash reaction (Brehm & Brehm, 2013). However, most studies informing reactance theory have observed such backlash not by restricting the *options* for behavior, but through using controlling, pressuring language (i.e., domineering language; Quick et al., 2013) that interferes with the internalization process, such as saying “should” and “ought” (Miller et al., 2007), and “don’t you dare” (Reich & Robertson, 1979). In contrast, freedom-enhancing interventions are conceptually proximal to autonomy-supportive messages; they encourage the individual being motivated to identify with the message (Shen, 2010). Further, participants who are given a choice that is honored show similarly low reactance to those who are given no choice at all; only those who are given a choice that is then not honored exhibit more reactance behavior (Kanfer & Grimm, 1978). Such findings speak to the importance of the subjective experience of restricted freedoms (applied here, freedom may be restricted during lockdowns), and suggest that interfering with the internalization process (i.e., through a controlling message) is more important than whether or not a behavior is restricted, per se.

Therefore, it may well be that a restriction on behavior in the context of health communications is not in itself controlling. Under certain conditions – for example, during a global pandemic – restrictions may be felt to be a reasonable health response that are personally and socially advantageous. In other words, restrictions can be autonomy-supportive when they are understood to be valuable. Because few studies speak to both mandates (i.e., restrictions) and control in the context of health communication, we know little about the motivational consequences of imposing rules or restrictions. However, a growing literature within the parenting domain demonstrates that, unlike when they impose control, authority figures can set limits and restrictions in a way that promotes autonomy and healthy behavioral outcomes. This is evidenced in research on behaviors that are inherently problematic, namely lying and stealing (Vansteenkiste et al., 2014), cyberbullying (Legate et al., 2019), and affiliation with deviant peers (Soenens et al., 2009).

Current study

The current study analyzed two waves of a longitudinal study across two early months of the COVID-19 pandemic to test how aspects of motivating messages to staying at home shape motivations over that time period. Though there is some evidence that controlling messages undermine autonomous motivation, and that autonomy-supportive messages can reduce controlled motivation (e.g., Pelletier & Sharp, 2008), the links

are weaker than when the motivational type directly follows from the environmental influence (e.g., autonomy support to autonomous motivation; Vansteenkiste & Ryan, 2013). This may be because autonomous and controlled motivation can co-exist such that, for example, individuals continue to report being motivated by social pressure even as they recognize the importance of an activity. We therefore tested the following pre-registered predictions <https://osf.io/9g5t2/> grounded in SDT:

1a. Perceiving messages about staying at home from different sources (governmental and public health agencies, physicians, family and friends, and the news) as autonomy-supportive would relate to increases in autonomous motivation for staying at home.

1b. Perceiving messages about staying at home as autonomy-supportive would either not relate to or predict decreases in controlled motivation.

2a. Perceiving messages about staying at home as controlling would relate to increased controlled motivation.

2b. Perceiving messages about staying at home as controlling would either not relate or predict decreases in autonomous motivation.

3. While we had less evidence to guide expectations of how mandating staying at home would impact motivation, we expected a mandate would not harm (would not relate or relate to more) autonomous motivation across time.

Method

Waves of this study were collected and analyzed as part of a separate project focused on initial preference and motivation for solitude predicting ill-being over the course of the COVID-19 pandemic (Weinstein & Nguyen, 2020). The first wave was completed in mid-March 2020 at the beginning of the COVID-19 outbreak in the UK and US, and the final wave of data collection happened in mid-May 2020 (herein referred to as Waves 1 and 2, respectively). We recruited adults living alone and older adults who pay a higher price, in terms of their solitude, when they stay home for extended periods (e.g., Brooke & Jackson, 2020). Wave 2 included measures designed specifically for this project; both waves are described below.

Participants and procedure

Recruiting strategy

Participants ages 35 years or older and living alone in the UK or US were recruited via Prolific.co. Wave 1 data captured the sample at the start of nationwide messages for self-isolation (set by the U.K. government two days later, and the US. days after that). We recruited 823 people to achieve power (95%, alpha level .05) to detect $f^2 = .016$ for models in (Weinstein & Nguyen, 2020); we were content with $n = 400$ matched across waves; resulting in 95% power to detect $f^2 = .033$. We tested for inattention with two items “Choose ‘somewhat agree’” and “Choose ‘very true’”, and participants ($n = 750$) who passed the study’s attention check were invited to take part in further data collections. An additional data collection point (Wave 2) took place two months later, and inattention was used as an exclusion criterion at this wave as well.

Participants

A total of 683 participants (ages 32–87 years; $M = 53.3$ years, $SD = 12.03$) were matched across both waves. Four participants reported an age below our recruitment selection criterion of being 35+ years of age and we kept them in the dataset. The sample was 380 (55.6%) women, 299 (43.8%) men, and 2 (0.3%) reported another gender. They were split between residing in the US (43.5%) and the UK (56.2%), with 2 unknown (0.3%). The largest group, 260 (38.1%) reported full-time work; 87 (12.7%) part-time; 105 (15.4%) were self-employed, and 151 (22.1%) were retired (11.5% reported another type of employment). Ethical approval for this study was attained by University Ethics Committee (PSYCH-2020-03-11T23_41_08).

Measures

Measures (along with the dataset) can be found on the study page: <https://osf.io/wpcm3/>.

Motivation (Wave 1 and Wave 2)

Autonomous and controlled motivations for staying at home were measured with a scale adapted from Nguyen et al. (2018). Five items that assessed autonomous motivation (specifically, the identified form of autonomous motivation that concerns finding value and importance in the activity; Ryan & Deci, 2017; Wave 1: $\omega = .77$; Wave 2: $\omega = .90$). Five items measured controlled motivation (specifically, the external form of controlled motivation that concerns feeling external pressures); Wave 1: $\omega = .84$; Wave 2: $\omega = .84$. Items were paired with a scale from 1 (*this does not apply to me at all*) to 7 (*this applies to me very much*). These items at Wave 2 had two modifications: 1. Modifying the stem to staying at home in the past week, as opposed to self-isolation in two future weeks, and 2. Changing an item for greater context specificity (from: “I really value having time by myself”; to: “I really value the benefit to society”).

Source of messages to stay home (Waves 1 and 2)

For descriptive purposes, participants were asked about the sources of recommendations to stay at home. The item at Wave 2 was: “Over the past 2 months, were you specifically following ____ recommendations to stay home as much as possible during the COVID-19 outbreak” with multiple-selection options: Public health agency (e.g., W.H.O.), Personal doctor/physician, family members and friends, and news outlets. Wave 1 referred to the messages they received the previous week. See percentages of different message sources in Waves 1 and 2 in Table 1.

Mandate (Wave 2)

Participants were asked: “Think back to those messages you received in the past 2 months to stay at home during the COVID-19 outbreak ... Messages or orders in the past 2 months to stay at home have made it mandatory”; 1(*not at all mandatory*) to 7(*entirely mandatory*).

Controlling and autonomy-supportive messages (Wave 2)

How autonomy-supportive messages were perceived to be was measured with three items adapted from the Health Care Climate Questionnaire (Williams et al., 1996), following the

Table 1. Percentages of participants indicating receiving recommendations to stay home from different sources.

	Wave 1 %	Wave 2 %
Public health or governmental agency (e.g., W.H.O., national government health agency)	29.9	92.7
Personal doctor/physician recommendation	2.6	9.4
News outlet	22.1	39.5
Request by family members and friends	9.2	23.7

Wave 1 refers to recommendations from the previous week, Wave 2 refers to recommendations over the past two months (the lag time between waves). Totals do not add up to 100% because participants could indicate multiple sources.

stem: “We want to know your impression of these recommendations you have received in the past 2 months about staying at home during the COVID-19 outbreak. I feel these messages . . . ” Autonomy-supportive items were: “provided me with some choices and options around how to make staying at home work for me”, “made an effort to acknowledge my point of view before suggesting new ways to do things”, and “gave legitimate reasons why it is important to stay at home” ($\omega = .66$). Three additional items assessing how controlling messages were perceived to be were adapted from the Perceived Parental Autonomy Support Scale (Mageau et al., 2015: “pressured me”, “emphasized harsh legal consequences of not staying at home”, and “conveyed I’d be selfish if I didn’t stay at home” ($\omega = .64$); scale ranged from 1(*strongly disagree*) to 7(*strongly agree*).

Staying at home (Wave 2)

At Wave 2, participants were asked about how much they stayed at home in response to the coronavirus outbreak with two items. The first was categorical asking, “In the past week, did you self-isolate in response to the coronavirus outbreak (COVID-19)?” with response options: *no*, *somewhat/in part*, and *yes*. If participants answered *somewhat/in part* or *yes*, they were asked: “In the past week, what percentage of your time spent at home, alone, was deliberate self-isolation (keeping away from other people and places) in response to the coronavirus outbreak (COVID-19)?” This latter item was used in analyses, and we assigned those who indicated *no* on the categorical screener question 0% on this item.

Covariates (Wave 1)

The covariates of gender, age, and health were measured at Wave 1. The measure of health was a single item asking “All in all, how would you describe your state of health these days? Would you say it is . . .”, with primary options: (1) *Very poor*; (2) *Poor*; (3) *Fair*; (4) *Good*; (5) *Very good* (World Value Survey; <http://www.worldvaluessurvey.org/wvs.jsp>). Age and health were selected as covariates because older adults and those with preexisting health problems face greater risks of contracting severe manifestations of COVID-19 (Mayo Clinic Staff, 2020), which may impact perceptions of messages to stay at home as well as motivation to do so. We also included gender since prior research indicates it influences perceptions of autonomy support and control (Vallerand et al., 1997; Vansteenkiste et al., 2009).

Results

Preliminary analyses

Correlations are presented in Table 2. A repeated-measures ANOVA showed that both autonomous and controlled motivations to stay at home increased over two months (autonomous: $F(1, 655) = 118.74, p < .001, \eta^2 = .15$; controlled: $F(1, 655) = 36.57, p < .001, \eta^2 = .05$).

We also observed more autonomous motivation as compared to controlled motivation to stay at home at both waves: paired samples t -tests at Wave 1 ($t(758) = 29.8, p < .001$, Cohen's $d = 1.08$) and Wave 2 ($t(662) = 27.2, p < .001$, $d = 1.06$). Similarly, people perceived messages about staying at home to be more autonomy-supportive than controlling, $t(662) = 10.7, p < .001, d = .41$.

Confirmatory analyses

Analytic approach

To test pre-registered Hypotheses 1–3, we conducted linear regression analyses regressing difference scores of Wave 1 motivation subtracted from Wave 2 motivation (where higher scores indicate increases over time) based on recommendations for a two-time point longitudinal analysis where groups are not randomized or equivalent. In this case difference scores minimize the likelihood of Type-1 errors (Castro-Schilo & Grimm, 2018), and provide more readily interpretable coefficients. Perceptions of messages as autonomy-supportive and controlling, the extent staying at home was seen as mandatory, and preregistered covariates

(gender, age, baseline health) were entered as simultaneous predictors (see Table 3).

Controlled motivation to stay at home

Accounting for covariates, perceiving messages as controlling related to increases in controlled motivation to stay at home, $B = .43$ ($SE = .05$), $p < .001, \Delta R^2 = .09$ (the unique variance accounted for by this predictor), while perceiving messages as autonomy supportive predicted decreases over time, $B = -.16$ ($SE = .06$), $p = .004, \Delta R^2 = .01$. Holding this constant, being mandated to stay at home predicted increases in controlled motivation, $B = .18$ ($SE = .05$), $p < .001, \Delta R^2 = .02$. All predictors and covariates accounted for 17% of the variance in changes in controlled motivation, $F(6, 642) = 21.35, R^2 = .17$, adjusted $R^2 = .16$.

Autonomous motivation to stay at home

Perceiving messages as autonomy-supportive related to increases, $B = .33$ ($SE = .05$), $p < .001, \Delta R^2 = .06$, and perceiving messages as controlling predicted decreases, $B = -.18$ ($SE = .05$), $p = .001, \Delta R^2 = .02$, in autonomous motivation over the two-month period. Further, mandates to stay at home related to increased autonomous motivation, $B = .21$ ($SE = .04$), $p < .001, \Delta R^2 = .04$. Predictors and covariates accounted for 15% of the variance in changes in autonomous motivation, $F(6, 642) = 19.22, R^2 = .15$, adjusted $R^2 = .14$.

Alternate model analyses

We tested a residualized change model (regressing Wave 2, controlling for Wave 1) to check robustness of findings when

Table 2. Bivariate correlations of study variables.

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Autonomous motivation W1	4.93	1.27	–									
2. Autonomous motivation W2	5.64	1.44	.24***	–								
3. Controlled motivation W1	2.93	1.52	.14***	.09*	–							
4. Controlled motivation W2	3.39	1.54	-.03	-.03	.23***	–						
5. Aut-supportive message (W2)	4.49	1.26	.17***	.50***	.08*	-.03	–					
6. Controlling message (W2)	3.68	1.40	-.07	-.17***	.10*	.56***	-.06	–				
7. Mandate (W2)	5.09	1.62	.01	.23***	.07	.37***	.15***	.33***	–			
8. % at home (W2)	63.40	39.2	.04	.32***	.05	.00	.18***	-.08*	.09*	–		
9. Gender (W1)	–	–	.12***	.16***	-.004	-.03	.09*	-.10*	-.02	.07	–	
10. Age (W1)	53.1	12.03	-.04	.11**	-.10**	-.12**	.03	-.03	.03	.13***	.18***	–
11. Health (W1)	3.81	0.94	-.02	.08*	-.08*	-.05	.06	-.04	.00	-.04	-.03	-.04

Variables are on a scale of 1–7 except for health, which ranges from 1–5 and % at home which ranges from 0–100; Gender is coded 1 = men, 2 = women; W1 indicates the variable was assessed at Wave 1, W2 indicates the variable was assessed at Wave 2; % at home is the percentage of time spent at home due to coronavirus. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3. Motivating aspects of messages to stay at home predicting motivation, difference score model.

	Autonomous motivation			Controlled motivation		
	B ($S.E.$)	95% CI	R^2	B ($S.E.$)	95% CI	R^2
Gender	-.07 (.12)	[-.32, .17]	< .01	.10 (.14)	[-.18, .38]	< .01
Age	.02** (.01)	[.01, .03]	.02	.00 (.01)	[-.01, .01]	< .01
Health	.11 (.06)	[-.02, .23]	< .01	.11 (.07)	[-.03, .25]	< .01
Autonomy supportive	.33** (.05)	[.23, .42]	.06	-.16* (.06)	[-.27, -.05]	.01
Controlling	-.18** (.05)	[-.27, -.09]	.02	.43** (.05)	[.32, .53]	.09
Mandatory	.21** (.04)	[.13, .29]	.04	.18* (.05)	[.09, .27]	.02

B s represent the unstandardized regression coefficients, $S.E.$ s are their standard errors, 95% CIs are their 95% confidence intervals, and R^2 is the proportion of unique variance explained by the predictor. Both motivation outcomes are Wave 2 scores minus Wave 1 scores; positive coefficients represent increases in motivation over two months, and negative coefficients represent decreases in motivation over two months. Perceptions of messages as autonomy supportive, controlling, and mandatory were measured at Wave 2; Gender is coded 1 = men, 2 = women.

* $p < .01$, ** $p < .001$.

holding constant individual standing on motivation at baseline (Allen, 1997). Predictors remained the same in terms of their significance and direction with one exception: perceiving messages to stay at home as autonomy supportive did not predict controlled motivation at Wave 2 controlling for Wave 1, $B = -.07$ ($SE = .04$), $p = .07$ (see full results Table 4). Overall, confirmatory hypotheses were supported regardless of analytic choice, showing that perceiving autonomy-supportive and controlling messages predicted changes in their corresponding motivation, and that mandating staying at home predicted increases in both forms of motivation.

Exploratory analyses

Staying at home due to coronavirus

To explore a behavioral correlate of changes in motivation, analyses examined how changes in autonomous and controlled motivation (Wave 1 motivation subtracted from Wave 2 motivation) simultaneously predicted time spent at home at Wave 2. Over-and-above the role of covariates, increases in autonomous motivation predicted more time spent at home at Wave 2 ($B = 5.56$, $SE = .91$, $p < .001$, $\Delta R^2 = .05$), whereas increases in controlled motivation did not relate ($B = -.77$, $SE = .78$, $p = .33$). The model explained 8% of the variance in staying at home $F(5, 647) = 10.79$, $R^2 = .08$, adjusted $R^2 = .07$.

We were also interested in exploring whether motivating aspects of messages related to staying at home and tested this using the same approach used above. We found that perceiving messages as autonomy supportive related to more time spent at home, $B = 4.72$ ($SE = 1.22$), $p < .001$, $\Delta R^2 = .02$, and perceiving messages as controlling predicted spending less time at home, $B = -3.08$ ($SE = 1.15$), $p = .008$, $\Delta R^2 = .01$. A mandated message also predicted more time spent at home, $B = 2.79$ ($SE = 1.00$), $p = .005$, $\Delta R^2 = .01$. This model explained 7% of the variance in staying at home $F(6, 647) = 7.93$, $R^2 = .07$, adjusted $R^2 = .06$. In an exploratory manner we also tested an SDT behavioral change model whereby motivating aspects of messages predicted time spent at home indirectly through autonomous and controlled motivation using Process (Hayes, 2017). All three indirect paths of message aspects predicting time spent at home through autonomous motivation were significant (see Table 5), while those through controlled motivation were not.

Interactions

Additional exploratory analyses examined whether mandated messages moderated the effects of perceiving messages as autonomy-supportive and controlling on changes in motivation over time and staying at home at Wave 2. Above covariates and main effects, being mandated moderated the effect of a controlling message on autonomous motivation over time ($B = .05$, $SE = .03$, $p = .05$, $\Delta R^2 = .005$). Simple slopes showed that controlling messages predicted weaker declines in autonomous motivation over time when they were mandatory ($B = -.15$, $SE = .06$, $p = .01$) compared to when they were not mandatory ($B = -.34$, $SE = .06$, $p < .001$). There were no interaction effects for controlled motivation over time (mandate X controlling message, $B = .001$ ($SE = .03$), $p = .96$, mandate X autonomy-supportive message, $B = -.02$ ($SE = .03$), $p = .62$) or for staying at home at Wave 2 ($ps > .20$).

Discussion

Findings tracking motivation across two months suggested that motivational messages may influence motivation for a critical public health behavior: Staying at home during the COVID-19 pandemic to “flatten the curve” or slow transmission rates. These messages were received from governmental and health organizations, media, and with less frequency, family, friends, and physicians. Across two months, autonomous motivation was higher than controlled: In general, adults living alone and older adults were more motivated by the importance of staying at home in terms of their own and public health than because of felt pressure and coercion, a finding which replicates similar data collected with Belgian adults (Morbée et al., 2021). Both types of motivation increased across time as health communication and awareness of COVID-19 grew in the early months of the pandemic within the UK and US.

Our preregistered hypotheses concerned how messaging related to changes in motivation. Perceiving messages as autonomy-supportive versus controlling predicted change in motivation as we had hypothesized in three out of four cases: perceiving more controlling messages to stay at home predicted increases in controlling motivation to stay at home and decreases in autonomous motivation across two months. Further, accounting for this, perceiving more autonomy-

Table 4. Motivating aspects of messages to stay at home predicting motivation, residualized change model.

	Wave 2 Autonomous Motivation			Wave 2 Controlled Motivation		
	<i>B</i> (<i>S.E.</i>)	95% CI	<i>R</i> ²	<i>B</i> (<i>S.E.</i>)	95% CI	<i>R</i> ²
Gender	.17 (.09)	[-.02, .35]	< .01	.13 (.10)	[-.07, .32]	< .01
Age	.01** (.004)	[.01, .02]	.01	-.01* (.004)	[-.02, -.004]	.01
Health	.08 (.05)	[-.01, .18]	< .01	-.04 (.05)	[-.14, .06]	< .01
W1 autonomous motivation	.18** (.04)	[.11, .25]	.02	–	–	–
W1 controlled motivation	–	–	–	.17** (.03)	[.11, .23]	.03
Autonomy supportive	.46** (.04)	[.38, .53]	.15	-.07 (.04)	[-.15, .01]	< .01
Controlling	-.21** (.03)	[-.28, -.15]	.04	.51** (.04)	[.44, .58]	.18
Mandatory	.21** (.03)	[.15, .27]	.05	.20** (.03)	[.14, .26]	.04

W1 = Wave 1. *B*s represent the unstandardized regression coefficients, *S.E.*s are their standard errors, 95% CIs are their 95% confidence intervals, and *R*² is the proportion of unique variance explained by the predictor. Positive coefficients represent increases in motivation over two months, and negative coefficients represent decreases in motivation over two months. Perceptions of messages as autonomy supportive, controlling, and mandatory were measured at Wave 2; Gender is coded 1 = men, 2 = women.

* $p < .01$, ** $p < .001$.

Table 5. Exploratory analyses of change in motivation (autonomous and controlled) as mediators of effects of message framing (autonomy-supportive, controlling, and mandatory) on percent time self-isolating.

	Autonomy supportive		Controlling		Mandatory	
	<i>B</i> (<i>S.E.</i>)	95% CI	<i>B</i> (<i>S.E.</i>)	95% CI	<i>B</i> (<i>S.E.</i>)	95% CI
Gender	1.99 (2.99)	-3.88, 7.85	2.42 (3.01)	-3.49, 8.33	2.97 (3.00)	-2.92, 8.86
Age	0.33* (0.12)	0.82, 0.57	0.32* (-0.13)	0.07, 0.56	0.32* (0.13)	0.74, 0.57
Health	-2.50 (1.55)	-5.54, 0.54	-2.38 (1.56)	-5.44, 0.68	-2.47 (1.56)	-5.54, 0.59
Δ autonomous mot.	4.58* (0.93)	2.76, 6.39	5.28* (0.90)	3.52, 7.04	5.24* (0.91)	3.45, 7.03
Δ controlled mot.	-0.59 (0.77)	-2.11, 0.92	-0.48 (0.84)	-2.12, 1.16	-1.29 (0.80)	-2.86, 0.28
Predictor (as detailed in column headings)	3.75* (1.22)	1.35, 6.14	-1.35 (1.43)	-3.59, 0.90	1.62 (0.96)	-0.26, 3.50
Indirect effect through Δ autonomous motivation	1.74*(0.43)	0.95, 2.66	-0.65* (0.28)	-1.26, -0.12	1.07* (0.32)	0.50, 1.76
Indirect effect through Δ controlled motivation	0.86 (0.14)	-0.16, 0.39	-0.25 (0.45)	-1.16, 0.62	-0.37 (-0.25)	-0.89, 0.10

All variables predict the percent time spent self-isolating at Wave 2 (outcome variable). Rows represent main effects of predictors and mediators in each of three models (one for each predictor: autonomy supportive, controlling, and mandated messages). *B*s represent the unstandardized regression coefficients, *S.E.*s are their standard errors, 95% CIs are their 95% confidence intervals. Δ in motivation are the two mediators and represent Wave 2 scores minus Wave 1 scores; Perceptions of messages as autonomy supportive, controlling, and mandatory were measured at Wave 2; Gender is coded 1 = men, 2 = women.

* $p < .01$, ** $p < .001$.

supportive messages to stay at home predicted increases in autonomous motivation for staying at home, but did not consistently predict decreases in controlled motivation.

Exploratory analyses showed that motivation and message framing predicted participants' reports of staying at home in theoretically expected ways. Namely, perceiving messages to stay at home as both autonomy-supportive and mandated predicted actually spending more time at home, whereas perceiving those messages as controlling predicted spending less time at home. Further, these links were explained through increases in autonomous – but not controlled – motivation over the two-month period.

These findings complement work showing that autonomous, and less controlled, motivations predicts more cooperation (Vansteenkiste et al., 2014), effective and sustained behavioral change (Grant et al., 2011; Koestner et al., 2008; Ryan et al., 2008; Silva et al., 2011; Vancampfort et al., 2016; Williams et al., 2002), and well-being in those who are motivated (Deci & Ryan, 2008). Though many previous studies have linked autonomy-supportive and controlling messages to their respective motivations, relatively few examine how these messages predict changes in motivation across time (see Gunnell et al., 2014; Jõesaar et al., 2012; Julien et al., 2009 for exceptions in health-relevant contexts). Thus, we tested a critical and fundamental argument within SDT that has received little empirical attention.

Although results for perceiving messages as autonomy supportive and controlling could be readily anticipated, little is understood about mandates, which are fundamentally restrictive of freedoms but often communicate reasonable consequences of not pursuing important behaviors. This study found the extent that staying at home was seen as mandatory predicted increases in both controlled motivation, feeling more pressure, and autonomous motivation, being motivated by the importance of staying at home, across time. Despite predicting increases in both autonomous and controlled motivation over time, exploratory analyses showed that mandated messages predicted actually spending more time at home at Wave 2.

These intriguing findings point to the nuanced role that mandates play in motivating health behaviors. Arguably, mandating that people stay at home represented a threat to freedom of behavior (Brehm & Brehm, 2013). Equally likely,

receiving a mandated order to stay at home may actually convey the importance or urgency of staying at home (Lancet Respiratory Medicine, 2020), and provide people with structure and clear guidance (Matosic et al., 2016) – all ways to support autonomy when requesting people's behavior change (Ryan & Deci, 2017).

Similarly, this work implies that practitioners communicating about the importance of social distancing or wearing a mask may be most effective when using autonomy-supportive strategies such as providing a compelling rationale, or reason for behavior, recognizing the potential challenges and hardships of decisions to stay at home, and avoiding using controlling language such as “should”, or “must” (see Gillison et al., 2019 and Legate et al., 2021 for more). It is important to recognize that mandating behavior, in and of itself, is equally helpful as it is harmful, motivationally speaking: it simultaneously motivates behaviors in both adaptive and maladaptive ways. Results actually suggested a net positive function of mandates in that they predicted more time spent at home, implying that restrictions in themselves should not be avoided. However, this work also suggests that an emphasis should be placed on autonomy-supportive message framing, as it had a clear directional outcome.

A limitation of the current work concerns measurement. Specifically, we relied on global and retrospective perceptions of messages as autonomy supportive or controlling over a two-month period. This longitudinal work would be complemented by other methods including experimental manipulations presenting autonomy-supportive versus controlling messages, and experience-sampling designs tracking messages delivered to participants daily to observe incremental changes in autonomous and controlled motivation over time. A related limitation is that we are unable to examine whether different sources of recommendations for social distancing are better at motivating people than others. From these data, we are only able to infer that most individuals are following recommendations from public health agencies such as the World Health Organization, suggesting the importance of framing those messages in ways that optimize autonomous motivation. Future work examining mandates should use objective measures in cross-cultural samples, testing the effects of laws that mandate staying at home. The current results suggest there are nuances when communicating restrictions to motivate behavior change, and points to the need for

future research evaluating how mandates and message-framing affect behavior in both desirable and undesirable ways.

Funding

This research was partly funded by the European Research Council grant num. 851890 (SOAR) awarded to N. W.

ORCID

Nicole Legate  <http://orcid.org/0000-0001-8086-9643>
Netta Weinstein  <http://orcid.org/0000-0003-2200-6617>

References

- Allen, M. P. (1997). *Understanding regression analysis*. Springer. <https://doi.org/10.1007/b102242>
- Anderson, R. M., Heesterbeek, H., Klinkenberg, D., & Hollingsworth, T. D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet*, 395(10228), 931–934. [https://doi.org/10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5)
- Brehm, S. S., & Brehm, J. W. (2013). *Psychological reactance: A theory of freedom and control*. Academic Press.
- Brooke, J., & Jackson, D. (2020). Older people and COVID-19: Isolation, risk and ageism. *Journal of Clinical Nursing*, 29(13–14), 2044–2046. <https://doi.org/10.1111/jocn.15274>
- Calvo, R. A., Deterding, S., & Ryan, R. M. (2020). Health surveillance during covid-19 pandemic: How to safeguard autonomy and why it matters. *The British Medical Journal*, 369, m1373. <https://doi.org/10.1136/bmj.m1373>
- Castro-Schilo, L., & Grimm, K. J. (2018). Using residualized change versus difference scores for longitudinal research. *Journal of Social and Personal Relationships*, 35(1), 32–58. <https://doi.org/10.1177/0265407517718387>
- Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology/Psychologie Canadienne*, 49(1), 14–23. <https://doi.org/10.1037/0708-5591.49.1.14>
- Deci, E. L., & Ryan, R. M. (2012). Self-determination theory in health care and its relations to motivational interviewing: A few comments. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 24. <https://doi.org/10.1186/1479-5868-9-24>
- Gillison, F. B., Rouse, P., Standage, M., Sebire, S. J., & Ryan, R. M. (2019). A meta-analysis of techniques to promote motivation for health behaviour change from a self-determination theory perspective. *Health Psychology Review*, 13(1), 110–130. <https://doi.org/10.1080/17437199.2018.1534071>
- Grant, A. M., Nurmohamed, S., Ashford, S. J., & Dekas, K. (2011). The performance implications of ambivalent initiative: The interplay of autonomous and controlled motivations. *Organizational Behavior and Human Decision Processes*, 116(2), 241–251. <https://doi.org/10.1016/j.obhdp.2011.03.004>
- Gunnell, K. E., Crocker, P. R., Mack, D. E., Wilson, P. M., & Zumbo, B. D. (2014). Goal contents, motivation, psychological need satisfaction, well-being and physical activity: A test of self-determination theory over 6 months. *Psychology of Sport and Exercise*, 15(1), 19–29. <https://doi.org/10.1016/j.psychsport.2013.08.005>
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications.
- Jøesaar, H., Hein, V., & Hagger, M. S. (2012). Youth athletes' perception of autonomy support from the coach, peer motivational climate and intrinsic motivation in sport setting: One-year effects. *Psychology of Sport and Exercise*, 13(3), 257–262. <https://doi.org/10.1016/j.psychsport.2011.12.001>
- Julien, E., Senécal, C., & Guay, F. (2009). Longitudinal relations among perceived autonomy support from health care practitioners, motivation, coping strategies and dietary compliance in a sample of adults with type 2 diabetes. *Journal of Health Psychology*, 14(3), 457–470. <https://doi.org/10.1177/1359105309102202>
- Kanfer, F. H., & Grimm, L. G. (1978). Freedom of choice and behavioral change. *Journal of Consulting and Clinical Psychology*, 46(5), 873–878. <https://doi.org/10.1037/0022-006X.46.5.873>
- Kissler, S. M., Tedijanto, C., Goldstein, E., Grad, Y. H., & Lipsitch, M. (2020). Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. *Science*, 368(6493), 860–868. <https://doi.org/10.1126/science.abb5793>
- Koestner, R., Otis, N., Powers, T. A., Pelletier, L., & Gagnon, H. (2008). Autonomous motivation, controlled motivation, and goal progress. *Journal of Personality*, 76(5), 1201–1230. <https://doi.org/10.1111/j.1467-6494.2008.00519.x>
- Lancet Respiratory Medicine. (2020). COVID-19: Delay, mitigate, and communicate. *The Lancet Respiratory Medicine*, 8(4), 321. [https://doi.org/10.1016/S2213-2600\(20\)30128-4](https://doi.org/10.1016/S2213-2600(20)30128-4)
- Legate, N., Ngyuen, T., Moller, A., Legault, L., Maniaci, M., Weinstein, N., & Psychological Science Accelerator COVID-19 Rapid Team. (2021). *A global experiment on motivating social distancing during the COVID-19 pandemic* [Unpublished manuscript]. Department of Psychology, Illinois Institute of Technology.
- Legate, N., Weinstein, N., & Przybylski, A. K. (2019). Parenting strategies and adolescents' cyberbullying behaviors: Evidence from a preregistered study of parent-child dyads. *Journal of Youth and Adolescence*, 48(2), 399–409. <https://doi.org/10.1007/s10964-018-0962-y>
- Legault, L., Gutsell, J. N., & Inzlicht, M. (2011). Ironic effects of antiprejudice messages: How motivational interventions can reduce (but also increase) prejudice. *Psychological Science*, 22(12), 1472–1477. <https://doi.org/10.1177/0956797611427918>
- Mageau, G. A., Ranger, F., Joussemet, M., Koestner, R., Moreau, E., & Forest, J. (2015). Validation of the perceived parental autonomy support scale (P-PASS). *Canadian Journal of Behavioural Science*, 47(3), 251–262. <https://doi.org/10.1037/a0039325>
- Matosic, D., Ntoumanis, N., & Queded, E. (2016). Antecedents of need supportive and controlling interpersonal styles from a self-determination theory perspective: A review and implications for sport psychology research. In M. Raab, P. Wylleman, R. Seiler, A. M. Elbe, & A. Hatzigeorgiadis (Eds.), *New perspectives on sport and exercise psychology* (pp. 145–180). Elsevier. <https://doi.org/10.1016/B978-0-12-803634-1.00007-8>
- Mayo Clinic Staff. (2020, August 21). *COVID-19: Who's at higher risk of serious symptoms?* Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/coronavirus-who-is-at-risk/art-20483301>
- Miller, C. H., Lane, L. T., Deatrck, L. M., Young, A. M., & Potts, K. A. (2007). Psychological reactance and promotional health messages: The effects of controlling language, lexical concreteness, and the restoration of freedom. *Human Communication Research*, 33(2), 219–240. <https://doi.org/10.1111/j.1468-2958.2007.00297.x>
- Morbée, S., Vermote, B., Waterschoot, J., Dieleman, L., Soenens, B., Van den Bergh, O., Ryan, R. M., Vanhalst, J., De Muynck, G.-J., & Vansteenkiste, M. (2021). *Adherence to covid-19 measures: The critical role of voluntary motivation on a short- and long-term basis* [Submitted for publication]. Department of Developmental, Personality, and Social Psychology, Ghent University.
- Nguyen, T. V. T., Ryan, R. M., & Deci, E. L. (2018). Solitude as an approach to affective self-regulation. *Personality & Social Psychology Bulletin*, 44(1), 92–106. <https://doi.org/10.1177/0146167217733073>
- Pelletier, L. G., & Sharp, E. (2008). Persuasive communication and pro-environmental behaviours: How message tailoring and message framing can improve the integration of behaviours through self-determined motivation. *Canadian Psychology/Psychologie Canadienne*, 49(3), 210–217. <https://doi.org/10.1037/a0012755>
- Quick, B. L., Shen, L., & Dillard, J. P. (2013). Reactance theory and persuasion. In J. P. Dillard & L. Shen (Eds.), *The SAGE handbook of persuasion: Developments in theory and practice* (pp. 167–183). Sage publications.
- Rasmussen, S. A., & Goodman, R. A. (Eds.). (2018). *The CDC field epidemiology manual*. Oxford University Press.

- Reich, J. W., & Robertson, J. L. (1979). Reactance and norm appeal in anti-littering messages. *Journal of Applied Social Psychology*, 9(1), 91–101. <https://doi.org/10.1111/j.1559-1816.1979.tb00796.x>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066x.55.1.68>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford.
- Ryan, R. M., Patrick, H., Deci, E. L., & Williams, G. C. (2008). Facilitating health behavior change and its maintenance: Interventions based on self-determination theory. *European Health Psychologist*, 10(1), 2–5. <https://doi.org/10.1.1.460.1417>
- Shen, L. (2010). Mitigating psychological reactance: The role of message-induced empathy in persuasion. *Human Communication Research*, 36(3), 397–422. <https://doi.org/10.1111/j.1468-2958.2010.01381.x>
- Showkat, N., & Gull, M. (2020). *The study of Google search trends for an effective communication during COVID-19 pandemic*. Sage Submissions Preprint. <https://doi.org/10.31124/advance.12138732.v1>
- Silva, M. N., Markland, D., Carraça, E. V., Vieira, P. N., Coutinho, S. R., Minderico, C. S., Matos, M. G., Sardinha, L. B., & Teixeira, P. J. (2011). Exercise autonomous motivation predicts 3-yr weight loss in women. *Medicine and Science in Sports and Exercise*, 43(4), 728–737. <https://doi.org/10.1249/MSS.0b013e3181f3818f>
- Soenens, B., Vansteenkiste, M., & Niemiec, C. P. (2009). Should parental prohibition of adolescents' peer relationships be prohibited? *Personal Relationships*, 16(4), 507–530. <https://doi.org/10.1111/j.1475-6811.2009.01237.x>
- Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology*, 72(5), 1161–1176. <https://doi.org/10.1037/0022-3514.72.5.1161>
- Vancampfort, D., Moens, H., Madou, T., De Backer, T., Vallons, V., Bruyninx, P., Vanheuverzwijn, S., Teixeira Motai, C., Soundy, A., & Probst, M. (2016). Autonomous motivation is associated with the maintenance stage of behaviour change in people with affective disorders. *Psychiatry Research*, 240, 267–271. <https://doi.org/10.1016/j.psychres.2016.04.005>
- Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, 23(3), 263–280. <https://doi.org/10.1037/a0032359>
- Vansteenkiste, M., Sierens, E., Soenens, B., Luyckx, K., & Lens, W. (2009). Motivational profiles from a self-determination perspective: The quality of motivation matters. *Journal of Educational Psychology*, 101(3), 671–688. <https://doi.org/10.1037/a0015083>
- Vansteenkiste, M., Soenens, B., Van Petegem, S., & Duriez, B. (2014). Longitudinal associations between adolescent perceived degree and style of parental prohibition and internalization and defiance. *Developmental Psychology*, 50(1), 229–236. <https://doi.org/10.1037/a0032972>
- Weinstein, N., & Nguyen, T. V. (2020). Motivation and preference in isolation: A test of their different influences on responses to self-isolation during the COVID-19 outbreak. *Royal Society: Open Science*, 7(5), 200458. <https://doi.org/10.1098/rsos.200458>
- Williams, G., Gagné, M., Ryan, R. M., & Deci, E. L. (2002). Facilitating autonomous motivation for smoking cessation. *Health Psychology*, 21(1), 40–50. <https://doi.org/10.1037/0278-6133.21.1.40>
- Williams, G., Grow, V. M., Freedman, Z. R., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology*, 70(1), 115–126. <https://doi.org/10.1037/0022-3514.70.1.115>
- World Health Organization. (2020, February 14). *COVID-19 strategic preparedness and response plan*. <https://www.who.int/docs/default-source/coronaviruse/covid-19-sprp-unct-guidelines.pdf>