Study title: Effects of communication style on motivation to follow versus defy social distancing guidelines during the COVID 19 pandemic

<<Note: this is an amended version of our earlier preregistration on 4/10/20 with all changes based on feedback from PSA collaborators. The main change is that we no longer hypothesize a mediation; instead we will examine direct links between autonomous and controlled motivation and defiance and behavioral intentions. There is also more specificity for making analytic choices in this version. Data collection in SDT labs has begun, PSA data collection has not started, and no data have been examined.>>

Study background

To reduce the spread of COVID-19, governments around the world are asking their citizens to practice *social distancing* by keeping a physical distance from others, limiting social encounters, and generally staying at home as much as possible. In many countries, however, individuals have some degree of choice over whether they follow these recommendations. Understanding how to best motivate and engage people to practice social distancing has become a global public health priority. According to self-determination theory (Ryan & Deci, 2017), messages that inspire reflective choices (i.e., *autonomy supportive messages*) promote more sustainable motivation, compared to those that are restrictive and forceful (i.e., *controlling messages*). This large-scale cross-cultural confirmatory experiment, run in collaboration with the Psychological Science Accelerator (part of the COVID-19 Rapid Project), tests whether autonomy-supportive versus controlling messages can impact people's motivation to participate in social distancing in 55 countries (projected $N = 30{,}000$). We expect a controlling message to a) reduce internalization, or autonomous motivation, for social distancing, b) increase feelings of defiance in response to those messages, and c) reduce intentions to socially distance, relative to an autonomy-supportive message and a no-message condition. We also expect autonomous motivation for social distancing to predict a) lower defiance and b) higher behavioral intentions, while we expect the opposite links for controlled motivation. We will discuss the boundaries of

this methodology in making inferences about *actual* social distancing behavior, but also outline how public officials, health professionals, journalists, and other stakeholders can communicate in ways that motivate people more effectively during the current and future public health crises.

Confirmatory Hypotheses

Our key hypothesis concerns autonomy and controlled motivational messages for two reasons: First, the existing literature contrasts autonomy-supportive and controlling communications, often without a comparison. Thus, this hypothesis is better supported by previous evidence and speaks to the generalizability of this evidence to a public health messaging context.

Second, although we include a no-message comparison, this is not a clean neutral comparison to compare against the two motivational communications. Frameless communication cannot exist without it appearing highly artificial, and any frame risks introducing confounds and losing neutrality and non-generalizable. Instead, in this study we include a no-message comparison, but this means that participants in this condition will likely be influenced entirely by their previous motivation; recent research in three countries suggests this motivation is autonomous more so than controlled, but it is unclear whether this will be the case in this culturally diverse sample. As a large literature demonstrates links between autonomous and controlled motivation predicting defiance and behavioral change in myriad domains, we expect that independent of the manipulation, motivation for social distancing will predict feelings of defiance and higher immediate (1 week) and delayed (6 month) behavioral intentions to socially distance in this sample.

Two confirmatory hypotheses will be tested:

Hypothesis 1. Compared to the controlling message condition, those in the no message and autonomy-supportive message condition will display:

1a. Higher levels of internalization of, or autonomous motivation for, social distancing

1b. Lower feelings of defiance toward social distancing

1c. Higher immediate (1 week) and delayed (6 month) behavioral intentions to socially distance

Hypothesis 2. Autonomous and controlled motivation for social distancing will predict feelings of defiance and behavioral intentions to socially distance. Specifically,

1a. Autonomous motivation for social distancing will predict lower feelings of defiance and higher immediate (1 week) and delayed (6 month) behavioral intentions to socially distance.

1b. Controlled motivation for social distancing will predict higher feelings of defiance and lower immediate (1 week) and delayed (6 month) behavioral intentions to socially distance.

Methods

Through the Psychological Science Accelerator processes, the methodological approach, measurements, and analytic strategy, have been subjected to extensive feedback by co-authors and external reviewers. Below we outline the methodological approach to be taken by all labs participating in the study.

Participants and Statistical Power Considerations

The sample size will be determined by recruiting as many collaborators as possible around the world through the Psychological Science Accelerator (PSA, Moshontz et al. 2018) and through the self-determination (SDT) listserv. From the initial call for collaborators, the PSA has identified 194 interested labs from 55 countries, and an additional 40 labs from 19 countries are collaborating from the SDT listserv. All labs agreed to collect at least 75

participants each. Together, these two groups include labs in 57 countries. The estimated total sample size from these labs is expected to be ≈30,000. Based on available resources, ≈4,050 participants from this sample will be recruited through semi-representative paneling (based on sex, age, and sometimes ethnicity) from the following countries: Austria, China, Egypt, Japan, Kenya, Mexico, Nigeria, South Africa, United States, Romania, Russia, South Korea, Sweden, Switzerland, Thailand, Turkey, and United Kingdom (270 participants per region).

A sample of 30,000 provides 95% power to detect effects as small as $d = 0.05$ between any two groups, far exceeding effects sizes in previous examinations of these predictions (d = .50 to d = .94 in Legault and colleagues (2011). The size of the entire sample should provide more than adequate power. Furthermore, our planned semi-representative samples will have adequate power to detect this effect size within the concerned countries, and most individual countries will likely have well-powered samples based on this power estimate (to detect an effect size of d = .50 between any two groups, a sample size of n = 88 per group is needed, suggesting minimum country-level samples of 264 are ideal). Because excessive inattention can undermine the effectiveness of manipulations that require attention (including reading a message), we will exclude participants who took less than two standard deviations of the mean time of completion (Maniaci & Rogge, 2014). Analyses will not be conducted until data collection is complete (June 1, 2020).

Procedure

Participants will complete the study online. This study is one of three studies in the PSA COVID-19 Rapid Project. Participants recruited through the PSA will be randomly assigned to see our study first approximately one third of the time (our study will be bundled with one other PSA study in a single link, and the third PSA study, which has a longer completion time, will be

presented in its own link). Order will be recorded to examine for possible carry-over effects. The PSA COVID-19 Rapid Project will also collect a number of demographic and background variables related to COVID-19, which may be examined in exploratory analyses but are not central to study hypotheses. Participants recruited from SDT labs will only take part in our study. They will be asked a limited set of demographic questions (e.g., age, gender, education, country).

If necessary, all study materials will be translated to the languages where the labs recruit their participants. The PSA has identified translators for every language represented in our pool of collaborators. The study materials will be forward and backward translated by two translators (Brislin, 1970). Once the translators agree on a translation, the materials will be sent to the labs using that particular language for any further cultural adjustment to their local context (e.g., differences between European and Brazilian Portuguese).

All data collection labs will follow the ethical guidelines of their institutions. Functionally, this means that each team will (1) receive ethical approval from their local Institutional Review Board (IRB), (2) gain approval through Ashland University's Human Subject's Review Board where the PSA is based or through Illinois Institute of Technology's IRB (for the SDT labs), or (3) not require local IRB approval for data collection.

First, participants will answer pre-manipulation questions to report the extent to which they are currently following social distancing recommendations (all materials are available on the study page: https://osf.io/fc9y7/). Following these questions, participants will be randomly assigned to one of three conditions: autonomy-supportive messages, controlling messages, or no message. The two message conditions will receive comparable information about social distancing, including what it is, why it is important, and a few recommendations on what to do. However, the autonomy-supportive and controlling messages contain theory-based motivational

elements shown in prior manipulations to influence motivation (Legault et al., 2011; Vansteenkiste et al., 2004). Specifically, those in the autonomy-supportive message condition will read an article that provides (a) perspective taking (e.g., acknowledging how difficult it is to alter one's daily life), (b) a meaningful rationale (e.g., explaining why social distancing is effective and important for slowing transmission), and (c) a sense of choice over one's own behavior within the practical constraints of the situation. In comparison, those in the controlling message condition will read an article that pairs information with coercion, shame, and pressure, including the use of demanding language such as 'should' and 'must'. Finally, those in the no-message condition will receive no message, with the primary aim of understanding whether the controlling actively undermines natural tendencies toward autonomous motivation and elicits defiance.

After reading the messages in the autonomy-supportive and controlling message conditions, and immediately after the current adherence questions in the no-message condition, participants will answer short questionnaires assessing their subsequent motivation and intentions to follow social distancing recommendations. Most participants will have been exposed to a high volume of messages related to social distancing before enrolling in our study. As such, it is reasonable that the impact of each new message, including the messages that participants are randomized to receive in this study, is diluted. We therefore expect a smaller effect size than may be observed when messages concern a less frequently discussed behavior, making the PSA format especially advantageous to this study. Additionally, to partially address this concern, the phrasing of the subsequent motivation and intentions questions will depend on assignment to condition. Specifically, those reading autonomy-supportive and controlling messages will respond to outcomes in terms of "social distancing recommendations in this

article", and those in the no message condition will respond to outcomes in terms of "social distancing recommendations" (not tied to an article).

Measures

Composite variables will be created for all multi-item measures (with items being reverse-scored when appropriate) by calculating the mean of items assuming the items demonstrate an acceptable level of reliability (alpha or omega > .70). If items show less than acceptable reliability on any composite variable, we will accept all items in the scale with corrected item-total correlations exceeding .3.

Pre-Manipulation Measures

Adherence to Social Distancing. Participants will respond to questions assessing the degree to which they are "currently following the recommendation to stay at home as much as possible", and to avoid specific situations: "gatherings with friends", "crowded areas", and "non-essential shopping trips". Participants will rate their responses on a 7-point scale (1 = *not at all*, 7 = *completely*). These questions will be used for quality check analyses.

Post-Manipulation Measures

Perceived Autonomy Support (Manipulation Check). Three items will assess how autonomy-supportive (versus controlling) the social distancing message was perceived to be in the two message conditions, and in the no-message condition, how autonomy-supportive social distancing guidelines, in general, are perceived to be. These items were adapted from the Health Care Climate Questionnaire (Kasser & Ryan, 1999; Williams et al., 1999). Participants in the autonomy-supportive and controlling message conditions will respond to the stem "I feel that social distancing recommendations [in this article]" with three items: "provided people some choices and options", "try to pressure people", and "aren't very sensitive to people's needs".

Participants will rate their responses on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). These items will be presented after dependent variables of interest to make the manipulation less obvious to participants.

Autonomous Motivation (Outcome). Participants will respond to the stem "I plan to follow social distancing recommendations [in this article] because:" with four autonomous and four controlled reasons for doing so. Example items assessing controlled motivation are "because others would disapprove of me if I did not" and "I would feel guilty if I did not follow the recommendation". Example items assessing autonomous motivation include "the recommendations reflect my values" and "it is personally important to me to follow them". These items, paired with a scale from 1 = *strongly disagree* to 7 = *strongly agree,* were adapted from a previous measure of Perceived Locus of Causality (Ryan & Connell, 1989; Soenens et al., 2009) so that the motivations are appropriate in the context of social distancing and the contents of the article. Autonomous and controlled motivation items will be aggregated into two separate variables to be used in analyses.

Defiance (Outcome). Feelings of defiance will be measured with four items from Vansteenkiste et al. (2014). Items measured feelings of defiance about "recommendations [in this article] on social distancing, or staying home as much as possible" rated on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The items are "make me feel like I want to do exactly the opposite", " feel aggravating", "feel like an intrusion", and "make me want to resist attempts to influence me".

Behavioral Intentions (Outcome). Behavioral intention items were adapted from McGarrity and Huebner (2014) to assess participants' short-term and long-term intentions to "follow social distancing recommendations [in the article]". Specifically, we will measure short-

term intentions within the next week, and long-term intentions over the next 6 months, in line with experts' predictions of the duration of the pandemic (Kayyem, 2020; Yong, 2020).

Within the next week. Participants will be asked how likely they are to "follow recommendations [in this article]" to participate in social distancing, or staying at home as much as possible, in general. They will also be asked how likely they are to avoid gatherings with friends, going in crowded areas, or taking non-essential shopping trips. The response scale ranges from 1 = *extremely unlikely* to 7 = *extremely likely*.

Over the next 6 months. Participants will be asked, "assuming the guidelines [described in the article] last for 6 months, how long do you intend on avoiding the following in-person places and activities" including restaurants, gatherings with friends, traveling, going in crowded areas, non-essential shopping trips, getting a haircut or going to the salon, and going to the gym or fitness classes. These items will be rated in one-week increments using a dropdown menu from 0 to 24 weeks. An average score will be calculated for the activities that show adequate internal consistency.

Quality Checks

Two quality checks will be performed to increase our confidence that the obtained results are able to provide a fair test of the stated hypotheses. First, the pre-manipulation items (i.e., current adherence of social distancing recommendations prior to manipulation) will be used to determine condition equivalence within each country. Determining condition equivalence will allow us to see whether conditions did not differ at the onset in terms of initial social distancing adherence. As per the analytic strategy below, we will examine condition effects on initial adherence using mixed-effects models, nested within countries. If effects for initial adherence

surpass a cutoff of $f = .02$ (equivalent to an $r = .02$), we will control for initial adherence in confirmatory analyses.

As this study will be bundled with one other experiment in the Psychological Science Accelerator COVID-19 project, we will also examine potential carryover effects based on the order in which participants completed this study. We will create a dummy code based on whether our study was presented first (coded 0) or second (coded 1). This dummy code will be tested as a main effect, as well as an interaction with experimental manipulations (only the autonomy supportive and controlling conditions will be considered) on the manipulation check (to examine whether the order effect differentially impacts the effect of condition). If carryover effects surpass a cutoff $f = .02$ on the manipulation check (perceptions of the manipulation being autonomy supportive, coded 1, relative to controlling, coded 0), we will run analyses restricting the sample to only those who took this study first (or who only took this study), and focus results on this sub-sample (though we will also present results for the full sample).

Analytic Strategy

We anticipate collecting data from over 50 countries around the world. To account for the nested structure of the data, we will examine the condition effects using mixed-effects models. Specifically, we will construct a mixed-effects model predicting each outcome (autonomous motivation, defiance, short-term behavioral intentions and long-term behavioral intentions), as well as the manipulation check, from condition as a fixed effect, nested within country (using dummy codes as specified below). We will estimate random intercepts at both person and country level and random slope for the condition. If this model fails to converge, we will remove the random slope.

To test Hypothesis 1, we will create two dummy variables, D1 and D2, where both the autonomy-supportive message and no message conditions are coded 1, with the controlling message condition being the reference group (coded 0). By entering D1 and D2 simultaneously into the mixed-effects model, this approach will allow us to observe whether no message and autonomy supportive conditions differ from the controlling condition, testing Hypothesis 1. We will set the interval null (the region of practical equivalence) as d = -0.05 to 0.05. If an effect and its 95% confidence interval (CI) is fully within the interval null, the hypothesis is deemed unsupported; if the effect and its CI is fully outside the interval null, the hypothesis is deemed supported; overlap of the effect and the interval null would be deemed equivocal.

	D1	**D2**
Autonomy supportive message	0	1
Controlling message	0	0
No message	1	0

For Hypothesis 2, we will examine relations between autonomous and controlled motivation predicting outcomes (defiance, and behavioral intentions at 1 week as well as 6 months) using the same mixed-effects model, and the same interval null of ds = -0.05 to 0.05.

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