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# Personality and Individual Differences

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## We're all in this together, but for different reasons: Social values and social actions that affect COVID-19 preventative behaviors<sup>☆</sup>

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### ABSTRACT

We examined how personal values, beliefs and concerns about COVID-19, and socio-demographics, relate to two important COVID-19 preventative behaviors: willingness to get vaccinated for COVID-19 and social distancing, in 1413 Australian adults. As expected, social focus values influenced the extent of compliance with these preventative behaviors, even when controlling for beliefs and concerns about COVID-19 and socio-demographics. We also examined the persuasiveness of four different value-expressive messages promoting social distancing, in a subsample of 737 Australian adults. We found that the message expressing self-transcendence values was ranked most persuasive by 77% of respondents. However, as hypothesized, personal values were related to message persuasiveness. As the importance ascribed to social focus values increased, the likelihood that the self-transcendence message was ranked as most persuasive increased. In contrast, the likelihood that the openness to change message was ranked as most persuasive increased for those who ascribed lesser importance to social focus values. Our findings can help the framing of government messaging around preventative behaviors, including maintaining social distancing in vaccinated populations who may still spread the disease, and preventing COVID-19 spread by or to vaccine refusers.

### 1. Introduction

The global impact of COVID-19 has necessitated the introduction of a range of measures by governments to mitigate its spread, including social distancing, track-and-trace applications, and lockdowns. Such policies require compliance by a relatively large proportion of the population in order to be effective. The mass rollout of vaccines is similarly reliant on public support and compliance to succeed at reducing the burden on the healthcare system. Further work is needed to understand the cumulative impact of policies on compliance, what motivates compliance, and what message framing is most effective in encouraging these behaviors. This article explores the responses of Australian adults to two key strategies designed to limit the spread of COVID-19: social distancing and vaccination.

Evidence from around the world shows that compliance with restrictive policies varies between individuals. For instance, women

have been found to be more likely to comply with COVID-19 preventative behaviors than men, and older people more likely to comply than younger people (Zettler et al., 2020). Beyond demographic factors, it is also important to understand the psychological correlates of compliance with preventative behaviors (van Bavel et al., 2020), which we discuss in the next section.

#### 1.1. Personality traits and COVID-19 preventative behaviors

A small number of studies have examined links between psychological traits and self-reported COVID-19 preventative behaviors. For example, using indices of preventative behaviors (e.g., handwashing and social distancing), compliance was associated with openness to experience, conscientiousness, and agreeableness (Nofal et al., 2020), as well as trait gratitude and fairness (Syropoulos & Markowitz, 2021). In contrast, less desirable (i.e., dark triad) traits were associated with non-

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compliance, using a generalized item asking about restrictions implemented by the Polish government (Zajenkowski et al., 2020). However, when examining specific behaviors, Hardin et al. (2021) found dark personality traits to be associated with hygiene behaviors but not social distancing. They attributed the non-significant association with social distancing to the high level of compliance with this behavior, suggesting that strong situational cues may have overridden the role of dark personality traits in this case. They called for research to identify other individual differences that may predict this behavior.

In the present study, we explore the role of personal values in explaining two specific and important preventative behaviors: social distancing and willingness to get vaccinated. Personal values are broad, motivational life goals that transcend situations, vary in importance between people, and serve as guiding principles in life (Rokeach, 1973; Schwartz, 1992). Given that values have been associated with a wide range of behaviors that have consequences for the individual, as well as close and distant others (Sagiv et al., 2017), there is good reason to believe that they will be implicated in compliance with COVID-19 preventative behaviors (Wolf et al., 2020).

1.2. Values and COVID-19 preventative behaviors

The Schwartz (1992) theory of human values posits that values are organized in a circular structure based on an underlying motivational continuum (see Fig. 1). Values that are neighboring in the circle share similar motivations, whereas values that oppose each other have conflicting motivations. Schwartz (1992) partitioned the values circle into 10 motivationally distinct basic values (see Fig. 1. inner circle), and summarized the compatibilities and conflicts among them with four higher order values (see Fig. 1. middle ring) that reflect two main conflicts. The first conflict contrasts self-transcendence with self-enhancement values, reflecting motivational incompatibility between

values that emphasize putting the interests of others above one's own and values that emphasize the pursuit of one's own interests. The second conflict contrasts openness to change with conservation values, reflecting motivational incompatibility between values that emphasize readiness for new ideas and experiences and values that emphasize self-restriction and order.

The four higher order values have also been described in terms of their social or personal focus (e.g., Schwartz et al., 2012) (see Fig. 1. outer ring). Social focus values, including self-transcendence and conservation values, express the motivation to preserve cooperative relations. They focus on attaining social outcomes connected to concern for others or established institutions. In contrast, personal focus values, including openness to change and self-enhancement values, express self-interest. They focus on attaining personal outcomes connected to concern for one's self.

During the COVID-19 pandemic, a range of social focus values were found to be positively associated with preventative behaviors. For instance, social responsibility values (e.g., considering others' needs and treating all people fairly) were positively associated with hygiene behaviors (Oosterhoff & Palmer, 2020), and conservation values were positively associated with social distancing (Tabernero et al., 2020). In contrast, personal focus values (i.e., self-interest values) were negatively associated with social distancing (Oosterhoff & Palmer, 2020). Further, despite several developed vaccines providing the imminent strategy for tackling COVID-19, no published research was found to examine how individuals' values inform the likelihood of vaccine acceptance.

Given the emphasis of social focus values on outcomes for others, we expect people who prioritize these values to be more likely to comply with social distancing, and to be more willing to get vaccinated for COVID-19 (see Wolf et al., 2020). Those who prioritize social focus values should be motivated to comply, either out of concern for the welfare of others (i.e., self-transcendence values), or for the desire to

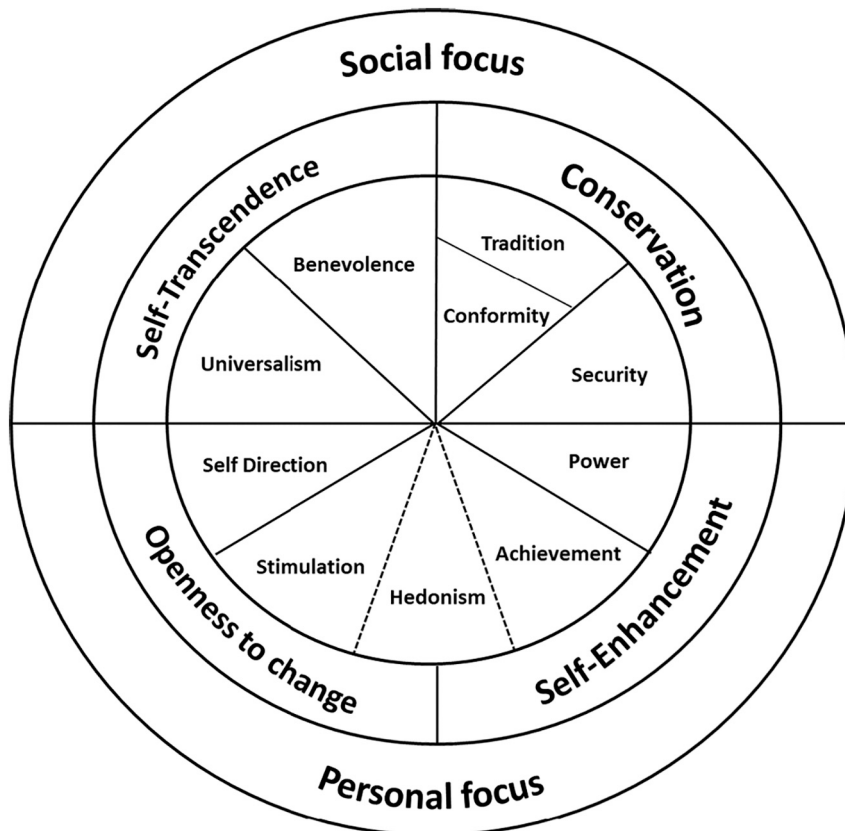


Fig. 1. The circular model of values showing relations among 10 basic, 4 higher order and personal focus versus social focus values. Adapted from Schwartz (1992) and Schwartz et al. (2012).

conform to societal expectations (i.e., conservation values). However, these propositions are yet to be empirically tested. In this paper, we hypothesize that social focus values will lead to increased compliance with COVID-19 preventative behaviors, including social distancing (H1a) and willingness to get vaccinated (H1b).

### 1.3. Responses to messages about COVID-19 preventative behaviors

Understanding how personal values relate to compliance with COVID-19 preventative behaviors is important for creating effective messages to promote these behaviors (Eaton & Kalichman, 2020). However, direct evidence about message framing effects on COVID-19 behaviors is limited, and results are mixed. For instance, pro-social framing was found to be more effective than self-interest framing in promoting social distancing intentions in the early stages of the pandemic, but there was no significant difference observed when the study was repeated one month later (Jordan et al., 2020). In contrast, other research found pro-social messages (e.g., *protect your community*) to be less effective than self-focused messages (e.g., *protect yourself*) in achieving clickthroughs from a Facebook ad; however, close other-framed messages (e.g., *protect your loved ones*) were found to be equally as effective as self-focused messages (Banker & Park, 2020). In both studies, message types align with social and personal focus values; however, neither of these studies examined relations between message effectiveness and individual psychological differences.

We hypothesize that messages that express social focus values will be more persuasive than those that express personal focus values in the promotion of social distancing (H2). We also hypothesize that people's value priorities will influence the persuasiveness of value-expressive messages, where value alignment with a message is expected to increase persuasiveness (H3).

### 1.4. The current study

We test these hypotheses in two overlapping studies. In part 1, we jointly model willingness to get vaccinated and self-reported social distancing to see how they relate to each other, and whether social focus values are related to these behaviors, over and above the effects of COVID-19 beliefs and concerns and socio-demographics. In part 2, we examine the persuasiveness of four value-expressive messages in the context of social distancing, as this is likely to be an ongoing issue regardless of vaccine uptake. Specifically, we examine whether there is a dominant value-expressive message, and whether personal values influence the persuasiveness of these messages.

The present study was conducted in April/May 2020 in Australia, after COVID-19 was declared a pandemic by the World Health Organization. Australian states and territories had been placed in various degrees of lock-down, and the Federal Government introduced the COVIDSafe app to support contact tracing efforts. According to the Australian Bureau of Statistics' Household Impacts of COVID-19 Survey, in early April 2020, over two thirds (68%) of people reported being concerned or very concerned about their health due to COVID-19 and almost all (98%) were keeping their distance from others (Australian Bureau of Statistics, 2020). Efforts to develop an effective COVID-19 vaccine were in their early stages, with no clear prospect of imminent success.

## 2. Materials and methods

### 2.1. Participants and procedure

The current study includes two overlapping samples from the fourth wave of the Values Project (see Section 1 of Supplemental Materials for details). The sample for part 1 consisted of 1413 Australian adults (60% women,  $M_{age} = 58$  years,  $SD = 13.0$ ), who completed the focal questions across a series of sequential survey modules. Part 2 consisted of a

subsample of the same respondents. In total, 737 Australian adults (61% women,  $M_{age} = 58$  years,  $SD = 13.3$ ) completed the additional survey eliciting their response to value-expressive messages. Since there were only nine cases with missing data (see Worry about COVID-19 below) all respondents were included in the analyses.

### 2.2. Measures

#### 2.2.1. COVID-19 related variables

Vaccine willingness, social distancing, willingness to download the COVIDSafe app, and beliefs about COVID-19 as a hoax were measured with single items. **Vaccine willingness** was measured with the item, 'If a COVID-19 vaccine were available today, would you get it?', on a 3-point scale (1 = No, 2 = Maybe, 3 = Yes). **Social distancing** was measured with the item, 'To what extent are you engaging in social distancing?', on a 5-point scale (0 = not at all, 1 = a little, 2 = somewhat, 3 = a lot, 4 = a great deal). For the purpose of the analyses, and given high levels of compliance reported in the literature, we coded this variable into minimum (1 = not at all, a little and somewhat), medium (2 = a lot), and maximum (3 = a great deal) social distancing.

**Willingness to download the COVIDSafe app** was measured with the item, 'The government is developing a phone App to monitor individuals and identify those in contact with COVID-19. Individuals will be asked to download the App voluntarily. If enough people use the App the current restrictions could be removed earlier. Would you do this?' on a 3-point scale (1 = No, 2 = Maybe, 3 = Yes). Beliefs about **COVID-19 being a hoax** was measured with the item 'The social media are full of stories telling that the COVID-19 pandemic is a hoax and that all the lockdown measures are a hysteric overreaction. Do you believe in these stories?' on a 2-point scale (YES, I do believe in these stories; NO, I don't believe in these stories). We also asked a similar question about **Climate Change being a hoax**: 'The social media are full of stories telling that climate change is a hoax. Do you believe in these stories?' on the same 2-point scale.

**Worry about COVID-19** was measured with an adapted form of the McCaul Brief Worry Scale (McCaul et al., 1996). This scale included three items: *During the past week, how often have you worried about getting COVID-19?* (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = All of the time); *How bothered are you by thinking about getting COVID-19?* (1 = Not at all, 2 = Somewhat, 3 = Moderately, 4 = A great deal, 5 = Extremely); *How worried are you about getting COVID-19?* (1 = Not at all, 2 = Somewhat, 3 = Moderately, 4 = A great deal, 5 = Extremely). These items were summed to form a 3 to 14 scale, a higher score indicating greater worry ( $\alpha = 0.892$ ). Scores for the four cases with one missing response were rescaled to the same 3 to 14 and scores for the five cases missing more than one response on this scale were replaced with the mean score.

The extent of **COVID-19 comorbidities** included a list of factors identified in the literature. Respondents were asked whether they had been diagnosed with any of the following: cardiovascular disease, chronic lung disease, diabetes, chronic kidney disorder, immunocompromising conditions, respiratory difficulties with neurological origin, coronary heart disease, and whether they smoke, on a yes/no scale. We dummy coded responses, with zero being no comorbidities and one being one or more comorbidity.

#### 2.2.2. Schwartz personal values

Personal values were measured with the Best-Worst Refined Values scale (Lee et al., 2019). The basic count scoring procedure was used to obtain a score for each value item for each participant. Specifically, we counted the number of times a respondent chose the same value item as most important and subtracted the number of times the respondent chose the same value as least important. The 11-point value-item scores were rescaled to 0 to 10 for ease of interpretation, with higher scores indicating higher relative value importance. Social focus values were scored by first averaging items to form the ten basic values (see Fig. 1; Lee et al., 2019), then averaging basic values to form the four higher-order values, and finally the self-transcendence and conservation

values were averaged to form the social focus values.

2.2.3. Value-expressive messages

Four value-expressive messages were designed by values experts to reflect the two social focus values of self-transcendence and conservation, and the two personal focus values of openness to change, and self-enhancement. Specifically, respondents were asked to rank these messages in terms of their persuasiveness to them personally: (1) *Social distance now. Do what is expected of you now to protect our people and traditions* (expressive of conservation values); (2) *Social distance now. Do this to bring back independence and excitement to your life, as soon as possible* (expressive of openness to change values); (3) *Social distance now. Do this to care for your loved ones and support vulnerable people* (expressive of self-transcendence values); and (4) *Social distance now. Do this so you can soon refocus on your personal success and status* (expressive of self-enhancement values). These messages were presented to participants in randomized order.

2.2.4. Socio-demographics

In addition to gender, we collected year of birth, which was used to construct generational cohorts: Silent generation <1946; Baby Boomers ≥1945 and <1965; Gen-X ≥ 1965 and ≤1980; and Millennials >1980 (Dimock, 2019). Respondents were also asked whether they have a university degree as an indicator of their level of education. Responses were coded as 1 = yes and 0 = no.

2.3. Analytical strategy

2.3.1. Part 1: vaccine willingness and social distancing

In part 1, we conducted a bivariate ordered probit regression, estimated in Stata (StataCorp, 2019) with the *cmp* program (Roodman, 2011) to jointly model willingness to get vaccinated and propensity to social distance (see Section 2 of Supplemental Materials for details of the models). The set of explanatory variables in the joint regression equations included social focus values, COVID-19 related variables, and socio-demographics. COVID-19 related variables included (1) worry about the disease, (2) whether they believed COVID-19 was a hoax (yes, base no), (3) whether they intended to download the COVIDSafe tracking app (no and yes, base group maybe), and (4) whether they had at least one COVID-19 comorbidity (yes, base no). Socio-demographics included (1) gender (female, base male), (2) whether the respondent held a university degree (yes, base no), and (3) generation (Silent Gen, Gen X, Millennials, base group Baby Boomers). We also included participant's state or territory of residence as a control variable.

2.3.2. Part 2: social distancing message effectiveness

In part 2, we examined respondents' ranking of the persuasiveness of four value-expressive messages to see whether (a) there was a dominant message and (b) whether personal values were predictors of message persuasiveness. To do this, a rank-ordered probit model was estimated using maximum simulated likelihood, via the Stata v.16 command *cmprobit* (see Section 2 of Supplemental Materials for details about the model).

3. Results

3.1. Part 1: vaccine willingness and social distancing

In the part 1 sample, Baby Boomers were the largest cohort (58%;  $M_{age} = 65$  years,  $SD = 5.2$ ), followed by Gen-X (23%;  $M_{age} = 47$  years,  $SD = 4.8$ ), Millennials (11%;  $M_{age} = 33$  years,  $SD = 4.2$ ), and the Silent generation (8%;  $M_{age} = 75$  years,  $SD = 1.1$ ). The proportion of respondents with a degree was 30%. Respondents with a least one comorbidity also comprised 30% of the sample. Those willing to download the COVIDSafe app comprised the largest group of respondents (42%); however, a significant proportion were non-committal (36% maybe) or

unwilling (22% no). Only a small proportion (4%) believed that COVID-19 was a social media hoax. Worry over the COVID-19 pandemic had a mean of 7.64 ( $SD = 3.06$ ).

Table 1 presents the means, standard deviations and Kendall rank correlations of the focal variables. The correlations between the two outcome variables (social distancing and vaccine willingness) and the key predictor variable (social focus values) were positive and significant.

Results of the joint ordered probit regressions show that those likely to social distance more were also more positive toward getting the vaccine. That is, they were more likely to answer maybe or yes to being willing to get vaccinated. The correlation of residuals for the two regressions was significant ( $\rho = 0.140$ ,  $p < 0.01$ ), supporting the expectation that the two behaviors are related. This justifies joint estimation; however, while they appear to be complementary behaviors, they are clearly not perfectly aligned.

Table 2 presents the overall probabilities for vaccine willingness and reported level of social distancing. The statistics in the first row, in parentheses, presents the estimated probability for each vaccine response overall. The statistics in the first column, in parentheses, presents the probability for each level of social distancing overall. The remaining cells present the probability for different levels of vaccine willingness, conditional on the level of social distancing. Maximum social distancing was the most likely reported behavior among participants (61%), and minimal social distancing the least likely (9%). Similarly, people were most likely to say yes to getting a vaccine (65%) and least likely to say no (8%). In the joint estimation, those who maximally socially distanced were the most likely to say yes to the vaccine (68%); however, at all levels of social distancing, more than 50% of respondents were likely to say yes. Those who engaged in a minimal level of social distancing had the highest probability of refusing the vaccination (11%), which was almost twice as high as those maximally social distancing (6%).

Next, we examined the factors related to vaccine willingness, within each level of social distancing. Specifically, we examined whether social focus values were related to these decisions, after accounting for COVID-19 beliefs and concerns, and socio-demographics. To do this, we estimated the average marginal effects<sup>1</sup> for each of the three categories of vaccine willingness, conditional on the propensity to social distance (see

Table 1  
Summary statistics for key variables in part 1.

	Mean	Correlation (Kendall $\tau_b$ )		
		Social focus values	Vaccine willingness	Social distancing
Social focus values	5.93 (0.66)	1		
Vaccine willingness	2.58 (0.63)	0.096***	1	
Social distancing	2.52 (0.65)	0.117***	0.127***	1

Note.  $N = 1413$ . Standard deviations in parentheses.

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ .

<sup>1</sup> For continuous predictor variables (e.g. social focus values) the marginal effect is the rate of change in probability of selecting a given outcome (e.g. yes to the vaccine) given a unit change in the predictor, averaged over all observations. For binary predictor variables (e.g. university degree) the marginal effect is the change in probability of selecting a given outcome for those with a degree versus those without, averaged over all observations. For predictor variables with more than two categories (e.g. download app) the marginal effect is the change in probability of selecting a given outcome for those in one category (e.g. no download) compared to a base category (e.g. maybe download), averaged over all observations.

**Table 2**  
Probability of getting a vaccine conditional on level of social distancing.

			Willingness to vaccinate		
			No	Maybe	Yes
			(0.077)	(0.269)	(0.654)
Level of social distancing	Minimum	(0.089)	0.114	0.326	0.559
	Medium	(0.304)	0.088	0.295	0.617
	Maximum	(0.607)	0.064	0.252	0.684

Note.  $N = 1413$ . Overall probabilities for each response category are in parentheses. Conditional probabilities are the probability of each vaccine response, conditional on the level of social distancing (rows).

**Table 3**  
Average marginal effects for willingness to get vaccinated, conditional on the propensity to social distance.

	Vaccine willingness, conditional on:								
	Minimum social distancing (0.088)			Medium social distancing (0.304)			Maximum social distancing (0.607)		
	No	Maybe	Yes	No	Maybe	Yes	No	Maybe	Yes
Social focus values	-0.028** (0.010)	-0.030** (0.011)	0.058** (0.020)	-0.023** (0.008)	-0.033** (0.011)	0.056** (0.019)	-0.018 (0.006)	-0.036** (0.012)	0.054** (0.018)
Worry about COVID-19	-0.005** (0.002)	-0.006** (0.002)	0.011** (0.004)	-0.004** (0.002)	-0.006** (0.002)	0.011** (0.004)	-0.004** (0.001)	-0.007** (0.003)	0.011** (0.004)
COVID-19 hoax	0.172*** (0.035)	0.186*** (0.040)	-0.359*** (0.072)	0.142 (0.029)	0.203*** (0.042)	-0.345*** (0.069)	0.113*** (0.023)	0.217*** (0.043)	-0.330 (0.064)
No - download app (base maybe)	0.053* (0.020)	0.038** (0.013)	-0.091** (0.033)	0.044* (0.017)	0.046** (0.016)	-0.090** (0.033)	0.035* (0.014)	0.053** (0.019)	-0.088** (0.032)
Yes - download app (base maybe)	-0.059*** (0.012)	-0.080*** (0.017)	0.139*** (0.028)	-0.048*** (0.010)	-0.085*** (0.018)	0.133*** (0.027)	-0.036*** (0.008)	-0.085*** (0.018)	0.121*** (0.025)
COVID-19 comorbidities	-0.014 (0.013)	-0.015 (0.015)	0.029 (0.028)	-0.011 (0.011)	-0.016 (0.016)	0.027 (0.027)	-0.009 (0.008)	-0.018 (0.016)	0.027 (0.024)
Female	0.055*** (0.012)	0.065*** (0.015)	-0.121*** (0.026)	0.046*** (0.010)	0.071*** (0.016)	-0.117*** (0.025)	0.034 (0.007)	0.070*** (0.016)	-0.104*** (0.023)
University degree	-0.028* (0.013)	-0.033* (0.016)	0.061* (0.028)	-0.023* (0.010)	-0.035 (0.017)	0.059* (0.027)	-0.018* (0.008)	-0.036* (0.017)	0.053* (0.024)
Silent Gen (base Baby Boomers)	-0.040* (0.017)	-0.054* (0.027)	0.094* (0.044)	-0.032* (0.014)	-0.057* (0.028)	0.089* (0.042)	-0.025* (0.010)	-0.057* (0.027)	0.081* (0.037)
Gen-X (base Baby Boomers)	0.011 (0.016)	0.011 (0.016)	-0.022 (0.032)	0.009 (0.013)	0.012 (0.018)	-0.020 (0.031)	0.008 (0.010)	0.015 (0.019)	-0.023 (0.029)
Millennials (base Baby Boomers)	0.001 (0.022)	0.001 (0.023)	-0.003 (0.045)	0.001 (0.018)	0.001 (0.026)	-0.002 (0.044)	0.002 (0.014)	0.004 (0.027)	-0.006 (0.041)

Note.  $N = 1413$ . Numbers in parentheses are standard errors. State or Territory of residence was controlled for.  $LL = -2229.744$ ,  $Wald\ chi^2 = 304.54$ ,  $\rho = 0.140$ \*\*\*  
\*  $p < 0.05$ .  
\*\*  $p < 0.01$ .  
\*\*\*  $p < 0.001$ .

Table 3). However, across all levels of social distancing we found a similar pattern of relations.

Across all levels of social distancing, social focus values were significant positive predictors of being willing to get vaccinated ('yes' responders) and significant negative predictors of being less willing ('maybe' and 'no' responders). Worry about COVID-19 exhibited the same pattern of effects as for social focus values, whereas beliefs about COVID-19 being a hoax exhibited the reverse pattern of effects. Propensity to download the COVIDSafe app was also a significant positive predictor of being willing to get vaccinated ('yes' responders compared to 'maybe') and a significant negative predictor of being less willing ('no' responders compared to 'maybe'). The presence of comorbidities did not have a significant effect on willingness to get vaccinated. For the socio-demographics, being male, having a university degree, and being in the oldest generation (the Silent generation, compared to Baby Boomers) were all significant positive predictors of being willing to get vaccinated ('yes' responders) and significant negative predictors of being less willing ('maybe' and 'no' responders).

### 3.2. Part 2: social distancing message effectiveness

In part 2, we examined whether any one type of value-expressive message was more persuasive than others, and whether personal

values influenced the persuasiveness of different messages. Overall, we found the self-transcendence message (i.e., *Social distance now. Do this to care for your loved ones and support vulnerable people*) to be the most persuasive, as it was ranked highest by 77% of the sample. However, a significant minority of respondents ranked either the openness to change message (*Social distance now. Do this to bring back independence and excitement to your life, as soon as possible*) the highest (11%) or the conservation message (*Social distance now. Do what is expected of you now to protect our people and traditions*) the highest (10%). Only 2% of respondents ranked the self-enhancement message (*Social distance now. Do this so you can soon refocus on your personal success and status*) the highest.

In Table 4, we report the estimated marginal effects on the proba-

bility that each value-expressive message was ranked the highest. Due to the low overall incidence of the belief that COVID-19 was a hoax, the definition was expanded to include perception of either COVID-19 or climate change as being a social media hoax, coded as 1 (no = 0). Marginal effects for categorical variables are interpreted in the same way as in part 1 (i.e., difference in probability of being female vs male, having a university degree vs not, having at least one comorbidity vs none, believing either climate change or COVID-19 are social media hoaxes vs neither). For intentions to download the COVIDSafe app, the comparisons are between those who answered yes vs maybe, and between those who answered no vs maybe. For continuous variables (i.e., age,<sup>2</sup> worry, and social focus values), the marginal effect reflects the change in probability for a change in the respective variable, from -1 standard deviation to +1 standard deviation, averaged over all observations.

Fig. 2 shows that the self-transcendence message was likely to be the most persuasive across respondents. However, it was more likely to be ranked as most persuasive by those who scored higher on social focus values. Those who scored lowest on social focus values (the bottom 10%) were the most likely to rank an alternative message as most

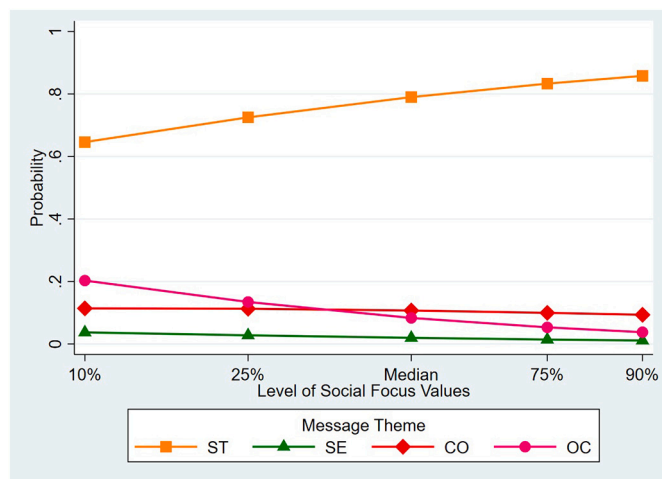
<sup>2</sup> We use age as a continuous variable in part 2, given the smaller sample size.

**Table 4**  
Marginal effects on value-expressive messages.

	Self-transcendence message (0.768)	Openness to change message (0.106)	Conservation message (0.104)	Self-enhancement message (0.022)
Social focus values	0.157*** (0.029)	-0.119*** (0.017)	-0.018 (0.019)	-0.019*** (0.006)
COVID-19 worry	0.010 (0.029)	-0.019 (0.016)	0.013 (0.018)	-0.003 (0.005)
Hoax for COVID-19 or climate change	-0.049 (0.043)	0.041 (0.026)	-0.005 (0.024)	0.012 (0.010)
No - download app	0.002 (0.037)	0.007 (0.019)	-0.005 (0.023)	-0.004 (0.006)
Yes - download app	-0.045 (0.033)	0.041* (0.018)	0.003 (0.020)	0.001 (0.006)
Comorbidities	0.006 (0.031)	0.007 (0.016)	-0.014 (0.019)	0.001 (0.005)
Female	0.022 (0.031)	-0.008 (0.017)	-0.004 (0.019)	-0.010* (0.006)
Degree	0.052* (0.031)	-0.016 (0.017)	-0.028 (0.019)	-0.008 (0.005)
Age	0.004 (0.032)	-0.056** (0.017)	0.067*** (0.020)	-0.016** (0.006)
Individuals	737			
Log simulated-likelihood	-1442.6			
Wald chi <sup>2</sup> (df 27)	109.23			

Note. Numbers in parentheses are standard errors.

- \*  $p < 0.05$ .
- \*\*  $p < 0.01$ .
- \*\*\*  $p < 0.001$ .



**Fig. 2.** Predicted highest ranked value-expressive message by social focus values

Note.  $N = 737$ . ST = Self-transcendence; SE = Self-enhancement; CO = Conservation; OC = Openness to change.

persuasive. Specifically, for these people, we estimated a 20% probability that the openness to change message would be ranked most persuasive.

Finally, we investigated the subsample who reported they were less willing to get vaccinated ('no' or 'maybe';  $n = 225$  respondents). These people may be the most important target of social distancing messages; however, their ranking of value-expressive messages was not

substantively different from the sample as whole (see Table S1 and Fig. S1 in Section 3 of Supplemental Materials).

#### 4. Discussion and conclusions

We predicted that the prioritization of social focus values would be associated with increased compliance with COVID-19 preventative behaviors (H1a & H1b), and that social focus messages would be more persuasive for most people (H2). Results supported the first hypotheses for both self-reports of social distancing and willingness to get vaccinated. We likewise found support for our second hypothesis; social focus messages about social distancing were the most persuasive across the sample.

We also hypothesized that people would view value-expressive messages that aligned with their own values priorities as more persuasive (H3). This hypothesis received limited support, because across all levels of social focus values, participants found the self-transcendence message to be the most persuasive. However, the self-transcendence message was increasingly persuasive for those who ascribed higher importance to social focus values. Those who ascribed lesser importance to social focus values were more likely than others to find the openness to change message most persuasive.

In terms of COVID-19 self-reported compliance, social distancing and vaccine willingness appear to be complementary behaviors rather than potential substitutes. That is, those who are social distancing are also more willing to get vaccinated for COVID-19. This is important, as current COVID-19 vaccines may be more effective at preventing serious illness in vaccinated individuals than at preventing transmission to others (Australian Academy of Health and Medical Sciences, 2020), meaning that social distancing is likely to remain a key preventative behavior into the future.

Further research is needed to investigate the persuasiveness of different types of messages to encourage vaccination against COVID-19. Rather than examining self-transcendence messages that highlight preventing disease transmission to loved ones and vulnerable people, research could investigate alternative social focus messages (e.g., those that call attention to reducing the burden on the public health system and those who work in it). This may be particularly important if existing vaccines do not prove sufficiently successful at curbing community transmission.

Despite evidence of the link between social distancing and willingness to get a vaccine in our study, there is a risk that people who get vaccinated will subsequently become lax with social distancing. Adams (1995) describes each individual's level of risk acceptance as their 'risk thermostat', and argues that people adjust their behavior to keep their personal balance between risks and rewards at a consistent level. The introduction of greater safety into a situation may result in riskier behavior. Now that COVID-19 vaccines are being rolled out, research should explore whether people who have been vaccinated change their behavior.

Our study also has some limitations to consider. First, it was conducted in Australia, where the impact of COVID-19 has been less than in many other countries. Future research is needed to see whether our results hold in a broader array of socio-demographic and pandemic affected contexts, and whether they might be stronger in countries hit harder by the pandemic. Second, the study used self-report data, which can be influenced by response biases. To mitigate these biases (see Hulland et al., 2018), constructs were measured on separate occasions in different survey modules, with the personal values module being fielded prior to self-reports of social distancing, vaccine willingness, and the ranking of value-expressive messages. Third, the study used single item measures for some constructs. While single item measures were included for practical reasons (i.e., space constraints within an existing larger study), there is evidence that they can perform as well as multiple item scales when the object of the construct (e.g., getting a vaccination or social distancing) can be conceptualized as concrete and singular

(Bergkvist & Rossiter, 2007). Fourth, the present sample was over-representative of older Australians. Future research should examine compliance in younger people, and give special attention to potential age and cohort confounds, as well as including a wider range of socio-demographic correlates. Finally, the generally high rates of reported compliance to social distancing found in this study, and most others (e. g., Hardin et al., 2021 found 95% compliance), meant that our social distancing behavior coding was skewed toward the positive end. Samples that include more respondents at lower levels of social distancing behavior may find different or potentially stronger results than we found. Furthermore, qualitative research, especially with noncompliant groups, may uncover other factors with the potential to influence their attitudes and behavior.

In sum, our study found that social focus values influence the extent of compliance with COVID-19 preventative behaviors, over and above beliefs and concerns about COVID-19 and socio-demographics. Further, social focus messages, especially those that draw attention to caring for loved ones and vulnerable people, are likely to be more persuasive than other value-expressive messages. We found this to be the case across groups with different levels of compliance with preventative behaviors.

### CRedit authorship contribution statement

**Joshua Lake:** writing – conceptualization (supporting); writing – original draft (lead) and editing (lead). **Paul Gerrans:** conceptualization (supporting); writing – original draft (supporting) and editing (supporting); methodology (lead); formal analyses (lead). **Joanne Sneddon:** writing – conceptualization (supporting); original draft (supporting); writing – review and editing (supporting). **Katie Attwell:** writing – original draft (supporting); writing – review and editing (supporting). **Linda Botterill:** writing – original draft (supporting); writing – review and editing (supporting). **Julie Lee:** conceptualization (lead); writing – original draft (supporting); writing – review and editing (supporting) funding, investigation, data curation and supervision.

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### Appendix A. Supplemental Materials

Supplemental Materials to this article can be found online at <https://doi.org/10.1016/j.paid.2021.110868>.

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