Moral foundations underlying behavioral compliance during the COVID-19 pandemic

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ABSTRACT

During the COVID-19 pandemic, government and public health officials have advocated three behaviors to help "flatten the curve" of the disease—staying-at-home, wearing face masks, and social distancing. But, some people, especially those younger in age, have flouted restrictions, harming themselves and the community. We explore the moral foundations underlying people's compliance with the three behaviors. Our study with 1033 Americans revealed that caring and fairness concerns predict complying with all behaviors, while sanctity concerns only predict compliance with wearing face masks and social distancing. A deeper investigation revealed age differences in loyalty and sanctity concerns for staying-at-home and social distancing, and in sanctity concerns only for wearing face masks. The findings document the innate intuitions that guide one's decision to comply with such behaviors. They also provide governments and policy officials with implications on possible message frames to use in communicating the importance of the three behaviors in order to protect one's and the public's health from COVID-19 and other flu-like illnesses in the future.

1. Introduction

The COVID-19 coronavirus pandemic accelerated ever since January 2020, infecting over 37 million people and resulting in over 1,000,000 deaths globally (as of October 2020; Johns Hopkins University, 2020). The pandemic resulted in a seismic shift in how people live, work, and play, with economies being shattered, families unable to see loved ones, and air travel coming to a screeching halt (Garfin, Silver, & Holman, 2020). Consequently, governments and public health officials globally have offered guidelines that would help "flatten the curve" (Anderson, Heesterbeek, Klinkenberg, & Hollingsworth, 2020). The three most common guidelines that governments have issued either forcibly or voluntarily are staying-at-home (Jia et al., 2020; Wu, Chen, et al., 2020; Wu, Leung, et al., 2020), wearing face masks (Feng et al., 2020; Horwell & McDonald, 2020), and social distancing when out in public (Lewnard & Lo, 2020).

Regrettably, there have been examples where individuals have flouted such regulations enacted to protect their own and the community's health. Who can forget the hoards of people descending on Bondi Beach in Sydney, Australia, despite stay-at-home restrictions (Precel & Colangelo, 2020)? Or the steady stream of tourists flying into Hawaii to take advantage of low airfares and hotel rates (Pachelli,

2020)? Or the protests across the United States against the government-imposed lockdown (Maqbool, 2020)? In fact, some government officials themselves have disobeyed the regulations that they proposed, including New Zealand's minister of health and the U.K. government's coronavirus task force advisor (Menendez, 2020). Consequently, understanding why people decide to comply or ignore the regulations designed to protect public health is crucial. This not only will only benefit this current novel coronavirus pandemic when governments still have time to contain the spread of COVID-19 in delivering proper and appropriate public health messages, but can also help governments plan for upcoming pandemics when the same guidelines can also protect the public's health.

One framework to understand the acceptance of or resistance to actions highlighted by governments involves examining one's moral intuitions. Namely, Moral Foundations Theory (MFT; Graham, Haidt, & Nosek, 2009; Graham et al., 2011; Strimling, Vartanova, Jansson, & Eriksson, 2019; Waytz, Iyer, Young, Haidt, & Graham, 2019) examines how people make judgments about proper behavior and "right versus wrong." MFT is premised on the belief that people form judgments about morality intuitively and without conscious thought (Graham et al., 2011; Haidt, 2001; Hauser, Cushman, Young, Kang-Xing Jin, & Mikhail, 2007). Conscious reasoning about morality, that is, is thought to follow

the intuitions that are used to justify or explain one's intuitive moral judgments. Thus, judgments about morality are, like many other psychological processes, made with the "dual-process system" (Kahneman, 2003) according to which intuitions precede and influence more reasoned, explicit thought.

MFT proposes five central moral foundations along which proper behavior is intuitively evaluated against: caring involves intuitions that prevent harm and caring for others; fairness produces intuitions involving reciprocity, fair practices, and equality; loyalty involves intuitions relating to sacrificing for one's in-group; authority is associated with intuitions that respect for and obedience to authority figures, social traditions, and hierarchies; and sanctity emphasizes bodily and moral purity in contrast to degradation. Some classifications have grouped caring and fairness into a single "individualizing foundation" and loyalty, authority, and sanctity into the "binding" foundations (Graham et al., 2011; Haidt, 2012), but the five are often acknowledged to form MFT. A sixth (liberty, focusing on concerns regarding domination and coercion) has been proposed, but the previous five are primarily studied, and there is controversy regarding the inclusion of it as a moral foundation (Haidt, 2013; Iyer, Koleva, Graham, Ditto, & Haidt, 2012). As such, in this research, we focus on the core five moral foundations.

The five moral foundations against which people innately evaluate "proper behaviors" predict a host of behavioral outcomes. For instance, individuals who place greater value on the sanctity foundation are more hesitant to use vaccines for children (Amin et al., 2017; Hornsey, Harris, & Fielding, 2018; Rossen, Hurlstone, Dunlop, & Lawrence, 2019). Meanwhile, individuals who place value on the caring and fairness foundations are more likely to donate money to charity (Nilsson, Erlandsson, & Västfjäll, 2016; Winterich, Zhang, & Mittal, 2012). Moreover, the fairness foundation has been suggested to predict support for punishment in crimes involving sexual aggression (Harper & Harris, 2017). In all of these and other cases, people intuitively evaluate a behavior or judgment along the relevant moral foundations, coming to a formal assessment of what to do (or not do). That is, they react immediately based on the relevant moral foundations to then form a proper judgment about what to do (or not do).

Importantly, not all the moral foundations are relevant to every situation. The strength of MFT is that it proposes morality as a multidimensional construct; therefore, some moral foundations might be relevant to some situations while others might not be. Understanding the moral foundations that are associated with an action or judgment has policy implications as communications need to be framed around relevant moral foundations. For example, promoting vaccine use using messages stressing caring, fairness, and sanctity encourages vaccine use adoption (Amin et al., 2017; Rossen et al., 2019) while messages conveying caring and fairness themes heighten donation intentions (Nilsson et al., 2016). Likewise, different individuals stress some moral foundations more than others. Consider that political liberals are more focused on the foundations of caring and fairness, while conservatives are focused on loyalty, authority, and sanctity (Day, Fiske, Downing, & Trail, 2014; Graham et al., 2009; Winterich et al., 2012).

One particular strength of moral foundations is that, by examining people's underlying moral intuitions, there is stronger attitude-behavior consistency. Indeed, when individuals identify a moral basis for an attitude, the attitude more strongly predicts behavior (Bloom, 2013; Morgan, Skitka, & Wisneski, 2010; Skitka & Bauman, 2008; Skitka, Bauman, & Sargis, 2005; Wright, Cullum, & Schwab, 2008) and is more resistant to change (Aramovich, Lytle, & Skitka, 2012; Haidt, 2001; Hornsey, Majkut, Terry, & McKimmie, 2003; Hornsey, Smith, & Begg, 2007), compared to an attitude not having a moral basis. The exact reasoning for this is unclear. One possibility for the superiority of moral-based attitudes in the prediction of behavior is that moral views are stable and internal influences (Rozin, 1999) or potentially even genetic (Brandt & Wetherell, 2012; Tesser, 1993), and so attitudes that are based on morality can also be stable and resistant to influence.

MFT likely also provides a framework for understanding how people decide whether or not to comply with behaviors governments have promoted to flatten the COVID-19 curve. MFT's likely links to behavioral compliance in the context of COVID-19 and other pandemics have not been explored. But, conceivably, people who care about others should be more likely to adopt behaviors that can protect public health. Similarly, those who value fairness should be more likely to take action because the positive benefits of these behaviors only arise when everyone plays their part. Individuals who value following authority may also be willing to take up these behaviors that governments promote or even mandate. By examining moral foundations that are associated with staying-at-home, wearing face masks, and social distancing, public health communication can communicate the importance of such actions appropriately to increase behavioral compliance (Eaton et al., 2020; Hossain et al., 2020).

Furthermore, exploring the relevant moral foundations depending on one's age is also pertinent. People younger in age have been more likely to flout coronavirus restrictions than older age groups. For example, young adults breaking local and national rules are argued to be the principle drivers of the "second" or even the "third" waves of the coronavirus (Gowen, Hernández, & Rozsa, 2020; Rosney, 2020). In fact, nearly 40% of young adults aged between 18 and 31 years have defied social distancing rules (Moore, Lee, Hancock, Halley, & Linos, 2020), and less than 50% of people under 30 years old were "completely" complying with lockdown restrictions (PA Media, 2020). Naturally, given that deaths from COVID-19 are more prevalent among the older populations in society (Vandoros, 2020; Verity et al., 2020; Wu, Chen, et al., 2020; Wu, Leung, et al., 2020), young adults may simply consider the virus not an issue that is pertinent to them. However, there may be deeper underlying concerns relating to moral foundations at play. Indeed, there is early evidence that age predicts which moral foundations are stressed—with loyalty and sanctity more relevant for older than younger age groups (Friesen, 2019; Sağel, 2015). However, it might also be that younger (or older) adults may associate different moral foundations with different behaviors that "flatten the curve."

The purpose of the current research then is to examine the associations that people have between the five moral foundations (caring, fairness, loyalty, authority, and sanctity) and the primary three behaviors targeted and promoted by governments to flatten the curve (staying-at-home, wearing face masks, and social distancing). In particular, age differences in such associations warrant attention given that, observationally, young adults are more likely to flout these restrictions. Given a lack of understanding of age difference in moral foundations, and of links between moral foundations and public health behaviors aside from vaccine use hesitancy, there is little for us upon which to make formal hypotheses. Thus, our research and study are exploratory in nature. We now present the study that we conducted here and then we will discuss the policy implications of our findings in our General Discussion.

2. Method

In the current research, our outcome of interest is behavioral compliance, defined here formally as a willingness to take up actions in the absence of government enforcement. We recruited 1033 American citizens for this study (M_{age} = 38.49 years old, *S.D.* = 13.31 years old; 408 men, 625 women). First, their intentions to comply with the target behaviors (i.e., stay-at-home, wearing face masks, social distancing; Conner, McEachan, Lawton, & Gardner, 2016) were measured, if such behaviors were being advised by the state in which they live until August 2020. We expressly asked if respondents would comply with such recommendations until this date since, as of the study's date (April 2020), no U.S. state had such advice until this time. Therefore, these hypothetical recommendations would be relevant to all, as opposed to measuring real behavior but where some states had certain advice but not others or were already easing restrictions at the time of the study. Moreover, to assess compliance with mandated orders would override one's own considerations.

All our respondents first completed the Moral Foundations Questionnaire (Graham et al., 2011), designed to measure one's consideration of the five moral foundations in determining whether a behavior is "right" or "wrong." They then indicated the degree to which they were afraid of COVID-19 on the Fear of COVID-19 Scale (Ahorsu et al., 2020), designed to assess respondents' general fears of contracting the novel coronavirus. Afterwards, respondents completed the Global Health Scale (Hays, Bjorner, Revicki, Spritzer, & Cella, 2009), which measured one's perception of their overall health. Both the Fear of COVID-19 and Global Health Scales were used as covariates in our analyses. Respondents completed demographic questions, including questions about gender, age, political party supported, level of education, both personal and household income levels, whether they had been diagnosed with novel coronavirus, and how many people they knew were diagnosed with it.

Following medical and health adherence literatures (Ivanova et al., 2012; Peterson et al., 2007; Vitolins, Rand, Rapp, Ribisl, & Sevick, 2000), we trichotomized behavioral compliance intentions for each target behavior separately. This allowed us to segment our population along low, medium, high compliance intention groups for each behavior, allowing us to compare the medium against the low, and the high against the low, intentions groups, along the five moral foundations. Each of the three target behaviors was regressed onto the five foundations using no-interaction unconditional polytomous regressions, with covariates including Fear of COVID-19 and Global Health Scales and all demographic variables. The rationale for our analytic choice is in our Supplementary Materials. Adjusted odds ratios (ORs) for each moral foundation are shown in Figs. 1 (staying-at-home), 2 (face masks), and 3 (social distancing).
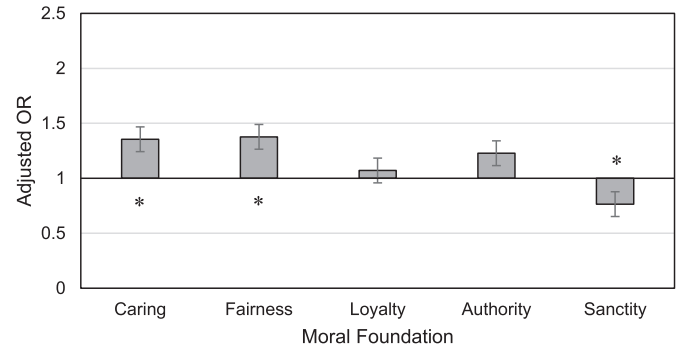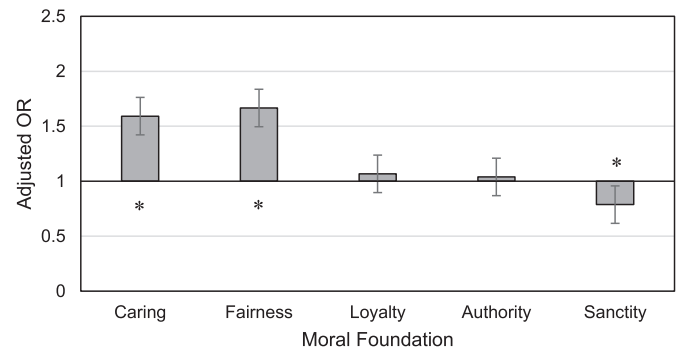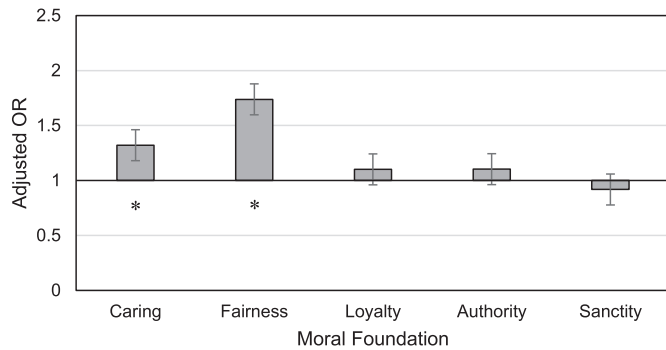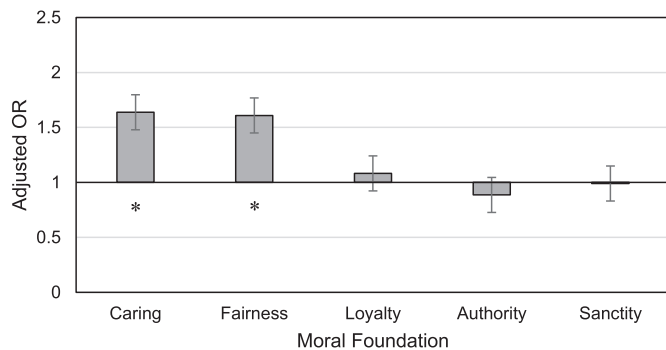

Fig. 1. Medium and high vs. low compliance for staying-at-home.
Adjusted ORs and 95% CIs from an unconditional polytomous logistic regression model with no interactions, adjusted for fear of COVID-19, global health, and all demographic variables. Subfigure A is likelihood of higher emphasis on a moral foundation for respondents scoring medium (vs. low) on behavioral compliance. Subfigure B is likelihood of higher emphasis on a moral foundation for respondents scoring high (vs. low) on behavioral compliance. *$p < .05$.

Fig. 2. Medium and high vs. low compliance for wearing face masks.
Adjusted ORs and 95% CIs from an unconditional polytomous logistic regression model with no interactions, adjusted for fear of COVID-19, global health, and all demographic variables. Subfigure A is likelihood of higher emphasis on a moral foundation for respondents scoring medium (vs. low) on behavioral compliance. Subfigure B is likelihood of higher emphasis on a moral foundation for respondents scoring high (vs. low) on behavioral compliance. *$p < .05$.

3. Results

Tables 1 to 4 present the descriptive statistics for our sample overall (1), and then compares them across the high, medium, and low compliance categories firstly for staying-at-home (2), wearing face masks (3), and social distancing (4). Table 5 presents the correlation results between all dependent variables measured. Finally, Tables 6 to 8 present the adjusted ORs, 95% CIs, and *p* values for each of the target behavior compliance measures—for staying-at-home (6), wearing face masks (7), and social distancing (8).

There were similar moral foundations relevant for both high and medium compliance respondents for all target behaviors. For our first target behavior staying-at-home, medium compliance respondents were more likely than low compliance ones (adjusted OR = 1.321) to place an emphasis on caring; they were also nearly twice as likely (OR = 1.738) to place an emphasis on fairness. This is consistent also among high compliance respondents for both moral foundations of caring and fairness ($OR_{caring} = 1.638$ and $OR_{fairness} = 1.609$). For wearing face masks, medium compliance respondents were more likely than low compliance ones to place an emphasis on caring and fairness ($OR_{caring} = 1.355$ and $OR_{fairness} = 1.377$). However, medium compliance respondents were less likely than the low compliance group (OR = 0.765) to place emphasis on sanctity. As with staying-at-home, the results were consistent among the high compliance group who were more likely than the low-compliance ones in considering both caring and fairness ($OR_{caring} = 1.592$ and $OR_{fairness} = 1.666$). Further, like medium compliance respondents, high compliance respondents were also less likely than low compliance respondents to stress sanctity (OR = 0.787).
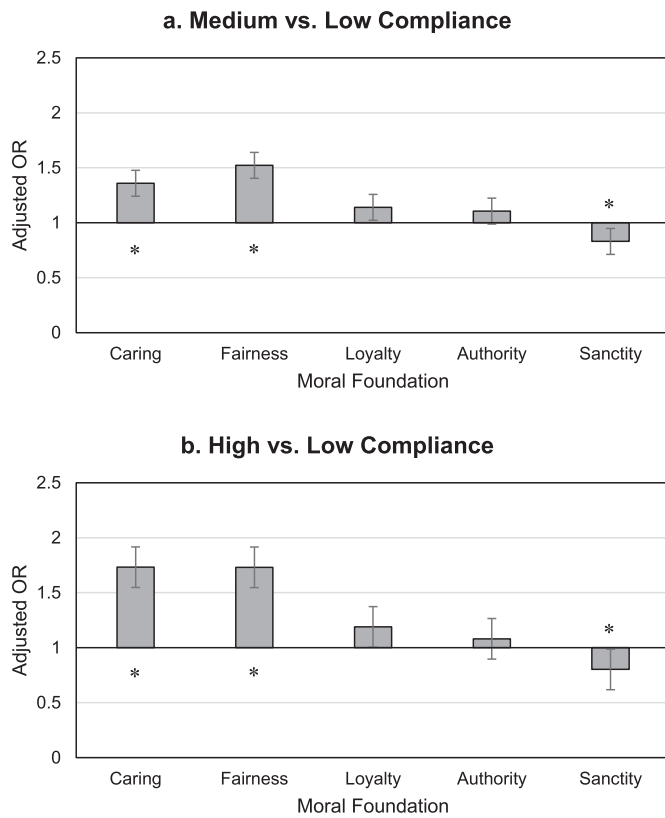
Fig. 3. Medium and high vs. low compliance for social distancing. Adjusted ORs and 95% CIs from an unconditional polytomous logistic regression model with no interactions, adjusted for fear of COVID-19, global health, and all demographic variables. Subfigure A is likelihood of higher emphasis on a moral foundation for respondents scoring medium (vs. low) on behavioral compliance. Subfigure B is likelihood of higher emphasis on a moral foundation for respondents scoring high (vs. low) on behavioral compliance. *$p < .05$.

Finally, for social distancing, medium compliance respondents were more likely than their low compliance counterparts (OR = 1.359) to place an emphasis on caring; they were also more likely (OR = 1.522) to value fairness. And, the medium compliance group was less likely than low compliance ones (OR = 0.830) to place a consideration on sanctity. These findings were again similar for high compliance respondents, who were nearly twice as likely to emphasize caring and fairness (OR_{caring} = 1.732 and $OR_{fairness}$ = 1.731) and were also less likely (OR = 0.802) to value sanctity. We verified all of these results by employing stepwise backwards regressions (Supplementary Tables 1, 2, and 3) and with continuous (vs. categorized) responses for each measured target behavior using multivariate regression analyses (Supplementary Tables 4, 5, and 6).

Examining the data deeper to study potential age differences, we reran our multivariate analyses with age interactions (under 40 years old vs. 40 years of age and over) for all moral foundations (Tables 9 to 11). Replicating earlier results, the analysis also revealed age interaction effects that were not initially apparent. For staying-at-home (Supplementary Table 7), there were noted age differences for loyalty (B = 0.286, SE = 0.117, t = 2.444, p = .013) and sanctity (B = 0.194, SE = 0.096, t = 2.020, p = .042). Younger respondents negatively associated sanctity with staying-at-home (B = −0.184, SE = 0.064, t = −2.875, p = .003) but not older ones (B = 0.062, SE = 0.073, t = 0.863, p = .394). In contrast, younger respondents did not associate loyalty with the target behavior (B = 0.023, SE = 0.073, t = 0.313, p = .754), whereas older ones did, positively (B = −0.312, SE = 0.099, t = −3.151, p = .001).

For wearing face masks, there was an age interaction only for sanctity (Supplementary Table 8; B = 0.196, SE = 0.095, t = 2.071, p = .039).

Table 1
Descriptive statistics.

Characteristics	N (%)/M (SD)
Gender	
Male	408 (39.5)
Female	625 (60.5)
Age	
Under 40 years old	614 (59.4)
40 years old and over	419 (40.5)
Political party	
Democrats	506 (48.9)
Republicans	317 (30.6)
Other/Independent	210 (20.3)
Education level	
Less than high school	10 (0.09)
High school diploma	239 (23.1)
Two year/associate degree	145 (14.0)
Four year/bachelor degree	413 (39.9)
Master's/professional degree	199 (19.2)
Doctoral degree	27 (2.6)
Income $	
Personal	40,361 (49,310)
Household	70,686 (69,389)
Diagnosed with COVID-19	
Yes	44 (4.2)
No	989 (95.7)
Known COVID-19 contacts	1.323 (4.285)
Measured variables	
Target behaviors	
Staying-at-home	5.447 (1.652)
Wearing face masks	5.697 (1.668)
Maintaining social distancing	5.885 (1.468)
Moral foundations	
Caring	5.463 (0.970)
Fairness	5.325 (0.904)
Loyalty	4.272 (1.208)
Authority	4.640 (1.148)
Sanctity	4.268 (1.447)
Others	
Fear	3.589 (1.536)
Global health	5.080 (0.997)

Figures for all except personal income, household income, known COVID-19 contacts, staying-at-home, wearing face masks, social distancing, fear of COVID-19, and global health are in N (%). Percentages in each row may not add up to 100 due to rounding.

Younger respondents negatively associated sanctity with the use of face masks (B = −0.230, SE = 0.066, t = −3.485, p = .001) but this did not arise for older respondents (B = −0.065, SE = 0.073, t = −0.883, p = .378). Unlike staying-at-home and social distancing, for the use of face masks, there was no interactive effect between age and the loyalty foundation. The interactive effects that we obtained for social distancing were for loyalty and sanctity, just like staying-at-home (Supplementary Table 9; $B_{loyalty}$ = 0.213, SE = 0.107, t = 1.997, p = .046; $B_{sanctity}$ = 0.182, SE = 0.088, t = 2.068, p = .039). Younger respondents' sanctity concerns negatively predicted compliance intentions with social distancing, (B = −0.156, SE = 0.061, t = 2.535, p = .01), but older respondents' loyalty concerns predicted it instead in a positive manner (B = 0.173, SE = 0.088, t = 0.1971, p = .049).

However, one important matter is that correlation does not necessarily mean causation. Do differences in emphases on loyalty and sanctity explain differences between younger and older respondents in complying with staying-at-home and social distancing, and differences in sanctity explain age differences in wearing face masks? Mediation analyses (Supplementary Tables 10 to 12 for each target behavior) revealed significant indirect effects. Sanctity concerns explained why younger respondents were less likely to stay-at-home (B = 0.0003, SE = 0.0003), wear face masks (B = 0.0006, SE = 0.0006), and social distance (B = 0.0004, SE = 0.0004); loyalty explained why older people were more likely to stay-at-home (B = 0.0003, SE = 0.0003) and social distance (B = 0.0002, SE = 0.0002).

Table 2
Descriptive statistics by high/medium/low compliance for staying-at-home.

Characteristics	N (%)/M (SD) High (n = 276)	Medium (n = 343)	Low (n = 414)
Gender ($p = .002$)			
Male	94 (23.0)	124 (30.4)	190 (46.6)
Female	182 (29.1)	219 (35.0)	224 (35.8)
Age ($p = .111$)			
Under 40 years old	152 (24.8)	201 (32.8)	260 (42.4)
40 years old and over	124 (29.6)	142 (33.9)	153 (36.5)
Political party ($p < .001$)			
Democrats	173 (34.2)	182 (26.0)	151 (29.8)
Republicans	57 (18.0)	89 (28.1)	171 (53.9)
Other/Independent	45 (21.6)	72 (34.6)	91 (43.8)
Education level ($p = .577$)			
Less than high school	1 (25.0)	1 (25.0)	2 (50.0)
High school diploma	55 (23.0)	85 (35.6)	99 (41.4)
Two year/associate degree	46 (31.7)	39 (26.9)	60 (41.4)
Four-year/bachelor degree	106 (25.7)	145 (35.1)	162 (39.2)
Master's/professional degree	55 (27.6)	63 (31.7)	81 (40.7)
Doctoral degree	10 (37.0)	10 (37.0)	7 (25.9)
Income $			
Personal ($p = .902$)	39,412 (43,966)	41,224 (57,294)	40,219 (45,654)
Household ($p = .104$)	65,549 (54,730)	76,166 (80,142)	68,276 (57,930)
Diagnosed with COVID-19 ($p = .009$)			
Yes	3 (6.8)	19 (43.2)	22 (50.0)
No	273 (27.6)	324 (32.8)	392 (39.6)
Known COVID-19 contacts ($p = .429$)	1.613 (4.450)	1.283 (3.375)	1.181 (4.881)
Measured variables			
Target behaviors			
Face masks ($p < .001$)	6.821 (0.630)	6.231 (1.018)	4.504 (1.824)
Social distancing ($p < .001$)	6.954 (0.268)	6.453 (0.688)	4.701 (1.583)
Moral foundations			
Caring ($p < .001$)	5.840 (0.928)	5.618 (0.811)	5.083 (0.980)
Fairness ($p < .001$)	5.654 (0.889)	5.501 (0.773)	4.960 (0.888)
Loyalty ($p = .530$)	4.266 (0.996)	4.325 (1.252)	4.216 (1.423)
Authority ($p = .307$)	4.596 (1.411)	4.718 (1.166)	4.605 (0.912)
Sanctity ($p = .809$)	4.221 (1.670)	4.295 (1.474)	4.277 (1.256)
Others			
Fear ($p < .001$)	4.123 (1.539)	3.832 (1.497)	3.032 (1.382)
Global health ($p = .052$)	5.194 (1.083)	5.076 (0.913)	5.006 (0.998)

Figures for all except personal income, household income, known COVID-19 contacts, staying-at-home, wearing face masks, social distancing, fear of COVID-19, and global health are in *N* (%). Percentages in each row may not add up to 100 due to rounding.

Table 3
Descriptive statistics by high/medium/low compliance for wearing face masks.

Characteristics	N (%)/M (SD) High (n = 412)	Medium (n = 280)	Low (n = 341)
Gender ($p < .001$)			
Male	132 (32.4)	111 (27.2)	165 (40.4)
Female	280 (44.8)	169 (27.0)	176 (28.2)
Age ($p = .588$)			
Under 40 years old	238 (38.8)	166 (27.1)	210 (34.1)
40 years old and over	174 (41.5)	114 (27.2)	131 (31.3)
Political party ($p < .001$)			
Democrats	256 (50.6)	144 (28.5)	106 (20.9)
Republicans	78 (24.6)	87 (27.4)	152 (47.9)
Other/Independent	78 (37.5)	48 (23.1)	82 (39.4)
Education level ($p = .048$)			
Less than high school	1 (25.0)	0 (0.0)	3 (75.0)
High school diploma	98 (41.0)	53 (22.2)	88 (36.8)
Two year/associate degree	53 (36.6)	34 (23.4)	58 (40.0)
Four-year/bachelor degree	176 (42.6)	115 (27.8)	122 (29.5)
Master's/professional degree	71 (35.7)	65 (32.7)	63 (31.7)
Doctoral degree	10 (37.0)	11 (40.7)	6 (22.2)
Income $			
Personal ($p = .002$)	35,470 (37,106)	49,102 (65,837)	39,098 (45,766)
Household ($p = .074$)	70,055 (66,193)	76,915 (68,624)	64,746 (61,392)
Diagnosed with COVID-19 ($p < .001$)			
Yes	2 (4.5)	20 (45.5)	22 (50.0)
No	410 (41.5)	260 (26.3)	319 (32.3)
Known COVID-19 contacts ($p = .050$)	1.277 (2.769)	1.838 (5.808)	0.985 (4.410)
Measured variables			
Target behaviors			
Stay-at-home ($p < .001$)	6.470 (0.962)	5.654 (1.201)	4.042 (1.641)
Social distancing ($p < .001$)	6.807 (0.619)	6.154 (0.837)	4.546 (1.619)
Moral foundations			
Caring ($p < .001$)	5.788 (0.879)	5.498 (0.893)	5.041 (0.979)
Fairness ($p < .001$)	5.618 (0.835)	5.378 (0.809)	4.928 (0.914)
Loyalty ($p = .038$)	4.323 (0.975)	4.380 (1.232)	4.157 (1.349)
Authority ($p = .168$)	4.567 (1.315)	4.734 (1.106)	4.651 (0.944)
Sanctity ($p = .010$)	4.104 (1.639)	4.336 (1.382)	4.411 (1.220)
Others			
Fear ($p < .001$)	3.875 (1.472)	3.830 (1.537)	3.036 (1.469)
Global health ($p = .207$)	5.134 (1.069)	5.090 (0.861)	5.005 (1.008)

Figures for all except personal income, household income, known COVID-19 contacts, staying-at-home, wearing face masks, social distancing, fear of COVID-19, and global health are in *N* (%). Percentages in each row may not add up to 100 due to rounding.

4. Discussion

These findings with over 1000 American respondents provide unique insights into the moral foundations that they associate with staying-at-home, wearing face masks, and social distancing—three common behaviors that governments have advocated to flatten the COVID-19 curve. Caring and fairness are important considerations that predict behavioral compliance intentions for all target behaviors. This finding is perhaps not surprising because these behaviors all protect not just oneself but other people, but they also only "work" when everyone engages in them and no one social loafs (Karau & Williams, 1993). Authority does not predict behavioral compliance for the target behaviors. This can be explained as we were not examining compliance with government orders.

What is interesting are the age interaction findings for loyalty and sanctity. Loyalty is relevant for staying-at-home and social distancing, but not wearing face masks, among older respondents. This may also make sense as staying-at-home and social distancing are behaviors that involve putting one's group concerns above one's own. To stay-at-home

means avoiding contact, and to social distance means separating oneself from others. This stands in opposition to face masks, which one can wear to protect the self even when not near other people. Older people furthermore tend to be more collectivistic, potentially explaining why they might place greater emphasis on group goals over self-considerations (Litman, Robinson, & Abberbock, 2017). Meanwhile, younger respondents' sanctity considerations predict lower compliance. This moral foundation is, in a way, least studied and most controversial. It originated, conceptually, in physical disgust (e.g., a physical object is disgusting), then later becoming an umbrella term that also captured moral purity (e.g., going against social or moral norms) (Davis, Dooley, Hook, Choe, & McElroy, 2017). It does not seem likely that the three target behaviors evoke physical disgust, although face masks could potentially be seen as a "dirtied" item given its propensity to collect germs. However, moral disgust may be a likely result. Indeed, social commentators often contend that humans are social animals who cannot be contained to one's residence solely, and that wearing face masks is not just uncomfortable but also unnatural. Therefore, younger people might feel it go against "human nature" to stay-at-home, wear face

Table 4

Descriptive statistics by high/medium/low compliance for social distancing.

Characteristics	N (%)/M (SD)		
	High (n = 458)	Medium (n = 267)	Low (n = 308)
Gender (p = .001)			
Male	156 (38.2)	107 (26.2)	145 (35.5)
Female	302 (48.3)	160 (25.6)	163 (26.1)
Age (p = .017)			
Under 40 years old	254 (41.4)	157 (25.6)	203 (41.4)
40 years old and over	204 (48.7)	110 (26.3)	105 (25.1)
Political party (p < .001)			
Democrats	270 (53.4)	124 (24.5)	112 (22.1)
Republicans	91 (28.7)	90 (28.4)	136 (42.9)
Other/Independent	97 (46.6)	52 (25.0)	59 (28.4)
Education level (p = .432)			
Less than high school	1 (25.0)	1 (25.0)	2 (50.0)
High school diploma	114 (47.7)	48 (2.1)	77 (32.2)
Two year/associate degree	68 (46.9)	33 (22.8)	44 (30.3)
Four-year/bachelor degree	178 (43.1)	115 (27.8)	120 (29.1)
Master's/professional degree	80 (40.2)	61 (30.7)	58 (29.1)
Doctoral degree	14 (51.9)	7 (25.9)	6 (22.2)
Income $			
Personal (p = .453)	38,272 (43,832)	42,880 (57,562)	41,223 (49,484)
Household (p = .249)	70,164 (66,436)	75,072 (68,193)	65,850 (61,236)
Diagnosed with COVID-19 (p < .001)			
Yes	3 (6.8)	22 (50)	19 (43.2)
No	455 (46.0)	245 (24.8)	289 (29.2)
Known COVID-19 contacts (p = .811)	1.253 (2.675)	1.471 (4.908)	1.327 (5.591)
Measured variables			
Target behaviors			
Stay-at-home (p < .001)	6.499 (0.886)	5.638 (1.155)	3.718 (1.471)
Face masks (p < .001)	6.644 (0.934)	5.915 (1.138)	4.098 (1.730)
Moral foundations			
Caring (p < .001)	5.780 (0.890)	5.465 (0.866)	4.989 (0.978)
Fairness (p < .001)	5.609 (0.855)	5.343 (0.814)	4.886 (0.877)
Loyalty (p = .082)	4.318 (0.938)	4.376 (1.239)	4.182 (1.339)
Authority (p = .195)	4.598 (1.321)	4.749 (1.095)	4.608 (0.881)
Sanctity (p = .047)	4.147 (1.642)	4.014 (1.366)	4.334 (1.172)
Others			
Fear (p < .001)	3.771 (1.486)	3.860 (1.596)	3.085 (1.438)
Global health (p = .051)	5.149 (1.60)	5.085 (0.866)	4.971 (0.998)

Figures for all except personal income, household income, known COVID-19 contacts, staying-at-home, wearing face masks, social distancing, fear of COVID-19, and global health are in N (%). Percentages may not add up to 100 due to rounding.

masks, and maintain social distance.

The findings we report provide insights for governments, doctors, and policy officials interested in encouraging the adoption of the three

Table 6

Summary of results from no-interaction unconditional polytomous logistic regression models by compliance level for staying-at-home.

Medium vs. low behavioral compliance					
Predictors	B	SE	Wald	Sig.	OR
Moral foundations					
Caring	0.278	0.124	5.028	0.025	1.321
Fairness	0.553	0.133	17.340	<0.001	1.738
Loyalty	0.106	0.113	0.879	0.349	1.101
Authority	0.098	0.132	0.551	0.458	1.103
Sanctity	−0.085	0.091	0.883	0.347	0.918
Others					
Fear	0.478	0.066	51.643	<0.001	1.612
Global health	0.179	0.097	3.377	0.066	1.196
Demographics					
Gender	0.218	0.181	1.446	0.229	1.243
Age	0.016	0.007	6.118	0.013	1.016
Political party	−0.291	0.107	7.415	0.006	0.748
Education level	−0.009	0.027	0.119	0.730	0.991
Personal income	<0.001	<0.001	0.132	0.716	1.000
Household income	<0.001	<0.001	2.658	0.103	1.000
Diagnosed	−0.294	0.425	0.478	0.489	0.745
Known contacts	−0.005	0.021	0.058	0.809	0.995

High vs. low behavioral compliance					
Predictors	B	SE	Wald	Sig.	OR
Moral foundations					
Caring	0.494	0.139	12.591	<0.001	1.638
Fairness	0.476	0.146	10.554	0.001	1.609
Loyalty	0.085	0.118	0.523	0.470	1.082
Authority	−0.121	0.140	0.752	0.386	0.886
Sanctity	−0.010	0.098	0.011	0.918	0.990
Others					
Fear	0.654	0.076	74.513	<0.001	1.924
Global health	0.427	0.107	15.948	<0.001	1.533
Demographics					
Gender	0.270	0.208	1.690	0.194	1.310
Age	0.022	0.008	8.273	0.004	1.022
Political party	−0.338	0.124	7.347	0.007	0.714
Education level	<0.001	0.026	<0.001	0.990	1.000
Personal income	<0.001	<0.001	0.485	0.486	1.000
Household income	<0.001	<0.001	<0.001	0.992	1.000
Diagnosed	−1.770	0.863	4.208	0.040	0.170
Known contacts	0.028	0.021	1.723	0.189	1.028

Table 5

Correlations between dependent variables.

	1	2	3	4	5	6	7	8	9	10
Target behaviors										
Staying-at-home	–	0.699*	0.774*	0.303*	0.296*	0.006	0.006	−0.019	0.381*	0.005
Wearing face masks		–	0.718*	0.292*	0.295*	0.022	−0.027	−0.084*	0.333*	0.010
Maintaining social distancing			–	0.298*	0.299*	0.024	0.003	−0.064*	0.271*	0.030
Moral foundations										
Caring				–	0.670*	0.136*	0.181*	0.144*	0.122*	0.107*
Fairness					–	0.102*	0.124*	0.055	0.144*	0.084*
Loyalty						–	0.723*	0.651*	0.216*	0.156*
Authority							–	0.723*	0.152*	0.194*
Sanctity								–	0.187*	0.122*
Others										
Fear									–	−0.234*
Global health										–

All variables were assigned on 7-point scales, with higher values indicating behavioral compliance intentions, greater endorsement of the respective moral foundation, greater fear of COVID-19, and greater self-reported global health.

  * p < .05.

Table 7
Summary of results from no-interaction unconditional polytomous logistic regression models by compliance level for wearing face masks.

Medium vs. low behavioral compliance					
Predictors	B	SE	Wald	Sig.	OR
Moral foundations					
Caring	0.304	0.140	4.712	0.030	1.355
Fairness	0.320	0.146	4.783	0.029	1.377
Loyalty	0.073	0.126	0.338	0.561	1.071
Authority	0.206	0.143	2.055	0.152	1.228
Sanctity	−0.268	0.106	6.393	0.011	0.765
Others					
Fear	0.424	0.071	35.611	<0.001	1.528
Global health	0.104	0.109	0.910	0.340	1.109
Demographics					
Gender	0.317	0.199	2.523	0.112	1.373
Age	0.008	0.007	1.159	0.282	1.008
Political party	−0.313	0.115	7.390	0.007	0.831
Education level	0.148	0.088	2.833	0.092	1.159
Personal income	<0.001	<0.001	1.498	0.221	1.000
Household income	<0.001	<0.001	1.778	0.182	1.000
Diagnosed	−0.449	0.420	1.144	0.285	0.638
Known contacts	0.032	0.021	2.260	0.133	1.032

High vs. low behavioral compliance					
Predictors	B	SE	Wald	Sig.	OR
Moral foundations					
Caring	0.465	0.128	13.112	<0.001	1.592
Fairness	0.511	0.136	14.144	<0.001	1.666
Loyalty	0.070	0.115	0.368	0.544	1.067
Authority	0.038	0.134	0.080	0.777	1.039
Sanctity	−0.240	0.089	7.299	0.007	0.787
Others					
Fear	0.498	0.070	50.895	<0.001	1.645
Global health	0.287	0.098	8.494	0.004	1.332
Demographics					
Gender	0.434	0.192	5.106	0.024	1.543
Age	0.013	0.007	3.263	0.071	1.013
Political party	−0.497	0.115	18.738	<0.001	0.608
Education level	0.014	0.023	0.373	0.541	1.014
Personal income	<0.001	<0.001	0.023	0.881	1.000
Household income	<0.001	<0.001	2.380	0.123	1.000
Diagnosed	−2.495	0.931	7.175	0.007	0.082
Known contacts	0.044	0.025	3.270	0.071	1.045

Table 8
Summary of results from no-interaction unconditional polytomous logistic regression models by compliance level for social distancing.

Medium vs. low behavioral compliance					
Predictors	B	SE	Wald	Sig.	OR
Moral foundations					
Caring	0.307	0.141	4.762	0.029	1.359
Fairness	0.420	0.148	8.030	0.005	1.522
Loyalty	0.151	0.102	2.171	0.141	1.140
Authority	0.101	0.149	0.459	0.498	1.106
Sanctity	−0.186	0.091	4.183	0.041	0.830
Others					
Fear	0.442	0.073	36.683	<0.001	1.556
Global health	0.194	0.112	2.977	0.084	1.214
Demographics					
Gender	0.184	0.204	0.813	0.367	1.202
Age	0.019	0.008	6.440	0.011	1.019
Political party	−0.108	0.115	0.881	0.348	0.898
Education level	0.010	0.027	0.125	0.723	1.010
Personal income	<0.001	<0.001	0.071	0.790	1.000
Household income	<0.001	<0.001	4.378	0.036	1.000
Diagnosed	0.034	0.413	0.007	0.935	1.034
Known contacts	−0.009	0.019	0.209	0.647	0.992

High vs. low behavioral compliance					
Predictors	B	SE	Wald	Sig.	OR
Moral foundations					
Caring	0.549	0.121	20.530	<0.001	1.732
Fairness	0.549	0.130	17.937	<0.001	1.731
Loyalty	0.210	0.125	2.831	0.092	1.189
Authority	0.083	0.127	0.434	0.510	1.087
Sanctity	−0.221	0.111	4 < 0.001	0.045	0.802
Others					
Fear	0.431	0.068	39.612	<0.001	1.539
Global health	0.272	0.096	8.049	0.005	1.312
Demographics					
Gender	0.149	0.188	0.631	0.427	1.161
Age	0.025	0.007	12.748	<0.001	1.026
Political party	−0.348	0.114	9.310	0.002	0.706
Education level	0.006	0.025	0.055	0.815	1.006
Personal income	<0.001	<0.001	0.087	0.768	1.000
Household income	<0.001	<0.001	1.279	0.258	1.000
Diagnosed	−1.623	0.730	4.944	0.026	0.197
Known contacts	0.002	0.022	0.011	0.917	1.002

target behaviors to reduce future waves of COVID-19, or even future pandemics. As we observed, caring and fairness are two foundations relevant to all three target behaviors. This suggests that public health campaigns that promote these target behaviors should emphasize how such actions show that one is caring and is fair for all members of society. In contrast, some health campaigns across the globe have stressed the mandate nature of these orders, using fines and punishments as deterrent. For example, in Hawaii, failure to comply with their 14-day quarantine orders for incoming tourists can result in a one-year jail term or a $5000 USD fine. Our findings suggest that fines and punishments may do little to promote compliance, given that they relate to the authority foundation, which we found is not relevant to all three target behaviors. Similarly, our findings offer insights in health communications targeted at different age groups. As documented, older adults' loyalty increased their (but not younger adults') compliance with staying-at-home and wearing face masks (not social distancing). Many public health campaigns have used "catch phrases" like "Staying apart keeps us together" (Inspector-General for Emergency Management, 2020). Our results suggest that the themes should be targeted to older adults for staying-at-home and wearing face masks; it likely has no effect on any age group for social distancing.

There are limitations to the current study that warrant attention. First, we recruited participants from Amazon.com's Mechanical Turk platform. This online panel has been documented to contain more Americans who are women, lower in educational attainment and income, and more politically liberal (Mason & Suri, 2012; Paolacci, Chandler, & Ipeirotis, 2010). However, MTurk samples have produced results documented in the literature in such tasks as framing effects and cognitive biases, economic games, psychological priming, and the Stroop task (Crump, McDonnell, & Gureckis, 2013; Goodman, Cryder, & Cheema, 2013; Sprouse, 2011), thus our results may be more or less representative of the American population on actual outcomes. Second, it may be possible for moral foundations underlying the three target behaviors to change across time. We conducted the study in April 2020, when most U.S. states were experiencing the "first wave," and attitudes toward staying-at-home, wearing face masks, and social distancing may change as states have started experiencing second or even third waves in the summer and fall of 2020. Indeed, many people may have become accustomed to wearing face masks as time goes on, for example. But, given that moral foundations are by definition foundational, our findings during the so-called first wave may also be relevant and stable into the latter waves. In any case, further research is needed to document our findings across time, longitudinally.

Crucially, we do not imply that only moral foundations can predict attitudes or behaviors concerning staying-at-home, wearing face masks, and social distancing, or that MFT predicts attitudes and behaviors in

Table 9
Summary of results from multivariate linear regression model including age interactions for staying-at-home.

Predictors	B	SE	t	Sig.
Moral foundations				
Caring	0.258	0.067	3.851	<0.001
Fairness	0.164	0.070	2.355	0.019
Loyalty	0.083	0.060	1.380	0.168
Authority	0.023	0.067	0.336	0.737
Sanctity	−0.048	0.048	−0.995	0.320
Age interactions				
Age × Caring	0.057	0.131	0.433	0.665
Age × Fairness	0.058	0.139	0.421	0.674
Age × Loyalty	0.286	0.117	2.444	0.013
Age × Authority	0.004	0.136	0.030	0.976
Age × Sanctity	0.194	0.096	2.020	0.042
Others				
Fear	0.422	0.033	12.889	<0.001
Global health	0.131	0.050	2.652	0.008
Demographics				
Gender	0.144	0.098	1.472	0.141
Age	0.009	0.003	2.610	0.009
Political party	−0.306	0.108	−2.820	0.005
Education level	−0.011	0.014	−0.806	0.420
Personal income	<0.001	<0.001	0.932	0.351
Household income	<0.001	<0.001	−0.155	0.877
Diagnosed	−0.388	0.248	−1.567	0.117
Known contacts	0.009	0.011	0.821	0.412

Age was coded as 0 = Under 40 year old and 1 = 40 years old and over.

Table 10
Summary of results from multivariate linear regression model including age interactions for wearing face masks.

Predictors	B	SE	t	Sig.
Moral foundations				
Caring	0.254	0.068	3.713	<0.001
Fairness	0.182	0.071	2.551	0.011
Loyalty	0.009	0.061	0.156	0.876
Authority	0.033	0.068	0.481	0.631
Sanctity	−0.147	0.049	−2.973	0.003
Age interactions				
Age × Caring	−0.111	0.129	−0.859	0.391
Age × Fairness	0.079	0.136	0.577	0.564
Age × Loyalty	0.170	0.115	1.478	0.135
Age × Authority	−0.046	0.134	−0.346	0.729
Age × Sanctity	0.196	0.095	2.071	0.039
Others				
Fear	0.369	0.033	11.044	<0.001
Global health	0.109	0.051	2.153	0.031
Demographics				
Gender	0.127	0.100	1.270	0.204
Age	0.031	0.004	0.863	0.388
Political party	−0.320	0.111	−2.893	0.004
Education level	0.021	0.014	1.463	0.144
Personal income	<0.001	<0.001	−0.393	0.694
Household income	<0.001	<0.001	1.882	0.060
Diagnosed	−0.509	0.253	−2.017	0.044
Known contacts	0.011	0.011	0.946	0.344

Age was coded as 0 = Under 40 year old and 1 = 40 years old and over.

Table 11
Summary of results from multivariate linear regression model including age interactions for social distancing.

Predictors	B	SE	t	Sig.
Moral foundations				
Caring	0.217	0.062	3.517	<0.001
Fairness	0.176	0.064	2.750	0.006
Loyalty	0.069	0.055	1.258	0.209
Authority	0.083	0.062	1.335	0.182
Sanctity	−0.087	0.042	−1.969	0.049
Age interactions				
Age × Caring	−0.141	0.119	−1.181	0.238
Age × Fairness	0.025	0.126	0.197	0.844
Age × Loyalty	0.213	0.107	1.997	0.046
Age × Authority	0.148	0.124	1.194	0.233
Age × Sanctity	0.182	0.088	2.068	0.039
Others				
Fear	0.270	0.030	8.955	<0.001
Global health	0.094	0.046	2.066	0.039
Demographics				
Gender	0.070	0.090	0.772	0.440
Age	0.012	0.003	3.602	<0.001
Political party	−0.325	0.100	−3.249	0.001
Education level	0.004	0.013	−0.294	0.770
Personal income	<0.001	<0.001	−0.784	0.433
Household income	<0.001	<0.001	1.208	0.227
Diagnosed	−0.353	0.228	−1.546	0.122
Known contacts	0.001	0.010	0.145	0.884

Age was coded as 0 = Under 40 year old and 1 = 40 years old and over.

that other people are engaging in such behaviors will also improve compliance (Miller & Prentice, 1996), and the impact of social norms become even stronger when there are common identities shared (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990). This highlights the possibility that, even in cases where moral foundations are not relevant to the target behaviors being promoted (e.g., authority, as we reported, is not associated with any of the target behaviors) social norms can be a route to increase behavioral compliance (e.g., seeing others follow authority can encourage one to authority). But, to the degree that moral-based attitudes are strong predictors of behavior, and social norms are by definition susceptible to what the norm is in society which may change, our results offer strong predictive power to explain why people are or are not following guidelines that flatten the curve independent of social norms, at least for behaviors that are associated with moral foundation.

Indeed, the strength of Moral Foundations Theory is that it explores people's underlying intuitions. By understanding the moral foundations relevant, we offer guidance concerning how to design and frame public health communications that are aimed at increasing uptake of behaviors. In the United States, surveys have reported that many respondents do not comply with guidelines concerning the three target behaviors that would help flatten the curve. However, the surveys rely upon self-reported explanations for (not) taking up the actions, leading to concerns about social desirability bias and the need to understand deeper intuitions, which MFT examines. Our research is exploratory and more work is needed to explicate why individuals associate different moral foundations with each of the three target behaviors, as we only report that they do hold different associations but do not explore the underlying reasoning.

CRediT authorship contribution statement

This research was conducted by a single author (E.C.), who conceived of the study, collected and analyzed the data, and wrote-up the results.

these areas strongest. Indeed, other factors likely predict compliance as well. For example, a wealth of studies shows positive correlations between social norms and positive behaviors such as environmentalism and morality (Goldstein, Cialdini, & Griskevicius, 2008; Gorsuch & Ortberg, 1983). Even the simple recognition that everyone else is engaging in a certain behavior can promote said behavior (Asch, 1956; Cialdini & Goldstein, 2004; Sherif, 1936). Thus, the more people staying-at-home, wearing face masks, and maintaining social distancing, the higher likelihood that others would also do so. The mere perception

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2020.110463.

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