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Personality in a pandemic: Social norms moderate associations between personality and social distancing behaviors

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ABSTRACT

To limit the transmission of the coronavirus disease 2019 (COVID-19), it is important to understand the sources of social behavior for members of the general public. However, there is limited research on how basic psychological dispositions interact with social contexts to shape behaviors that help mitigate contagion risk, such as social distancing. Using a sample of 89,305 individuals from 39 countries, we show that Big Five personality traits and the social context *jointly* shape citizens' social distancing during the pandemic. Specifically, we observed that the association between personality traits and social distancing behaviors were attenuated as the perceived societal consensus for social distancing increased. This held even after controlling for objective features of the environment such as the level of government restrictions in place, demonstrating the importance of subjective perceptions of local norms.

1. Introduction

Due to coronavirus disease 2019 (COVID-19), public compliance with social distancing mandates and guidelines is a central concern for public health experts, government administrators, and political leaders (Bish & Michie, 2010; West, Michie, Rubin, & Amlôt, 2020). Recent research has highlighted the relevance of individual-level characteristics such as Big Five personality traits as predictors of social distancing behavior (Götz, Gvirtz, Galinsky, & Jachimowicz, 2020; Xie, Campbell, & Zhang, 2020). Critically, the study of social behaviors during the COVID-19 pandemic also promises insights into longstanding scientific questions concerning the *conditions* under which personality has its greatest effects on behavior. This issue concerns how the "strength" of a situation, such as the degree of government restrictions during a global pandemic, can exaggerate or mitigate the effect of personality on behavior (Cooper & Withey, 2009). For example, government restrictions moderated some relationships between personality and one type of social distancing behavior, namely, staying at home during the pandemic (Götz et al., 2020). We extend these investigations by examining the impact of another important indicator of situational strength—the individual's perception of local social norms regarding social distancing. Using responses from 89,305 individuals from 39 countries, this analysis allows us to examine whether perceived social norms constrain the influence of personality on behavior in the context of a pandemic.

1.1. Why personality should predict social distancing

Götz et al. (2020) recently explored how Big Five traits predicted staying at home during the early weeks of the COVID-19 pandemic. We rely on the same dataset as Götz et al. (2020), but make fuller use of the data in a few ways. First, we evaluate social distancing more broadly, using a composite of three separate behavioral indicators: (i) staying at home; (ii) avoiding social gatherings; and (iii) maintaining physical distance from others. Each of these indicators represent changes in social behavior recommended by public health authorities in order to reduce disease transmission during the COVID pandemic. Within the context of a pandemic, these three behaviors are thus readily recognized as "health behaviors," a highly diverse class of behaviors concerning the maintenance, restoration, and improvement of one's health. But these

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behaviors also connect to motivations and goals outside of the health domain, including adherence to social norms and government rules, and (conversely) maintenance and enjoyment of one's interpersonal connections. The similarities between these behaviors suggests that the correlation between Big Five traits and this social distancing composite should be very similar to what Götz et al. (2020) observed when analyzing staying at home.

A second departure from Götz et al. (2020) concerns our focus on the extent to which perceptions of social norms moderate the relationship between the Big Five and our composite measure of social distancing. Whereas Götz et al. (2020) examined the moderating role of government restrictions, we control for these policies in our analysis, and investigate how perceptions of the behaviors of others condition the relationship between personality trait and social distancing.

Recent work on the topic has highlighted a few distinct core motivations that highlight why Big Five traits predict social distancing during the pandemic. Consider the results from the previous study using the present data: Götz et al. (2020) found that staying at home was more common among those higher in Conscientiousness, Agreeableness, Openness, and Neuroticism, and lower among Extroverts. The proffered explanations for these links focused primarily on two broad classes of explanations, namely those pertaining to health behaviors, and those pertaining to social norm adherence. The latter is best illustrated by agreeableness, which reflects social compliance and compassion. Although not typically associated with health behaviors or outcomes, agreeableness is connected with the more socially normative health behaviors such as not smoking or consuming illicit substances (Hampson, Goldberg, Vogt, & Dubanoski, 2007; Turiano et al., 2018). Given the normativity of social distancing behavior at the time of the data collection, then, agreeable people are expected to engage in social distancing.

The clearest illustration of links attributable to health behaviors come from neuroticism, which reflects anxiety and irritability. Neuroticism positively correlates not only with fear of disease but also with germ avoidance behavior (Duncan, Schaller, & Park, 2009), and research during the H1N1 pandemic points to such subjective anxiety about the disease as a predictor of adherence to prevention behaviors (Bults et al., 2011). Thus, we expect neurotic individuals to socially distance in order to preserve their own health.

Beyond social norms and health behaviors, we also recognize the relevance of socializing tendencies. Extraverts—who are sociable and assertive—may be more reluctant to socially distance than introverts, given that the former may have a greater need to interact with others and a higher tolerance of risk when doing so. Other health behavior correlates of extraversion also reflects the socializing associated with the trait, such as the excessive use of alcohol that can accompany attendance at social events that involve alcohol consumption (Ibáñez, 2008).

A positive link between social distancing and conscientiousness—which concerns orderliness and self-discipline—may derive from both social norms and health behavior concerns. Conscientiousness is the most reliable and robust Big Five predictor of health behaviors (Hampson & Friedman, 2008), including increased adherence to medical advice (Hill & Roberts, 2011). But conscientiousness also predicts adherence to social norms (Fiddick et al., 2016), as also exemplified by its particularly negative links with socially-proscribed unhealthy behaviors (Bogg & Roberts, 2004).

The final Big Five trait—openness to experience, which reflects orientations towards aesthetics and novelty—has less obvious connections to social distancing behaviors, and our hypotheses in this domain are speculative. One potential explanation for the positive links observed between openness and social distancing include the tendencies of open individuals to be in professional employment that allows working from home (John & Thomsen, 2014; Mongey, Pilossoph, & Weinberg, 2020). Open individuals are also ideologically left-wing (Sibley, Osborne, & Duckitt, 2012), which is associated with elevated concern with the pandemic (at least in some contexts: Allcott et al., 2020; Motta, Stecula, & Farhart, 2020). These considerations suggest a positive association between openness and social distancing.

1.2. Why these associations should be moderated by context

Associations between personality traits and social distancing behavior need not manifest identically across contexts. Instead, the effects of personality on behavior could be suppressed when features of the person's social context—such as government regulations and the individual's perceptions of prevailing social norms—constrain autonomy and behavior (e.g., Hardies, 2019). Contexts in which behavioral options are highly constrained or highly incentivized are considered to be "strong" (Cooper & Withey, 2009; Mischel, 1977). For example, Meyer, Dalal, and Hermida (2010) define situation strength as "implicit or explicit cues provided by external entities regarding the desirability of potential behaviors" (p.122). Here, external pressures and constraints are comparatively potent, with context providing a range of cues and incentives for performing specific behaviors. Under these condition, personality-behavior relationships are attenuated. In contrast, the effect of personality traits on behavior are more visible in "weak" situations, where behavioral cues or incentives are less pronounced and autonomous action is less constrained (Cooper & Withey, 2009; Meyer et al., 2010; Mischel, 1977).

Consider, for example, the influence of one's level of neuroticism on the behavior of "staying at home." A country which introduced a ban on public social gatherings represents a markedly "stronger" situation for this behavior than did the same country before the ban. Intermediate in "strength" between these two contexts would be a country that permits such gatherings but has closed down many of the locations where such gatherings tend to occur (e.g., bars). We might therefore expect that the (positive) effect of neuroticism on social distancing behaviors would be larger in contexts where the government has been less restrictive, where this effect would decrease monotonically as the levels of government restrictiveness increase.

This is, in fact, what Götz et al. (2020) found, with a similar moderation observed for Openness: As government stringency increased, the effects of Neuroticism and Openness on staying at home decreased. Importantly, however, situations can be "strong" even in the absence of pertinent government regulations. Meyer et al.'s (2010) definition of situation strength recognized that behavioral cues can be inferred as readily from peers and media as from government officials. Thus, the individual's perceptions of social norms relating to social distancing, in addition to government restrictions, are also expected to moderate the effect of personality on social distancing behaviors. We provide the first test of this possibility within the context of the COVID pandemic, using data from Fetzer et al. (2020) concerning the individual's perception of what others in their society believe about social distancing.

Increasing government restrictions and relevant social norms should, in general, monotonically attenuate the relationships between Big Five traits and social distancing behaviors. Above we illustrated the principle for neuroticism, but the case of extraversion is similar. While extraverts might typically resist social distancing moreso than introverts, their ability to do so will be attenuated if their social partners become less able or willing to reciprocate, as should be expected if social distancing is legally mandated or socially normative.

Importantly, this bivariate pattern may not hold for all traits. Agreeableness represents the strongest candidate for a deviation. For instance, we theorize that the association between agreeableness and social distancing primarily reflects compliance with laws and social norms. Thus, the moderation pattern suggested for extraversion and neuroticism—with smaller personality-behavior correlations at higher levels of legal restrictions and social norms—may not hold for agreeableness. When the normativity of social distancing is low, higher agreeableness may not translate to increased social distancing. As the normativity of social distancing increases, however, those with higher

agreeableness may feel particularly compelled to adhere to such norms. Thus, we expect a monotonically increasing relationship between agreeableness and social distancing as the normativity of social distancing increases. Such a result would serve as a particularly powerful demonstration of the importance of the intersection of specific situations, traits, and behaviors.

Conscientiousness may reflect a blend between this "calibration-to-situation" pattern described for agreeableness and the attenuation described for extraversion and neuroticism. The fact that highly conscientious individuals are expected to be the quickest to adopt health-improving behaviors points to similarities with extraversion and neuroticism: As social distancing becomes more mandated or normative, highly conscientious individuals will no longer be as distinctive in having adopted such behaviors. However, the norm-obeying element of conscientiousness implies that the trait will function similarly to agreeableness: As social distancing becomes more normative, highly conscientious individuals might particularly excel at adhering to such norms.[2] Conceivably, this could result in moderation results for conscientiousness that sit somewhere between the moderation observed for agreeableness and that observed for other traits.

2. Methods

2.1. Data source and sample

The full dataset provided by Fetzer et al. (2020)—known as the *Global Behaviors and Perceptions in the COVID-19 Pandemic* survey—consists of 113,083 participants from 157 countries, who responded to the survey in 69 languages. The sample is an online opt-in sample and not a random probability sample. The dataset is available at https://osf.io/3sn2k/.[3]

Previous international studies using abbreviated measures of personality have sometimes proved unreliable or uninterpretable due to the absence of information about reliability of the measures used in the data, which when reported is commonly below accepted conventions (see Ludeke & Larsen, 2017). For this reason, we only used data from a given country *if* it met two conditions. First, because correlations can be unstable with low numbers of participants (Schönbrodt & Perugini, 2013) we used only countries in which at least 250 respondents took the survey in the same language. Second, we included only those countries for which the inter-item correlations for each Big Five trait was in the keyed direction ($r > 0.05$). Big Five inter-item correlations for all traits and countries are available in Online Appendix C.

The final sample consists of 89,305 participants from the following 39 countries: Argentina, Austria, Australia, Brazil, Belarus, Canada, Switzerland, Chile, Colombia, Germany, Ecuador, Spain, Finland, France, United Kingdom, Indonesia, Ireland, India, Italy, Kenya, Latvia, Mexico, Malaysia, Netherlands, New Zealand, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Sweden, Singapore, Ukraine, United States, Venezuela, Vietnam and South Africa. Descriptive statistics for each country are available in Online Appendix B.

2.2. Measures

2.2.1. Demographics

Respondents provide their year of birth, years of education completed, monthly pre-tax household income, marital status (married/cohabiting vs single/divorced), and gender.

2.2.2. Social distancing behaviors

Participants were asked "To what extent do the following statements describe your behavior for the past week?" with answers provided on a 101-point sliding scale anchored by "Does not apply very much" (=0) versus "Applies very much" (=100). Three items pertained to social distancing: "I stayed at home," "I did not attend social gatherings," and "I kept a distance of at least two meters to other people." We averaged across these three responses to create our primary outcome measure, a composite social distancing score (Cronbach's alpha = 0.7). Equivalent self-report measures have accrued recent empirical validation with objectively assessed behaviors (Gollwitzer, Martel, Marshall, Höhs, & Bargh, 2020).

2.2.3. Big Five

Personality traits were assessed with the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), which includes one pro-trait and one con-trait item for each Big Five domain. Responses were provided on a seven-point Likert-type scale, ranging from "Disagree strongly" to "Agree strongly."

2.2.4. Perceptions of other's opinions

Respondents indicated what they perceived the attitudes of their fellow countrymates were regarding social distancing by answering four questions preceded by the same stem: "How many of 100 people in your country do you think believe that…" Specific items included cancelling social gatherings, not shaking hands, closing all non-essential shops, and a general curfew (prohibiting leaving home for all but a few reasons). The average across these four questions served as our primary measure of "situational strength."

2.2.5. Government stringency index

We control for government stringency using the Restriction index by Hale et al. (2020). The data provides information on government policy relating to COVID-19 responses for each government and for each day. Specifically, the data covers various aspects of government policies, i.e., school closures, workplace closures, cancellation of public events, closure of public transportation, public information, and restrictions on internal movement. Individual restrictions are coded ordinally with between two and five levels per restriction. For example, workplace closures are scored using four levels such that the lowest level indicates no measures are in place, the highest indicates workplace closures (or working from home) are required for all but essential workplaces such as grocery stores and doctors, with two intermediate levels (workplace closures recommended but not required; workplace closures required for some sectors or categories of work) in between. The final index has a range from 0 (no restrictions) to 100 (maximal restrictions). Each respondent is assigned a country-day score based on their government's stringency in place at the day they completed the survey.

3. Results

3.1. Analysis overview

To estimate the effect of personality traits on social distancing as a function of perceptions of others' beliefs, we run a multi-level regression models with country and date of survey completion fixed effects. Specifically, we include interactions between each of the Big Five traits and perceptions of others' beliefs. The analysis further controls for the government stringency index and its interaction with each of the Big Five traits. Finally, the demographic characteristics identified above are included as covariates. With this model specification, we are able to examine how social distancing is predicted by each personality trait, and how perceived social norms condition this relationship, while accounting for variability in government policies and its interactions with personality traits.

[2] We thank an anonymous reviewer for this insight.

[3] Replication material for the present article is provided at https://doi.org/10.7910/DVN/DUCVZI.

3.2. Situational strength

The scores on situational strength indicators highlighted the degree to which participants faced a "strong situation" with respect to social distancing. The median observed value on the Restriction index is 72 (on a scale from 0 to 100), such that at the time of survey completion most participants faced mandated closures of some but not all schools and workplaces, with gatherings of 11 or more individuals restricted. Still, there was meaningful variation among participants, with Restriction index scores of 5.7 and 91.4 for those at the 5th and 95th percentile of Restriction index scores. At the lower end, this involves few recommendations or minimal requirements for closures or event restrictions, whereas the upper end involves a near complete shutdown of society, with severe restrictions not merely on leaving one's country or region but even on leaving one's house. At the same time, Restriction index scores did not often change throughout the period of the data collection, such that respondents within the same country generally have the same Restriction index score even if completing the survey on different days.

Participants reported that they perceived different levels of support for social distancing behaviors: e.g., the median participant indicated they perceived 64.3 out of 100 countrymates to support requiring that social gatherings be cancelled because of the coronavirus. Accordingly, there was meaningful variation, with the 5th and 95th percentile scores on the same question being 29.5 and 91.3. Therefore, although the variability in situational strength should allow a meaningful test of the impact of situational strength on the relationship between social distancing and personality, the non-trivial median levels of observed situational strength should lead to attenuated relationships in the aggregate.

3.3. Bivariate relationships between Big Five and social distancing

The overall associations between personality and social distancing behavior aligned with expectations, with Extraversion predicting a failure to socially distance whereas Conscientiousness, Agreeableness, Neuroticism, and even Openness positively predicted social distancing (all p values $< .001$; see Online Appendix D for regression models). As expected based on the situational strength results just discussed, these associations are universally modest in magnitude (the beta coefficients are generally around or below 0.05).

3.4. Do features of "strong situations" moderate Big Five and social distancing relationships?

Fig. 1 shows that the magnitude of these linkages was far from equal across all respondents; see also model 1 in Table 1. To ease the interpretation of the focal results, we standardize both the social distancing composite and personality traits but leave other predictors in their unstandardized form (e.g., gender to easily compare the difference); a table

Table 1
Personality traits and social distancing as a function of perceptions of others' beliefs.

	(1)	(2)
	Perceptions of beliefs	Stringency index
Others beliefs	0.005*** (0.0002)	0.005*** (0.0002)
Openness	0.10*** (0.01)	0.09*** (0.01)
Conscientiousness	0.07*** (0.01)	0.06*** (0.01)
Extraversion	−0.09*** (0.01)	−0.08*** (0.01)
Agreeableness	−0.03* (0.01)	−0.04** (0.01)
Neuroticism	0.06*** (0.01)	0.08*** (0.01)
Restriction Index	0.01*** (0.0005)	0.01*** (0.0005)
Male	−0.07*** (0.01)	−0.07*** (0.01)
Age	0.01*** (0.0003)	0.01*** (0.0003)
Education	0.01*** (0.001)	0.01*** (0.001)
Income	0.01*** (0.002)	0.01*** (0.002)
Marital status	−0.07*** (0.01)	−0.07*** (0.01)
Openness * Others beliefs	−0.001*** (0.0002)	−0.001*** (0.0002)
Conscientiousness * Others beliefs	−0.0004* (0.0002)	−0.0004* (0.0002)
Extraversion * Others beliefs	0.001*** (0.0002)	0.001*** (0.0002)
Agreeableness * Others beliefs	0.001*** (0.0002)	0.001*** (0.0002)
Neuroticism * Others beliefs	−0.001*** (0.0002)	−0.001** (0.0002)
Openness * Restriction Index		0.0001 (0.0002)
Conscientiousness * Restriction Index		0.0001 (0.0002)
Extraversion * Restriction Index		−0.0001 (0.0002)
Agreeableness * Restriction Index		0.0002 (0.0002)
Neuroticism * Restriction Index		−0.0005** (0.0002)
Observations	89,305	89,305
R^2	0.22	0.22

Note. Unstandardized regression coefficients with standard errors in parentheses. Both the social distancing composite and personality traits are standardized.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

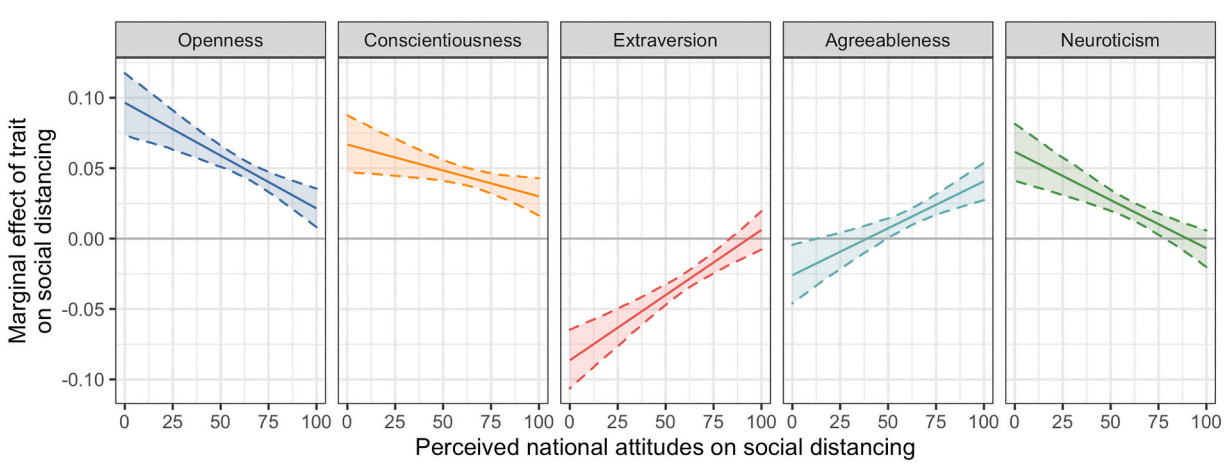

Fig. 1. Perceived national attitudes on social distancing moderates the effects of personality on social distancing behaviors
Note. Marginal effect of personality traits on social distancing composite (with 95% confidence intervals) as a function of perceptions of others' beliefs based on Model 1 in Table 1. Higher values correspond with higher levels of the trait and increased perceptions that others believe it is important to engage in social distancing.

with all coefficients standardized is provided in Online Appendix Table D.2. Those facing a "stronger" situation, as represented by perceiving members of their society to broadly support social distancing, generally showed no link between personality and social distancing. In contrast, among those who perceived members of their society to *not* support social distancing, personality traits correlated with social distancing. These relationships were two or three times larger in magnitude than observed in the sample as a whole, with the interactions all statistically significant (for Conscientiousness, $p = .024$; for other traits, $p < .001$). Only one trait was exempted from this overall pattern: Agreeableness. Among individuals who perceived greater support for social distancing in their country, the effect of Agreeableness on social distancing behaviors became increasingly positive, consistent with the hypothesized mechanism by which Agreeableness was expected to predict social distancing behavior. It is noteworthy that these results hold when taking the actual restrictions in the country into account. Further, adding interaction terms between these restrictions and Big Five traits (Model 2, Table 1) shows that the perceptions of others' opinions serves as the more potent moderator, with government stringency only showing one comparatively modest moderation (for Neuroticism).

4. Discussion

Despite the broad prevalence of theoretical claims regarding situational strength, empirical investigations of the hypothesis remain comparatively rare (Cooper & Withey, 2009; Meyer et al., 2010; Mischel, 2004; for exceptions, see Beaty, Cleveland, & Murphy, 2001; Hardies, 2019; Judge & Zapata, 2015; Meyer, Dalal, & Bonaccio, 2009). Götz et al. (2020) recently demonstrated the power of situational strength within the COVID-19 pandemic by showing that government policies moderated some connections between personality and staying at home. Our analysis extends this work and points to an even *more* consequential moderator for the link between personality and social distancing behavior—perception of local social norms. The relationship between personality and social distancing was generally attenuated when people perceived there to be more social consensus regarding the act of social distancing. Importantly, we observe this pattern independent the effect of government restrictions. The only exception to this trend—agreeableness, which became *more,* not *less,* predictive of social distancing—is, we suggest, not a surprise. Whereas for most traits, the consequence of increasingly restrictive perceived social norms is to reduce their association with behavior, agreeableness represents a trait particularly associated with sensitivity and obedience to such norms, such that the trait becomes increasingly linked with social distancing as those behaviors become more normative. In short, personality matters in a pandemic, but less so under conditions of "situational strength," in which perceptions of social norms *and* imposition of government policies constrain autonomous action and diverging situational construal, thereby restricting variability in behavioral responses as a function of individual-level characteristics.

These results should be kept in mind by researchers and policymakers alike. Although we found that the links between personality and social distancing were largely absent at the highest levels of perceived social normativity of social distancing, personality was more consequential in the weaker situations—a situation that has increasingly come to characterize many contemporary societies as societies might experience "pandemic fatigue." Efforts to convince the public to engage in future social distancing behaviors under these conditions are thus less able to rely purely on context to ensure societal compliance. Instead, with laxed social norms concerning social distancing, efforts to increase more social distancing will likely benefit from tailored messaging based on the individual characteristics that predict (non-)compliance (Lunz Trujillo, Motta, Callaghan, & Sylvester, 2020; Luttig & Lavine, 2016).

The predictive relationships between personality and social distancing that we observed were well-matched to theoretical expectations: Individuals who scored highly on Extraversion were less likely to comply with social distancing whereas those who scored highly on Conscientiousness, Neuroticism, Openness, and Agreeableness were more likely to engage in social distancing. These effects were somewhat weaker than meta-analytic estimates of personality-behavior relations in the health domain (Bogg & Roberts, 2004; Strickhouser, Zell, & Krizan, 2017), presumably reflecting both the comparatively strong situation experienced by most participants as well as the abbreviated personality measure used in the present study (Bakker & Lelkes, 2018). Future research should consider how public health officials can most usefully frame and target their social distancing messages based on the individual characteristics of their audience, given the increasing relevance of these dispositions to social distancing behaviors.

Limitations of the present work include our use of an online, opt-in sample, rather than a more representative sample. However, with prior work indicating that correlations between behaviors and personality traits do not differ systematically between fully representative samples and sub-populations such as internet users, we anticipate that the present results are highly likely to hold when using alternative sampling procedures (cf., Vitriol, Larsen, & Ludeke, 2019).

Future work should also consider how the reliance on the highly-abbreviated TIPI measure underestimated the effect of personality on social distancing (see Credé, Harms, Niehorster, & Gaye-Valentine, 2012). While the very large size of the present sample is likely to have reduced the impact of any such attenuation on our ability to detect significant effects, studies like ours that use such abbreviated measures still risk understating the true connections between personality and social distancing behaviors.

The present study is also limited by reliance on self-report social distancing behaviors rather than objectively observed social distancing. Work using such objective measurement, such as cell phone data, would help evaluate if the present results reflect response biases.

CRediT authorship contribution statement

Steven G. Ludeke: Conceptualization, Writing – original draft, Writing – review & editing. **Joseph A. Vitriol:** Conceptualization, Writing – original draft, Writing – review & editing. **Erik Gahner Larsen:** Conceptualization, Formal analysis, Writing – review & editing, Visualization. **Miriam Gensowski:** Conceptualization, Writing – review & editing.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2021.110828.

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