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Violating social distancing amid the COVID-19 pandemic: Psychological factors to improve compliance

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Abstract

This study uses the theory of planned behavior as a framework to predict intentions of social distancing violation and past non-compliance during the COVID-19 pandemic, controlling for the effects of intolerance of uncertainty and sociodemographic variables. A total of 2,056 Brazilian participants completed measures on attitudes, injunctive and descriptive norms, and perceived behavioral control toward social distancing and answered about their political ideology, income, professional status, gender, and age. Our findings indicate that positive attitudes toward complying with physical distancing, strong descriptive norms using ingroup members as referents, and weaker perceived behavioral control over breaching social distancing predict stronger intentions of adhering to it and actual adherence. Besides, individuals who support right-wing parties, earn lower wages, are students, unemployed, young, and male are more prone to stronger intentions of violating this prevention measure. We suggest designing interventions that foster positive attitudes toward social distancing and address the negative consequences that non-compliance can cause to ingroup members to persuade individuals to stay at home. We also discuss the need for support from prominent political figures and provide evidence to the relevance of investing in conditional cash transfer programs to increase adherence to this preventive measure.

Keywords: Social distancing; theory of planned behavior; COVID-19; pandemic judgment; decision-making.

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Introduction

The COVID-19 pandemic is caused by a newly discovered coronavirus (Sars-CoV-2) which is highly infectious. As approximately 20% of the people who contract it need hospital care (World Health Organization, 2020), the disease is causing an overwhelming burden on health systems throughout the world. In an effort to try to flatten the infection curve, one of the practices to slow the transmission of the COVID-19 disease down consists of social distancing, that is, “avoiding unnecessary travel and staying away from large groups of people” (World Health Organization, 2020). However, complying with physical distancing may not be a straightforward decision, for financial consequences may impede that part of the population strictly follows this preventive measure. For instance, a workforce that has no access to free healthcare and/or is not covered by an income protection scheme is especially vulnerable, and casual workers may have to choose whether to go to work when ill or to starve (McKee & Stuckler, 2020).

One of the most recognized models among cognitive theories which is adopted to analyze decision-making processes is the theory of planned behavior (TPB; Ajzen, 1991), being widely applied to understand and predict health-related behaviors (Gabriel et al., 2019, Hagger et al., 2016, Huang et al., 2020). In the context of the COVID-19 pandemic, TPB has been applied to evaluate factors that affect the perceived effectiveness of COVID-19 preventive measures (Prasetyo et al., 2020), to predict intention and practice on personal preventive measures against the COVID-19 disease (Andarge et al., 2020), and to explain why individuals fail to comply and adhere to health behaviors (Lin et al., 2020). It has also been used to predict destination choices (Han et al., 2020) as well as tourist preference for hotels (Wang et al., 2020) in the post-pandemic period.

Pandemics comprise periods of uncertainty. Decisions about actions must be made when the threat is only modest, and they involve a trade-off between the comparatively small harm that

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interventions may cause and the uncertain probability of much greater harm from a widespread outbreak (Wilson & Baker, 2009). Stringent measures have been taken worldwide (e.g. closure of schools and other public venues, and encouraging people to work at home), and it is impossible to predict when the pandemic will end and these measures will no longer be necessary. Considering that higher levels of intolerance of uncertainty (IU) may lead to inaction and avoidance of ambiguous situations (Dugas et al., 1997), we expect that people high on IU be more likely to comply with preventive measures because they are inapt to face the ambiguous and threatening situation posed by the pandemic.

The COVID-19 pandemic has been politicized. Political partisanship significantly affects communications (Green et al., 2020), belief in conspiracy theories (Havey, 2020; Shahsavari et al., 2020), risk perceptions (Hsiehchen et al., 2020; Pennycook et al., 2020), and adherence to state policies (Grossman et al., 2020; Makridis & Rothwell, 2020; Painter & Qiu, 2020) such as closure of businesses and stay-at-home orders (Makridis & Rothwell, 2020). Indeed, political differences consist of the factor that most consistently distinguishes Americans' health behaviors and policy preferences (Gadarian et al., 2020). For instance, Republicans are less prone to stay at home after a state order has been issued (Grossman et al., 2020; Makridis & Rothwell, 2020; Painter & Qiu, 2020) and tend to believe that the COVID-19 disease has been made a bigger deal than it really is (Pew Research Center, 2020).

Financial aspects may also play a role in non-compliance. Individuals with lower or no job stability (e.g. self-employed and unemployed) may be more likely not to comply with keeping space between themselves and other people outside of their homes, since they may feel more compelled to work to be able to subsist (Jay et al., 2020). Men and young individuals may also be more prone to engage in social distancing violation (Coroiu et al., 2020; Smith, Jacob et al., 2020). This may be the

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case because the former may see adherence to prevention measures as a sign of fear and weakness whereas the latter may think that the virus does not pose a serious threat to their health.

We aim at analyzing the effect of attitudes, injunctive and descriptive norms (using proximal and distal others as referents), and perceived behavioral control on intentions of violating social distancing as well as actual social distancing violation. We also intend to assess the effect of IU and sociodemographic variables (political partisanship, professional status, income, gender, and age) as control variables.

Behavioral intentions

According to TPB, behavioral intention, a predictor of behavior, is influenced by attitudes — the overall evaluation one performs of a certain behavior —, behavioral control — the perceived ease or difficulty associated with a specific behavior —, and subjective norms — social pressure from relevant others (e.g. family, friends, and colleagues). People tend to comply with rules, requirements, and guidelines when they have positive attitudes toward them (McMillan & Conner, 2003, Sasse et al., 2020, Ng et al., 2009, Herath and Rao, 2009, Bulgurcu et al., 2010). In the context of the COVID-19 pandemic, vaccination beliefs and attitudes are the greatest determinants of vaccination intention (Sherman et al., 2020). Indeed, positive attitudes toward epidemic prevention are a driver of preventive behavior (Ahmad et al., 2020) and are linked with actual practice of COVID-19 personal preventive measures (Andarge et al., 2020). Conversely, individuals who disregard certain guidelines are more prone not to adhere readily to them (Pahnila et al., 2007; Myyry et al., 2009). Thus, we expect that positive attitudes toward social distancing lead to stronger intentions of complying with it as well as more compliance.

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Subjective norms contain injunctive and descriptive elements (Ajzen, 2002). While descriptive norms refer to people's perceptions about the prevalence of a behavior in their social midst, injunctive norms refer to people's understanding about what others expect them to do (Chung & Rimal, 2016). The social context in turn determines which of both types of norms people follow at a certain time and how they interfere in the immediate behavior of an individual (Cialdini et al., 1990). When the social context highlights descriptive norms toward a certain type of behavior, it helps people to justify it, which reduces dissonance. On the other hand, when injunctive norms that contradict a behavior are highlighted, the dissonance is increased (Cialdini, Reno, & Kallgren, 1990).

The perceived social pressure one experiences is expected to come from individuals who belong to the same groups one belongs to. Individuals categorize themselves and others into groups they consider themselves to be a part of — ingroups — and other groups — outgroups (Tajfel & Turner, 1979). Therefore, individuals think of themselves as having not only an individual “personal identity” but also a “social identity”, which is defined by these group memberships. When this social identity becomes salient in a given situation, the norms and values associated with the ingroup guide individuals' thoughts and behavior (Terry & Hogg, 1996). The strength of the group's influence is determined by the degree to which individuals perceive themselves as group members (Ellemers et al., 2002) and the degree to which the ingroup is incorporated into the self (Tropp & Wright, 2001). The level of ingroup identification may vary among members of a social group (Ellemers et al., 2002). The stronger ingroup identification is, the more individuals tend to perceive themselves as group members. In the context of the COVID-19 pandemic, subjective norms have been found to be significant predictors of intention of compliance with social distancing (Hagger et al., 2020). In fact, perceived public threat of the novel coronavirus has been more strongly associated with prevention intentions than the perceived personal threat (Jordan et al., 2020). Furthermore, focusing on one's community has been shown to promote increased intentions to wear a face covering (Capraro &

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Barcelo, 2020), suggesting that relevant others have a remarkable influence on adherence to prevention measures.

Perceived behavioral control is a prominent determinant of individuals' intention to engage in COVID-19 preventive behaviors (Ahmad et al., 2020; Andarge et al., 2020; Hagger et al., 2020; Lin et al., 2020). In fact, it has been found to be a driver of epidemic prevention (Ahmad et al. 2020) and is associated with intentions of compliance with personal preventive measures (Andarge et al., 2020). Besides, it consists of a consistent predictor of social distancing intentions and behavior (Hagger et al., 2020), being reported to have the largest effect on intentions of compliance with preventive measures among the components of TBP (Lin et al., 2020). Therefore, having control over the action of not leaving one's house during the COVID-19 pandemic is expected to have a strong impact on intentions and actual compliance with social distancing.

Based on this rationale, we hypothesize that attitudes (Hypothesis 1), injunctive (Hypothesis 2) and descriptive norms (Hypothesis 3), and perceived behavioral control (Hypothesis 4) predict both (a) intentions of violating social distancing and (b) non-compliance with social distancing, even when controlling for the effects of IU and sociodemographic factors. We also expect that both injunctive and descriptive norms be strongest predictors of behaviors when using ingroup members (family and friends) as referents.

Intolerance of uncertainty and socioeconomic factors

Intolerance of uncertainty (IU) has been identified as a discriminating individual difference characteristic involved in excessive worry (Laugesen et al., 2003) and the state of anxiety (Greco & Roger, 2001), having a strong positive association with anxiety pathologies such as Generalized Anxiety Disorder (GAD) and Panic Disorder (Dugas et al., 1998; Dugas et al., 2001). This individual

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difference characteristic comprises the inability to stand aversive responses triggered by the perception of uncertainty and lack of information (Carleton, 2016). Individuals vary in the extent to which uncertainty is experienced as aversive as well as in the manner in which they choose to resolve uncertainty (Kruglanski, 2004; Sorrentino & Short, 1986). Despite being a characteristic present in everyday life, uncertainty can generate distress in individuals and can minimize the effectiveness of preparing for the future (Grupe & Nitschke, 2013; Tanovic et al., 2018).

In the face of the COVID-19 pandemic, IU intensifies negative impacts of social isolation on distress (Smith, Twohy et al., 2020). In fact, individuals' inability to tolerate uncertainty during the pandemic was predictive of mental health difficulties (generalized anxiety, depression, and health anxiety) — a relationship that is mediated by coping strategies (Rettie & Daniels, 2020). While positive coping strategies led to decreased mental health difficulties, negative ones had the opposite effect (Rettie & Daniels, 2020). Even though high IU may lead to inaction and avoidance of ambiguous situations (Dugas et al., 1997), people high on IU have been found to comply less with social distancing when they held stronger beliefs in general conspiracy theories (Farias & Pilati, 2020). Conversely, other research indicated that fear emerged as an important compliance factor during this pandemic (Harper et al., 2020) and that people high on IU estimate the risk of the new coronavirus as higher (Maftai & Holman, 2020). Besides, women — who tend to comply with social distancing more often when compared to men — have been found to hold higher levels of IU (Parlapani et al., 2020). We therefore expect that individuals who are more intolerant of uncertainty will tend to violate physical distancing measures less often in an attempt to avoid the ambiguous situation posed by the pandemic.

Evidence show that the COVID-19 disease has been politicized (Calvillo et al. 2020; Capraro & Barcelo, 2020; Conway et al., 2020; Green et al., 2020; Havey, 2020; Rothgerber et al., 2020). In

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the U.S., right-wing partisans comply less with behaviors aimed at preventing the spread of the disease (Rothgerber et al., 2020). Besides, Democrats discussed the crisis more frequently and placed greater emphasis on threats to public health and American workers whereas Republicans emphasized China and the impact on businesses (Green et al., 2020). Conservatives also talk consistently more about COVID-19 conspiracy theories on Twitter (Havey, 2020) and tend to perceive less personal vulnerability to the virus as well as lower severity of the disease (Calvillo et al. 2020), having more negative feelings when they have to wear a face covering (Capraro & Barcelo, 2020). Conservatives' lack of concern with the pandemic is likely to be motivated by desired political outcomes, which can be diminished by the effect of experiences as the impact of COVID-19 grows (Conway et al., 2020). Considering that the president of Brazil — who is a far-right politician — has repeatedly minimized the threat of the COVID-19 disease and undermined efforts to enforce social distancing (Burki, 2020), we expect that his position may influence individuals — especially his supporters — toward more social distancing violation. Therefore, we believe that right-wing supporters hold stronger positive intentions of violating social distancing and comply less with this preventive measure.

Apart from political ideology, other socioeconomic factors may play a role in non-compliance with social distancing. One of them is income. It has been found that social distancing following state-level emergency declarations substantially varies by income (Smith, Jacob et al., 2020). Notably, wealthier areas decreased mobility significantly more than poorer areas (Weill et al., 2020), for people who hold lower income may have faced barriers to physical distancing, particularly needing to work outside their homes (Jay et al., 2020). This may be the case because low-wage workers are often in occupations that make remote work impossible and not offer paid sick leave (Bureau of Labor Statistics, 2018). Due to the lack of job stability, we expect that people with lower income — especially unemployed individuals and self-employed ones — hold stronger intentions of violating physical distancing and violate social distancing.

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The COVID-19 pandemic has broadened gender inequality. Indeed, females are subjected to greater psychological distress than males during the pandemic (Conversano et al., 2020), reporting significantly higher levels of COVID-19–related fear, developing more severe depressive symptoms and sleep disturbances, and holding higher levels of IU (Parlapani et al., 2020). Some possible reasons for such distress may be that social distancing measures have caused a large impact on sectors with high female employment shares and that closures of schools and daycare centers have massively increased child care needs, greatly impacting working mothers (Alon et al., 2020). On the other hand, men and younger individuals (aged between 18 and 24 years) are likely to show lower adherence to social distancing recommendations when compared to women and older individuals (Coroiu et al., 2020; Smith, Jacob et al., 2020). Men tend to have weaker intentions to wear a face covering and are more prone to agree more that wearing such covering is shameful and a sign of weakness (Capraro & Barcelo, 2020). This may be the case because females are more prone to hold stronger beliefs that they will be seriously affected by the novel coronavirus in comparison with males (Capraro & Barcelo, 2020). Older individuals also tend to perceive the virus as a more serious threat and, consequently, they are more likely to respect social distancing and condemn violations (De Neys et al., 2020), holding stronger intentions of being vaccinated (Sherman et al., 2020).

Considering the evidence presented, we have proposed a model to investigate the role of the variables that affect intentions of violating social distancing as well as non-compliance with it (See Figure 1). We expect that stronger positive attitudes, injunctive and descriptive norms, and perceived behavioral control toward compliance with physical distancing lead to decreased intentions of social-distancing violation and less non-compliance, even when controlling for the effect of IU and sociodemographic variables. We also expect that injunctive and descriptive norms using proximal referents (family and friends) be a better predictor of stronger intentions of non-compliance if compared to the effect of such norms using more distal groups (people in general).

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– **Insert Figure 1 here** –

Method

Participants

A total of 2,056 participants answered an online questionnaire. There were 1,480 women, 576 men, and one participant did not report gender. The mean age was 38.45 (SD=14.58), ranging from 18 to 89 years. 1,233 participants stated to be left-wing supporters (60%), 162 declared to be center (7.9%), 237 stated to be right-wing supporters (11.5%), and 424 people said the question does not apply (20.6%). As for income, the most cited income bracket was from four to ten minimal wages. Our sample is highly educated, for 1,213 (56.7%) participants checked the graduate option, meaning they either are postgraduate students or have already finished a postgraduate degree. Out of the 2,056 participants, 1,814 answered about where they currently live. Participants were from all regions of Brazil (North, Northeast, Center west, Southeast, and South), and there were participants from 24 of the 26 states, and the Federal District. Most of them were concentrated in the Federal District and in the State of São Paulo (40.2% and 15.2%, respectively).

Measures and materials

The criterion variable of this study consists of intentions of violating social distancing and non-compliance with social distancing. The antecedent variables are attitudes, injunctive and descriptive norms, and perceived behavioral control. Control variables are IU, political partisanship, professional status, income, gender, and age.

Intentions of violating social distancing. Three items asking about one's intention of leaving one's home during the COVID-19 pandemic (e.g. "State to what extent you have the intention of

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leaving your house, even when it is not necessary”). It was scored at 5 points (1 = No intention, 2 = A little intention, 3 = Reasonable intention, 4 = Strong intention, 5 = Very strong intention).

Past non-compliance. One item asking about the frequency one left one’s home during the COVID-19 pandemic. It was scored at 5 points (1 = Never, 2 = A few times, 3 = Once in a while, 4 = Many times, 5 = Whenever I wanted to).

Attitudes toward social distancing. The scale was developed in the scope of this study and adapted the element attitudes of theory of planned behavior (Ajzen, 1991) to predict attitudes toward not complying with social distancing. It was composed of 5 items (eg. “Social distancing is important to stop the coronavirus from spreading”), two of which are reverse questions. The scale was scored at 5 points (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree). The higher the score was, the stronger attitudes towards social distancing were. The Cronbach's α coefficient of the scale was .76.

Norms toward social distancing. The scale was developed in the scope of this study by adapting the element subjective norms of theory of planned behavior (Ajzen, 1991) and creating items on injunctive and descriptive norms on social distancing using family, friends, and people in general as referents. Injunctive norms comprised five items (e.g. “My family thinks social distancing is important to protect groups at risk”), of which two were reversed. Descriptive norms presented six items (e.g. “My friends are complying with social distancing”), of which three were reversed. The scale was scored at 5 points (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree). The higher the score was the stronger norms toward social distancing were. The Cronbach's α coefficient of the scale was 0.88, and the Cronbach's α for each dimension was .84 (family injunctive norms), .83 (peer injunctive norms), .78 (general injunctive norms), .76 (family descriptive norms), .88 (peer descriptive norms), and .85 (general descriptive norms).

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Behavioral control toward social distancing. The scale was developed in the scope of this study by adapting the perceived behavioral control element of theory of planned behavior (Ajzen, 1991). Perceived behavioural control toward social distancing was composed of three items (e.g. “I have full control over the action of performing daily tasks that violate social distancing”). The scale was scored at 5 points (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree). The higher the score was, the stronger perceived behavioral control toward social distancing violation was. The Cronbach's α coefficient of the scale was .62.

IUS-12 (Intolerance of Uncertainty Scale, Short Version). The short version of the IUS-12 (Intolerance of Uncertainty Scale) adapted by Carleton et al. (2007) was used. The scale is comprised of 12 items which are grouped in two dimensions (prospective anxiety and inhibitory anxiety). A 5-point scoring was adopted (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree). The higher the score was, the higher was participants' IU level. The Cronbach's α coefficient of the scale was .91. The ones of prospective anxiety inhibitory anxiety were both .85. The results of a confirmatory factor analysis showed that the construct validity was good: CFI = .97, RMSEA = .06, SRMR = .04 (Carleton et al., 2007).

Sociodemographic measures. Sociodemographic measures comprise questions on participants' income, professional status, political ideology, gender, and age. Income was measured in a scale ranging from no income to above 20 minimal wages (1= Up to two minimal wages, 2= From two minimal wages to four minimal wages, 3= From four minimal wages to 10 minimal wages, 4= From 10 minimal wages to 20 wages, 5= Above 20 minimal wages). The current minimal wage in Brazil is R\$1,045, which is equivalent to approximately US\$ 199.65. The question about professional status was scored at 9 points (1= Retired, 2 = Employed in the private sector, 3= Self-employed, 4= Unemployed, 5= Student, 6= Business owner, 7= Employed in the public sector, 8= Liberal

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professional, 9= Other). The question about political ideology was scored at 8 points (1= Far right wing, 2= Regular right wing, 3= Moderate right wing, 4= Center, 5= Moderate left wing, 6= Regular left wing, 7= Far left wing, 8= Does not apply). Gender was measured at 2 points (1= Male, 2= Female). Age was assessed through an open-ended question in which participants typed their respective ages, which were subsequently organized in six age brackets (1= Between 18 and 27, 2= Between 28 and 37, 3= Between 38 and 47, 4= Between 48 and 57, 5= Between 58 and 67, and 6= Above 68).

Procedure

The questionnaire was applied online during the initial period of the pandemic (late March/early April), when the social distancing measures were initially applied in Brazil. An invitation was sent through WhatsApp — a popular messaging app in Brazil — to the researchers' contacts. In the invitation, there was a request to forward the link to other contacts/groups. Participants were introduced the purpose of the study, and then asked to sign informed consent — which stated that the survey was conducted anonymously, that the results were for academic research only, and that all information would be kept confidential —, read the instructions, and complete the questionnaire independently according to their true situation. To answer the study, participants must have been 18 years old or above. The collected data were sorted and analyzed by SPSS 22.0.

Results

Two stepwise multiple regression analyses have been conducted to assess the effect of attitudes, injunctive and descriptive norms, and behavioral control on intentions of violating social distancing as well as and prior social distancing violation while controlling for the effects of IU, political partisanship, income, professional status, gender, and age (See Figure 1 to grasp a more accurate comprehension of the model). When performing these analyses, we inserted the

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sociodemographic variables in the first step and the antecedent variables in the second step. By doing so, we have observed that the coefficient of determination (R^2) has improved significantly. In Model I, it has risen from .04 to .29. In Model II, it has increased from .008 to .08. We evaluated the assumptions of multivariate normality and linearity by using SPSS 22. Through the observation of box plots and the calculation of the Mahalanobis distance, we have spotted no multivariate outliers.

The results of the two multiple regression analyses as well as of Pearson bivariate correlation analyses can be observed in Table 1. Positive attitudes toward social distancing were found to be significant predictors of weaker intentions of violating social distancing as well as less past social distancing violation. Therefore, Hypotheses 1a and 1b have been accepted. Besides, only positive descriptive norms toward social distancing which used family and friends as referents have negatively predicted engagement in the two criterion variables (intentions of violating social distancing and past social distancing violation). Thus, Hypotheses 2a and 2b have been rejected while Hypotheses 3a and 3b have been accepted. Additionally, perceived behavioral control toward not engaging in social distancing has been found to be a significant positive predictor of intentions of non-compliance and past violation of social distancing (Hypotheses 4a and 4b accepted).

– **Insert Table 1 here** –

The control variables political partisanship, gender, and age have significantly predicted intentions of not complying with social distancing whereas only gender has significantly predicted past lack of compliance with this prevention measure. Specifically, right-wing partisans, men, and younger individuals are more prone to social-distancing violation. Professional status, on the other hand, has not significantly predicted the criterion variables.

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Two one-way ANOVAs have been performed to assess differences when it comes to intentions of violating social distancing as well as compliance with social distancing among individuals who hold different levels of IU. As to intentions of complying with social distancing, a statistically significant difference was found among participants who hold low, medium, and high levels of IU, $F(2,053, 2) = 4.67, p = .009, \eta^2 = .005$. As the scale ranged from one to five, low scores were considered to be the ones up to 2.5, medium ones were up to 3.5 and high ones were up to 5. Pairwise comparisons with Bonferroni adjustment showed that participants with low IU ($M=1.35, SE=.03$) significantly differed from medium ($M=1.45, SE=.02$) and high ones ($M=1.46, SE=.03$) as to intentions of violating social distancing. Nevertheless, there was not a significant difference among individuals who hold different levels of IU regarding non-compliance with social distancing, $F(2,053, 2) = .09, p = .91, \eta^2 < .001$.

There was a significant difference among political partisan groups concerning intentions of violating social distancing, $F(2,048, 7) = 19.50, p < .001, \eta^2 = .06$. The weakest intentions of violating physical distancing were found in far-left wing supporters and they rose continuously until achieving the highest level in far-right wing supporters (Figure 2). There was also a significant difference among political partisan groups when it comes to past non-compliance with social distancing, $F(2,048, 7) = 9.37, p < .001, \eta^2 = .03$, in which we found a similar trend. Far-right partisans have left their houses more often than all other partisan groups, and this frequency dropped progressively until reaching the minimum frequency among regular left-wing supporters (Figure 3).

– **Insert Figures 2 and 3 here** –

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Two additional one-way ANOVAs were performed to analyze whether differences in participants' income would lead to significant divergence in intentions of non-compliance with social distancing and actual non-compliance. Participants of different income brackets held significantly different intentions of violating social distancing, $F(2,051, 4) = 3.42, p = .008, \eta^2 = .007$, but not on social-distancing violation, $F(2,051, 4) = .88, p = .47, \eta^2 = .002$. As can be seen in Figure 4, participants with low income presented the strongest intentions of violating social distancing.

– **Insert Figure 4 here** –

When it comes to professional status, there was a significant difference as to intentions of not complying with social distancing, $F(2,047, 8) = 2.17, p = .002, \eta^2 = .012$. By performing pairwise comparisons with Bonferroni adjustment, we found out that the difference was only significant when comparing the retired individuals ($M = 1.23, SE = .60$) with students ($M = 1.50, SE = 0.03$), $p = 0.003$, and unemployed ones ($M = 1.57, SE = .07$), $p = .008$ (see Figure 5). Besides, participants' lack of compliance with social distancing differed significantly according to their professional status, $F(2,047, 8) = 2.37, p = .01, \eta^2 = .009$. Pairwise comparisons with Bonferroni adjustment indicated that the only significant differences occurred between students ($M = 1.95, SE = .06$) and people who work in the private sector ($M = 2.11, SE = .03$), $p = .03$ (Figure 6).

– **Insert Figures 5 and 6 here** –

There was a significant difference among participants as to the effect of gender and age on intentions of violating social distancing. Men ($M = 1.54, SD = .70$) tended to hold stronger intentions of non-compliance when compared to women ($M = 1.38, SD = .61$), $F(2,056, 1) = 24.71, p < .001, \eta^2 = .012$. Furthermore, men ($M = 2.12, SD = .612$) actually left their houses more frequently than women ($M = 2.01, SD = .61$), $F(2,056, 1) = 12.11, p = .001, \eta^2 = .006$. Younger individuals

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presented stronger intentions of violating such prevention measure, $F(2,054, 5) = 6.37$, $p < .001$, $\eta^2 = .015$ (Figure 7). Participants also differed significantly as to the frequency they left their houses according to their age, $F(2,054, 5) = 3.50$, $p = .004$, $\eta^2 = .008$ (Figure 8). Overall, older individuals (between 58 and 67 years old) presented the weakest intentions of violating social distancing, and there was a slight increase in intentions among individuals who were 68 years or older. People aged above 68 years were the ones who left their homes less often, but individuals aged between 18 and 27 as well as between 58 and 67 left their homes at only a slightly higher frequency.

– **Insert Figures 7 and 8 here** –

Discussion

This research sheds light on significant determinants of intentions and actual behavior related to the most efficient measure applied to contain the rapid spread of the COVID-19 disease: social distancing. Specifically, this study is aimed at applying an extended version of theory of planned behavior to predict intentions of non-compliance with social distancing as well as prior non-compliance with physical distancing, controlling the effects of IU and sociodemographic variables (political partisanship, income, professional status, and age) on the two criterion variables.

Attitudes and perceived behavioral control significant predicted intentions of violating social distancing. This result is in line with the reports that positive attitudes toward epidemic prevention drive preventive behavior (Ahmad et al., 2020), being related with actual practice of COVID-19 preventive measures (Andarge et al., 2020). It also supports the findings that perceived behavioral control toward epidemic prevention leads to individuals' intention to adopt COVID-19 preventive behaviors (Ahmad et al., 2020; Lin et al., 2020). Therefore, interventions should be designed to foster positive attitudes toward compliance with physical distancing at the same time that individuals'

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perceived behavioral control over complying with social distancing is increased. Positive attitudes could be promoted by providing accessible information on how social distancing can effectively prevent the rapid spread of COVID-19 whereas perceived behavioral control over the action of engaging in social distancing may be encouraged by demonstrating how to easy it is to maintain appropriate social distance and providing environments (e.g. workplaces and grocery stores) that provide consistent opportunities to engage in social distancing to develop habits. Conversely, decrease in perceived behavioral control over the action of violating physical distancing may be achieved though the implementation of policies that diminish individuals' control over the action of leaving their houses, such as lockdowns.

In line with the findings in the literature (Hagger et al. 2020), social norms have significantly predicted social distancing intention — but only the descriptive element of norms using family and friends as referents. To maintain their social identity, individuals may have tended to express intentions of behaving and actually behaving in a similar way to what other ingroup members do. This result is also aligned with the report that focusing on one's community may promote intentions of complying with prevention measures (Capraro & Barcelo, 2020). Therefore, when creating public campaigns to persuade individuals to comply with COVID-19 prevention measures, it is important to address perceptions, norms and possible detrimental consequences of non-compliance applied to ingroup members such as family and friends. Designing messages that highlight individuals' obligations to significant others and the moral imperative of protecting the most vulnerable may be used as reasons to underpin the need for engaging in social distancing.

As to the control variables, IU has not played a significant role in predicting intentions of social distancing violation as well as lack of compliance with social distancing. Nevertheless, individuals who held low levels of IU significantly differed from the with medium and high IU levels

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in intentions of non-compliance with this preventive measure. Specifically, average and highly intolerant of uncertainty individuals had significantly stronger intentions of not adhering to physical distancing. This result is supported by the fact that women hold higher levels of IU and are more prone to comply more with this preventive measure (Parlapani et al., 2020), that fear predicts compliance during the pandemic (Harper et al., 2020), and that people high on IU estimate the risk of the virus as higher (Maftei & Holman, 2020).

It has also been found that political partisanship had a significant effect on intentions of violating social distancing but not social distancing violation, in that right-wing partisans are more prone to hold intentions of not complying with such preventive measure. These results can be explained by the politicization around the COVID-19 pandemic (Calvillo et al. 2020; Capraro & Barcelo, 2020; Conway et al., 2020; Green et al., 2020; Havey, 2020; Rothgerber et al., 2020). In fact, political partisanship has been found to affect adherence to state policies (Grossman et al., 2020; Makridis & Rothwell, 2020; Painter & Qiu, 2020). In Brazil, Bolsonaro has repeatedly stated to be against social distancing measures (Burki, 2020). Consequently, right-wing supporters — who share a partisan identity with him — are prone to endorse him and question social distancing measures.

Furthermore, as social identities shape the way people interpret information (Turner et al., 1994; Xiao et al., 2016), ingroup bias is also expected to have played a role in the polarization around the virus, for individuals tend to believe that they see the world around them objectively and that members of other parties who disagree with them are uninformed, irrational, and biased (Vallone et al., 1985). This can exacerbate intergroup conflict, hindering the resolution of disputes among political groups (Ross, 1995; Ross, & Ward, 1996). Another factor that may have played a role in exacerbating politicization around COVID-19 is motivated reasoning, that is, the bias to confirm one's preexisting beliefs and to evaluate evidence with self-serving partiality (Kunda, 1990). By this

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token, right-wing supporters may have aligned their intentions in accordance with ingroup members who had shown stronger intentions of violating social distancing. Plus, conservatives may have tended to accept information that confirms beliefs that provide support to their intentions of violating social distancing, such as that the virus only affects at-risk groups or that it is just like the common flu.

Income is also reported to influence intentions of violating social distancing. The lower the income, the stronger are intentions of violating social distancing are. This may be due to the fact that it could be harder for people with lower income to stay at home and comply with COVID-19 prevention measures since they may be less likely to have savings that could be used in case of being fired (for those who are employed), in case of not being able to make any money during the period of isolation (for those who are self-employed), or in case of being unemployed. Furthermore, individuals who do not have a job may feel more compelled to leave their homes in order to obtain one. In fact, the unemployed and students were the two groups that held stronger intentions of physical distancing violation. This provides evidence to the importance of creating policies to promote conditional cash transference in the period of the pandemic so that individuals have means of surviving while complying with social distancing measures. Besides, our results add further evidence to the reports that men and younger people are more likely to have stronger intentions of violating preventive measures amid the COVID-19 pandemic (Coroiu et al., 2020; Smith, Jacob et al., 2020; Capraro & Barcelo, 2020; De Neys et al., 2020). Considering this body of evidence, policy-makers are advised to concentrate more efforts on eliciting compliance among these groups of individuals since they hold a stronger tendency to violation.

This study provides several avenues for future research. Based on our findings, we may assume that social networks can amplify the spread of behaviors that are either harmful or beneficial

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during the pandemic. Further research should delve into assessing the role of norms using ingroup members as referents in predicting health-related behaviors. Besides, seeing that a strong sense of shared social identity can help coordinate efforts to manage threats (Haslam & Reicher, 2006) and foster ingroup endorsement of norms (Ellemers et al., 2002), leaders can function as role models and motivate individuals to put their own values into action (Schnall & Roper, 2012; Yang et al., 2018). Therefore, future research may run experiments targeting well-connected individuals and making their positive behavior salient to others to influence people toward more compliance with health-related prevention measures. Furthermore, since individuals are highly reactive to the choices made by others, interventions with nudges may be used to create a positive understanding of emerging social norms, affecting the community's behavior (Sparkman & Walton, 2017). We recommend that future research also shed light on the relation between psychological disorders (such as anxiety and depression) and compliance with social distancing.

Our study also has some limitations. The sample is skewed in terms of gender (70.3% of participants were females), political partisanship (60% were left-wing supporters), income (72.5% earned above two minimal wages), and education (56.7% were either postgraduate students or had a postgraduate degree). Thus, the composition of the sample may impede the generalization of the findings. Besides, we measured intentions to engage in social distancing violation and self-reported past behavior not actual engagement, and intentions not always translate into action (Conner, 2015; Ajzen, 1991). Even though participants were found to vary in terms of intentions of complying with social distancing according to their levels of IU, political partisanship, income, professional status, gender, and age, the effect sizes associated with each variable were rather small.

Behavioral scientists can provide insights that can assist in aligning human behavior with the recommendations of epidemiologists and public health experts (Van Bavel et al., 2020). This study

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contributed to produce evidence that could guide the elaboration of public policies to cope with pandemics. First, the attitudes, norms, and perceived behavioral control components of TBP — which had been reported to significantly predict health-related behaviors (Gabriel et al., 2019, Hagger et al., 2016, Huang et al., 2020) — have been found to be significant predictors of intentions of violating social distancing. While previous research had found that norms were a weak predictor of behavioral intentions (Nigbur et al., 2015), in this study, we discovered that their predictive strength may be increased by using ingroup members as referents. Our results provide support to the relevance of conditional cash transfer programs during the COVID-19 pandemic so that individuals have financial means of staying at home. In extremely unequal economies, such as Brazil, this sort of strategy is of uttermost importance to the efficacy of social distancing policies. Additionally, it has been found that, similarly to other reports (Calvillo et al. 2020; Capraro & Barcelo, 2020; Conway et al., 2020; Green et al., 2020; Havey, 2020; Rothgerber et al., 2020), there has been political polarization around COVID-19 in Brazil. More precisely, this political polarization has been a significant determinant of intentions of violating social distancing and non-compliance with social distancing., having been found to be a factor that increases the intentions of the population toward defying this preventive measure. Prominent political figures are advised to show support to social distancing policies in the COVID-19 pandemic, considering that it is one of the most functional strategies implemented so far. The insights provided by our study may be of relevance when implementing policies to combat the COVID-19 disease and pandemics that may happen in the future.

Declarations

Conflicts of interest

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Ethics approval

The study reported in the manuscript strictly followed the Ethical Principles in the Conduct of Research with Human Participants proposed by the American Psychological Association. Participants were informed about the research purposes, the risks involved in taking part of the research as well as the confidentiality and anonymity of the participation. They explicitly informed their consent in taking part in the research by checking a box and were free to quit participation at any moment. No personal information has been collected to preserve participants' anonymity. We have not submitted this research to an approving institutional review board because the committee's rules and regulations in Brazil only evaluate projects in the realm of medical and pharmacological research. Considering the current situation concerning the national regulations, it is not required to obtain approval from an institutional review board to conduct studies with human subjects in social sciences in Brazil.

Consent to participate

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Participants explicitly informed their consent in taking part in the research by checking a box and were free to quit participation at any moment. No personal information was collected to preserve participants' anonymity.

Consent for publication

All data collected were unidentified and analyzed in a grouped manner so that each participant who answered the research is anonymous. Informed consent on the academic purpose data collection was obtained from all individual participants.

Availability of data and material

The datasets for this study can be found in the OSF platform at <https://osf.io/hs6zb/>. Once the manuscript is published, the files will be made public. Moreover, a preprint version of this manuscript can be found at <https://psyarxiv.com/apg9e>.

Code availability

Not applicable.

Authors' contributions

The first and second authors contributed to the conception and design of the study. Both authors collected the raw data, and the first author organized the database. The first author performed statistical analyses and wrote the first draft of the manuscript. The second author revised it critically for important intellectual content.

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Appendix A

Table 1. Summary of a multiple regression analysis and bivariate correlations for intentions of non-compliance with social distancing as a criterion variable and with attitudes, social norms, and behavioral control as antecedent variables. Intolerance of uncertainty and sociodemographic variables are controls (N = 2,156).

[illegible]

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[illegible]

+p < .001, *p < .05

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Appendix B

Figure 1. Proposed model using TBP's components as predictors of intentions of violating social distancing and non-compliance with social distancing whereas controlling for the effects of IU and sociodemographic variables.

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Appendix C

Figure 2. Intentions of violating social distancing according to political ideology

VIOLATING SOCIAL DISTANCING**Appendix D****Figure 3.** Non-compliance with social distancing according to political ideology

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Appendix E

Figure 4. Intentions of violating social distancing according to participants' income

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Appendix F

Figure 5. Intentions of violating social distancing according to participants' professional status

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Appendix G

Figure 6. Non-compliance with social distancing according to participants' professional status

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Appendix H

Figure 7. Intentions of violating social distancing according to participants' age brackets

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Appendix I

Figure 8. Non-compliance with social distancing according to participants' age brackets