Journal of Social and Political Psychology

PsychOpen GOLD

Original Research Reports

The Psychological Determinants of Avoiding Crowded Areas: An International and Political Investigation

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Journal of Social and Political Psychology, 2023, Vol. 11(2), 458–477, https://doi.org/10.5964/jspp.9819

Received: 2022-07-01 • **Accepted:** 2023-07-12 • **Published (VoR):** 2023-08-21

Handling Editor: Hélder Vinagreiro Alves, Centro de Investigação e Intervenção Social, ISCTE-IUL, Lisbon, Portugal

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Supplementary Materials: Data, Materials [see Index of Supplementary Materials]

Abstract

Social isolation is one of the most important measures to reduce clusters of infections. This research aims to explain why people avoided crowded spaces during periods of high global infection of COVID-19 in a cross-national and politically diverse sample. We conducted a cross-cultural survey using Likert-type scale questions (N = 1,196) in New York (n = 313), Brasilia (n = 283), Tokyo (n = 300), and Taipei (n = 300). We ascertained the validity of a model based on the theory of planned behavior, moral norms, and risk perception while analyzing invariance in its estimates and differences in the component`s mean scores across cultures and political groups. The results showed that the data fit the model well, and we found significant differences across countries by comparing the components` mean scores and estimates. Finally, diverging political views generated contrasting scores in the most politically polarized cultures. This study thus shows how the act of avoiding crowded places is shaped by social-cognitive determinants, cultural background, and political views. These insights are relevant for the formulation of better public health policies. It also calls for the academic community to build an integrative research agenda over psychological phenomena based on social factors and calls for the need for behavioral management in pandemics.

Keywords

COVID-19, crowdedness, moral norms, political views, risk perception, planned behavior

Non-Technical Summary

Background

Avoiding crowded areas is one of the major protective measures in pandemics to reduce the spread of clusters of infection and risks to citizens with vulnerable conditions. It also aids health policy logistics to create better conditions in hospitals, such as controlling the number of emergency beds to treat patients with severe conditions. Avoiding crowded areas can be seen as a protective action that implies social distance. This is especially important in metropolitan areas during pandemics.

In the recent COVID-19 pandemic, however, not all citizens from big cities adopted this essential measure of disease control. The literature points out that the cultural and political norms of countries are key factors to understand how citizens and governments reacted to the COVID-19 pandemic. However, no study has addressed how these factors impact the psychological determinants and mechanisms that shape people's motivation and efforts to do so.

Why was this study done?
Based on the research background, and using a cross-cultural and diverse political sample, our research explains why people avoided crowded spaces during the periods of high global infection of the COVID-19 pandemic. We ascertained that people`s beliefs, perception of risk, and feelings of moral obligation predict efforts to avoid crowded areas. Furthermore, we ascertained that those factors predict the protective behavior of avoiding crowded places differently according to the cultural setting. Finally, we ascertained that both culture and political identification not only predict the extent to which people avoid crowded areas, but also their beliefs, risk perceptions, and feelings of moral obligation.

What did the researchers do and find?
We selected one major city in four countries to conduct our research. Our choice was based on cultural and political differences and contrasts in health outcomes during the COVID-19 pandemic, whereby the time, infection, and mortality rate associated with COVID-19 were mainly found in the Americas, but least in the Western Pacific. Then, between December 31, 2020 and March 3, 2021, we conducted a cross-cultural survey with 1196 individuals living in four large cities, specifically New York (n = 313), Brasilia (n = 283), Tokyo (n = 300), and Taipei (n = 300). Participants responded to questions taken from various scales which measured diverse social and psychological factors: (1) attitudes, (2) perceptions of what groups approve of (injunctive norms), (3) moral norms, (4) trust in authorities, (5) perceived behavioral control, (6) risk perception, (7) frequency of exposition to COVID-19 information, (8) intentions (to avoid crowded areas), (9) behavior, (10) political views and (11) socio-demographics. To reach results with the available data, we conducted a series of advanced statistical analyses called Structural Equation Modelling and ANOVAs to test whether the relations of the variables of interest on the target behavior were statistically significant.

What do these findings mean?
The results showed that the variables investigated explained substantially why people decided to avoid crowded areas during periods of high infection rates. Specifically, this behavior was more likely among individuals who (1) had positive beliefs about its effectiveness, (2) had a high perception of control over it, (3) felt social pressure, (4) had higher risk perception, and (5) strong feelings of moral obligation. Moreover, we found that depending on the culture individuals are members of and their political position, their position over the previous factors might change substantially, especially in countries with high infection rates. Thus, this study explores how avoiding crowded places is shaped by social-cognitive determinants, cultural background, and political views. By being aware of this, policy-makers, governmental actors, and citizens can improve their strategies to influence others to cooperate and maximize societies' cohesion and their well-being while preserving people`s freedom.

Crowdedness regulates social interactions, limits behavioral options, and negatively impacts personal space (Bilotta, Vaid, & Evans, 2018). Few studies however investigated the social-psychological determinants of avoiding crowded places that rely on both Western and non-Western populations. Furthermore, during the COVID-19 pandemic, authorities asked people to reduce clusters of infection by practicing social distancing (Fraser & Aldrich, 2021). While these measures aimed at reducing the congestion of hospital beds and preventing deaths, especially in settings that share higher infection rates (Hamidi et al., 2020; Van Bavel et al., 2020), they were met with antagonism in various settings (De Wit et al., 2023; Guglielmi et al., 2020).

Investigating the role of cultural-political norms will clarify public response in a highly politicized scenario (Bartusevičius et al., 2021; Cavazza et al., 2021). With our research, we aimed to account for the behavior of avoiding crowded places in large cities through a structural model in a cross-cultural and politically diverse sample.

Cultural and Political Context of our Research

The rapid spread of COVID-19 was first identified in 2020. By December 31 of the same year, 753 thousand daily increase in cases worldwide (World Health Organization [WHO], 2021). These cases were mainly found in the Americas, but least in the Western Pacific countries. Because of this contrast at the time of data collection, we surveyed citizens from two large cities in the Americas and two in the Western Pacific. Thus, four cities were selected (1) Brasilia, (2) New York, (3) Tokyo, and (4) Taipei.

Brazil declared the COVID-19 pandemic a national public health emergency on February 3, 2020. It quickly became one of the world's largest centers of COVID-19 spreading (de Souza et al., 2020). Brasilia and its Federal District, under a state of emergency, had 300,393 cumulative cases of COVID-19 by March 3, 2021, even after implementing measures for infection control (Public Security Secretary of the Federal District, 2021). The U.S. also showed a peak of cases by that time with New York reporting roughly 5,599 new cases weekly by January 31st (New York Times, 2021), after the implementation of a series of control measures since March 2020, such as declaring a state of emergency (Cheng et al., 2020). On the other side of the globe, Japan had a relatively low number of COVID-19 cases and deaths, but it presented the second worst scenario in the Western Pacific (Shimizu et al., 2021). In Tokyo, lockdown measures were not mandatory, but their measures could still be effective to control infection rates based on previous research conducted before our data collection (Yabe et al., 2020). By March 2020, 112,345 cumulative cases were registered in the Tokyo Metropolitan area (Tokyo Metropolitan Government, 2021). As regards Taiwan, this city could be expected to show one of the highest COVID-19 cases, considering its geographic relation to Mainland China (Wang et al., 2020). However, it presented only rare cases due to the rapid adoption of protective measures since January 2020, such as border control (Cheng et al., 2020; Wang et al., 2020). As a result, between February 28 and March 6, 2021, only 19 confirmed cases were registered in the country.

Previous research showed that the success of infection prevention control is likely to depend on the country's cultural background (Borg, 2014). For example, Biddlestone et al. (2020) and Huynh (2020) found that cultural differences play a role in engaging social distancing, whereas, countries with high individualism adopted this measure to lower degrees. Nonetheless, substantial attention to the influence of political views is also needed, since COVID-19 can be a highly politicized matter (Bartusevičius et al., 2021). Rising political polarization, conflicting information from the news, and government representatives can be critical factors to consider in the management of health policies in some countries like Japan, Brazil, and the U.S. (Liff, 2021; Lopes, 2021; Pew Research Center, 2017). For example, at that time, there was a political conflict between the USA and the World Health Organization, which influenced the American response to the COVID-19 pandemic (Kerr et al., 2021). In Japan, political concerns rose due to the hosting of the Olympics during the pandemic, which generated division in domestic opinions (Liff, 2021). Brazil faced increasing political instability in the last years, with discontentment and the rising of diverse political ideologies (Lopes, 2021). On the other hand, domestic political stability seems to be a key issue for the effectiveness of certain countries, like Taiwan, in their fight against COVID (Wang et al., 2020).

Theoretical Model

The Theory of Planned Behavior

To understand the motivation to engage in a behavior in a specific context and time, the theory of planned behavior (TPB) puts forward several major components: (1) attitudes, or the evaluation of the target behavior, (2) perceived behavioral control, or the perceived easiness and controllability of performing the behavior, and (3) injuctive norms or the perceived social influence to engage (or not) in a given behavior ("subjective norms"; Ajzen, 1991). Thus, if a negative attitude, lack of social support, and perceived difficulty in performing a behavior are present at a specific moment, people are expected not to perform it (Fujii, 2003).

By using the theory of planned behavior, researchers have amassed much explanatory evidence regarding health behaviours (McEachan et al., 2011; Myers et al., 2016; Steg et al., 2017). This model was used in research during the COVID-19 pandemic to explain protective actions (see also Das et al., 2021; Lin et al., 2020; Prasetyo et al., 2020), in such diverse cultural settings as the Philippines, Iran, Norway, Israel, and Bangladesh (see Das et al., 2021; Fan et al., 2021; Lin et al., 2020; Prasetyo et al., 2020; Shmueli, 2021; Wolff, 2021). Aschwanden and collaborators (2021) and Mao et al. (2021) found that the theory predicts social distance in the U.S., Puerto Rico, and China. Also, a cross-cultural meta-analysis comprising 83 studies conducted worldwide (Fischer & Karl, 2022) highlighted the validity of the theory for understanding public response regarding protective measures during the pandemic. Other findings include (1) no significant differences between injunctive and descriptive norms (i.e., perceptions of what is approved of versus usual in a given context, respectively), (2) all components of TPB being significant predictors, and (3) culture as an important component for influencing estimates. Despite the relevance of the aforementioned research, to the best of

our knowledge the literature still lacks research focusing on avoiding public crowded areas, especially that considering the political and cultural differences while aggregating constructs taking into account the importance of risk perception (McEachan et al., 2011) and moral norms (Chan & Bishop, 2013; Parker et al., 1995).

Risk Perception

Risk perception is positively correlated with preventive health behaviors against COVID-19 in ten countries (Dryhurst et al., 2020). By using an expanded model of the theory of planned behavior in Canada, Frounfelker and collaborators (2021; N = 3,183) found that worry about becoming infected can significantly predict more behavioral efforts to engage in social distance (β = .16; SE = .01, p < .001). As determinants of risk perception, the frequency of exposition to related information, social trust, as well as social and moral norms may influence how people make intuitions about risks by updating available knowledge or amplifying perceived threats (Cvetkovich, 2013; Ng & Kemp, 2020; Slovic et al., 2007).

According to the theory of social amplification of risk (Kasperson et al., 1988) and the cultural theory of risk (Douglas & Wildavsky, 1983), threatening and uncertain events interact with social-psychological and internalized cultural processes that attenuate public perception of risk. These determinants might communicate that risks are higher than expected (Kahan & Braman, 2003; Tversky & Kahneman, 1973). Thus, by taking risk perception as a determinant of protective actions, we considered that the following variables could predict the avoidance of crowded areas indirectly: (1) trust in the authority's policies, (2) frequency of exposure to information about COVID-19 both in the media and face-to-face, (3) injunctive norms, and (4) moral norms. As we will argue in the next section, the latter variable is also expected to predict that behavior directly.

Moral Norms

Avoiding crowded areas may involve costs to individuals, such as depriving them of going to places that they need to go to. However, there is evidence of a cooperative tendency in human decision-making, which might counterbalance the costs involved in the protection of highly vulnerable ones (Jordan et al., 2020). Moral norms play a central role in this process.

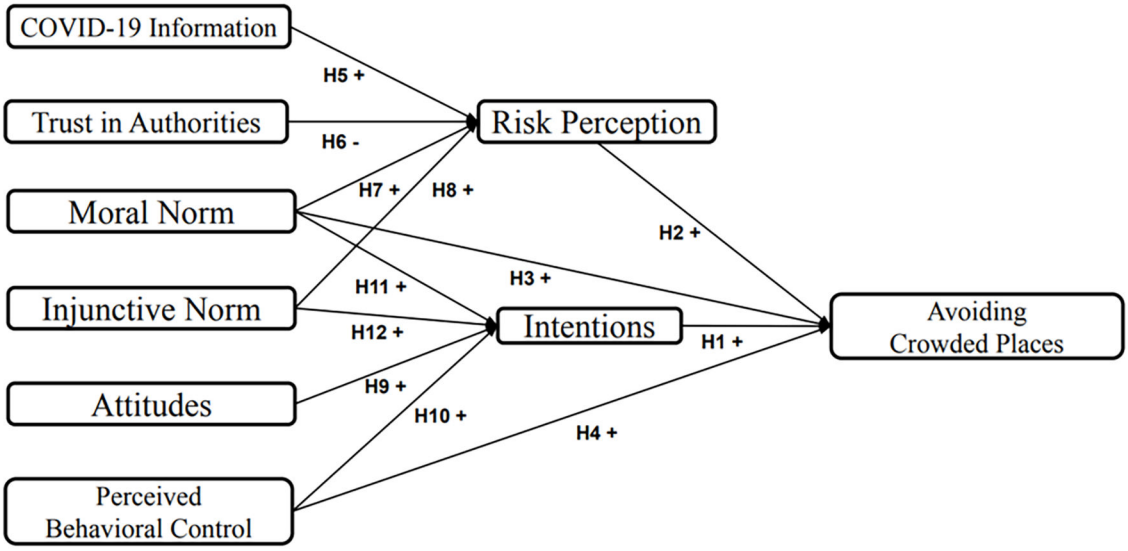
Moral norms can be described as feelings of obligations anchored in people's experience of empathy, which lead to emotional arousal in the face of the needs of other individuals (Schwartz, 1977). Thus, moral norms can help understand behavior involving moral dilemmas. Importantly, moral norms can be also applied to expanded models in the theory of planned behavior (Chan & Bishop, 2013; Parker et al., 1995). Previous research has shown that empathy arousal can be a significant component of social distancing and compliance with COVID-19 guidelines (Pfattheicher et al., 2020; Shanka & Gebremariam Kotecho, 2023). Further, in previous studies moral norms were shown to predict not only behavior, but also to have a direct explanation path to intention on COVID-19 prevention behaviors. Indeed, based on people`s intention to protect others, feelings of moral obligation provide an incentive for more efforts to avoid crowded places (Hagger et al., 2020; Turner et al., 2023). In this research, we ascertained whether moral norms can explain risk perception, behavior and intention to avoid crowded places.

Our Model

Why people undertake physical distancing from crowded places remains an understudied question. To ascertain potential solutions to reduce clusters of infection, we added "risk perception" and "moral norms" to the original model of planned behavior to explain the avoidance of crowded places behaviour. As displayed in Figure 1, in our model, intention (Hypothesis 1), risk perception (Hypothesis 2), moral norms (Hypothesis 3), and perceived behavioral control (Hypothesis 4) are expected to directly predict behavior. Concomitantly, the frequency of exposition to COVID-19 information (Hypothesis 5), social trust in governmental health policies (Hypothesis 6), moral norms (Hypothesis 7) and injunctive norms (Hypothesis 8) are expected to predict risk perception. We also hypothesized that intention would be predicted by attitudes (Hypothesis 9), perceived behavioral control (Hypothesis 10), moral (Hypothesis 11) and injunctive norms (Hypothesis 12).

Figure 1

Depiction of Our Hypotheses



Note. Plus signs refer to positive relations between variables, whereas minus signs refer to negative ones. The letter "H" followed by a number refers to the hypothesis to be tested (e.g., H1 refers to Hypothesis 1).

Due to cultural-political differences, we conducted this research with a cross-cultural and politically diverse sample. Thus, we first checked the validity of the integrative structural multigroup model across the cities in which we conducted our research. Then, we compared the mean scores for each element across cities and political views.

Method

Data Collection and Questionnaire

The study comprised a cross-national survey with most questions being responded on 5-point Likert-type scales that measured (1) attitudes, (2) injunctive norms, (3) moral norms, (4) trust in authorities, (5) perceived behavioral control, (6) risk perception, (7) behavior intention, and (8) frequency of exposition to COVID-19 information. To measure the first seven constructs we asked participants how much they agreed with the statements described in Table 1 (1 = *Strongly disagree*; 5 = *Totally disagree*). Moreover, the frequency of COVID-19 information received was asked from 1 (*Never*) to 5 (*Very often*). One question asked how often individuals avoided crowded places when going out. This item was responded to on a seven-point scale, from 1 (*Never*) to 7 (*Every time*).

We selected cities based on health, cultural and political differences. Thus, the survey was conducted online in New York, Tokyo, Taipei, and Brasilia between December 31, 2020 and March 3, 2021. The data were collected by private survey companies (Qualtrics and Cross-Market) in New York, Tokyo, and Taipei while using a quota sampling strategy based on equal distribution of age and gender. However, in Brasilia, the researchers resorted to snowball sampling due to the Brazilian national norms of research (i.e., *Resolution of the Conselho Nacional de Saúde number 196 of 1996*) that do not allow research participants to be paid. The cities selected were located near to where each author lived to avoid biased conclusions over cultural, political, and language barriers.

Table 1

Means (M) and Standard Deviations (SD) of Each Item by Their Dimensions, Followed by Their Reliability Score (Cronbach's alpha)

Items	*M*	*SD*	α	Spearman-Brown's *r*
Attitude				
Avoiding crowded places is good for me.	4.33	0.80		
Avoiding crowded places is desirable.	4.26	0.84		.795
Injunctive Norm				
People tell me to avoid crowded places.	4.25	0.80		
It is expected of me to avoid crowded places.	4.23	0.85		.703
Perceived Behavioral Control				
I am confident that I can avoid crowded places.	3.96	0.95		
It is easy for me to avoid crowded places.	3.80	1.01		.811
Moral Norm				
I would feel guilty if I stay in crowded places.	3.64	1.09	.853	
I believe that I have a moral obligation to avoid crowded places.	3.92	1.00		
Staying in crowded places goes against my moral principles.	3.62	1.10		
Intention				
I intended to avoid crowded places.	4.21	0.90		
I made an effort to avoid crowded places.	4.25	0.84		.788
Behavior				
In the midst of the coronavirus pandemic, how often do you avoid crowded places when going outside?	5.23	1.51	Single Item	
Risk Perception				
About being affected by catching the coronavirus in the near future: I think I will be directly affected by it.	3.39	1.04	.781	
About being affected by catching the coronavirus in the near future: I think I will seriously be affected by it.	3.24	1.02		
Getting sick with the coronavirus can be a worry.	3.86	1.03		
(Inverted) Getting sick with the coronavirus may not be a concern.	3.93	1.06		
Frequency of COVID-19 Information				
Frequency of COVID-19 information on the T.V., radio, and newspapers	4.22	1.01	.690	
Frequency of COVID-19 information on social media	3.85	1.22		
Frequency of COVID-19 information in face-to-face communication	3.64	1.14		
Trust in Authorities				
The national government can generally be trusted to manage the COVID-19 crisis (For Taiwan and Japan) OR In 2020, I thought the federal government could be trusted to manage the COVID-19 crisis (for the US and Brazil).	2.81	1.29	.769	
The COVID-19 policies of my country should be changed.	2.41	1.10		
COVID-19 policies in my country are effective in protecting people's basic health.	2.93	1.21		

Note. Cronbach's alpha used for constructs with three or more items. For constructs with only two items, we used Spearman Brown's Coefficient.

All procedures in our study followed the ethical standards for studies involving human participants as well as the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The research was approved by the research ethics committee and all participation in this study was consented to and voluntary. The questionnaire, originally written in English, was translated into Portuguese, Mandarin Chinese, and Japanese. Then, it was back-translated. All

translators were native to their respective languages and had academic backgrounds. The interested reader may read the translations and back translations in Supplementary Material 1.

For comparing groups with ANOVAs, a minimum sample size of 1096 participants was required taking a power (1 - β) of .8, four groups formulated by the four cultures involved, a low effect size of Cohen's f = .1 and α = .05. A small effect size was stipulated due to a lack of comparative studies. This sample size also satisfied the data necessary for structural equation modelling according to the number of parameters in the model.

Sample Characteristics

The sample consisted of 1196 participants from Taipei (n = 300), Tokyo (n = 300), New York (n = 313), and Brasilia (n = 283). The mean age was 44 years old (SD = 14), but no participant was under 18, and 58.9% were women. Unemployed people were 16.7% while 35.9% were working remotely. Only 30 participants declared staying under quarantine. As regards political orientation, 42% of participants declared being centrists; people not interested in politics amounted to 20.2%.

Importantly, each country considers the political spectrum in different terms. For that reason, in Brasilia we considered the division between left-wing and right-wing, in New York between republicans and liberals, and in Taipei between the Democratic Progressive Party (D.P.P.) and the Kuomintang (K.M.T.)/ the Chinese Nationalist Party, and finally in Tokyo between progressists and conservatives. Further, sociodemographic characteristics can be consulted in Table 2.

Table 2

Socio-Demographic Characteristics

	All Cities (N = 1196)		New York (n = 313)		Tokyo (n = 300)		Taipei (n = 300)		Brasilia (n = 283)	
Baseline Characteristics	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Gender										
Female	701	58.60	196	62.60	151	50.30	150	50.00	204	72.10
Male	492	41.10	117	37.40	149	49.70	150	50.00	76	26.90
Political Position										
Left-Wing/ Liberals/ Progressives/ DPP	264	22.10	96	30.70	40	13.30	50	16.70	78	27.60
Right-Wing/ Conservatives/ Republicans/ KMT	184	15.40	56	17.90	46	15.30	38	12.70	44	15.50
Centrist	502	42.00	102	32.59	163	54.30	166	55.30	71	25.10
Not Interested	242	20.20	59	18.84	51	17.00	46	15.30	86	30.40
Highest education										
Other	80	6.70	8	2.60	3	1.00	62	20.60	7	2.50
High school	201	16.80	74	23.60	33	11.00	52	17.30	45	14.80
Undergraduate	658	55.00	126	40.30	195	65.00	166	55.30	171	60.40
Master	209	17.50	85	27.20	64	21.30	13	4.30	47	16.60
Ph.D.	48	4.00	20	6.40	5	1.70	7	2.30	16	2.70
Working remotely										
Yes	429	35.90	131	41.90	75	25.00	75	25.00	148	52.30
No	565	47.20	119	38.00	145	48.30	188	62.70	113	39.90
Unemployed	200	16.70	63	20.10	80	26.70	37	12.30	20	7.10
Cases under quarantine	30	2.50	19	6.10	2	0.70	2	0.70	7	2.50
Cases that contracted coronavirus	79	6.60	32	10.20	1	0.30	1	0.30	45	15.90

Note. For all cities: N = 1196; for New York: n = 313; for Tokyo: n = 300; for Taipei: n = 300; and for Brasilia: n = 283. Participants were on average 44.10 years old (SD = 14.84). Numbers may vary and not add up to the total number due to missing responses.

Data Analysis

We present our results in two sections: (1) structural model and multi-group analysis, (2) comparison of the mean scores between cities and political views. In the first section, we ascertained the validity of the model comprising all the samples via Structural Equation Modeling (AMOS SPSS v.26). We followed minimum (Bentler, 1992; Byrne, 2013) or superior criteria (Hu & Bentler, 1999) respectively according to these criteria: χ^2 with $p \leq .05$, Root Mean Square Error of Approximation (RMSEA) ≤ .08 or ≤ 0.05, Comparative Fit Index (CFI) ≥ .90 or ≥ .95, NFI ≥ .90 or ≥ .95, and Tucker-Lewis Index (TLI) ≥ .90 or ≥ .95. Because our sample comprises participants from four different cities, we conducted a multi-group analysis. In the second section, we ascertained the differences in the mean scores of each component of the model across the cities and across political views. For this section, we conducted Welch's ANOVAs (Robust Test of Equality of Means) to control for any violation in the homogeneity of variance or differences in the number of participants across groups (Delacre et al., 2019).

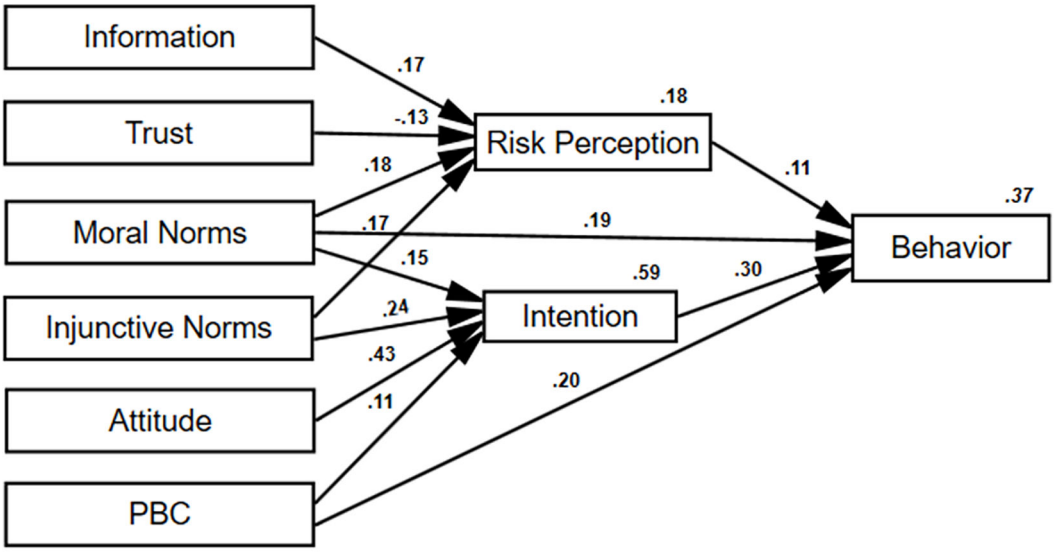
Results

Section 1: Structural Model and Multi-Group Analysis

The data fit the model well with $\chi^2(10) = 90.673$, $p < .001$, CFI = .977, NFI = .975, TLI = .898, and RMSEA = .082, 95% CI [.067, .098]. As can be seen in Figure 2, it was possible to explain around 18% of the variance in risk perception, 59% in intention, and 37% in behavior.

Figure 2

Results of Structural Equation Model With Regression Paths and Total Variance of Endogenous Variables



Note. Numbers above paths represent standardized regression weights, and numbers above endogenous variables are total effects.

The data supported all hypotheses. The reported behavior of avoiding crowded places was predicted by intention (β = .30, $p < .001$; Hyp. 1), risk perception (β = .11, $p < .001$; Hyp. 2), moral norm (β = .19, $p < .001$; Hyp. 3), and perceived behavioral control (β = .20, $p < .001$; Hyp. 4). Then, risk perception was predicted positively by the frequency of information related to COVID-19 (β = .17, $p < .001$; Hyp. 5), negatively by trust in authorities and health policies (β = -.13, $p < .001$; Hyp. 6), and positively by moral norm (β = .18, $p < .001$; Hyp. 7) and injunctive norm (β = .17, $p < .001$; Hyp. 8). Moreover, intention was predicted positively by attitude (β = .43, $p < .001$; Hyp. 9), perceived behavioral control

(β = .11, p < .001; Hyp. 10), moral norm (β = .15, p < .001; Hyp. 11), and injunctive norm (β = .24, p < .001; Hyp. 12). In explaining the motivation and behavior to avoid crowded areas, moral norms and risk perception thus contributed over and above the by default components of the theory of planned behavior. Covariates and other details of the model can be consulted in Supplementary Material 2.

For multi-group analysis, a model considering cities (as proxies for cultures) as different groups were analyzed with all parameters to be freely estimated, showed a good fit: $\chi^2(40)$ = 111.494 (p < .001), CFI = .979, NFI = .969, TLI = .907 and RMSEA = .039, 95% CI [.032, .047] (see Supplementary Material 3 for scores of unconstrained estimates). A constrained model where all estimates were forced to be equal across the cities showed a worse fit with non-invariance in the estimates ($\Delta\chi^2$ of 120.334, p < .001; ΔCFI = .024): χ^2 = 231.828 (p < .001), CFI = .955, NFI = .936, TLI = .893 and RMSEA = .041, 95% CI [.035, .048]. Based on Cheung and Rensvold's (2002) criterion to decide on invariance (i.e., ΔCFI < .01), we concluded that this model did not show invariance in the structural weights by culture (ΔCFI = .024) or in structural covariants (ΔCFI = .115) and structural residuals (ΔCFI = .121). We thus conducted a step-by-step analysis of the estimates, covariances, and residuals that could be constrained and invariant without significantly harming the model fit across the groups. We were thus able to achieve a significantly better fit with $\chi^2(82)$ = 179.599 (p < .001), CFI = .972, NFI = .951, TLI = .938, RMSEA (90% CI) = .032 [.025, .038] (see Supplementary Material 4 for more information on parameters before and after adjustment). The latter model accounted for 47% of the behavioral variance in Brasilia, 34% in Tokyo, 35% in New York, and 21% in Taipei. Intention variance was the greatest in Tokyo (69%), while fear was in Taipei (38%). The estimates that would be considered equal across cultures were the paths: 1) from PBC ($\Delta\chi^2$ = 5.708, p = .127), moral norms ($\Delta\chi^2$ = 4.268, p = .234), and attitude ($\Delta\chi^2$ = 6.908, p = .075) to intention; 2) from injunctive norms ($\Delta\chi^2$ = 6.920, p = .074) to risk perception; and 3)moral norms ($\Delta\chi^2$ = 2.185, p = .535) and risk perception to behavior ($\Delta\chi^2$ = 5.981, p = .113) (See Supplementary Material 5 for the list of all constrained parameters).

As for the estimates in the multi-group model, moral norms (p < .001) and risk perception (p < .001) were constrained to predict behavior, while intention and perceived behavioral control varied significantly across cities. Indeed, as can be seen in Table 3, intention was the strongest predictor of behavior in New York, followed by Tokyo, but in Brasília and Taipei, Perceived Behavioral Control was. Intention was predicted with the same effect across cities by moral norms, attitude, and perceived behavioral control, while injunctive norms varied significantly with a stronger effect in Tokyo, and New York, respectively.

Table 3

Standardized Estimates, Standard Errors, and Significance of the Estimates in the Multi-Group Model

Estimates		New York (n = 313)			Tokyo (n = 300)			Brasília (n = 283)			Taipei (n = 300)		
Dependent	**Independent**	**β**	***SE***	***p***	**β**	***SE***	***p***	**β**	***SE***	***p***	**β**	***SE***	***p***
Intention	Moral Norm	**.125**	**0.020**	***	**.119**	**0.020**	***	**.153**	**0.020**	***	**.135**	**0.020**	***
	Attitude	**.445**	**0.028**	***	**.454**	**0.028**	***	**.412**	**0.028**	***	**.465**	**0.028**	***
	Injunctive Norm	.294	0.044	***	.299	0.042	***	.172	0.047	***	.166	0.044	***
	PBC	**.092**	**0.019**	***	**.100**	**0.019**	***	**.122**	**0.019**	***	**.095**	**0.019**	***
Risk	Trust	-.107	0.052	.034	-.027	0.049	.620	-.247	0.046	***	**-.150**	0.057	.005
Perception	Information	.115	0.046	.025	.102	0.049	.068	.125	0.062	.020	.335	0.046	***
	Injunctive Norm	**.183**	**0.033**	***	**.199**	**0.033**	***	**.160**	**0.033**	***	**.191**	**0.033**	***
	Moral Norm	.300	0.046	***	.129	0.050	.025	.166	0.053	.004	-.121	0.050	.029
Behavior	Moral Norm	**.160**	**0.045**	***	**.154**	**0.045**	***	**.180**	**0.045**	***	**.168**	**0.045**	***
	Intention	.405	0.095	***	.347	0.096	***	.300	0.101	***	.071	0.110	.226
	Risk Perception	**.082**	**0.044**	***	**.078**	**0.044**	***	**.095**	**0.044**	***	**.088**	**0.044**	***
	PBC	.079	0.091	.122	.188	0.085	***	.330	0.072	***	.294	0.104	***

Note. Scores in bold are constrained across the cultures.
***p < .001.

As regards risk perception, only injunctive norms were predicted with the same effect across cities. On the contrary, the frequency of COVID information, trust, and moral norms varied significantly. Indeed, the strongest predictors of risk perception were COVID-19 information in Taipei, trust in Brasilia, moral norms in New York and injunctive norms in Tokyo. There were nonsignificant results only in the following paths: from perceived behavioral control to behavior in New York, from Intention to behavior in Taipei, and from trust and information to risk perception in Tokyo. Explained variance in Behavior was stronger in Brasilia (R^2 = .466), New York (R^2 = .345), Tokyo (R^2 = .337), and Taipei (R^2 = .208), respectively. Explained variance of risk perception and intentions can be consulted in Table 4.

Table 4

Squared Multiple Correlations Across Cities

Estimates	**New York**	**Tokyo**	**Brasília**	**Taipei**
Dependent / Independent	R^2	R^2	R^2	R^2
Risk Perception	.223	.106	.241	.158
Intention	.591	.683	.495	.508
Behavior	.345	.337	.466	.208

To sum up, in the first section of our results, we could find that several regression weights were similar across the cities, while others were not if we consider preserving the data fit and model`s explanation.

Section 2: Comparison of the Mean Scores Across Cultures and Political Views

Although we could analyze each estimate in the model, comparing the mean scores across cities gave us additional information. Indeed, as can be seen in Table 5, there were significant differences in all measures across cities as indicated by one-way Welch ANOVAs (all *ps* < .001). Means, standard deviations, *F tests,* and partial eta squared values can be consulted in Table 5.

Table 5

Mean and Standard Deviation of Scores by Country, Followed by Results From ANOVA

	Tokyo (*n* = 300)		**Taipei** (*n* = 300)		**New York** (*n* = 313)		**Brasília** (*n* = 283)		***F***	
Measure	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	**(3, 1192)**	η_p^2
Intention	4.03^{a}	0.82	4.04^{a}	0.71	4.34^{b}	0.80	4.51^{b}	0.71	27.733***	.065
Behavior	4.85^{a}	1.50	4.66^{a}	1.33	5.58^{b}	1.50	5.86^{b}	1.35	47.560***	.107
Moral Norm	3.37 ^{a}	0.90	3.54^{a}	0.80	3.85^{b}	0.92	4.18^{c}	0.91	48.031***	.108
Attitude	4.20^{a}	0.78	4.16^{ab}	0.69	4.22^{ab}	0.80	4.63^{c}	0.61	26.190***	.062
PBC	3.45^{a}	0.91	3.91^{b}	0.74	4.03^{bc}	0.85	4.15^{c}	0.93	37.630***	.087
Injunctive Norm	4.25^{a}	0.75	4.03^{b}	0.71	4.23^{a}	0.73	4.45^{c}	0.65	16.330***	.039
Frequency of Information	3.78^{a}	0.88	3.88^{a}	0.91	3.67^{a}	0.90	4.32^{b}	0.69	32.530***	.076
Risk Perception	3.41^{a}	0.78	3.46^{a}	0.78	3.71^{b}	0.77	3.86^{b}	0.81	22.064***	.053
Trust	2.57^{a}	0.83	3.37^{b}	0.73	2.98^{c}	0.77	1.91^{d}	1.01	161.200***	.289

Note. From left to right and within a row, means without a common superscript differ relative to the first score to use the superscript (p < .05) as indicated by Bonferroni posthoc tests in Supplementary Material 6.

Firstly, cities showed a moderate to strong effect on intention (η_p^2 = .065) and behavior (η^2 = .107). For intention, Brasilia scored the highest followed by New York, Tokyo and Taipei. As for reported Behavior, Taipei presented the lowest score,

followed by Tokyo, New York and Brasilia. Moreover, the differences in the cities also showed a medium to high effect size on moral norms (η_p^2 = .108), attitude (η_p^2 = .062), PBC (η_p^2 = .087), and low to medium in injunctive norms (η_p^2 = .039). Brasilia and New York presented the highest moral norms scores. Brasilia also presented the highest score for injunctive norms, followed by Tokyo and New York.

Brasilia continued to present the highest score for attitude, followed by New York, Tokyo, and Taipei. Perceived Behavioral Control in Tokyo was relatively lower than in Taipei, New York and Brasilia. The differences across cities also showed a moderate effect on the frequency of COVID-19 information (η^2 = .076), a moderate to strong effect on risk perception (η^2 = .053), and a strong effect on trust in authorities (η^2 = .289). The frequency of exposed information on COVID-19 was much higher in Brasilia than in other cities. Trust in authorities was the highest in Taipei, but not much higher than the midpoint of the scale, and the lowest in Brasilia. On the contrary, Brasilia had the highest score in risk perception, followed by New York. Tokyo and Taipei remained relatively equal in their scores on risk perception.

The latter results show that, although components can have a significant effect on influencing intention and behavior, as seen in the first section of our findings, all their mean scores varied substantially across the cities, showing how culture can affect avoiding crowded places and its determinants.

Next, we present the differences in political orientations in each city. As can be seen in Table 6, Taipei showed no differences in the measures across the political dimensions, except for moral norms, and trust in authorities. For moral norms, the greatest difference was between centrists and citizens not interested in politics (Cohen's d = .502). For trust in authorities, the greatest difference was between D.P.P. partisans compared to K.M.T. partisans (d = .735) and those not interested in politics (d = .657).

Table 6

Means and Standard Deviations of Scores by Political Position in Taipei, Followed by Results of Welch`s ANOVAs

	K.M.T. (n = 46)		D.P.P (n = 40)		Centrist (n = 163)		Not interested (n = 51)		F		
Measure	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	**(3, 296)**	***p***	η_p^2
Risk Perception	3.31[a]	0.80	3.46[ab]	0.75	3.46[abc]	0.78	3.59[abc]	0.79	0.838	.476	.010
Attitude	4.13[a]	0.76	3.99[ab]	0.82	4.20[abc]	0.65	4.17[abc]	0.60	0.956	.403	.013
PBC	3.97[a]	0.76	3.74[ab]	0.72	3.93[abc]	0.76	4.00[abc]	0.65	1.311	.275	.012
Injunctive Norm	3.99[a]	0.68	4.02[ab]	0.76	4.06[abc]	0.71	4.00[abc]	0.66	0.163	.921	.002
Moral Norm	3.53[a]	0.75	3.41[ab]	0.76	3.66[abc]	0.78	3.26[abc]	0.88	3.308	.023	.036
Information	3.84[a]	0.94	3.92[ab]	0.91	3.88[abc]	0.94	3.83[abc]	0.80	0.098	.961	.002
Intention	4.11[a]	0.82	3.99[ab]	0.75	4.05[abc]	0.69	4.03[abc]	0.61	0.158	.925	.002
Trust	3.15[a]	0.81	3.68[b]	0.65	3.36[ac]	0.71	3.23[ac]	0.72	5.240	.002	.047
Behavior	4.55[a]	1.27	4.52[ab]	1.33	4.72[abc]	1.35	4.72[abc]	1.33	0.397	.755	.004

Note. From left to right and within a row, means without a common superscript differ relative to the first score to use the superscript (p < .05) as indicated by Bonferroni posthoc tests in Supplementary Material 6.

As reported in Table 7, participants from Tokyo showed significant political differences in six measures, with the largest effect size being on intention and trust. No significant difference was found in behavior, but people who are not interested in politics showed significantly less intention to engage in this behavior than Conservatives, Progressists, and Centrists.

Table 7

Mean and Standard Deviation of Scores by Political Position in Tokyo, Followed by Results From Welch`s ANOVAs

	Conservatives (*n* = 46)		Progressists (*n* = 40)		Centrist (*n* = 163)		Not interested (*n* = 51)				
Measure	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***F* (3,296)**	***p***	**η2**
Risk Perception	3.22[a]	0.90	3.41[ab]	0.82	3.51[abc]	0.74	3.24[abc]	0.74	2.463	.067	.025
Attitude	4.11[a]	0.84	4.46[ab]	0.56	4.23[abc]	0.79	3.99[ac]	0.78	4.184	.008	.031
PBC	3.48[a]	0.91	3.55[ab]	1.01	3.42[abc]	0.92	3.45[abc]	0.81	.212	.888	.002
Injunctive Norm	4.02[a]	0.86	4.50[b]	0.58	4.33[abc]	0.70	4.02[ac]	0.81	5.248	.002	.051
Moral Norm	3.08[a]	1.05	3.68[b]	0.74	3.40[abc]	0.86	3.27[abc]	0.93	3.614	.016	.034
Information	3.70[a]	0.99	3.95[ab]	0.82	3.84[ab]	0.80	3.42[a]	0.98	3.015	.034	.031
Intention	3.85[a]	0.97	4.36[b]	0.71	4.10[ab]	0.80	3.72[a]	0.72	6.865	< .001	.057
Trust	3.01[a]	0.90	2.26[b]	0.94	2.45[bc]	0.76	2.79[ac]	0.71	7.891	< .001	.084
Behavior	4.76[a]	1.77	5.03[ab]	1.37	4.93[abc]	1.48	4.51[abc]	1.38	1.446	.234	.013

Note. From left to right and within a row, means without a common superscript differ relative to the first score to use the superscript ($p < .05$) as indicated by Bonferroni posthoc tests in Supplementary Material 6.

On average individuals in all cities agreed with having avoided crowded areas and producing efforts for that. Conservatives, despite scoring high in injunctive norms, still presented significantly lower scores compared to Progressists (d = .646). Regarding trust in the health policies, these differences were seemingly even higher between the same groups with Conservatives reporting more trust than Progressists (d = .813). The differences between Conservatives and Centrists were also relatively strong (d = .70).

The political differences in New York (see Table 8) were significant in risk perception, intention, behavior, frequency of information, attitude and trust in authorities, with small to medium effect sizes. In behavior, a large difference was found between Liberals and Republicans (d = .491) and Liberals versus citizens not interested in politics (d = .473) respectively. In intention, the largest difference was between Liberals and Republicans (d = .541), while risk perception also presented a relatively large difference between Liberals and Republicans (d = .741). Finally, following the same tendency, trust was higher among Republicans than Liberals (d = .650).

Table 8

Means and Standard Deviations of Scores by Political Position in New York, Followed by Results From Welch's ANOVA

	Republicans (*n* = 56)		Liberals (*n* = 96)		Centrist (*n* = 102)		Not interested (*n* = 59)				
Measure	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***F* (3,309)**	***p***	**η^2**
Risk Perception	3.39[a]	0.79	3.93[b]	0.70	3.69[abc]	0.79	3.68[abc]	0.73	6.321	< .001	.014
Attitude	4.13[a]	0.88	4.41[ab]	0.75	4.23[abc]	0.82	3.97[ac]	0.71	4.572	.004	.037
PBC	4.21[a]	0.71	4.09[ab]	0.88	3.98[abc]	0.86	3.86[abc]	0.86	2.176	.093	.019
Injunctive Norm	4.04[a]	0.91	4.35[ab]	0.66	4.25[abc]	0.73	4.19[abc]	0.62	1.806	.149	.020
Moral Norm	3.75[a]	1.03	3.98[ab]	0.89	3.88[abc]	0.89	3.67[abc]	0.85	1.786	.152	.016
Information	3.72[a]	0.91	3.85[ab]	0.84	3.66[abc]	0.88	3.34[ac]	0.95	3.814	.011	.037
Intention	4.08[a]	1.01	4.54[b]	0.73	4.39[abc]	0.73	4.19[abc]	0.75	4.273	.006	.045
Trust	3.29[a]	0.69	2.78[b]	0.83	3.01[abc]	0.73	2.93[abc]	0.71	5.658	.001	.051
Behavior	5.23[a]	1.63	5.94[b]	1.31	5.61[abc]	1.46	5.25[ac]	1.64	3.879	.011	.036

Note. From left to right and within a row, means without a common superscript differ relative to the first score to use the superscript ($p < .05$) as indicated by Bonferroni posthoc tests in Supplementary Material 6.

Results for Brasilia can be seen in Table 9. This city showed the largest differences in the scores by political positions with all of them, but PBC and frequency of COVID-19 information, were significant. The most evident differences concerned trust in authorities with it being higher among Right-wing partisans than both Left-Wingers (d = 2.279), and centrists (d = 1.143). Moral norms presented the second greatest difference followed by intention and behavior. Specifically, Right-wing partisans reported fewer feelings of moral obligation than Left-wingers (d = 1.285), centrists (d = .824) and those not interested in politics (d = .777). Right-wingers reported less intention behavior of avoiding crowded places than the other groups, with Cohen's ds varying from 0.679 to 1.218. Right-wingers also perceived less risk than Left-Wingers (d = 1.043).

Table 9

Means and Standard Deviations of Scores by Political Position in Brasilia, Followed by Results From Welch's ANOVA

	Right-wing (n = 44)		Left-wing (n = 96)		Centrist (n = 102)		Not interested (n = 59)		F		
Measure	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	**(3,275)**	***p***	**η2**
Risk Perception	3.34[a]	1.06	4.19[b]	0.64	3.81[c]	0.61	3.86[c]	0.81	9.765	< .001	.067
Attitude	4.25[a]	0.87	4.83[b]	0.44	4.63[bc]	0.55	4.63[bc]	0.53	6.806	< .001	.091
PBC	3.77[a]	1.05	4.22[ab]	0.98	4.18[abc]	0.75	4.28[abc]	0.87	2.656	.051	.036
Injunctive Norm	4.16[a]	0.81	4.58[b]	0.55	4.46[abc]	0.64	4.47[abc]	0.62	3.239	.024	.044
Moral Norm	3.43[a]	1.21	4.54[b]	0.58	4.27[bc]	0.87	4.18[c]	0.81	12.340	< .001	.151
Information	4.30[a]	0.70	4.43[ab]	0.61	4.22[ac]	0.74	4.31[abc]	0.69	1.246	.296	.045
Intention	4.01[a]	0.99	4.67[b]	0.57	4.62[bc]	0.62	4.52[bc]	0.60	5.810	.001	.100
Trust	2.90[a]	0.88	1.29[b]	0.59	1.85[c]	0.95	2.03[c]	1.03	45.869	< .001	.261
Behavior	4.89[a]	1.86	6.03[b]	1.17	6.15[bc]	1.09	5.97[bc]	1.19	5.670	.001	.100

Note. From left to right and within a row, means without a common superscript differ relative to the first score to use the superscript (p < .05) as indicated by Bonferroni posthoc tests in Supplementary Material 6.

In sum, our findings indicate that both the behavior of avoiding crowded places in large cities and its determinants can also be influenced by the political views of cities facing the COVID-19 pandemic. Thus, it reveals that the components of the proposed model can vary largely (e.g., in Brasilia), or low (e.g., in Taipei) across political parties depending on the target city or culture of study.

Discussion

Why people engage in physical distancing from crowded places during pandemics has remained understudied. With this research, we aimed at filling in this gap by using the theory of planned behavior and including risk perception, and moral norms to explain that behavior. We also investigated the extent to which this behavior and its determinants can differ according to the culture and the political positions of individuals across four cities around the world.

Behavior, Intention, and Attitude

The model`s explained variance of behavior and intention can be considered high compared to previous research (McEachan et al., 2011). Indeed, intention had the most explained variance in behavior, except in Taipei, where authoritiesenforced strictly controlled public health policies (Wang et al., 2020). Furthermore, risk perception and moral norms were relevant determinants to filling the intention-behavior gap in all cities, since behavior is not only directly explained by people`s intention to avoid crowded places. These findings complement other studies focusing on explaining this gap, in the pandemic, by showing that risk perception and moral norms can contribute to explaining

behavior of avoiding crowded places along with intention and its determinants (Gibson et al., 2021). This leads our model to be in accordance with the proposals of the generation of extending models of the theory of planned behavior (e.g., TPB), with respect to theoretical coherence and parsimony (Conner & Armitage, 1998; Neto et al., 2020), which follows the critique that the theory of planned behavior considers few behavioral predictors in its original model (Hagger, 2010).

Moderate to large differences in mean scores of behavior and intention across cities hint at the contextual and cultural impact on adherence to protective actions. By looking at the political views, we see significant differences between New York, Brasilia, and Tokyo. Thus, highly politicized health crises can lead people to avoid crowded areas (Cavazza et al., 2021). That is less likely in Taipei, presumably because politicians who self-identify as moderates have increased popularity among voters. Indeed, data from the Taiwan National Security Survey showed that vote choice tends to respect a normal distribution in the political spectrum (Wang, 2019). Thus, policymakers might consider differences in political and cultural views in health public responses in polarized versus non-polarized contexts. Moreover, reducing this polarization and understanding the social psychological processes of communities divided by it is needed (Bartusevičius et al., 2021).

Attitudes, moral and injunctive norms, perceived behavioral control, and risk perception components significantly predicted behavior and/or intention in every city. Similar findings can be seen in the literature (Fischer & Karl, 2022; Pfattheicher et al., 2020; Shanka & Gebremariam Kotecho, 2023). The fact that attitude was the best predictor of intention hints at the importance of attitudinal change through health policies and communication that highlight the positive outcomes of avoiding crowded places (Fujii, 2003). Furthermore, differences in attitudes had a moderate effect size across cities. Attitudes were also significantly different among political parties in Brasilia, New York, and Tokyo, with the three cities mostly polarized between the opposing political parties on how they view avoiding crowded places. Brasilia showed the largest difference in this respect. In summary, highly polarized settings can thus impact attitudes, which might be a product of how political leaders frame and evaluate certain beliefs of their political partisans (Calvillo et al., 2020).

Moral and Social Norms

Moral and social norms explained intention, behavior, and risk perception substantially. In this sense, targeting feelings of moral obligation to the public by raising awareness about people in need, while emphasizing one's ability to do it and indicating their responsibility to become involved can be significant in communications (Schwartz, 1977; Van Bavel et al., 2020). Also, creating means for individuals to be aware of the expectations of their referent people to avoid crowded places is also important in determining intention (Cialdini & Goldstein, 2004; Young & Goldstein, 2021). Moreover, as seen in past literature and our results, these social and moral-based norms can also amplify the perception of risk, thus shaping public response and adherence to measures (Douglas & Wildavsky, 1983; Kahan & Braman, 2003; Kasperson et al., 1988).

Moral norms showed invariance in behavior and intention explanations across countries, in contrast with social norms, which varied significantly across cultures. Thus, the findings show that the effect of moral norms on avoiding crowded places is independent of the effect of social norms, presumably because it is more stable when shaping behavior (Schwartz, 1977). Nevertheless, moral norms presented differences in their mean scores across all cities and political parties in Japan, Taiwan, and Brazil. Thus, cultural and political norms can affect personal feelings of obligation to avoid crowded areas. Furthermore, social norms were significantly different across political parties, especially in Tokyo and Brasilia, but also across the other cities.

These patterns offer evidence that the social-political norms of cities can impact compliance to authority demands. Indeed, previous studies showed that citizens are influenced by opinions from politicians or people closest to them (Cialdini & Trost, 1998). Furthermore, during the COVID-19 pandemic, partisan identification was found to influence social distancing through the control of social norms (Fieldhouse & Cutts, 2021).

Perceived Behavioral Control

The effect of perceived behavioral control on intention was invariant across cities. However, it can explain behavior substantially, especially in Brasilia, Tokyo, and Taipei, which points to its importance in reducing the perceived costs and increasing the perceived controllability of avoiding crowded places in these cities for actual behavioral change. In terms of mean scores, perceived behavioral control had significant differences across cities, but not across political parties. One reason for the latter finding can be attributed to urban planning, which could have facilitated social distancing in crowded areas during the pandemic (e.g., guiding the flow of pedestrians to other routes to alleviate the congestion of citizens in a certain area; Hamidi et al., 2020). This is especially visible in the densest city in the study (i.e., Taipei), which scored the lowest in perceived behavioral control.

Other factors that may be relevant to consider are how the pandemic may have established work and economic constraints in certain cities, which makes social distancing be perceived as difficult for individuals to put into practice (Aschwanden et al., 2021). In this sense, Yabe et al. (2020), for example, found a significant and negative correlation of r = -.696 between taxable income per household in Japan and the number of social contacts during the pandemic, where lower-income households may not perceive flexibility in restricting their mobility in daily lives. Also, in Brazil, the COVID-19 pandemic produced a substantial impact on informal sectors and services, which require activities in dense areas (Ferreira dos Santos et al., 2020).

Risk Perception

Risk perception remained invariant in predicting behavior across cities, with the frequency of COVID-19 information, trust in authorities, and moral and social norms being significant predictors. Risk perception was better explained and had the highest score in New York and Brasilia, which is consistent with the fact that these cities had a higher number of infections compared to Tokyo and Taipei. In this sense, high-risk perceptions may be a product of close contact with the urgent reality and can be amplified by a lack of trust, exposition of risk information, social norms, and feelings of moral obligation to prevent risks (Cvetkovich, 2013; Douglas & Wildavsky, 1983; Kahan & Braman, 2003; Tversky & Kahneman, 1973). This can be taken as evidence that the effect of risk perception in pandemics is not only cognitively formulated by the dynamics of real risk estimations but by a series of social factors (Slovic & Peters, 2006).

Trust in authorities to manage the pandemic was the factor that varied the most across cities and political parties. The smallest difference in trust across political parties and the highest level of trust was found in Taipei, which is consistent with both its health management scenario (Wang et al., 2020) and its internal political stability compared to the other cities (Wang, 2019). On the other hand, the large difference in trust in authorities across the cities may be due to their COVID-19 situation and how effectively the policies may have been conducted. The highest differences across political parties and the highest score of distrust were mostly found in Brasilia, the capital city of a country with high levels of inequality and political instability in the last decade (Barberia et al., 2021; Lopes, 2021).

Moreover, the effect of COVID-19 information frequency on risk perception differed across cities. In this sense, exposure to COVID-19 information regulates people`s perception of infection risk through different sources such as the social/mass media (Stevens et al., 2021). Information frequency also differed significantly across cities in its mean scores, being the highest in Brasilia. Moreover, in New York and Brasilia, there were differences across parties in this component, suggesting potential political boundaries for the spread of key COVID-19 information (Fraser & Aldrich, 2021).

Limitations and Future Agenda

This research presents several limitations. First, we could not conduct a multi-group analysis by political positions accounting for each city, since it would require a much larger sample divided into 16 groups (i.e., four political views for each of the four cities). Second, although some effects in the model can be considered equal across the cultures, replication of data in other cultures and cities is needed before considering estimates as fairly universal. Third, our study is correlational. Besides precluding causal interpretations, our study does not capture nuanced information about each location, which would allow for more accurate interpretations. Conducting a multi-method study is thus important.

Fourth, data collection was conducted differently in Brasilia with the use of snowball sampling due to the national regulations, where participants are not allowed to be paid. This may have compromised the equivalence among samples. Finally, despite using diverse samples, they are not representative of the studied cities, much less of the countries and their cultures.

Conclusions

By analyzing the social and cognitive factors of avoiding crowded places during the pandemic, this study offers several significant academic contributions. Also, by verifying the validity of a model based on the theory of planned behavior, risk perception, and moral norms to explain the behavior of avoiding crowded places during the COVID-19 pandemic, we showed that avoiding crowded places can be a planned behavior shaped by social-cognitive determinants. Moreover, the cross-cultural evidence of the study shows that the relationship between people and places can significantly change according to the social context or the political position with which people identify themselves. This provides an additional contribution to the discussion of target-focused policies and to the academic community in building a comprehensive model. Thus, after critical debate and thinking over the findings of this research, and while considering its limitations, these results can be useful to new proposals in health policymaking designed according to the social-political need of each culture (Uzzell, 2015).

Funding: This study is part of the international project named "The behavioral mechanisms of cooperation during the COVID-19 pandemic: An international comparative analysis in Japan, The United States, Taiwan, and Brazil" with financial support from the frontline of COVID-19 research of Tohoku University, Japan.

Acknowledgments: The author is grateful for the helpful comments and suggestions of Professor Masahiro Sato (Tohoku University, Japan), Professor Yuichi Furukawa (Aichi University, Japan), and RIETI members.

Competing Interests: The authors have declared that no competing interests exist.

Author Contributions: All authors are credited for substantial contributions to the paper while critically revising it for important intellectual content, and final approval of the version to be published. In addition, this study is also promoted as a part of the Project "Social Scientific Studies on Self-replicating Natural and Technical Phenomenon" undertaken at the Research Institute of Economy, Trade, and Industry (RIETI).

Ethics Statement: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The research was approved by the research ethics committee of Tohoku University, Graduate School of International Cultural Studies (Approval Number 2020-2). All participation in this study was consent and voluntary. In addition, the participants could leave the survey at any moment according to their will.

Data Availability: For this article, a data set is freely available (Matsunaga, Aldrich, Faiad, Aoki, Tseng, & Aida, 2023a).

Supplementary Materials

The Supplementary Materials contain the following items (for access see Index of Supplementary Materials below):

1. The research data and codebook for the study
2. Additional information:
   a. Supplementary Material 1: Contains the translation and back-translation of items from our questionnaire
   b. Supplementary Material 2: Contains information about the covariates in our model
   c. Supplementary Material 3: Contains the score of unconstrained estimates of our model
   d. Supplementary Material 4: Contains information on the parameters of our model before and after adjustments
   e. Supplementary Material 5: Contains a list of all constrained parameters in our model
   f. Supplementary Material 6: Contains Bonferroni posthoc tests for our comparison analysis

Index of Supplementary Materials

Matsunaga, L. H., Aldrich, D., Faiad, C., Aoki, T., Tseng, P., & Aida, J. (2023a). *Supplementary materials to "The psychological determinants of avoiding crowded areas: An international and political investigation"* [Research data and codebook]. PsychOpen GOLD. https://doi.org/10.23668/psycharchives.13051

Matsunaga, L. H., Aldrich, D., Faiad, C., Aoki, T., Tseng, P., & Aida, J. (2023b). *Supplementary materials to "The psychological determinants of avoiding crowded areas: An international and political investigation"* [Additional information]. PsychOpen GOLD. https://doi.org/10.23668/psycharchives.13052

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