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Desire for Cultural Tightness: The Associated between COVID-19 Infection Concern and Mental Health and Protective Behavior During- and Post-COVID-19 Lockdown in China


Yi Yin¹ Qian Sun^{*1} Nicolas Geeraert² Qi Sun^{*1}

¹ School of Psychology, Zhejiang Normal University (China)

² Department of Psychology, University of Essex (UK)

Author notes

Qian Sun  <https://orcid.org/0000-0002-1346-2904>

Nicolas Geeraert  <https://orcid.org/0000-0002-0123-4664>

Qi Sun  <https://orcid.org/0000-0001-9382-3249>

Correspondence concerning this article can be addressed to Qian Sun (sunqian@zjnu.edu.cn) or Qi Sun (sunqi_psy@zjnu.edu.cn), School of Psychology, Zhejiang Normal University, Jinhua 321004, China. The research reported in this article was supported by a research grant of the Zhejiang Office of Philosophy and Social Science to Qian Sun (24NDQN190YBM).

Abstract

The COVID-19 global health crisis has caused widespread concern among people worldwide, affecting their mental health and behavior. People's response to this crisis varied greatly from country to country, with cultural tightness being one of the key influences. Countries, like China, with tighter cultures demonstrated a clear advantage. Its strict anti-pandemic measures prompted the population to adopt more effective protective behavior to curb the spread of the virus while protecting their mental health. However, research on people's attitudes towards such cultural tightness is lacking. Additionally, previous studies have mainly focused on individuals' concern of their own infections, neglecting their concern about the infections of people around them. Lastly, it is unclear whether this process varies during and post COVID-19 lockdown. To address those questions, a study of 614 mainland Chinese participants was conducted. The results indicate that, Chinese individuals were more concerned about their family, significant others and the public being infected than they were about themselves being infected. In terms of infection concern of oneself and public, individuals who more concerned desired more cultural tightness, which in turn led to better mental health and greater engagement in protective behavior. Interestingly however, people who more concerned about their family members being infected expect a looser culture during the lockdown and desire a tighter culture post-lockdown, which promotes more protective behavior and better mental health. Furthermore, the association between the desire for tightness in response to concern about COVID-19 infection and promoting mental health and protective behavior was more pronounced post-lockdown compared to lockdown phase.

Keywords: Chinese Individuals, COVID-19 Infection Concern, Desire for Cultural Tightness, Mental Health, Protective Behavior

Introduction

The COVID-19 pandemic has had a significant impact on people's lives, causing widespread concern that affects individuals' mental health (Holmes et al., 2020; Rajkumar, 2020; Santomauro et al., 2021) and drives protective behavior to curb the spread of the virus (Ezati Rad et al., 2021).

Interestingly, people's response to this crisis varies greatly from country to country, with cultural tightness being one of the key drivers. Cultural tightness, referring to the strength of social norms and the tolerance of deviant behavior (Gelfand, 2006), may influence how societies and individuals respond to collective threats (Gelfand et al., 2021). Compared to individuals from loose cultures, individuals from tight cultures, like China, were more compliant following protective behavior (Gilliam et al., 2022), which helped stem the spread of the virus (Gelfand et al., 2021; Cao et al., 2020; Liu et al., 2022) and benefited people's mental health (Dong et al., 2021). Previous research has demonstrated major cultural differences in the extent to which people endorse tightness (Gelfand et al., 2011). Nevertheless, we argue that cultural tightness is also a dynamic construct.

Thus, when a particular context (such as the COVID-19 pandemic) requires collective action, people's desire for tightness might increase. However, there is limited research on people's attitudes towards cultural tightness and how these attitudes impact people's mental health and protective behavior. Therefore, the present study investigates the association between COVID-19 infection concern and mental health and protective behavior among Chinese, as well as the mediating role of desire for cultural tightness in this relationship. The current study hypothesizes that concern about getting infected would be associated with both poorer mental health (lower life satisfaction and greater depression) and greater protective behavior (H1). Furthermore, these relationships are believed to be mediated by a greater desire for cultural tightness (H2) (see Figure 1).

- - - Insert Figure 1 about here - - -

Previous studies have mainly focused on individuals' concern of getting infected themselves (Mula et al., 2022; Baldner et al., 2022). However, collective interests are prioritized in collectivist cultures (Bochner, 1994; Hofstede, 1980). Indeed, the interdependent self-concept leads individuals to be more attentive to the feelings and thoughts of people in their social circle (Markus & Kitayama, 1991). Thus, there may be differences among COVID-19 concern in different targets. The present study compares the levels of concern individuals have for themselves, their families, significant others and the general (Chinese) public, and examines how various types of concern are associated with mental health and protective behavior through their desires of cultural tightness. The current study hypothesizes the levels of concern individuals have for family, significant others and public would be higher than for oneself (H3), and the mediating effects of the desire for cultural tightness in other targets model are expected to be stronger than that in oneself model (H4).

Notably, China's anti-pandemic process could be divided into two distinct phases. First, the lockdown phase involved the implementation of strict measures to contain the spread of virus. In the second, post-lockdown phase, the Chinese government shifted its prevention and control policy to a looser approach due to the upturn in the pandemic situation and virus mutation (The Joint Prevention and Control Mechanism of the State Council, 2022). Changes in the tightness of social norms can affect people's psychological and behavioral responses (Gelfand et al., 2006). However, to our knowledge, no studies have compared people's attitudes and responses across the two phases. Thus, the present study examines whether the mediating effect of desire for cultural tightness on people's responses changed between the two phases. It is examined as exploratory analysis due to the lack of prior research.

In summary, the present study has a number of aims. It examines how Chinese individuals' concern about COVID-19 infections is associated with their mental health and protective behavior through the mediation effect of desire for cultural tightness. Second, it compares the levels of concern for various targets: oneself, family, significant others, and the general (Chinese) public, and examines the effect of different types of concern on mental health and protective behavior through the desire for cultural tightness. Finally, changes in such mediation associations between the lockdown and post-lockdown phases are examined.

Method

Participants

The study's sampling frame consisted of Chinese individuals residing in mainland China during the COVID-19 lockdown and post-lockdown. The participants included 652 Chinese who were recruited from November 5th, 2022 to January 16th, 2023. Thirty-four participants were excluded due to atypical responses (e.g., incomplete or same response for most items, Meade & Craig, 2012). The final sample consisted of 614 participants. Due to a shift in public health measures, the lockdown phase (t_1 , $N_{t1} = 328$, 64% female, $M_{age} = 22.85$, $SD = 6.33$) came to an end and the post-lockdown phase started (t_2 , $N_{t2} = 286$, 65% females, $M_{age} = 27.69$; $SD = 8.11$) on the December 7th, 2022.

Measures and Procedure

Participants were recruited through social media using snowball sampling and responded to the questionnaire on an online platform (Wenjuanxing). Informed consent was obtained at the start of the survey. All aspects of the research complied with the American Psychological Association ethics guidelines.

Demographic variables

Participants were asked to report demographic information about themselves, including their gender, age, location, level of education and socioeconomic status.

Infection Concern of COVID-19

Participants' concern about COVID-19 infection was measured using 6 items adapted from Mula et al. (2022) and Dai et al. (2011), to assess the extent to which participants were worried about contracting COVID-19 and their perceived severity of COVID-19 infection. Example items were like "How personally disturbing would you find the following possible consequences of the coronavirus? – Me contracting the virus" on a scale from 1 (Not disturbing at all) to 5 (Extremely disturbing), and "If I am infected with COVID-19, it will pose a serious threat to my health" on a scale from 1 (Strongly disagree) to 5 (Strongly agree). Infection concern of family, significant others and the general (Chinese) public were assessed using the same items, with the wording adjusted for each infection targets. The scales had good reliability ($\alpha > 0.87$).

Desire for Cultural Tightness

Desire for culture tightness was adopted from Gelfand et al. (2011) and wording was made to specify the context of China pandemic. Participants were asked to indicate, in the current pandemic context, which of the following characteristics they believed Chinese society should have, using a scale from 1 (Extremely flexible) to 5 (Extremely rigid) on items like "China should 'Have flexible social norms' vs 'Have rigid social norms'". The scale had good reliability ($\alpha = 0.83$).

Mental health

The present study measured participants' satisfaction with life and depression level to indicate their mental health.

Satisfaction with life. Participants' wellbeing was measured using the 5-item Satisfaction with Life Scale (Diener et al., 1985). Participants were asked how satisfied they were with their life using a scale from 1 (Strongly disagree) to 5 (Strongly agree), on items like "In most ways my life is close to my ideal". The scale had good reliability ($\alpha = 0.89$).

Depression. Participants' depressive symptoms were assessed using the 11-item Iowa CES-Depression Scale (Kohout et al., 1993). Participants were asked to indicate how often they experienced depressive symptoms in the past two weeks using a scale from 1 (Hardly ever or never) to 5 (Much or most of the time), on items like "I felt that everything I did was an effort". The scale had good reliability ($\alpha = 0.92$).

Protective behavior

To assess protective behavior, participants were presented with nine items based on the Chinese pandemic rules (from the Chinese Basic Code of Conduct for Citizen Pandemic Prevention). Participants were asked to indicate how often they complied with each protective behavior in the last two weeks using a scale from 1 (Hardly ever or never) to 5 (Much or most of the time). Example behavior include "wash your hands frequently", "wear masks correctly", "minimize gatherings", "cover your mouth when you cough or sneeze", "keep one-meter social distance", "clean and disinfect". The scale had good reliability ($\alpha = 0.86$).

Result

Descriptive statistics and correlation analyses were conducted (see Supplementary Materials). Variables that were associated with the outcome variables were controlled for in subsequent analyses. Specifically, age and SES were controlled for in the analyses for life satisfaction,

gender and SES were controlled for in the analyses for depression, and gender was controlled for in the analyses for protective behavior.

Association between COVID-19 Infection Concern of Oneself and Mental Health and Protective Behavior: Mediation Effect of Desire for Cultural Tightness (t1)

A mediation effect bootstrap test was conducted using Mplus 8.3 (Asparouhov & Muthén, 2019) to examine the mediating effect of desire for cultural tightness in the relationship between concern about personally getting infected and mental health as well as health-protective behavior during the lockdown (t1). The results are presented in Table 1 and Figure 2. The total effects of concern about personally getting infected on life satisfaction and protective behavior were found. The mediating effects of desire for cultural tightness between the personally infection concern and the three outcomes were all significant (95% bootstrap CI). During the lockdown phase, the greater concern of personally getting infected, the greater participants' desire for cultural tightness, which in turn was associated with increased levels of life satisfaction, decreased levels of depression, and more protective behavior (Hypothesis 1 was partially supported, Hypothesis 2 was supported). More details are presented in supplemental materials.

--- Insert Table 1 about here ---

--- Insert Figure 2 about here ---

COVID-19 Infection Concern about Different targets (t1)

To compare differences in COVID-19 infection concern of different targets during the lockdown (t1), a one-way repeated measures ANOVA was conducted. The results indicated significant differences by targets ($F = 53.19, p < .001$). Individuals ($M = 3.34; SD = 0.98$) were significantly less concerned about getting infected themselves compared to family members ($M = 3.78, SD = 0.95, p$

< .001), significant others ($M = 3.51$, $SD = 0.95$, $p < .001$), and the public ($M = 3.58$, $SD = 0.98$, $p < .001$). Hypotheses 3 was supported.

To test the mediating effects of desire for cultural tightness among COVID-19 infection concern of different targets and three outcome variables during t1, the present study conducted mediating effect bootstrap analysis. The results indicated that the mediating effects of desire for cultural tightness were significant for infection concern of oneself, family members, and public (See Figure 3). Infection concern of oneself and public were positively associated with the desire for cultural tightness, which in turn was associated with better mental health and more engaged protective behavior. Notably, infection concern of family was negatively associated with the desire for cultural tightness. The more individuals were concerned about family member getting infected, the less cultural tightness they desired and, in turn, displayed better mental health and more protective behavior. However, the mediating effect of desire for cultural tightness was not significant in terms of concern about significant other getting infected. Therefore, the infection concern of significant other was not included in further testing.

- - - Insert Figure 3 about here - - -

The present study compared the mediating effects of desire for cultural tightness across different concern targets. Results were shown in Table 2. During t1, the mediating effects of desire for cultural tightness in infection concern of oneself on life satisfaction ($\beta = 0.07$, 95% bootstrap CI = [0.02, 0.17]) and protection behavior ($\beta = 0.09$, 95% bootstrap CI = [0.03, 0.18]) were significantly greater than the mediating effect in infection concern of family. In contrast, the mediating effect of desire for cultural tightness in infection concern of oneself on depression was significantly smaller than the mediating effect in infection concern-family ($\beta = -0.07$, 95% bootstrap CI = [-0.15, -0.01]).

However, the mediating effect of desire for cultural tightness did not significantly differ between infection concern of oneself and infection concern of public. Hypothesis 4 was partially supported.

- - - Insert Table 2 about here - - -

Association between COVID-19 Infection Concern and Mental Health and Protective Behavior:

Mediation Effect of Desire for Cultural Tightness (t2)

For exploratory purposes, the same analyses were conducted for t2 to examine whether the associations between COVID-19 infection concern, desire for cultural tightness and mental health as well as protective behavior varied between lockdown and post-lockdown phases. Individuals were significantly less concerned about getting infected themselves ($M = 3.27$; $SD = 0.06$), compared to family members ($M = 3.69$, $SD = 0.06$, $p < .001$), significant others ($M = 3.39$, $SD = 0.06$, $p < .001$), and the general public ($M = 3.44$, $SD = 0.06$, $p < .001$), which yielded the similar result during t1. the mediating effect of desire for cultural tightness in the relationship between concern about personally getting infected and mental health as well as health-protective behavior during t2 were significant (see Figure 4).

- - - Insert Figure 4 about here - - -

In terms of the model incorporating infection concern of different targets, the same analyses were conducted for t2 (see Figure 5). it was found that infection concern of family was positively associated with the desire for cultural tightness and further promoted outcomes ($\beta = 0.11$, 95% bootstrap CI = [0.03, 0.22], see Figure5). This indicates that individuals who were more concerned about family member getting infected in the post-lockdown, desired greater cultural tightness, leading to improved mental health and health-protective behavior. However, there were no significant differences in the mediating effect of desire for tightness among different concern of

infection targets at t2 (95% bootstrap CI all include 0), which contrasts with the results observed at t1.

- - - Insert Figure 5 about here - - -

Comparison Between COVID-19 Lockdown and Post-lockdown Phases

The associations between COVID-19 infection concern, desire for cultural tightness and mental health as well as protective behavior were compared between lockdown and post-lockdown phases¹ (see Table 3). Results indicate that at t2, the mediating effect of desire for cultural tightness in the infection concern-family was significantly larger than at t1 in terms of life satisfaction ($\beta = 0.15$, 95% bootstrap CI = [0.06, 0.27]) and protective behavior ($\beta = 0.11$, 95% bootstrap CI = [0.05, 0.20]). However, for depression, the effect was notably smaller compared to t1 ($\beta = -0.13$, 95% bootstrap CI = [-0.24, -0.05]). And there was no significant difference found in the mediating effect of desire for cultural tightness in the infection concern-self and the infection concern-public between the two phases.

- - - Insert Table 3 about here - - -

Discussion

The COVID-19 pandemic is a global ecological and environmental threat that severely influences on people's daily lives and health (Holmes et al., 2020; Zhang et al., 2020). The present study examines the mediating role of the desire for cultural tightness between concern about COVID-19 infection (i.e., oneself, family member, significant other, and general Chinese public) and personal psychological and behavioral outcomes during and post the COVID-19 lockdown.

¹ A sensitivity analysis was conducted by combining T1 and T2 datasets. Please see detailed results in the supplementary materials.

The present study found that either during the lockdown or post-lockdown, higher levels of personal infection concern, were associated with greater desire for cultural tightness, which further promotes individuals' mental health and protective behavior. This finding is in line with the Cultural Tightness and Looseness Theory (Gelfand et al., 2011) and previous studies that suggest threats lead people to strongly support their country's cultural tightness (e.g., Jackson et al., 2019), driving more personal self-control and greater self-regulated preventive behavior (Mula et al., 2021; Nisa et al., 2021). Notably, Chinese people's mental health in this study also seemed to be safeguarded. Mental health is more likely to improve when an individual's cultural attitudes align with the environment (Lu et al., 2017). In the context of COVID-19 pandemic, Chinese people's desires for cultural tightness match the original cultural trait of China: a relatively tight culture, which would benefit the mental health of the Chinese individuals.

Individuals are more concerned about their family, significant others, and public getting infected than they are about themselves getting infected during and post lockdown. This finding is consistent with the previous studies conducted in Jordan and Philippine (El-Elimat et al., 2021; Nicomedes & Avila's, 2020), which also have a collectivist culture and interdependent self-concept (Church, 1987; Hofstede, 1980; Harb & Smith, 2008). People from such cultural backgrounds tend to have a greater concern for related others (Markus & Kitayama, 1991) and are more sensitive to the demands of the social context, responding positively to the perceived needs of others (Bochner, 1994).

In considering the role of desire for cultural tightness in various concern targets, higher levels of concern about public getting infected are associated with a greater desire for cultural tightness, leading to improved mental health and adoption of protective behavior. The result replicates the

results in the infection concern-self model. Interestingly, during the lockdown, individuals who are more worried about their family getting infected exhibit a lower desire for cultural tightness, whereas in the post-lockdown, the effect of this concern is reversed. Presumably, during the lockdown, individuals with family at risk of infection may be less inclined towards a tight culture. This is due to concern that stricter social norms could result in centralized quarantine for infected family members. Conversely, in the post-lockdown, there is a higher desire for a tighter culture to prevent the spread of the virus as centralized isolation is no longer required. No mediating effect was found regarding the infection of significant others when including various concern of four targets in both phases. One possible explanation is that the effect of concern about the infection of significant others is attenuated when multiple concern targets were taken into account.

The mediating effect of desire for cultural tightness is more pronounced in the post-lockdown compared to the lockdown phase, particularly in concern about family members being infected. China experienced a nationwide outbreak of the Omicron variant from late 2022 to early 2023 (t2), with an estimated infection rate exceeding 80% of the population. The global number of infections is likely higher due to a high rate of asymptomatic cases and limited testing capacity, as indicated by the World Health Organization in 2023. Therefore, the desire for cultural tightness may play a more crucial role in promoting mental health and protective behavior in the post-lockdown, where panic and alarm are prevalent but strict anti-pandemic measures are no longer in place to control the spread of the virus.

Strengths and limitations

The present study has a number of strengths. First of all, this study confirms and extends the Cultural Tightness and Looseness Theory by emphasizing people's attitudes and willingness to

tighten culture beyond the established characteristics of cultural tightness and looseness in a society.

This study also contributes by examining how concern about COVID-19 infection is linked to psychological and behavioral outcomes across different infection targets. Cross-time comparisons in the study provide valuable insights into changing responses during and post-COVID-19 lockdown. However, the study is limited by the use of different samples in the two phases, leading to potential between-sample variation despite efforts to control for demographic variables. Biases in participant responses may also have been influenced by the within-subject design of questions regarding concern about different infection targets. Future research should consider randomizing question presentation for sequential counterbalancing.

Conclusion

The global COVID-19 crisis has raised concern worldwide, impacting individuals' mental health and behavior. The present study examined how Chinese individuals' concern about COVID-19 infection is linked to mental health and behavior, with a focus on the role of cultural tightness. Results show that Chinese individuals were more concerned about their family, significant others and general (Chinese) public being infected than themselves. Those with higher concern desired more cultural tightness, leading to improved mental health and increased protective behavior. Interestingly, individuals concerned about family infections expected a looser culture during the COVID-19 lockdown but desired a tighter culture post-lockdown, resulting in better mental health and increased protective behavior. The mediating effect of cultural tightness desire was stronger post-lockdown. These findings contribute to a deeper understanding of how people respond psychologically and behaviorally to the threat of COVID-19.

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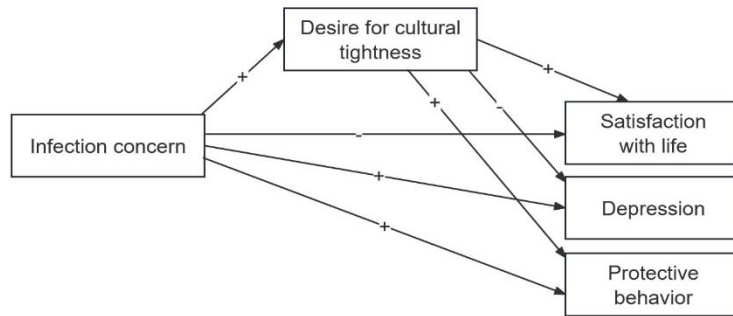


Figure 1 Graphical representation of the hypothetical model

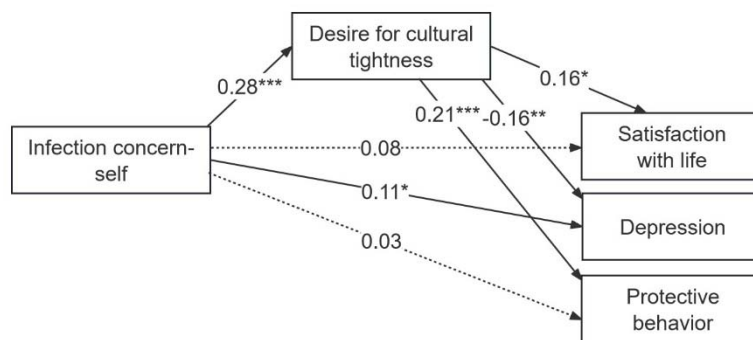


Figure 2 Mediation effect of desire for cultural tightness (concern-self, t1)

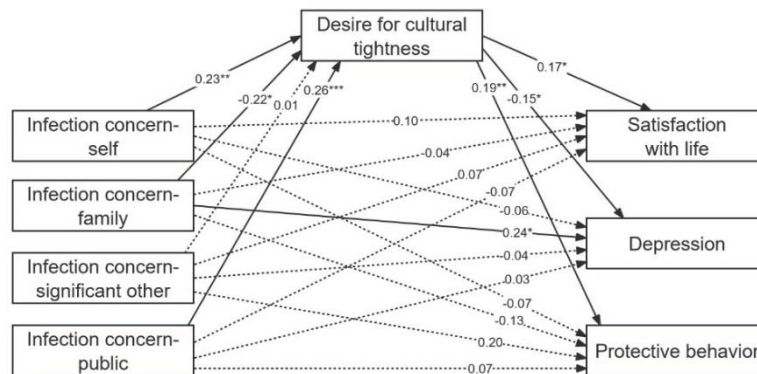


Figure 3 Mediation effects test of desire for cultural tightness in different concern paths (t1)

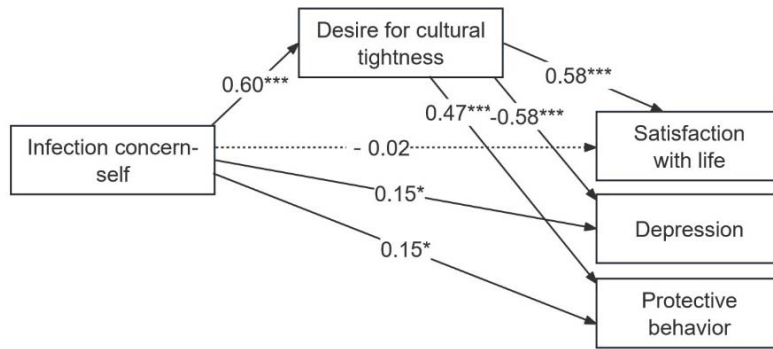


Figure 4 Mediation effect of desire for cultural tightness (concern-self, t2)

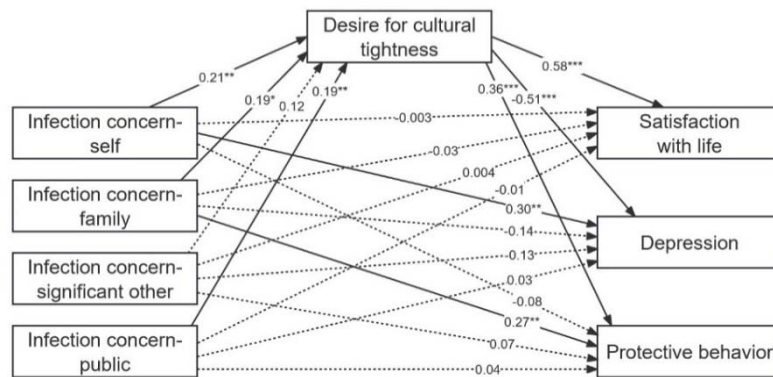


Figure 5 Mediation effects test of desire for cultural tightness in different concern paths (t2)

Table 1 Bootstrap tests for the mediation effect of desire for cultural tightness (concern-self, t1)

Outcomes	Model path	β	95% bootstrap CI
Satisfaction with life	Total effect	0.12**	
	Indirect effect	0.04*	[0.01, 0.08]
Depression	Total effect	0.06	
	Indirect effect	-0.04**	[-0.08, -0.02]
Protective behavior	Total effect	0.09*	
	Indirect effect	0.06**	[0.03, 0.11]

Table 2 Bootstrap tests for the mediation effect of desire for cultural tightness in different concern

paths (t1)

DV	Mediation effect	β	95% bootstrap CI
Satisfaction with life	Infection concern-self	0.04	[0.01, 0.09]
	Infection concern-family	-0.04	[-0.09, -0.01]
	Infection concern-significant other	0.002	[-0.04, 0.04]
	Infection concern-public	0.04	[0.01, 0.09]
Depression	Infection concern-self	-0.03	[-0.08, -0.01]
	Infection concern-family	0.03	[0.01, 0.08]
	Infection concern-significant other	0.00	[-0.04, 0.03]
	Infection concern-public	-0.04	[-0.09, -0.01]
Protective behavior	Infection concern-self	0.04	[0.01, 0.10]
	Infection concern-family	-0.04	[-0.09, -0.01]
	Infection concern-significant other	0.00	[-0.04, 0.05]
	Infection concern- public	0.05	[0.02, 0.11]

Table 3 Differences in the mediating effects of desire for cultural tightness in different concern paths

across time

DV	differences between two phases	$\Delta \beta_{(t2-t1)}$	S.E.	95% bootstrap CI
Satisfaction with life	Infection concern-self	0.08	0.06	[-0.01, 0.20]
	Infection concern-family	0.15	0.05	[0.06, 0.27]
	Infection concern-public	0.07	0.05	[-0.02, 0.18]
Depression	Infection concern-self	-0.07	0.05	[-0.18, 0.01]
	Infection concern-family	-0.13	0.05	[-0.24, -0.05]
	Infection concern-public	-0.06	0.05	[-0.16, 0.02]
Protective behavior	Infection concern-self	0.03	0.04	[-0.04, 0.12]
	Infection concern-family	0.11	0.04	[0.05, 0.20]
	Infection concern-public	0.02	0.04	[-0.05, 0.11]

Note: “ $\Delta_{(t2-t1)}$ ” denote that the indirect effect of desire for cultural tightness during t2 minus that during t1, i.e., the difference of mediating effect in two phases.

Supplemental materials

Appendix A

Common Method Bias Test

To avoid common method bias, the questionnaire included some reverse-scored items since all research data were derived from questionnaire surveys. Afterward, a Harman single-factor test was conducted, and the results showed that the characteristic root values of the seven factors exceeded 1. The first factor explained 33.65% of the variance, which is below the critical standard of 40%. Therefore, the study concluded that there was no significant common method bias.

Appendix B

Bootstrap tests for the mediation effect of desire for cultural tightness in different concerns paths

DV	Model path	t1		t2	
		β	95% bootstrap CI	β	95% bootstrap CI
Satisfaction with life	Indirect effect (<i>Infection concern-self</i>)	0.04	[0.01, 0.09]	0.12	[0.03, 0.23]
	Indirect effect (<i>Infection concern-family</i>)	-0.04	[-0.09, -0.01]	0.11	[0.03, 0.22]
	Indirect effect (<i>Infection concern-significant other</i>)	0.002	[-0.04, 0.04]	0.07	[-0.01, 0.16]
	Indirect effect (<i>Infection concern-public</i>)	0.04	[0.01, 0.099]	0.11	[0.03, 0.20]
	Δ indirect effect(<i>self, family</i>)	0.07	[0.02, 0.17]	0.01	[-0.14, 0.18]
	Δ indirect effect(<i>self, public</i>)	-0.01	[-0.06, 0.03]	0.01	[-0.13, 0.17]
Depression	Indirect effect (<i>Infection concern-self</i>)	-0.03	[-0.08, -0.01]	- 0.10	[-0.21, -0.03]
	Indirect effect (<i>Infection concern-family</i>)	0.03	[0.01, 0.08]	- 0.10	[-0.20, -0.03]
	Indirect effect (<i>Infection concern-significant other</i>)	0.00	[-0.04, 0.03]	- 0.06	[-0.15, 0.01]
	Indirect effect (<i>Infection concern-public</i>)	-0.04	[-0.09, -0.01]	- 0.10	[-0.19, -0.03]
	Δ indirect effect(<i>self, family</i>)	-0.07	[-0.15, -0.01]	- 0.01	[-0.16, 0.12]
	Δ indirect effect(<i>self, public</i>)	0.00	[-0.03, 0.05]	- 0.01	[-0.15, 0.11]
Protective behavior	Indirect effect (<i>Infection concern-self</i>)	0.04	[0.01, 0.10]	0.07	[0.02, 0.16]
	Indirect effect (<i>Infection concern-family</i>)	-0.04	[-0.09, -0.01]	0.07	[0.02, 0.15]
	Indirect effect (<i>Infection concern-significant other</i>)	0.00	[-0.04, 0.05]	0.04	[-0.01, 0.11]
	Indirect effect (<i>Infection concern-public</i>)	0.05	[0.02, 0.11]	0.07	[0.02, 0.15]
	Δ indirect effect(<i>self, family</i>)	0.09	[0.03, 0.18]	0.00	[-0.09, 0.11]
	Δ indirect effect(<i>self, public</i>)	-0.01	[-0.06, 0.03]	0.01	[-0.09, 0.11]

Appendix C

A sensitivity analysis was conducted by combining data t1 and t2. First, a mediation effect bootstrap test was conducted using Mplus 8.3 to examine the mediating effect of desire for cultural tightness in the relationship between concern about personally getting infected and mental health as well as health-protective behavior. The results are presented in the Figure 6 blow. The mediating effects of desire for cultural tightness between the personally infection concern and the three outcomes were all significant (95% bootstrap CI). The greater the concern about personally getting infected, the greater participants' desire for cultural tightness, which in turn was associated with increased levels of life satisfaction, decreased levels of depression, and more protective behavior. This is similar to the results of the analyses of t1 and t2 separately.

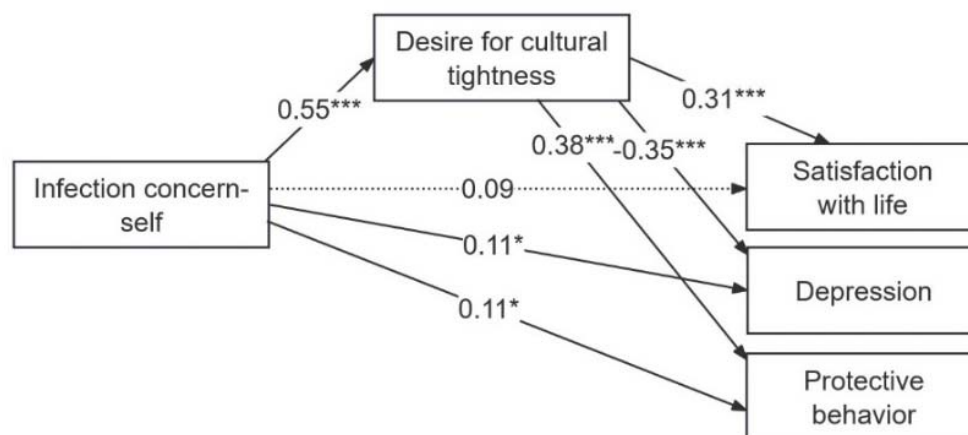


Figure 6 Mediation effect of desire for cultural tightness (concern-self, combining t1 & t2)

To test the mediating effects of desire for cultural tightness among COVID-19 infection concerns of different targets and three outcome variables, we conducted mediating effect bootstrap analysis. The results indicated that the mediating effects of desire for cultural tightness were significant only for infection concerns of oneself and the public (See Figure 7 blow). Infection concerns of oneself and public were positively associated with the desire for cultural tightness, which

in turn was associated with better mental health and more engaged protective behavior. However, the mediating effect of desire for cultural tightness was not significant in terms of concern about family and significant other getting infected. This presents a different result from that of the analyses based on separating t1 and t2 datasets. Upon analysis of the data across two phases, differences in psychological and behavioral responses associated to infection concerns of family could be observed.

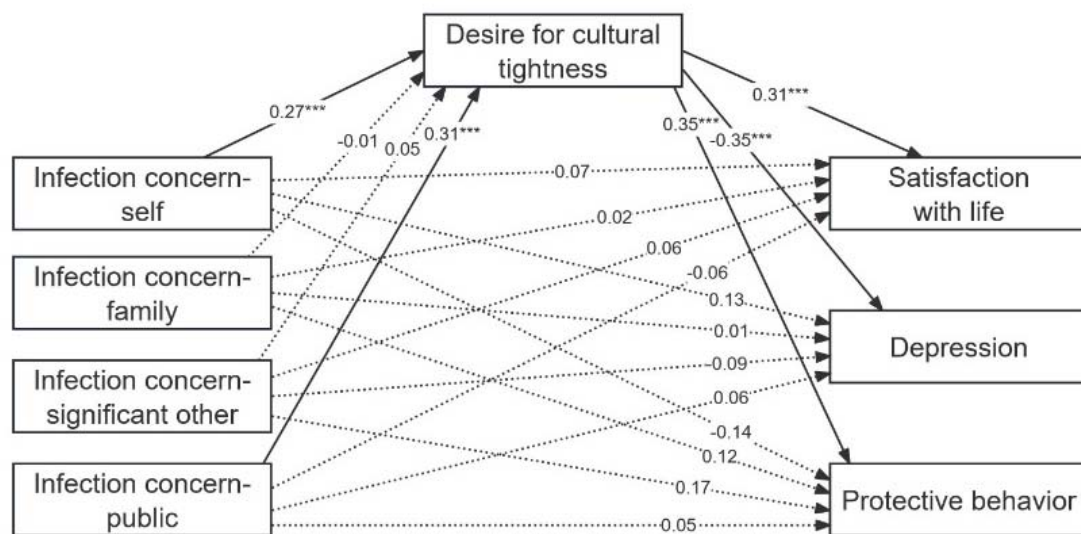


Figure 7 Mediation effects test of desire for cultural tightness in different concern paths (combining t1 & t2)

Appendix D

Correlations between demographic variables and outcome variables

	<i>M</i>	<i>SD</i>	Gender ^b	Age ^b	SES ^b	Infection concern-self ^b	Infection concern-family ^b	Infection concern-significant other ^b	Infection concern-public ^b	Desire for cultural tightness ^b	Satisfaction with life ^b	Depression ^b	Protective behavior ^b
<i>M</i>	\	\	1.66	27.69	5.72	3.27	3.69	3.39	3.44	3.34	3.17	2.45	3.76
<i>SD</i>	\	\	0.50	8.11	1.73	1.04	0.97	0.99	0.99	0.88	0.98	0.89	0.88
Gender ^a	1.73	0.61	\	-0.18**	0.01	0.11	0.14*	0.06	0.14*	0.04	-0.02	0.05	0.11
Age ^a	22.85	6.33	-0.03	\	-0.22**	0.15*	-0.06	0.06	0.06	0.12*	0.25**	-0.05	-0.23**
SES ^a	6.13	1.56	-0.03	-0.20**	\	-0.24**	-0.14*	-0.20**	-0.25**	-0.28**	-0.49**	0.30**	-0.19**
Infection concern-self ^a	3.34	0.98	0.06	-0.15**	0.06	\	0.78**	0.83**	0.81**	0.73**	0.45**	-0.28**	0.49**
Infection concern-family ^a	3.78	0.95	0.08	-0.21**	0.13*	0.78**	\	0.83**	0.75**	0.69**	0.37**	-0.36**	0.61**
Infection concern-significant other ^a	3.51	0.95	0.05	-0.21**	0.14*	0.80**	0.86**	\	0.82**	0.71**	0.42**	-0.36**	0.55**
Infection concern-public ^a	3.58	0.98	0.05	-0.23**	0.06	0.75**	0.71**	0.76**	\	0.71**	0.43**	-0.33**	0.53**
Desire for cultural tightness ^a	3.36	0.74	-0.15**	-0.01	-0.02	0.36**	0.21**	0.28**	0.39**	\	0.60**	-0.49*	0.58**
Satisfaction with life ^a	2.85	0.76	-0.03	0.12*	-0.33**	0.12*	0.05	0.07	0.07	0.19**	\	-0.68**	0.49**
Depression ^a	2.55	0.75	0.13*	-0.07	0.20**	0.10	0.22**	0.15**	0.11*	-0.13*	-0.54**	\	-0.50**
Protective behavior ^a	4.02	0.66	0.12*	0.08	0.03	0.14**	0.11*	0.19**	0.20**	0.23**	0.14**	-0.19**	\

Note: *** $p < .001$, ** $p < .01$, * $p < .05$. The superscripts 'a' and 'b' indicate variables at Time 1 and Time 2, respectively.