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ORIGINAL RESEARCH

The Prevention Behaviors and Impact Mechanisms Among Different Chinese Social Classes at the Early Stage of COVID-19 Pandemic

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Background: Whether the pandemic can be effectively prevented and controlled depends on the entire population's adherence to recommendations and preventive behaviors. The present study aimed to investigate the social class differences and internal mechanisms of prevention behaviors in the COVID-19 pandemic.

Methods: We conducted an online cross-sectional survey among the general Chinese population at the early stage of the COVID-19 pandemic. The survey website's subscribers could access the questionnaire through the Tencent online platform, and a total of 1948 participants voluntarily completed it. Most of the participants were female (n = 1257, 64.528%), between the ages of 18–29 (n = 999, 51.284%), university graduates (n = 1015, 52.105%), and had an annual family income below 100,000 yuan (n = 1119, 57.444%). The differences in COVID-19 prevention behaviors among different social classes, the mediating role of infectious threat perception and the moderating role of perceived epidemic transparency were examined.

Results: 1) There were significant differences in prevention behaviors among different social classes. 2) The level of infectious threat perception played a mediating role in the relationship between social class and prevention behavior. When the individuals were from a lower social class, the level of threat perception and the level of COVID-19 prevention behaviors were also lower. 3) Perceived epidemic transparency played a moderating role in the relationship between social class and COVID-19 prevention behavior. It also played a moderating role in the relationship between social class and infectious threat perception.

Conclusion: In the implementation of epidemic prevention and control measures, different social classes should be targeted and guided differently. In particular, lower-class individuals can be guided by improving the perceptions of epidemic transparency and infectious threat.

Keywords: social class, infectious threat perception, COVID-19 prevention behaviors, perceived epidemic transparency

Introduction

The COVID-19 pandemic started in December 2019, and has since spread worldwide.[1] By January 2022, there had been more than 305 million confirmed cases of COVID-19, with infections accelerating each time a new variant emerged.[2] The World Health Organization claimed that the COVID-19 epidemic was not only a health crisis but also an information and socioeconomic crisis.[3] Whether the pandemic can be effectively prevented and controlled depends on people's adherence to the measures and recommendations that are in place to prevent its spread.[4] However, not all risks associated with a public crisis are perceived equally or reacted to in the same way.[4–6]

At the early stage of the outbreak, China did not implement strict and unified laws and norms on epidemic prevention control yet.[7] The most powerful way to stop the spread of the virus relied on people's willingness to follow public health

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advice.[8] During the Spring Festival in China, most people do not need to go to work; Therefore, the cost of following public health advice (ie, to stay at home or maintain physical distance) was relatively equal during this time.[5,9] Were there socioeconomic differences in the psychological and behavioral responses to the COVID-19 pandemic? What factors made the differences, and how can they be regulated? The present study tried to answer these questions in the framework of the health belief model and risk communication theory. The present study aimed to investigate the differences in COVID-19 preventive behaviors at the early stage among different social classes in China and explore the impact mechanisms between social class and prevention behavior. The results hoped to provide an empirical basis and reference for public health emergency management and the promotion of epidemic prevention measures.

Social Class and Health Protective Behaviors

Social class refers to groups in different positions in society; it arises from the social and monetary resources that an individual possesses. There are objective differences in social resources among different social classes, leading to differences in the perception of social status.[10] Previous studies have shown that many health behaviors vary at different socioeconomic levels.[11] Lower-class individuals are more likely to have unhealthy behavioral choices, such as smoking,[12] binge drinking,[13] not wearing seat belts,[14] unhealthy diet,[15] etc. In addition, they are less likely to participate in cancer screening than their upper-class counterparts.[16,17]

Previous studies showed that when there was no epidemic, people with lower-class backgrounds were more likely to engage in risk behaviors, while their upper-class counterparts were more likely to adopt health protection behaviors. Several studies that were conducted during the COVID-19 pandemic also found relevant hierarchical differences among different social classes.[4,5] However, these studies emphasized the unequal financial burden of adhering to public health advice. Although the cost of following public health advice was relatively equal during the festival time, it is to be determined whether there were still hierarchical differences that affected people's adherence to protective behaviors. That is the first question the present study tried to answer. Thus, we proposed:

Hypothesis 1: At the early stage of the COVID-19 outbreak in China, lower-class individuals were less likely to adopt protective behaviors to prevent COVID-19 than upper-class individuals.

Social Class, Infectious Threat Perception and Health Protective Behavior

Several health protective behavior theories, such as the health belief model (HBM), share the idea that motivation toward health behavior results from a perceived threat and the desire to avoid potential negative outcome.[18,19] HBM is mainly composed of two factors: the perception of health threats and the perception that specific health behaviors can reduce or eradicate threats. HBM assumed that demographic variables and sociopsychological factors might affect individuals' perception of disease and thus indirectly influence health protective behavior.[20]

Several studies have been conducted to verify the differences in the perception of disease threats among different social classes. A survey with a sample of 685 white people conducted by Chen and Land found that perception of health threats positively correlated with social class.[21] An empirical study of 614 Scottish women conducted by Orbell et al found that women in higher social classes were more likely to uptake cervical screening.[22]

After the outbreak of severe acute respiratory syndrome (SARS) in 2003, several studies confirmed that the risk perception of infection had a positive effect on preventive behaviors. In a telephone survey of 1002 Hong Kong residents, Tang and Wong found that a higher level of risk perception implied more possibilities to engage in recommended preventive behaviors.[23] During the 2003 SARS outbreak, Lau et al examined the preventive health measures and risk behaviors. The researchers found that people's threat perception of SARS was a predictor of preventive health behaviors, such as mask-wearing in public places or avoiding crowded areas.[24–26]

Previous research has respectively verified the predictive effect of social class on disease threat perception and the predictive effect of threat perception on prevention behaviors. The present study directly investigated the mediating role of threat perception on the relationship between social class and preventive health behavior. Thus, it would verify that the differences in infectious threat perception were one of the reasons for preventive behavior differences among different

social classes during the outbreak. In sum, the present study attempted to understand the underlying mechanism between social class and COVID-19 prevention behaviors under the framework of the HBM. Thus, we proposed:

Hypothesis 2: The perception of COVID-19 as an infectious threat played a mediating role in the relationship between social class and prevention behavior. Lower-class individuals had lower threat perceptions of COVID-19 and lower levels of preventive health behaviors.

Moderation Effect of Perceived Epidemic Transparency

In the process of coping with a public health crisis, emergency risk communication measures must be implemented by authorities when there is a mismatch between the risk perception of the public and the actual hazard.[27–29] Both researchers and practitioners of risk communication recognize the important role of information transparency in risk management. They share the idea that sufficient, clear and transparent information has a direct impact on public trust and compliance with recommended public health measures.[3,30] According to risk communication theory, information transparency is the decisive factor for trust-building in the process of risk communication. Transparency means that communicators must clearly inform people of what they have done, what they do not know and what they are doing as soon as possible, without hiding relevant information.[28,31]

By cooperating with the Centers for Disease Control and Prevention, Seeger et al developed a conceptual model of public health. The model emphasizes the importance of open and transparent information.[27] When the World Health Organization (WHO) released its COVID-19 interim guidance in December 2020, it also claimed that open and transparent information played a critical role in reducing risks and attracting public participation and cooperation.[3] Relevant studies found that information transparency affected people's confidence in risk control and risk perception through social and government trust.[30,32] Information transparency also affects people's emotional experiences and psychological and behavioral responses in the epidemic.[29,33]

British scholars Rubin et al conducted a cross-sectional telephone survey during the swine flu outbreak in 2009. The researchers found that those participants who held the view that the authorities can be trusted and provided correct and true information were more likely to adopt the recommended measures by the authorities.[34] Abunyewah et al found that message clarity and source credibility had a significant impact on residents' intentions to prepare in flood disaster areas.[35] At the very beginning of the COVID-19 outbreak in China, lower-class individuals paid little attention to epidemic information. According to relevant studies, lower-class individuals had relatively less knowledge and information about COVID-19 than their upper-class counterparts.[36] Therefore, we hypothesize that when perceived epidemic transparency is high, lower-class individuals may have more trust in media information and authorities and have a clear and consistent understanding of epidemic information. Lower-class individuals may also adopt more preventive health behaviors like upper-class individuals. Based on this, the present study proposed:

Hypothesis 3a: Perceived epidemic transparency played a moderating role in the influence process of social class on COVID-19 prevention behaviors. When perceived epidemic transparency was high, the level of preventive health behaviors of lower-class individuals increased.

There is also some evidence that epidemic message transparency has a significant impact on infectious threat perception during the outbreak. Gentili et al retrospectively investigated risk perception among parents during a school tuberculosis outbreak in early 2019 in Italy.[28] The scholars found that there was a significant change in risk perception before and after the communication measures were implemented by local health authorities. The results implied that risk management measures of openness, transparency and communication of epidemic information had a significant impact on risk perception.[28] Higher-class individuals have a high demand for epidemic information,[37,38] and epidemic transparency can help reduce high risk perception. The present study assumes that when perceived epidemic transparency is high, upper-class individuals may feel a greater sense of control, and their infectious threat perception would decline. Based on this, we proposed:

Hypothesis 3b: Perceived epidemic transparency played a moderating role in the process of social class affecting infectious threat perception. When perceived epidemic transparency was high, the class differences in infectious threat

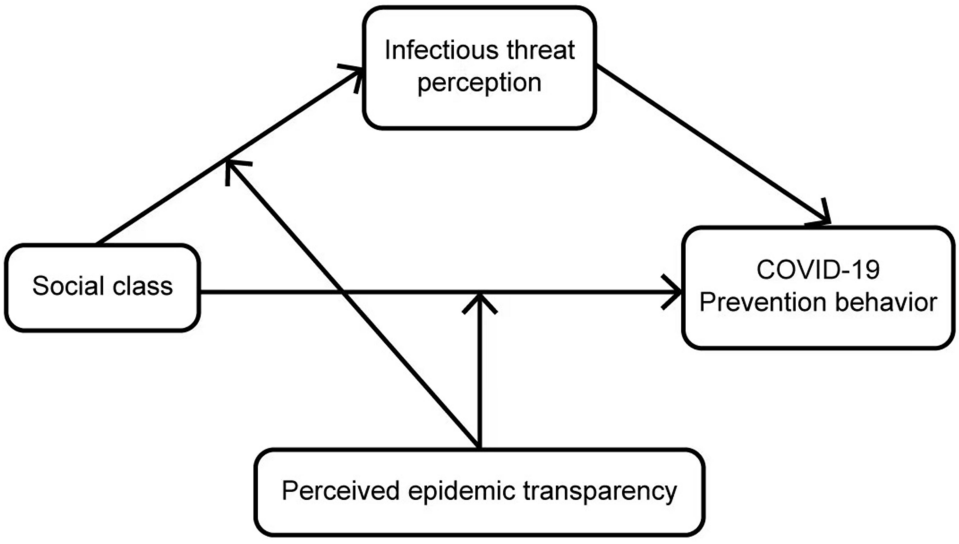

Figure 1 Proposed research model.

perception disappeared. Particularly, the infectious threat perception of higher-class individuals decreased. The overall hypothesis model is shown in Figure 1.

Method

Study Design and Participants

Our study adopted a cross-sectional online survey to verify the above hypotheses. We evaluated infectious threat perception, perceived epidemic transparency and COVID-19 preventive behaviors by self-developed questionnaires. The bootstrap program was introduced to test the mediation and moderation effects.

The present study was conducted in the two weeks after the "lockdown" in Wuhan, which occurred from 23 January to 5 February, 2020. That time was during the Chinese Spring Festival holiday. We distributed the questionnaires on the Tencent online questionnaire platform (https://wj.qq.com). The one-page recruitment poster and survey website were sent to 1000 subscribers of the Tencent online questionnaire platform. Some of the participants also shared the one-page recruitment poster and website link to friends and acquaintances via We-chat (similar to "WhatsApp"). The response rate was 30%.

A total of 124 data were excluded for the following reasons: less than one minute answer time, more than five missing values and COVID-19 infection for the respondent himself or his family. The final valid sample consisted of 1948 participants, with an effective sample rate of 94.015%. Demographic information included participants' age, gender, current location, education level, and annual household income. The education level and annual family income were considered to be indicators of social class, and participants were spread across 30 provinces across mainland China. The demographic characteristics of the sample are presented in Table 1.

About 46.869% of respondents (n=913) were between 30 and 61 years old. About 64.528% of participants (n=1257) were female, and nearly two-thirds of the sample (n=1297) had a university education or more. Additionally, 57.444% of participants (n=1119) had an annual family income below 100,000 yuan (USD 15,700).

Ethical Considerations

Given the high infection rates, the consequences of having COVID-19, and the public panic over the pandemic, the research was conducted with special care. Data collection was conducted online to avoid virus transmission. The research purpose, confidentiality measures, and participation remuneration (each subject would be paid 8 yuan after submission) were shared with participants in the one-page recruitment poster. Information including a support hotline and the methods of acquiring mental health knowledge were also included in the recruitment poster. All the subjects voluntarily participated in the study

Table 1 The Demographic Characteristics of Respondents (N = 1948)

Variable	Frequency	Percentage (%)
Age group		
16–17 years	36	1.848%
18–29 years	999	51.283%
30–39 years	296	15.195%
40–49 years	399	20.483%
50–61 years	218	11.191%
Gender		
Male	691	35.473%
Female	1257	64.528%
Education		
Primary school or below	9	0.462%
Secondary school	80	4.107%
High school	304	15.606%
College	258	13.244%
Undergraduate university degree	858	44.045%
Master's degree or above	439	22.536%
Family annual income (RMB)		
10,000 or below	140	7.187%
10,001–30,000	268	13.758%
30,001–50,000	267	13.706%
50,001–100,000	444	22.793%
100,001–150,000	344	17.659%
150,001–200,000	181	9.292%
200,001–300,000	175	8.984%
300,001–500,000	85	4.363%
500,001–1,000,000	33	1.694%
1,000,001 and above	11	0.565%

and were able to withdraw at any time during the survey. The study was approved by the research ethics committee of Huaqiao University (NO. M2019014) and complied with the Declaration of Helsinki. Participants above age of 16 years old were approved by the research ethics committee to provide informed consent on their own behalf. The questionnaire items did not appear until the participator read the informed consent form and clicked "APPROVE."

Study Variables

The independent variable in this study was social class, and the dependent variable was COVID-19 prevention behaviors. The mediating variable was infectious threat perception, and the moderating variable was perceived epidemic transparency.

Social Class

Two indicators, education and annual family income level, were used to evaluate social class. The degree of education was divided into six categories: primary school and below, junior school, high school/technical school, junior college, bachelor's degree, and master's degree and above, assigned 1–6, respectively. The annual family income level was divided from "below 10,000 yuan" to "over 1 million yuan" into 10 levels, assigned 1–10. The frequency of each category is listed in Table 1. Social class scores took the mean of two indicator standard points, according to previous studies.[39]

Infectious Threat Perception

We used the concept of infectious threat perception to demonstrate the individual cognitive-affective response characteristics of the COVID-19 infection threat, on the basis of existing studies.[40,41] Thus, it could fully describe and measure the psychological response to the threat of infection and include the concept of risk perception.

The measure of infectious threat perception was referred the rejection threat perception.[42] After reviewing the existing body of literature and interviewing twenty citizens and three experts (who have doctoral psychology degrees and are also the authors of the present study), we developed an infectious threat perception questionnaire on the basis of literature analysis. The questionnaire contains six possible situations regarding COVID-19 (noted as the Appendix 1), such as "the pandemic spread further". We asked the participants to judge the degree of likelihood of each situation on a 7-point scale, ranging from completely impossible (1) to very likely (7). They were then asked to indicate their degree of worry or anxiety towards each situation on a 7-point scale, which ranged from not at all worried (1) to very worried (7). We then multiplied the likelihood score by the score for degree of worry and computed a total infectious threat perception for each participant.[42] A higher score indicated a higher perception level of virus infectious threat. In this study, the Cronbach's α coefficient of the entire scale was 0.925. The factor analysis yielded only one factor with eigenvalues greater than 1, which accounted for 71.793% of all variance. The factor loading of all the items were between 0.692–0.895.

Perceived Epidemic Transparency

We developed the COVID-19 epidemic information transparency questionnaire based on a literature analysis and discussions with experts. The questionnaire included seven items (noted as the Appendix 2), such as "After the outbreak, the authenticity of the number of confirmed cases announced by authorities is __". The participants were asked to indicate their degree of transparency perception of each situation on a 7-point scale, ranging from *not real at all* (1) to *very real* (7). The greater the score was, the higher the perceived transparency. In this study, the Cronbach's α coefficient of the entire scale was 0.924. The factor analysis yielded only one factor with an eigenvalue greater than 1, which accounted for 68.839% of the variance. The factor loading of the items were between 0.773–0.881.

COVID-19 Prevention Behaviors

According to the guidelines for public protection against novel coronavirus infection by the National Health Commission of the People's Republic of China,[8] we developed a COVID-19 preventative behavior questionnaire. The self-developed COVID-19 prevention behaviors questionnaire included a total of 16 items (noted as the Appendix 3). We asked the participants about protective behavior frequency changes compared with those before the outbreak, such as "wash hands" and "wear a face mask". The participants were asked to indicate their degree of frequency change of each behavior on a 7-point scale. The greater the score was, the stronger the protective behavior response level. The Cronbach's α coefficient of the entire scale was 0.888, indicating an acceptable internal consistency. The factor analysis yielded only four factors with eigenvalues greater than 1, which accounted for 68.525% of the variance. The factor loading of the items were between 0.516–0.865. The four factors were isolation protection, medical protection, healthy daily life, and focus on others and surroundings, respectively.

Statistical Analysis and Results

We carried out statistical analysis of the present study using IBM SPSS version 23 software. The descriptive statistics of all the participants and the correlations for the main variables were employed before the hypothesis test, including social class, infectious threat perception, perceived epidemic transparency and COVID-19 prevention behaviors. A conditional process analysis with a bootstrapped approach (PROCESS) was applied to test the hypotheses of the mediation effect and moderation effect.[43] In addition, some research has found that age and gender account for COVID-19 preventive behaviors.[36,44] Thus, age and gender were controlled in the hypothesis test.

Descriptive Statistics and Correlation Analysis

The correlations, means and standard deviations among social class, infectious threat perception, perceived epidemic transparency and COVID-19 prevention behaviors are presented in Table 2. As shown in Table 2, the correlations among the main variables were significant. This indicated that they were possible predictors of the outcome variables and provided the basis for further analysis. The data are normally distributed across all the variables.

Table 2 Correlations, Means, and Standard Deviations of the Main Variables (N = 1948)

	M	SD	1	2	3
1 Social class	0.00	0.80			
2 Infectious threat perception	83.010	62.144	0.093***		
3 Perceived epidemic transparency	36.738	8.580	−0.155***	−0.058**	
4 COVID-19 preventive behavior	70.792	18.494	0.065**	0.360***	0.105***

Notes: ***$p < 0.001$; **$p < 0.01$.

Mediation Analysis

We tested the mediation effect of infectious threat perception on the association between social class and COVID-19 prevention behaviors. According to Hayes,[43] we used Model 4 in the PROCESS macro in IBM SPSS software to test the mediation hypothesis. A total of 5000 bootstraps and 95% confidence intervals were set in the analysis. All the variables were normalized through the z-score approach before the test. Control variables, including age and gender, were assigned as covariates in the test.

The results showed that the total predictive effect of social class on COVID-19 prevention behaviors was significant ($\beta = 0.061$, $p < 0.05$: CI=0.004—0.117). Hypothesis 1 was verified. After the mediating variable entered the model, social class had a significant positive effect on infectious threat perception ($\beta = 0.091$, $p < 0.001$: CI=0.041—0.153). Infectious threat perception also had a significant positive effect on COVID-19 prevention behaviors ($\beta = 0.344$, $p < 0.001$: CI=0.302—0.386). The mediation effect accounted for 55.206% of the total effect. Thus, infectious threat perception was verified to mediate the relationship between social class and COVID-19 prevention behaviors. Hypothesis 2 was verified.

Moderation Analysis

We used Model 8 in the PROCESS macro to examine the moderating effect of perceived epidemic transparency. A total of 5000 bootstraps and 95% confidence intervals were set in the analysis. All the variables were normalized through the z-score approach before the test. Control variables, including age and gender, were assigned as covariates in the test.

The results are presented in Table 3. As shown in Table 3, when the outcome variable was infectious threat perception, social class had a significant positive effect on infectious threat perception ($\beta = 0.094$, $p < 0.001$: CI=0.038—0.150). The interaction between social class and perceived epidemic transparency had a significant negative effect on infectious threat perception ($\beta = -0.069$, $p < 0.05$: CI=−0.125—-0.012). With prevention behaviors as the outcome variable, social class significantly positively affected COVID-19 prevention behaviors ($\beta = 0.055$, $p < 0.05$: CI=0.001—0.108). Infectious threat perception also significantly positively affected health prevention behaviors ($\beta = 0.344$, $p < 0.001$: CI=0.303—0.385). The interaction between social class and perceived epidemic transparency had a significant negative effect on COVID-19 prevention behaviors ($\beta = -0.072$, $p < 0.01$: CI=−0.122—-0.022). According to Edwards and Lambert, the moderation effects in Hypotheses 3a and 3b were verified.[45]

Table 3 The Moderate Effect Test (Model 8)

Predict Variables	Regression Equation 1 (Outcome Variable: Infectious Threat Perception)				Regression Equation 2 (Outcome Variable: COVID-19 Preventive Behaviors)			
	β	SE	t	95% CI	β	SE	t	95% CI
Social class (X)	0.094	0.029	3.293***	[0.038, 0.150]	0.055	0.027	2.005*	[0.001, 0.108]
Infectious threat perception (M)					0.344	0.021	16.444***	[0.303, 0.385]
Perceived epidemic transparency (U)	−0.028	0.024	−1.184	[−0.076, 0.019]	0.141	0.022	6.389***	[0.098, 0.184]
Interaction (X*U)	−0.069	0.029	−2.360*	[−.125, 0.012]	−0.072	0.025	−2.846**	[−.122, 0.022]
R^2	0.035				0.165			
F	13.415***				68.772***			

Notes: Each variable of the model was normalized ***p <0.001; **p <0.01; *p <0.05.

Figure 2 shows that low perceived epidemic transparency had a significant negative moderating effect on the relationship between social class and COVID-19 preventive behaviors (β = 0.182, p < 0.001: CI=0.107—0.258). This means when the perceived epidemic transparency was low, the differences in COVID-19 preventive behaviors between higher and lower social classes were significant. However, high perceived epidemic transparency did not have a significant moderating effect on the relationship between social class and COVID-19 preventive behaviors (β =− 0.009, p > 0.05: CI=−0.091—0.073). This means that when perceived epidemic transparency was high, the differences in COVID-19 preventive behaviors between higher and lower social classes were not significant. The COVID-19 preventive behaviors of lower-class individuals were much more pronounced when the perceived epidemic transparency was high.

Figure 3 shows that low perceived epidemic transparency had a significant negative moderating effect on the relationship between social class and infectious threat perception (β = 0.162, p < 0.001: CI=0.084—0.240). This means that when perceived epidemic transparency was low, the difference in infectious threat perception between higher and lower social classes was significant. However, high perceived epidemic transparency did not have a significant moderating effect on the relationship between social class and infectious threat perception (β = 0.025, p > 0.05: CI=−0.057—0.107). This means that when perceived epidemic transparency was high, the difference in infectious threat perception between higher and lower social classes was not significant. The infectious threat perception of the higher class was much lower when the perceived epidemic transparency was high compared with the low perceived epidemic transparency condition.

Discussion

The aim of the present study was to investigate the social class differences and internal mechanisms of prevention behaviors under the background of the COVID-19 pandemic. We hope the results can provide implications and references for the guidance of epidemic prevention. The study was conducted at the early stage of the outbreak of the COVID-19 pandemic in China, which was during the Chinese Spring Festival holiday. It was a time when the cost of epidemic prevention measures was relatively equal. The results showed that there were differences in prevention behaviors among different social classes. The differences were partly due to the social class differences in infectious threat perception. Perceived epidemic transparency played a moderating role in the direct and indirect paths.

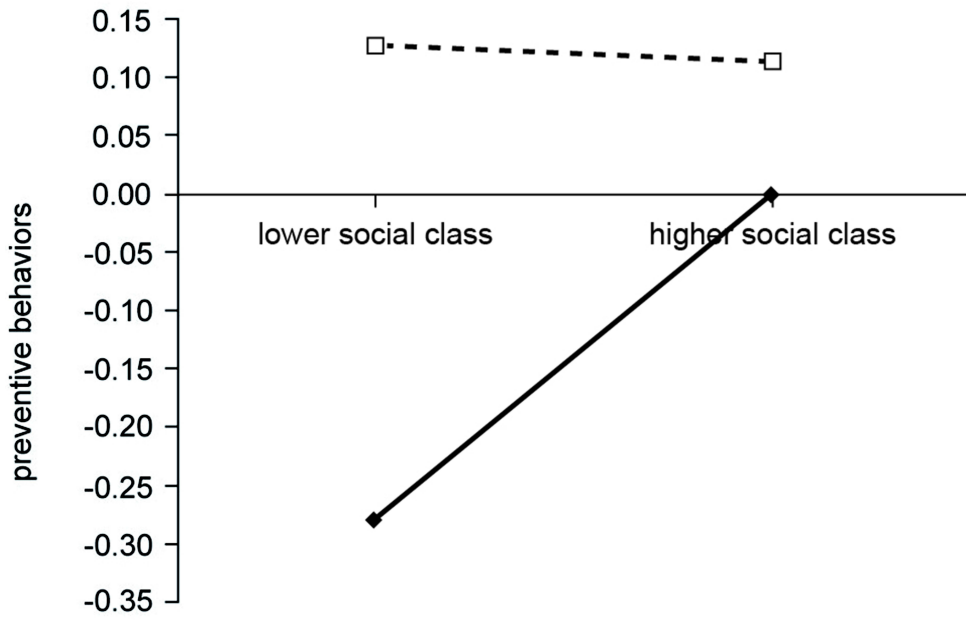

Figure 2 Moderating effect of perceived epidemic transparency on the relationship between social class and preventive behaviors.
Notes: —●— Perceived epidemic transparency low (-1SD), –□– perceived epidemic transparency high (+1SD).

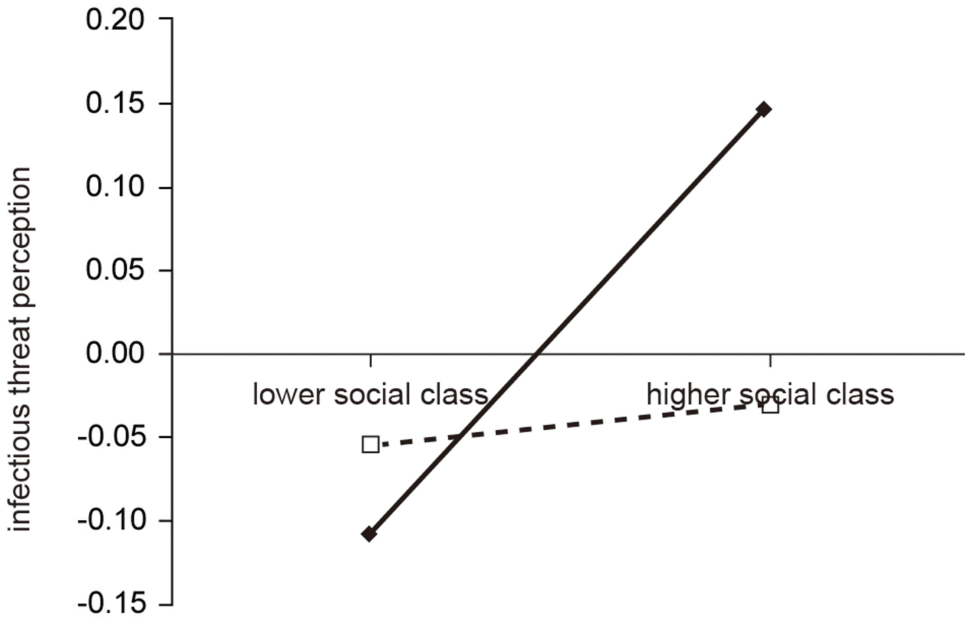

Figure 3 Moderating effect of perceived epidemic transparency on the relationship between social class and infectious threat perception.
Notes: —◆— Perceived epidemic transparency low (-1SD), -□- perceived epidemic transparency high (+1SD).

Socioeconomic Differences in Prevention Behaviors During COVID-19 Epidemic

Previous studies have verified social class differences in preventive health behaviors and risk behaviors.[46–48] It is necessary to investigate the socioeconomic disparities in preventive health behaviors during the pandemic, as well as the causes for formulating control strategies and guidance. Several studies conducted in the later period of the COVID-19 pandemic also found hierarchical differences across social classes.[4,5,49] However, scholars also concluded that the unequal financial burden between families was noteworthy. The results of this study showed that the preventive health behaviors of lower-class individuals were less than those of higher-class individuals during the early stages of the COVID-19 outbreak in China, despite relatively equal costs. This is partially consistent with the findings of Berhanu et al.[50]

Therefore, when new diseases or new health behaviors appear, governments in different countries need to pay attention to the socioeconomic differences of health behaviors and take actions to ensure that protective measures are equal and easily adapted for people from all social classes.[51] This is especially meaningful for epidemic prevention and control. Whether the epidemic can be effectively prevented and controlled depends on the weakest population. It is necessary to find and intervene the group with weak epidemic prevention measures. This can provide a reference for current and future effective epidemic prevention and risk management.

Mediating Role of COVID-19 Infectious Threat Perception

Another contribution of the present study is that we verified the difference in infectious threat perception as one of the reasons for the socioeconomic differences in COVID-19 preventive health behaviors. The results showed that infectious threat perception of COVID-19 effectively mediated the impact of social class on COVID-19 prevention behaviors. Comparing with higher-class individuals, lower-class individuals were less sensitive to emerging diseases. Therefore, they took fewer preventive health behaviors. Hypothesis 2 has been verified.

The results of the socioeconomic differences in infectious threat perception are consistent with other studies conducted during the COVID-19 pandemic. Turnek et al found that people who were more educated tended to perceive a higher level of infectious threat from an early convenient sample in Slovenia.[52] Jahangiry et al had a similar finding in the Iranian population.[53] However, these findings are contrary to the results of Kraus et al,[54] who found that individuals from the lower social class had higher threat sensitivity. The possible reason is that when Kraus et al explored threat sensitivity, the types of threats were relatively controllable or the potential damage was only to individuals, such as social

threats and violence.[54] However, when the type of threat is more uncontrollable or involves a large group, such as the COVID-19 pandemic, the results may be opposite.

The results of the promoting effect of infectious threat perception on preventive health behaviors are consistent with some studies conducted during the COVID-19 epidemic. Wise et al found that the perceived likelihood of personally being infected strongly predicted protective behaviors, such as hand washing and social distancing.[55] Moreover, Cypryańska and Nezlek[56] and Kachanoff et al[57] also found the impact of perceptions of the COVID-19 threat on coping behaviors. However, some studies also revealed that infectious threat perception could promote preventive health behaviors only under certain conditions.[41] There is a likelihood that the relationship between threat perception and protective behaviors is not completely linear. High risk perception in some subgroups might evoke feelings of helplessness and a freeze response instead of mobilizing people into action.[58]

Previous studies have respectively verified the socioeconomic differences in infectious threat perception and the impact of infectious threat perception on preventive health behaviors during the epidemic. The present study directly verified the mediating effect of infectious threat perception on the relationship between social class and preventive behavior and once again confirmed the theoretical hypothesis of HBM.[59] This is another contribution of the present study. Thus, infectious threat perception is one of the key factors in understanding the socioeconomic differences of preventive behaviors, in addition to financial costs. In the current and future epidemic prevention and control strategies, we can make full use of the mediation effect by carrying out targeted prevention education intervention and support for lower-class individuals. Thus, it may stimulate a higher threat perception level among lower-class individuals in the context of equal cost conditions, which will trigger more epidemic prevention behaviors.

Moderating Role of Perceived Epidemic Transparency

At the beginning of the outbreak of the COVID-19 pandemic, the level of infectious threat perception and preventive health behaviors among the lower-class individuals were significantly lower than those of the higher-class individuals. What can be changed so that the public adopt the recommended prevention measures to the greatest extent? This study found the moderating effect of perceived epidemic transparency under the framework of risk communication theory. Risk communication theory especially emphasizes the impact and function of information transparency and openness in risk management.[60] Some scholars have also directly or indirectly tested the impact of perceived information transparency on threat perception[28] and protective behaviors[35] in risk communication. To the best of our knowledge, this was the first study to investigate the moderating effect of perceived epidemic transparency on the socioeconomic differences of threat perception and protective behaviors. As expected, the results show that the moderating effect of perceived epidemic transparency was significant. When the level of perceived transparency was higher, the level of preventive health behaviors was also higher, especially among lower-class individuals.

Some studies during the COVID-19 pandemic found that risk communication and information transparency could promote people to adopt more recommended prevention behaviors.[61,62] The present study revealed the important impact of information transparency on preventive health behaviors and verified the important role of perceived transparency in improving the preventive health behaviors of lower-class individuals, which provides empirical evidence for prevention and control measures in the future.

Apart from verifying the moderating effect of perceived transparency between social class and prevention behaviors, this study also verified the moderating effect of perceived transparency between social classes and infectious threat perceptions. Perceived transparency played a moderating role between social class and infectious threat perception, and it had a greater moderating effect among higher-class individuals. This is consistent with previous research on the negative correlation between epidemic transparency and risk perception.[28] Dryhurst et al found that a higher level of trust was related to a lower level of risk perception.[63] Lalot et al conducted a cross-sectional survey in the Scottish population and found that high political trust could ameliorate the high threat perception caused by uncertainty.[58] However, trust-building relies on open and transparent information communication. It also reflects the reducing effect of risk communication on threat perception from high to a moderate level.

As mentioned above, we should moderate the level of infectious threat perception and prevention behaviors of different social classes through risk communication and education intervention. Epidemic transparency plays an

important moderating role. Furthermore, information transparency is also a crucial factor in building trust between authorities and the public. Trust is the basic precondition for effective risk communication and the intervention of public health behaviors.[27,60] Therefore, maintaining epidemic transparency is the priority of prevention and control strategies, which has also been verified in studies during 2009 influenza A (H1N1).[64]

Limitations

There are some limitations to this research. First, the study was conducted online. Those who do not use Tencent or WeChat APP were not adequately investigated. Therefore, it is likely that highly educated people made up the majority of the sample, and the absence of participants from lower educational backgrounds people may have resulted in a low effect size in the model. Second, the present study used a cross-sectional survey to collect all the variable data. The results and conclusions need to be verified using multiple research designs and various research methods. Finally, it is necessary to further examine the explanatory effects of other factors on the socioeconomic differences of preventive behaviors in future studies.

Conclusions

The present study identified disparities in prevention behaviors among different social classes at the early stage of the COVID-19 pandemic in China. The level of infectious threat perception played a mediating role in the relationship between social class and prevention behavior. When the individuals were from a lower social class, the level of threat perception and the level of COVID-19 prevention behaviors were also lower. Furthermore, perceived transparency played a moderating role in the relationship. When the level of perceived epidemic transparency was higher, the level of preventive health behaviors was higher, especially among lower-class individuals. Perceived transparency also played a moderating role in the relationship between social class and infectious threat perception. When the level of perceived epidemic transparency was higher, the level of infectious threat perception was also higher, especially for higher-class individuals.

Thus far, the COVID-19 pandemic has lasted for two years. Risk communication and education intervention are still the most important strategies at every new stage of this global health crisis. We hope that the findings of this study can help authorities understand the importance of a transparent, multi-faceted, targeted approach to promoting prevention behaviors. In the implementation of risk communication and education intervention measures, different social classes should be targeted and guided in different ways. In particular, lower-class individuals should be guided by improving their perceptions of transparency and the infectious threat.

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Disclosure

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