



BMJ Open Perceived effectiveness of public health measures and positive attitudes during a pandemic: a large cross-sectional study in Shanghai, China

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ABSTRACT

Objectives Building individuals' positive attitudes during a pandemic is essential for facilitating psychological resilience. However, little is known about how public health measures may improve people's positive attitudes during a pandemic. We investigated the potential mechanism underlying the association between individuals' perceived effectiveness of public health measures and positive attitudes towards the success of pandemic control during the COVID-19 pandemic, by examining the parallel mediating effects of three types of threat appraisals: concerns about contracting the virus, perceived impact of the pandemic on life and estimated duration of the pandemic.

Design, setting and participants In February 2020 when the COVID-19 infection was spreading rapidly in China, a large cross-sectional survey was conducted among 132 054 adults from the 16 districts in Shanghai, China.

Outcome measures Perceived effectiveness of the public health measures, positive attitudes towards the success of pandemic control and threat appraisals.

Results Results of structural equation modelling supported the hypothesised mediation model: perceived effectiveness of public health measures was associated with lower levels of concerns about contracting the virus ($\beta=-0.20$), perceived impact of the pandemic ($\beta=-0.13$) and perceived duration of the pandemic ($\beta=-0.20$), which were then associated with higher levels of positive attitudes towards the success of pandemic control ($\beta_s=-0.12$ to -0.25).

Conclusions The findings suggest that threat appraisals may be important pathways through which individuals' evaluations of prevention strategies may influence their attitudes towards the success of pandemic control. The health authorities should consider reducing people's inappropriate threat appraisals when designing public health policies to facilitate people's positive attitudes during a pandemic.

INTRODUCTION

The world is currently fighting against COVID-19. A pandemic like COVID-19 can be a stressful life event. It not only threatens individuals' health and well-being, but can also cause widespread anxiety and fear in the

Strengths and limitations of this study

- This study examined the potential psychological mechanism underlying the association between individuals' perceived effectiveness of public health measures and positive attitudes towards the success of pandemic control using a large sample recruited from the 16 districts in Shanghai.
- The present study was carried out when the fast-spreading COVID-19 infection caused widespread fear and anxiety in China, and findings can inform the future implementation of public health policies to build people's positive attitudes during a pandemic.
- A theory-based parallel mediation model was tested using structural equation modelling, controlling for a variety of sociodemographic, clinical and behavioural covariates.
- Because of the social distancing policy during the study period, measures of the variables were reliant on self-reports, which may introduce response bias.
- Females, the highly educated people and younger adults were over-represented in the sample.

public.¹ Building individuals' positive attitudes towards the success of pandemic control may facilitate compliance with the government's health policies,² uptake of preventive practices³ and psychological resilience⁴ during the crisis. However, research is lacking about whether people's perceptions of the public health measures can influence their attitudes towards the success of pandemic control, and the underlying psychological mechanisms.

The transactional model of stress and coping^{5,6} suggests that individuals' responses to a stressor depend on their threat appraisals of the stressor. When confronted with a stressful event, individuals first adopt primary appraisal regarding the potential harm of the stressor. When the stressor is appraised as harmful and threatening, individuals then make secondary appraisal regarding whether they have the resources to cope with the stress.

These appraisal processes would then influence individuals' responses to and attitudes towards the stressor. Based on the theory, people's evaluations of the effectiveness of public health measures may improve their perceived controllability of the pandemic through influencing their threat appraisals. When a pandemic is perceived as threatening to individuals' safety and well-being, they may develop negative attitudes towards the success of pandemic control. Nevertheless, effective prevention measures implemented by the health authorities may function as supportive resources⁷ that alleviate people's perceived harmfulness of the pandemic and may, in turn, facilitate positive attitudes and perceived controllability of the pandemic. The limited empirical studies on people's responses to public health emergencies have partially supported the theory. Studies have indicated that people's perceived effectiveness of the government's policies is associated with lower levels of perceived risks of public health emergencies.^{8,9} Another study on 9402 adults during the 2003 SARS outbreak found that participants' evaluation of the government's health policies for the pandemic was strongly associated with reduced anxiety.¹⁰ The limited empirical evidence has suggested that people's perceptions regarding public health measures are associated with their threat appraisals and responses to the pandemic. However, so far no studies have been done to examine whether threat appraisals may mediate the association between evaluations of public health measures and attitudes towards the success of pandemic control. Based on the transactional model of stress and coping, we hypothesised that individuals' perceptions regarding the effectiveness of public health measures in controlling COVID-19 would be associated with lower levels of concerns about contracting the virus, perceived impact of the pandemic on life and estimated duration of the pandemic, which were then associated with higher levels of positive attitudes towards the success of controlling COVID-19.

The present study was carried out in early February 2020, when the COVID-19 infection was spreading rapidly in China, leading to widespread fear and anxiety. As one of the municipalities in China, Shanghai faced multiple challenges in controlling the infection. First, Shanghai is a densely populated city, with 24.24 million residents as of 2018.¹¹ This dense population puts great pressure on living supplies and healthcare resources during the pandemic, especially when travel restrictions were enforced. Second, as a major trading city and financial hub, Shanghai has attracted migrants in and outside of China, which may increase the risk of viral transmission. Third, Shanghai has an ageing population, with those over 65 years old comprising 12.93% of the population as of 2015.¹² Since the case fatality rate of COVID-19 tends to be higher among older adults,¹³ the large ageing population may lead to more severe cases and deaths, which may increase people's perceived threat of the pandemic and risk of psychological distress.

Since the outbreak of COVID-19 in China, the Shanghai government has implemented a variety of public health

measures to control the pandemic. Social distancing policies included extending the Lunar New Year holiday, shutting down non-essential public institutions, downsizing the public transportation system and limited community access. The health authorities also set up temperature screening checkpoints at airports and railway stations, and required 14-day self-quarantine for inbound travellers. The health officials also made efforts to promote health practices, including mandatory use of face masks on public transportation, hand hygiene and cough etiquette. However, at that moment, researchers and health authorities had limited knowledge about the incubation period and modes of transmission of COVID-19. Research has demonstrated that people's evaluations of public health policies have particularly large effects on their risk appraisals when personal knowledge about the hazard is limited.¹⁴ Thus, we would expect that during this difficult time when people had little understanding about the virus, perceived effectiveness of the public health measures would serve as essential coping resources that may attenuate people's perceived threat of the pandemic, which would then facilitate positive attitudes towards the success of pandemic control.

METHODS

Patient and public involvement

No patient involved.

Study design and participants

Because of the social distancing policy to minimise in-person interactions during the study period, we administered and advertised the survey through PAPER.cn, a popular Chinese internet-based media platform. Potential participants were informed that the study aimed to understand people's life situations during the outbreak of COVID-19 in Shanghai. Shanghai residents who stayed in any of the 16 districts in Shanghai since the local outbreak (15 January 2020) were invited to participate. Patients or the public were not involved in the design, or conduct, or reporting or dissemination plans of our research. An electronic consent form was presented at the beginning of the survey. Participants need to indicate their willingness to participate by making a yes/no response. Those who indicated willingness to participate were able to take the survey. After data collection, we screened off participants who were likely not residing in Shanghai, and those residents who had left Shanghai after the outbreak, using two questions: (a) 'Since the COVID-19 outbreak (after 15 January 2020), have you left Shanghai?' and (b) 'Which district in Shanghai do you currently live in?' We retained participants who answered 'I never left Shanghai' or 'I left Shanghai after the outbreak but have now returned' to the first question, as well as those who made a valid response to the second question.

MEASURES

Perceived effectiveness of public health measures

Participants were given six major public health measures that had been implemented in Shanghai since the outbreak

of COVID-19, including: (a) setting up body temperature screening checkpoints at the airports, railway stations and highway entrances and exits; (b) mandatory declaration of travel history and health status for incoming travellers; (c) 14-day self-quarantine for incoming travellers; (d) requiring face masks on public transportation; (e) downsizing public transportation system and (f) limited community access. Participants were asked to rate the effectiveness of each public health measure in controlling the spread of the virus using a five-point scale from 1 (not effective at all) to 5 (very effective).

Positive attitudes towards the success of pandemic control

Participants' positive attitudes were assessed using a single item 'How confident do you feel that the COVID-19 outbreak will be under control in Shanghai?' Responses were made on a five-point scale from 1 (very unconfident) to 5 (very confident).

Threat appraisals

Three types of threat appraisals were assessed: concerns about contracting the virus, perceived impact of the pandemic on life and estimated duration of the pandemic. Concerns about contracting the virus were assessed by asking 'Based on your current life and work situation, to what degree are you concerned about contracting COVID-19?' Answers were given on a four-point scale from 1 (not concerned at all) to 4 (very concerned). Perceived impact of the pandemic on life was assessed using a single item 'In general, to what extent is your life influenced by the COVID-19 outbreak?' Responses were made on a four-point scale from 1 (My life is not influenced at all) to 4 (My life is influenced a lot). Estimated duration of the outbreak was measured by asking 'How long do you think the COVID-19 outbreak will last?' Provided options included '1 month', '2 months', '3 months', '4 months or above' and 'hard to estimate'.

Covariates adjusted in the mediation model

Sociodemographic covariates included age, gender, educational level and employment status. Participants' neighbourhood was used as a proxy for socioeconomic status in the present study: low-income neighbourhoods included public housing, affordable housing and rural residence; medium-income neighbourhoods included apartment complexes in urban areas; high-income neighbourhoods included single family homes. Previous studies have indicated that poorer self-reported physical health is associated with emotional distress in reaction to COVID-19 outbreak,¹⁵ and that pre-existing chronic medical conditions predict worse outcomes of COVID-19.^{16 17} Thus, individuals with chronic medical conditions or worse self-reported physical health may perceive the pandemic as more threatening. Moreover, compared with people who stayed at home most of the time during the outbreak, those who went out for work regularly may be more concerned about contracting the virus and may appraise the outbreak as more harmful. Therefore, we

included self-reported physical health status (continuous variable measured using a five-point scale ranging from very unhealthy to very healthy), self-reported chronic medical conditions (having chronic medical conditions vs no chronic medical conditions) and working status during the outbreak (going out for work regularly vs working from home/on vacation/unemployed) in the analyses as additional covariates.

Statistical analysis

First, preliminary analyses were conducted in SPSS V.24.0,¹⁸ including descriptive statistics of the sample and participants' effectiveness ratings of the public health measures. Zero-order correlations were analysed among variables of interest. Continuous variables were summarised in means and SDs. Categorical variables were presented as percentages (%).

The hypothesised parallel mediation model was tested using structural equation modelling with observed variables in Mplus V.7.0.¹⁹ Specifically, we examined the parallel mediating effects of concerns about contracting the virus, perceived impact of the pandemic on life and estimated duration of the pandemic on the association between perceived effectiveness of public health measures (averaged across the six measures) and positive attitudes towards the success of pandemic control. Adjusted covariates included age, gender, education, employment status, neighbourhoods, self-reported physical health status, self-reported chronic medical conditions and working status during the outbreak. Due to the cross-sectional design, the reverse mediation model was also tested, with individuals' positive attitudes mediating the relationship between perceived effectiveness of public health measures and threat appraisals.²⁰

Model fit was assessed using χ^2 goodness of fit statistic, the comparative fit index (CFI), the root mean square error of approximation (RMSEA) and the standardised root mean square residual (sRMR). A model with CFI greater than 0.95, and with RMSEA and sRMR values less than 0.05 indicates a good fit.²¹ Indirect effects were assessed using 5000 bootstrapped iterations with bias-corrected 95% CIs.²² An absence of zero in the 95% CI suggests a significant indirect effect. Full information maximum likelihood (FIML) estimation was used to accommodate missing data.

RESULTS

Preliminary analysis

Among the 146 086 surveys administered, 133 108 valid surveys were returned (response rate=91.1%). We excluded participants who were under 18 years old (n=251) and those with missing data for age (n=803), resulting in 132 054 participants from the 16 districts included in the analyses. Table 1 presents the sample characteristics. Participants were between 18 and 89 years old (M=36.0, SD=8.1). Among the enrolled participants, 72.5% were female, and 73.1% had college-level

Table 1 Demographic characteristics of participants

	Unweighted N (%)/ mean (SD)
Age (years)	36.0 (8.1)
Gender	
Male	36346 (27.5)
Female	95708 (72.5)
Education	
Below high school	1155 (0.9)
High school	7788 (5.9)
Junior college	26601 (20.1)
College	78510 (59.5)
Postgraduate or higher	18000 (13.6)
Employment status	
Currently employed	120592 (91.3)
Retired/unemployed/homemaker	8828 (6.7)
Enrolled student	2616 (2.0)
Undecided	18 (<0.1)
Neighbourhood	
Low-income neighbourhood	19830 (15.0)
Medium-income neighbourhood	106572 (80.7)
High-income neighbourhood	5181 (3.9)
Other	471 (0.4)
Working status	
Going out for work regularly	16253 (12.3)
Working from home/on vacation/ unemployed	115801 (87.7)
Self-reported chronic medical conditions	
No chronic medical conditions	109549 (83.0)
Having chronic medical conditions	15586 (11.8)
Do not know	6919 (5.2)
Self-reported physical health status	4.4 (0.6)

Values represent mean (SD) for age and self-reported physical health status. n (%) for the other variables.

education or above. The majority of participants were employed (91.3%), and 95.7% of the participants lived in low-income or medium-income neighbourhoods. Most of the participants reported not going out to work regularly during the study period (87.7%), and 11.8% reported having chronic medical conditions.

Table 2 presents the descriptive statistics and zero-order correlations among variables of interest. On average, participants perceived the public health measure of 'requiring face masks on public transportation' (M=4.46, SD=0.82) to be the most effective in controlling the spread of COVID-19 in Shanghai, followed by the measures of 'limited community access' (M=4.31, SD=0.93),

Table 2 Zero-order correlations among variables of interest

	1	2	3	4	5	6	7	8	9	10
Perceived effectiveness of public health measures										
1 Strategy a. Body temperature screening checkpoints	1	0.59**	0.51**	0.43**	0.23**	0.17**	0.42**	-0.23**	-0.15**	-0.19**
2 Strategy b. Declaration of health status	..	1	0.59**	0.48**	0.27**	0.21**	0.50**	-0.27**	-0.19**	-0.22**
3 Strategy c. 14-day self-quarantine	..	..	1	0.56**	0.29**	0.27**	0.39**	-0.22**	-0.14**	-0.18**
4 Strategy d. Requiring face masks on public transport	..	..	..	1	0.37**	0.29**	0.34**	-0.18**	-0.11**	-0.15**
5 Strategy e. Downsizing public transportation system	..	..	..	..	1	0.49**	0.15**	-0.04**	-0.02**	-0.06**
6 Strategy f. Limited community access	..	..	..	..	..	1	0.10**	<0.001	-0.01*	-0.04**
7 Positive attitudes towards pandemic control	..	..	..	..	..	..	1	-0.44**	-0.29**	-0.37**
8 Concerns about contracting the virus	..	..	..	..	..	..	..	1	0.31**	0.28**
9 Perceived impact of the pandemic on life	..	..	..	..	..	..	..	..	1	0.16**
10 Estimated duration of the pandemic	..	..	..	..	..	..	..	..	..	1
Mean	3.52	3.35	4.13	4.46	4.15	4.31	3.40	2.52	3.34	2.47
SD	1.11	1.30	1.18	0.82	0.93	0.93	1.18	0.90	0.74	0.92

*p < 0.01, **p < 0.001.

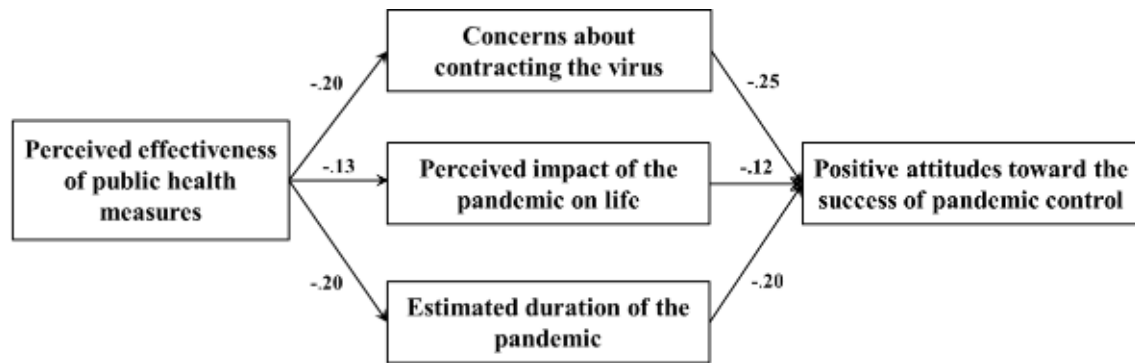


Figure 1 Hypothesised parallel mediation model. All paths shown were standardised regression coefficients, and were all significant at $p < 0.001$. Adjusted covariates included sociodemographic characteristics (age, gender, educational level, employment status and neighbourhood), working status, self-reported physical health status and self-reported chronic medical condition. Correlations among the three types of threat appraisals were omitted in the figure for purpose of conciseness.

‘downsizing public transportation system’ ($M=4.15$, $SD=0.93$) and ‘14-day self-quarantine for incoming travellers’ ($M=4.13$, $SD=1.18$). Percentages of the responses for variables of interest are presented in online supplemental table S1-S5 in the Online Supplement.

Participants’ effectiveness ratings for the six public health measures were associated with higher levels of positive attitudes towards the success of pandemic control ($r=0.10$ to 0.50), and were associated with lower levels of perceived impact of the pandemic on life ($r=-0.01$ to -0.19) and estimated duration of the pandemic ($r=-0.04$ to -0.22). In addition, perceived effectiveness of public health measures was negatively associated with concerns about contracting the virus ($r=-0.04$ to -0.27), except the measure of ‘limited community access’ ($r < 0.001$). The three types of threat appraisals were negatively associated with positive attitudes towards the success of pandemic control ($r=-0.29$ to -0.44).

The parallel mediation model

The parallel mediation model yielded a good fit, $\chi^2(3)=150.63$, $p < 0.001$, $CFI=0.999$, $RMSEA=0.019$, 90% CI (0.017 to 0.022), $sRMR=0.003$. Consistent with our hypothesis, perceived effectiveness of public health measures was associated with lower levels of concerns about contracting the virus, perceived impact of the pandemic on life and

perceived duration of the pandemic, which were then associated with higher levels of positive attitudes towards the success of pandemic control. Figure 1 presents the standardised model paths. Table 3 presents the specific standardised indirect effects and the 95% CIs. The total effect of perceived effectiveness of public health measures on positive attitudes (standardised total effect=0.44, 95% CI (0.434 to 0.444), $p < 0.001$), total indirect effect (standardised total indirect effect=0.11, 95% CI (0.105 to 0.110), $p < 0.001$) and the direct effect (standardised direct effect=0.33, 95% CI (0.33 to 0.34), $p < 0.001$) were all significant. Moreover, the specific indirect effects of perceived effectiveness of public health measures through concerns about contracting the virus, perceived impact of the pandemic and perceived duration of the pandemic were all significant. The total indirect effect through the three mediators accounted for 43.9% of the total effect. The mediation model accounted for 40.1% of the total variance of positive attitudes towards the success of pandemic control.

The reverse mediation model also indicated a good fit with the data, $\chi^2(1)=95.56$, $p < 0.001$, $CFI=0.999$, $RMSEA=0.027$, 90% CI (0.022 to 0.031), $sRMR=0.002$. Standardised model paths are presented in online supplemental figure S1 in the Online Supplement.

Table 3 Standardised indirect effects for the parallel mediation model

	Standardised indirect effect	95% CI
Perceived effectiveness of public health measures ▶ Concerns about contracting the virus ▶ Positive attitudes towards pandemic control	0.050*	0.049 to 0.052
Perceived effectiveness of public health measures ▶ Estimated duration of the pandemic ▶ Positive attitudes towards pandemic control	0.041*	0.039 to 0.042
Perceived effectiveness of public health measures ▶ Perceived impact of the pandemic on life ▶ Positive attitudes towards pandemic control	0.016*	0.015 to 0.017

* $p < 0.001$.

DISCUSSION

To the best of our knowledge, the present study is the first to investigate the potential mechanism by which individuals' perceived efficacy of public health measures may be associated with attitudes towards the success of pandemic control. There are two major findings: first, participants' effectiveness ratings varied among the six public health measures. Second, the association between perceived effectiveness of public health measures and positive attitudes was mediated by people's threat appraisals, including concerns about contracting the virus, perceived impact of the pandemic and perceived duration of the pandemic.

The results showed that participants perceived 'requiring face masks on public transportation' to be the most effective measure in controlling the spread of the virus. This may be related to people's increasing reliance on public transportation near the end of the Lunar New Year holiday. On public transportation where social distancing is difficult, it is reasonable for individuals to believe that wearing face masks would be the most effective way in avoiding virus exposure. The relatively low effectiveness rating for 'mandatory declaration of travel history and health status for incoming travellers' may be attributed to people's low trust in travellers' self-report. For the measure of 'setting up body temperature checkpoints', there are two possible explanations for its low effectiveness rating. First, by the end of January before the study was conducted, COVID-19 cases without fevers or with late presence of fevers were already reported,^{23 24} which may lower people's perceived effectiveness of fever screening in identifying potential patients. Second, body temperature checking may reduce mobility and cause crowding at airports, railways and subway stations, which may heighten people's concerns for viral transmission.

The present study supported the transactional model of stress and coping^{5 6} and has suggested that threat appraisals mediate the association between people's perceptions of public health policies and attitudes towards the success of pandemic control. In line with the theory, perceived effectiveness of public health measures may function as supportive resources for individuals to cope with the stress induced by the pandemic, and alleviate their perceived harmfulness of the pandemic, including concerns about contracting the virus, perceived impact of the pandemic and perceived duration of the pandemic. The reduction in perceived threat may, in turn, contribute to people's positive attitudes towards the success of pandemic control.

Our findings align with the limited quantitative studies demonstrating that individuals' evaluations of the government's health policies are associated with threat appraisals of public health emergencies.^{8 9} The present study also provided quantitative evidence supporting previous qualitative research. For example, Malagón-Rojas *et al.*²⁵ found that airport workers' perceived effectiveness of the COVID-19 prevention strategies (eg, disinfection of common areas and provision of hand sanitizers) facilitated a sense of security and bolstered workers'

confidence in preventing the spread of infection at the airport. Another qualitative study found that individuals who were concerned about the impact of the pandemic on their health and income felt depressed and expressed negative attitudes towards the success of pandemic control.²⁶ Consistent with these findings, our results have demonstrated that people's perceptions regarding the efficacy of prevention strategies may influence their attitudes towards the success of pandemic control through threat appraisals.

Considering the relatively small indirect effects in the current study, alternative mechanisms may be plausible. For example, research has demonstrated the essential role of self-efficacy in influencing individuals' attitudes towards the epidemic and the intentions for health-protective behaviours,^{27 28} suggesting that self-efficacy may be an alternative mechanism underlying the association between perceived effectiveness of public health policies and attitudes towards pandemic control. Future research is needed to identify other potential mediators.

Implications

The study findings can guide the design and the implementation of health policies to facilitate people's confidence and psychological resilience during an infectious disease outbreak. The results demonstrated that individuals' threat appraisals may act as important pathways through which individuals' perceptions regarding public health measures may influence their attitudes towards the success of pandemic control. Thus, the health authorities should take measures to mitigate people's inappropriate threat appraisals and excessive health concerns when implementing prevention measures. Previous research has found that possessing accurate knowledge about an epidemic is associated with reduced health anxiety.^{3 29} Thus, combining the prevention strategies with health education programmes to improve basic knowledge of the disease may mitigate people's exaggerated severity estimates of the outbreak.³⁰ In particular, establishing education programmes for the public to explain how the prevention strategies (eg, self-quarantine, hand hygiene and requirement for wearing face masks) can reduce the spread of the virus may increase people's perceived effectiveness of these strategies and improve compliance with the strategies, which may then facilitate their positive attitudes towards the battle against the pandemic. Moreover, offering emergency assistance to people with financial difficulties and providing remote medical consultation services to people with limited mobility may help alleviate the perceived threat of the pandemic, and build individuals' psychological resilience to get through the hard times.⁷ Besides, given that excessive health concerns sometimes deviate from rationality,³¹ and can lead to risk-taking behaviours and social disturbance during a public health crisis,³²⁻³⁴ mental health services (eg, cognitive-behavioural therapy) may be considered for people with excessive health concerns and illness severity overestimates.³⁵

Limitations

The study was subject to several limitations. First, the cross-sectional design of our study impedes drawing conclusions of causal relationship or temporal precedence. In particular, our results suggested a good fit of the reverse mediation model, with individuals' positive attitudes mediating the relationship between perceived effectiveness of the public health measures and threat appraisals. However, Tate has pointed out that in mediation analysis, the conceptual time-ordering is the more fundamental criterion for selecting a mediator than the sequential time-ordering.³⁶ That is, regardless of the temporal order of measurement, the predictor should occur before the mediator conceptually, and the mediator is supposed to precede the outcome variable conceptually. Based on the transactional model of stress and coping,^{5 6} individuals' beliefs that coping resources are available would lessen their perceived threat of the stressor, which then leads to perceived controllability of the stressful event. Thus, we believe the hypothesised model meets the conceptual time-ordering criterion. Future research with longitudinal or experimental design is needed to confirm our hypothesised mediation model. Second, measures of the variables were reliant on self-reports, which may be subject to response bias. For example, it is likely that some participants tended to select the highest response categories (acquiescent response style) or the middle response categories (midpoint response style) in the online survey. We cannot rule out the possibility that the observed outcome levels or associations among variables may be affected by these response biases.³⁷ Third, females, the highly educated people and younger adults were over-represented in the sample. In particular, the majority of our participants (72.5%) were females, and 73.1% of the participants had a college-level education or above. Previous research has found that individuals' threat appraisals and psychological responses during public health events are associated with gender and educational level.^{27 29 38 39} Thus, whether our findings are generalisable to other populations warrants future research. Fourth, the sample was restricted to residents in Shanghai. The educational level and personal income level in Shanghai are relatively higher than many other cities in China.¹¹ In addition, the severity of the COVID-19 outbreak and the implemented public health measures varied among different cities and countries. Thus, it calls for future studies to test the generalisability of our findings to other areas in China, and elsewhere. Finally, in order to reduce participant burden during the pandemic, we assessed the variables using self-developed questionnaires, and were not able to perform analyses on test-retest reliability and construct validity. These measures need to be further validated in future research.

CONCLUSIONS

The present study indicated that individual's perceptions of public health measures may influence their attitudes

towards the success of pandemic control by influencing their threat appraisals, including concerns about contracting the virus, perceived impact of the pandemic on life and estimated duration of the pandemic. To facilitate people's positive attitudes during public health emergencies, the health authorities should take efforts to reduce people's inappropriate threat appraisals and excessive concerns when implementing prevention strategies.

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Patient consent for publication Not required.

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