The effects of the COVID-19 pandemic, risk perception, and perceived social support on public trust in physicians in China: A latent transition analysis

Yidi Chen[1], Brian J. Hall[2,3], Wenju Li[4], Jian hui Wu[5], Jinjin Ma[1], Huanya Zhu,[1] and Yiqun Gan[1] (iD)

Abstract

A population-based, longitudinal study was conducted among 29 provinces in mainland China to investigate how public trust in physicians (PTP) changed since the outbreak of COVID-19 and how the resulting lockdown and social support contributed to its restoration. The baseline sample ($n = 3,233$) was obtained during the period of the most rapid progression of COVID-19 (February 1 to 9, 2020, T1). Follow-up ($n = 1,380$) took place during the recovery period (March 17 to 24, T2). Latent profile models and a latent transition model were estimated. Participants were classified into either a moderate trust (21% at T1; 45% transition into high at T2) or a high trust (79% at T1; 88% remained in the high group) group in the latent profile. A latent transition from moderate to high trust was observed in locked-down regions and among those with higher social support. Social support moderated the transition from low to high trust. The current study showed that the epidemic outbreak and lockdown experience in China were associated with increased PTP; furthermore, public trust can be restored during a public health emergency. Attention should be paid to assure that social support and risk management strategies maintain PTP.

Introduction

Trust in physicians during a public health emergency in China

Public trust in physicians (PTP) is significant for the healthcare system (Zhao & Zhang, 2019). For more than a decade, the difficult relationship between physicians and patients has been a prominent issue in Chinese society (Tucker et al., 2016). At the root of this deteriorating relationship is a legacy of China's healthcare reform (Zhao & Zhang, 2019), namely the widespread public perception that doctors have the illusion of putting their own financial interests ahead of those of their patients (Blumenthal & Hsiao, 2005). The physician–patient relationship in China reached a record low point before the Coronavirus disease 2019 (COVID-19) outbreak with shocking acts of medical violence. Wen Yang, an emergency physician at Beijing Civil Aviation Hospital, was stabbed to death by a patient's family member; this has been strongly condemned by the Chinese Medical Association (Lancet, 2020).

[1]School of Psychological and Cognitive Sciences and Beijing Key Laboratory of Behavior and Mental Health, Peking University, Beijing, China
[2]Department of Psychology, University of Macau, Macao (SAR), China
[3]Health, Behavior, and Society, Johns Hopkins Bloomberg School of Public Health, Washington, USA
[4]National Center of Gerontology, Beijing Hospital, China
[5]School of Psychology, Shenzhen University, Shenzhen, China

Corresponding authors:
Wenju Li, National Center of Gerontology, Beijing Hospital, Beijing 100730, China.
Email: jiwenju@163.com

Yiqun Gan, School of Psychological and Cognitive Sciences, Peking University, Beijing 100871, China.
Email: ygan@pku.edu.cn

The lack of PTP and increasing violence against health professionals is a global problem (Phillips, 2016; Tucker et al., 2016). However, the scale, frequency, and magnitude of violent attacks in China are particularly serious (Hall et al., 2018; Jiang et al., 2014). The lack of trust between doctors and patients in China is an urgent problem that affects the entire health system, physician well-being, and patient outcomes (Lancet, 2019). Trust between physicians and patients is essential for maintaining a good physician–patient relationship (Ozawa & Sripad, 2013): patients' trust in physicians predicts patients' treatment outcomes and satisfaction along with physical and mental health (Dong et al., 2017; Levy et al., 2017; Müller et al., 2014). The frequent occurrence of workplace medical violence and disputes in the medical arena affects the quality of public health services. Additionally, it has a severe impact on the mental health of medical health professionals (MHPs; including physicians, nurses, and other medical workers), causing stress, burnout, emotional distress, and trauma (Hall et al., 2018; Jiang et al., 2014). The number of MHPs has decreased rapidly in the previous decade, exacerbating already scarce medical resources, which highlights the importance of more research focusing on PTP (Song & Walline, 2020). According to the Chinese Physicians Association (Jie, 2012), there has been a steady decline in the proportion of physicians who want their children to enter the medical field from 11% in 2002 to 7% in 2011. Similarly, it has been reported that almost half of the physicians do not want their children to enter the medical profession (Lancet, 2019). Despite the ongoing reforms to improve PTP, there has been limited success in improving trust due to the scarcity of medical resources in China.

During the COVID-19 epidemic outbreak, frontline MHPs have been essential in the work of treating infected patients regardless of the risk to their own health and well-being. With reports in official and social media channels glorifying the sacrifices of MHPs, the public's respect and praise for MHPs may have increased, similar to what was noted during the severe acute respiratory system (SARS) outbreak in 2003 (Gan et al., 2020). Increasing PTP is one of the crucial objectives of healthcare reform. However, few studies have examined the current status of PTP in China during COVID-19. In such a context, the effect of unexpected health events on the healthcare system can change the PTP by updating the public perception of healthcare (Veit et al., 2021). Therefore, we used two Latent Profile Models (LPMs) to observe whether PTP improved after the COVID-19 outbreak.

By observing the changes in the two LPMs at two time points, we can observe the patterns of PTP elevation during the pandemic. By exploring the restoration of PTP in China after the pandemic began, we can give MHPs a morale boost and rekindle the wish of more people joining the medical profession (Imai, 2020). This will also address the shortage of medical resources in China (Lancet,

2019). Furthermore, exploring the trends in PTP has provided valuable policy implications for policymakers. The two time points considered in this study were of 10 days (T1) and 50 days (T2) after the lockdown in Wuhan; these time points were chosen for measurement because the COVID-19 outbreak in China progressed very rapidly at T1, while at T2 it had gradually entered a stable period after lockdown policies of the Chinese government were put in place. The LPM can divide a variable into different levels and can also observe the transition between different time points so that one can overcome the statistical weakness of comparing means at different time points, and further infer the antecedent variables of the transition. Thus, we hope to observe the restoration of PTP through longitudinal data following the COVID-19 epidemic. Specifically, more people with a low level of PTP will transition to a higher level of trust (H1).

Risk perception hypothesis and social support as an explanation for restoration

Trusting someone involves taking a risk, and this increases vulnerability due to uncertainty and unpredictability of the trusted person's behavior (Moldoveanu & Baum, 2011). In the event of a public health emergency accompanied by risk, such as COVID-19, the public knew little about the pathogenesis and treatment of the disease (Park et al., 2020) and were forced to rely on MHPs. According to the risk perception hypothesis of trust, this uncertainty, coupled with disease severity, increases trust (Hillen et al., 2011); if a patient's physical condition worsens, they tend to have a more positive expectation of MHPs with hope of rehabilitation. This was also documented among patients with human immunodeficiency virus (HIV) (Cunningham et al., 2007) and among patients with other immune diseases (Berrios-rivera et al., 2006) who exhibited higher levels of trust when compared to control patients. A study on social network analysis of trust in the Czech Republic showed that the institutions or actors directly involved in crisis resolution, such as security agencies and MHPs, were located at the center of the trust network during the COVID-19 pandemic (Tabery & Pilnacek, 2021). During the COVID-19 epidemic, we would expect public trust in medical experts to increase due to the severity and uncertainty of the illness (Gopichandran & Chetlapalli, 2015).

The risk of transmission influences local lockdown policies, and each individual's lockdown experiences are tied to their risk perception (Huang et al., 2020). As the COVID-19 outbreak was classified as a public health emergency of international concern as soon as widespread transmission was detected, the Chinese government initiated a high level of prevention and control during the outbreak by concentrating on whether to adopt a lockdown policy for the city, region, or community based on the severity

level of the outbreak. Having had experience with a lockdown implies that the individual was in an area where the outbreak was more severe during the period just after the outbreak. Therefore, we use the lockdown experience as an objective indicator of risk perception.

In addition to increased risk perception, social support can also promote trust. Social support refers to perceived support availability from friends, family members, and government (Zhang et al., 2015), and is a form of social capital (Reininger et al., 2013). According to social support theory, individuals with high perceived social support reap a more positive experience in interpersonal interactions and tend to have positive expectations when communicating with others (Reininger et al., 2013). The COVID-19 outbreak has brought great challenges and risks to society, but also provides an opportunity for the restoration of PTP, amplifying the key role of government intervention and support in risk management and control (Born, 2003). Based on the risk perception hypothesis (Hillen et al., 2011) and social support theory (Sendra et al., 2019), we hypothesize that during a major public health emergency, risk perception (lockdown experience, as an objective index of risk perception) and perceived social support can predict the transition from low to high trust (H1). Conversely, a lack of social support will contribute to a transition from high to low trust (H2).

Resource-dependent characteristics of trust during times of risk

Public trust is a key component of an adequate public health emergency response. During an epidemic, risk perceptions are heightened, which affects the public's subsequent thoughts and behaviors (Murray & McCrone, 2015). According to protective motivation theory, during a pandemic, risk perception leads to a public willingness to cooperate with a range of government policies and a willingness to adopt health behaviors (Bish & Michie, 2010; Rudisill, 2013). Therefore, accurate public risk perceptions are essential for effective management of public health risks (Dryhurst et al., 2020). Trust increases the perceived predictability of public health officials' behavior and reduces the complexity of decision-making (Hall et al., 2001). The "predictability" function of trust inevitably implies risk (Mechanic & Meyer, 2000), thus that once you choose to trust others, you transfer your own resources to them to control. Therefore, trust is not only a positive prediction of another's behavior, but also the degree of confidence in facing risks.

The interpretation framework of risk perception emphasizes the role of the government in maintaining public trust. On the basis of the interpretation framework of risk perception, and due to the vulnerability of the public when faced with risks, the government has always been regarded as responsible for the public's best interest. This causes the public to rely on the government during high-risk events.

In other words, when the public feels that the threat of risk is overwhelming, they expect social support in order to continue to survive and even thrive, especially with government participation (Chappell et al., 2007). The stronger the public's risk perception the higher their demand for government assistance. With the risk of COVID-19, adequate social support (especially support from the government) meets these needs and increases trust, and since MHPs are the people delivering the government's response, this presents an opportunity to improve the PTP (Hillen et al., 2011). During the epidemic, support available from the government and medical institutions can reduce psychological distress as the realistic possibility of infection increases (Han et al., 2020). In this way, when individuals find that they cannot ask for help, the positive expectations of physicians are greatly reduced. As a result, if individuals know whom to turn to for help when perceiving risk, whether it comes from relatives, friends, or government medical providers, this can increase trust in the medical system; this is in line with resource-dependent characteristics of trust during times of risk (Born, 2003).

Thus, there already exists a need to improve PTP in China, and COVID-19 provides a good opportunity for change. Meanwhile, as the global mortality rates for COVID-19 rise, it is increasingly important to understand the public's perception of risk (Van Bavel et al., 2020). For this purpose, we propose a research framework. On the basis of the interpretation framework of risk perception (Hillen et al., 2011), social support theory (Reininger et al., 2013), and resource-dependent characteristics of trust (Born, 2003), social support can moderate the effect of risk perception on the transition of trust. Specifically, sufficient social support will predict a high transition rate from low to high trust, and this would be maintained among those with increased risk perception. Conversely, low risk perception with a lack of social support would contribute to a transition from high to low trust (H3) (Figure 1).

Methods

Sampling, study population, and procedures

The survey was conducted at two time points with a longitudinal study design. The baseline sample ($n = 3,233$) was obtained during the most rapid progression of COVID-19 in China (February 1 to 9, 2020, 10 days after the Wuhan lockdown) among 29 provinces in mainland China. The number of cases in the area we could obtain during the study period determined the sample size. Approximately 50% were from Hubei ($n = 1,630$), the province wherein the worst outbreak occurred. Study follow-up ($n = 1,380$, 42.6% of participants were connected and completed follow-up) took place during the COVID-19 epidemic recovery period (March 17 to 24, 2020). The inclusion criteria for each study was being a Chinese adult with at least a
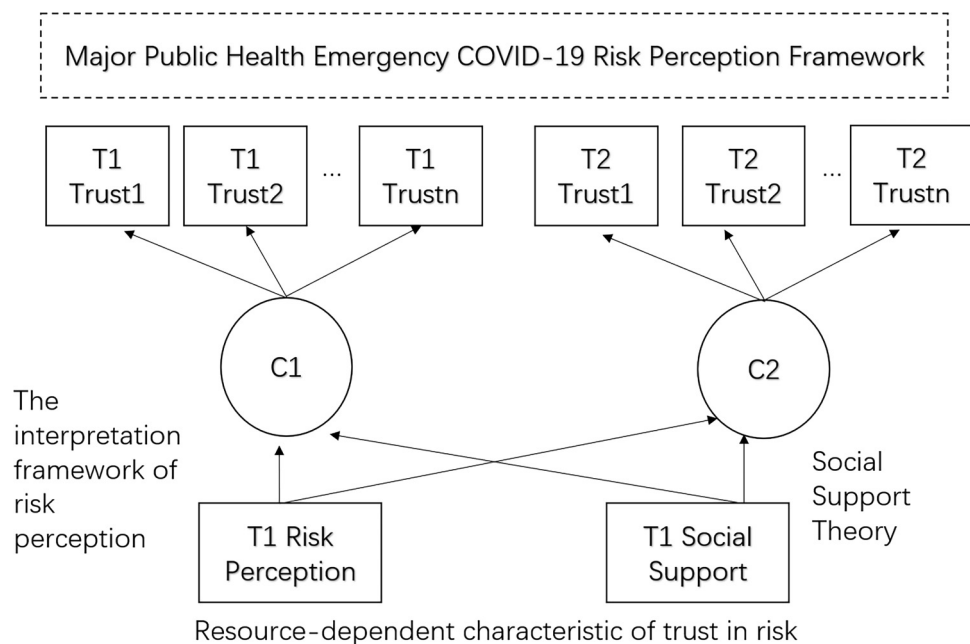
Figure 1. Conceptual framework.

junior high school education. A total of 1,350 participants were matched between the two time points (30 participants were removed from our analysis due to change of location). All the valid subjects completed the scales without missing any variables. Among the 1,350 participants, 378 were from Hubei province and 972 were from among the 28 provinces in mainland China. A total of 10 (0.74%) participants were diagnosed with COVID-19, 49 (3.63%) were suspected as infected, 256 (18.96%) were quarantined for having had close contact with those diagnosed with COVID-19, and 1,035 (76.67%) were not quarantined. Participant characteristics are presented in Table 1.

Self-report questionnaires were administered to participants through a survey website hosted by WenJuanXing (Changsha Haoxing Information Technology Co., Ltd., China). Six items (e.g., I usually feel winter is hotter than summer) were included to identify and exclude invalid answers.

Ethical considerations

The study procedures were approved by the authors' Institutional Review Board. All participants provided written informed consent. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Measurements: The Trust in Physicians Scale

The Trust in Physicians Scale (Yamagishi & Yamagishi, 1994) measures public trust in physicians, which indicates

Table 1. Sociodemographic characteristics of the sample

Characteristics category	Sample ($n = 1350$)
Gender	
Male	574 (42.52)
Female	776 (57.48)
Age (years) [$M(SD)$]	30.75 (8.94)
Education	
High school and below	91 (6.74)
Junior college	239 (17.70)
Bachelor degree	906 (67.11)
Master degree or above	114 (8.44)
Individual income(yuan/year)	
Less than 30k	272 (20.15)
30k–80k	295 (21.85)
80k–300k	715 (52.96)
More than 300k	68 (5.04)
Occupation	
Full-time students	289 (21.41)
National government personnel	29 (2.15)
Employees of enterprises/institutions	751 (55.63)
Professional technical staff	89 (6.59)
Business/service personnel	73 (5.41)
Medical industry personnel	22 (1.63)
Education industry personnel	43 (3.19)
Others	54 (4.00)

Note: Values are numbers (percentages) unless stated otherwise.

general trust in physicians as a group. It contains 6 items in total and is scored using a 7-point Likert scale. The sample item was "Overall, I trust the physicians" and "Most physicians are trustworthy." In this study, the Cronbach's alpha was 0.69 at T1 and 0.73 at T2.

Perceived social support

Zimet et al. (1990) included two subscales: family and friends support and governmental support. Items in the family and friends support subscale measure perceived support and help from family and friends, whereas items in the governmental subscale measure perceived support from the government, medical institutions, and hospitals. In this study, the Cronbach's alpha was 0.81 at T1 and 0.83 at T2, 0.78 and 0.82 for family friend support, and 0.75 and 0.75 for governmental support, respectively.

Demographic information

Participants' provided self-reported age, gender, geographical location, occupation, education experience, individual income, risk perception (lockdown experience), and attention on the epidemic (using 1 to 5 to measure to what extent individuals are focused on the outbreak) during the outbreak.

Statistical analyses

Statistical analyses using M plus 7.0, a latent profile analysis of PTP across the two time points, were conducted using robust maximum likelihood estimation (MLR), which is recommended for analyzing small and medium samples, and also robust when the sample size is large (Chonu, 2013). It uses a robust estimation method that does not require normally distributed data to estimate the model, thus its parameter estimates are not prone to bias (Muthén, 2002).

From a single class model, an LPM was established individually by increasing the number of classes (up to six) to find the best model. The index of overall fit was obtained including LMR (Lo–Mendell–Rubin likelihood ratio test), BLRT (Parametric Bootstrapped Likelihood Ratio Test), AIC (Akaike Information Criterion), BIC (Bayesian Information Criterion), aBIC (sample-size-adjusted Bayes Information Criterion), and entropy (classification quality). LMR and BLRT show comparison of an LCM (k) to a model with one less class (k-1); significant tests of LMR and BLRT indicate a better model compared to the model with one less class. Lower AIC, BIC, and aBIC estimates indicate the quality of the model (Muthen & Muthen, 2000). Entropy, ranging from 0 to 1, signifies perfect classification of individuals into the latent class when approaching 1. Generally speaking, an entropy which is higher than 0.8 indicates a sufficient fit (Nylund et al., 2007).

After optimal LPM was determined, a latent transition model was used to assess transitions between latent profiles and two time points. Predictors of latent profile transitions between baseline and follow-up were modeled using logistic regression in SPSS 24.0. The bootstrapping procedure of Preacher and Hayes (2008) was used (Preacher & Hayes, 2008) and the corresponding SPSS Process macro (Model 1) was chosen to test for moderating effects. We set the number of samples at 1,000 and used the bias correction option with gender, age, and education as covariates.

Results

General trust pattern of two LPMS

Based on the overall fit, the model with two classes indicated the best fit (T1: $p_{LMR} < .001$, $p_{BLRT} < .001$, AIC = 18701.68, BIC = 18800.63, aBIC = 18740.27, and Entropy = 0.89; T2: $p_{LMR} = .006$, $p_{BLRT} < .001$, AIC = 18108.62, BIC = 18807.57, aBIC = 18747.21, and Entropy = 0.87). The model with three classes had a lower entropy and the *p-value* for LMR was nonsignificant (although the entropy was higher with five classes, the p-value for LMR was non-significant, which indicated a better goodness-of-fit; Wang & Wang, 2019). Therefore, the two-class model was chosen after considering model fit and theoretical tenability (see Table 2) and used in the subsequent latent transition model. Latent profile 1 ["moderate trust in physicians", $n = 270$ (21.0%)] was comprised of participants with moderate levels of physician trust. Participants in latent profile 2 ["high trust in physicians", $n = 1,080$ (79.0%)] had the highest levels of physician trust. The estimated mean values of each trust item included in the latent profile analysis are shown in Figure 2.

Latent transition model of general trust

According to the category information and probabilities of individuals at two time points, the latent transition probability and transition information (see Figure 3) of the general trust model at two time points were calculated. From T1 to T2, 122 individuals transited from the moderate trust to high trust group, and less than 129 individuals transited from the high trust to the moderate trust group. Furthermore, the transit rate from the moderate trust group to the high from T1 to T2 was the greatest (45.0%) and was greater than the 12.0% transit rate from the high trust to the moderate trust group. Simultaneously, the majority of individuals ($n = 951$) remained in the high trust group (88.0%) through the two time points. Thus, in both the rapid transmission and recovery periods of the epidemic, the general public's trust of physicians was high.

The role of risk perception and social support

Two logistic regression models explored factors that affect the transition of general trust in physicians. The non-transition group and the transition group were coded as 0 and 1 in the moderate trust and high trust groups, where 1 indicated a transition to the opposite group, between baseline
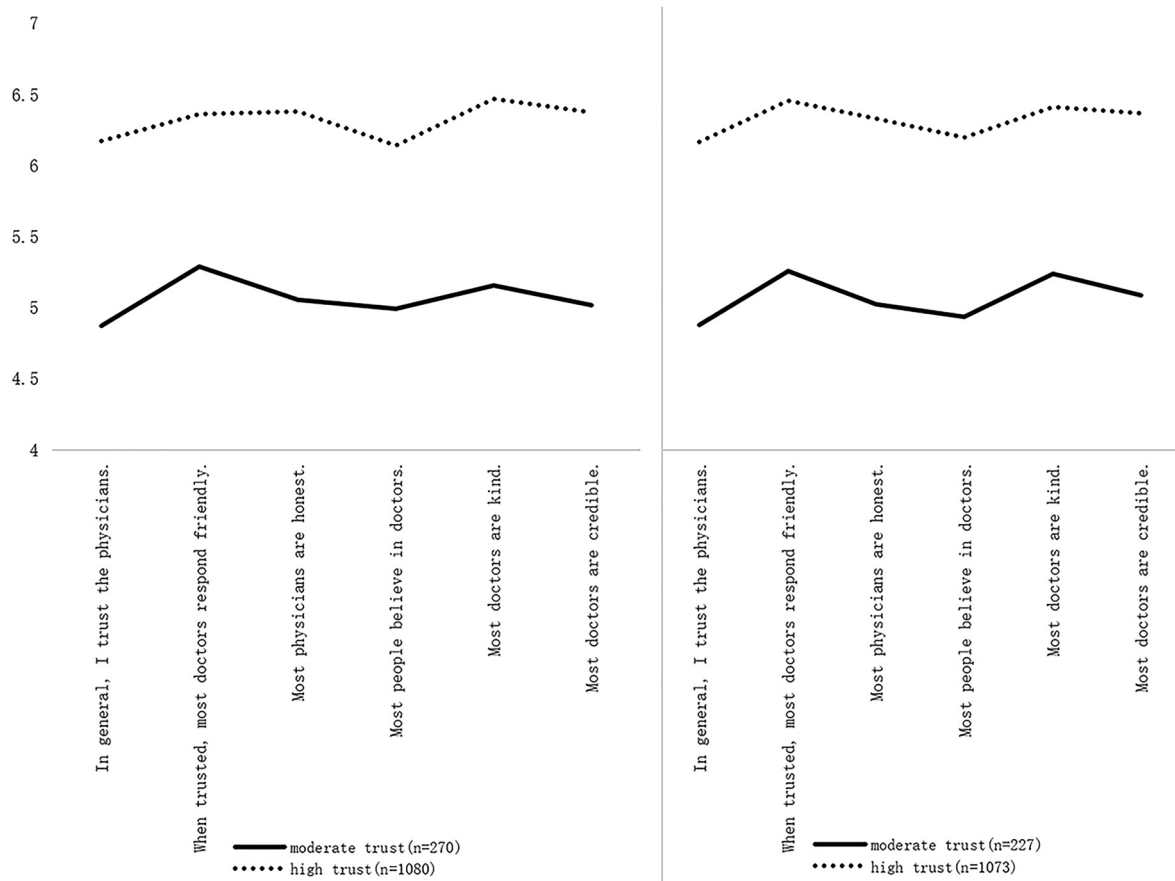
Figure 2. Estimated mean value of general trust in latent profile analysis.
Note: The left is latent profile model at T1, while the right is at T2; the X axis represents general trust items, and the axis of Y represents the estimated average value of each item.

Table 2. Summary of good-in-fit information of latent profile model of general trust

	k	log(L)	AIC	BIC	aBIC	Entropy	BLRT	LMR	Categorical probability
T1									
1	12	−10391.51	20807.02	20869.52	20831.40	–	–	–	1.00
2	19	−9331.84	18701.68	18800.63	18740.27	0.89	<0.001	<0.001	0.79/0.21
3	26	−8987.15	18026.29	18161.70	18079.10	0.81	<0.001	0.152	0.51/0.41/0.08
4	33	−8766.94	17599.88	17771.74	17666.91	0.83	<0.001	0.314	0.41/0.44/0.13/0.02
5	40	−7385.85	14851.70	15060.01	14932.95	1.00	<0.001	0.677	0.47/0.34/0.16/0.02/0.01
T2									
1	12	−10382.18	20788.35	20850.85	20812.73	–	–	–	1.00
2	19	−9335.31	18708.62	18807.57	18747.21	0.87	<0.001	0.006	0.78/0.22
3	26	−8907.29	17866.58	18001.99	17919.40	0.85	<0.001	0.043	0.58/0.38/0.04
4	33	−8708.76	17483.53	17655.39	17550.56	0.84	<0.001	0.045	0.46/0.43/0.10/0.01
5	40	−8070.04	16220.08	16428.39	16301.33	0.89	<0.001	0.706	0.33/0.33/0.16/0.15/0.03

and follow-up. Transition status was the dependent variable. Baseline predictors of group transition included risk perception (using lockdown experience and attention on the epidemic as predictors), perceived social support from family and friends, and perceived government support.

In the moderate trust group, logistic regression results indicated that lockdown experience ($B = 0.52$, $SE = 0.26$, $p = 0.041$, 95% CI = [0.02, 1.03], $OR = 1.68$) and perceived government support ($B = 0.60$, $SE = 0.19$, $p = 0.001$, 95% CI = [0.29, 1.02], $OR = 1.83$) predicted transitions from

the moderate to high trust groups. Perceived support from family and friends and the amount of attention paid to the epidemic were not significantly associated with latent class transition ($p > 0.05$).

In the high trust group, family and friend support ($B = -0.40$, $SE = 0.12$, $p = 0.001$, 95% CI = [−0.64, −0.16], $OR = 0.67$) and government support ($B = -0.38$, $SE = 0.12$, $p = 0.001$, 95% CI = [−0.61, −0.15], $OR = 0.69$) were significant negative predictors of transitions from the high trust group to the low trust group. No other variable significantly predicted the transition ($p > 0.05$).

The moderating effect of social support

To further explore the moderating effect of social support on risk perception and the transition of general trust in physicians, Model 1 of Process Macro in SPSS was used (Preacher & Hayes, 2008) with lockdown experience as the independent variable, transition of general trust between the two time points as the dependent variable, social support as the moderating variable, and gender, age, and education levels as control variables. In the moderate trust group ($N = 270$), the interaction between risk perception and social support was significant ($B = -0.83$, $SE = 0.40$, $p = 0.039$, 95% CI [−1.61, −0.04]). Simple slope analysis demonstrates that when social support was low, risk perception significantly predicts the transition of trust from low to high ($B = 1.09$, $SE = 0.45$, $p = 0.015$, 95% CI [0.21, 1.96]). However, when social support was high, risk perception failed to predict the transition between trust groups ($B = -0.18$, $SE = 0.37$, $p = 0.610$, 95% CI [−0.91, 0.53]). Those with high social support are more likely to transition to a higher trust level. In addition, in the high trust group ($N = 1,080$), the interaction between risk perception and social support was not significant ($B = 0.05$, $SE = 0.27$, $p = 0.853$, 95% CI [−0.48, 0.58]). However, the main effect of social support in predicting the transition of trust at T2 was significant ($B = -0.80$, $SE = 0.22$, $p < 0.001$, 95% CI [−1.22, −0.38]), indicating that individuals with high social support were more likely to maintain a high level of trust at T2. In contrast, individuals with low social support were more likely to transit into the moderate trust group (Figure 4).

Discussion

High PTP was observed in a longitudinal nationwide study of Chinese adults. Latent profile analysis demonstrated that general trust in physicians could be divided into a high trust and a moderate trust group. On the one hand, the majority of PTP levels obtained at both time points fell in the high trust group, indicating a high PTP in China after the outbreak of COVID-19. On the other hand, regarding the transition rate, approximately half the sample from the moderate group at T1 transited into the high group at T2, signifying that the

trust level improved in line with H1. However, due to the difference in the base of the two groups, the change in the number of people within the two groups does not absolutely match the pattern of change in conversion rate, which means that one should be cautious when interpreting H1. In addition, lockdown experience, family and friend support, and governmental support significantly predicted this transition, supporting H2. For those who experienced lockdown, trust was more likely to improve. Further, individuals with high social support are more likely to maintain a high level of trust. Additionally, in the high trust group, social support moderated the relation between lockdown experience and trust transition. For those with high social support, the higher the risk perceived, the more likely people were to maintain a high level of trust which partially supports H3.

Resource-dependent risk perception and restoration of trust

When comparing the data collected at two time points, we found a notable transition to the high trust group between the two time points which indicated a restoration of trust as the epidemic progressed. This may be due to the high transmission rate of COVID-19; the public suddenly became anxious, and the possibility of infection affected normal life as a major stressor (Stein, 2020). In this case, PTP became a daily issue (McCloskey et al., 2020). In accordance with the risk perception hypothesis (Hillen et al., 2011), people with lockdown experience transitioned from low trust (T1) to high trust (T2), which demonstrated that greater risk was associated with a higher probability of increased PTP. Previous research found that as the perception of threat increases, trust also increases (Bonds et al., 2004), and due to this threat, the public must trust that doctors will make professional diagnoses and treatment decisions (Bachinger et al., 2009). On a macro level, an epidemic outbreak can increase helplessness, especially if people think that they are at a high risk of infection (Brooks et al., 2020), and this makes people aware of the important role of doctors and the scarcity of resources, which thereby increases PTP (Katapodi et al., 2005).

In the early days of the COVID-19 outbreak, the Chinese government actively adopted mass quarantine measures including a provincewide lockdown policy in Hubei province. Thus, lockdown experience, as an objective index, was associated with high risk perception, which resulted in a higher probability of transition from a low to high trust group, supporting the risk perception hypothesis. Lockdown not only serves as a danger signal; to increase individual risk perception it also conveys information to the public that the government is taking effective measures to manage risk, which can lead to increased PTP (Anderson et al., 2020). This supports the resource-
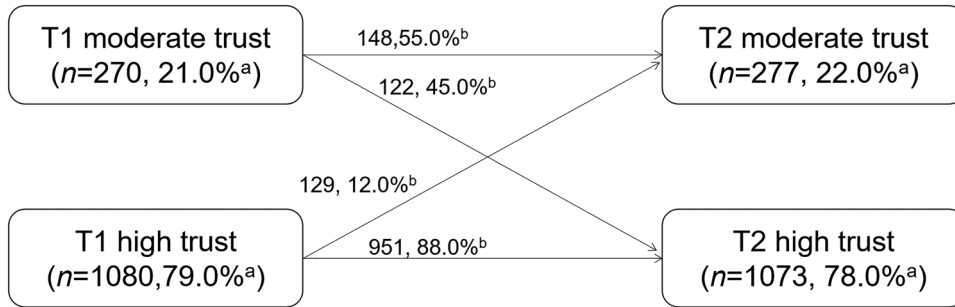
Figure 3. General trust pattern in physicians latent transition information graph.
Note: [a] means category probability, [b] means transition probability to another group. T1 means time 1, T2 means time 2.
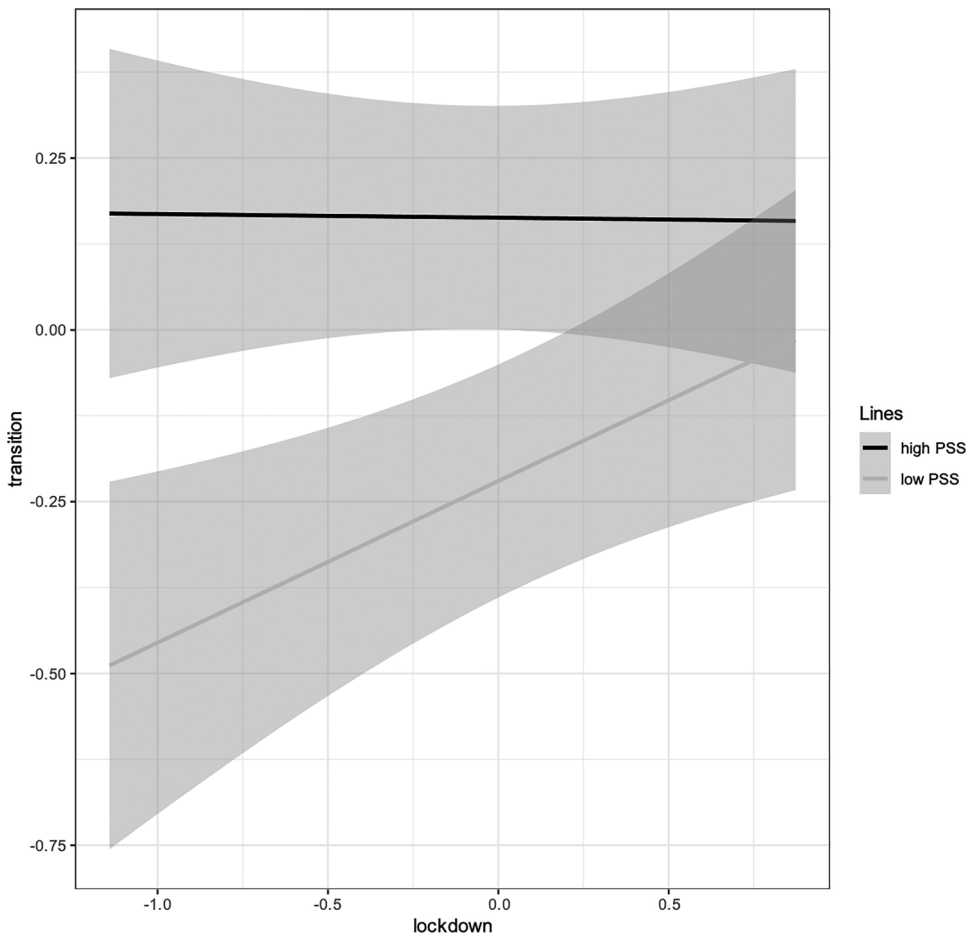

Figure 4. The moderation effect of perceived social support in the relationship between lockdown experience and transition.
Note: PSS means perceived social support; transition >0 means transit from the moderate trust group to the high group, <0 means maintain at a moderate trust level.

dependent characteristic of trust hypothesis that proposes people are willing to offer their trust when they rely on resources from the government (Joseph & Reddy, 2013). We found that social support moderated the influence of risk perception on transition probabilities. In particular, perceiving a high level of support from friends, family, and the government encouraged those in the high trust group at T1 to maintain PTP at T2. That is to say, the

risk perception hypothesis only works in conjunction with high social support.

Social support as a protective factor

Although social support can be a boundary condition to support the risk perception hypothesis, we found that it could be a vital protective factor to facilitate the moderate trust group transferring to high trust and to help retain trust at a high level. Previous studies have not reached a consistent conclusion regarding the relationship between trust in physicians and perceived social support. Research suggests that individuals with higher social support receive more positive experiences when interacting with others, and thus have positive expectations of MHP's behaviors. This is in line with social support theory (Reininger et al., 2013). Simultaneously, however, social support may undermine PTP. Nowadays, medical commercialization undermines the continuity of traditional physician–patient relationships, although it does create more choice for patients, that is, they can choose to complete healthcare at home and rely on their families, online consultation, or private doctors. However, if there are more sources of social support for individuals, entrusting their care to doctors is then not the only method to recovery; thus, the trust between physicians and patients may be more tenuous, because patients have other choices to rely on (Boulware et al., 2003). Our research supports the first explanation. In the present study, we found that when people had only moderate trust in physicians, higher governmental support was associated with the development of stronger trust as the epidemic progressed. Thus, social support can be used as a protective factor to improve trust, not only because individuals who perceived more social support have more positive interpersonal experiences, but also as support from governmental and medical institutions are typically the only source of help in health emergencies.

Since the COVID-19 epidemic is a major public health emergency, policies concerned with the allocation of medical resources and how to achieve quarantine will affect the public's expectations regarding MHPs (Huang et al., 2020). Therefore, government regulation is essential, especially as Chinese people typically trust their government more than those in other countries (Li, 2016). In this process, if individuals feel that the support from the government and medical care is sufficient when their risk perception is high, then they can seek medical treatment from designated hospitals in a timely manner, thereby increasing PTP. However, if people do not perceive adequate availability of social support in an emergency situation, and sufficient medical resources were unavailable, trust in medical professionals will decline (Zhao et al., 2016).

Limitations of the study

There are some limitations in the present study. First, the study explains the restoration of PTP from the perspective of risk perception and social support. However, there are other variables, such as social media dissemination and information asymmetry, which would affect PTP. Second, although our transition analysis indicated that more people transit from the moderate trust to high trust group, this result may be due to this numerical disparity between the two groups that make this restoration less robust. This may also be because both time points for data collection were after the COVID-19 outbreak. The collection of prospective data may solve this problem. Further studies comparing high and moderate trust groups with more balance in regard to numerosity should be conducted. Third, we chose lockdown experience as an objective risk perception indicator and ignored the role of subjective risk perception in PTP changes. Future research should combine the two different risk-perception indicators to explore whether they have an interactive effect on PTP. Furthermore, participants were followed-up 50 days after baseline, limiting our inferences to the restoration of trust to the short term. Future studies can explore PTP during the epidemic period to evaluate whether PTP was maintained.

Contributions of the study

The conflict between physicians and patients in China has existed over decades, and the COVID-19 epidemic can be an opportunity to restore trust (Gan et al., 2020). Therefore, the observation of the improvement of PTP at this moment, and the exploration of the internal dynamics in light of the Social Support Theory and Risk Perception Hypothesis of trust, provides solid evidence for this process. This research adopted a latent transition model to find an effective method of observing the transition of promotion of PTP, and to provide cues on how to maintain this level after a public health emergency. The local epidemic in China has been halted temporarily, however, maintaining PTP is still a long-term public health priority. The risk-perception hypothesis can be an alternative explanation of this restoration: focusing on risk perception encourages the government to reasonably assess risks and make corresponding decisions. At the present time when pandemic prevention and control remain complex, we are faced with the serious problem of external prevention and importation as well as internal prevention and rebound. Timely government regulations and quarantine measures can help increase public trust in the healthcare system. Meanwhile, social support is another important factor that needs attention. Social support is a conditional foundation to the hypothesis, in which a high level of social support allows individuals to trust physicians, even in high-risk situations. However, social support can have a strong effect on the

trust transition from low to high trust. In a state of social isolation, the government can provide social support in the form of media, communication devices, and securing supplies. These are all effective ways to enhance PTP.

Future directions and policy suggestions

PTP in China is greatly influenced by government regulation; thus, this study provides new insight on retaining the high level of public trust in MHPs after the epidemic. At a policy and macro level, not only do MHPs and patients need to take responsibility, but further, the government should ensure the quality of medical services available to maintain a good relationship between patients and MHPs. Under a public health emergency, the government needs to safeguard the public and use the media to convey confidence. For example, the government needs to do more to publicize the work of MHPs and the ways in which to seek healthcare service, so that people know they can expect a response when they ask for help. The government needs to improve the risk management system to prevent similar crises from becoming major crises. Our findings show that high PTP under high risk perception is only associated with high social support. Therefore, on the one hand, in this case it is more important for the government to exert its power to build public confidence in fighting the pandemic. On the other hand, the government should establish a good media image of the medical sector, such as enhancing the media image of healthcare institutions, so that the public can feel the support of the government and medical forces and improve their trust therein. In addition, besides government support, the support of family and friends in the pandemic also contributes to the PTP. This study also reveals that adequate perceived family and friend support in daily doctor–patient interactions can also predict a better doctor–patient relationship. Nevertheless, progress has been made in rebuilding harmonious doctor–patient relationships during the COVID-19 outbreak. However, much remains to be done.

Authors' note

Brian Hall, Center for Global Health Equity, NYU Shanghai.

Availability of data and materials

The datasets used and/or analyzed during the current study are available on the figshare (https://doi.org/10.6084/m9.figshare. 13854830.v1).

ORCID iD

Yiqun Gan 🆔 https://orcid.org/0000-0001-9886-6862

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