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Does social capital contribute to prevention and control of the COVID-19 pandemic? Empirical evidence from China

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A R T I C L E   I N F O

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ABSTRACT

By exploiting anonymized travel records of patients with COVID-19, this study examines the impact of social capital on individuals’ responses to control measures during the early stage of the COVID-19 pandemic in China. The empirical results show that social capital measured by social trust, media publicity of social norms, and public recognition of social norms has a significant effect on reducing individuals’ close contact behavior in the context of the COVID-19 pandemic. The mechanism tests indicate that social capital reduces the prevalence of close contact behavior by encouraging people to comply with public morality, which refers to self-monitored quarantine in this pandemic. Further analysis reveals that social trust shows no significant effects on all types of entertainment activities, that media publicity of social norms is more conducive to preventing family entertainment activities than public recognition of social norms, and that improving public recognition of social norms plays a decisive role in preventing social entertainment activities. This study sheds substantial light on the key role that informal institutions play in epidemic prevention and control.

1. Introduction

The COVID-19 pandemic is a major public health emergency, which has severely endangered human health. In facing the unexpected pandemic, the Chinese government has adopted comprehensive, rigorous, and thorough measures to fight the virus. Nevertheless, we observed that during the early stage of this epidemic, people appeared to respond differently to these strict control measures. For example, according to Jieman News, an influential and original financial media outlet in China, only 0.28% of Wuhan’s residents traveled to Heilongjiang Province, and this level ranks 8th from last in the country. However, at the same time, the number of confirmed cases in Heilongjiang Province was rising at the highest rate, which was mainly caused by family gatherings. In contrast, as the largest outbound destination for the population of Wuhan, Henan Province was faced with the same severe prevention and control situation as Hubei Province. However, Henan Province won broad praise across the nation for its outstanding achievements in epidemic control. Thus, it can be seen that the practical effect of epidemic prevention and control is not absolutely determined by geographical distance, migration rate, population density, or other objective factors, while local residents’ responses to prevention measures plays a vital role. Therefore, an important question to consider is what accounts for people’s varying degrees of adherence to containment measures.

The “Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version 7)” released by the National Health Commission (NHC) states that the main transmission routes of the virus are droplet transmission and close contact transmission, which implies that decreasing the prevalence of close contact behavior can effectively prevent a wider spread and further development of the virus. As a result, in the early stage of the epidemic, raising public awareness about reducing close contact with other people became the key to cutting off the transmission of the virus. According to Putnam [1], social capital enables participants to act together more effectively to pursue shared objectives, thereby promoting trust and cooperation, motivating individuals to observe social norms, and restraining self-interested behavior in terms of interpersonal communication [2–5]. Consequently, it is reasonable to infer that residents living in areas with higher social capital are more likely to adhere to the strict control measures, which coincides with decreasing the frequency of close contact with others.

This article explores how social capital affected residents’ responses to control measures during the early phases of the COVID-19 pandemic in China. According to the travel records of people who were diagnosed
with COVID-19, we identify their behaviors during the period from January 21, 2020 until their diagnoses, and we investigate the association between social capital and the close contact behavior of these patients. To explore whether social capital reduces the prevalence of close contact behavior by strengthening individuals’ moral restraint, a mechanism test is conducted. We also extend this topic by considering the heterogeneity of this behavior.

Compared with existing studies, the novelty of this paper is reflected in three aspects. First, the COVID-19 pandemic highlights the role of contextual social capital and provides us with a good chance to examine its effect. Since regional economic development is always accompanied by a rapid flow of population and information, it was difficult for previous studies to clearly isolate the effect of contextual province-level social capital. During the pandemic, the Chinese government implemented the strictest access control management across the country and enforced quarantine and isolation on a grand scale to curb the spread of the virus, which invisibly set boundaries among different social communities. This provides a good scenario for us to investigate the impact of contextual social capital on individual behavior.

Second, taking advantage of the detailed and anonymized travel records of people who were diagnosed with COVID-19, we successfully identify how many times the person was in close contact with others, and this tally serves as the basis for the quantitative analysis of the relationship between social capital and individuals’ responses to control measures. Also, we classify these behaviors according to the degree of hazards they may bring to society, so as to assess the different effects that social capital exerts in different conditions, which provides additional insights into the relationship between social capital and individual behavior in the context of the COVID-19 pandemic.

Third, our study establishes a causal relationship between social capital and epidemic control. On the one hand, using femininity-masculinity and blood donation as instruments of social capital, we adopt a two-stage least squares (2SLS) approach to deal with the endogeneity problems. On the other hand, most of the existing studies about social capital and epidemic prevention and control have failed to specify the channels through which social capital influences people’s behavior. Based on the analytical framework of “social capital – moral restraint – individual behavior”, this paper empirically confirms the mechanism by which social capital contributes to COVID-19 prevention and control by encouraging people to obey public ethics.

This paper is organized as follows: Section 2 reviews the related literature; Section 3 proposes our hypotheses; Section 4 introduces the research design; Section 5 reports and discusses the empirical results; and conclusions, limitations and implications are presented in Section 6.

2. Literature review

2.1. Social capital

The concept of social capital originated from sociology and was first proposed by the French sociologist Bourdieu in the book “The Forms of Capital”, in which it was initially defined as the aggregated value of connections between individuals and the norms of reciprocity developed from social networks [6]. Since then, social capital has been added to the economic growth model as a production factor with the same status as physical capital and human capital, and several definitions of social capital have been advanced. Newton [7] suggested that the concept of social capital focuses on the cultural values and attitudes that encourage citizens within a community to cooperate, trust, understand, and empathize with one another. More specifically, Coleman [3] identified three forms of social capital: obligations and expectations, which depend on the trustworthiness of the social environment; the information-flow capability of the social structure; and norms accompanied by sanctions. Putnam [5] provided the most widely used definition, referring to social capital as “features of social organizations, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions”.

According to the previous literature, it is generally believed that social capital contains two levels and three dimensions. The two levels are the individual level and the contextual level, and the three dimensions are social trust, social norms, and social networks [5,8,9]. Individual level social capital includes membership in associations and a level of generalized trust [5,10], which means it is usually associated with social networks and social trust. Contextual level social capital—which is often characterized by a flourishing social life and widely shared norms of trust and reciprocity [5], and is believed to have the function of facilitating collective action and reducing transaction costs [3,5]—is usually associated with social trust and social norms. In addition, social capital is claimed to have a structural component and a cognitive one [11]. The structural aspects of social capital are the degree of civic participation, membership in associations, and formal and informal networks, which are considered highly relevant to social networks. The cognitive aspects of social capital are trust and shared values, which are highly relevant to social trust and social norms.

2.2. Social capital and disaster reduction

Empirical evidence shows that social capital can enhance individuals’ or communities’ ability to prepare for, respond to, and recover from various crises such as natural disasters, viral epidemics, and terrorist attacks [12-14]. Among the two levels and three dimensions of social capital, the role of social networks at the individual level has been widely discussed. For example, Hurlbert et al. [15] find that individuals who are in high-density networks are more likely to obtain informal support during the preparedness and recovery phases of a disaster. Aldrich [16] shows that most of the victims are rescued by people who have social connections with them rather than by government rescue forces.

Recently, as more and more scholars suggest that the success of disaster prevention and relief depends largely on the nature of socio-cultural resources in a given region [16-18], social trust and social norms—as two forms of cognitive social capital, at the contextual level have received increasing attention. As Aldrich [16] states, trust among community members influences greater sharing of information about facts, procedures, or threats to the community [19,20]. In contrast, an atmosphere of mistrust will fuel the spread of misinformation and affect people’s risk perceptions of disasters [21]. Many evidences have shown that the exchange of trust can foster preparedness for a disaster [22-24]. Also, trust makes people prioritize the common good [5]. Members of societies characterized by high levels of trust tend to take more precautions against an epidemic [25,26] and have higher immunization acceptance [27], because trust may be a factor prompting people to pay attention to how their own decisions affect disease transmission in the wider community.

In addition, engendering new norms governing participation and compliance is also a channel through which social capital promotes disaster reduction [28]. Evidences show that social norms add to the effect of risk perceptions so that can enhance people’s positive responses to crises [29,30]. For example, Morrison et al. [31] find a strong relationship between preparedness for bushfires and propaganda promoting social norms that support preparedness in local communities. Lin [32], based on a case study of Koh Klang island, argues that embedded social norms form the basis for a resilient community. Lin also recommends that disaster recovery and mitigation policies should be scaled to local levels.

2.3. Social capital and COVID-19

During the COVID-19 pandemic, the importance of social capital was highlighted. Many studies have attempted to study the linkage between social capital and people’s testing rates, infection rates, compliance with control measures, and vaccine intentions. For example, Wu et al. [33]
considers the association between social capital and the state-level testing rate in the United States. Wu [8] conducted a survey in China’s Hubei Province and studies how social capital in different forms affects an individual’s exposure to COVID-19 by asking whether the respondent knew someone who had been infected with COVID-19 in the neighborhood. Makridis and Wu [34] use the Joint Economic Committee (JEC) measure of social capital at the county-level to explore how social capital affects the level and growth rate of infections in the United States. Bartscher et al. [35] provide evidence from seven European countries that social capital has a considerable impact on the cumulative number of COVID-19 cases and the number of deaths. Ding et al. [36] and Bai et al. [37] both explain how social capital influences residents’ social distancing behaviors by using American mobile phone location data. Thaker [38] investigates the role of social capital in public attitudes toward the COVID-19 vaccine base on a survey of the New Zealand public.

Although there have been a number of studies on social capital and its role in the COVID-19 pandemic, there are still some points to be further examined. First, some scholars have investigated the impact of social capital on people’s responses to the COVID-19 pandemic. However, most of these studies consider the COVID-19 response at the place level (such as counties, states, or countries) [36,39]. They use data like residents’ overall stay-at-home prevalence, average time away from home, and the number of visitors in certain places as the COVID-19 responses outcomes. This data is usually provided by a third party [37,40], and cannot help identify individuals’ exact behaviors and the motivations behind them. Few studies to day have explored the relationship between social capital and the COVID-19 responses at the individual level yet.

Second, the mechanism through which social capital affects people’s responses to the COVID-19 pandemic has not been discussed widely or thoroughly. Wu [8] suggest that social capital affects COVID-19 responses mainly through facilitating collective actions in the form of trust and norms in response to the forceful top-down containment means imposed in China. However, the above statement has not been empirically verified with solid methods. More importantly, the current studies have ignored the moral restraint role of social capital.

Third, existing studies have some weaknesses in terms of their research methods. Most of them examine the role of social capital and come to conclusions using only a least squares method, which cannot rigorously confirm the causal relationship between social capital and its outcomes.

In this paper, attempts have been made to fill this research gap. The rigorous prevention measures taken by the Chinese government divided the society into relatively isolated segments, which particularly highlights the role of socio-cultural factors at the provincial level. This creates a clean setting for us to explore how province-level social capital can play a role in epidemic prevention and control. By exploiting the anonymized travel records of patients with COVID-19 in the early phases of this pandemic in China, we were able to identify and classify the specific close contact behaviors of these cases. Thus, our paper contributes to the recent literature on the relationship between social capital and the COVID-19 responses at the individual level. Using a 2SLS instrumental variables approach, we also mitigate potential omitted variable bias. Moreover, we further probe into the underlying mechanism through which social capital affects individual responses to COVID-19. We consider self-restraint in morality as the intermediate mechanism, and we test this by adopting a mediation model.

3. Hypothesis development

The COVID-19 pandemic is a major public health emergency. The virus has proven to be extremely difficult to contain. So far, it has broken out in many places across the world and keeps spreading, posing a great threat to human health. Two major measures have been applied to control the virus in China. One is to control the sources of infection and cut off the channels of transmission, and the other is to build stringent lines of defense across society, which means joint prevention and control. These measures require not only the strong leadership of the government, but also the active involvement of all members of society. However, epidemic prevention has the characteristics of a public good, so it may lead to free-riding behavior among residents, which means that people who do not comply with control measures can still enjoy the safety environment created by others. Therefore, motivating residents across the country to follow instructions and act as one becomes the key in the fight against the virus. According to Coleman [3], social capital plays an important role in overcoming the public good problem that exists in collectivities, which we believe may produce a positive effect on epidemic prevention and control.

Social capital provides common values and norms for individuals [2, 41]. It encourages individuals to forgo self-interest and act in the interests of the collective. If someone violates cooperative norms in times of disaster, then he/she will bear moral pressure and shame and may be repelled by other people [3,42–44]—and these reputational costs are higher for people with more social capital [45]. In the early phases of COVID-19, social distancing and self-quarantine measures were the most effective means to curb the spread of the virus. Such measures required all residents to subordinate their needs to the overall interests of epidemic control, avoiding as much contact with other people as possible and observing self-quarantine at home. Violating the control measures was considered unethical behavior that could cause great damage to a person’s reputation [42,46]. Especially in areas with higher social capital, residents are more likely to consciously restrain selfish and unethical behaviors, otherwise their reputations are more prone to be damaged.

Based on this discussion, we propose the following hypothesis.

H: Individuals in areas with higher social capital are more likely to obey social morality, and thus they reduced their close contact behavior during the early phases of COVID-19.

4. Research design

4.1. Data sources

We obtained COVID-19 patients’ travel records from the China Stock Market and Accounting Research (CSMAR) Database, a leading financial data provider in China, from which we could identify each patient’s specific behaviors from January 21, 2020 until his/her diagnosis by the information disclosed. The sample period of our paper is set from January 21 to February 27, 2020 for the following three reasons: (1) President Xi Jinping gave important instructions on fighting the novel coronavirus on January 20. He called for the prompt release of information on the epidemic and enhanced international cooperation. Meanwhile, Premier Li Keqiang decided to take more steps for epidemic prevention and control. (2) The NHC organized a press conference for disease control experts on January 20, where Zhong Nanshan, head of the high-level expert team, determined that the new coronavirus was spreading between humans. (3) During January 20 to 21, the World Health Organization arrived in China to visit Wuhan Central South Hospital and Hubei Province Center for Disease Control and Prevention. Obviously, leading experts from home and overseas have taken important actions since January 20. The information released by the NHC has attracted much attention from the whole society. Therefore, Chinese citizens were expected to make fewer trips outside and to quarantine themselves at home after receiving the information. Considering that it takes time for information to spread, we take January 21, 2020 as the start date of our sample period. We choose February 27, 2020 as the closing date, because by that time, the domestic epidemic had been effectively under control in China. According to data released by the NHC, the daily figure for new cases on the mainland, except for Wuhan, had dropped to single digits as of February 27 for the first time. To provide a more intuitive understanding of the development trend of the
epidemic in China during our sample period, the newly confirmed cases
and the key measures taken by the Chinese government are shown in
Fig. 1. As can be seen from the figure, during our sample period from
January 21, 2020 to February 27, 2020, China had gone through a
trajectory from the rapid outbreak of the epidemic to the initial
containment of it.

Note: The “four categories of people” refers to confirmed cases,
suspected cases, febrile patients who might be carriers, and close
contacts.

As for social capital measures, we use two main data sources in this
analysis. (1) The Chinese General Social Survey (CGSS), which is the first
nationwide and continuous large-scale social survey project in China,
collecting data from all levels of society, community, family, and indi-
vidual. The first phase of the CGSS was conducted annually from 2003 to
2008. The second phase of the CGSS was conducted from 2010 to 2019
and was carried out every other year. The data used in our paper is the
latest from the CGSS for 2017, officially released on October 1, 2020,
which collected a total of 12,582 valid samples, covering 28 provincial-
level administrative regions in China except for Tibet, Xinjiang, Hellan
, Hong Kong, Macao, and Taiwan. Using multi-stage stratified probability
sampling, this survey selected 100 counties (districts) across the
province, plus five major cities, including Beijing, Shanghai, Tianjin,
Guangzhou, and Shenzhen, as the primary sampling unit. In each
selected county (district), four neighborhood committees or village
committees were randomly selected. Then, 25 households were sur-
vveyed for each neighborhood or village committee. One person
was randomly selected for an interview in each selected household. (2) The
Baidu Search Index, a data analysis platform on which we could obtain
the weighted sum of a key word’s search frequency in the Baidu web.
Besides, data on the province-level confounders were obtained from the
China Statistical Yearbook published in 2019.

The CGSS did not conduct a survey in Hainan Province, which means
that some data was missing. Therefore, we excluded samples from Hainan Province.
Moreover, among the final samples, there are 56 missing values for gender and 290 for age. We replaced these missing
values with their respective mean values. Finally, we obtained 1259
valid samples from the 5046 pieces of patient information. The specific
data screening process is shown in Table 1.

4.2. Models

We first examine the effect of social capital on individuals’ responses
to control measures by using the ordinary least squares (OLS) regression
model. The baseline model is shown in Eq. (1) as follows:

\[ \text{Contacts}_{i} = a_{0} + a_{1}\text{SocialCapital}_{i} + a_{2}X_{ij} + \epsilon_{ij} \]  

(1)

where \( i \) and \( j \) denote individual and province, respectively. Contacts
represents how many times the person had been in close contact with
other people before being diagnosed with COVID-19. In this specifica-
tion, we are mainly interested in the coefficient on SocialCapital, which
quantifies the impact of social capital at the province-level on the close
contact behavior at the individual-level. \( \text{X} \) refers to the set of control
variables, which will be described in detail in Subsection 4.3.3.

Then, to verify our hypothesis, namely whether a moral restraint
mechanism is the channel through which social capital affects people’s
responses to control measures, we follow the study of Baron and Kenny
(47), establishing the mediation model as follows:

\[ \text{Contacts}_{i} = a_{0} + a_{1}\text{SocialCapital}_{i} + a_{2}X_{ij} + \epsilon_{ij} \]  

(2)

\[ \text{Quarantine}_{ij} = a_{0} + a_{1}\text{SocialCapital}_{ij} + a_{2}X_{ij} + \epsilon_{ij} \]  

(3)

\[ \text{Contacts}_{ij} = a_{0} + a_{1}\text{SocialCapital}_{ij} + a_{2}\text{Quarantine}_{ij} + a_{3}X_{ij} + \epsilon_{ij} \]  

(4)

We first estimate Eq. (2), which is the same as Eq. (1). Then, in Eq.
(3), we examine the effect of social capital on the intervening variable,

\[ \text{Quarantine}. \]  

Last, we include the intervening variable into the baseline model in Eq. (4), holding the other control variables equal.

4.3. Variables

4.3.1. Dependent variables

The most effective way for people to prevent COVID-19 is to stay at
home and avoid close contact with others. In other words, the more
frequently a person comes into contact with others, the more likely he/
she is to get infected and then infect others around him/her. Therefore,
we take a person’s frequency of close contact behavior as the main
dependent variable. Here, we define close contact behavior as the
spontaneous behavior that increases the chances of being in close con-
tact with other people and carries the risk of being infected or of
infecting others. We winsorize this variable at the 1st and 99th per-
centiles to mitigate the effects of outliers.

To extend this topic, we create the dummy variable Entertainment to
measure the risk level of this behavior, which equals 1 if the close
contact behavior is associated with going out for entertainment and
0 otherwise. Here, entertainment is defined as all kinds of activities in
which people take part during their leisure time to meet their spiritual
needs, which are unnecessary for life. We divide entertainment into two
categories: family entertainment (Family-Ent) and social entertainment
(Social-Ent), among which family entertainment is defined as having a
family feast, visiting families for the Spring Festival, and other activities
held within the family. Social entertainment is defined as certain un-
necessary entertainment activities held outside the family, such as going
to a bath center, beauty salon, pet hospital, internet bar, or teahouse,
or traveling, fishing, washing cars, playing cards, and worshipping.

Here we take the case in Heilongjiang Province as an example. Ac-
cording to the study subject’s travel records, we can tell that there were
10 close contact behavior incidents before his diagnosis, numbered (1)
to (10), among which (1) should be categorized as social entertainment,
and (4) to (6) should be categorized as family entertainment. The in-
formation does not mention that he had consciously quarantined himself
before his diagnosis.

“From 11:00 to 16:00 on January 25, (1) he walked to a mahjong hall
to play mahjong. At 16:00 on January 25, (2) he walked to Xie’s
barbecue shop near the south gate of the seventh primary school for
dinner. At 19:00, (3) he hitched a ride with the Case 8 to go home. On
January 26, he stayed at home. On the morning of January 31, (4) he
walked to his parents’ home (Wenhua Court) for dinner. At 11:30, (5) he went to
his uncle’s home (Wenhua Court) for dinner. At 14:00, he went home on
foot. On January 28, (6) he walked to his parents’ home (Yinquan Court)
without any other travel history. From 6:30 on January 29 to January
30, (7) he hitched a ride with his colleague to work and stayed there for
the entire night. From 8:00 to 10:00 on January 31, (8) he hitched a ride
with his colleague to go home. At 10:30, (9) he went to the Dashang
shopping mall, then he went home on foot. In the morning of February 1,
(10) he went to the supermarket downstairs. On February 2 to 3, he
stayed at home. At 12:00 on February 3, he was identified as a close
contact of Case 8. At 14:00, he got a fever and was sent to the fever clinic
of Qitaier People’s Hospital by ambulance.”
During the pandemic, as the media constantly reported new cases and developments throughout each day, the public could feel the seriousness of the problem [51]. Through media, people could better understand opinion about whether most people in the society can be trusted, with COVID-19 pandemic. We argue that social capital promotes personal moral restraint, thus leading to less close contact behavior. In the early phases of COVID-19, self-quarantine was considered the kind of behavior that required people to sacrifice personal interests for the welfare of the national interest; it can thereby reflect people’s actual compliance with social norms. By assessing whether people in an area comply with basic social norms in peacetime, we can determine whether they will comply with social norms during the epidemic prevention and control period.

Fig. 1. Newly confirmed cases in China and the key measures taken by the Chinese government (from January 20 to February 27, 2020): http://www.nhc.gov.cn/xcs/yqtb/list_gzbd.shtml

Table 1
Data screening process.

| Total number of samples | 5046 |
|-------------------------|------|
| Diagnosed before Journal 21 | (34) |
| From abroad | (84) |
| Missing travel records | (3556) |
| Missing social capital data | (113) |
| Final samples | 1259 |

The Chinese government took the decisive measure to close outbound traffic from Wuhan

The central Party leadership decided to set up a leading group for epidemic prevention and control

The Daily figure for new cases dropped to single digits in all other regions except Wuhan

Wuhan began to adopt measures to put “four categories of people” under classified management in designated facilities

Most provinces started to downgrade their public health emergency response level

The daily number of newly cured and discharged coronavirus patients exceeded that of newly confirmed cases

We follow Shen et al. [53]’s work and use the logarithm of Baidu Search Index—which can reflect people’s attention to certain information—to measure media publicity. The specific steps are as follows: after entering the keyword “novel coronavirus” into the search field of the Baidu Search Index, we set the time period from January 21, 2020 to February 27, 2020, and we then obtain the daily mean of this keyword in each province during this period.

As for public recognition, it is difficult to evaluate public awareness of epidemic prevention and control measures. Therefore, we construct a measure to investigate public recognition of basic social norms according to some items in the CGSS. The CGSS lists 10 kinds of behavior and asks each respondent’s opinion of them: (1) talking loudly in public; (2) smoking in public; (3) spitting in public; (4) littering; (5) saying dirty words; (6) cutting in line; (7) running red lights; (8) lack of punctuality; (9) dishonesty; (10) not caring for the sick and the aged. We argue that these items can largely reflect public acceptance of social norms and are also manifestations of civic responsibilities. Each item is scored on a 5-point Likert scale from “strongly agree” to “strongly disagree,” indicating that the higher the score, the more the respondents disapprove of such behavior. An analysis of the scale reliability coefficient of these 10 items shows a Cronbach’s alpha of 0.91. Finally, we can obtain the public recognition measure at the province-level by computing the overall mean of all respondents in each province.

4.3.3. Intervening variable

We argue that social capital promotes personal moral restraint, thus leading to less close contact behavior. In the early phases of COVID-19, self-quarantine was considered the kind of behavior that required people to sacrifice personal interests for the welfare of the national interest; it can thereby reflect people’s sense of social responsibility and public morality. Accordingly, we construct a dummy variable Quarantine to measure if a person has consciously obeyed social morality expectations during the prevention and control period. Quarantine equals 1 if self-quarantine is explicitly mentioned in an individual’s travel records, and 0 otherwise.

1 The administrative divisions of China’s provinces have been gradually adjusted and formed in the long history. This process takes full account of the geographical division, cultural tradition, and ethnic distribution of each region, which is the comprehensive effect of various social and cultural factors. Hence, each province can be seen as a relatively independent socio-cultural unit.

we use provincial-level data to conceptualize social capital. Because the level of social capital within each province is considered relatively similar, while the level of social capital varies greatly among provinces. And we want to figure out whether different levels of social capital in each province were responsible for people’s different responses to the COVID-19 pandemic.

The method of constructing social trust measures is in line with the approach of Huhe [48] and Rommerstrand [11]. The CGSS database attempts to explore people’s trust level by asking each respondent’s opinion about whether most people in the society can be trusted, with answers including strongly disagree, disagree, relative agree, strongly agree. We first construct a corresponding variable ranging from 1 to 5 to measure each respondent’s awareness of the social norms to be followed, because evidence shows that media publicity is one of the most important channels for raising people’s awareness of social norms. On the other hand, after perceiving social norms, people must be able to accept them [52]. Public recognition can reflect people’s actual compliance with social norms. By assessing whether people in an area comply with basic social norms in peacetime, we can determine whether they will comply with social norms during the epidemic prevention and control period.

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4.3.3. Intervening variable

We argue that social capital promotes personal moral restraint, thus leading to less close contact behavior. In the early phases of COVID-19, self-quarantine was considered the kind of behavior that required people to sacrifice personal interests for the welfare of the national interest; it can thereby reflect people’s sense of social responsibility and public morality. Accordingly, we construct a dummy variable Quarantine to measure if a person has consciously obeyed social morality expectations during the prevention and control period. Quarantine equals 1 if self-quarantine is explicitly mentioned in an individual’s travel records, and 0 otherwise.
4.3.4. Control variables

For the other control variables, the data does not disclose more detailed information about patients’ characteristics, so the individual-level demographic variables include only gender, age, age squared, a dummy variable that indicates whether the person returned from Hubei Province, and the number of days between January 21st and the date of his/her diagnosis. In addition, some province-level measures such as GDP growth rate, highway density, regional education level, and per capita disposable income are used to control for socio-economic conditions. The specific definitions of all variables are shown in Table 2.

4.3.5. Descriptive statistics

Fig. 2 depicts the average frequency of close contact behaviors in each province. As shown below, the database contains samples from 26 provinces of China, with the average frequency of each province ranging from 0 to 17. The samples from Beijing Province have the lowest frequency of close contact behaviors on average, while the samples from Shaanxi Province have the highest one.

Panel A of Table 3 presents summary statistics for each key variable. The table shows that the entire group of samples on average have been found to have 5.7 close contact behavior incidents before a COVID-19 diagnosis. During the sample period, some people had no close contact behavior, while some had as many as 27 close contact behavior incidents. In addition, 44.7 % of the samples engaged in entertainment activities, while 39.3 % engaged in family entertainment, and 14.8 % engaged in social entertainment. The mean values of Trust, Media, and Accept are 3.49, 10.17, and 4.27, respectively. Moreover, the samples have an average age of 43.14, 52.6 % are male, and 33.7 % had returned from Hubei Province. On average, these cases were infected 18 days after January 21st. Lastly, the mean value of Quarantine is 0.09, which indicates that only 9 % of the samples consciously observed self-quarantine at home before their diagnoses.

Panel B in Table 3 gives the pairwise correlation coefficients for the key variables. It shows that there is a significant negative correlation between Contacts and the three measures of social capital—Trust, Media, and Accept; FromHubei, GDPG, Traffic, and Income are negatively and significantly correlated with Contacts; Period has a positive and significant correlation with Contacts. Panel B also shows that the pairwise correlation coefficients between other control variables are substantially below 0.5, implying that our models do not suffer from high multicollinearity.

5. Results and discussion

5.1. Baseline results

We begin our analysis by estimating Eq. (1), using Trust, Media, and Accept as the major explanatory variables. The results are presented in Table 4. Column (1) shows that the effect of Trust on Contacts is found to be negative and statistically significant at the 1 % statistical level. Specifically, an interquartile increase in Trust from the 25th percentile to the 75th percentile in our data would reduce Contacts by 0.4 times (−2.47 × (3.54–3.38)). In a similar way, Columns (2)–(3) show that the coefficients for Media and Accept are both negative at the 1 % statistical level, which indicates that the two indicators of social norms also have a negative impact on close contact behaviors. Specifically, an interquartile increase in Media from the 25th percentile to the 75th percentile in our data would reduce Contacts by 0.89 times (−1.10 × (10.66–9.85)), and an interquartile increase in Accept from the 25th percentile to the 75th percentile in our data would reduce Contacts by 1.24 times (−6.53 × (4.36–4.17)). Based on the regression results, we can draw a preliminary conclusion that individuals in areas with higher social capital were less likely to be in close contact with others during the crucial phases of epidemic prevention and control.

In terms of control variables, as reported in Table 4, Male, Age, Period, and Education have positive effects on Contacts, while Age Square, FromHubei, and Traffic have negative effects on it. These indicate that: female and people who had returned from Hubei Province tended to exhibit fewer close contact behaviors; the later a person was diagnosed, the more close contact behaviors he/she had exhibited; there is a significant “inverse U” relationship between Age and Contacts, which means that the middle-aged people had a higher frequency of close contact behaviors, while the elderly and the children were less likely to be in close contact with others. In terms of socio-economic factors, the more developed the transportation in an area, individuals in there were more likely to be in close contact with others; the higher the level of education in an area, individuals in there were more likely to be in close contact with others.

5.2. Channel tests

Thus far, we have confirmed that social capital reduces individuals’ frequency of close contact behaviors during the early stage of an
epidemic. Then, we argued that social capital affects individual’s behavior by promoting self-restraint in accordance with social mores. Hence, in this subsection, we provide more direct evidence to support this argument by using a mediation model.

Since the results of Eq. (2) have been reported in Table 4, Table 5 shows only the estimated results of Eq. (3) and Eq. (4). Columns (1), (3), and (5) report the estimated results of Eq. (3), while Columns (2), (4), and (6) report the estimated results of Eq. (4). As it turns out, the results largely verify our hypothesis that social capital urges individuals to strengthen moral restraint and obey social morality, thus reducing their close contact behaviors. Taking social trust for instance, Column (1) shows that the coefficient for \( T_{trust} \) is statistically significant at the 10\% level, which indicates that people in areas with a higher social trust level were more likely to observe self-quarantine at home during the prevention and control period. Then, we add the intervening variable, namely Quarantine, into the regression. Column (2) shows that the estimated coefficients for \( T_{trust} \) and Quarantine are both negative and significant. Hence, we verify the existence of a mediating effect, and we posit that the individuals in areas with higher social capital were more likely to obey social morality, which refers to self-monitored quarantine in this epidemic. It was individuals’ compliance with social morality that effectively decreased their frequency of their close contact behaviors. Similarly, the results in Columns (3)–(6) also verify that media publicity and public recognition reduced close contact behaviors by strengthening people’s moral restraint, and we will not illustrate them in detail.

5.3. Further results and discussion

In the previous section, we have investigated the relationship between social capital and individuals’ frequency of close contact behaviors. However, different motivations may be driving these behaviors, which may result in varying degrees of influence on epidemic prevention and control. Therefore, in this subsection, we consider the...
heterogeneity of close contact behaviors by replacing the primary dependent variable with dummy variables for different types of close contact behaviors.

When an individual’s close contact behavior is associated with entertainment activities, we define a dummy variable, namely Entertainment, to further identify the effect of social capital on people’s response to control measures. According to the degree of hazards these entertainment activities bring to society, we divide them into family entertainment and social entertainment.

Table 6 presents the empirical evidence. First, Columns (1)-(3) report the relationship between social capital and entertainment. The coefficient for Trust is not significant, while the coefficients for Media and Accept are both statistically significant at the 1 % level. The results reveal that individuals in areas with wider media publicity about social norms and a higher level of public recognition of social norms were less likely to engage in entertainment activities. Then, Columns (4)-(6) report the effect of social capital on an individual’s family entertainment. We still find an insignificant correlation between social trust and family entertainment, while the two indicators of social norms still produce negative impacts, statistically significant at the 5 % level and the 10 % level, respectively. Finally, Columns (7)-(9) show the regression of social capital on social entertainment. The coefficient for Accept remains significant, and the coefficients for Trust and Media are insignificant.

In this section, we clarify certain points. First, when it comes to entertainment activities, social trust shows an insignificant effect on

Table 6

Further tests based on the heterogeneity of close contact behaviors.

| Variables | Entertainment | Family-Ent | Social-Ent |
|-----------|---------------|------------|------------|
| Trust     |               |            |            |
| Accept    |               |            |            |
| Female    |               |            |            |
| Income    |               |            |            |
| GDP       |               |            |            |
| N         |               |            |            |
| R²/Pseudo-R² |            |            |            |

Notes: The corresponding t-statistics are adjusted by White Heteroscedasticity and reported in parentheses. Significance levels are indicated by ***, **, * and correspond to the 1 %, 5 %, and 10 % significance levels, respectively.

Table 5

Results of mechanism tests.

| Variables | Quarantine (1)Logit | Contacts (2)Logit | Quarantine (3)Logit | Contacts (4)OLS | Quarantine (5)Logit | Contacts (6)Logit |
|-----------|---------------------|------------------|---------------------|----------------|---------------------|------------------|
| Trust     | 1.164*** (1.957)    | -2.293** (-2.524) | 1.318*** (3.082)    | -0.930* (-1.886) | 1.018 (1.386)      | -6.395*** (-7.373) |
| Media     | -0.158 (-0.765)     | 0.704** (2.308)   | -0.148 (0.714)      | 0.706** (2.312)  | -0.156 (-0.758)    | 0.703** (2.339)   |
| Accept    | -0.009 (-0.293)     | 0.215** (3.635)   | 0.000 (0.008)       | 0.210** (3.146)  | -0.008 (-0.273)    | 0.199** (5.967)   |
| Age       | -0.001 (0.034)      | -0.270** (-7.399) | -0.013 (0.529)      | -0.264** (-7.130) | -0.001 (-0.030)    | -0.258** (-7.140) |
| PromTrust | 1.128*** (9.411)    | -2.539*** (8.078) | 1.033*** (4.411)    | -2.416*** (-7.802) | 1.083** (4.636)    | -2.337*** (7.731) |
| Period    | 0.052*** (2.991)    | 0.096*** (3.473)  | 0.050*** (2.775)    | 0.098*** (3.605)  | 0.049*** (2.837)   | 0.112*** (4.088)  |
| Traffic   | 0.118 (0.652)       | -1.118*** (-3.434) | 0.152 (0.769)      | -1.165*** (-3.623) | 0.335 (1.568)      | -2.116*** (6.388) |
| Education | -2.605 (0.772)      | 15.923** (2.925)  | 13.192** (2.297)    | 3.104 (0.398)     | -2.673 (0.759)     | 17.905*** (3.390) |
| Income    | 2.759*** (4.218)    | -2.166** (-2.205) | -0.078** (-0.288)  | 0.516 (0.388)     | 2.279*** (3.871)   | -0.789 (-0.881)   |
| _cons     | -35.030*** (-4.764) | 29.191*** (2.655) | -17.822*** (-2.954) | 2.663 (0.268)     | -30.674*** (-4.428) | 32.814*** (3.732) |

Notes: The corresponding t-statistics are adjusted by White Heteroscedasticity and reported in parentheses. Significance levels are indicated by ***, **, * and correspond to the 1 %, 5 %, and 10 % significance levels, respectively.
individuals’ responses, but media publicity and public recognition still show negative and significant effects on such responses. This indicates that with the increasing severity of close contact behavior, social norms have a consistent effect on decreasing the prevalence of such behavior; however, the role played by social trust is diminished. Second, we argue that family entertainment is relatively forgivable, because the outbreak of COVID-19 occurred during the Spring Festival holiday, which is regarded as the most important occasion for family reunions in China. Although gathering activities were discouraged, it is understandable that people organized family parties for annual reunions. As a result, public recognition of social norms had less effects on such family gatherings. Third, individuals’ engaging in social entertainment will bring about a wider spread of the virus and pose a more severe threat to public, which means that social entertainment runs counter to the requirements of epidemic prevention and control to a greater degree than family entertainment. Giving up on a variety of social entertainment activities requires more self-discipline. Therefore, improving public recognition of social norms is more effective than media publicity in preventing social entertainment.

5.4. Endogeneity

The baseline results show that social capital reduces the frequency of individuals going out and having close contact with others. However, omitted variable bias could make it challenging to infer a causal relation between social capital and close contact behaviors. To address the endogeneity concerns, we employ a 2SLS instrumental variables approach. It is generally known that a valid instrumental variable has to satisfy two criteria: (1) the instrument is correlated with the endogenous variable, and (2) the instrument affects the dependent variable only indirectly. Based on these criteria, we exploit two instrumental variables, namely femininity-masculinity (Fem-male) and blood donation (Blood), in each province to instrument the potentially endogenous variables. First, we refer to the study of Hoi et al. [54] to use femininity-masculinity as an instrument for social capital, which measures the relative strength of feminine social values against masculine social values. According to Hofstede [55], masculine values stress the importance of material success, while feminine values stress the importance of building ties with people and helping others. It has been proven that femininity-masculinity is positively correlated with social capital [54]. Specifically, we construct this measure based on five items related to people’s views on gender roles in the CGSS database. Using a weighted average method, we calculate each respondent’s score on the five questions. Then, we compute the average score of all respondents in each province, so that we can obtain the measure of femininity-masculinity at the province-level. Second, according to Guiso et al. [4], blood donation is also strongly correlated with social capital. Thus, we use it as another instrument for social capital. As for the exclusion restriction, in general it is not possible to test whether or not the instruments are uncorrelated with the error term. We argue that the femininity-masculinity and blood donation both are not directly related to people’s responses to the COVID-19 control measures, but do affect the way people behave in this pandemic through social capital.

The first-stage results reported in Columns (1), (3), and (5) of Table 7. Except for Fem-male, shows no significant effects on Media. We find that our instruments all correlate with social capital, satisfying the first criteria. In addition, the excluded F-statistic in all columns exceeds the rule-of-thumb threshold of 10 suggested by Staiger and Stock [56], indicating that our instruments do not suffer from the weak instrument problem. The second-stage results presented in Columns (2), (4), and (6) show that the estimated coefficients for Trust, Media, and Accept are all negative and significant. These results are consistent with our prior belief that social capital can decrease people’s frequency of close contact behaviors.

5.5. Robustness tests

To further support our results, we conduct several robustness checks in this subsection. First, we include samples from Hainan Province. Previously, we deleted samples from Hainan Province because of the unrepresentative social capital data. Here, considering that Hainan Province once belonged to Guangdong Province, we use the data from Guangdong Province to replace the missing Hainan data. Second, we exclude samples without age or gender information. Previously, to enlarge the sample size, we replaced the missing values of age and gender with their mean values. We re-estimate our baseline regression for these two subsamples. The results in Table 8 show that in all cases the effect of social capital remains statistically significant, confirming that our main findings remain unchanged. In addition, the direction of the coefficients for the other control variables remain fairly constant.

6. Conclusions and discussions

Different from previous studies that have focused mainly on the link between social capital and the COVID-19 response at the place level, this paper investigates the association between contextual social capital and the COVID-19 response at the individual level. There is little knowledge available about the causal pathways linking social capital with individuals’ responses to COVID-19. Although several potential mechanisms have been proposed, most of these studies lack strict theoretical deduction and empirical tests. In this paper, we consider self-restraint in terms of social morality as the intermediate mechanism, and we validate this supposition through the mediating effect analysis. We use an instrumental variable regression model to tackle the problem of endogeneity, thus making up for the methodological weaknesses of prior literature.

Based on the anonymized and detailed travel records of Chinese residents who were diagnosed with COVID-19, our paper investigates the impact of social capital on individuals’ responses to control measures during the early stage of the COVID-19 pandemic in China. We find that social capital is negatively and significantly related to people’s frequency of close contact behaviors. After addressing the inherent endogeneity issues and conducting several robustness tests, our main results remain consistent. Further, we analyze the underlying mechanism for the impact of social capital and find that social capital urges individuals to strengthen moral restraint and comply with social morality, thus decreasing the prevalence of close contact behaviors during the crucial stage of epidemic prevention and control. In addition, the results show that social capital significantly decreases people’s frequency of going out for entertainment. We further distinguish the impact of social capital on different kinds of entertainment and find that social trust shows no significant effect on all types of entertainment activities. Media publicity and public recognition both play an important role in reducing people’s involvement in family entertainment, with media publicity having the greater impact. As for social entertainment, only by improving public recognition of social norms can we effectively prevent people from participating in social entertainment activities during the COVID-19 pandemic.

Some limitations in this study should be noted. First, our data has some inherent shortcomings because of its uniqueness. On the one hand, the sample could be biased given that this study is based on patient cases. In reality, the general population that was not exposed to COVID-
might act differently from the infected people. Therefore, our sample may have limited generalizability to other populations. On the other hand, we can only observe the behaviors of people who became infected with COVID-19, but we cannot observe the behaviors of those who succeeded in not becoming infected through social capital, so this remains a subject worth further attention. Second, ideally, more accurate of social capital identification. Fourth, the missing travel records reduce the sample size of our dependent variable, causing our results: informal systems have an increasingly profound and lasting chance findings.

In addition, there are some important implications that stem from the work reported in this paper. First, the evidence posed a worldwide threat to human lives and health, the most urgent interest or personal relationships that could have appeared to influence our results: informal systems have an increasingly profound and lasting chance findings. FromHubei

| Variables | (1)First stage | (2)Second stage | (3)First stage | (4)Second stage | (5)First stage | (6)Second stage |
|-----------|---------------|----------------|---------------|----------------|---------------|----------------|
| Male      | 0.004 (0.497) | 0.745** (2.280) | 0.011 (0.566) | 0.758** (2.396) | 0.005 (0.793) | 0.726** (2.412) |
| Age       | 0.000 (0.174) | -0.258** (-6.316) | 0.008** (2.691) | -0.214** (-4.925) | 0.001 (0.609) | -0.254** (-7.052) |
| FromHubei | -0.041*** (-3.596) | -3.179** (-8.342) | 0.044** (1.777) | -2.254** (-6.373) | 0.003 (0.375) | -2.482** (-8.323) |
| Period    | -0.022** (-2.723) | 0.075** (2.505) | -0.003 (-1.389) | 0.093*** (3.184) | 0.002*** (3.311) | 0.107** (3.846) |
| GDPG      | 1.066*** (3.473) | 21.167*** (3.014) | 2.897** (2.785) | 17.748 (2.476) | -1.954** (-8.758) | 5.259 (0.863) |
| Income    | -0.611*** (-13.337) | -8.240** (-4.816) | 1.562** (15.953) | -10.964** (2.456) | -0.424** (14.255) | -1.066 (1.217) |
| R²        | -0.002** (10.742) | 0.208*** (5.483) | 0.075** (2.505) | 0.091* (1.774) | 0.208*** (5.483) | 0.091* (1.774) |
| N         | 1372           | 1372           | 1372           | 1372           | 1372           | 1372           |

Notes: The corresponding t-statistics are adjusted by White Heteroscedasticity and reported in parentheses. Significance levels are indicated by ***, **, * and correspond to the 1 %, 5 %, and 10 % significance levels, respectively.
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References

[1] R.D. Putnam, Tuning in, tuning out: the strange disappearance of social capital in America, Ps. Political Sci. Polit. 28 (4) (1995) 664–683.
[2] R.D. Putnam, The prosperous community: social capital and public life, Am. Prospect 4 (13) (1993) 35–42.
[3] J.S. Coleman, Social capital in the creation of human capital, Am. J. Sociol. 94 (1988) 95–120.
[4] L. Guiso, P. Sapienza, L. Zingales, The role of social capital in financial development, Am. Econ. Rev. 94 (3) (2004) 526–556.
[5] B.D. Putnam, Making democracy work: civic traditions in modern Italy, Contemp. Sociol. 23 (3) (1993) 258.
[6] P. Bourdieu, The Forms of Capital, Greenwood, New York, 1986.
[7] K. Newton, Social capital and democracy, Am. Behav. Sci. 40 (5) (1997) 575–586.
[8] C. Wu, Social capital and COVID-19: a multidimensional and multilevel approach, Chin. Sociol. Rev. 53 (1) (2020) 27–54.
[9] T.F. Coleman, C. Hempel, Computing a trust region step for a penalty function, SIAM J. Stat. Comput. 11 (1) (1990) 180–201.
[10] B. Ronnenstrand, Social capital and immunization against the 2009 a(H1N1) pandemic in the American states, Publ. Health 128 (8) (2014) 709–715.
[11] T. Harpham, E. Grant, E. Thomas, Measuring social capital within health surveys: key issues, Health Pol. Plann. 17 (1) (2002) 106–111.
[12] A. Varshney, Ethnic Conflict & Civic Life: Hindus and Muslims in India, Yale University Press, New Haven, 2002.
[13] H.K. Koh, R.O. Cadigan, Social Capital and Health, Springer, New York, 2008.
[14] A. Wilkinson, J. Fairhead, Comparison of social resistance to Ebola response in Sierra Leone and Guinea suggests explanations lie in political configurations not culture, Crit. Publ. Health 27 (1) (2017) 14–27.
[15] J.S. Hurlbert, V.A. Haines, J.J. Beggs, Core networks and tie activation: what kinds of routine networks allocate resources in nonroutine situations? Am. Socio. Rev. 65 (4) (2000) 598–618.
[16] D.P. Aldrich, The power of people: social capital’s role in recovery from the 1995 Kobe earthquake, Nat. Hazards 56 (3) (2011) 595–611.
[17] W.N. Adger, T.P. Hughes, C. Folke, J. Rockstrom, Social-ecological resilience to coastal disasters, Science 309 (5737) (2005) 1036–1039.
[18] F.H. Norris, S.P. Stevens, B. Pfefferbaum, K.F. Wyche, R.L. Pfefferbaum, Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness, Am. J. Community Psychol. 41 (2–3) (2008) 127–150.
[19] B.M. Reininger, M.H. Rabrab, M. Lee, Z. Chen, S.R. Alam, J. Pope, B. Adams, Social capital and disaster preparedness among low income Mexican Americans in a disaster prone area, Soc. Sci. Med. 83 (1) (2013) 50–60.
[20] E. Egedahl, R. Lidskog, Risk, communication and trust: towards an emotional understanding of trust, Publ. Understand. Sci. 23 (6) (2014) 703–717.
[21] S.H. Ali, K. Wells, J.R. Rose, Contextualizing risk perception and trust in the community-based response to ebola virus disease in Liberia, Int. J. Environ. Res. Publ. Health 18 (6) (2021) 3270.
[22] B.M. Reininger, M.H. Rabrab, M. Lee, Z. Chen, S.R. Alam, J. Pope, B. Adams, Social capital and disaster preparedness among low income Mexicans in a disaster prone area, Soc. Sci. Med. 83 (1) (2013) 50–60.
[23] N.C. Bronfman, P.C. Gistemas, E. López-Vázquez, L.A. Cifuentes, Trust and risk perception of natural hazards: implications for risk preparedness in Chile, Nat. Hazards 81 (1) (2016) 307–327.
[24] S. Folloti, F. Pagliero, Trust your peers! How trust among citizens can foster collective risk prevention, Int. J. Dis. Risk Reduct. 36 (2019), 101082.
[25] R.A. Blair, B.S. Morse, L.L. Tsai, Public health and public trust: survey evidence from the Ebola virus disease epidemic in Liberia, Soc. Sci. Med. 172 (2017) 89–97.
[26] M. Deurenberg-Yap, L.L. Foo, Y.Y. Low, S.P. Chan, K. Vijaya, M. Lee, The Singaporean response to the SARS outbreak: knowledge sufficiency versus public trust, Health Promot. Int. 20 (4) (2005) 320–326.
[27] B. Ronnenstrand, Contextual generalized trust and immunization against the 2009 a(H1N1) pandemic in the American states: a multilevel approach, SSM Popul. Health 2 (2016) 622–639.
[28] D.P. Aldrich, Building Resilience:Social Capital in Post-Disaster Recovery, University of Chicago Press, Chicago, 2012.