

Exploring Factors that Influence Citizens' Voluntary Quarantine Compliance about Future Pandemics

CHIN-CHANG TSAI, CHIAKO HUNG & WEI-NING WU

Abstract To cope with pressing challenges posed by a pandemic, governments cannot merely rely on coercive power; rather, governments must know why and why not citizens voluntarily comply with policy measures. Building on previous research, this study examines the drivers of citizens' voluntary quarantine compliance from two perspectives: citizens' perceptions of risks and citizens' perceptions of government. We find that citizens' perceived risks significantly drive their voluntary quarantine compliance about a future pandemic. However, as for citizens' perceptions of government, only citizens' trust in government authority and trust in government responsiveness are positively related to their voluntary quarantine compliance. Government transparency is not positively related to citizens' voluntary quarantine compliance. Based on the results, we conclude that governments can facilitate citizens' voluntary quarantine compliance by lowering citizens' compliance costs, justifying their authority actions, highlighting their rapid efforts to fight pandemics, and preventing media exaggeration.

Keywords: • voluntary policy compliance • voluntary quarantine • risk perception • trust in government • media • transparency

CORRESPONDENCE ADDRESS: Chin-Chang Tsai, Ph.D., Associate Professor, National Sun Yat-sen University, Institute of Public Affairs Management, No.70 Lien-hai Road, Kaohsiung, Taiwan, e-mail: cctsay0624@mail.nsysu.edu.tw. ChiaKo Hung, Ph.D., Associate Professor, University of Hawai'i at Mānoa, Public Administration Program, 2424 Maile Way, Saunders Hall 631, Honolulu, HI 96822, USA, e-mail: chung35@hawaii.edu. Wei-Ning Wu, Ph.D., Associate Professor, National Sun Yat-sen University, Institute of Public Affairs Management, No.70 Lien-hai Road, Kaohsiung, Taiwan, e-mail: weiningwu@mail.nsysu.edu.tw.

[https://doi.org/10.4335/21.4.833-852\(2023\)](https://doi.org/10.4335/21.4.833-852(2023))
ISSN 1581-5374 Print/1855-363X Online © 2023 Lex localis
Available online at <http://journal.lex-localis.press>.

1 Introduction

Citizens' voluntary policy compliance is a key issue in times of pandemics (Guan, Bao, Liu, & Raymond, 2021; Moon, 2020). In particular, voluntary quarantine is considered an efficient measure for governments to reduce pandemic influenza transmission (Oruc, Baxter, Keskinocak, Asplund, & Serban, 2021). However, even though voluntary quarantine might benefit governments in terms of efficiency, it could bring greater inconvenience or compliance burdens to citizens (Brooks et al., 2020). For example, citizens who voluntarily practice self-quarantine might experience salary loss due to lack of paid leave or various depressive symptoms. These make voluntary quarantine difficult for citizens to achieve and make governments wonder what would drive citizens to comply with quarantine recommendations. Moreover, pandemics with different pathogens and vectors have occurred throughout human history (Piret & Boivin, 2021) and future pandemics could bring about more uncertainty and risks. Thus, this study's aim is to understand factors that influence citizens' voluntary compliance with policy measures about a future pandemic.

Prior research has identified several factors influencing voluntary policy compliance in routine policy domains, such as self-interest consideration (Meier & Morgan, 1982; Porumbescu, Lindeman, Ceka, & Cucciniello, 2017), sense of citizenship (Braithwaite & Makkai, 1994; May, 2004; Porumbescu et al., 2017), trust in government (Braithwaite & Makkai, 1994; Im, Cho, Porumbescu, & Park, 2014), transparency (Porumbescu et al., 2017), perceived policy or government legitimacy (Meier & Morgan, 1982), and social acceptance of personal behaviors (May, 2004; Meier & Morgan, 1982; Porumbescu et al., 2017). Moreover, several studies have addressed determinants of voluntary compliance with epidemic prevention measures, such as perceived susceptibility (Barr et al., 2008), perceived severity of illness (Prati, Pietrantonio, & Zani, 2011), and perceived media exaggeration (Prati et al., 2011; Rubin, Amlôt, Page, & Wessely, 2009). Despite that, little empirical investigation has explored how these or other potential factors specifically influence citizens' willingness to voluntarily comply with quarantine measures for future pandemics. Given the unpredictability and risks of pandemics, governments at central and local levels cannot wait until the arrival of a pandemic to understand citizens' perspectives and develop appropriate response strategies. Therefore, addressing this topic is an urgent issue in current research. This study asks the following research question: What could impact citizens' voluntary quarantine compliance when they think of a future pandemic?

This study's novelty is shown in the specific exploration of drivers of citizens' voluntary quarantine compliance as well as the focus on citizens' perspectives about future pandemics. First, compared to previous studies that investigate citizens' voluntary compliance about routine policies (May, 2004; Meier & Morgan, 1982; Porumbescu et al., 2017), we specifically focus on quarantine compliance policy

widely used and considered by many governments during a pandemic. Second, different from prior research that addresses current pandemic prevention (Barr et al., 2008; Prati et al., 2011), we focus on exploring how citizens may act regarding future pandemics. This focus enables us to more precisely capture the drivers of citizens' voluntary quarantine compliance without the influence from governments' coercive actions, and then we could offer more effective practical suggestions for future pandemic response preparation.

This study has three objectives. First, we seek to explore the literature to identify key drivers of citizens' voluntary quarantine compliance. Second, we seek to empirically test the relationships between those drivers and citizens' voluntary quarantine compliance. Third, we seek to offer theoretical contributions and practical suggestions for central and local governments.

To answer the research question, we first build on previous work regarding citizens' compliance (Meier & Morgan, 1982; Porumbescu et al., 2017; Weaver, 2014) to develop possible determinants of voluntary quarantine compliance into two categories: citizens' perceptions of risks and citizens' perceptions of government. Second, we employ a Taiwan social change survey that investigates citizens' perceptions of a new type of influenza, conducting statistical analysis to examine our hypotheses. The results suggest that citizens' risk perceptions (perceived susceptibility, perceived severity, perceived media exaggeration, and perceived social pressure) are associated with citizens' willingness to practice self-quarantine. Moreover, citizens' trust in government authority and trust in government responsiveness are positively related to citizens' voluntary compliance with self-quarantine recommendations, whereas citizens' perceived government transparency is not significantly associated with their willingness to voluntarily self-quarantine.

This study offers both theoretical and practical contributions. For theoretical contributions, our findings show that traditional determinants of voluntary policy compliance in prior research still matter in citizens' willingness to follow self-quarantine recommendations (May, 2004; Meier & Morgan, 1982; Weaver, 2014), but those factors influence citizens in a way that highlights the risky nature of pandemic. Moreover, our findings highlight the importance of information delivery from both government and the media in fighting future pandemics. Another theoretical contribution is the use of Taiwan's data. The Taiwan government has successfully collaborated with citizens to deal with several kinds of pandemic influenza, including SARS, H1N1, and COVID-19 (L.-Y. Liu, Wu, & McEntire, 2021). Thus, examining Taiwan citizens' perceptions of risk and government offers significant implications for other countries and future pandemics.

As for practical contributions, we suggest that central and local governments could contribute to citizens' willingness to voluntarily comply with quarantine measures in several ways. First, since citizens' trust in government authority is positively

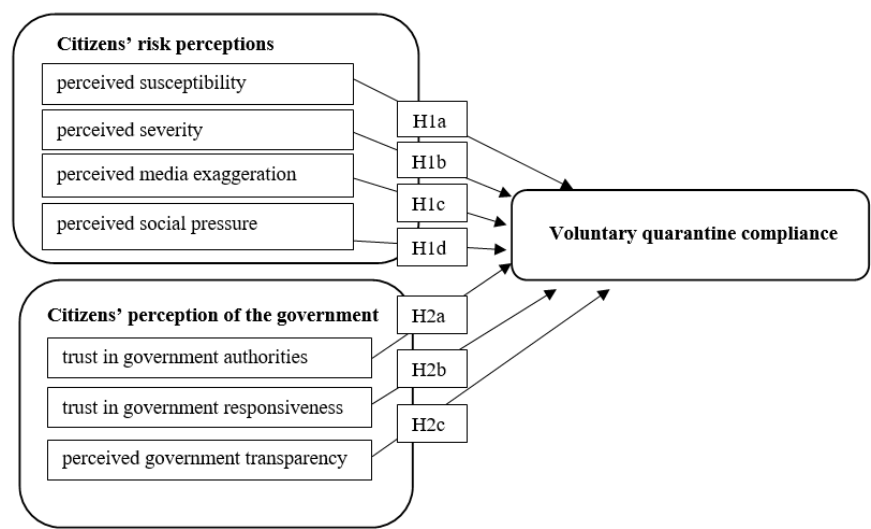
related to citizens' voluntary quarantine compliance, governments could develop clear and accessible pandemic influenza prevention guidelines for citizens to weather a health crisis (French & Raymond, 2009). Second, because trust in government responsiveness is also associated with citizens' voluntary quarantine compliance, governments need to make citizens' aware during a pandemic that that they are actively responding or will quickly respond to the pandemic with effective policy packages (French, 2011). Third, because of the potentially negative impact of media exaggeration, central and local governments need to work with the media in delivering correct pandemic-related information.

2 Literature overview

While prior research has addressed various determinants of citizen compliance, less is known about why citizens voluntarily comply with quarantine recommendations when thinking of future pandemics. In this section, this study reviews previous studies in different policy domains and categorizes related determinants of voluntary quarantine compliance into two groups: citizens' perceptions of risks and citizens' perceptions of government. We discuss these two groups and formulate hypotheses based on the literature.

Figure 1 illustrates our conceptual model. The dimension of citizens' risk perceptions has four main factors, and the dimension of citizens' perceptions of the government has three main factors.

Figure 1: Conceptual model



2.1 Citizens' risk perceptions

Citizens' risk perceptions could serve as a main dimension that impacts citizens' willingness to comply with non-coercive policy recommendations amid the pandemic (Y. Fu, Ma, & Wu, 2020). The current COVID-19 pandemic could even become a "new normal state of risks" that requires more effective policy responses as well as citizen participation (Moon, 2020; Yang, 2020). Studies have found that citizens' risk perception could be associated with voluntary compliance with epidemic prevention measures (Barr et al., 2008; Bish & Michie, 2010). For instance, according to data in Australia, individuals with greater perceived susceptibility (such as the perceived likelihood of getting the infectious disease) are more likely to comply with quarantine restrictions (Barr et al., 2008). Likewise, those who consider infection as a more serious health issue (perceived severity of illness) are more willing to act in accordance with public agencies' recommendations (Prati et al., 2011). These empirical results also support one frequently-used theory in public health studies: the health belief model, which argues that perceived susceptibility and perceived severity explain health-related behaviors (Rosenstock, 1974). Therefore, we expect that citizens with higher levels of perceived susceptibility and severity are more likely to voluntarily comply with self-quarantine recommendations for a future pandemic. We develop our first two hypotheses as follows:

H1a: Citizens' perceived susceptibility is positively associated with their voluntary quarantine compliance for a future pandemic.

H1b: Citizens' perceived severity is positively associated with their voluntary quarantine compliance for a future pandemic.

Moreover, citizens' risk perceptions of the pandemic could also link to the broader social aspect, including citizens' perspectives on the media and the issue of social pressure. First, in an era of information explosion, the media greatly shapes citizens' risk perception of infectious diseases. Prior research has examined the relationship between media exaggeration and citizens' tendency to adopt recommended behaviors (Prati et al., 2011; Rubin et al., 2009). For example, by conducting a survey in the UK, Rubin and colleagues (2009) find that if individuals have higher levels of believing the media has over-exaggerated the risks of getting swine flu, they are less likely to make recommended changes to their behaviors. Likewise, the results of a survey conducted by Prati and colleagues (2011) in Italy also support that media exaggeration could lead to a low level of compliance with behavioral recommendations. While these studies find relationships between media exaggeration and recommended behavioral changes, they do not test whether citizens' perceptions of media reports specifically influence their intention to comply with quarantine recommendations that limit personal freedom. We expect

that citizens' judgment of media reports on the pandemic greatly influences their willingness to voluntarily comply with recommendations that bring greater inconvenience. Thus, we develop the following hypothesis:

H1c: Citizens' perceived media exaggeration is negatively associated with their voluntary quarantine compliance for a future pandemic.

Second, the social aspect also includes the considerations of social pressure or acceptance, especially during pandemic times (Cava, Fay, Beanlands, McCay, & Wignall, 2005; DeWall & Bushman, 2011). People usually do not want to hear negative gossip about themselves or encounter social exclusion. Thus, if people get infected with a certain infectious disease, they may tend to let other people (e.g., neighbors) know this fact and are more willing to comply with self-quarantine recommendations. For example, studies have identified that social pressure influences willingness to comply with recommended preventive measures (Cava et al., 2005; Tang & Wong, 2004). Analyzing a large-scale survey done in Guangdong Province, China, Zhang and colleagues (2020) also find that social pressure (from neighbors and the health department) is an important factor influencing willingness to self-isolate. Hence, we develop another hypothesis related to the social dimension of risk perception:

H1d: Citizens' perceived social pressure is positively associated with their voluntary quarantine compliance for a future pandemic.

2.2 Citizens' perceptions of the government

Apart from citizens' individual risk perception, citizens' perception of the government is another core dimension impacting citizens' likelihood to voluntarily comply with government recommendations amid a pandemic. Specifically, we hold that citizens' voluntary compliance for a future pandemic may be related to citizens' trust in government and perceived transparency.

First, prior research has identified trust in government as a key predictor of citizen compliance (Braithwaite & Makkai, 1994; Im et al., 2014). During a pandemic, citizens' trust in governmental authority to protect the broader public interest is crucial for successful crisis management (Bish & Michie, 2010; Deslatte, 2020; Prati et al., 2011). For example, Christensen and Lægrend (2020) examine how the Norwegian government tackles the pandemic crisis, finding positive connections between trust in government authority and support from citizens. Moreover, Zaki and colleagues (2022) find evidence that citizens' higher trust in government is positively related to their respect for non-compulsory policy recommendations. Therefore, we expect that when thinking of a future pandemic crisis, citizens who have higher levels of trust in government authority are more likely to practice self-quarantine.

Furthermore, effective crisis and emergency management require rapid government response (Kapucu, 2008). In the literature, trust in government responsiveness is also related to citizens' compliance or participation (French, 2011; Moon, 2020; Prati et al., 2011). For example, Prati and colleagues (2011) find that individuals' trust in the institutional response to the outbreak could explain their adherence to two recommended behaviors (using tissues when sneezing, and accepting vaccines). When encountering various challenges, governments not only need to develop comprehensive response plans (French, 2011), but also must respond agilely and flexibly to earn greater citizens' trust and voluntary cooperation (Moon, 2020).

Overall, we seek to focus on examining how specific types of trust in government (citizens' trust in government authority and responsiveness) influence citizens' willingness to practice self-quarantine. We hypothesize a positive relationship between these specific types of trust in government and citizens' voluntary quarantine compliance. The hypotheses read:

H2a: Citizens' trust in government authority is positively associated with citizens' voluntary quarantine compliance for a future pandemic.

H2b: Citizens' trust in government responsiveness is positively associated with citizens' voluntary quarantine compliance for a future pandemic.

Second, prior research has demonstrated the positive impact of perceived government transparency on citizen compliance in general and in pandemic crises (French, 2011; Moon, 2020; Porumbescu et al., 2017). For instance, by employing an online survey experiment, Porumbescu and colleagues (2017) find that policy transparency (which in their study refers to the intelligibility of policy information) is positively related to policy understanding—which, in turn, has a positive relationship with citizens' intentions to voluntarily comply with a policy. Moreover, during times of crisis, citizens may experience considerable anxiety and thus require more relevant information offered by the government. Governments need to develop better communication and coordination mechanisms that help the public understand the crisis (Christensen & Lægreid, 2020). Several studies have pointed out the importance of timeliness, openness and transparency in risk communications between citizens and governments (Bish & Michie, 2010; French, 2011; Vaughan & Tinker, 2009). While the 2020 COVID-19 pandemic keeps impacting the world, many countries' information disclosure strategies help earn public trust and coordination. For example, two recent studies (Y. Fu et al., 2020; B. Liu, Lin, Wang, Chen, & Zhang, 2020) find that Chinese local governments' information disclosure could reduce citizens' panic and increase citizens' trust in government and compliance behaviors. Likewise, Moon (Moon, 2020) discusses the South Korean government's rapid response and highlights the importance of transparency in earning greater public trust and voluntary participation. In sum, we expect if citizens

perceive the government as more transparent, they are more likely to comply with government recommendations. Thus, we develop the following hypothesis:

H2c: Citizens' perceived government transparency is positively associated with citizens' voluntary quarantine compliance for a future pandemic.

3 Research

3.1 Data

We employed the 2013 Taiwan Social Change Survey (TSCS) data collected by Academia Sinica, Taiwan (Y.-C. Fu, 2016) in this study. Funded by Taiwan's National Science Council, the TSCS project has traced Taiwan's long-term social changes since 1985. The survey polled Taiwan citizens 18 years old or above using stratified three-stage probability proportional to size sampling methods. The face-to-face surveys were conducted between September and December 2013 and the number of completed questionnaires was 2,005. The overall response rate was 53 percent.

We chose the TSCS data because of three reasons. First, the survey investigated citizens' attitudes toward a future new type of influenza, which fulfils the purpose of this study that seeks to understand citizens' intention to follow quarantine recommendations about future pandemics. Second, Taiwan has performed relatively well in fighting the COVID-19 pandemic (L.-Y. Liu et al., 2021). The Taiwan data could offer other countries insight into increasing citizen voluntary compliance with health policy recommendations. Third, the TSCS data allow us to examine more variables in our concept model, such as trust in government and perceived transparency. Hence, it could help a more comprehensive analysis of our concept model and offer insights for different pandemic conditions.

3.2 Measures

Dependent variable. Table 1 presents our measures. Our dependent variable is citizens' voluntary quarantine compliance about a future pandemic. We measure this variable using a survey question asking whether respondents would stay home for at least 10 days following contact with people infected with a new type of influenza.

Independent variables. The potential drivers of citizens' voluntary compliance with self-quarantine recommendations are categorized into two groups in this study: citizens' perceptions of risks and citizens' perceptions of government. Four independent variables fall under the risk dimension: perceived susceptibility, perceived severity, perceived media exaggeration, perceived social pressure. Three independent variables fall under the government dimension: trust in government

authority, trust in government responsiveness, and perceived government transparency (see Table 1 for measurement details).

Control variables. Citizens' individual characteristics may affect their perception of risk and the government (Bish & Michie, 2010). To control for these potential effects, we include gender, age, education level, job status, current marital status, and perceived social level variables in our model (Bish & Michie, 2010; Taylor et al., 2009; Weaver, 2014). Moreover, an individual's social network could also influence willingness to comply with self-quarantine recommendations, considering the possible help individuals may get from their social network (Weaver, 2014). Thus, we include as control variables time to connect with relatives or friends, contacts per day, and living arrangements. In addition, citizens' understanding of policy-related knowledge could impact voluntary policy compliance during times of crisis (Webster et al., 2020). We include two variables related to policy understanding during times of crisis: emergency evacuation rehearsal participation and belief in government announcements regarding policy conflicts. See Table 1 for measurement details.

Table 1: Summary of indicator measurements

Variables	Measurement
Dependent Variable	
Voluntary quarantine compliance	If you have contact with people who get infected with a new type of influenza, government officials recommend that you stay home for at least 10 days. Do you think you could do that? (Yes=1; Otherwise=0)
Independent Variables	
Perceived susceptibility	In general: How likely do you think it is that you will get infected with a new type of influenza? (Likely=3; Neither likely nor unlikely=2; unlikely=1) Traveling for leisure or business: How likely do you think it is that you will get infected with a new type of influenza when you travel abroad for leisure or business? (Likely=3; Neither likely nor unlikely=2; Unlikely=1)
Perceived severity	How serious do you think it is to get infected with a new type of influenza? (Yes=1; Other responses=0)
Perceived media exaggeration	Do you think that media reports on new types of influenza are exaggerated or conservative? (Exaggerated=1; Other responses=0)
Perceived social pressure	If you get infected with a new type of influenza, would you let your neighbor know about this fact? (Definitely no=1; No=2; Yes=3; Definitely yes=4)
Trust in government authority	Do you agree or disagree that the government should compel the screening of foreigners who are from the affected region where people get infected with a new type of influenza? (Agree=1; Other responses=0)
Trust in government responsiveness	If an epidemic of a new type of influenza occurs in Taiwan, do you think the government has the ability to manage it immediately? (Definitely not=1; Probably not=2; Hard to say=3; Probably yes=4; Definitely yes=5)
Perceived government transparency	Do you think the government fully informs the public regarding information about a new type of influenza? (Yes=3; Neither yes nor no =2; No=1)
Gender	Citizen response to their gender (Male=1; Female=0)
Time to connect with relatives or friends	Among the relatives or friends who could offer you a place to live, how long would it take to get from your home to the nearest home of your relative or

	friend? (An hour or more by car, train, etc.=1; 30 minutes to an hour by car, train, etc.=2; Within 30 minutes by car, train, etc.=3; Within 15 minutes' walk=4; Next-door, same building, or same street=5)
Age	When were you born? (Respondents were asked to report their birth month and year)
Education level	Under Elementary school=1; Junior high school=2; Senior high school=3; Junior college=4; University=5; Graduate school=6)
Contacts per day	0-4=1; 5-9 =2; 10-19=3; 20-49=4; 50-99=5;100 or more=6)
Emergency evacuation rehearsal participation	Have you ever done any of the following things for nature disaster prevention? (Attend Emergency Evacuation rehearsal=1; Other responses=0)
Job status	Citizen response to Full-time job (Yes= 1).
Belief in government's announcements regarding policy conflicts	Some say that it is all right to believe the government's announcements regarding many policy conflicts when the opinions of experts recruited by the government and civic experts contradict each other. To what extent do you agree or disagree with this statement? (Disagree=1; Neither agree nor disagree=2; Agree=3)
Current Marital Status	Single and never married=1; Cohabiting/Divorced/Separated/Widowed=2; Married=3)
Living arrangements	With whom do you live at present? (Live alone=1; Other responses=0)
Perceived social level	In our society there are groups which tend to be towards the top and groups which tend to be towards the bottom. Where would you put yourself now on the top-to-bottom scale of social groups? (Top=10; Bottom=1)

3.3 Statistical analysis

Since our dependent variable is binary, this study uses a logistic regression model to examine drivers of citizens' voluntary compliance with self-quarantine recommendations for a future pandemic. We also conduct several correlation analyses to explain statistically significant results from our logistic regression analysis. For example, we investigate those who are more likely to perceive themselves as susceptible to novel influenza when our logistic regression results support the susceptibility hypothesis. Put another way, we use evidence from correlation analyses to explain results from logistic regression analyses.

3.4 Results

Table 2 shows our sample's descriptive statistics. The sample size in this survey is 2,005. Among these 2,005 respondents, 1,783 would accept government officials' recommendation to stay home for at least 10 days after contact with people infected with a new type of influenza, and 199 would not. Our logistic regression analysis (Table 3) shows some evidence to support the hypotheses of this study.

Table 2: Sample's Descriptive Statistics

Variable	Freq.	Percent	Variable	Freq.	Percent
Voluntary quarantine compliance			Contacts per day		
No	199	10.04	0-4=1	140	7.01
Yes	1783	89.96	5-9 =2	358	17.9
Total	1982	100	10-19=3	541	27.1
Perceived susceptibility (in general)			20-49=4	580	29.1
Unlikely	1449	76.55	50-99=5	240	12
Neither likely nor unlikely	110	5.81	100 or more=6	137	6.86
Likely	334	17.64	Total	1996	100
Total	1893	100	Emergency evacuation rehearsal participation		
Perceived susceptibility (traveling for leisure or business)			other responses=0	1728	86.4
Unlikely	1263	64.84	Attend Emergency Evacuation rehearsal=1	273	13.6
Neither likely nor unlikely	204	10.47	Total	2001	100
Likely	481	24.69	Job status		
Total	1948	100	other responses=0	955	47.7
Perceived severity			Full-time=1	1048	52.3
No	232	11.82	Total	2003	100
Yes	1730	88.18	Belief in government's announcements regarding policy conflicts		
Total	1962	100	Disagree=1	1342	70.9
Perceived media exaggeration			Neither agree nor disagree=2	148	7.82
other responses=0	699	36.5	Agree=3	402	21.3
Exaggerated=1	1216	63.5	Total	1892	100
Total	1915	100	Current Marital Status		
Perceived social pressure			Single and never married=1	566	28.3
Definitely no=1	111	5.68	Cohabiting/Divorced/ Separated/ Widowed=2	234	11.7
No=2	770	39.43	Married=3	1203	60.1
Yes=4	806	41.27	Total	2003	100
Definitely yes=4	266	13.62	Time to connect with relatives or friends		
Total	1953	100	A hour or more by car, train, etc.=1	127	7.6

Trust in government authority			30 minutes to an hour by car, train, etc.=2	215	12.9
other responses=0	230	11.63	Within 30 minutes by car, train, etc.=3	787	47.1
Agree=1	1747	88.37	Within 15 minutes' walk=4	383	22.9
Total	1977	100	Next door, same building, or same street=5	160	9.57
Trust in government responsiveness			Total	1672	100
Definitely not=1	194	9.94	Living arrangements		
Probably not=2	646	33.11	Other responses=0	1907	95.2
Hard to say=3	233	11.94	Live alone=1	96	4.79
Probably yes=4	760	38.95	Total	2003	100
Definitely yes=5	118	6.05	Perceived social level		
Total	1951	100	Level 1	146	7.51
Perceived government transparency			Level 2	108	5.55
No=1	773	39.95	Level 3	241	12.4
Neither yes nor no =2	134	6.93	Level 4	226	11.6
Yes=3	1028	53.13	Level 5	629	32.3
Total	1935	100	Level 6	397	20.4
Gender			Level 7	128	6.58
Female=0	985	49.13	Level 8	52	2.67
Male=1	1020	50.87	Level 9	8	0.41
Total	2005	100	Level 10	10	0.51
Education level			Total	1945	100
Under Elementary school=1	363	18.11			
Junior high school=2	203	10.13			
Senior high school=3	529	26.4			
junior college=4	245	12.23			
university=5	524	26.15			
Graduate school=6	140	6.99			
Total	2004	100			

Table 3: Logistic regression results. Dependent variable: Voluntary quarantine compliance

	Coef.	Std. Err.
Perceived susceptibility (in general)		
Neither likely nor unlikely Vs. Unlikely	0.755	0.524
Likely Vs. Unlikely	0.075	0.267
Perceived susceptibility (traveling for leisure or business)		
Neither likely nor unlikely Vs. Unlikely	0.055	0.311
Likely Vs. Unlikely	0.447	0.239 *
Perceived severity	0.475	0.268 *
Perceived media exaggeration	-0.416	0.210 **
Perceived social pressure		
No Vs. Definitely No	0.156	0.389
Yes Vs. Definitely no	0.619	0.399
Definitely yes Vs. Definitely No	1.323	0.513 **
Trust in government authority	1.342	0.227 ***
Trust in government responsiveness		
Probably not Vs. Definitely not	0.154	0.308
Hard to say Vs. Definitely not	0.303	0.427
Probably yes Vs. Definitely not	0.750	0.342 **
Definitely yes Vs. Definitely No	1.328	0.614 **
Perceived government transparency		
Neither yes nor no Vs. No	-0.161	0.413
Yes Vs. No	-0.118	0.220
Time to connect with relatives or friends		
30 minutes to an hour Vs. A hour or more	0.527	0.418
Within 30 minutes Vs. A hour or more	0.463	0.335
Within 15 minutes' walk Vs. A hour or more	0.773	0.377 **
Next door, same building, or same street Vs. A hour or more	0.908	0.471 **
Gender	-0.409	0.198 **
Age	0.040	0.011 ***
Education level		
Junior high school Vs. Under Elementary school	0.987	0.505 **
Senior high school Vs. Under Elementary school	0.705	0.412 *
Junior college Vs. Under Elementary school	1.036	0.460 **
University Vs. Under Elementary school	1.454	0.469 **
Graduate school Vs. Under Elementary school	1.449	0.552 **
Contacts per day		
5-9 Vs. 0-4	0.073	0.542
10-19 Vs. 0-4	0.155	0.517
20-49 Vs. 0-4	-0.166	0.511
50-99 Vs. 0-4	-0.533	0.534
100 or more Vs. 0-4	-0.381	0.577
Emergency evacuation rehearsal participation	0.106	0.283
Job status	0.226	0.209
Belief in government's announcements regarding policy conflicts		
Neither agree nor disagree Vs. Disagree	0.729	0.479
Agree Vs. Disagree	-0.228	0.265
Current marital status		
Cohabiting/Divorced/ Separated/ Widowed Vs. Single and never married	-0.322	0.440

Married Vs. Single and never married	-0.388	0.278
Living arrangements	0.345	0.642
Perceived social level	0.022	0.062
Constant	-2.739	0.991 **
Number of Obs.	1,401	
Log likelihood	-398.670	
LR Chi2	126.220	
Pseudo R2	0.137	

Note: Std. Err. = Standard Error; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Our first hypothesis (H1a) predicts a positive relationship between perceived susceptibility and voluntary quarantine compliance for a future pandemic. The results indicate that a higher level of perceived susceptibility to infection with a new type of influenza is not associated with citizens' quarantine intentions (in general). Moreover, compared to those with low perceived susceptibility of getting a new type of influenza by traveling abroad for leisure and business, citizens who report high perceived susceptibility are more likely to voluntarily comply with self-quarantine recommendations ($p < 0.1$). However, compared to those with low perceived susceptibility of getting a new type of influenza by traveling abroad for leisure and business, citizens who report neutral perceived susceptibility are not more likely to voluntarily comply with self-quarantine recommendations. Overall, the empirical support for this hypothesis is trivial.

We find support for our second hypothesis (H1b). We hypothesized that citizens' perceived severity is positively associated with their voluntary quarantine compliance for a future pandemic. The coefficient is positive and statistically significant at the 0.1 level.

Our third hypothesis (H1c) predicts that citizens' perceived media exaggeration is negatively associated with their voluntary quarantine compliance for a future pandemic. The coefficient is negative and statistically significant at the 0.05 level, supporting our hypothesis.

As for our fourth hypothesis (H1d), that citizens' perceived social pressure is positively associated with their voluntary quarantine compliance for a future pandemic, the results show statistically significant support for H1d. The higher the level of perceived social pressure (the intention to notify neighbors should a citizen become infected with a new type of influenza), the more likely it is that citizens will follow self-quarantine recommendations amid a pandemic ($p < 0.05$).

Our fifth hypothesis (H2a) predicts that citizens' trust in government authority positively correlates with their voluntary quarantine compliance for a future pandemic. We find strong support for H2a based on the positive and statistically significant coefficient ($p < 0.01$). Citizens with higher trust in government authority (agreeing that government should compel screening of foreigners from regions

affected by a new type of influenza) are more likely to comply with self-quarantine recommendations.

For our sixth hypothesis (H2b), we hypothesized that citizens' trust in government responsiveness is positively related to their voluntary quarantine compliance for a future pandemic. The results offer some support for this hypothesis. Citizens who report "definitely yes" or "probably yes" for their trust in government responsiveness (the ability to manage a new type of influenza immediately) are more likely to comply with self-quarantine recommendations, compared to those who answer "definitely not."

Our seventh hypothesis (H2c) predicts a positive relationship between citizens' perceived government transparency and voluntary quarantine compliance for a future pandemic. However, this hypothesis does not receive empirical support. Overall, the analytic results support most of our hypotheses (from H1a to H2b), while the hypothesis regarding perceived government transparency (H2c) is not supported.

4 Discussion

Our results show that citizens' risk perception (including perceived susceptibility, perceived severity, perceived media exaggeration, and perceived social pressure) and citizens' perception of the government (trust in government authority and responsiveness) do matter in explaining citizens' voluntary quarantine compliance about future pandemics. The following discussion addresses these results' implications for health policy scholarship and practice.

First, our analysis demonstrates the importance of self-interest calculation in citizens' voluntary policy compliance for a future pandemic. In line with our expectations, we find evidence that citizens' perceived susceptibility, severity and social pressure are positively associated with their intention to practice voluntary quarantine. Moreover, citizens' perceived susceptibility is only significantly associated with voluntary quarantine compliance in the condition of travelling for leisure or business. These results could be explained by citizens' self-interest calculation, an important factor of citizens' voluntary policy compliance addressed by prior studies (Braithwaite & Makkai, 1994; Meier & Morgan, 1982; Porumbescu et al., 2017). That is, citizens with higher risk perceptions of a pandemic influenza (with higher perceived costs for citizens in terms of health influence and social pressure) are more inclined to follow quarantine recommendations (when their perceived costs from getting pandemic influenza is higher than the cost of following quarantine recommendations).

Second, the result of perceived media exaggeration highlights the role of media in information delivery in times of pandemics. Consistent with prior research (Prati et

al., 2011; Rubin et al., 2009), we find evidence supporting the negative association between citizens' perceived media exaggeration and voluntary quarantine compliance. While the role of media is not clearly addressed in previous studies about citizen compliance, it could actually be linked with information problems that lead to noncompliance (Weaver, 2014). As Weaver (2014) argues, information shortage, incorrectness or overload could negatively influence citizens' capacity or willingness to comply. In the context of a pandemic with great uncertainty, to calculate the benefits and costs of voluntary compliance, citizens would search for relevant information from governments and different non-government agencies (including the media) (Y. Fu et al., 2020). Consistent with the conceptual framework developed by Fu and colleagues (Y. Fu et al., 2020), our analysis provides empirical evidence that the media does play a critical role in how information disclosure influences voluntary compliance. Our analysis further indicates that citizens' perceived information accuracy of media reports matters. If media reports about the pandemic are deemed exaggerated by citizens, the compliance barriers addressed by Weaver (2014) are likely to happen. Thus, the role of media needs to be taken into account in fostering voluntary policy compliance in future pandemic responses.

Third, our finding about perceived government transparency further addresses the nuance of government information delivery in the midst of a pandemic. Contrary to our prediction, we do not find evidence that citizens' perceived government transparency is significantly related to their voluntary quarantine compliance. This seemingly counterintuitive result invites further examination. One possible explanation is that the impacts of government transparency vary in different policy domains. For example, Porumbescu and colleagues (2017) find policy transparency is significantly associated with voluntary policy compliance in routine policy domains, but not in policy domains involving safety and security issues. This prior finding could explain our finding that government transparency (in our case, full disclosure of information regarding a new type of influenza) may not significantly influence voluntary quarantine compliance for a future pandemic (a policy issue related to public health, safety, and security). Another explanation is about information overload. In times of crisis, information disclosure does matter in fostering voluntary compliance (Y. Fu et al., 2020). Nevertheless, releasing ample information without considering its usability or understandability for citizens (Porumbescu et al., 2017) may create confusion, panic, and accompanying communication problems between citizens and the government, leading to citizen noncompliance (Coombs, 1980; Weaver, 2014). In short, as Cucciniello and colleagues (2017) conclude from previous government transparency research, "[g]overnment transparency is no cure-all and does not always have positive outcomes" (p. 32).

5 Conclusions

Overall, our findings offer two theoretical implications. First, traditional determinants of citizen compliance still matter in the case of voluntary quarantine, but demonstrate specific features in the pandemic context. That is, determinants addressed by prior research, including self-interest calculation, social acceptance, and trust in government (May, 2004; Meier & Morgan, 1982; Weaver, 2014), are still significant for voluntary quarantine compliance in the pandemic context, but they influence citizens in a way that highlights the risks of the pandemic and the need for rapid government action. Health related studies need to pay attention to how traditional citizen compliance determinants work in the pandemic context. Second, citizen compliance research needs to take into consideration information delivery from both the government and the media. While prior studies have stressed the importance of information disclosure from public agencies in the pandemic context (Y. Fu et al., 2020), our findings indicate that government transparency does not necessarily guarantee voluntary policy compliance for a future pandemic. Instead, the information delivery role played by the media does significantly influence citizens' voluntary quarantine compliance. In the pandemic context with great uncertainty and unknown factors, health policy scholarship needs to deal with information delivery issues intertwined with the government and the media, especially the negative impacts of information overload and inaccuracy.

Our study also offers practical suggestions for government actions to foster citizen voluntary quarantine compliance in times of pandemic. First, since self-interest calculation matters in citizens' willingness to comply, governments could seek to lower compliance costs of related policies. For example, governments could design measures (such as compensation for salary loss) to facilitate voluntary quarantine compliance. Second, governments could increase emphasis on justifying their authority actions (e.g., strengthening border management) and highlighting their rapid efforts to fight the pandemic. Since trust in government authority and responsiveness matters in voluntary quarantine compliance, government information disclosure should focus on gaining public trust in these two areas, rather than on offering vast amounts of information that is not easily understandable for citizens. Third, governments need to cope with the government-media relationship. While freedom of the press is critical to contemporary society, preventing media exaggeration about the pandemic and government actions can reduce potential citizen noncompliance.

Our study, however, has some limitations. First, we use cross-sectional survey data, which shows citizens' perceptions at a specific time. However, the ongoing coronavirus pandemic offers a remarkable example of how new types of infectious diseases could dramatically change citizens' perceptions and behaviors. Thus, future research could employ a longitudinal design to understand the changing patterns and predictors of citizen compliance in the face of different pandemic

diseases. Second, the survey data we utilized merely measured citizens' intentions; there may be a gap between intentions and actual policy compliance. Future studies could collect data regarding actual compliance behaviors.

Acknowledgment:

1. We appreciate the open data shared by the Academia Sinica. Data source is from Yang-chih Fu (2016). 2013 Taiwan Social Change Survey (Round 6, Year 4): Risk Social (C00224_1) [data file]. Available from Survey Research Data Archive, Academia Sinica. doi:10.6141/TW-SRDA-C00224_1-1.
2. This research is partially supported by the College of Management, National Sun Yat-sen University, TAIWAN under grant CMNSYSU-SRS-2022-01.

References:

- Barr, M., Raphael, B., Taylor, M., Stevens, G., Jorm, L., Giffin, M. & Lujic, S. (2008) Pandemic influenza in Australia: Using telephone surveys to measure perceptions of threat and willingness to comply, *BMC Infectious Diseases*, 8, pp. 1–14.
- Bish, A. & Michie, S. (2010) Demographic and attitudinal determinants of protective behaviours during a pandemic: A review, *British Journal of Health Psychology*, 15(4), pp. 797–824.
- Braithwaite, J. & Makkai, T. (1994) Trust and compliance, *Policing and Society: An International Journal of Research and Policy*, 4(1), pp. 1–12.
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N. & Rubin, G. J. (2020) The psychological impact of quarantine and how to reduce it: rapid review of the evidence, *The Lancet*, 395(10227), pp. 912–920, [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8).
- Cava, M. A., Fay, K. E., Beanlands, H. J., McCay, E. A. & Wignall, R. (2005) Risk perception and compliance with quarantine during the SARS outbreak, *Journal of Nursing Scholarship*, 37(4), pp. 343–347.
- Christensen, T. & Lægreid, P. (2020) The coronavirus crisis—crisis communication, meaning-making, and reputation management, *International Public Management Journal*, 23(5), pp. 713–729, <https://doi.org/10.1080/10967494.2020.1812455>.
- Coombs, F. S. (1980) The bases of noncompliance with a policy, *Policy Studies Journal*, 8(6), pp. 885–893.
- Cucciniello, M., Porumbescu, G. A. & Grimmelikhuijsen, S. (2017) 25 years of transparency research: Evidence and future directions, *Public Administration Review*, 77(1), pp. 32–44.
- Deslatte, A. (2020) The erosion of trust during a global pandemic and how public administrators should counter it, *American Review of Public Administration*, 50(6–7), pp. 489–496, <https://doi.org/10.1177/0275074020941676>.
- DeWall, C. N. & Bushman, B. J. (2011) Social acceptance and rejection: The sweet and the bitter, *Current Directions in Psychological Science*, 20(4), pp. 256–260.
- French, P. E. (2011) Enhancing the legitimacy of local government pandemic influenza planning through transparency and public engagement, *Public Administration Review*, 71(2), pp. 253–264.

- French, P. E. & Raymond, E. S. (2009) Pandemic influenza planning: An extraordinary ethical dilemma for local government officials, *Public Administration Review*, 69(5), pp. 823–830.
- Fu, Y., Ma, W. & Wu, J. (2020) Fostering voluntary compliance in the COVID-19 pandemic: An analytical framework of information disclosure, *American Review of Public Administration*, 50(6–7), pp. 685–691, <https://doi.org/10.1177/0275074020942102>.
- Fu, Y.-C. (2016) 2013 Taiwan Social Change Survey (Round 6, Year 4): Risk Social, https://doi.org/10.6141/TW-SRDA-C00224_1-1.
- Guan, B., Bao, G., Liu, Q. & Raymond, R. G. (2021) Two-way risk communication, public value consensus, and citizens' policy compliance willingness about COVID-19: Multilevel analysis based on a nudge view, *Administration & Society*, 53(7), pp. 1106–1149, <https://doi.org/10.1177/0095399721990332>.
- Im, T., Cho, W., Porumbescu, G. & Park, J. (2014) Internet, trust in government, and citizen compliance, *Journal of Public Administration Research and Theory*, 24(3), pp. 741–763.
- Kapucu, N. (2008) Collaborative emergency management: Better community organising, better public preparedness and response, *Disasters*, 32(2), pp. 239–262.
- Liu, B., Lin, S., Wang, Q., Chen, Y. & Zhang, J. (2020) Can local governments' disclosure of pandemic information decrease residents' panic when facing COVID-19 in China?, *International Public Management Journal*, 24(2), pp. 1–19, <https://doi.org/10.1080/10967494.2020.1840463>.
- Liu, L.-Y., Wu, W.-N. & McEntire, D. A. (2021) Six Cs of pandemic emergency management: A case study of Taiwan's initial response to the COVID-19 pandemic, *International Journal of Disaster Risk Reduction*, 64, <https://doi.org/10.1016/j.ijdrr.2021.102516>.
- May, P. J. (2004) Compliance motivations: Affirmative and negative bases, *Law and Society Review*, 38(1), pp. 41–68.
- Meier, K. J. & Morgan, D. R. (1982) Citizen compliance with public policy: The national maximum speed law, *The Western Political Quarterly*, 35(2), pp. 258–273.
- Moon, M. J. (2020) Fighting against COVID-19 with agility, transparency, and participation: Wicked policy problems and new governance challenges, *Public Administration Review*, 80(4), pp. 651–656, <https://doi.org/10.1111/puar.13214>.
- Oruc, B. E., Baxter, A., Keskinocak, P., Asplund, J. & Serban, N. (2021) Homebound by COVID19: the benefits and consequences of non-pharmaceutical intervention strategies, *BMC Public Health*, 21, <https://doi.org/10.1186/s12889-021-10725-9>.
- Piret, J. & Boivin, G. (2021) Pandemics throughout history, *Frontiers in Microbiology*, 11, <https://doi.org/10.3389/fmicb.2020.631736>.
- Porumbescu, G. A., Lindeman, M. I. H., Ceka, E. & Cucciniello, M. (2017) Can transparency foster more understanding and compliant citizens?, *Public Administration Review*, 77(6), pp. 840–850.
- Prati, G., Pietrantonio, L. & Zani, B. (2011) Compliance with recommendations for pandemic influenza H1N1 2009: The role of trust and personal beliefs, *Health Education Research*, 26(5), pp. 761–769.
- Rosenstock, I. M. (1974) Historical origins of the health belief model, *Health Education Monographs*, 2(4), pp. 328–335.
- Rubin, G. J., Amlôt, R., Page, L. & Wessely, S. (2009) Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: Cross sectional telephone survey, *BMJ: British Medical Journal*, 339(7713), p. 156.

- Tang, C. S. K. & Wong, C. Y. (2004) Factors influencing the wearing of facemasks to prevent the severe acute respiratory syndrome among adult Chinese in Hong Kong, *Preventive Medicine*, 39(6), pp. 1187–1193.
- Taylor, M., Raphael, Barr, Agho, Stevens & Jorm (2009) Public health measures during an anticipated influenza pandemic: Factors influencing willingness to comply, *Risk Management and Healthcare Policy*, 2, pp. 9–20, <https://doi.org/10.2147/rmhp.s4810>.
- Vaughan, E. & Tinker, T. (2009) Effective health risk communication about pandemic influenza for vulnerable populations, *American Journal of Public Health*, 99(S2), pp. S324–S332.
- Weaver, R. K. (2014) Compliance regimes and barriers to behavioral change, *Governance*, 27(2), pp. 243–265, <https://doi.org/10.1111/gove.12032>.
- Webster, R. K., Brooks, S. K., Smith, L. E., Woodland, L., Wessely, S. & Rubin, G. J. (2020) How to improve adherence with quarantine: rapid review of the evidence, *Public Health*, 182, pp. 163–169, <https://doi.org/10.1016/j.puhe.2020.03.007>.
- Yang, K. (2020) Unprecedented challenges, familiar paradoxes: COVID-19 and governance in a new normal state of risks, *Public Administration Review*, <https://doi.org/10.1111/puar.13248>.
- Zaki, B. L., Nicoli, F., Wayenberg, E. & Verschuere, B. (2022) In trust we trust: The impact of trust in government on excess mortality during the COVID-19 pandemic, *Public Policy and Administration*, 37(2), pp. 1–27, <https://doi.org/10.1177/09520767211058003>.
- Zhang, X., Wang, F., Zhu, C. & Wang, Z. (2020) Willingness to self-isolate when facing a pandemic risk: Model, empirical test, and policy recommendations, *International Journal of Environmental Research and Public Health*, 17(1), p. 197, <https://doi.org/10.3390/ijerph17010197>.