

# Behavioral Economics in Epidemic Situation: Why do Some People Hide and Refuse Isolation? —How Can Public Policy Influence Them?

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## ABSTRACT

At the end of December 2019, a sudden rare viral pneumonia invaded Wuhan. In order to effectively control the epidemic, isolation and other prevention and control measures have been quickly implemented throughout the country: Wuhan was closed on January 23, 2020; then the whole country began to isolate in the community: only one person in each family was allowed to go out with a mask by virtue of a travel permit at a time, all enterprises were postponed to return to work after the festival, and all entertainment places were closed. The epidemic is more serious than SARS. It has not only caused a large number of deaths, but also brought serious losses to the global economy. This article will be based on existing theoretical foundations and social status quo, and discuss the value choices and considerations between concealing the disease/cooperating treatment in the period of epidemic spread, and explore the contradiction between the current authorities' and the public' values of choice. Many proven effective policies should continue to be adopted more broadly, like counseling mechanisms and community construction. In addition to reasonable resource allocation, the psychological construction of quarantined persons should be paid more attention to during the outbreak. Good psychological construction can guide the value choice of infected people, making them more inclined to choose cooperation.

**Keywords:** coronavirus, value selection, current affairs, public policy

## 1. INTRODUCTION

With the improvement of COVID-19's situation, cases of mass communication have been greatly reduced. Community communication has become a pressing matter of the moment, for people still have needs of daily activities. When community communication occurs, it often becomes difficult to trace the virus because it spread as a chain and it is possible that someone would decide to conceal their infection. Community transmission is an important link in the whole process of epidemic chain transmission. If the authorities want to trace the source of community transmission, the concealment and non reporting of infected persons can not be bypassed. Strengthening the community and avoiding the community transmission of the outbreak would be the problem to be solved under epidemic situation currently. Only when the unity of individuals, communities and authorities is achieved, misled value choice would be avoided.

This research will focus on the rate of concealed cases and the reason of them in order to find out some solutions worth taking.

## 2. MODEL AND CASE ANALYSIS

### 2.1. Advantages and disadvantages of concealing and not concealing infection

People who have the history of tourism in the epidemic area can choose to cooperate, to tell the truth about their past travel and contact history. If so, the public can easily judge whether it is necessary to isolate them. It will also be possible to track others who have been in contact and quickly isolate them too. As it is shown in Table 1, it offers the biggest social benefit. These people also have certain benefits, for example, they can get medicine for their symptoms treatment, if the COVID 19 can be detected at first time, the benefit is accordingly reduced. Nevertheless, there are still a huge number of people who choose to conceal, because

concealment is usually more profitable. If a person has a tourism history to Wuhan, even if he just coughs, he may soon be reported and quarantined. He will form the thoughts that he may not be ill, and he would get sick because of isolation. If he conceals it, he can live freely, stay at home, stay in hotels, go to restaurants, travel and so on. Just like in Taiwan other provinces in China, other people will not regard them differently, and the profit is largely increased.

In another case, he cooperates with the public, then he is isolated. For example, in the United States, a common worker should ask for leave from his company. All the loss must be borne by the worker himself. He has to go out to the hotel for isolation, to pay the hotel fee. A series of losses are all there with no income for

himself, so he has no motivation to take the action from the beginning. Because of such concealment, the whole public may pay a greater price. Contacts are not tracked quickly, and it is difficult to track them over a long period of time, and the cost of isolation is also greatly increased.

**2.2. Analysis based on "prisoner's dilemma"**

There is a classic "prisoner's dilemma" model in game theory, as shown in Table 1, which can explain why people like to hide and do not cooperate with isolation. It should be started with an original example.

**Table 1.** Classical "prisoner's dilemma" model

		Prisoner A(left)	
	Result(profit)	lie	Frame up B
Prisoner B(right)	Lie	3, 3	5, 0
	Frame up A	0, 5	-2, -2

Two suspects are under arrest, who are trialed separately. They both have choices: to disguise or to frame up the other. They may lie on their crime simultaneously so that they will be freed. The profit for each is 3 (Escape punishment). The police often need to break their trust and cooperation, so usually if one party betrays his teammates first, the police will give some inducements. For example, in addition to the acquittal, they can also commit crimes, become witnesses, and give commendation. Assume that the profit is 5, while the other party will bear all the bad consequences because of the betrayal of his teammates, and the profit is 0. But if both of them decide to betray the other, to confess, they will be punished severely. It is obvious that the profit will be -2 totally. On the contrast, the best choice is to stay quiet, in which way the profit can be maximized.

In reality, people often choose to betray their teammates (supposing that they have not heard of prisoner's dilemma before). People are often afraid of that they will keep their promises, while the others will break it, but they can only bear the bad consequences. To be safe, the condition may turns into two people choosing to betray their teammate, and everyone loses, which is the "prisoner's dilemma".

In the epidemic situation, people who often have a history of tourism in the epidemic area, or even have symptoms, do not take the initiative to isolate and spread it in many places. In the United States, although the CDC has stipulated that asymptomatic people who

return from the epidemic area should be self isolated for two weeks, otherwise they will be fined \$1000. It is still often reported that people come back from the epidemic area, go to somewhere else directly without isolation. Many people think that these people conceal the history of tourism, have neither public morality nor social responsibility, selfishness and so on. In fact, the history of epidemic tourism between people and society can be well explained by game theory, just like a "prisoner's dilemma". We may find them quite similar with each other.

On July 29 this year, the Yangzhou Municipal Public Security Bureau opened a case against Mao for allegedly obstructing the prevention and treatment of infectious diseases. Although the authorities have ordered ordinary citizens to be isolated at home, Mao left Nanjing on July 21st, to Yangzhou's sister's house, after which she frequented various gathering places, and in mahjong hall, chess room and other entertainment venues to play cards, play mahjong, and do not wear masks throughout the process. After being diagnosed, a large number of people were infected [1]. In this case, although Mao was finally brought to justice, the serious consequences she had caused had become a reality. It is no exaggeration to say that "because of her, the authorities have isolated a city". When the Prisoner's dilemma model comes to epidemic situation in Table 2, efficient protection would definitely become the best choice for the public no matter what choice would individuals have.

**Table 2.** Prisoner's dilemma model under epidemic situation

		Tourists (left)	
	Result	Cooperation	Disguise
The public(right)	Efficient protection	1, 3	5, -1
	Forced isolation	-1, 5	-2, -2

**2.3. "Choice paradox" and "cognitive fallacy"**

Behavioral economics is often related to psychology. People cannot make rational choices because of their moods and emotional factors. Especially when in epidemic conditions Professor Tversky of Stanford University and Professor Kahneman of Princeton University have a famous psychological experiment called "paradox of choice". Apply this experiment [2] to an epidemic, similar to the following.

The United States is preparing for the outbreak of COVID-19 disease, which is expected to kill 600 citizens. There are two ways to fight the disease: first, 200 people can be cured. There is a 33% probability that all 600 people will be saved, but there is a 67% probability that no one will be saved. The result: 72% chose the former.

The choice changed dramatically when its form switched: it will ensure that 400 people will die; there may be a 33% probability that no one will die, or a 67% probability that 600 people will die. A reversal in people's preferences appeared: 78% are in favor of the second option.

This is unreasonable. There is no difference in Mathematics between the two questions, just the difference in asking methods. One is from the perspective of the number of people saved and cured, and the other is from the perspective of the number of deaths. People's choice turns, so it is called "paradox of choice".

The two professors explained that loss is greater than gain, and the pain of loss is greater than the happiness of gain. Therefore, if we ask questions from the perspective of cure (benefit), people prefer certainty to avoid the risk of loss; if we ask questions from the perspective of death (loss), people will be willing to take more risks to escape death. Even when the disease is hypothetical, this case shows that our decision-making can no longer be rational, and it is easy to make bad decisions. When the disease is real, when we see the actual number of deaths increasing every day, in addition to the sensitivity to loss, there is another factor at work in people's decision-making: fear. The two professors did another experiment called cognitive fallacy. Firstly, make people feel sad or angry by

reading an article in a magazine that describes the impact of natural disasters on a small town (making people feel sad) or the details of intense anti American protests abroad (making people angry). Secondly, ask people to estimate the frequency of events, such as how many people have to euthanize their pets (sadness) or how many people have been cheated by dishonest car dealers to buy inferior cars this year (anger). The experiment found that when people's emotions match the emotional tone of future events, their prediction of the frequency of the event will increase. For example, people who feel angry expect more people to be cheated by car dealers than those who feel sad, even if the anger they feel has nothing to do with the car. Similarly, those who feel sad choose to ask more people to euthanize their pets. Therefore, we can come to the conclusion that when we are in a certain emotion, when an event in line with this emotion occurs, even if the event has nothing to do with us, we will expect that the probability of such an event will greatly increase, which is called "cognitive fallacy". In the epidemic situation, people are generally in the "fear" mood, so all events related to the "fear" mood, people will feel that the probability of occurrence is greatly increased. It also explains why Japan, as shown in Figure 1, with its good quality, is rushing to buy "toilet paper" because of a rumor.



**Figure 1** Supermarkets were snapped up under the epidemic in Japan[3]

### **2.4. Some ill effects of “prisoner’s dilemma”**

It is very simple to give the individual great benefits of active cooperation and isolation. When the benefits outweigh his losses, people's natural choice changes. For example, on January 16, 2020, the defendant, Gou, returned to Xining City, Qinghai Province, by train from Wuhan City, Hubei Province, with his son, Gou. On January 23, the village committee where Gou is located, in accordance with the requirements of the prevention and control of the new coronavirus infection pneumonia epidemic in Qinghai Province, city and county, informed Wuhan to return to Xining personnel for registration, Gou did not register as required. On January 24, the town health hospital doctor telephoned to check the return time from Wuhan and the situation of his colleagues, Goo did not truthfully inform the return from Wuhan xining time and his son Gou a mountain together to return the situation. On the evening of January 25th, the town health hospital doctor, village doctor and village director went to go to a home to carry out the investigation of the outbreak, Goo still deliberately concealed, falsely claimed that he had been home for more than 40 days, the return ticket has been torn up. On the evening of January 26, Gou felt unwell and took a bus to his sister's house in Xining City, and the next day took a taxi to Qinghai Red Cross Hospital, where he was diagnosed with a suspected case of new coronary pneumonia.[4] In the special period, after all, many people are not willing to isolate and are worried about the risk of cross infection. If we can achieve the goal that most people are willing to isolate and reduce the cost of social compulsory isolation, the policy will be meaningful.

### **3. SUGGESTIONS ON PUBLIC POLICY**

Here are some suggestions on public policy:

(1) To maintain social confidence and stability, human psychology is a process of self strengthening. If pessimism and fear are gradually amplified, "sense of control" helps to build social confidence. The authority of many provinces in China provided services like entertainments for the isolated. According to feedback from people who have been isolated, this trend will increase in the future.

(2) People's behavior and psychology is a feedback process. It's very important whether people's psychology has been reflected and verified by the society. People are social animals. If they feel accepted by the society, they will also be willing to contribute to the society. Relevant media reports for the case of epidemic prevention propaganda, played an important role in the epidemic. If the authorities can recognize the people who actively cooperate in epidemic prevention, this sense of identity will be better strengthened.

(3) In terms of public health care and community construction, the public need mental health professionals, counseling mechanisms, and opportunities for expression and release. Especially when they lose most of their chances to contact with their friends and some family members. Counseling mechanisms may also help those who have not been isolate better avoid cognitive fallacy.

(4) In the event of a sudden crisis, the human fear or anxiety response is an adaptive response preserved under evolution. Individual psychological crisis is a gradual development process, resulting in a series of physical and mental reactions will generally last 6-8 weeks, and then gradually recover. But about 20 percent of people experience excessive stress responses due to the severity of crisis events and a combination of individual qualities, such as excessive panic, anxiety, insomnia, or over-duration, more than a month or more. In 1999, taiwan experienced a major earthquake on September 21, and post-earthquake studies found that post-traumatic stress disorder (PTSD) and depression declined in the six months, two, and three years after the disaster; Therefore, the psychological crisis after the disaster needs special attention.[5]

(5) From a more micro level, although it is in a special period at present, it is necessary to ensure the minimum legitimate rights and interests of citizens. Personal and property rights must be protected, and citizens' rights cannot be deprived at will. At present, China has been implementing a long-standing hotel isolation polic [6] has proved to be very effective.

### **4. CONCLUSION**

Communities are the first line of defense against outbreaks. This outbreak reminds us once again that the needle-tip hole can be relaxed through the strong wind. After unsealing, we should still make no effort to grasp the prevention and control work, and continue to strengthen community. There are still many problems in the community transmission of the outbreak that need to be properly addressed, such as the screening of close contacts in the itinerary of infected persons. Happily, many strong measures like the health code have been taken by the authorities. In the future, the overall unity of individuals, communities and authorities can be achieved, and the epidemic prevention work can be further improved. How to achieve such coordination of departments and how to carry out coordination efficiently will be worth exploring for a long time.

### **AUTHORS' CONTRIBUTIONS**

This paper is independently completed by Ruijiang.

## ACKNOWLEDGMENTS

I would like to show my deepest gratitude to my supervisor, Ms. Wang, a respectable, responsible and resourceful scholar, who has provided me with valuable guidance in every stage of the writing of this paper. Her keen and vigorous academic observation enlightens me not only in this paper but also in my future study. I shall extend my thanks to Ms. Li for all her kindness and help. I would also like to thank all my teachers who have helped me to develop the fundamental and essential academic competence. My sincere appreciation also goes to the teachers and students from Behavioral, Experimental Economics High School Group, who participated in this study with great cooperation.

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