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Behavioral Economics under the COVID-19 Pandemic

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ABSTRACT
Behavioral economics can provide information about human behavior preferences and ways of thinking. The development of behavioral economics is mature enough, and various theories are based on experimental data. This paper mainly discusses the changing process of human behavior preferences and thinking mode under the outbreak of the epidemic. As it can be seen from human history, the large-scale global spread of Covid-19 has been rare, which has led to insufficient experience in this field that behavioral economics can learn from. The research in this paper mainly obtains relevant experimental data through the research literature of behavioral economics on the epidemic, psychological theories, and news. Through some research examples, the paper proves that some behavioral economics theories can be used to provide information for policy making. The initial supply of vaccines is insufficient, and the allocation policy is optimized by adopting more appropriate behavioral economics theories.

Keywords: *Covid-19, Decision, Isolation, Unethical Behavior, Vaccination*

1. INTRODUCTION

In recent years, with the spread of covid-19, most countries in the world have been affected to varying degrees, and the world's economic development has been severely hit. As of 29 December 2021, the cumulative number of newly crowned patients reached 284.53 million worldwide[10]. It is worth noting that in the early stage of the outbreak, the relevant protection measures and policies implemented by many countries were not implemented smoothly. In almost every country, we can find that some people deliberately conceal their trips and do not cooperate with the government's isolation policy. OConnor and Evans surveyed to analyse the relationship between withholding information about the covid-19 and age, community, lying, etc [2] They find that COVID-19 concealing practices reduced as age and community orientation grew. In addition, when the initial vaccination was introduced, most countries also faced problems such as insufficient vaccine supply. Chen, Marathe and Marathe did a study to analyze how to optimize the allocation of limited vaccine supply between hospitals and the market from the perspective of behavioral economics, to solve the huge cost of vaccine production[3]. Moreover, there are scenes of the fuse of the US stock market, the panic buying of toilet paper in Japan, etc. We can find that the theory of behavioral economics can help us explain the occurrence of these behaviors. At present, many studies on behavioral economics under the outbreak of the epidemic have investigated the behavioral changes of human society and analyzed the overall social change trend. This paper focuses on the study of the behavioral changes of individual human beings, and introduces game theory to help the analysis.

This paper focuses on how the behaviour and decisions of some people are influenced by the spread of the epidemic and the main research significance of this paper is to analyze some behavioral decisions through behavioral economics and other related psychological theories, and provide some theoretically based solutions.

2. ANALYSIS

2.1 Some unethical behaviors caused by the epidemic

The spread of the epidemic is very rapid, and many countries do not have enough time to react and stop at the beginning. However, the main reason is not only that the government has not responded quickly enough, but also one of the reasons why the relevant epidemic measures introduced by many countries have not played an obvious role. It is worth noting that we can find some cases in many countries. There is a group of people who choose to lie and conceal after being infected with the new crown virus. This behavior is unethical. DePaulo et al. find out

that adults tend to tell about 1-2 lies a day[4]. In addition, it is worrying that a study they did in 2004 also found that adults sometimes tell serious lies related to the disease[5]. People often lie because the risk of disclosing the information is greater than the risk of hiding it. Therefore, these lies can have a psychological effect because they can be told to protect oneself from embarrassment or hide the pain or negative aspects of oneself. There is a classic "prisoner's dilemma" model in game theory, which can be used to explain why people tend to conceal and do not cooperate with isolation. First of all, the author will explain this model with an example.

2.1.1 Assumptions 1

The police arrested two suspects A and B, but there was insufficient evidence to charge them guilty. The police imprisoned the suspect separately and met with the two separately. Both suspects faced two choices, either tight-lipped or betrayed their teammates.

(1): If both suspects choose to be silent, the income is 4

(2): Suspect A betrays B, and suspect B continues to remain silent, A gains 6 and B gains 0

(3): Suspect B betrays A, and suspect A continues to remain silent, then B gains 6 and A gains 0

(4): If two people betray each other at the same time, both parties will be punished, and the gain will be -3

Table 1 Suspect-Suspect

	Suspect B: Silence (cooperation)	Suspect B: Plead guilty (betrayal)
Suspect A: Silence (cooperation)	(4,4)	(0,6)
Suspect A: Plead guilty (betrayal)	(6,0)	(-3,-3)

The best option for the 2 suspects is for both sides to choose silence so that the total gain is 8, which maximizes the benefit. But in reality, people are often afraid that if they keep their word and the other person betrays them, the other person will take most of the gains and they will have to bear the bad consequences. Therefore, in the end, they both choose to betray their teammates and everyone loses - the Prisoner's Dilemma. Similarly, this model can be applied to those who conceal and do not cooperate in an epidemic.

2.1.2 Assumptions 2

Suspected patients and people with travel history in the epidemic area can choose to cooperate and reveal their past travel and contact history, so that the government can isolate them well and at the same time track other contacts more quickly, and take corresponding measures. This is the greatest benefit to society. But why would people choose to hide it? It is because concealed benefits are greater. If a person with a travel history in an epidemic area just coughs, if he reports truthfully, he may be forced to quarantine. If he conceals it, he can still live freely.

(1): The society adopts proper protection, and suspected patients cooperate with treatment. Thus, the social benefit is 4. Suspected patients' symptoms can be given medicine and treatment. If it is COVID-19, they can be rescued as soon as possible, with a benefit of 2.

(2): Suspected patients choose to conceal, and society has not taken protective measures against suspected patients. The suspected patient benefit is 5. Society has to pay a huge price, and the benefit is -1.

(3): Suspected patients cooperate with observation and treatment, but the society adopts compulsory isolation, regardless of whether they are infected with Covid-19. The social benefit is 5, and the benefit for suspected patients is -1.

(4): The mandatory isolation measures taken by the society made suspected patients dare not report their illness and chose to conceal it. Society did not take relevant measures, and the benefit was -3. Suspected patients are not treated in time, the benefit is -3

Table 2 Society-Suspect

	Suspect B: Cooperation	Suspect B: Conceal
Society: Legitimate protection	(4,2)	(-1,5)
Society: Mandatory isolation	(5,-1)	(-3,-3)

We can find that from a moral perspective, these people's behavior is immoral and irresponsible to society. But from the perspective of economics, an important assumption of economics is that everyone is rational (everyone pursues personal interests more than social interests), and this kind of thinking is wrong on the moral level. Therefore, in the end, they often fall into the "prisoner's dilemma" of personal concealment-social compulsory isolation.

2.2 Epidemic affecting the human decision

Behavioral economics is often related to psychology, and people are often unable to make rational choices and

judgments due to psychological and emotional factors. Kahneman and Schwartz studied how people make decisions. And they found many rules of thumb that often make us misjudge[6]. They conducted an experiment, which will result in something similar to the following if applied to the epidemic.

A country is preparing to fight the epidemic. The epidemic is expected to kill 600 citizens. There are two vaccines at this time: (1) Vaccine A can cure 200 people. (2) Vaccine B has a 33% probability that it will save all 600 people, but there is also a 67% probability that it will not save anyone. The result: 72% of people chose the former.

When the expression is changed to another: (1) Vaccine A will ensure that 400 people will die; (2) Vaccine B may have a 33% probability that no one will die, or a 67% probability that 600 people will die. The result: 78% of people chose the latter.

From the point of view of mathematics, this is unreasonable because there is no difference in mathematics between the two problems. One is from the perspective of the number of people treated, and the other is from the perspective of the number of deaths, which leads to a different final choice. This is the "selection paradox." Schwartz found that when there are multiple choices and the utility of the choices is roughly the same, people will remember the sum of the lost utility, rather than the utility maximized choice. Moreover, they also found that most people value rumors. The higher the frequency of certain information, the higher its weight when it affects people's decision-making. During the epidemic, various information and news related to the epidemic appeared frequently, gradually causing panic and other emotions, affecting people's decision-making behavior, such as panic buying of toilet paper in some countries[7] and plummeting U.S. stocks [7].

2.3 The implementation of the vaccine is not smooth

Because vaccination is voluntary, how to promote vaccination depends on behavior. The implementation of the new crown vaccine has not been smooth. There are still some people who do not believe in the safety of the vaccine and refuse to be injected[9]. Humans fear the unknown. Uncertainty will increase the threat. People do not know the safety of vaccines, and some people think that vaccines pose a threat to their lives. Increasing the attractiveness of vaccines is a very critical factor. Because research has found that people will follow their peers for clues about the behaviors they care about[10]. Nobel laureate in economics Richard Thaler suggested in "New Times" that when the early vaccine supply is insufficient, part of the vaccine should be sold through charity auctions to some of the industries that have the best chance of full resumption of work[11] The proceeds from the auction will then be used to assist the disadvantaged groups most affected by the epidemic to help tide over the difficulties. In addition to raising funds, some celebrities can also be vaccinated through auctions, so as to make more people believe in the safety of the vaccine. Moreover, some countries have used the nudge theory. This is an important theory in behavioral economics. Nudge theory is to indirectly make suggestions (with suggestive effect) to influence individual or group behavior decisions. We can see that since the outbreak of the epidemic, many countries in the world have been advocating the safety of vaccines, and constantly hinting at promoting more people's vaccination. However, the world's epidemic situation is gradually deteriorating. Whether vaccination should be nudged or compulsory, countries such as the United Kingdom and the United States have fallen into an ethical dilemma. Why did the nudge theory fail. Although "nudge" gives people the right to choose freely, it is not proactive. Only under irrational conditions can people be affected by various hints of information. The more we want to drastically change the behavior of others, the less "nudge" will be effective.

2.4 Side effects of the epidemic isolation policy

The policy of most countries during the epidemic is to stipulate that the people must not go out and stay home. People need to adapt to stay in their own homes 24 hours a day, so they will lose the opportunity to exercise, go out to relax, and hang out with friends. Relevant research shows that isolation measures will affect people's mental health[11]. During the quarantine period, constant negative news about the epidemic will continue to put pressure on the quarantined personnel. In addition, many people have lost their jobs due to government measures such as isolation. In this way, they will also face pressure from the family economy. Therefore, how to use behavioral economics to weaken the negative impact of isolation on people's health and family economic pressure is very important. For example, some people will seek spiritual pleasure because of increasing pressure(Cigarettes, alcohol, hallucino-gens, etc.). However, this is obviously incorrect. We can use the theory of loss aversion to continuously clarify in various public media that drugs and other psychotropic substances will bring devastating consequences. In addition, people lack exercise while staying at home. We can also provide suggestions through rules of thumb. Because many people don't understand how to exercise more effectively at home, reducing the cost of understanding effective exercise can strengthen people's motivation for self-exercise.

3. CONCLUSION

This paper aims to study the impact of the 2020 Covid-19 outbreak on human behavior and describe the

process of changing people's behavior. We can discover how some unethical behaviors of mankind are produced step by step under the epidemic. We need to understand this process because it can help us find more efficient solutions. In addition, we know that the theory of behavioral economics and psychology are closely related. Under the epidemic situation, negative news such as various death tolls and diseases continue to bring panic and other emotions to the people, which affects the people's judgment and decision-making ability. Moreover, the promotion of vaccines also faced many difficulties at the beginning. The theory of behavioral economics is a theory worth considering in terms of helping the promotion of vaccination. But at this stage, behavioral economics still has many shortcomings in the study of the epidemic. For example, in vaccination, many countries have adopted the nudge theory. However, the nudge theory did not work. There are still some people who are unwilling to vaccinate. In addition, behavioral economics is based on experiments (so it often appears at the same time as experimental economics). However, we have never had such a large-scale epidemic spread before, which has led to the inability of behavioral economics to learn from valuable experience. Furthermore, behavioral scientists have no time to study the changes in people's various behaviors under this epidemic. Without these research results, behavioral economics has not been able to fully function. The research in this paper is not comprehensive enough, and there is still a lack of research on the changing process of human behavior. At the same time, behavioral economics has very high requirements for experimental data. However, the only data related to the new crown epidemic is the number of infections and deaths. Therefore, the data research in this paper needs to be improved. In addition, the research on why the nudge theory fails in vaccination is not comprehensive enough, and further discussion is needed.

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