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The effects of psychological attitudes on voluntary cooperation against COVID-19: an analysis using a social dilemma framework

Keywords:

COVID-19, Social dilemma, prosocial behavior, public health

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Abstract

The COVID-19 Pandemic is a global problem, and to prevent the spread of the infections, it is crucial not only to develop vaccines and therapeutic medications but also to encourage people to change their behavior. Behavioral change to prevent the spread of infectious diseases has required people to give up many activities, especially pleasures outside the home. However, it is hoped that if most people behave cooperatively, individuals' selfish pursuit of pleasure will have little effect on the spread of infection. This conflict between benefits for individuals and those for the community as a whole can be considered a social dilemma. Clarifying the factors that define people's behavior during epidemics is essential for designing social systems after the COVID-19 Pandemic is declared over. Here, we analyze the determinants of people's behavior in the framework of a social dilemma by conducting a two-wave panel survey in 2020 and 2021. The results show that in the first wave, psychological attitudes that affect prosocial behavior, such as reciprocity, positively affect prosocial behavior. However, in the second wave, these effects disappear, and other factors define people's behavior. Continuous analysis of the factors determining people's behavior under drastically changing circumstances can provide information for planning measures to promote desirable behavioral changes.

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1. Introduction

The COVID-19 Pandemic has significantly impacted humanity, causing over 200 million confirmed infections and over 4 million deaths worldwide as of October 2021. To overcome COVID-19, not only medical measures such as the development of vaccines but also behavioral changes and restructuring of people's lifestyles are required (Van Bavel et al., 2020). Some studies have analyzed behavioral change and hoarding behavior during the pandemic (Columbus, 2020; Lunn et al., 2020). In many countries, people's behavior has been forcibly restricted by legally enforceable lockdown policies. In Japan, however, the constitution does not allow for enforceable restrictions on people's movements or associations. Therefore, people were encouraged to change their behavior voluntarily. Although vaccination is progressing in many countries and behavioral restrictions are being relaxed, one significant public health issue is to clarify the factors that determine behavioral changes to prevent the spread of infections in the future.

To prevent infections, people have been encouraged to act less selfishly. For example, enjoying a meal at a restaurant or going to a concert is an essential part of people's welfare, but people have been told that they need to voluntarily give up these pleasures to control infections. In Japan, a state of emergency has been declared four times, but no enforceable restrictions were imposed on individuals, and only voluntary cooperation was requested of citizens. We need a framework for analyzing people's behavior in situations where benefits for individuals conflict with the benefits for society as a whole. This situation can be considered a

social dilemma with the structure of the tragedy of the commons (Hardin, 1968).

The research questions of this paper are whether the psychological attitudes that have been shown to influence prosocial behavior in social dilemma situations have affected people's behavior during the COVID-19 Pandemic. Some studies answer this question affirmatively (Van Hulsen et al., 2020; Van Lange et al., 2021; Harring et al., 2021; Ling et al., 2020; Johnson et al., 2020). For example, a positive correlation has been found between prosociality and COVID-19 prevention behaviors (Jordan et al. 2020; Luttrell & Petty 2020; Pfattheicher et al. 2020; Fischer et al., 2021). However, few studies have analyzed in detail the impact of prosociality and related psychological attitudes on preventive behavior.

In theoretical studies of social dilemmas, two variables are often used as the individual's behavioral strategy: 1) the behavioral strategy of cooperation or non-cooperation and 2) the punishment strategy of whether to use punishment or not. The former behavioral strategy can be measured by whether people voluntarily refrain from or intend to avoid going out to prevent infection. The latter punishment strategy, however, is difficult to measure directly. This is because, in many cases, direct private punishment is prohibited in the real world, and punishment is carried out by public authorities (e.g., the police). Therefore, we adopt a punishment norm that considers "non-cooperators should be punished" as a punishment strategy.

In this study, we focus on three variables as psychological attitudes that influence COVID-19 prevention behaviors. It is well known that these variables have a positive correlation with prosocial behavior in social dilemmas. The first is

generalized reciprocity and generalized trust (Yamagishi and Yamagishi, 1994; Yamagishi and Kiyonari, 2000). Generalized reciprocity and generalized trust are typical variables that promote cooperative behavior in social dilemmas. Second is a belief in a just world (Lerner, 1980). The literature (Miller, 1977, Zuckerman, 1975) has reported a positive association between the belief in a just world strength and altruistic behavior. The belief in a just world is a cognitive bias in which one believes that the world is still fair when exposed to harsh or difficult situations, such as those faced by people throughout the world during the COVID-19 Pandemic. Thus, the belief in a just world is thought to influence people's behavior during the COVID-19 Pandemic. Third, we adopt justice sensitivity (Schmitt et al., 2010), which measures sensitivity to various types of injustice. For instance, it consists of sensitivity to unfair losses suffered by oneself and to unfair losses suffered by others. Because COVID-19 has had a non-homogeneous and unequal impact on people, sensitivity to this unequal impact should influence people's behavior. We analyze the impact of these three psychological attitudes on infection prevention behavior and punishment norms during the COVID-19 Pandemic. The factors comprising justice sensitivity have been shown to promote altruistic behavior (Fetchenhauer & Huang, 2004, Gollwitzer et al., 2009) and third-party punishment (Fetchenhauer & Huang, 2004), respectively.

Additionally, we must consider that the social climate surrounding COVID-19 continues to change rapidly and dynamically. In the early stages, it was important to focus on the conflict between individual and collective benefits, but during the vaccination campaign, new problems

have emerged, such as the conflict between people's beliefs toward the vaccines. Specifically, the cumulative number of confirmed infections in Japan as of 1st April, 2020 was 2,502, which is 0.0020% of the Japanese population. At this point, the maximum number of reported infections per day was 268. However, as of 1st. Apr. 2021, the cumulative number of confirmed infections in Japan was 477,846, which is 0.3810% of the population. The maximum number of reported infections per day before the second-wave survey reached 7,957 on 8th Jan. 2021. As a situation changes so significantly, people's risk perception and determinants of behavior should be expected to change.

Here, we conducted two waves of panel surveys, one in April 2020 during the early stages of the COVID-19 Pandemic and the other a year later in April 2021, to investigate whether people's prosociality affects preventive behavior and whether this effect changed over time. Continuous analysis of the factors determining people's behavior under drastically changing circumstances can provide information for planning measures to promote desirable behavioral changes.

The factors that determine people's behavior are not the only ones related to social dilemmas. Other related factors also need to be controlled. On the one hand, prosocial behavior in preventing the spread of infections is not necessarily altruistically motivated. The self-centered motive of preventing oneself and one's family members from being infected should also naturally promote infection prevention behavior (Harper et al. 2020; Wise et al., 2020). On the other hand, the behavior of others strongly influences people's behavior (Asch, 1951). Information from the mass media and social media is the primary way by which

people infer the social atmosphere and the behavior of the majority. Therefore, it is necessary to consider the influence of media exposure on people's risk perception and estimation of the behavior of others. The relationship between COVID-19 prevention behaviors and the media has also been researched (Liu et al., 2020; Liu et al., 2021; Chemli et al., 2020;). In today's society, the influence of not only mass media but also social media is expanding, so the influence of social media on COVID-19 prevention behaviors should also be considered (Huynh, L., 2020; Yu, M. et al., 2021; Allington et al., 2021). It is also essential to consider what effect each of the two types of media will have (Piltch-Loeb et al., 2021). Even after controlling for these factors, it is necessary to examine whether the factors that promote prosocial behavior in social dilemma environments still affect determinants of behavior.

This study has conducted during the first-wave survey on 3rd Apr. 2020 and the second-wave panel survey from 13th to 24th Apr. 2021 to analyze the changes in the determinants of people's behavior over time. In both two periods, no state of emergency declaration was in place, so there were minimal restrictions on daily life. However, after both surveys, a state of emergency was declared. In other words, these surveys were conducted when there were minimal restrictions on behavior, but the number of reported infections was increasing.

2. Methods

We conducted the first-wave survey on 3rd Apr. 2020 (38.3% female; mean age 46.5) among 2,000 monitors registered with Yahoo! Crowd Sourcing, a major crowdsourcing platform in

Japan. The second-wave survey was conducted from 13th to 24th Apr. 2021 and received 987 valid responses (33.4% female; mean age 49.0). Comparing the participants who responded to both Wave 1 and Wave 2 and those who attrited in Wave 2 revealed differences in age (mean = 47.95 for the former, mean = 45.05 for the latter, $p < .001$). There were no significant differences in gender and the psychological attitudes used in the following analysis.

2-1. Dependent variables

We set the behaviors and norms for dependent variables as follows. First, for behavior, we used the responses to the two items "I went out for fun" and "I went out for dinner" on the weekend of 28th and 29th March 2020, the week before the first-wave survey, and set up a dummy variable in which those who did either of the two items were designated as "not-cooperation" and those who did neither of the two items were designated as "cooperation." Then, in the second-wave survey, we set a dummy variable using the same manipulation for the weekend of 10th and 11th Apr. 2021.

For behavioral intentions, we adopted two items using a 5-point scale: "Assuming the current situation continues, will you refrain from going out this weekend?" and "If the current situation continues, how much do you plan to refrain from going out on weekends in the next month?" The score of behavioral intention was obtained by the simple addition of two items.

Previous studies have revealed that punishment and beliefs about punishment positively affect the promotion of cooperation (Fehr and Gächter, 2002; Yamamoto and Suzuki, 2018). In this study, we measured punishment norms because, in the real world, institutional punishments (Sigmund *et*

al., 2010) such as a police are used for non-cooperative behavior, and direct observation of peer punishment behavior is not suitable. Therefore, as a punishment norm, in response to the question, “How do you feel about people who go out on unnecessary and not urgent errands?”, we asked three questions on a five-point scale: “The public should condemn them,” “They should be punished with a fine,” and “They should be allowed to do so because of their individual circumstances” (reversal item). The score of punishment norm was obtained by the simple addition of the three items.

2-2. Independent variables

We have adopted a representative set of well-known psychological attitudes that affect prosocial behavior. The first is generalized reciprocity and generalized trust (Yamagishi and Yamagishi, 1994; Yamagishi and Kiyonari, 2000). It is known that people with high levels of these two are more likely to engage in prosocial behavior. To measure generalized trust, subjects were asked to rate two items: “Most people are trustworthy” and “Most people trust others.” A subject’s score on generalized trust was obtained by the simple addition of the two items’ scores. Two statements on a questionnaire were used to measure the subjects’ level of reciprocity. Their overall score was obtained by the simple addition of the scores of the responses to the two statements. The two items used to calculate reciprocity were: “When someone helps me, I also help someone else,” and “I believe that good things eventually come back to me when I am kind to others.”

Second, we have focused on a belief in a just world, which is a cognitive bias that leads people to believe that the world is fair (Lerner, 1980).

Concretely, it is the psychological tendency to believe that positive outcomes such as future success and rewards will result from prosocial behaviors such as effort and helping others. Alternatively, antisocial behavior such as corruption and negligence will result in future failure and punishment. There is a positive correlation between the belief in a just world and altruistic behavior (Miller, 1977; Zuckerman, 1975). The belief in a just world is composed of two sub-concepts: belief in ultimate justice (BUJ) and belief in immanent justice (BIJ). BUJ is the belief that present misfortune or bad luck will be compensated for positively in the future, while BIJ is the belief that present injustice or wrongdoing will be rewarded negatively in the future. Recently, a relationship between mental health and a belief in a just world has been shown (Wang et al., 2021). We adopted the eight items developed by Murayama and Miura (2015) for the belief in a just world.

Third, we adopt justice sensitivity (Schmitt et al., 2010). The justice sensitivity scale has been used to examine cooperative and non-cooperative behavior in the real world as well as in the laboratory. There are four sub-concepts of justice sensitivity: victim, observer, beneficiary, and perpetrator. Their respective meanings are as follows: susceptibility to loss from an unfair event, susceptibility to knowing about an unfair event as a third party, susceptibility to passively benefiting from an unfair event, and susceptibility to actively causing an unfair event. For a scale, we adopted the shortened version (8 items) created by the Japanese version of the Justice Sensitivity Scale (Jessica Tham, et al., 2019). In addition to the above factors, many other variables influence prosocial behavior and punishment norms, but in this study, we focused on the three factors

mentioned above, which are well known as determinants of prosocial behavior.

Finally, we introduce the influence of media exposure. It is natural to think that not only psychological attitudes but also information from the surrounding environment impact people's behavior. In particular, the COVID-19 Pandemic has been one of the most important news items worldwide since the beginning of 2020. We asked how much information about COVID-19 people had seen or heard in the media, dividing these two types of media into mass media and social media. In the context of public health, it has been pointed out that the third-person effect is a factor in determining people's behavior (Lee and Park, 2016). The third-person effect refers to the tendency for people to perceive mass media messages as having a more significant impact on others than on themselves (Davison, 1983).

On the one hand, for mass media exposure, subjects were asked how much information about COVID-19 they had seen or heard in each of the following media: newspapers, television, news websites operated by newspapers, and Yahoo! News. The simple addition of the results was used. On the other hand, subjects were asked the degree of exposure to social media services such as Facebook, Twitter, LINE, and YouTube for social media exposure.

For the third-person effect, subjects responded to two items: "How much do you think the average citizen's opinion about refraining from going out is influenced by the media and their surroundings?" and "How much of your own opinion is influenced by the media?" The former minus the latter was adopted as a variable. This variable becomes larger the more the subject thinks that others are more influenced than themselves by the media.

3. Results

In the first step of the analysis, we have checked the independent variables. Factor analysis of two items each for generalized reciprocity and generalized trust revealed a one-factor structure ($\alpha=.72$ and $\alpha=.83$, respectively), and the simple summary of the two was adopted as the variable. For belief in a just world, a two-factor structure, the same as that in previous studies (Murayama and Miura, 2015), was confirmed, and BUJ ($\alpha=.93$) and BIJ ($\alpha=.91$) were extracted. Since previous research on justice sensitivity (Jessica Tham, et al., 2019) has argued that the validity of the short version is generally robust, and since the purpose of this study was not to examine the validity of the scale, the simple addition of two items from each of the four proposed factors was adopted as the variable. The alpha coefficients of victim, observer, beneficiary, and perpetrator are $\alpha=.61$, $\alpha=.77$, $\alpha=.75$, and $\alpha=.77$, respectively.

The distribution of the dependent variable "behavior" is shown in Table 1. As a result of the exact binomial test for the values of the first and second waves, the cooperative behavior of the first wave was significantly higher ($p=0.04$). Thus, cooperative behavior decreased between the two waves. The distribution of the dependent variable "behavioral intention" is shown in Figure 1. The results of the one-factor ANOVA show that the intention to go out has also increased ($F(1,986)=63.08$, $p=.00$, $\eta^2=.06$), indicating that people's behavioral inhibition has attenuated over the past year. Finally, the distribution of punishment norms is shown in Figure 2. Punishment norms also decreased in the second wave ($F(1,986)=112.66$, $p=.00$, $\eta^2=1.03$).

What factors determined behavior, behavioral

Table 1. Results of first-wave and second-wave behaviors (number of people)

		First-wave		
		Cooperation	Not-cooperation	Total
Second-wave	Cooperation (staying home)	641	72	713
	Not-cooperation (went out)	152	122	274
	Total	793	194	987

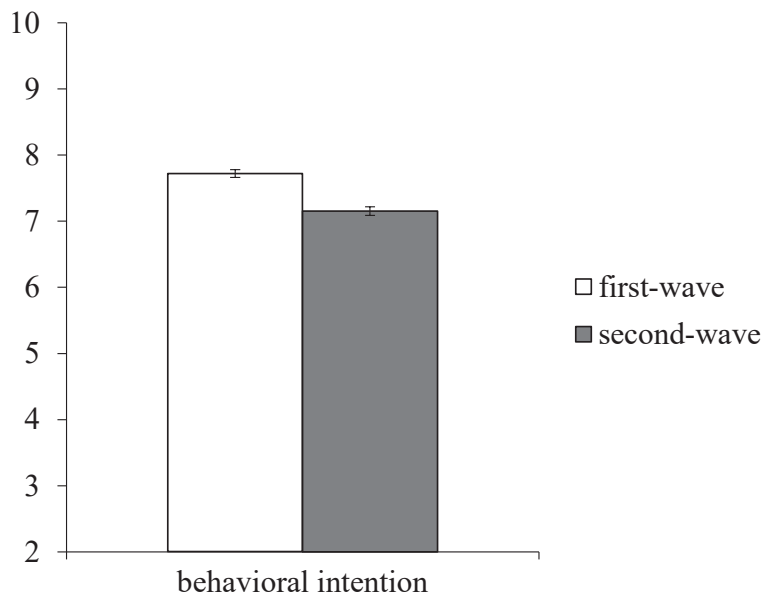


Figure 1. Results of ANOVA (behavioral intentions). The vertical axis shows simple addition of behavioral intention items. Minimum value is two; maximum is ten. The error bars show standard errors.

intention, and punishment norm? Moreover, did the determinants change over the year? We conducted multiple regression analysis using the first and second waves of data to answer these questions. Since the change in psychological attitudes is considered slight, we adopted the data from the first wave for psychological attitudes (trust, reciprocity, a belief in a just world, and justice sensitivity). Models 1 and 2 have the first- and second-wave responses as the

dependent variables, respectively. We can observe the determinants of the dependent variable in each period. In Model 3, the second-wave data were used as the dependent variable, and the first wave data were used as the control variable. This model enables us to observe changes over one year. COVID-19 does not threaten everyone equally. For example, the elderly and those with underlying diseases will be more likely to take proactive preventive

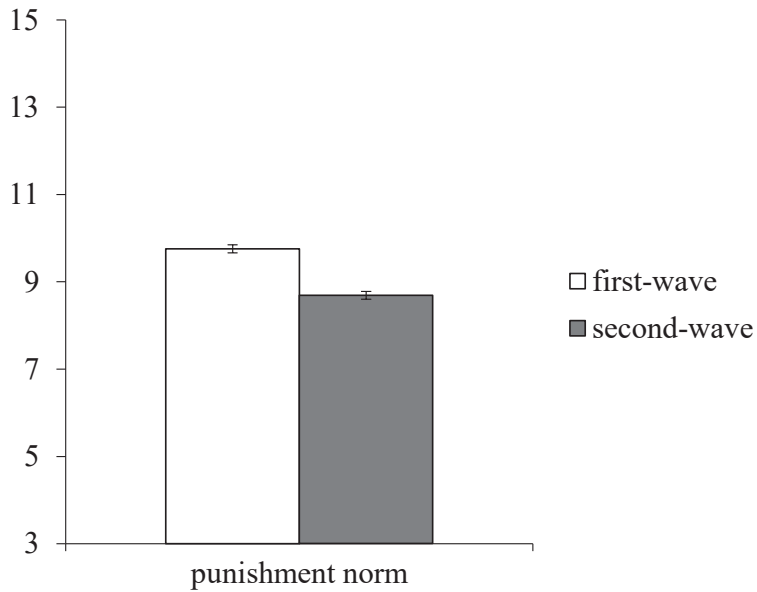


Figure 2. Results of ANOVA (punishment norm). The vertical axis shows simple addition of punishment norm items. Minimum value is three; maximum is fifteen. The error bars show standard errors.

actions for self-protection. The subjective infection risk might have a significant impact on people’s behavior. Therefore, we introduced the subjective risk of infection as a control variable.

Table 2 reports odd ratios (ORs) from logistic regressions with behavior as the dependent variable. First, women tend to go out less than men. Reciprocity had a positive effect only during the first wave, and BUJ consistently had a negative effect. Furthermore, BUJ has a transformative effect on curtailment: it is the belief that present misery will be compensated for in the future. Therefore, it can be considered that the more people believe that they are currently forced to endure hardship, the more they perceive that they are justified in going out. The BIJ, on the other hand, has a positive effect on discouraging going out in the second wave and also has the effect of making people more

inhibited from going out than the first wave. Since, BIJ is the belief that one will be sanctioned in the future for one’s present wrongful behavior, people avoided going out as reported cases were rising because they perceived it as antisocial behavior. As for justice sensitivity, “perpetrator sensitivity” consistently had a positive effect. The perception of not wanting to be a perpetrator who infects others through one’s own going out inhibits one from going out. Naturally, the perception of one’s own risk has a positive effect on inhibiting going out. However, media contact did not affect behavioral change.

Next, we analyze “behavioral intention.” Table 3 reports β from ordinary least squares regressions (OLS). For behavior, the tendency to not go out was stronger among women. In addition, older people intended not to go out. The same as behavior, reciprocity had a positive effect

Table 2. Effects of psychological attitudes and media exposure on behaviors by logistic regressions.

		Model 1	Model 2	Model 3
ORs				
	Behavior in the first-wave (dummy variable: cooperation=1)			7.103 ***
Control variables	Age	1.008	1.015 *	1.014
	Gender (female=1)	2.037 ***	1.462 **	1.177
	Subjective infection risk	1.157 ***	1.223 ***	1.240 ***
Trust and reciprocity	Generalized trust	1.063	1.075	1.061
	Reciprocity	1.148 **	1.011	0.961
Belief in a just world	BUJ	0.929 ***	0.934 ***	0.947 **
	BIJ	1.014	1.065 **	1.071 **
Justice sensitivity	Victim	0.93	0.909 **	0.920 *
	Observer	0.889 **	1.091 *	1.152 **
	Beneficiary	0.983	0.96	0.955
	Perpetrator	1.132 **	1.122 ***	1.086 *
Media exposure	Mass media exposure	0.987	0.987	0.994
	Social media exposure	0.994	0.989	0.989
	Third-person effect	0.962	1.006	0.96
	Constant	0.834	0.171 ***	0.041 ***
	Pseudo R ²	0.07	0.06	0.162
	Log likelihood	-454.81	-547.78	-488.52

only in the first wave. However, the effect of a belief in a just world was weaker than the effect on behavior; BIJ was not statistically significant, although BUJ tended to have a negative effect. As for fairness sensitivity, beneficiary sensitivity strengthened the intention to reduce going out. Perception of one's own infection risk also

strengthened the intention to go out. Exposure to mass media increased the perception of infection risk and reinforced people's intention not to go out. The third-person effect also has a negative effect. This result means that people who think that others are more influenced by the media than themselves tended to intend to go out.

Table 3. Effects of psychological attitudes and media exposure on behavioral intentions by OLS.

		Model 1	Model 2	Model 3
		β		
Behavioral intention in the first-wave				0.290***
Control variables	Age	0.086***	0.064*	0.037
	Gender (female=1)	0.062**	0.042	0.016
	Subjective infection risk	0.303***	0.268***	0.239***
Trust and reciprocity	Generalized trust	0.008	0.002	0.005
	Reciprocity	0.077**	0.070*	0.043
Belief in a just world	BUJ	-0.046	-0.084**	-0.072*
	BIJ	0.026	0.022	0.012
Justice sensitivity	Victim	-0.048	-0.057	-0.04
	Observer	0.044	0.043	0.031
	Beneficiary	-0.087**	0.058	0.079**
	Perpetrator	0.024	0.016	0.005
Media exposure	Mass media exposure	0.057*	0.076**	0.058*
	Social media exposure	0.073**	0.057*	0.036
	Third-person effect	-0.085***	-0.102***	-0.088***
R ²		0.158	0.139	0.217
adj. R ²		0.146	0.127	0.205

Finally, we analyze the determinants of punishment norms. Table 4 also reports β from ordinary least squares regressions (OLS). Gender and age had no significant effect. As in the previous analyses, reciprocity has a positive effect only in the first wave. As for the belief in a just world, BUJ has a negative effect, and BIJ has a positive effect. In addition, both have an effect in the direction of reinforcing the tendency. This

result means that those who believe that their current misfortune will eventually be positively rewarded will avoid punishing others, while those who believe that their current injustice will eventually be negatively sanctioned will be more willing to punish others. Victim sensitivity had a positive effect on the punishment norm. Perception of one's own infection risk had a consistently strong positive effect on punishment

Table 4. Effects of psychological attitudes and media exposure on punishment norms by OLS.

		Model 1	Model 2	Model 3
		β		
Punishment norm in the first-wave				0.343***
Control variables	Age	0.02	0.05	0.04
	Gender (female=1)	-0.008	-0.022	-0.028
	Subjective infection risk	0.285***	0.212***	0.188***
Trust and reciprocity	Generalized trust	0.019	-0.024	-0.024
	Reciprocity	0.097**	-0.019	-0.057
Belief in a just world	BUJ	-0.106***	-0.119***	-0.086**
	BIJ	0.04	0.129***	0.113***
Justice sensitivity	Victim	0.132***	0.127***	0.085**
	Observer	-0.090**	-0.076*	-0.043
	Beneficiary	0.023	0.071*	0.057
	Perpetrator	-0.008	-0.044	-0.048
Media exposure	Mass media exposure	0.013	-0.007	-0.013
	Social media exposure	0.073**	0.028	0.002
	Third-person effect	-0.099***	-0.091***	-0.078***
R ²		0.133	0.0982	0.21
adj. R ²		0.12	0.0853	0.198

norm. Media exposure did not have a significant effect. The third-person effect has a negative effect. This means that people who believe that others are more influenced by the media than themselves have weaker norms for punishing others.

4. Summary

In this paper, we analyzed changes in the determinants of behavior and norms during a pandemic by surveying the same subjects at two time points: early in the COVID-19 Pandemic and one year later. In particular, this paper considers restraint from going out as prosocial behavior and attempts to analyze it within the framework

of a social dilemma.

Generalized trust and reciprocity have been known to have positive effects on prosocial behavior in many studies. However, in the present study, reciprocity had positive effects on prosocial behavior, intention of prosocial behavior, and punishment norms, in the first wave, but these effects disappeared in the second wave. On the other hand, psychological attitudes toward fairness, such as the belief in a just world and justice sensitivity, consistently had an effect on people's behavior and norms. As for the belief in a just world, BIJ has a positive effect on prosocial behavior and punishment norms. The belief in a just world has led to blaming the victim (Correia et al., 2007), and the results of this study also suggest a risk of unfairly blaming infected people. Regarding justice sensitivity, the results are consistent with the intuition that the higher someone's perpetrator sensitivity, the less likely they are to go out, and the higher someone's victim sensitivity, the higher the punishment norm.

These results indicate that altruistic attitudes such as reciprocity influenced people's behavior in the early stage of the pandemic, but that influence of altruism changed as the pandemic continued. On the other hand, attitudes regarding fairness consistently affected people's behavior, behavioral intentions, and punishment norms. In particular, BUJ has consistently had a negative effect on cooperative behavior and punishment norms. BUJ is the belief that "present misfortunes should eventually be rewarded." The result suggests that people who believe they have been inconvenienced enough will refrain from voluntary cooperation. In addition, victim sensitivity has a consistently positive effect on the punishment norm. Victim sensitivity is

"sensitivity to one's own loss." These findings suggest that emphasizing prosociality and altruism effectively encourages voluntary cooperation in the early stages of the pandemic but that policies emphasizing fairness are necessary after the infections have become widespread. By continuously researching the factors that define people's behavior, it is possible to obtain a comprehensive picture of the social atmosphere surrounding a pandemic. This analysis can guide in developing policies that promote prosocial behavior.

As for media exposure and third-person effects, the effects are limited. Since this survey simply measured the amount of exposure through voluntary responses, more quantitative analysis, such as analyzing actual media consumption history, will be necessary in the future. Influential factors for COVID-19 prevention behavior are not only social dilemmas but also personality. Some researchers have focused on the effects of personalities on behavior during the COVID-19 Pandemic (Qian & Yahara, 2020; Nowak et al. 2020; Makhanova & Shepherd, 2020). In the future, our research will need to explore a wide range of factors. That exploration is planned for the third wave of panel studies.

Notes

- 1) The all data of this study are stored in an OSF data package titled 'Data of The effects of psychological attitudes and media exposure on voluntary cooperation against COVID-19' (Yamamoto, 2022), which can be accessed at the below link.
<https://doi.org/10.17605/OSF.IO/P7F3C>
- 2) All experiments were approved by the ethics committee of Rissho University, application number 02-01 and 03-02.
- 3) The authors acknowledge Grants-in-Aid for

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