Psychological Research on the COVID-19 Crisis in Japan: Focusing on Infection Preventive Behaviors, Future Prospects, and Information Dissemination Behaviors

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Abstract

The COVID-19 pandemic is a serious problem all over the world in 2020. In this study, a large-scale online survey was conducted in Japan to explore the determinants of infection preventive behaviors. In addition, this survey collected data on various attitudes and behaviors in this pandemic situation, including optimistic/pessimistic views and information dissemination behavior on social networking sites (SNS). The results showed that the infection risk perception of self and others were both associated with the preventive behaviors, but the social pressure was not. The results were unclear in regard to optimistic/pessimistic views for infection risk perception and prospect for the end of coronavirus outbreak. Surprisingly, information spreading via SNS was negatively associated with knowledge of COVID-19, which calls attention to the credibility of information on SNS. In addition, subjective evaluation of achievement in regard to preventive behaviors was higher for self than for other people. This suggests that a self-enhancement tendency may contribute to the evaluation of preventive behaviors. Despite limitations such as employing a cross-sectional survey design and using data collected only in Japan, our study provides useful insights into the determinants of infection preventive behaviors, information dissemination, and the self-enhancement tendency in the evaluation of preventive behaviors. These findings should be useful in preventing the spread of COVID-19 around the world and in preparing for a possible future pandemic.

Keywords: COVID-19, pandemic, infection preventive behavior, information dissemination behavior, optimism, culture.

1 Introduction

Since it was reported in Wuhan, China, in November 2019, the novel coronavirus (hereinafter referred to as COVID-19) has spread worldwide and caused a plethora of deaths, and as of June 2020 (at the time of writing) there is no end in sight. There is great room for psychological research to contribute to understanding of this pandemic. In this study, a large-scale online survey was conducted in Japan to explore the determinants of infection preventive behaviors. The data will be foundational and an important resource in promoting preventive behaviors. In addition, this survey collected data on various attitudes and behaviors in this pandemic situation, including optimistic/pessimistic views and information dissemination behavior on social networking sites (SNS). These data will help address not only this pandemic, but similar problems that may arise in the future. The following are some of the points considered in this study.

1.1 The determinants of infection preventive behaviors against COVID-19

It would be useful to know the factors that promote or inhibit infection preventive behaviors against COVID-19. In this study, we asked the participants about various infection preventive behaviors such as wearing a mask, washing hands, and refraining from going out, to identify what predicts these behaviors.

First, infection risk perception of one's self could promote preventive behaviors; this might be construed as a selfish motive. The risk perception of infecting other people due to himself or herself (hereinafter called "infection risk perception of others") could also promote preventive behaviors, which can be regarded as altruistic motives. Second, the present study considered that rejection avoidance tendencies, that is, avoidance of being judged negatively or rejected by others, especially by ingroup members, would promote preventive behaviors. Rejection avoidance has been discussed as a factor explaining collectivism in East Asia including Japan (Hashimoto and Yamagishi, 2013, 2016). Hashimoto and Yamagishi (2013, 2016) found that harmony seeking tendencies, which is associated with collectivism, is not higher in Japan than in the U.S., but there is a difference between the U.S. and Japan in rejection avoidance. Therefore, it is possible that preventive behaviors may be promoted by concern about being devalued or rejected by others if one does not take preventive behaviors in Japan. Third, the lack of mask-wearing habits in

western countries may be a deterrent to mask-wearing behavior. We examine whether mask-wearing habits prior to COVID-19 explain the current mask-wearing behavior in a Japanese sample.

1.2 Optimistic or pessimistic views on risk or the end of COVID-19

There might be individual differences of optimism/pessimism in infection risk perceptions of self, economic prospects, and prospects for the end of the coronavirus outbreak. We examined the factors that affect these prospects. Examples of items from the prospect factor included, “In how many months do you anticipate that the vaccine for COVID-19 will be developed?” and “In how many months do you anticipate that self-restraint in going out will be completely unnecessary in Japan?” We believe that these individual differences are worth considering for the following reasons. First, these prospects would promote or discourage the preventive behaviors described earlier. Second, such individual differences in prospects might lead to disagreements in opinion and behavior, which worsen relationships with others and mental health.

This study examines how chronic diseases, changes in economic circumstances, and changes in daily life due to COVID-19 relate to these prospects – these three factors seem to be difficult to improve through personal effort. According to a dual-process model of perceived control (Rothbaum et al., 1982), if it is difficult to improve a situation by direct approach to the environment (primary control), an attempt is made to optimize the environment by cognitively reassessing the situation (secondary control). Based on this, people with chronic diseases, as well as those whose economic circumstances and daily lives have been worsened by COVID-19, may have a lower estimate of their own risk of infection and an optimistic evaluation of their personal and social prospects for the future. However, this pandemic is an unprecedented crisis that may cause people to feel a strong sense of anxiety and fear, which may make it difficult for them to take an optimistic view of the situation (Kraaij et al., 2007; Sheppes and Meiran, 2007). Therefore, this secondary strategy may not generate optimism about future prospects, and people with chronic diseases and those whose economic circumstances and daily lives have been worsened by COVID-19 may also be pessimistic about future prospects. In this study, we investigate which of these is correct.

1.3 Determinants of ideas and information about COVID-19 and disseminating behavior

We receive a large volume of information about COVID-19 on a daily basis, not only from public institutions such as the government and mass media but also from individuals. Especially nowadays, with the ubiquity of SNS, it is easy for individuals to disseminate information. Sharing and dissemination of information is important in dealing with crises, but can sometimes lead to great confusion (Tanaka et al., 2012). Therefore, it is necessary to identify who has the ideas for solving COVID-19 and is actively disseminating them. This study examines whether knowledge of COVID-19 and expertise in various fields (medicine, infectious diseases, political economy, and social welfare) predict having ideas for solving COVID-19 problems, calls for preventive behaviors by others, and the dissemination of information on SNS.

1.4 Self-enhancement tendency in evaluation of infection preventive behaviors

This study also examined whether a self-enhancement tendency occurred in the evaluation of infection preventive behaviors. If there is a self-enhancement tendency, one will evaluate one's preventive behaviors more highly than those of others. We also asked about self and others in regard to what extent going out is acceptable in the face of demands for self-restraint. If one has self-enhancement tendencies, one would be more accepting of one's own behavior. Uncovering these trends would provide insights into considering excessive critical attitudes and behaviors toward others.

2 Materials and Methods

This study is approved by the Ethics Review Committee of the Faculty of Economics, Law and Humanities, Kagoshima University.

2.1 Participants

We conducted the online survey on 28 April 2020 (first round) and 3–5 May 2020 (second round). At that time, the Japanese Government was declaring a state of emergency and strongly urging people to take preventive behaviors such as refraining from going out. Initially, we did not plan a second round of the survey, but because there were items (i.e. infection risk perception of others) that were unfortunately not obtained in the first round, we introduced the second

round. A few items were added and corrected in the second round, and these will be explained later. In each round, Yahoo! crowdsourcing registrants in Japan were recruited on the site. The survey was targeted at 18–99 years old, and the recruitment document clearly specified the age range. Registrants went to the crowdsourcing site and participated in the survey if they agreed to the content of the survey. Fifteen Japanese yen were paid to participants who completed the survey.

We obtained the data for a total of 5072 participants in the first (2281 participants) and second (2791 participants) rounds, but some data were excluded based on the following criteria: (1) 50 participants who did not respond; (2) 942 participants who incorrectly answered the items for detecting “satisficers,” i.e. those who answered the questionnaire inattentively such as answering “correct” to the question “If you contract COVID-19, you will be able to speak English”; (3) one participant who answered that he or she was infected with COVID-19; (4) two participants who said their age was 17 years or over 100 years old; (5) six participants who said they lived abroad; and (6) 179 participants who gave apparently mutually contradictory answers such as two participants who answered that they were pregnant, despite being male, and 36 participants who reported that their personal annual income exceeded their household annual income. Ultimately, 3892 (1771 women, $M = 45.44$, $SD = 10.75$ and range 18–86 years) respondents were included in the analysis.

2.2 Questionnaire items

All questionnaire items are listed in Supplementary dataset. In the following, we mainly describe the items in response to the topics presented in the introduction.

2.2.1 Demographics and personalities

We asked about demographic factors and personalities to be used as control variables in the analyses. First, we inquired about age and gender as demographic factors. Participants’ background are assessed in the following aspects: the number of household members, marriage, personal and household income, occupation, educational background, place of residence (prefecture). In addition, we requested the participant to reveal if they or their family members had been infected with COVID-19. We used the Japanese version of the Ten Item Personality Inventory (Oshio et al., 2014) for

measuring Big Five personality traits.

2.2.2 Determinants of infection preventive behaviors

To investigate the determinants of infection preventive behaviors, we asked about various preventive behaviors (e.g. wearing a mask, refraining from going outside, washing hands, and maintaining social distance) on a seven-point Likert scale (13 items: $\alpha = 0.864$). Note that all questions below also used a seven-point Likert scale, unless otherwise noted. We also asked about the infection risk perception of self and others as explanatory factors. In terms of risk perceptions of self, we asked about the risk in terms of becoming infected with COVID-19 with minimum or maximum precautionary measures, developing severe symptoms, and the fatality rate (four items: $\alpha = 0.759$). An example of the item for risk perception of others included, “I have someone close to me who has high potential to be infected with COVID-19 from me” (four items: $\alpha = 0.800$). We unfortunately did not ask questions about the risk perception of others in the first round. Furthermore, we used the scale developed by Hashimoto and Yamagishi (2016) to examine whether rejection avoidance tendency is a determinant of preventive behaviors. The scale includes four subscales: self-expression, distinctiveness of the self, harmony seeking, and rejection avoidance. Only the scales of rejection avoidance (five items: $\alpha = 0.855$) and harmony seeking (five items: $\alpha = 0.823$) were used in our analysis.

In addition, we directly asked what the participant’s purpose was in taking infection preventive behaviors. Specifically, we asked how well each of the following reasons applies to them: preventing oneself, preventing others, avoiding negative evaluations, following the requests from government, and doing the same things as others.

Finally, in order to examine whether earlier habits had a facilitative effect especially on mask wearing, we included “Even before COVID-19 became a problem, I was in the habit of wearing a mask on a daily basis” (only second round). They were also asked about their reasons for wearing a mask and how well each of the following applies to them: wearing mask for oneself, wearing mask for others, and wearing mask for avoiding negative evaluations.

2.2.3 Optimistic/pessimistic views

Some people have optimistic views and others have pessimistic views about the risk of infection or the prospects for

the end. The factors that contribute to individual differences in these views were examined. First, we asked about the various prospects. Specifically, in addition to the aforementioned infection risk perception of self, we asked about when the COVID-19 pandemic would end, when a vaccine would be developed, and when abstaining from going outside would no longer be necessary, in units of months (five items: $\alpha = 0.812$). They were asked about their own future economic prospects such as how their income and saving would change in the future (two items: $\alpha = 0.823$). They were also asked about the economic prospects for Japan as a whole, including whether they thought the economy would worsen to a record low (two items: $\alpha = 0.629$).

As predictors, the objective health risks such as having a chronic disease were measured using appropriate formats instead of using a seven-point Likert scale. In addition, in order to examine whether the current uncontrollable difficulties brought about an optimistic outlook, they were asked about how their current economic circumstances, their overall life load, their daily enjoyment, and their relationships with their families had changed compared to before COVID-19.

2.2.4 Ideas and information about COVID-19 and disseminating them

We examined what kind of individuals had ideas about COVID-19 and were disseminating this information to others. First, we asked participants whether they could suggest effective own ideas for each of the following: prevention of the spread of infection, prevention of the economic slowdown, and helping people's household budget. In order to measure information dissemination behavior, we asked whether they have contacted others to persuade them to use preventive behaviors (three items: $\alpha = 0.613$) and whether they disseminate information through SNS. As determinants of the dissemination of these ideas and information, knowledge of COVID-19 and expertise in infectious disease, political economy, and social welfare were measured. First, as an indicator of objective knowledge, we created a COVID-19 knowledge questionnaire consisting of six items, in which participants judged correctness on a four-point scale: 1 (not at all correct) to 4 (completely correct). One example item was "Infection with COVID-19 always results in symptoms such as fever and cough" ($\alpha = 0.579$). Second, in order to measure their self-assessed expertise, they were asked if they had a wide variety of expert knowledge in infectiology, political economy, and social welfare. Although we also asked about expertise in medicine, we used only infectiology to avoid the problem of multicollinearity caused by high

correlations between the two variables ($r = 0.906$).

2.2.5 Self-enhancement tendency in evaluation of infection preventive behaviors

To determine any self-enhancement tendencies, the participants were asked to evaluate whether infection preventive behaviors of self, close others, and other Japanese people were sufficient. We also asked about self and others concerning the extent that going out is acceptable in the face of demands for self-restraint.

2.2.6 Other items

We used the Japanese version of K6 (Furukawa et al., 2008) for measuring depression and also measured fear and anxiety related to COVID-19 in order to increase fruitfulness of the data. Due to unprecedented nature of the COVID-19 crisis, we did not have solid systematic data to base our speculation or hypothesis. Note that depression was assessed on a five-point scale, as by Furukawa et al. (2008). These results are reported in the Supplement Table S2, S3 and S4. Although we asked some other questions, we do not report these in this paper. All items and the dataset are provided in the supplement, so researchers can freely analyze the data.

In order to detect “satisficers”, we included the following two questions: “How much has your blood type changed as a result of COVID-19 compared to before?” and “If you contract COVID-19, you will be able to speak English” (the first round) or “Even if you contract COVID-19, you will not be able to speak English” (the second round).

3 Results and Discussion

Due to the large sample size, it is not important whether the results were statistically significant or not. Therefore, the results of the multiple regression analysis will mainly refer to β which was 0.100 or higher. Also, in comparing the mean, it should be noted that the effect sizes and the raw scores themselves are important.

3.1 Predictors of preventive behaviors and mask wearing

A hierarchical multiple regression analysis was conducted using preventive behaviors and mask wearing as the

dependent variables (Table 1). In step 1, age, gender, and personality traits were entered. When the dependent variable was mask wearing, the habit of mask wearing before COVID-19 was also entered. Results showed that being female and agreeableness were positively associated with both dependent variables. This gender difference is consistent with a previous study (Yıldırım et al., 2020). In addition, the habit of mask wearing before COVID-19 was positively associated with mask wearing ($\beta = 0.213$). Our results suggest that cultural differences in usual mask-wearing habits are linked to differences in mask-wearing behavior under COVID-19.

In step 2, infection risk perception of self and others, rejection avoidance and harmony seeking, reasons for preventive behavior, and reasons for mask wearing (only in the case where the dependent variable was mask wearing) were separately entered as independent variables. First, infection risk perception of self and others showed positive relationships with both dependent variables. The results regarding risk perception of self is consistent with those of Plohl and Musil (2020) and Yıldırım et al. (2020). Furthermore, harmony seeking was positively associated with preventive behaviors and mask wearing, but no association was found for rejection avoidance. In addition, the reasons for preventing the spread of infection, such as “To prevent myself from being infected” and “To prevent others from being infected” were positively associated with preventive behaviors and mask wearing. However, the reasons related to social pressure, such as “To avoid negative evaluations from people around me,” “To follow the requests from the Japanese and local government,” and “Because people around me are taking preventive behaviors,” did not predict preventive behaviors or mask wearing.

These results indicate that preventive behaviors and mask wearing of Japanese people can be explained by individual awareness to prevent the spread of infection, rather than by social pressure. In previous studies, Japanese people have been shown to be sensitive to social pressure and to avoid negative evaluations by others (Hashimoto and Yamagishi, 2013, 2016; Sato et al., 2014). It has been pointed out that these characteristics explain why preventive behaviors have been taken in Japan without a mandatory lockdown¹. Although the results of this study are limited to Japan and cannot be compared with other countries, our results suggest that Japanese people may be taking preventive behaviors and wearing masks based on their intentions to prevent the spread of infection rather than due to social

¹ https://www.washingtonpost.com/world/asia_pacific/tokyo-lifts-state-of-emergency-braces-for-new-lifestyle-with-the-virus/2020/05/25/7a0e5836-9b75-11ea-ad79-eef7cd734641_story.html

pressures (for further discussion about cultural differences under COVID-19, see Salvador et al., 2020).

3.2 Predictors of future prospects about COVID-19

A hierarchical multiple regression analysis was conducted with the infection risk perception of self, the prospects for the end, the prospect of future individual economic loss, and the prospect of future societal economic loss as the dependent variables (Table 2). In step 1, age, gender, and personality traits were entered. In step 2, various chronic diseases, changes in the individual's economic circumstances (income, spending, savings, and debt) up to the present, and changes in the individual's living circumstances (work and other burdens, leisure enjoyment, and family relationships) up to the present were respectively entered.

First, age and neuroticism were positively related with risk perception of self. Iorfa et al. (2020) also showed that age and risk perception of COVID-19 were positively related. It was also shown that those with various chronic diseases, especially respiratory diseases, tended to have a higher risk perception of self.

The prospects for the end were generally not predictable using the explanatory variables in this analysis. This result did not support the prediction that the more deprived people are, the more secondary control will work and the more optimistic they are. This may be because the two cases are mixed; the case of pessimism may simply arise from poverty and the case of optimism from secondary control. In addition, the COVID-19 pandemic was an unprecedented experience for most people, and estimating the time needed for the situation to be resolved may be difficult.

Furthermore, with respect to the prospects of individual economic losses, the results show that those who previously had greater economic and daily losses were more likely to expect future losses. This suggests that such people tend to continue to see the future negatively, rather than exerting secondary controls and positively viewing the future. A similar trend was found in the estimates of future economic losses for society, but the magnitude of the association was very small compared to the estimates of future economic losses for individuals.

3.3 Calling for prevention to others, information spreading, and ideas

A hierarchical multiple regression analysis was conducted with the call for prevention to others, information spreading via SNS, and ideas for resolving the problems caused by COVID-19 as the dependent variables (Table 3). Age, gender,

and personality traits were entered in step 1, and education history (1. graduating from university/graduate school, 0. other), knowledge, and subjective expertise in infectious diseases, political economy, and social work were entered in step 2.

The call for prevention to others was positively associated with extraversion, conscientiousness, neuroticism, and specialty for social work. Information spreading via SNS was positively associated with high openness, subjective evaluation of infectious diseases and political economy expertise, and, surprisingly, negatively associated with knowledge. It should be noted that this knowledge measurement was not a subjective assessment, but rather the extent that participants could correctly answer questions related to knowledge of COVID-19. In general, people with low ability tend to overestimate themselves and people with high ability tend to underestimate themselves (Dunning et al., 2003). In regard to COVID-19, people without sufficient knowledge may overestimate their knowledge and post more on SNS. These results call attention to the credibility of information on SNS.

Openness was positively associated with all ideas for solving problems caused by COVID-19. Since openness is a trait associated with intelligence and creativity, it is possible that people who have high openness generate a range of ideas in this situation (although their effects and correctness are unclear). In addition, the three specialties were associated with ideas about the respective specialties (infectious diseases to prevent the spread of infection, political economy to prevent economic downturn, and social welfare to save households). However, knowledge of COVID-19 showed little association with any of the ideas.

3.4 Self-enhancement tendency

First, we conducted a one-way ANOVA to test whether evaluations of preventive behaviors for oneself, close others, and other Japanese people differed (Figure 1). The result showed that preventive behaviors were highly rated in the following order: self ($M = 4.38$), close others ($M = 4.11$), and other Japanese people ($M = 3.15$) ($F(2, 3892) = 1704.175$, $p < 0.001$, $\eta^2 = 0.133$). This suggests that self-enhancement tendency may contribute to the evaluation of preventive behaviors. The frequent media coverage concerning people who do not take sufficient preventive behaviors may also contribute to the differences.

Furthermore, we conducted a t -test to compare the means for the tolerance of self and others' behaviors in

regard to self-restraint in going out. The mean of tolerance was higher for self ($M = 3.59$) than for others ($M = 3.46$), but the difference was small ($t = 5.361$, $df = 1995$, $p < 0.001$, $d = 0.096$). Unlike preventive behaviors, tolerance of behaviors is assessed by the same criteria for self and others (for further analysis of self-enhancement tendency, see Supplementary information Figure S1).

These results indicate the presence of a self-enhancement tendency, which tends to elevate the self above others in terms of preventive behaviors and their reasons. These differences of evaluation between self and others may be a contributing factor that causes blame and conflicts over preventive behaviors. However, since there is little difference between self and others in the level of tolerance for behaviors regarding self-restraint in going out, it seems that many people set behavioral standards for themselves that do not differ from those they set for others.

3.5 Limitations and conclusion

The study has following limitations. First, since this was a cross-sectional survey, the causal relationships between variables are unknown. Second, it is not clear whether the results are generalizable to other countries and cultures because the survey was conducted only for Japanese people. Third, the validity of some of the scales used may not have been sufficient. These limitations were unavoidable due to the need to rapidly design and conduct a survey. Based on various studies, including this one, a comprehensive understanding of people's minds and behaviors in the COVID-19 crisis will be needed.

Despite these limitations, this study provides useful insights into the determinants of infection preventive behaviors, information dissemination, and the self-enhancement tendency in the evaluation of preventive behaviors. Our findings should be useful in preventing the spread of COVID-19 around the world and in preparing for possible future pandemics.

3.6 Conflict of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

3.7 Author contributions

Both authors, R.S. and H.O., contributed equally to all aspects of this research.

3.8 Acknowledgments

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Open practice statement

The data and materials for the experiment are available at <https://osf.io/mw6qc/>, and the experiment was not preregistered. Japanese version of the paper is available at <https://psyarxiv.com/635zk> (doi: 10.31234/osf.io/635zk).

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Table 1 Results of hierarchical regression analyses with objective variables being preventive behaviors and mask wearing.

		Preventive Behaviors		Mask wearing	
		β	R^2	β	R^2
step1	Age	0.023	0.145	0.028	0.146
	Sex	0.270 ***		0.209 ***	
	Extraversion	0.102 ***		0.060 **	
	Agreeableness	0.190 ***		0.153 ***	
	Conscientiousness	0.109 ***		-0.008	
	Neuroticism	0.054 **		0.022	
	Openness	0.000		-0.024	
	Habit of wearing a mask before COVID-19			0.213 ***	
step2	Risk perception (self)	0.214 ***	0.222	0.098 ***	0.176
	Risk perception (others)	0.107 ***		0.121 ***	
	Rejection avoidance	0.006	0.184	0.019	0.155
	Harmony seeking	0.236 ***		0.104 ***	
	Preventing oneself	0.242 ***	0.388	0.147 ***	0.261
	Preventing others	0.303 ***		0.233 ***	
	Avoiding negative evaluations	-0.029		-0.013	
	Following the requests from government	0.066 ***		0.029	
	Doing the same things as others	0.019		0.019	
	Wearing mask for oneself			0.164 ***	0.307
	Wearing mask for others			0.336 ***	
	Wearing mask for avoiding negative evaluations			-0.020	

** $p < 0.01$; *** $p < 0.001$

Table 2 Results of hierarchical regression analyses with objective variables being the risk perception of self, the prospect for the end of the coronavirus outbreak, the prospect of future individual economic loss, and the prospect of future societal economic loss.

		Risk perception (self)		Prospects for the end		Prospects for economic damages on individuals		Prospects for economic damages on society	
		β	R^2	β	R^2	β	R^2	β	R^2
step1	Age	0.165 ***	0.046	0.008	0.009	0.058 ***	0.012	0.098 ***	0.019
	Sex	0.049 **		-0.038 *		0.026		-0.026	
	Extraversion	-0.003		-0.047 **		0.030		0.020	
	Agreeableness	-0.012		-0.058 **		0.031		0.076 ***	
	Conscientiousness	-0.020		0.007		-0.034		0.019	
	Neuroticism	0.137 ***		0.029		0.094 ***		0.099 ***	
	Openness	-0.041 *		0.039 *		0.022		0.000	
step2	Heart disease	0.039 *	0.094	0.024	0.013	0.005	0.016	-0.028	0.022
	Respiratory disease	0.133 ***		0.036 *		0.023		0.008	
	Diabetes	0.069 ***		-0.024		0.017		0.029	
	High blood pressure	0.074 ***		0.039 *		0.050 **		0.034 *	
	Autoimmune disease	0.099 ***		0.021		0.026		0.001	
	Cancer	0.049 **		-0.010		-0.008		0.012	
	Change of income	-0.045 *	0.068	-0.038	0.011	-0.415 ***	0.541	-0.091 ***	0.049
	Change of spending	0.070 ***		0.016		0.018		0.029	
	Change of saving	-0.110 ***		-0.018		-0.397 ***		-0.100 ***	
	Change of debt	-0.022		-0.026		0.034 **		0.017	
	Daily burden	0.056 ***	0.054	0.047 **	0.012	-0.047 **	0.07	0.009	0.042
	Fun	-0.040 *		0.024		-0.185 ***		-0.141 ***	
	Relationship with family	-0.051 **		-0.034 *		-0.133 ***		-0.042 **	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3 Results of hierarchical regression analyses with objective variables being the call for prevention to others, information spreading via SNS, and ideas for resolving the problems caused by COVID-19.

		Call for prevention		SNS		Idea for prevention of the spread of infection		Idea for prevention of the economic slowdown		Idea for helping people's household budget	
		β	R^2	β	R^2	β	R^2	β	R^2	β	R^2
step1	Age	-0.063 **	0.090	-0.097 ***	0.031	-0.034 *	0.092	-0.047 **	0.104	-0.029	0.098
	Sex	0.085 ***		-0.038 *		-0.088 ***		-0.098 ***		-0.089 ***	
	Extraversion	0.196 ***		0.068 ***		0.056 ***		0.068 ***		0.059 ***	
	Agreeableness	0.080 ***		-0.028		0.014		-0.004		0.005	
	Conscientiousness	0.107 ***		0.002		0.095 ***		0.086 ***		0.088 ***	
	Neuroticism	0.104 ***		0.044 *		0.010		-0.021		-0.015	
	Openess	0.084 ***		0.114 ***		0.224 ***		0.231 ***		0.228 ***	
step2	Education	-0.021	0.147	-0.036 *	0.102	-0.022	0.181	-0.036 *	0.197	-0.028	0.197
	Knowledge	-0.049 **		-0.112 ***		0.015		-0.017		-0.011	
	Infectiology	0.091 ***		0.104 ***		0.155 ***		0.110 ***		0.076 ***	
	Politics and economimics	0.038		0.107 ***		0.124 ***		0.167 ***		0.177 ***	
	Social welfare	0.144 ***		0.079 ***		0.084 ***		0.097 ***		0.129 ***	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Figure 1 Evaluations of preventive behaviors of self, close others, and other Japanese people (error bars indicate standard errors).