Mask Wearing Behavior and COVID-19: Synthetic Effects of Individualism and Collectivism in Korea

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Abstract

The behavior of the general public has largely been critical to the effective COVID-19 response. Republic of Korea has shown a better response performance than many other countries around the world. Based on the theories of individualism-collectivism, this study analyzes how the Korean culture influences the mask-wearing behavior of people in Korea. Two online surveys were conducted after the first wave and in the middle of third wave of COVID-19 pandemic in Korea. The results of regression analysis demonstrate that, when demographic variables are controlled, concerns around infecting others and respondents' horizontal individualistic tendency have significant positive effects on mask wearing behavior. Meanwhile, horizontal collectivism also positively affects the respondents' mask-wearing behavior as expected in collectivistic culture of Korean people. We conclude that the general collectivism of Korean people is mutually synergetic with the horizontal individualism in responding to the COVID-19 pandemic in Korea.

Introduction

Republic of Korea has successfully controlled COVID-19 so far, even though Korea did not execute a strong lockdown policy.¹ According to Sachs, et al.¹, Korea's index of epidemic control, which combines mortality rate, effective reproduction rate, and efficiency of epidemic control, is higher than other OECD countries. This performance seems to be the result of the fact that Korean people followed social distancing policies, including wearing masks, very well. It has been found that wearing a mask is one of the most important mass preventive measures for COVID-19²⁻⁵. Wearing a mask is more effective in reducing the risk of infecting other people than preventing the wearer from being infected by other people^{3,4}, for masks can mechanically reduce the transmission of respiratory droplets.

Mask wearing behavior varies greatly from country to country, based on cultural, environmental, and political characteristics⁶. According to the international Gallup Poll⁷, Koreans followed the mask wearing mandates very well compared with other countries (90% of the Koreans stated that they wear mask when going out). This was similar for other Asian countries as well, namely Thailand (81%) and Japan (70%)⁷. Flaskerud⁶ argues that there is a "strong mask wearing culture" in East Asian countries such as South Korea, Hong Kong, Japan, China, and Taiwan, where collectivism is strong. In contrast, a lot of people in Western countries in individualistic cultures are less likely to wear masks in public places because they tend to view a mask mandate as a symbolic infringement on their personal choice and freedom⁸.

Collectivism refers to a tendency where the behavior of people is constrained by collective norms, rather than individual autonomy. Hofstede⁹ suggested the concepts of individualism-collectivism, that is "individualism, on the one side versus its opposite, collectivism, is the degree to which individuals are supposed to look after themselves or remain integrated into groups." This has to do with the question of whether people's self-image is defined in terms of "I" or "We"¹⁰. Triandis¹¹ suggested the individualism-collectivism distinction as a personal psychological attribute, rather than a macro-cultural one. Thus,

Triandis and Gelfand ¹² have identified four types of cultures: Horizontal Individualism (HI), where people want to be unique and do “their own thing”; Vertical Individualism (VI), where people want to do their own thing and also want to be “the best”; Horizontal Collectivism (HC), where people merge their selves with their in-groups; and Vertical Collectivism (VC), where people submit to the authorities of in-group and are willing to sacrifice themselves for their in-group.

Given the vertical-horizontal dimension, there are different varieties of individualism and collectivism ¹³. Hierarchical or equitable relationships can exist in individualistic cultures. American individualism represents more of vertical individualism, for it stresses on hierarchy on the basis of meritocracy, rather than on communitarian values (highly competitive Americans who want to be “the best”). In addition, there are diverse forms of collectivism. For instance, Korean collectivism is not the same as the collectivism of the Israeli kibbutz. While some cultures emphasize on equality (e.g., Australians, Swedes, and Kibbutzim), others emphasize on hierarchy (e.g., India). Korean culture is characterized as a mix of individualism and collectivism. While collectivism is present in elderly people, individualism has come to be increasingly apparent among the well-educated people living in urban cities ^{14,15}.

Various extant studies have suggested that collectivism is more effective than individualism in responding to infectious diseases ^{3,16-18}. Among them, Fincher, et al. ¹⁶ suggest that collectivism will more often characterize the cultures of those regions that have historically had a higher prevalence of pathogens, for it can inhibit the transmission of pathogens (in comparison to individualism). Biddlestone, et al. ¹⁹ investigated the factors of collectivism and individualism in terms of the willingness to engage in social distancing behaviors for COVID-19. They demonstrated that VI negatively and VC positively contributed to social distancing intentions directly, with there being indirect positive association of HC. For the mask wearing behavior and collectivism, Lu, et al. ⁸ provide evidence that collectivism positively predicts mask usage both within the United States and across the world using large scale data set. Meanwhile, Nakayachi, et al. ³ shows that the Japanese tendencies of collectivism, that conform to other people’s behaviors (societal norms), have contributed toward an increase in their mask wearing behavior.

In this sense, collectivistic cultural characteristics may increase people’s conformity to preventive measures such as wearing masks, which would strengthen the collective response capacity in the entire society ³. Meanwhile, it is assumed that individualism leads to the opposite result, increasing the possibility of people not conforming to governmental policies, which would contribute toward the deterioration of the capacity of pandemic responses. However, in-depth studies on understanding the effect of individualistic tendencies on infectious diseases are lacking. Unlike Hofstede’s point of view, individualism and collectivism can be different concepts, rather than being opposite concepts ¹¹, and thus, an in-depth consideration of the influence of individualism on infectious diseases is needed.

In this research, we utilized Triandis’ theory to explain why almost all Korean people wear face masks very well. By paying particular attention to the generation factor related to individualism and collectivism,

we insist that the mask-wearing behavior of Korean people results from the synergetic effects of individualism and collectivism.

Methods

Surveys

To evaluate the relationship between mask usage and collectivism-individualism, we constructed two survey datasets of Korean adults (aged 19 years and older). The first online survey of 1,000 online panels was conducted using a mobile survey application on July 9, 2020. The second survey aims to replicate the result of the first survey using a more detailed measure of mask usage with larger samples. The second online survey was conducted between December 21 and December 29, 2020 by a large polling company in Korea. A sample of 1,569 online panels participated in the structured questionnaire web survey. The sample was selected through stratified sampling method based on gender, age, and region. Table 1 provides demographic information of the participants.

Table 1
The demography of survey participants

Variable	Value	1 st (July) Cases (<i>n</i> = 1,000)	2nd (December) Cases (<i>n</i> = 1,569)
Gender	Male	511 (51.1%)	789 (50.30%)
	Female	489 (48.9%)	780 (49.70%)
Age	19–29	183 (18.3%)	267 (17.00%)
	30s	187 (18.3%)	261 (16.60%)
	40s	222 (22.2%)	310 (19.80%)
	50s	235 (23.5%)	312 (19.90%)
	60 years and older	173 (17.3%)	419 (26.70%)
Political party preference	Democratic Party	537 (53.7%)	666 (42.40%)
	People Power Party	221 (22.1%)	410 (26.10%)
	Justice Party	101 (10.1%)	175 (11.20%)
	Others	141 (14.1%)	318 (20.30%)

Our study obtained ethical approval from the Institutional Review Board of the Ulsan National Institute of Science and Technology (No. UNISTIRB-20-55-A, UNISTIRB-65-A). This study protocol was performed in accordance with the relevant guidelines of this board. Our survey was based on informed consent from participants and the survey data is protected, based on the Korean Statistics Act.

Measures

Measuring individual mask usage and the risk perception of COVID-19

To measure the risk perception of COVID-19 and related behaviors, we questioned respondents' mask wearing behavior and their fears of COVID-19 related issues. The general mask wearing behavior (do you wear face mask when you go out?) was measured using a Likert-scale with a 5-point frequency (1 = "never", 2 = "rarely", 3 = "sometimes", 4 = "very often", and 5 = "always"). Because the general mask usage of the participants was generally very high (mean = 4.64) in the first survey, we added four additional questionnaires to measure the respondents' location-specific mask wearing behavior in the second survey. Each item measured respondents' level of compliance with a mask mandate at each location; office, café, bar, and outdoor such as park. The items consisted of 4-point Likert-scale from 1 = "not at all" to 4 = "to a great extent." Using the four location-specific mask wearing behaviors, we developed the mask wearing index. The mask wearing index was calculated as the sum of four location-specific mask usage questionnaires.

The respondents' perceived risks of COVID-19 were measured using five items: an item about the perceived possibility of catching COVID-19 and four items related to the worry of related issues. The possibility of catching COVID-19 was measured using a 5-point Likert scale, with 1 indicating "not at all" and 5 indicating "to a great extent." The four items measuring worry were also five-point Likert-scale variables, with 1 indicating "not at all worried" and 5 indicating "very worried." The first item asked respondents of their worry about health deterioration, if they happen to be infected by COVID-19. The second item measured the level of worry that they could transmit the disease to others, such as family and friends. The third item was concerning privacy breach issues, which occurred in Korea as a result of people sharing a lot of information of infected people via emergency alert SMS ²⁰. The last item asked respondents as to how worried they were of being blamed by others if they were infected. In this paper, each item was named as follows: worry about my health, worry about infecting others, worry about a privacy breach, and worry about being blamed.

Measuring individualism and collectivism

This study developed a modified version of individualism and collectivism scale based on the original 32 items developed by Singelis, et al. ²¹. For better reliability of the responses, we adopted the Korean translated questionnaire developed by prior studies ^{22,23}. A pilot test was conducted to reduce the number of items on June 25, 2020. 74 respondents were selected via convenience sampling and were asked to answer the original 32-items of individualism and collectivism questionnaires. By conducting exploratory factor analyses and several tests of reliability analyses, we developed a modified version of the individualism and collectivism test set comprising of 12 questionnaires. They were selected to assess four subscales: VI, HI, VC, and HC. The following items are examples of the finally selected items used for each subscale: "without competition, it is not possible to have a good society (VI)," "I often do 'my own

thing' (HI)," "I usually sacrifice my self-interest for the benefit of my group (VC)," and "the well-being of my co-workers is important to me (HC)." Each subscale consists of three items, and the score of each scale index is the sum of the three items. Each item is a 5-point Likert-scale variable ranging from 1 (strongly disagree) to 5 (strongly agree). The higher the score, the higher the corresponding indices of VI, HI, VC, and HC (max 15; min 3). In the first survey, Cronbach's α for each dimension were 0.59 (VI), 0.69 (HI), 0.74 (VC), and 0.75 (HC), which exhibited acceptable internal consistency except for VI (< 0.60). All four indices from the second survey had acceptable internal consistency, Cronbach's $\alpha = 0.66$ (VI), 0.67 (HI), 0.75 (VC), and 0.79 (HC).

Effects of political values

Some South Korea's COVID-19 policies, like that of the other countries, such as the United States^{24,25}, were also engulfed by a vigorous political debate. Therefore, we added a variable of the respondents' preference of political parties. Respondents were provided four response options, which include three of the major political parties in Korea and "others." The political parties – "Democratic Party" (current ruling party, politically liberal), "People Power Party" (the representative conservative party in Korea), and "Justice Party" (politically progressive) – were selected in terms of their number of seats. The party preference variable was reorganized by having the three dummy coded variables used for analysis, with "others" used as the reference category.

This study analyzes Korean people's mask-wearing behavior by focusing on the cultural characteristics of individualism and collectivism. As in the previous literature^{14,15,26}, the cultural characteristics of individualism and collectivism can be very different among younger and older generations, particularly in Korea, a country which has achieved rapid economic and social development. As a result, we conducted the same analysis for the younger generation and older generation to uncover the differences between the two groups.

Result

General mask wearing behavior and individualism-collectivism

Since the first survey was conducted on July, 2020, when the major outbreak (the first wave) had subsided, the mean value of the degree of possibility of catching COVID-19 is below neutral (2.64). However, most of the respondents answered that they wear face masks when going out (4.64). Women tended to wear masks (4.82) better than men (4.47), and the younger generation tended to wear masks significantly better than the older generations (20s and younger: 4.83; 30s: 4.68; 40s: 4.61; 50s: 4.57; 60s and older: 4.55, $p < 0.01$). The second survey was conducted in December, in the middle of third wave in Korea. Because the COVID-19 situation was much worse than the first one, the mean value of the possibility of catching COVID-19 was above the neutral (3.24). The mean value of the general mask wearing behavior was also increased to 4.83, and it was not statistically different by gender and age group. For the location specific mask-wearing behaviors, respondents were more compliant in cafés (3.66) and outdoors (3.63) and less in offices (3.49) and bars (3.55). Generally, female respondents

tended to use masks better than male (office, $p < .001$; café, $p < .05$; bar, $p < .001$; and outdoor, $p < .001$). There also showed statistical differences among age group, according to ANOVA (office, $p < .001$; café, $p < .01$; bar, $p < .001$; and outdoor, $p < .05$).

The respondents answered that they worried most about infecting other persons (1st, 4.30; 2nd, 4.27), than being worried about their own health (1st, 3.94; 2nd, 4.10) if they had COVID-19. As there was an intense surveillance of patients' travel routes by the Korean government, many respondents worried about privacy breach (1st, 3.66; 2nd, 3.63). Furthermore, with respect to the possibility of infecting other persons and privacy breach, respondents worried that they would be blamed if they were infected by COVID-19 (1st, 3.72; 2nd, 3.83).

As expected, owing to the collectivistic cultural characteristics of Korean people, the values of collectivism (VC, HC) were higher than the values of individualism among the respondents (VI, HI) in both surveys. Furthermore, the horizontal values were generally higher than the vertical values. Male respondents tended to have significantly higher levels of VI (1st, 8.66 vs. 8.06, $p < 0.001$; 2nd, 8.62 vs. 8.05, $p < 0.001$) and HC (1st, 11.62 vs. 11.35, $p < 0.05$; 2nd, 10.88 vs. 10.63, $p < 0.05$) than female respondents. Older respondents tended to have significantly higher VC (1st, $r = 0.122$, $p < 0.01$; 2nd, $r = 0.122$, $p < 0.01$) and HC (1st, $r = 0.100$, $p < 0.01$; 2nd, $r = 0.180$, $p < 0.01$) than the younger respondents when we saw the correlation coefficient of age and collectivism value.

Respondents' mask wearing behavior was correlated to their worry about health (1st, $r = 0.103$, $p < 0.01$; 2nd, $r = 0.240$, $p < 0.01$), worry about infecting others (1st, $r = 0.161$, $p < 0.01$; 2nd, $r = 0.256$, $p < 0.01$), and worry about being blamed (1st, not significant; 2nd, $r = 0.084$, $p < 0.01$). The descriptive statistics of the important measuring variables are shown in Table 2.

Table 2. Descriptive statistics of measuring variables

	Min	Max	1 st		2 nd	
			Mean	SD	Mean	SD
<i>Mask wearing behavior</i>						
General mask wearing behavior (M_G)	1	5	4.64	0.69	4.83	0.55
Mask wearing index (M_I)	4	16	NA	NA	14.32	2.16
<i>Risk perception</i>						
Possibility of catching (R_c)	1	5	2.64	0.82	3.24	0.88
Worry about my health (R_h)	1	5	3.94	0.89	4.10	0.87
Worry about infecting others (R_o)	1	5	4.30	0.78	4.27	0.83
Worry about privacy breach (R_p)	1	5	3.66	1.02	3.63	1.09
Worry about being blamed (R_b)	1	5	3.72	1.01	3.83	1.03
<i>Individualism and Collectivism</i>						
Vertical individualism (VI)	3	15	8.37	2.19	8.34	2.27
Horizontal individualism (HI)	3	15	10.97	2.05	10.71	2.02
Vertical collectivism (VC)	3	15	10.66	1.94	10.56	1.96
Horizontal collectivism (HC)	3	15	11.49	2.03	10.75	2.11

Effects of political party support

A comparison of political party preference, individualism-collectivism tendencies, and general mask wearing behavior was carried out using ANOVA (Table 3). In accordance with party preferences, VI showed significantly clear differences between respondents' political party preferences in both surveys. As VI values competitive spirit, the politically conservative People Power Party supporters tended to have higher VI values than the other party supporters. Other dimensions of individualism-collectivism showed only small differences in accordance with the party preferences, even though the most progressive Justice Party supporters showed significantly lower collectivism value indexes. In case of general mask wearing behavior, there were no significant differences in accordance with the party preferences in the first survey. However, in the latter survey, it was found that the supporters of Democratic Party generally wore masks better than the supporters of the People Power Party supporters ($p < 0.001$).

Table 3. Mask wearing behavior, individualism, and collectivism by party preference

		1 st				2 nd			
		N	Mean	SD	P-value	N	Mean	SD	P-value
General mask wearing behavior	Democratic Party	537	4.64	.689	.153	666	4.87	.489	.001
	People Power Party	221	4.58	.744		410	4.77	.648	
	Justice Party	101	4.68	.582		175	4.74	.658	
	Etc.	141	4.74	.701		318	4.88	.426	
VI	Democratic Party	537	8.31	2.112	.000	666	8.24	2.313	.000
	People Power Party	221	8.90	2.204		410	8.91	2.165	
	Justice Party	101	7.89	2.126		175	7.70	2.325	
	Etc.	141	8.05	2.373		318	8.17	2.135	
HI	Democratic Party	537	10.98	2.047	.977	666	10.85	1.922	.046
	People Power Party	221	10.97	2.138		410	10.73	2.057	
	Justice Party	101	10.89	1.832		175	10.50	2.284	
	Etc.	141	10.94	2.078		318	10.52	1.985	
VC	Democratic Party	537	10.74	1.851	.556	666	10.70	1.833	.006
	People Power Party	221	10.57	2.126		410	10.60	1.933	
	Justice Party	101	10.52	1.937		175	10.18	2.144	
	Etc.	141	10.58	2.011		318	10.40	2.093	
HC	Democratic Party	537	11.49	2.034	.950	666	10.85	2.018	.029
	People Power Party	221	11.43	2.128		410	10.76	2.117	
	Justice Party	101	11.53	1.942		175	10.31	2.246	
	Etc.	141	11.55	1.951		318	10.78	2.203	

Generation effects

The factor that shows a clear difference in Korea's individualism-collectivism is the age generations. In this study, the respondents were divided into two groups, an older group (45 years old or older, 1st, n = 503; 2nd, n = 877) and a younger group (below 45 years, 1st, n = 497; 2nd, n = 692) to identify the differences between generations. Figure 1 presents the differences in the important measuring variables between the older and younger groups. In the earlier survey, the younger group tended to wear masks better than the older group ($p < 0.001$). The younger group also tended to show a higher level of worry of infecting other people ($p < 0.05$). However, as the COVID-19 situation worsened in the second survey, the differences in mask wearing behavior and worry by age groups diminished.

The older group tended to have a higher level of collectivism, as mentioned in the literature. The older group had higher levels of VC ($p < 0.001$ in both survey) and HC (1st, $p < 0.01$; 2nd, $p < 0.001$) than the younger group. The younger group tended to have a significantly higher level of HI than the older group in the first survey ($p < 0.001$), but this tendency was reversed in the second survey ($p < 0.05$). There was no significant difference in VI value between the two groups.

Factors affecting general mask wearing behavior

A linear regression analysis was conducted to ascertain as to how the factors affected the respondents' mask-wearing behavior. The dependent variable was mask-wearing behavior. Demographic characteristics such as gender, age, and party preference; risk perception variables such as the possibility of catching and worrying about COVID-19; and four subscales of individualism and collectivism were used as independent variables. Table 4 shows the results of the linear regression analyses for both surveys. To analyze the differences between generations, the same linear regression model was applied separately for the whole group, the younger group only (below 45 years), and the older group only (45 years or older).

At the first survey, gender, age, worry about infecting others, and HC had statistically significant effects on respondents' mask-wearing behavior for the whole group model. Women and younger respondents tended to wear masks better ($p < 0.001$). Respondents who were more worried about infecting others tended to wear masks better ($p < 0.01$). Among the subscales of individualism and collectivism, only HC was positively significant ($p < 0.01$), which means that the respondents with higher HC scales tended to wear masks better. While the younger respondents who were more worried of infecting others tended to wear masks better ($p < 0.01$), those who were more worried about being blamed for catching COVID-19 were wearing masks less frequently ($p < 0.05$). In the older group, the worry about infecting others did not affect their mask-wearing behavior. The older group was affected by HC ($p < 0.05$). The HI scale was only significant in the younger group model ($p < 0.01$), and the direction of its effect was also positive. Younger respondents with a stronger HI tendency tended to wear masks better. On the other hand, the older respondents with a stronger HC tendency tended to wear masks better.

However, at the second survey, when the COVID-19 situation has gotten much worse in Korea, we could not find any statistically significant demographic effects. As increasing COVID-19 confirmed cases, worry

about my health in addition to worried about infecting others have significant impact on respondents' mask wearing behaviors ($p < .001$). As most respondents wear mask better than earlier survey, the effect of collectivism diminished. However, the effect of individualism was more significant, in that VI had negative effect ($p < .001$) and HI had positive effect ($p < .01$) on respondents' mask wearing behaviors.

Table 4. The results of regression analysis for general mask wearing behavior (standardized regression coefficients for each sub-group)

	1 st			2 nd		
Sub-groups	Whole	Younger	Older	Whole	Younger	Older
<i>Demographics</i>						
Gender dummy (male = 0)	.259***	.188***	.305***	.009	.031	-.019
Age	-.123***	-.025	.019	-.017	-.040	-.022
<i>Risk perception</i>						
Possibility of catching	.013	-.004	-.019	-.009	.001	-.020
Worry about my health	.017	.035	.011	.146***	.109*	.180***
Worry about infecting others	.107**	.130**	.087	.168***	.216***	.118**
Worry about privacy breach	.054	.083	.029	-.047	-.074	-.014
Worry about blaming	-.058	-.104*	.005	.006	.037	-.024
<i>Political party preference</i>						
Democratic party dummy	-.058	.001	-.100	-.024	.002	-.046
Conservative party dummy	-.051	.007	-.106	-.060	-.076	-.046
Justice party dummy	-.041	.010	-.057	-.076**	-.055	-.096**
<i>Individualism and collectivism</i>						
Vertical individualism (VI)	-.022	-.028	-.028	-.131***	-.115**	-.147***
Horizontal individualism (HI)	.059	.158**	.001	.081**	.085*	.075*
Vertical collectivism (VC)	.027	.088	-.011	.029	.004	.059
Horizontal collectivism (HC)	.109**	.069	.128*	.058	.045	.058
Total adjusted R ² (%)	12.8%	13.9%	10.7%	10.8%	11.2%	9.9%

* $p < .05$, ** $p < .01$, *** $p < .001$

In the second survey, a location specific mask wearing index was introduced and used for the analysis. Table 5 shows the result of the regression analysis for the location specific mask wearing index. This result also showed the significant effect of HI that respondents with high HI scores tended to wear masks well for both sub-groups. Furthermore, the HC score also positively affected respondents' location specific mask wearing index in the older group.

Table 5. The results of regression analysis for location specific mask wearing index (2nd survey)

Dependent variable (mask wearing index)	Sub-groups		
Independent variables	Whole	Younger	Older
<i>Demographics</i>			
Gender dummy (male = 0)	.009	.062	.162***
Age	-.017	-.033	.104**
<i>Risk perception</i>			
Possibility of catching	-.009	-.031	-.014
Worry about my health	.146***	.118**	.154***
Worry about infecting others	.168***	.099*	.027
Worry about privacy breach	-.047	.011	.045
Worry about blaming	.006	-.007	-.004
<i>Political party preference</i>			
Democratic party dummy	-.024	-.017	-.015
Conservative party dummy	-.060	.054	-.034
Justice party dummy	-.076**	-.021	-.067
<i>Individualism and collectivism</i>			
Vertical individualism (VI)	-.131***	-.021	-.059
Horizontal individualism (HI)	.081**	.089*	.098**
Vertical collectivism (VC)	.029	-.054	-.014
Horizontal collectivism (HC)	.058	.023	.089*
Total adjusted R ² (%)	6.8%	3.3%	10.3%

Discussion

In the U.S., the public response to preventive measures such as wearing masks was divided along partisan lines ^{6,24}. This may be a result of many reasons such as inconsistent public health recommendations from politicians and media, concerns toward the shortage of masks for health workers, gender norms, and people's belief in conspiracy theories ^{5,24,27}. More fundamentally, it may be because of people's cultural tendencies in the U.S., where wearing masks has often been associated with sinister activity, foreign culture, femininity, and weakness ²⁴. Moreover, the strong individualistic characteristics of U.S. citizens may have exacerbated the situation. Contrary to the situation in the U.S., despite the political

controversy over the government's COVID-19 policies, there was only small partisan differences in the level of mask wearing behavior in Korea. This might possibly be because of mask wearing already being a culturally familiar activity in Korea, and the Korean government has consistently emphasized that wearing masks is the most important mass prevention measure since the early stage of the pandemic. Furthermore, the collectivistic tendency of general Koreans makes them easily accept and conform to this recommendation.

As can be seen from the results of the correlation analysis, both collectivism and individualism showed a significant relationship with the respondents' mask-wearing behavior. First, the results imply that the Korean public conforms to the mask mandate because of the collectivistic tendencies¹⁶⁻¹⁸ that prioritize the group over the individual. The results of the regression analysis demonstrated that, when demographic variables were in control, HC tendency and concern about infecting others had a significantly positive effect on the mask wearing behavior. In other words, respondents who prioritized their group over themselves and worry about other people tended to wear masks better. Meanwhile, HI also positively affected respondents' mask-wearing behavior, particularly the younger generation's behavior. In other words, HI also contributed to the mask wearing behavior synergistically with HC, a result not found in any of the previous studies.

This result is similar to the study by Campbell²⁸, who compared the differences between the collectivists and individualists' perceptions of cell phone etiquette in public places. This study found collectivists to be more tolerant to other people using cell phones (i.e., voice calling and ringing) than individualists. He argued that this trend translates into individualists' sense of injustice when they witness other people using cell phones in public places. In other words, the individualists viewed improper cell phone use in public space to be an injustice because of the tendency that "collectivists in conflict situations are primarily concerned with maintaining their relationships with others, whereas individualists are primarily concerned with achieving justice"²⁸. Likewise, the respondents who have a strong HI tendency in this study may also think that not wearing mask is an injustice, for it harms other people. It can be seen that the general horizontal collectivism and horizontal individualism of Korean people exert a mutual synergistic effect on people's mask-wearing behavior.

These results show different context from the Japanese case³. The respondents in the Nakayachi, et al.³ study may conform to societal norms in wearing masks (when you see other people wearing masks, do you think that you should wear a mask?), mainly based on their collectivistic culture. However, in the case of the Korean respondents, although they belonged to a general collectivistic culture, the horizontal individualism also worked positively. In other words, respondents tended to wear masks better, not because they worry about the criticism from others, but because they did not want to inflict harm on others. In fact, their mask-wearing behavior can be interpreted as a voluntary behavior, which is not a result of external pressure or others' attention.

Conclusion

The influence of HI was prominent mainly in younger respondents. This coincides with the extant literature's position that Korean culture is moving from collectivism to individualism^{14,15}. In Korea, young people with a tendency for HI seemed to wear mask as a kind of social etiquette to not harm others. We assume that HI would involve two types of morality: individual autonomy and non-maleficence. That being said, in the face of the COVID-19 pandemic, Korean respondents tended to prioritize non-maleficence over individual autonomy. Individual autonomy can be detrimental to mask wearing behavior, for there might be people who do not want to comply with the government's recommendation of mask wearing. However, non-maleficence is integral to the mask wearing behavior of Korean people. The Korean term *Minpye* is one of the most frequently used words for blaming virus patients. In particular, the young Koreans tend to take it seriously, saying that virus patients should not commit *Minpye*. This term denotes causing harm or trouble to others, which is opposite to the notion of non-maleficence²⁹. Moreover, non-maleficence is close to collectivism, thus, collectivism and individualism share the virtue of non-maleficence. As a result of this, individualism is synergetic with collectivism in affecting the mask-wearing behavior of South Koreans.

Declarations

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Author contributions

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Competing interests

The authors declare no competing interests.

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Figures

Figure 1

differences by older and younger groups (Note: Older, 45 years old or older group; Younger, below 45 years group; 1st, the first survey; 2nd, the second survey, and asterisk indicates statistically significant difference)