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Mask-wearing behavior during the COVID-19 pandemic in Korea: The role of individualism in a collectivistic country

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ABSTRACT

The behavior of the general public is crucial for an effective COVID-19 response. The Republic of Korea has shown better performance in this regard than many other countries worldwide. Based on the theories of individualism and collectivism, this study analyzes how Korean culture and political preferences influence the mask-wearing behavior of people in Korea. We conducted two online surveys after the first wave and in the middle of the third wave of the pandemic in Korea. The results showed only small partisan differences in the level of mask-wearing behavior in Korea. Additionally, regression analysis results demonstrate that, when demographic variables are controlled, concerns of spreading infection and horizontal individualistic tendencies of younger respondents have a significant positive relation to mask-wearing behavior. Meanwhile, horizontal collectivism had a significant positive relationship with older respondents’ mask-wearing behavior, as expected in the collectivistic culture of the Korean people. As a result, horizontal individualism has similar characteristics with horizontal collectivism in Koreans and both have a positive relation to their mask-wearing behavior.

1. Introduction

Government policies, such as swift surveillance, quarantine, and social distancing, are critical in making the response to COVID-19 effective [1]. However, these may not necessarily guarantee excellent preventive effects. The general public's behavior may be more important than governmental policies for an effective COVID-19 response. In other words, general people's behavior of following the recommended prevention guidelines, such as wearing a face mask and practicing social distancing, can be more crucial in preventing the spread of infectious diseases [58].

The Republic of Korea has shown a better response performance than many other countries worldwide. Even though Korea did not implement a strong lockdown policy [2]. According to Sachs et al. [2], Korea’s index of epidemic control, which combines mortality rate, effective reproduction rate, and efficiency of epidemic control, is higher than that of other OECD (The Organization for Economic Co-operation and Development) countries. This performance seems to be the result of the fact that Korean people followed social distancing policies, including wearing masks. It has been found that wearing a mask is one of the most important preventive measures against COVID-19 [3–6]. Wearing a mask is more effective in reducing the risk of infecting other people than preventing the wearer from being infected by other people [4,5], for masks can mechanically reduce the transmission of respiratory droplets. Ac-

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cording to the international Gallup Poll [7], Koreans followed the mask-wearing mandates very well compared to other countries (90% of Koreans stated that they wear masks when going out).

This study examined the relationship between cultural orientation and mask-wearing behaviors. Drawing on the theory of individualism-collectivism, we analyzed how individualism and collectivism influenced mask-wearing behavior in Korea during the pandemic. Various extant studies have suggested that collectivism is more effective than individualism in responding to infectious diseases [4,8–11]. However, very few studies have investigated the role of individualism in response to infectious diseases. In this vein, this study examines the individualistic tendencies involved in mask-wearing behavior in Korea. With particular attention to generational factors in terms of individualism-collectivism, we argue that the younger generation’s individualism is synergistic with the general collectivism of the Korean people with regard to the mask-wearing behavior of Koreans.

This study is presented in the following order. First, the study’s background, the outbreak of COVID-19 in Korea, and the responses of the Korean government and the public are presented. Second, extant research on individualism-collectivism and infectious diseases is presented, including the most recent studies on COVID-19. Third, in the methods section, we provide information on the survey methods and variables used. Fourth, in the results section, we present the descriptive statistics of the survey and carry out an analysis of the relationship between individualism-collectivism and public preventive behavior, in particular, the behavior of wearing face masks. Finally, we discuss the reason why Koreans wear masks from the viewpoint of individualism-collectivism.

2. Background: COVID-19 in Korea

Since the first confirmed case of COVID-19 was found on January 20, 2020, the number of confirmed cases has increased substantially around Daegu city, the fourth-largest city in Korea. The first death occurred on February 20, 2020. On February 23, 2020, the Korean government raised the national alert level to the highest (red) and decided to close all the schools nationwide. After the occurrence of several mass infection cases in Seoul, the government announced the “Strengthened Social Distance Campaign” on March 22, 2020 [12]. While the Korean government actively implemented this campaign throughout the entire country, no city in Korea was put into lockdown.

People’s general conformity with the government’s COVID-19 preventive policy seems to be high in Korea. According to the repeated survey results of the Hankook Research (https://www.hrc.co.kr/), the biggest survey company in Korea, most people agreed with the view that the Korean government is doing well in its response to COVID-19 (around 70–80% of participants agreed in 14 surveys of the 17 consecutive surveys held) [13]. The compliance rate in Korea for wearing face masks was very high in comparison to many other countries (94% as per the Gallup survey) [7], and the conformity to other social distancing policies was also high [13]. In terms of mask-wearing behavior, which is the core of mass prevention, it can be said that Koreans have adopted the respective behavior faster than the citizens of other countries.

Meanwhile, Korea’s COVID-19 policy, like that of other countries, such as the United States [14,15], was also engulfed by a vigorous political debate. In the United States, far more Democrats (85% in July) than Republicans (46%) saw COVID-19 as a major threat to the health of the U.S. public [16]. Accordingly, far more Democrats (87%) than Republicans (34%) believed that the U.S. response to COVID-19 has been less effective than the responses of other wealthy countries [17]. Furthermore, there is a correlation between political affiliation and mask-wearing behavior [18]. It has been reported that politically conservative individuals are less likely to wear masks in the United States, the United Kingdom, and Spain [19–22]. Similarly, in Korea, while 89% of those who evaluated themselves as political liberals stated that the government was doing well in its response to COVID-19, only 54% of those who evaluated themselves as political conservatives stated that they were doing well [13]. As the data for this study were collected, the ruling party in Korea is the Democratic Party, which is politically more liberal than the conservative People Power Party, the second largest party in Korea at the time. During the early stages of the coronavirus outbreak, the conservative People’s Power Party strongly criticized the government for not taking up the entry ban of Chinese people to Korea, resulting in a further intensification of the political debate.

3. Literature review

3.1. Individualism-collectivism

This research is guided by the individualism-collectivism theory, one of the most prevalent theories in social psychology used to determine how different cultural orientations affect people’s attitudes and behaviors. A major tenet of this theory is the idea of interrelationships between individuals and groups. As Hofstede [23] put it, “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.” Triandis [24] characterizes the four characteristics of individualism and collectivism. They are 1) the definition of the self as a personal versus collective construct, 2) personal goals versus in-group goals, 3) emphasis on exchange versus communal relationships, and 4) the impact of attitudes versus social norms on social behaviors [25]. In individualistic cultures, people prioritize personal goals over in-group goals and understand themselves as independent of their group/national identity. Therefore, individuals show less concern and emotional attachment to ingroups [25]. In contrast, in collectivistic cultures, people view themselves as part of their group. Social behaviors are highly constrained by social norms and in-group goals.

Social psychology literature has used the individualism-collectivism theory to make cross-national comparisons [23,26,27]. For instance, Western culture is akin to individualism, as opposed to the collectivistic culture of Asian nations. However, this dualist framework appears too rigid and simplistic, as it tends to downplay cultural differences among Asian nations, such as Japan, Korea, and Taiwan. It also disregards cultural differences between or within groups in East Asian nations.
To address this issue, Triandis [24] suggested a more complex theoretical framework that uses vertical-horizontal variables in addition to the individualism-collectivism framework. In terms of social hierarchy, novel variables reflect the degree of hierarchy in interpersonal relationships. The emphasis on hierarchy in the vertical dimension could be contrasted with the egalitarianism of the horizontal dimension. The horizontal dimension denotes an equal relationship among group members, in contrast to the vertical dimension in terms of whether they are more hierarchical or equitable. Given the vertical-horizontal dimension, there are different varieties of individualism and collectivism [28] emphasizing hierarchy [25]. Triandis and Gelfand [25] proposed four types of cultural orientation: horizontal individualism (HI), vertical individualism (VI), horizontal collectivism (HC), and vertical collectivism (VC) (Fig. 1).

The term “HI” refers to the perception of oneself as fully autonomous and the conviction that all people in a given group are equal. The term “VI” refers to the belief that people are fully autonomous but nevertheless willing to accept a hierarchy among group members. The term “HC” refers to the belief that all members in a group are interdependent but equal. The “VC” posits that even if people believe they are interdependent, they can accept a hierarchy within a group [25,29].

This new framework of the Triandis team can present a more sophisticated landscape of cultural variability. For instance, American individualism emphasizes hierarchy based on meritocracy rather than communitarian values (highly competitive Americans who want to be “the best”). Additionally, there are numerous types of collectivism. For instance, Korean collectivism is not the same as the collectivism of the Israeli kibbutz [25]. Koreans have both VC and HI, and HI has become more prevalent among well-educated city dwellers [30].

Our primary area of interest among the sociodemographic factors in this research is the relationship between age and cultural orientation. Generation has been used as a core variable in distinguishing between individualism and collectivism [29,31–33]. Notably, although VC has been dominant in China, the younger generation is increasingly leaning toward VI [29]. The age effect is not always identical to the generational effect. Nevertheless, the two are related and often overlap. According to Kertzer [34], there are four categories of generation—“generation as a principle of kinship descent: generation as a cohort, generation as a life stage, and generation as a historical period.” All but the first category are more or less age-related. This study uses age as a criterion of generation division to distinguish between individualism and collectivism. Older Koreans tend to be more collectivistic than younger people [33].

3.2. Factors affecting people’s mask-wearing behaviors

Mask-wearing behavior varies greatly from country to country, based on cultural, environmental, and political characteristics [35]. In China, where the problem of fine dust is serious, wearing a mask was common even before the pandemic. This was the same for neighboring Korea [36]. Flaskerud [35] 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. However, in some Western countries, legislation banned wearing masks in public places because of the fear of immigrants’ social unrest, protesters, and possible terrorists [14,35].

The mask-wearing behavior of people can be significantly affected by their risk perception. Risk perception can also be described as the fear associated with unknown and uncontrollable aspects of an entity or technology [37,38]. Risk perception is one of the key factors in determining COVID-19 preventive behaviors, such as wearing masks and washing hands [39,40]. Previous studies have determined that a higher perception of COVID-19 infection risk positively affects one’s handwashing and mask-wearing behaviors [39–41].

In a complex modern society, political values may be one of the most direct manifestations of various socioeconomic variables that underpin individual choices [42]. Previous research in the Korean context has discovered that political orientation is a significant determinant of people’s risk perceptions, values, and choices, such as energy preferences [42] and beef consumption [43]. Conservatives are generally rated low in health-related risk perception because of their low-risk aversion tendencies [44]. Many studies have verified that political values or related political party preferences affect one's risk perception of COVID-19 [45,46]. This could be due to trust in government [45,47] or the nature of conservatism, which is less sensitive to risks and threats [46].

There is a growing body of literature on the effects of collectivism and individualism on the COVID-19 response. Biddlestone [48] investigated the factors of collectivism and individualism associated to the intentions of engaging in social distancing behaviors against COVID-19. They demonstrated that VI negatively and VC positively predicted social distancing intentions directly with an indirect positive association with HC. Based on these results, they concluded that the promotion of collectivism may be a way to increase public engagement in the prevention measures for COVID-19 [48]. The collectivist tendencies of the Japanese, which require

![Fig. 1. Four types of cultural orientations (Triandis and Gelfand, 1998).](image-url)
them to conform to other people’s behaviors (societal norms), have contributed to an increase in their mask-wearing behavior [4]. Finally, using a large-scale dataset, Lu [49] present evidence that collectivism positively affects mask usage in the United States and worldwide. In summary, collectivist cultural characteristics may serve as a psychological buffer against disease dangers [9,10] and promote conformity to preventive measures such as wearing masks [4]. Consequently, it is assumed that individualism increases the likelihood of people not complying with government policies, reducing the frequency of mask-wearing behaviors.

However, in-depth studies on the effects of individualistic tendencies on mask-wearing behaviors are lacking. In particular, confirming the influence of individualistic characteristics of each individual in a country that has a strong collectivist culture would expand the extant literature and facilitate new perspectives in the areas of disaster risk reduction and health policy. Therefore, we utilized Triandis’ theory to explain the widespread and efficient use of face masks among Koreans. By paying particular attention to the generational factors related to individualism and collectivism, we developed the following research questions:

**RQ1.** How do vertical (horizontal) individualism and vertical (horizontal) collectivism relate to mask-wearing behavior of Korean respondents?

**RQ2.** What are the different generational roles of individualism and collectivism among Korean respondents’ mask-wearing behavior?

We insist that the mask-wearing behavior of Korean people is related to the different cultures to which the older and younger generations are subjected—the older generation’s collectivism and the younger generations’ individualism. Thus, we argue that there are synergetic effects of individualism and collectivism on mask-wearing behavior among Koreans.

### 4. Methods

#### 4.1. Surveys

We constructed two survey datasets for Korean adults. The first online survey of 1000 online panels aged 19 years and older was conducted using a mobile survey application on July 9, 2020, with a response rate of 24.59%. The sample was selected using a stratified random sampling method based on sex, age, and administrative districts. The second survey aimed 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 1569 online panels participated in a structured questionnaire web survey, with a response rate of 12.3%. Samples were selected in the same manner as in the first survey. This 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). The 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 were protected based on the Korean Statistics Act.

Table 1 provides the participants’ demographic, and Fig. 2 shows the number of COVID-19 cases in Korea and the date of each survey.

#### 4.2. Measures

##### 4.2.1. 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. General mask-wearing behavior (Do you wear a mask when you go out to prevent the novel coronavirus?) 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 (M = 4.64) in the first survey, we added four additional questionnaires to measure the respondents’ location-specific mask-wearing behavior in the second survey. The Korean government strongly recommends these location-specific mask wearing. Each item measured respondents’ level of compliance with a mask mandate at each location: office, café, bar, and outdoors, such as a park. The items consisted of a 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 a mask-wearing index. The mask-wearing index was calculated as the sum of four location-specific mask-usage questionnaires.

| Variable                  | Value         | 1st (July) Cases (n = 1000) | 2nd (December) Cases (n = 1569) |
|---------------------------|---------------|----------------------------|---------------------------------|
| 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%)               |                                 |
The respondents' perceived risk of COVID-19 was 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 about their worries about health deterioration if they were infected with 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 concerned privacy breach issues, which occurred in Korea as a result of people sharing information of the infected people. The last item asked respondents how worried they were about being blamed by others if they were infected. In this study, each item was named as follows: worry about my health, worry about infecting others, worry about a privacy breach, and worry about being blamed.

4.2.2. Measuring individualism and collectivism

This study developed a modified version of the individualism and collectivism scale based on the original 32 items developed by Singelis [50]. To improve the reliability of the responses, we adopted the Korean-translated questionnaire developed by prior studies [51,52]. A pilot test was conducted on June 25, 2020, to reduce the number of items. Seventy-four respondents were selected via convenience sampling and were asked to answer the original 32 items of the individualism and collectivism questionnaires. By conducting exploratory factor analyses and several reliability tests, we developed a modified version of the individualism and collectivism test set comprising 12 questionnaires. They were selected to assess the following 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 on each scale index is the sum of the three items. Each item is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The higher the score, the higher the corresponding indices of VI, HI, VC, and HC (maximum 15; minimum 3). In the first survey, Cronbach's α for each dimension was 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 showed acceptable internal consistency (Cronbach's α = 0.66 (VI), 0.67 (HI), 0.75 (VC), and 0.79 (HC)).

4.2.3. Effects of political preferences

Some of Korea's COVID-19 policies were also engulfed by vigorous political debate. Therefore, we added a variable for respondents' preferences for political parties. Respondents were provided four response options: three major political parties in Korea and “others.” The political parties — “Democratic Party” (politically liberal), “People Power Party” (conservative party), and “Justice Party” (politically progressive) — were selected in terms of their number of seats. The party preference variable was reorganized using the three dummy coded variables used for analysis, with “others” used as the reference category.

5. Results

As in previous literature [30,53,54], the cultural characteristics of individualism and collectivism can be very different between younger and older generations, particularly in Korea, a country that has achieved rapid economic and social development. Therefore, we conducted the same analysis for younger and older generations to uncover the differences between the two groups.

5.1. General mask-wearing behavior and individualism-collectivism

Since the first survey was conducted in July 2020, when the major outbreak (the first wave) subsided, the mean value of the degree of possibility of catching COVID-19 was below neutral (M = 2.64). However, most respondents answered that they wore face-masks when going out (M = 4.64). Women tended to wear masks (M = 4.82) better than men (M = 4.47), and the younger generation tended to wear masks significantly better than the older generations (the 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 the 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 neutral (M = 3.24). The mean value of general mask-wearing behavior also increased to 4.83, which was not statistically different by gender and age group. Regarding location-specific mask-wearing behaviors, respondents were more compliant in cafés (M = 3.66) and outdoors (M = 3.63) and less compliant in offices (M = 3.49) and bars (M = 3.55). Generally, female respondents tended to use masks better than male respondents (office, p < 0.001; café, p < 0.05; bar, p < 0.001; and outdoor, p < 0.001). There were also statistical differences among age groups according to ANOVA (office, p < 0.001; café, p < 0.01; bar, p < 0.001; and outdoor, p < 0.05).

The respondents answered that they worried most about infecting other persons (1st, M = 4.30; 2nd, M = 4.27) rather than about their own health (1st, M = 3.94; 2nd, M = 4.10) if they had COVID-19. With the Korean government’s intense surveillance of patients’ travel routes, so many respondents worried about privacy breaches (1st, M = 3.66; 2nd, M = 3.63). Furthermore, with respect to the possibility of infecting other persons and privacy breaches, respondents worried that they would be blamed if they were infected with COVID-19 (1st, M = 3.72; 2nd, M = 3.83).

As expected, owing to the collectivistic cultural characteristics of the 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, M\text{male} = 8.66 vs. M\text{female} = 8.06, p < 0.001; 2nd, M\text{male} = 8.62 vs. M\text{female} = 8.05, p < 0.001) and HC (1st, M\text{male} = 11.62 vs. M\text{female} = 11.35, p < 0.05; 2nd, M\text{male} = 10.88 vs. M\text{female} = 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 younger respondents when we saw the correlation coefficient of age and collectivism value.

Respondents’ mask-wearing behavior was correlated with their worry about health (1st, r = 0.103, p < 0.01; 2nd, r = 0.240, p < 0.01), infecting others (1st, r = 0.161, p < 0.01; 2nd, r = 0.256, p < 0.01), and being blamed (1st, not significant; 2nd, r = 0.084, p < 0.01). Table 2 presents the descriptive statistics of the important measurement variables.

5.2. Relationship with political preferences

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, the VI showed significantly clear differences between respondents’ political party preferences in both surveys. As VI values a competitive spirit, politically conservative People Power Party supporters tended to have higher VI values than other party supporters in both surveys. Other dimensions of individualism-collectivism showed only small differences in accordance with party preferences. In the case of general mask-wearing behavior, there were no significant differences according to party preferences in the first survey. However, in the latter survey, supporters of the Democratic Party generally wore masks better than supporters of the People Power Party (p < 0.001).

5.3. Generation effects

The factor that shows a clear difference in Korea’s individualism and collectivism is age generation. 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 (<45 years, 1st, n = 497; 2nd, n = 692) to identify the differences between generations. Fig. 3 presents the differences in the important variables between the older and younger groups. In an earlier survey, the younger group tended to wear masks better than the older group (p < 0.001). The younger group also showed a higher level of worry about 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 group diminished.

As mentioned in the literature, the older group tended to have a higher level of collectivism. The older group had higher levels of VC (p < 0.001 in both surveys) and HC (1st, p < 0.01; 2nd, p < 0.001) than the younger group. The younger group tended to have a significantly higher HI level 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 values between the two groups.

| Table 2 | Descriptive statistics of measuring variables. |
|---------|-----------------------------------------------|
|         | Min | Max | 1st (n = 1000) | 2nd (n = 1569) |
|         |     |     | Mean | SD | Mean | SD |
| **Mask-wearing behavior** |     |     |      |    |      |    |
| 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 |
| **Risk perception** |     |     |      |    |      |    |
| Possibility of catching (R,c) | 1   | 5   | 2.64 | 0.82 | 3.24 | 0.88 |
| Worry about my health (R,b) | 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 |
| **Individualism and Collectivism** |     |     |      |    |      |    |
| 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 |
5.4. Factors relating to general mask-wearing behavior

A linear regression analysis was conducted to ascertain the factors related to 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. The correlation analysis and VIF test results indicated no multicollinearity problems. 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 (<45 years) and the older group only (45 years or older).

In the first survey, the factors of gender, age, worry about spreading infection, and HC had statistically significant relationships with respondents’ mask-wearing behavior for the whole-group model. Women and younger respondents tended to wear masks with greater vigilance (p < 0.001). Respondents who were more worried about infecting others tended to wear masks with greater vige-

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

| Sub-groups | 1st (n = 1000) | 2nd (n = 1569) |
|------------|----------------|----------------|
|            | Whole (n = 1000) | Younger (n = 497) | Older (n = 503) | Whole (n = 1569) | Younger (n = 692) | Older (n = 877) |
| Demographics | Gender dummy (male = 0) | .259*** | .188*** | .305*** | .009 | .031 | -.019 |
|             | Age | -.123*** | -.025 | .019 | -.017 | -.040 | -.022 |
| Risk perception | Possibility of catching | .013 | -.004 | -.019 | -.009 | .001 | -.020 |
|                | Worry about my health | .017 | .035 | .011 | .146*** | .199* | .180*** |
|                | Worry about infecting others | .107*** | .130** | .087 | .168*** | .216*** | .118** |
|                | Worry about a privacy breach | .054 | .083 | .029 | -.047 | -.074 | -.014 |
|                | Worry about blaming | -.058 | -.104* | .005 | .006 | .037 | -.024 |
| Political party preference | 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** |
| Individualism and collectivism | 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 R² (%) | 12.8% | 13.9% | 13.2% | 11.6% | 13.0% | 11.4% |
| Total adjusted R² (%) | 11.6% | 11.4% | 10.7% | 10.8% | 11.2% | 9.9% |

*p < 0.05, **p < 0.01, ***p < 0.001.
lance (p < 0.01). Among the subscales of individualism and collectivism, only HC had a significant positive relationship (p < 0.01), which means that the respondents with higher HC tended to wear masks better. While younger respondents, who were more worried about infecting others, tended to wear masks better (p < 0.01), those who were more afraid of being blamed for catching COVID-19 were wearing masks less frequently (p < 0.05). In the older group, worry about infecting others did not impact their mask-wearing behavior but was related with HC (p < 0.05). The HI scale score was significant only in the younger group (p < 0.01), and the direction of its relationship was also positive. Younger respondents with higher HI values tended to wear masks sincerely. On the other hand, older respondents with a higher HC value tended to sincerely wear masks.

However, in the second survey, when the COVID-19 situation had become much worsened in Korea, we could not find any statistically significant demographic effects. With increasing COVID-19 cases, worry about personal well-being, in addition, to worry about infecting others, has a significant relationship with respondents’ mask-wearing behavior (p < 0.001). As most respondents wore masks more vigilantly than in the earlier survey, the effect of collectivism diminished. However, the association of individualism became more significant in that VI was related negatively (p < 0.001), and HI was related positively (p < 0.01) to respondents’ mask-wearing behaviors.

The second survey introduced a location-specific mask-wearing index and was used for analysis. Table 5 presents the results of the regression analysis for the location-specific mask-wearing index. The results also show that respondents with high HI scores tended to wear masks well for both subgroups. Furthermore, the HC score was also positively related to the respondents’ location-specific mask-wearing index, except for the younger group.

6. Discussion

Two surveys were conducted at different times. Although the first was carried out during a stable period after the first peak, the second survey was carried out during the third peak (Fig. 2). Therefore, the possibility of infection increased significantly during the second survey period. These changes also affected the respondents’ mask-wearing behavior. In the first survey, only concerns about infecting others were among the relevant risk perception variables; however, in the second survey, concerns about one’s own health also played an important role.

In the U.S., the public response to preventive measures, such as wearing masks, was divided along partisan lines [14,35]. This may be due to many reasons, such as inconsistent public health recommendations from politicians and media, concerns about the shortage of masks for health workers, gender norms, and people’s beliefs in conspiracy theories [6,14,55]. More fundamentally, this 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 [14]. Moreover, the strong individualistic characteristics of U.S. citizens may have exacerbated this situation. Contrary to the situation in the U.S., despite the political controversy over the government’s COVID-19 policies, there were only small partisan differences in the level of mask-wearing behavior in Korea. This might be due to 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 the general Koreans makes them easily accept and conform to this recommendation.

As can be seen from the results of the regression 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 collectivist tendencies [8,9,11] that prioritize the group over the individual. This tendency was significantly correlated with the risk perception variable of worry about infecting others. 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 relationship with mask-wearing behavior. In other words, respondents who prioritized their group over themselves and were worried about other people tended to wear masks better. Meanwhile, HI was also positively related to respondents' mask-wearing behavior, particularly that of the younger generation. In other words, HI also synergistically contributed to mask-wearing behavior with HC.

This result is similar to that of Campbell [56], who compared the differences between collectivist and individualist perceptions of cell phone etiquette in public places. This study found that collectivists are more tolerant of other people using cell phones (i.e., voice calling and ringing) than individualists. He argued that this trend translates into an individualist's 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 spaces as 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” [56]. Likewise, the respondents who had a strong HI tendency in this study may also think that not wearing a mask is an injustice, as it harms other people. It can be seen that the general horizontal collectivism and horizontal individualism of Koreans exert a mutual synergistic effect on people's mask-wearing behavior.

These results may differ from those in Japan [4]. The respondents in Nakayachi et al. [4] study may conform to societal norms in wearing masks, mainly based on their collectivist culture. However, in the case of Korean respondents, although they belonged to a general collectivist culture, horizontal individualism also worked positively. In other words, respondents tended to wear masks better, not because they worried about criticism from others but because they did not want to inflict harm on others. In fact, their mask-wearing behavior can be interpreted as voluntary behavior, which is not a result of external pressure or attention from others.

This study has some limitations. The most important issue is that the dependent variable of mask-wearing behavior may be inappropriate because of the ceiling effect. As one can observe, the results of the second survey, conducted during the third peak, indicated that mask-wearing behavior reached an all-time high, with a mean score close to the maximum possible value (from M = 4.64 to M = 4.83). This ceiling effect may be why we could not confirm a significant relationship between collectivism and mask-wearing behavior in the second survey (Table 4). In a collectivist country such as Korea, the individual variance of collectivism has little bearing on individuals' mask-wearing behavior.

7. Conclusion

The relationship between HI and mask-wearing behavior was more prominent among younger respondents. However, in the second survey, when the COVID-19 situation was worse in Korea, it was also associated with older adults. As the COVID-19 social dis-
tancing norms were extended in Korea, people with a tendency for HI seemed to wear masks as a kind of social etiquette so as not to harm others. We assumed that HI involves two types of morality: individual autonomy and non-maleficence. In the face of the COVID-19 pandemic, Korean respondents tend to prioritize non-maleficence over individual autonomy. Individual autonomy can be detrimental to mask-wearing behavior because there might be people who do not want to comply with the government’s recommendation that mask-wearing. However, non-maleficence is integral to the mask-wearing behavior of Koreans. The Korean term Minpye is one of the most frequently used words for blaming virus-infected patients. In particular, young Koreans tend to take it seriously, saying that virus-infected patients should not commit Minpye. This term denotes causing harm or trouble to others, which is the opposite of the notion of non-maleficence [57]. Moreover, non-maleficence is close to collectivism; thus, collectivism and individualism share the virtues of non-maleficence. As a result, horizontal individualism in Koreans has similar characteristics to horizontal collectivism, and both have a positive relationship with Koreans’ mask-wearing behavior.

The policy implications of this study are as follows: According to many recent research recommendations, mass masking is one of the greatest preventive measures for COVID-19. Many countries and organizations, such as Masks4All (https://masks4all.co/), actively promote the importance of wearing masks during COVID-19. However, people do not conform to this very well, especially those from Western countries with strong individualistic cultures. This study provides clues on how to change the behavior of people with strong individualistic tendencies. As coughing etiquette (i.e., coughing or sneezing into an arm) is already common in Western countries, it is necessary to promote “mask etiquette,” emphasizing that mask-wearing is a moral, altruistic, and courageous behavior to protect other people during the pandemic. The mask etiquette campaign could be a useful strategy for responding to COVID in a country with a strongly individualistic culture.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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