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Wearing Facemasks and Maintaining Social Distancing during COVID-19 among People in the U.S

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Abstract

This survey of 502 U.S. residents explored how people practiced wearing facemasks and maintaining social distancing during the COVID-19 pandemic. Using Health Benefit Model (HBM), the study found that perceived susceptibility, perceived severity, perceived self-efficacy, perceived benefit, and perceived barrier were significant predictors of wearing facemasks while perceived severity, perceived self-Efficacy, and perceived benefit were significant predictors for maintaining social distancing. While women and people with higher education and higher income were more likely to wear facemasks than others, people of 40 years of age and above and those with higher income tended to maintain social distancing more than others. Participants did not have COVID-19 were more likely to wear facemask and maintain social distancing than those who already had the disease.

Introduction

Coronavirus or COVID-19 pandemic has become the biggest global issue in 2020 with millions of deaths and confirmed cases around the world (WorldOmeter, 2020). COVID-19 is an infectious disease caused by a newly discovered coronavirus. The most common symptoms of COVID-19 include fever, dry cough, and tiredness. Serious symptoms include difficulty breathing or shortness of breath, chest pain or pressure, and loss of speech or movement (Coronavirus, 2020). Other symptoms are aches and pains, sore throat, diarrhea, conjunctivitis, headache, loss of taste or smell, a rash on skin, or discoloration of fingers or toes.

COVID-19 spreads primarily through droplets of saliva or discharge from nose when an infected person coughs or sneezes. Although anyone can get infected and become seriously ill or die due to COVID-19, there are certain groups of people who are at higher risk of severe illness from COVID-19. People of 65 years of age and older and those with underlying health conditions are at higher risk of getting infected. The underlying health conditions include asthma, chronic kidney disease being treated with dialysis, chronic lung disease, diabetes, liver disease, hemoglobin disorders, serious heart conditions, and serious heart conditions and people who are immunocompromised (Coronavirus, 2020).

Since the invention of vaccine for COVID-19 took several months, people were advised to prevent infection by wearing facemasks and social/physical distancing from others outside their homes as well as washing their hands frequently. Another attempt to prevent COVID-19 infection has been large scale quarantine or lockdown of entire cities and states, closure of schools and business and all kinds of large gatherings, and vaccines (Lacina, 2020).

This study explored how people maintained wearing facemask and social distancing in the United States during the COVID-19 pandemic. Using the Health Benefit Model (HBM) the purpose of this survey was to test the predictability of HBM components, demographics, and health factors of individuals and their family members on wearing facemask and maintaining social distancing (six feet from other people) among Americans. The HBM suggests that individuals' perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy can predict how much they practice preventive measures against diseases (Austin, Ahmad, McNally, & Stewart, 2002). The HBM has been utilized by health scholars to understand and predict different health behaviors ranging from healthy diet, influenza vaccination, breast self-examination (BSE), mammography screening, and oral hygiene, weight management interventions among others (Becker, Maiman, Kirscht, Haefner & Drachman, 1977; Blue & Valley, 2002; Champion, 1990; Hyman, Baker, Ephraim, Moadel, & Philip 1994; Kühner & Raetzke 1989; McAruthur, Riggs, Uribe, & Spaulding, 2018). This study adopted the HBM to COVID-19 pandemic in a sample (N = 502) to examine their behaviors of wearing facemasks and maintaining social distancing as key measures to limit and prevent more infections.

Methodology

Sampling

The population of the study was defined as Americans of 18 years of age or above. The survey was conducted on the first week of June 2020 and the participants were recruited from the Amazon Mechanical Turk (MTurk) online panels at the 95% HIT (Human Intelligence Task) approval rate. Scholars have noted that MTurk can be used as a good alternative to collecting data from other sources such as students, professionals, and online professional panels (Kees, Berry, Burton, & Sheehan, 2017). A total of 502 participants were recruited for this study. Before the participants started the online survey, online consent was received. Each participant received $.50 as the compensation for completing the survey.

During the time of this survey, most states in the U.S. had relaxed their stay-at-home orders and people had started to venture out. Although the stay-at-home orders were relaxed, the CDC was still urging people to be careful and practice behaviors such as wearing facemasks and maintaining social distance while going out.

Measures

Using HBM, the study explored how people in the U.S. used preventative measures of wearing facemasks and maintaining social distancing during the COVID-19 pandemic.

Independent variables. The independent variables included HBM variables, demographic factors, and health conditions. **Perceived severity** was measured with three items: seriousness, severity, and impact (reverse-coded) of COVID-19 on participant measured on a 5-point scale ranging from of 1 (Strongly Disagree) to 5 (Strongly Agree) (Mirotznik et al., 1995). **Perceived susceptibility** was measured with three items: feeling vulnerable to contracting COVID-19, contact with someone infected by COVID-19, and having respiratory infection syndromes such as sore throat, dry cough, fever, muscle ache,

and shortness of breath (Tang & Wong, 2004). The answers were yes or no, and affirmative responses were then summed to form a total score. **Perceived self-efficacy** was measured using six items such as: "wearing facemask/maintaining social distance when I go out will be easy for me" and "wearing facemask/maintaining social distance when I go out will be difficult for me (reversed),on a on a 5-point scale ranging from of 1 (Strongly Disagree) to 5 (Strongly Agree) (Richards & Johnson, 2014).

For **perceived benefits**, participants were asked to indicate whether they agreed wearing facemask/social distancing could prevent contracting and spreading COVID-19 on a 5-point scale ranging from of 1 (Strongly Disagree) to 5 (Strongly Agree) (Tang & Wong, 2004). For **perceived barrier**, respondents were asked to indicate the degree to which they had difficulty obtaining facemasks/maintaining social distance and level of discomfort when wearing facemasks on a 5-point scale ranging from of 1 (Strongly Disagree) to 5 (Strongly Agree) (Tang & Wong, 2004). **For cues to action**, respondents were asked to indicate the degree to which the local government, federal government, media, family members, and health organizations such as WHO and CDC encouraged them to wear facemask/maintain social distance on a 5-point scale ranging from of 1 (Strongly Disagree) to 5 (Strongly Agree) (Tang & Wong, 2004).

A check of the internal consistency of the dependent scales used in this study showed acceptable Cronbach's alpha coefficients (i.e., perceived severity α=.654, perceived self-efficacy for facemask wearing α=.893, cue for facemask wearing α=.702, perceived self-efficacy for social distancing α=.887, cue for facemask wearing α=.761), and confirmed good reliabilities. However, the scales for perceived barrier for wearing facemask was α=.402. The scale only included two items, this may have contributed to the low Cronbach's alpha coefficients. For perceived severity, respondents answered with 'yes' or 'no' responses, and affirmative responses were summed to form a total score. A high total score meant the respondents perceived themselves as being highly susceptible to contracting COVID-19.

Demographic factors included age, gender, race, income, education, employment status and marital status of the participants. Health condition included having/not having COVID-19, participants' underlying health conditions, their family members' underlying health conditions, being immunocompromised, and family members being immunocompromised. These questions were answered with 'Yes,' 'No,' or 'Don't Know' (Coronavirus, 2020).

Dependent variables. The dependent variables included facemask wearing and social distancing behaviors of participants with a question, "How often did you wear facemasks/ maintain social distancing (6 feet distance from another person) when you went out during the past week on a 5-point scale ranging from of 1 (Never) to 5 (Always) (Tang & Wong, 2004).

Results

From the 502 participants 53.8% were male and 45.6% female with an average of 39 years of age. They were primarily white (73.1%), Asian (8.8%), and African American (8.4%), 52.6% of them were married and 39.4% were never married. Among the participants, 48.2% had a bachelor's degree, 15.1% had a master's degree, and 14.9% had some college education. Further, 69.9% of participants were employed full time and 13.7% part time. The income of 81.9% of the participants ranged between $10,000 and $99,999. Only 15.5% of the participants had incomes above $100,000 and 2.6% had income below $10,000.

Hypothesis 1 proposed that the HBM variables (Perceived severity, perceived susceptibility, perceived benefits, perceived barriers, perceived self-efficacy, and cues to actions) are significant predictors of wearing facemask and maintaining social distance

among adults in the USA. A multiple regression test was performed, and the hypothesis was supported. The regression equation was significant for wearing facemask (R = .687, R^2 = .472, F (6, 464) = 69.005, p <.001), R^2=.472 −meaning HBM explains 47.2% of variance of wearing facemask. The probability associated with it indicated that severity (β=.110, p<.05, susceptibility (β =.115, p<.005), benefit (β=.069, p<.05), barrier (β=-.084, p<.05), and self-efficacy (β=.480, p<.001) add significantly to the prediction of the facemask wearing. However, cue (β=.033, p=.419) do not add significantly to the prediction of the facemask wearing.

Similarly, the regression equation was significant for social distancing (R = .216, R^2 = .418, F (6, 458) = 54.815, p <.001), R^2=.418 which indicates that HBM explains 41.8% of variance for social distancing. The probability associated with it indicates that severity (β=.197, p<.001, benefit (β=.148, p<.05), and self-efficacy (β=.454, p<.001) add significantly to the prediction of social distancing. However, susceptibility (β=-.036, p=.331), barrier (β=.016, p=.720), and cue (β=.030, p=.479) do not add significantly to the prediction of social distancing (See Table 1).

Table 1: Wearing facemask and social distancing regressed on HBM components

Predictors	***Standardized Beta Coefficients***
Wearing Facemask	
Cues	.419
Susceptibility	.115***
Severity	.110*
Self-Efficacy	.48***
Benefit	.096*
Barrier	-.084*
(R^2 for block)	.472
Social Distancing	
Cues	.03
Susceptibility	-.036
Severity	.197***
Self-Efficacy	.454***
Benefit	.148**
Barrier	.016
(R^2 for block)	.399

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

Research Question 1 asked if demographic factors were significant predictors of wearing facemasks and maintaining social distance behaviors during COVID-19. Two multiple regression models explored the differences in participants' facemask wearing and social distancing based on race, gender, age, education, employment, marital status, and income. Of these variables, the only significant demographic predictors for wearing facemask were gender (β=.089, p<.05), education (β =.126, p<.01), and income (β=.104, p<.01). The model explained 4.4% of variance for wearing facemask (R = .209, R^2 = .044, F (7, 485) = 3.162, p <.01).

A series of one-way ANOVAs were conducted to further analyze the effect of gender, education and income on facemask wearing. Significant differences were found based on

education, F (7,491) = 2.091, p<.05 and income, F(4,496) = 2.664, p<.05. As Figure 1 shows, participants with bachelor's degrees and higher: doctoral degrees (M=4.63, SD=.518), professional degrees (M=4.57, SD=.535), master's degree (M=4.01, SD=1.270), and bachelor degrees, were more likely to wear facemask than those high school degrees (M=3.53, SD=1.597), some college degrees (M=3.53, SD=1.597), and less than high school (M=2.67, SD=2.082). Participants with incomes higher than $70,000-$99,999 (M=4.14, SD=1.244) and higher than $100,000 (M=4.10, SD=1.252) were more likely to wear facemask than this with incomes lower than $69,000 (See Figure 2). The differences for gender were not significant, F (2,497) = 2.03, p = .132.

Figure 1: Education and facemask wearing

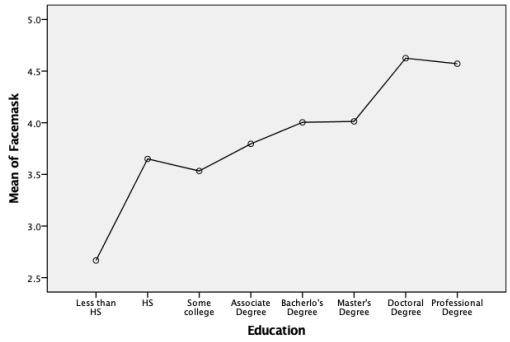
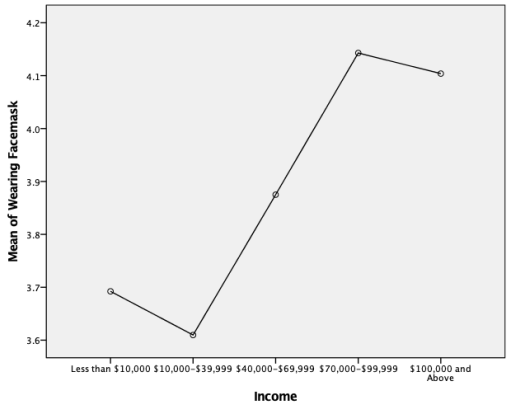
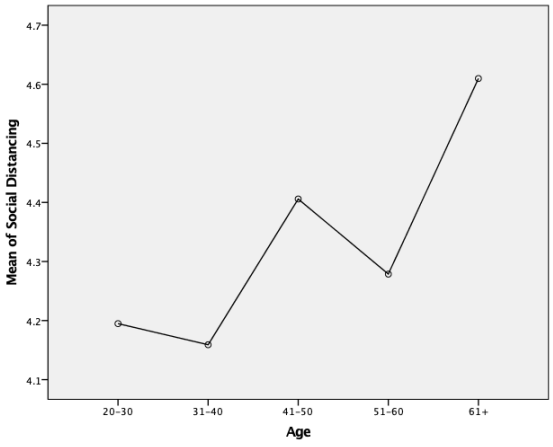


Figure 2: Income and facemask wearing



The significant predictors for social distancing were age (β=.106, p<.05) and income (β=.117, p<.01), while gender was near significant (β=.085, P = .06). The regression model explained 3.3% of the variance (R = .181, R^2 = .033, F (7, 486) = 2.360, p <.05). A series of one-way ANOVA were conducted to further analyze the effect of age and income on social distancing. The main effect of age on social distancing was statistically significant, F(4,496) = 2.317, p<.05. As figure 3 shows, participants older than 41 years of age were more likely to social distance: 61+ (M=4.61, SD=.586), 41-50 (M=4.41, SD=.975), and 51-60 (M=4.28, SD=1.002) than the younger ones, 31-40 (M=4.16, SD=1.03) and 20-30 (M=4.19, SD=1.004). The main effect of income on social distancing was not statistically significant, F(4,497) = 1.697, p=.149

Figure 3: Age and social distancing

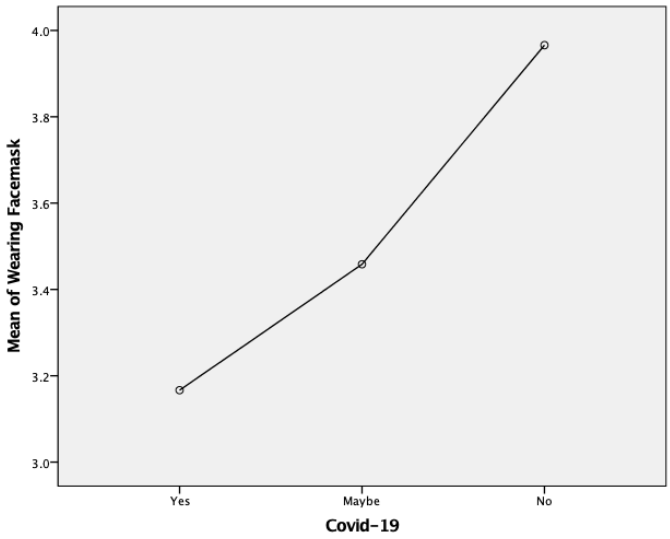


Research Question 2 asked if having/not having COVID-19 and individual and family health conditions are significant predictors of wearing facemask and maintaining social distancing behaviors during COVID-19.

A multiple regression test found that individual and family health conditions can predict participants' behavior for wearing facemasks (R = .150, R^2 = .023, F (5, 486) = 2.246, p <.05), which means that health-related factors explain the 2.3% of variance of facemask wearing. Having/not having COVID-19 was identified as a significant predictor of wearing Facemask (β=.122, p<.05). However, underlying health conditions of participants (β=-.007, p=.89), underlying health conditions of their family members (β=.032, p=.507), being immunocompromised (β=.068, p=.172), and family members being immunocompromised (β=-.047, p=.340) were not found significant predictors of wearing facemask.

A one-way ANOVA showed that having/not having COVID-19 had a significant main effect on facemask wearing, F(2,497) = 4.531, p = <.05. Tukey's post-hoc test indicated that the participants who did not have COVID-19 were significantly more likely (M=3.3.97, SD=1.397) to wear facemasks than the participants who said "maybe" (M=3.46, SD=1.414), p < .05) (See Figure 4).

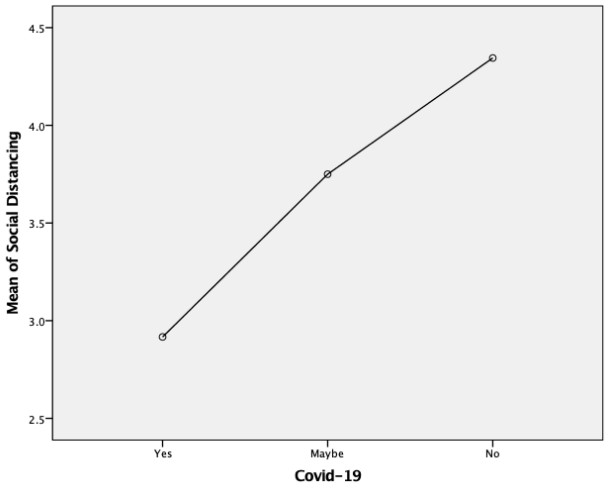
Figure 4: Have COVID-19 and wearing facemask



Similarly, the overall regression equation was significant for maintaining social distance (R = .311, R^2 = .097, F (7, 487) = 10.41, p <.001) – explaining 9.7% of variance for maintaining social distance. Having/not having COVID-19 (β =.263, p<.001), individual health condition (β =.096, p<.05), and family health conditions (β = -.104, p<.05) were significant predictors of maintaining social distancing. Nevertheless, being immunocompromised (β=.033, p=.497), and family members being immunocompromised (β=-.006, p=.907) did not add significantly to the prediction of the maintaining social distance.

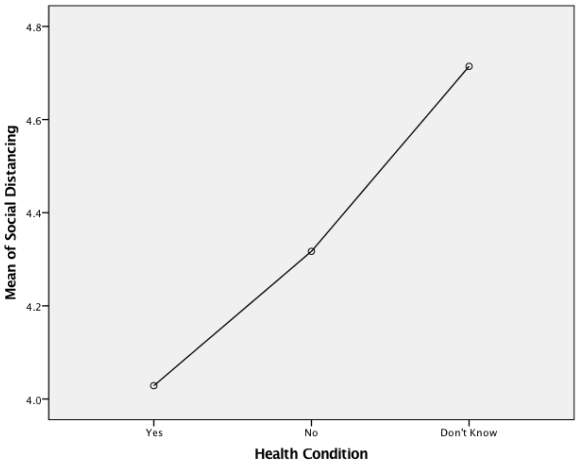
A series of one-way ANOVA were conducted to further analyze the effect of individual and family health conditions on social distancing. Having or not having COVID-19 had a significant main effect on social distancing, F (2, 498) = 20.65, p = <.001. Participants who said they did not have COVID-19 (M=4.34, SD=.939) were significantly more likely to maintain social distancing than those who had it (M=2.92, SD= 1.165, p < .001) and those who said they might have had it (M=3.75, SD=.1.000, p < .01) (See Figure 5).

Figure 5: Having/not having Covid-19 and maintaining social distancing



Underlying health conditions of participants had a significant main effect on social distancing, F (2,497) = 4.381, p <.05. Participants who answered 'no' were significantly more likely to practice social distancing (M=4.32, SD=.932) than the participants who answered 'yes' (M=4.03, SD=1.139), p <.05 (See Figure 6). Underlying health conditions of participants' family members on social distancing [F (2,499) = 2.145, p = .118] was not statistically significant.

Figure 6: Underlying health conditions and maintaining social distancing



Results and Discussion

This study examined how HBM components (perceived severity, perceived susceptibility, perceived benefits, perceived barriers, perceived self-efficacy, and cues to action) predict wearing facemasks and maintaining social distance among adults in USA during COVID-19 pandemic. The model provided a good fit for the data and the finding is in line with the previous studies, which found that HBM is helpful in identifying psychosocial factors of adopting preventive measures against diseases (Tang & Wong, 2004; Becker et al., 1977, McArthur et al., 2018; Larson et al., 1982). This study adds to the finding that HBM and to the prediction of wearing facemasks and maintaining social distance during COVID-19.

Five components of the model, perceived severity, perceived susceptibility, perceived benefit, perceived barrier, and perceived self-efficacy added to the prediction of facemask wearing behavior. However, only three components of the model, perceived severity, perceived self-efficacy, and perceived benefit were significant predictors of social distancing behavior. Cues to action was not a significant predictor of either facemask wearing or social distancing behavior. Previous studies have found that cues to action can motivate individuals to take recommended action regarding a health behavior (Mirotznik et al., 1995; Tang & Wong, 2004; Burgess & Horii, 2012). However, there have been studies where cues to action was not a significant predictor of individual's compliance with recommended health behavior (Winfield & Whaley, 2002; Umeh & Gibson, 2001). One reason why the cues to action did not significantly add to the prediction of facemask wearing behavior might be due to a continuous change and most of the times mixed recommendations from both local and federal governments on whether or not individuals are required to wear facemasks to prevent the spread of COVID-19 (Madhani & Associated Press, 2020). Wearing facemasks has also become a political statement in the United States, therefore individual choice and political affiliations may be affecting the wearing or not wearing of facemasks than the cues from government, family members or health organizations (Smith, 2020). There has also been a change in the recommendation from CDC whether or not people should be wearing masks in public. When the COVID-19 pandemic started to spread in the U.S., the CDC recommended that facemasks should be reserved for the front-line health workers, but the narrative started to shift with a spike in U.S. COVID-19 cases (Weissert & Lemire, 2020). The CDC now recommends people to wear cloth facemasks in public when social distancing is not feasible. The mixed messages from both the government as well as health organizations may have caused people to distrust the cues from these sources regarding facemask wearing.

Perceived barrier, cues to action and perceived susceptibility did not add significantly to the prediction of social distancing behavior. Although previous studies have found that perceived susceptibility, cues to action and perceived barriers can be significant predictors of preventive health behaviors (Teilter-Regev et al., 2011, Coe et al., 2012; Burgess & Horri, 2012), the literature is scant on social distancing behavior. Previous studies have found that when the health organizations recommended public to practice social distancing such as stay at home if sick, maintain safe distance from others, limit contact with people or close schools and places of worship, a conflict between the public health recommendations and public's behavior was evident (Kozlowski, Kiviniemi & Kalluri Ram, 2010; Baum, Jacobson, & Goold, 2009). People showed their concerns about prolonged social distancing measures and its impact on their finances and religious practices during H1N1 pandemic (Baum et al., 2009). During the COVID-19 pandemic, CDC has recommended people to keep a distance of 6 feet from others when possible. However, social distancing like facemask wearing has become a political statement during COVID-19 and there is a clear divide between Republicans and Democrats on whether or not they approve and follow social distancing measures (Allcott et al., 2020, Grossman, Kim, Rexer, & Thirumurthy, 2020). This study did find that perceived severity, perceived benefit and perceived self-efficacy were significant predictors of social distancing (keeping a six feet distance from others). This finding suggests that individuals will adhere to a health recommendation of social distancing during COVID-19, if they perceive that seriousness of contracting a disease is high, if they have self-confidence that they can practice social distancing, and if they believe that social distancing is effective in decreasing the risk of contracting the disease. Further research is necessary to understand and pinpoint what factors add to people's adherence to social distancing during public health emergency that includes an infectious disease.

Among the demographic factors, gender, education and income were significant predictors of wearing facemask. Participants with bachelor's degree or higher were more likely to wear facemasks. This is in line with previous studies that have found that people who were highly educated were more likely to comply with facemask wearing to limit the spread of respiratory infection (Taylor et al., 2009; Kuo, Huang, & Liu, 2011; Lau, Kim, Tsui, & Griffiths, 2007). Furthermore, this study found that participants with higher incomes were more likely to wear facemasks. A recent study during COVID-19 pandemic found that American adults with higher income were more likely to wear facemasks and practice social distancing (Kesher, 2020). In the current study, women were more likely to wear facemasks than men, but the mean differences among men and women were not significant. Previous studies have found that women were more likely to wear facemasks than men to prevent respiratory infections such as SARS and H1N1 outbreaks (Lau et al., 2007; Condon & Sinha, 2010). A gallop poll in mid-April, 2020 also found that more women than men wear masks in the USA (Ritter & Brenan, 2020). Therefore, although not significant, men were less likely to wear facemasks compared to other gender groups during COVID-19.

Among the demographic factors, age and income were significant predictors for social distancing and gender approached the significance. Participants who were 41 and older were more likely to social distance than their younger counterparts. Based on an analysis by Pew research, younger adults were more likely to see COVID-19 as a major threat to their finances than health (Jones, 2020). Those who were 70 and older were about four times as likely as the youngest adults (ages 18 to 29) that coronavirus outbreak is a major threat to their health but not their finances (Jones, 2020). The CDC has also listed older people more at risk of severe illness from coronavirus than the younger ones (Coronavirus, 2020). The differences in the income groups for social distancing was not significant although income level added significantly to the social distancing behavior. Gender approached significance but other factors such as race, employment status and marital status were not significant predictors of social distancing.

The health-related factors of participants and their families significantly predicted 2.3% variance for facemask wearing and 9.7% for social distancing behaviors. The only significant predictor for facemask wearing was having/not having COVID-19. The participants who said they had recovered or had COVID-19 at the time of taking the survey were least likely to wear facemasks while going out than those who answered 'maybe' or 'no.' This is an interesting finding. One reason for the finding might be that those who recovered from COVID-19 may think that they are immune against the disease and do not need to wear facemasks anymore. However, the health organizations such as WHO and CDC have indicated that individuals who recovered from COVID-19 are not necessarily immune from contracting the disease again (Clinical Questions, 2020; Feuer & Lovelace, 2020).

Moreover, participants who had underlying health conditions were less likely to practice social distancing than the participants who did not have underlying health conditions. One reason might be the optimistic bias that people have, which make them believe they are less likely to experience negative events in their lives than others (Helweg-Laresn & Shepperd, 2001). A recent study also found that people's optimistic bias was negatively related to the COVID-19 risk perception and resulted in less engagement with their information seeking and communicative behaviors regarding COVID-19 (Park, Ju, Ohs, & Hinsley, 2020). Similar to facemask wearing, participants who had recovered or had COVID-19 at the time of taking the survey were significantly less likely to practice social distancing than people who answered 'maybe' or 'no' to the question. This finding can also be tied to people's optimistic bias that recovering from COVID-19 gives them

immunity against the disease, although the health organizations have shown their doubts. The findings show that few demographic and health factors are stronger predictors of mask wearing and social distancing behaviors than others.

Limitation

This study only examined the behaviors of Americans for wearing facemasks and maintaining social distancing during the COVID-19 pandemic. Future research can further explore other preventative measures during the COVID-19 pandemic such as washing hands frequently, staying indoors when not needed, and disinfecting surfaces frequently. This study was conducted in the U.S.; therefore, the results cannot be generalized the people from other countries. Since this is a global pandemic, a comparison study showing people's preventive actions in different countries would be insightful. The current study defined social distancing as staying six feet apart from others while venturing out. Social distancing can include various ways to limit contact with others such as working from home, not going to beaches or restaurants and not vising family and friends among others. Broadening the description of social distance could have helped get a better understanding of whether or not HBM could predict different aspects of social distancing among Americans. Furthermore, this study only examined the five key components of the HBM model to predict facemask wearing and social distancing. Future research can include individual's knowledge of the COVID-19 and their religious and political views as predictor measures for wearing facemasks and maintaining social distancing.

Despite the mentioned limitations, this study has significant contributions to the research on HBM and preventive measures during pandemics. The findings suggest that HBM can predict the wearing of facemasks and social distancing during COVID-19 pandemic in America. The findings also suggest that demographics and health conditions of individuals affect their actions of wearing facemasks and maintaining social distancing.

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