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Mask-Wearing Behaviors in Air Travel During Coronavirus Pandemic – An Extended Theory of Planned Behavior Model

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MASK-WEARING INTENTION ON AIRPLANES DURING COVID-19 – AN EXTENDED THEORY OF PLANNED BEHAVIORAL MODEL

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16. Abstract

The COVID-19 pandemic has devastated the air transport industry, forcing airlines to take measures to ensure the safety of passengers and crew members. Among the many protective measures, a mask mandate onboard the airplane is an important one, but travelers' mask-wearing intentions during flight remain uninvestigated especially in the US where mask use is a topic of on-going debate. This study focused on the mask use of airline passengers when they fly during COVID-19, using the theory of planned behavior (TPB) model to examine the relationship between nine predicting factors and the mask-wearing intention in the aircraft cabin. A survey instrument was developed to collect data from 1,124 air travelers on Amazon Mechanical Turk (MTurk), and the data was statistically analyzed using structural equation modeling and logistic regression. Results showed that attitude, descriptive norms, risk avoidance, and information seeking significantly influenced the travelers' intention to wear a mask during flight during COVID-19. Group analysis indicated that the four factors influenced mask-wearing intentions differently in young, middle-aged, and senior travelers. The results further show a significant impact of the three factors on mask-wearing intention and a strong mediating effect of attitude, indicating that attitude can be used to better

understand the relationships between the factors. When five demographic characteristics – age, gender, education, income, and ethnicity were considered, all except gender could help to explain the group variations in factor impact and the mediating effect in mask-wearing intentions. It was also found that demographic and travel characteristics including age, education, income, and travel frequency can be used to predict if the airline passenger was willing to pay a large amount to switch to airlines that adopted different mask policies during COVID-19. The findings of this study fill the research gap of air travelers' intentions to wear a mask when flying during a global pandemic and provide recommendations for mask-wearing policies to help the air transport industry recover from COVID-19.

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Executive Summary

The COVID-19 pandemic has devastated the air transport industry, forcing airlines to take measures to ensure the safety of passengers and crew members. Among the many protective measures, a mask mandate is an important one onboard airplanes, but travelers' mask-wearing intentions during flight remain uninvestigated especially in the US where mask use is a topic of on-going debate. This study focused on the mask use of airline passengers when flying during COVID-19, using the theory of planned behavior (TPB) model to examine the relationship between nine predicting factors and the mask-wearing intention in the aircraft cabin. In addition to identifying important factors, further analysis was performed to examine attitude toward mask-wearing as a possible mediator for the relationship between various factors and mask use intentions. This study also utilized the choice model to estimate airline passengers' willingness to pay (WTP) when mask use decisions were involved.

A survey instrument was developed to collect data from 1,124 air travelers on Amazon Mechanical Turk (MTurk). This study aimed to answer the following research questions in the context of flying during COVID-19 in the US, including 1) what are the key determinants of mask-wearing intention of air travelers onboard airplanes, 2) whether the factors impacting mask-wearing onboard airplanes differ across age groups, 3) whether attitude toward masks is a meaningful mediator of the relationship between key impact factors and mask use intentions onboard airplanes, 4) whether attitude toward masks mediates the relationship between passenger demographics and mask use intentions, and 5) what is the WTP of US travelers when options are available for switching to another airline that adopts a different mask policy.

Three sets of analysis were conducted to address the research questions. In the first analysis, structural equation modeling was employed to determine if the nine independent variables - attitude, subjective norms, descriptive norms, perceived behavioral control, comfort, risk avoidance, information seeking, information avoidance, and individualism can be used to predict the mask-wearing intention of US travelers when flying during COVID-19. Results showed that attitude, descriptive norms, risk avoidance, and information seeking significantly influenced the travelers' intention to wear a mask during flight in COVID-19. Group analysis further indicated that the four factors influenced mask-wearing intentions differently on young, middle-aged, and senior travelers.

The second analysis examined three factors – subjective norms, risk avoidance, and information seeking and their influence on air travelers' mask-wearing intention onboard airplanes during COVID-19, and whether or not attitude toward masks was an important mediator. The results show a significant impact of the three factors on mask-wearing intention and a strong mediating effect of attitude, indicating that attitude can be used to better understand the relationships between the factors in the context of mask-wearing onboard airplanes. When five demographic characteristics – age, gender, education, income, and ethnicity were considered, all except gender could help to explain the group variations in factor impact and the mediating effect in mask-wearing intentions. In particular, Asian travelers had mask-wearing intentions that were not affected by attitude either directly or indirectly.

In the third analysis, passengers' WTP to switch to another airline that adopted different mask policies was examined. The findings indicated that more US travelers

were willing to pay to switch to airlines that made mask mandatory during flight, than vise-versa. However, opposing views toward mask-wearing still widely existed. It was also found that demographic and travel characteristics including age, education, income, and travel frequency can be used to predict if the airline passenger was willing to pay a large amount to switch to airlines that adopted different mask policies during COVI D-19.

1. RESEARCH INTRODUCTION

The COVID-19 pandemic has devastated the world with over 500 million confirmed cases and 6 million deaths (World Health Organization, 2022). Countries have responded with border closures and lockdown measures to curtail the spread of virus. The restrictive measures at the global and national levels, combined with the fear to travel during the pandemic, have led to a dramatic decrease in the number of airline passengers. A comparison between April 2019 and 2021 showed that the total demand for air travel (measured by revenue passenger kilometers) was down 65.4% internationally and 35% domestically in the US (International Air Transport Association, 2021). Compared to other industries, the airline industry has been dealing with unique challenges with regards to infectious disease outbreaks. An aircraft cabin is a tightly packed, enclosed environment where physical distancing is not possible during flight. Passengers sitting in the aircraft for a long duration would likely have an increased chance of contracting the virus by inhaling aerosols that remain airborne and touching surfaces that could contain large droplets, especially when sitting in close approximation to others who may already be infected by the disease (Mangili & Gendreau, 2005; Mangili et al., 2015). Consequently, airlines must rely on effective measures to protect the safety of passengers and crew members during flights, with mask-wearing being one of the most important measures.

Facemasks were originally designed for hospital use to protect surgical wounds from staff-generated nasal and oral bacteria (Abboah-Offei et al., 2021). Their use in protecting the general public from infectious disease, however, has been a topic of on-going debate. Early studies suggested that facemasks may provide a barrier to curb the spread of respiratory disease, but cautioned that more evidence is needed to support their effectiveness (Cowling et al., 2010; Sim et al., 2014). With regards to air transport, studies have long recognized that air travel is a

likely vehicle for the rapid dissemination of infectious disease. Because of the lack of consensus on mask use, however, the main focus has been on hygiene measures, contact tracing, and educational programs to ensure safety in air travel during a pandemic (Huizer et al., 2014; Mangili & Gendreau, 2005; Sevilla, 2018). Facemasks have received renewed attention following the WHO's recommendation that healthy adults should wear nonmedical masks to control the spread of COVID-19 (Betsch et al., 2020). Mask policies have since been adopted globally, but doubts remain especially in the US in terms of the comfort, convenience, and even the potential health risks in wearing a mask (Scheid et al., 2020). Recent studies provide additional support for mask use in COVID-19, indicating that wearing a mask would not increase hand-to-face contact, masks of any kinds – medical or nonmedical – can significantly reduce the overall risk of COVID-19, and mask-wearing protects the wearer from the virus and also protects others (Abboah-Offei et al., 2021; Tao et al., 2020; Wang et al., 2020).

While researchers continue to produce evidence on the effectiveness of masks, little is known regarding the intention of air travelers to wear a mask on airplanes when they travel during COVID-19. Important factors that drive the mask-wearing decisions have been explored at a general level, including social norms, knowledge about COVID-19, and empathy (Barceló et al., 2020; Pfattheicher et al., 2020; Zhou et al., 2021). Mask-wearing during COVID-19 has also been found to be related to demographic characteristics such as age, gender, and education (Barceló et al., 2020; Egan et al., 2021; Haischer et al., 2020; Zhou et al., 2020). While these studies have shed light on mask-wearing behaviors, they are not related to air transportation, a particularly relevant industry during the COVID-19 pandemic. There is also a lack of understanding of air travelers' mask use in the US. Although the US has had the most cases of COVID-19 and related deaths in the world, it has been slower than most other countries to adopt

the mask-wearing approach (Egan et al., 2021). Despite the surge in mask use across the country, following the CDC's recommendations, factors driving the intention to voluntarily wear a mask remain unclear, especially within the aircraft cabin. A better understanding is imperative for US airlines as they try to recover from the pandemic quickly and safely. As the vaccination rates pick up, airlines will gradually relax the restrictive measures onboard airplanes including the mask mandate. At the same time, COVID-19 continues to evolve and may still put travelers at risk for some time into the future. The key question is, if mask-wearing becomes a personal choice when flying during this transitional period, will airline passengers in the US wear masks during their flights, and what factors are influencing their mask-wearing intentions?

A factor that can be particularly important in this context is attitude of air travelers toward mask-wearing, as the importance of attitude towards following health recommendations during the pandemic has been recognized. Studies suggest that a positive public attitude is essential for achieving effective mask-wearing compliance (Cheok et al., 2021). In the US, however, opposing attitudes toward mask use are more common, with a small but vocal group of people holding a negative attitude about wearing masks in public (Tyler & Asmundson, 2021). Currently, it is unclear as to the extent that attitude toward mask-wearing might affect the intention of air travelers to wear masks onboard airplanes during COVID-19. Furthermore, it remains unknown whether or not attitude mediates the relationship between the COVID-related factors identified in the literature and air travelers' mask-wearing intentions during flight. Indeed, no research has examined the attitude of air travelers and their intention to voluntarily take protective measures during flight in the COVID-19 pandemic.

Furthermore, examining socio-economic characteristics of air travelers can add value to the knowledge about mask use on airplanes during COVID-19. Studies have generally found that

demographic factors are important and they can independently influence the development of adaptive or maladaptive coping responses (Volk et al., 2021). Some studies suggest that different demographic groups have different coping strategies for the pandemic. For instance, Americans were shown to have high COVID-19 stress and certain demographic groups were particularly vulnerable to the stress effect, making them more or less likely to adhere to the CDC guidelines (Park et al., 2020). While some demographic characteristics such as age have a relatively stable impact on compliance to the COVID-19 health recommendations (Niño et al., 2021; Zhang et al., 2021), the relationship between other factors like gender, income, and education level and COVID-19 responses are less clear (Barceló & Sheen, 2020; Brankston et al., 2021; Howard, 2021; Radar et al., 2021; Sinicrope et al., 2021). There are inconsistent findings in the literature, which highlight the need to further examine the association between demographic characteristics and voluntary compliance with mask-wearing during COVID-19, especially among air travelers where such relationships have not been tested.

In an effort to narrow the gaps in research, this study focused specifically on the US travelers in the context of flying during COVID-19, to determine 1) what are the key determinants of mask-wearing intentions of air travelers onboard airplanes, 2) whether the impact of the factors differ across age groups, 3) whether attitude toward masks is a meaningful mediator between some impact factors and mask use intentions onboard airplanes, 4) whether demographic characteristics and the mask use intention are closely related, with attitude toward masks as a mediator and, 5) what is the willingness to pay (WTP) of US travelers when given an option of paying a fee to switch to another airline that adopts different mask policy. Three sets of statistical analysis were performed. To answer questions one and two, this study proposed an extended theory of planned behavior model to examining factor impact on intentions to wear a

mask and compared mask-wearing intentions across different age groups when flying during COVID-19. To answer questions three and four, mediation analysis was conducted, focusing on attitude both as a direct impact factor in the intention to wear masks and a mediator in the relationship between key factors identified in the literature and mask-wearing intention onboard airplanes. Furter, mediation analysis was conducted regarding age, gender, education, income, and ethnicity and the use of masks. To answer question 5, logistic regression was performed focusing on passengers' willingness to pay to switch to airlines that adopted different mask policies, if such an option was available.

2. LITERATURE REVIEW

2.1 Mask, Air Travel, and COVID-19

On March 11, 2020, the WHO declared the COVID-19 outbreak a global pandemic. Protective measures including mask-wearing have since been taken to limit the spread of the virus. In the US, airlines have required all passengers to wear a mask onboard airplanes, which is an important measure given the increased risk of contracting and spreading COVID-19 in an aircraft cabin environment. Aircraft uses an automatic system to deliver mixed and recirculated air into the cabin during flight. While this process filters out large amounts of virus, a crowded, enclosed aircraft cabin for prolonged periods of time may increase the risk of inflight transmission of COVID-19 (Wang et al., 2021). Early studies of air travel and infectious disease focused on protective measures such as handwashing, social distancing, contact tracing, and educational programs to ensure passenger safety during flights (Huizer et al., 2014; Sevilla, 2018). Facemasks were rarely mentioned as a protective measure in air travel, partially due to mixed evidence for their effectiveness in reducing transmission of virus (Cowling et al., 2010). With the emergence of COVID-19, masks have gained a renewed attention. Recent studies have

re-examined the role of masks in preventing COVID-19 transmission in the aircraft cabin, suggesting a significant decrease in average infection if facemasks were properly worn by all passengers during the flight (Wang et al., 2021).

Despite the evidence of the effect of masks, there are mixed views of mask use in COVID-19. Studies conducted in different countries found that multiple factors may be associated with the intention to wear masks. Rieger (2020) examined factors that affected mask use in Germany, indicating that worries about the COVID-19 situation, self-protection and protection of others, concerns of the look of mask-wearing, and being afraid of others' judgement were determinants of mask-wearing. A study from Spain suggested that social norms of mask use is associated with voluntary use of masks in COVID-19 (Barceló and Sheen, 2020). Pfattheicher et al. (2020) collected data from Germany, the UK and the US to investigate the relationship between pro-social emotions and protective measures such as mask use. The results showed that mask adoption and compliance were largely motivated by empathy for people who were most vulnerable to infection of COVID-19. In China, similar studies were conducted, with findings suggesting the importance of environmental and personal factors, and factors related to pandemic stage, knowledge of the pandemic, and social influence in mask use (Kwok et al., 2021; Zhou et al., 2021). Noticeably, studies frequently suggested the relationship between certain demographic characteristics and mask compliance, indicating that older adults and females were more likely to wear masks (Barceló & Sheen, 2020; Haischer et al., 2020; Zhou et al., 2021). Surprisingly, mask-wearing has received only limited attention in the research of transportation. Dzisi and Dei (2020) examined the compliance to the policy on facemasks in public transportation, suggesting willingness to comply to the social distancing guidelines while the facemask policy was followed only partially. Only one study examined airline passengers'

health concerns and attitudes toward protective measures in COVID-19 (Sotomayor-Castillo et al., 2021). One of the findings related to mask use suggested that, compared to the use of sanitary measures, fewer respondents were willing to wear a mask even it was provided by their preferred airline.

2.2. Research Gaps

Clearly, substantial gaps exist in the research on the intention to wear a mask during COVID-19. The pandemic presents extraordinary challenges to transport policy (Zhang, 2020). In particular, more research is needed to understand the mask-wearing intention in air travel. First, little is known about the mask-wearing intention within the confined space of the aircraft cabin where passengers may face a greater risk of contracting COVID-19. The factors that drive the intention to wear a mask when flying are unique in the context of air transport. To the best of our knowledge, no prior studies have examined air travelers' intention to wear a mask on airplanes, even though such information is essential in the US where air travel is a major mode of travel. Second, the application of well-established behavioral models should be broadened to investigate mask use during COVID-19 in the context of air travel. While several studies have used behavioral models to examine cognitive processes in the decision to wear a mask, their application to the specific context of air travel is untested. Third, questions are still unanswered in regards to how different age groups might be motivated by different factors to wear a mask when flying during COVID-19. Particularly, vulnerable populations such as elderly travelers may face greater risks in contracting COVID-19 when traveling by air and the factors that shape their intention to use masks need to be investigated further. Finally, while some research has found an influence of attitude on mask compliance in general, more study is needed to determine the role of attitude in mask-wearing intention on airplanes where the risk of COVID-19

transmission may be high. In particular, it remains unknown whether the factors that are commonly identified in the literature influence mask-wearing intention directly or the influence is indirect via attitude toward mask-wearing. Furthermore, while prior studies have examined the impact of demographic factors on mask compliance, the findings have been contradictory, calling for more research of the relationship between air travelers' demographic characteristics and their mask use intentions during COVID-19, especially considering attitude as a mediator.

2.3. Extended Theory of Planned Behavioral Model

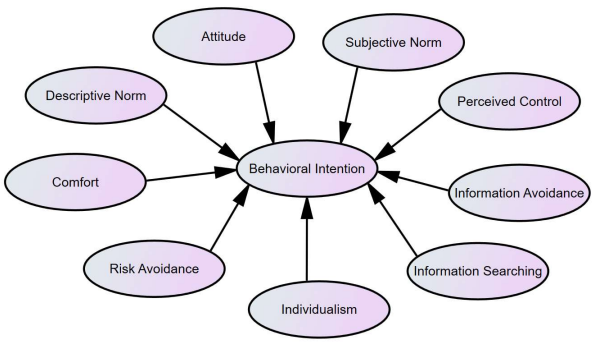
The first set of analysis was based on extended the theory of planned behavior (TPB) model to examine air travelers' mask-wearing intention onboard airplanes in COVID-19. The theory posits that behavior is immediately determined by behavior intention, which in turn is affected by three factors – attitude, subjective norms, and perceived behavioral control (PBC) (Ajzen, 1991). The TPB has been successfully used in various domains including air transportation for predicting intentions and behaviors (Buaphiban & Truong, 2017; Hsiao & Yang, 2010; Jing et al., 2014; Pan & Truong, 2018). Recent studies have also used the theory to examine mask-wearing intentions and behaviors of leisure activity participants, international students, and general public during COVID-19 (Irfan et al., 2021; Kim et al., 2020; Si et al., 2021; Sun et al., 2020).

The TPB provided a suitable theory to this study for three reasons. First, the theory views decision-making as a logic reasoning process that is affected by internal and external factors (Liu et al., 2013). Similarly, the present study considered mask-wearing the outcome of a mental decision-making process in which air travelers evaluated various factors in forming the intention to wear a mask when flying during COVID-19. Second, the three constructs of TPB – attitudes, subjective norms, and PBC – provided a good starting point in examining mask-wearing

intentions, given the role of attitudinal, normative, and control factors in the decision-making process. Finally, the TPB allows the researcher to add new factors to the model to enhance the predictive power of the model. For this study, the TPB model was extended with context-specific factors to better model mask-wearing intentions of air travelers during COVID-19. Figure 1 illustrated the theoretical framework for this analysis. The model contains nine *Exogenous* variables (attitude, subjective norms, descriptive norms, perceived behavioral control, comfort, information avoidance, information seeking, risk avoidance, individualism) and one *endogenous* variable (mask-wearing intention.) A structural equation modeling (SEM) technique was used to fit the empirical data to the model. This analysis focused on the direct relationships between the nine factors and mask-wear intentions. Given the scarce literature in this research area, examining direct factor impact is necessary to provide useful insights in air travelers' mask-wearing intention when flying during a global pandemic. In addition to the three original TPB constructs, the model in Figure 1 included six context-specific factors. These factors were selected based on the literature support and relevancy to air travel. The remainder of Section 2.3 provided literature support to factor selection in developing the model.

Figure 1

Theoretical Framework for Mask-Wearing Intention Onboard Airplanes



In the original TPB model, behavior intention is influenced by three predicting constructs - attitudes that refer to a psychologically favorable or unfavorable evaluation toward a particular outcome or behavior; subjective norms that represent the pressure a person feels from his or her significant others to perform or not perform a behavior; and perceived behavioral control that is concerned with perceived ease or difficulty in performing a certain behavior (Ajzen, 1991). Numerous studies in the transport domain suggested that attitudinal, social, and control factors can explain significant portions of the behavioral intention in various travel-related activities (Hsiao & Yang, 2010; Jalilvand & Samiei, 2012). Similar effects were observed in recent studies of mask-wearing in COVID-19. Attitude, subjective norms, and PBC significantly influenced mask-wearing intentions of international students (Sun et al., 2020), and they affected post-pandemic mask saving in China (Si et al., 2021). The three constructs, however, appeared to exhibit different impact in mask-related studies. While attitudes and PBC influenced mask-wearing among leisure activity participants in Korea (Kim et al., 2020), attitudes and subjective norms were important in mask-wearing intention in Pakistan during COVID-19 (Irfan et al., 2021). The effect of attitudes was frequently reported, indicating that negative attitude toward masks led to refusal to wear masks and positive attitude of mask enhanced mask compliance (Cheok et al., 2021; Taylor & Asmundson, 2020). There were mixed views of whether subjective norms should be used as a sole indicator of the normative influence in the TPB model, suggesting that descriptive norms (how other people actually behave) may contribute uniquely to explanation of behavioral intentions (Forward, 2009). Studies found that descriptive norms can be used to predict drivers' intention to violate (Forward, 2009) and the intention of university students to limit their alcohol consumption (Park et al., 2009), and they were able to increase the explained variance in the intention to choose travel modes (Jing & Juan, 2013). Studies of

COVID-19 further indicated that enhancing social norms including descriptive norms can promote compliance to COVID-19 prevention and control guidelines (Young & Goldstein, 2021). Descriptive norm was added to this study because air travelers' intention to wear a mask during flight can be influenced by other people's mask behaviors. The first four hypothesis statements were stated below:

H1: Attitude toward mask is positively related to mask-wearing intention when flying during COVID-19

H2: Subjective norms are positively related to mask-wearing intention when flying during COVID-19

H3: Descriptive norms are positively related to mask-wearing intention when flying during COVID-19

H4: Perceived behavioral control is positively related to mask-wearing intention when flying during COVID-19

Comfort is a complex construct encompassing thermal, air quality, visual, acoustic, ergonomic, and psychological dimensions (Huebner et al., 2013). In this study, comfort of mask-wearing was conceptualized as a psychological and physical state wherein an air traveler's anxiety concerning mask-wearing has been eased and he/she enjoys peace of mind, relaxation, and calm wearing a mask during flight (Lloyd & Luk, 2011). Comfort was often an important factor in travel decisions. In a study of elevated airport procedure in Jordan, passengers' feeling of comfort toward the enhanced procedure positively affected their intention to re-travel (Al-Saad et al., 2019). Comfort was also found to significantly influence the choice of low-cost carrier passengers especially those traveling long-haul in the trans-Atlantic market (Hunt & Truong, 2019). The relationship between mask-wearing and comfort was observed in COVID-

19. In a study conducted in New Zealand, over 40% of the survey respondents reported discomfort wearing a mask during COVID-19, suggesting that comfort may factor in people's views of mask use (Gray et al., 2020). For passengers sitting in enclosed cabin environment for long duration, comfort is likely to affect their intention to wear a mask. H5 was stated:

H5: Comfort is positively related to the intention to wear a mask onboard airplanes during COVID-19

Risk avoidance refers to the reduced willingness to engage in risky activities that are perceived as having negative outcomes (Lorian & Grisham, 2011). It is routinely included in health-related studies, in which rational models incorporated risk factors as predictors of health behaviors (Carvalho et al., 2008). Many of these studies were conducted at the macro level to understand how people perceived the risk of contracting infectious disease and took protective actions. Some countries, such as Brazil, perceived higher risk of COVID-19 than others, such as the US and the UK (Wang et al., 2020). Risk perception, in turn, can trigger risk avoidance by engaging in health protection behaviors including washing hands, wearing a mask, and social distancing (Dryhurst et al., 2020). Studies also found relationships between risk factors and the intention to wear a mask during COVID-19. Irfan et al. (2021) added risk factors to the TPB model to examine the willingness to wear a mask in Pakistan. The results indicated that risk perception, together with attitude, subjective norms, and perceived benefits, significantly enhanced mask-wearing behaviors in COVID-19. Similar observations were made in China where risk perception was important in mask-saving behavior following the outbreak of COVID-19 (Si et al., 2021). Risk avoidance is relevant to this study because human beings have the natural tendency to avoid risks during health crises. Given this tendency, air travelers may be more intended to wear a mask during flight to avoid risks of COVID-19. H6 was thus stated:

H6: Risk avoidance is positively related to the intention to wear a mask when flying during COVID-19

When people face aversive events, they generally exhibit two types of information process behaviors - Information seeking (the extent an individual seeks out and monitors for information about threat) and information avoidance (the extent to which one cognitively distract from and psychologically blunt threat-relevant information) (Miller et al., 1988). These information behaviors have been examined in the contexts of social media (Guo et al., 2020), environmental problems (Hmielowski et al., 2019), and coping with health challenges (Ek & Heinström, 2011). Information plays an essential role in fighting against the spread COVID-19 as well as providing guidance for action-taking. Various information behaviors have been observed during COVID-19. In the US, for example, people responded to the first report of COVID-19 in their state immediately by seeking information of coronavirus, but search for information regarding protective strategies including mask appeared to be slower (Bento et al., 2020). Excessive, incomplete, or even incorrect information affected information behavior in COVID-19. Soroya et al. (2021) suggested that the more people seek information on social media during COVID-19, the more they would feel information overload and information anxiety, and the more likely they would engage in information avoidance. The effect of misinformation on information behaviors was also observed, suggesting that misinformation exposure led to greater information avoidance and heuristic (as opposed to systematic) processing of information (Kim et al., 2020). Information seeking and information avoidance can be relevant to this study because airline passengers interacted with information available to them to make mask-wearing decisions when flying during COVID-19. H7 was thus stated.

H7: Information searching is positively related to the intention to wear a mask when flying during COVID-19

H8: Information avoidance is negatively related to the intention to wear a mask when flying during COVID-19

Individualism and collectivism are two types of culture that affect how people think and behave. Individualism is defined as the degree to which a person stresses the needs of individual over the needs of the group as a whole, as opposed to collectivism which emphasizes the collective needs and goals of the group over the needs and desire of the individual (Hofstede, 1994; 2001). Individualism and collectivism significantly influenced how people perceive and respond to health crises. A cross-countries study found that individualistic worldview, among other factors, was significantly associated with risk perception of COVID-19 (Dryhurst et al., 2020). Compared to individualistic culture, collectivistic culture may be more effective in reducing the spread of COVID-19 (Biddlestone et al., 2020) and increasing compliance to mask-wearing guidelines (Lu et al., 2020). Bazzi et al. (2021) suggested that American culture is characterized by a combination of individualism and anti-statism and this unique culture may undermine collective action against COVID-19, as evidenced by less compliance to COVID-19 guidelines including mask-wearing in some areas in the US. To further investigate the effect of individualism on mask-wearing intentions of air travelers in COVID-19, H9 was stated:

H9: Individualism is negatively related to the intention to wear a mask when flying during COVID-19

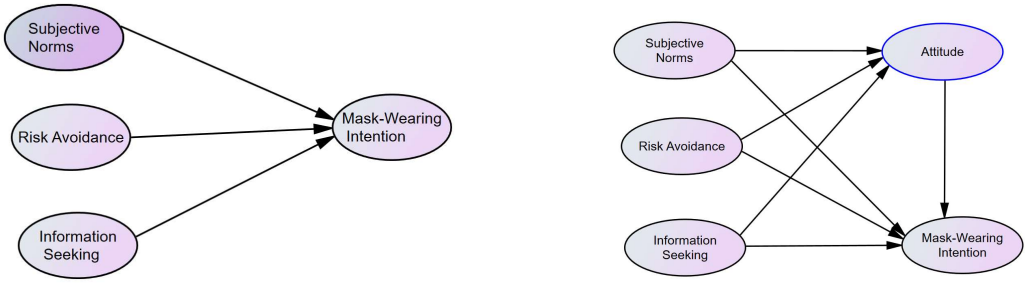
2.4. Mediation Effect of Attitude

The mediating analysis focusing on attitude as a mediator was based on the theory of planned behavior (TPB) model to examine air travelers' mask-wearing intention onboard

airplanes during COVID-19. The theoretical framework for this analysis is shown in Figure 2. Figure 2a tests the direct relationship between three exogenous variables (subjective norms, risk avoidance, and information seeking) and one endogenous variable (mask-wearing intention). Figure 2b introduces attitude as both a direct determinant of mask-wearing intention and a mediating factor.

Figure 2

Mask-Wearing Intention and Attitude as a Mediator (Figure 2a and Figure 2b)



While the literature routinely demonstrated direct impact of attitude on a wide range of intentions and behaviors, increasing studies have examined attitude as a mediator in the relationship involving human intentions and behaviors. The mediating effect of attitude has been successfully observed in many health- and safety-related studies, such as health behavior change (Wood et al., 2014), sensation seeking and traffic injury (Wang et al., 2019), and alcohol use of adolescents (Koning et al., 2011), to name just a few. Recent studies of COVID-19 also reported significant mediating effect of attitude. Potas et al (2021) investigated the mediating effect of attitude in the relationship between awareness and technology addiction of adolescents during COVID-19, taking gender into consideration. Results indicated a stronger indirect effect of attitude compared to that of awareness on the behavior of technology addiction, suggesting that awareness of technology addiction alone may not be sufficient in measuring actual behavior in the context of COVID-19. Another study examined attitude as a mediator in the relationship between risk

perception of COVID-19 and health-protective behavior in the context of *untact* tourism in Korea. Attitude exhibited a strong, significant mediating effect between affective risk perception and behavioral intention, indicating that risk perceptions contributed to the forming of the attitude toward *untact* tourism, which in turn affected the intention to engage in protective behaviors (Bae & Chang, 2021). In both studies, the specific context of COVID-19 outbreak was heavily emphasized, which may further enhance the mediating effect of attitude. Attitude can be a possible mediator in the relationship involving mask-wearing intention in COVID-19, given the vast opposing views of facemasks in the US (Taylor & Asmundson, 2020). It is thus meaningful for this study to examine the mediating effect of attitude in addition to its direct impact on mask use. H10, H11, and H12 were stated to hypothesize the mediation effect of attitude:

H10: Attitude significantly mediates the relationship between subjective norms and mask use intention when flying during COVID-19

H11: Attitude significantly mediates the relationship between risk avoidance and mask use intention when flying during COVID-19

H12: Attitude significantly mediates the relationship between information seeking and mask use intention when flying during COVID-19

2.5. Demographics and Mask Use during COVID-19

Adding to the growing knowledge of COVID-19 is the study findings of compliance behaviors with respect to protective measures based on different socio-demographic characteristics. The impact of age has been widely studied, likely due to the CDC analysis and messaging to the public regarding the risk of COVID-19 in older adults. Studies generally produced consistent results indicating the positive relationship between age and risk perception

of COVID-19 (Niño et al., 2021) and the odds of an individual wearing a mask increased significantly with age (Haischer et al., 2020; Zhang et al., 2021). Regarding race and ethnicity, existing studies focused largely on comparison between Whites and other ethnic groups, demonstrating a generally consistent pattern. Compared to Whites, historically marginalized racial and ethnic groups were more likely to perceive COVID-19 to be a major threat to their personal health (Hearne & Niño, 2020; Niño et al., 2021). Accordingly, Black, Latino, and Asian were more likely to wear a mask in response to COVID-19. When gender was factored in, it was further revealed that White men were the least likely to wear masks while Asian men had the highest probability to wear masks during COVID-19 (Hearne & Niño, 2020).

There were, however, divergent views on the impact of other important demographic factors on COVID-19 responses. The effect of education on mask use in COVID-19 has only been partially supported by the literature. While some studies indicated that people with higher educational attainment were more likely to wear facemasks (Sinicrope et al., 2021, Zhang et al., 2021), others suggested that educational attainment was negatively associated with mask-wearing in areas where mask-wearing behavior is less common, citing that highly educated but skeptical members of the public were less likely to blindly follow government recommendations of mask use especially given large amounts of inconsistent information of COVID-19 (Barceló & Sheen, 2020). Studies of gender and mask-wearing also produced mixed results. Some studies found that men were less likely to report high levels of threat and fear of COVID-19 compared to women, to consider public health measures effective, and to have confidence in their ability to comply (Brankston et al., 2021; Niño et al., 2021). Other studies suggested that, while there is a gender difference in the perception of masks, men and women were equally likely to wear face masks during the pandemic (Howard, 2021; Zhang et al., 2021). Similarly, some researchers

pointed to the significant role of income in mask-wearing, indicating people with higher income were more motivated to wear face masks in COVID-19 (Zhang et al., 2021), while others found that mask-wearing during COVID-19 was more commonly reported among lower income groups (Radar et al., 2021). These mixed views, coupled with the importance of socio-demographic characteristics on mask use, call for more empirical research in this area. This study thus examined the direct impact of subjective norms, risk avoidance, and information seeking on mask-wearing intentions during flight based on demographic characteristics of age, gender, income, education, and ethnicity. The analysis, again, included attitude both as a direct factor and a mediator.

3. METHODOLOGY

3.1. Sample and Data Collection

This study adopted a survey design, using the online platform of Amazon Mechanical Turk (MTurk) to recruit participants. The reason for choosing MTurk for data collection is two-fold. First, as structural equation modeling requires large sample size, a web-based approach was suitable especially given the pandemic situation. Second, MTurk is by far the most widely used online data collection method for academic research (Porter et al., 2019). Studies found that samples obtained from MTurk were generally more representative of the US population compared to traditional student samples and other internet samples (Burnham et al., 2018). This study implemented two measures to ensure data quality, including (1) survey participants must completed 100 approved online surveys with an overall performance approval of 98% or higher and, (2) those participated in the pilot study were not eligible to participate in the main survey.

The data collection took place between May12 and May15, 2021. The time for the survey was chosen to best capture air traveler opinions on mask-wearing onboard airplanes in the US.

By May, 2021, over 60% of adults in the US had received at least one dose of vaccination (CDC, 2021), which contributed to falling COVID -19 cases across the country. Gradually, fully vaccinated people would be allowed to resume activities without wearing a mask (CDC, 2021). As vaccination continues to roll out, it is reasonable to predict further relaxation of COVID restrictions across the country including mask mandate on airplanes. In the meantime, however, the possible variants in COVID -19 mean there could still be uncertainties surrounding around the risks of COVID -19. Consequently, many people may still feel the need to wear a mask in crowded settings even when masks are no longer mandated, especially in aircraft cabin where social distancing is not possible. Conducting a survey on in-flight mask-wearing during this transitional time allowed participants to more accurately evaluate factors that would affect their mask-wearing intentions.

Two pilot studies were conducted to test the survey questionnaire, followed by modification of the questionnaire for use in the main survey. After data cleaning, the final sample size for data analysis was 1,124. There were 198 incomplete questionnaires in which participants provided some demographic information. As these cases were not included in the data analysis, they were treated as non-respondents and were used to test the non-response bias of the study. A chi-square test was performed to compare the demographic characteristics of the respondents and non-respondents. The results showed no significant difference between the two groups (Age: X^2 =6.692, p = .245; Gender: X^2 = 1.895, p = .169; Education" X^2 = 4.620, p = .329; Marital status: X^2 = 5.586, p = .232), indicating minimal impact of non-response bias on the study results.

3.2. Survey Instrument

A survey questionnaire was developed to collect data of air travelers and their intentions to wear masks when flying during COVID-19. For the purpose of this study, participants were given a scenario of flying during the time when some airlines started to remove mask mandates on airplanes, but COVID-19 continued to spread and may still present risks to public health. The survey questionnaire consisted of four major sections: (1) demographics, (2) travel and mask experience, (3) factor impact on mask-wearing intention onboard airplanes, and (4) willingness to pay more to switch to airlines that offer different mask policies. Section 3 asked participants to evaluate the relationship between various factors and their intention to wear a mask when flying during COVID -19, based on a five-point Likert scale ranging from strongly disagree to strongly agree. Each factor was measured by at least three scale items. These scale items were either adopted and modified from validated scales in the literature (Bao et al., 2003; Cozma, 2011; DuBenske et al., 2009; Esposito et al., 2016; Harvey et al., 2014; Hmielowski et al., 2019; Hsiao & Yang, 2010, Jing & Juan, 2013; Jing et al., 2014; Meertens & Lion, 2008; Oborne & Clarke, 1975; Park et al., 2009; Raju, 1980; Soroya et al., 2021; Taylor & Todd, 1995; Triandis & Gelfand, 1998; Yang & Kahlor, 2012) or developed by the authors to reflect the context of this study. Section 4 provided a secnario in which participants were give the option to pay a fee to switch from mask mandate airline to non-mask mandate airline, or vice versa, to assess their willingness to pay (WTP) more to switch to airlines that adopted different mask policies in COVID -19.

3.3. Data Analysis

Three sets of data analysis were performed. First, structural equation modeling analysis was conducted to identify major determinants of air travelers' intention to wear a mask onboard

an airplane. As SEM requires a large sample size, the formular developed by Westland (2010) was used to determine the lower bound of the sample size. The online version of the formular yielded a minimal sample size of 475, which was satisfied in this study. Further SEM analysis was performed to compare mask-wearing intention across age groups – Young Group, Mid-Aged Group, and Senior Group. The Senior Group was comprised of older adults aged over 60 to reflect the high-risk population in COVID -19 as identified by CDC (CDC, 2021). The remaining respondents were divided into Young Group (ages 18-40) and Mid-Age Group (Ages 41 to 60). Second, this study examined the relationship between three factors - subjective norms, risk avoidance, and information seeking - and the intention to wear a mask onboard airplanes during COVID-19, and whether attitude toward masks mediated the relationship.

Structural equation modeling was used to perform two types of analysis. The first one utilized the entire sample to develop a broad understanding of factor impact on mask-wearing intention onboard airplanes during COVID-19. This analysis identified direct influence of the three factors (subjective norms, risk avoidance, and informaiton seeking) on mask-wearing intentions, as well as whether the influence may possibley take an indirect path through the mediator of attitude. In the second analysis, the study sample was divided into subgroups based on five demographic characteristics - age, gender, education, income, and ethnicity. Direct factor impact and mediating effect of attitude were examined to understand how they differed across the groups associated with each demographic characteristic. Finally, respondents were given the scenarios to indicate if they were willing to pay more to switch from a mask mandate airline to a non-mask mandate airline, and vice versa. For respondents who indicated their willingness to pay more to switch airlines, a logistic regression analysis was performed to identify whether

demographic and travel-related factors can be used to predict their willingness to pay a small or large amount to switch to airlines that adopt different mask policies.

4. RESULTS

This section presents the results of the three sets of data analysis, including 1) factor impact on intentions to wear masks when flying during COVID-19 (total sample and age group comparison), 2) direct and mediating effect of attitude and, 3) US travelers' WTP to switch to airlines that adopt different mask strategies. The results section is comprised of six major components including data preparation, passenger demographic and travel characteristics, descriptive statistics, and analytical results for the three sets of data analysis.

4.1. Data Preparation

Pretest and pilot study were used to test the instrument prior to the large-scale survey. After data collection, data cleaning was implemented to prepare the data for analysis.

4.1.1. Pre-test

The researcher conducted a pretest on the survey instrument to identify questions that may be unclear to participants, which may lead to biased answers. As the survey collected opinions on mask-wearing during air travel, there was no requirement for participants to have any special expertise. Four subjects with ages ranging from 23 to 51 participated in the pretest via a one-hour Zoom section. Overall, the respondents viewed the survey as interesting and easy to follow. Adjustment on the survey instrument as a result of the pretest included (a) rewording questions measuring five factors to avoid repetition and to clarify meanings to respondents, (b) adding two new questions to two factors as suggested by respondents to better evaluate the effect of the factors in a pandemic situation and, (c) simplifying the introduction at the beginning of

two sections for fast reading during the survey. On average, respondents took about ten minutes to complete the survey.

4.1.2. Pilot Study

Two pilot studies were conducted prior to the large-scale survey. Focus was given to the section of factor evaluation, which generated the data for the main analysis in this study. The initial pilot study involved 31 respondents to test the reliability of the instrument. Cronbach's alpha, with .70 being the lower limit of acceptability, was used for assessing consistency of the scales. The values of Cronbach's alpha for five factors were found to be below the threshold – perceived behavioral control (.664), comfortability (.380), risk avoidance (.656), information searching (.657), and behavioral intention (.689). Further examination revealed that several items, such as "I always want to reach my destination comfortably" and "I'd rather wear a mask on an airplane, just to be safe" did not correlate well with other items in their designated scales, indicating that these items may not measure the same underlying construct. The problematic items were either revised or removed to improve the questions. To test the revised questionnaire, the researcher conducted the second pilot study, collecting data from another 120 respondents. The Cronbach's alpha values ranged from .819 to .930, all well above the .70 threshold. As the instrument demonstrated satisfactory reliability, the decision was made to use the questionnaire directly for the large-scale survey. The data from 120 respondents in the second pilot study was later combined with the main survey data to achieve larger sample size. Table 1 shows the question items and Cronbach's alpha results in the second pilot study.

Table 1

Cronbach's Alpha in the Second Pilot Study

Construct		Item Question	α
Attitudes	AT1	I think wearing a mask on the airplane is a good idea	.919
	AT2	I think wearing a mask on the airplane is beneficial	
	AT3	I think wearing a mask on the airplane is wise	
	AT4	I'm in favor of wearing a mask on the airplane	
Subjective Norms	SN1	People who are important to me think I should wear a mask when flying	.903
	SN2	People who influence my behavior want me to wear a mask when flying	
	SN3	Those whose opinion I value prefer that I wear a mask when flying	
	SN4	People close to me recommend that I wear a mask when flying	
Descriptive Norm	DN1	Members in my family wear a mask onboard an airplane	.847
	DN2	Most of my friends and/or colleagues wear a mask onboard an airplane	
	DN3	Other travelers on the same flight with me wear a mask	
	DN4*	Airline employees wear a mask on the airplane	
	DN5	Many public figures wear a mask when flying	
Perceived Behavioral Control	PBC1*	I can easily obtain a mask to wear for air travel	.892
	PBC2	For me, putting on a mask when flying is an easy thing to do	
	PBC3*	I have the ability to quickly wear a mask when flying	
	PBC4*	I have the knowledge to properly wear a mask when flying	
	PBC5	I'm confident that I can handle mask-wearing-related issues when flying (e.g., change a mask, dispose a mask)	
Comfort	CO1	For me, stay comfortable when flying is more important than journey time	.849
	CO2*	I cannot breathe comfortably wearing a mask in a flight cabin environment	
	CO3	I find it difficult to relax during flight when wearing a mask	
	CO3	Wearing a mask for a long time when flying makes me restless	
	CO4*	mask for a Wearing a mask long time when flying makes me feel constrained	
Information Avoidance	IA1	I tune out information about mask-wearing	.875
	IA2	To avoid information of mask-wearing, I scroll down web pages	
	IA3	Whenever mask-wearing issues come up, I make it clear that I don't want to learn more about them	
	IA4	I think gathering a lot of information about mask-wearing is a waste of time	
Risk Avoidance	RA1	I do not take risks when it comes to my health	.819
	RA2*	I'd rather be safe then sorry	
	RA3	I'd rather wear a mask on the airplane, to feel protected against the virus	
	RA4	I'd rather wear a mask on the airplane, just to minimize uncertainty during flight	

	RA5*	I'd rather wear a mask on the airplane than regret not doing so	
Individualism	IDV1	I'd rather depend on myself than others for mask-wearing decisions	.826
	IDV2	Most of the time I make the decision for myself regarding whether or not to wear a mask	
	IDV3	Making my personal decision about mask-wearing, independent of others, is very important to me	
	IDV4	I make my own decision about mask-wearing whenever I have a chance to do so	
Information Searching	IS1	I have actively sought out information about mask-wearing	.903
	IS2*	I frequently check guidelines to face masks published by health organizations	
	IS3	I rely on multiple sources for information of mask-wearing	
	IS4	I always gather as much information as I can about mask-wearing	
	IS5	I like to review information multiple times before making a decision about mask-wearing	
Behavioral Intention	BI1	I intend to wear a mask	.930
	BI2*	My intention to wear a mask when flying is high	
	BI3	I intend to wear a mask next time I take a flight	
	BI4	It's likely that I would recommend others to wear a mask when flying	
	BI5	I intend to continue to wear a mask when flying	

Note. α = Cronbach's Alpha. * questions with major revision from the first pilot study.

4.1.3. Data Cleaning

Data collection for the main survey was conducted using Amazon Mechanical Turk (MTurk). The Human intelligence Task (HIT) was posted on MTurk which directed respondents to the SurveyMonkey online survey. In order to receive payment, respondents must enter the code provided at the end of the survey to the MTurk website. The data collection started on May 12th and completed on May 15th with 1,321 responses.

As required by IRB, respondents must be allowed to skip questions. While this is a necessary measure to protect survey participants, it can result in missing data which, if not handled properly, would lead to biased statistical estimates and invalid conclusions. This study followed two steps in handling missing data. The first step is the review of the returned questionnaires to identify those not suitable to be used for analysis. There were 101 respondents selected "No" to the informed consent question and the filter questions, which immediately

disqualified them for the study. Ten respondents failed to include their MTurk ID, which is required to receive the payment. There were another 26 respondents who skipped all the questions in the last two sections (51 questions), which means they only answered less than 30% of the questionnaire. These questionnaires, totaled 137, were deemed unusable and were removed from the study. In the second step, the remaining responses from the main survey were combined with the data from the second pilot study to form a total of 2,304 responses. Among them, 180 cases were found to have less than 50% of missing values. Cautions must be exercised in removing these cases because doing so may bias the result if the missing data does not occur at random. To determine if the data that was missing in the 180 cases was missing randomly or missing in a systematic way, Little's Missing Completely at Random test (MCAR) test was performed. The summary of missing data handling and the results of MCAR test are shown in Table 2. The non-significant *p* value ($p = .246$) indicated no relationship between the missing values and any other values in the dataset, suggesting random missing data. As the missing data was just a random subset of the dataset, it is deemed safe to remove the 180 cases from the study. The complete rate of the survey was 76%. The final sample used for data analysis with no missing data was n=1,124.

Table 2

Handling of Missing Data

Cases Deleted due to Missing Data	Number of Cases
Total Response Received	1441
Failed to answer consent and/or filter questions (Disqualified)	101
Failed to provide MTurk ID	10
Answered some demographic questions but skipped the rest of the questionnaire (missed more than 50% of the questionnaire)	26
Missing less than 50% of values	180*
Valid cases after removing unusable cases	1124

Note: * Little's MCAR test shows X^2 (df = 4221, n= 1304) = 4283.873, $p = .246$

4.1.4. Non-response Bias

While a full-scale assessment of non-response bias is not possible in this study due to the nature of online survey, an examination of differences between respondents who completed the questionnaire (the data included in the data analysis) and respondents who failed to complete the questionnaire (treated as missing data and removed from data analysis) can still provide useful insight into the representativeness of the sample. Respondents were divided into two groups – Respondent Group (cases with no missing data and were included in data analysis) and Nonrespondent Group (cases with missing data and were removed from data analysis). A chi-square test was performed to assess the differences between the two groups on four demographic variables – age, gender, educational level, and marital status. The results, showed in Table 3, revealed no significant difference between the two groups, suggesting minimal concern of non-response bias in this study.

Table 3

Chi-Square Test for Non-Response Bias

Demographics	Groups	X (n=1314)	*p*
Gender	Respondents vs. Non-respondents	1.895	0.169
Age	Respondents vs. Non-respondents	6.692	0.245
Education	Respondents vs. Non-respondents	4.620	0.329
Marital	Respondents vs. Non-respondents	5.586	0.232

Note: p is significant at $p < .05$. n=198 for Nonrespondent Group (missing data cases removed from the study answered questions on at least the four demographic variables), n=1,116 for Respondent Group (no missing data on demographic variables).

4.2. Passenger Characteristics

4.2.1. Passenger Demographics

The first major section of the survey collected demographic information including respondents' gender, age, educational level, marital status, personal income, ethnicity, and employment status. The results are shown in Table 4. Slightly more female (52.5% than male (46.9%) respondents participated in the survey, while seven respondents did not identify their gender. The gender ratio was similar to the national average which shows slightly more female (50.8%) and male (49.2%) in the general population in the US (United States Census Bureau, 2020). Most respondents fall within the age group of 31-40 (35.1%), followed by age group 20-30 (23.5% and 41-50 (19.8%). The respondents were younger compared to the national average, which reports similar population distribution in the ten-year age groups between age 20 and 50. The difference is particularly noticeable in the group of 60 years or older (8.5% vs. 22.8%), indicating that in this age group only a small percentage of the population is capable of or interested in participating in online surveys. Over half of the respondents were married at the time of the survey (55.5%), followed by those who were single (34.5%). These numbers were similar to the national average (47.7% vs. 34%). The remaining 10.3% fall within the categories of Separated, Widowed, and Divorced. With respect to educational attainment, respondents with a bachelor's degree or equivalent comprised more than half of the total sample (58.1%). There were similar numbers of respondents who hold a high school diploma (19.7%) and a master's degree (17.5%). Participants with lower than high school education and higher than master's degree accounted for a small portion of the total respondents (4.6%). A difference can be seen in educational levels between the survey participants and the general population in the US, which indicated only 32.1% of the US population received higher than bachelor's degree. In terms of

personal income, 55.8% of the respondents reported annual income between $25,000 to 75,000, followed by 15.8% between $75,001 – 100,000, and 12.7% below $25,000. Another 15.6% of the respondents fall within the high-end category, earning more than $100,000 per year. Nearly three quarters of participants (74.6%) self-identified as White, 10.4% as Asian, and 7.6% African American, while the remaining 7.2% covered Latino, Pacific Islander, and native American. This roughly reflects the racial makeup of the US population, with White Americans being the racial majority of people living in the US. The employment status of the respondents varied. The majority of the respondents (70.4%) worked full time while 14.5% took a part time job. About 10% of respondents were not employed at the time of the survey. The remaining respondents (5.7%) were either retired or not able to work due to disability.

Table 4

Demographic Characteristics

Variables	Category	Frequency	Percentage	National %
Gender	Male	527	46.9	49.2
	Female	590	52.5	50.8
	Missing	7	0.6	
		1124	100.0	
Age	< 20	15	1.3	
	20-30	264	23.5	13.6
	31-40	394	35.1	13.4
	41-50	223	19.8	12.3
	51-60	131	11.7	12.7
	> 60	96	8.5	22.8
	Missing	1	0.1	
		1124	99.9	
Marital Status	Single (never married)	385	34.3	34.0
	Married	624	55.5	47.7
	Separated	8	0.7	
	Widowed	21	1.9	
	Divorced	86	7.7	
		1124	100.0	
Education	Completed some high school	8	0.7	

	High school	221	19.7	
	Bachelor's degree or equivalent	653	58.1	Bachelor or Higher 32.1
	Master's degree	197	17.5	
	Higher than master's degree	44	3.9	
	Missing	1	0.1	
		1124	100.0	
Personal Income	< $25,000	143	12.7	
	$25,000 - $50,000	345	30.7	
	$50,000 - $75,000	282	25.1	
	$75,001 - $100,000	178	15.8	
	$100,001 - $125,000	71	6.3	
	> $125,000	105	9.3	
		1124	100.0	
Ethnicity	Black or African American	85	7.6	13.4
	Asian	117	10.4	5.9
	Hispanic or Latino	65	5.8	18.5
	Pacific islander	4	0.4	0.2
	White	839	74.6	60.1
	Native American	11	1.0	1.3
	Missing	3	0.3	
		1124	100.0	
Employment Status	Employed, working 40 or more hours per week	791	70.4	
	Not employed, not looking for work	49	4.4	
	Employed, working 1-39 hours per week	163	14.5	
	Retired	58	5.2	
	Not employed, looking for work	56	5.0	
	Disabled, not able to work	6	0.5	
	Missing	1	0.1	
		1124	100.0	

4.2.2. Travel and Mask Experience

The respondents' travel and mask-wearing experience before and during COVID-19 were collected and summarized in Table 5. Forty-one percent of the respondents reported two or three airline trips every year before the pandemic, followed by 27.8% reporting one trip a year and 13.8% for four or five trips a year. There were 6.7% very frequent travelers making more than five trips a year, and 10.4% very infrequent travelers travelling less than once a year. The travel

frequency of the respondents showed a very different pattern during the pandemic, with 43.4% reporting less than one trip since the starting of COVID-19 in the US in the beginning of 2020, followed by 32.4% who traveled only once. Fewer respondents (18%) traveled two to three times and a small portion of respondents reported four or more airline trips during this period of time. In terms of travel purpose, 51.3% of the respondents traveled for leisure purposes and another 23.3% reporting making an airline trip to visit friends and family. Collectively, leisure and visiting trips make up for nearly three quarters of the total sample. Nearly a quarter of the respondents (24.4%) traveled for business. Study and other purposes categories were the least selected (1%). A sharp contrast can be observed in respondents' mask-wearing choices before and during COVID-19. Before the outbreak of the pandemic, only 12.6% of the respondents wore a mask when they were sick in crowed public settings such as grocery stores and conferences while the rest of the respondents decided not to put on a mask. This pattern was reversed during COVID-19 where 94% of the respondents wore a mask, leaving only 5.9% choosing not to mask up in crowded public settings. Respondents in general demonstrated strong confidence in the effectiveness of facemasks, with 78.9% of them believing that wearing a mask can keep them safe from the infection of virus, and 85.8% agreed that wearing a mask can provide protection to those around them. Eight sources to obtain COVID-19 information were provided in the survey, allowing the respondents to select multiple sources that they used to obtain information of COVID-19. Of the top three sources, most respondents chose major news media for COVID-19 information (70.7%), followed by National, State, City or County health department/agency (67.4%) and Doctors or Other health Providers (53.5%). Considerable amounts of respondents also turned to Local News Media (44%), Social Media (41.6%), and

Family/Friends (38.3%) for this information. A much smaller portion of respondents (16%) obtained COVID-19 information from Coworkers/Classmates and other sources.

Table 5

Respondents' Mask and Travel Experience

Experience		Frequency	Percentage
Travel Frequency/Year	<1 time	117	10.4
	1 time	312	27.8
	2-3 times	462	41.1
	4-5 times	155	13.8
	>5 times	75	6.7
	Missing	3	0.3
Traveled Since Beginning of 2020	<1 time	488	43.4
	1 time	364	32.4
	2-3 times	202	18.0
	4-5 times	48	4.3
	>5 times	22	2.0
Travel Purpose	Leisure/vacation	577	51.3
	Business	274	24.4
	Visiting family/friends	262	23.3
	Study	4	0.4
	Others	7	0.6
Accompany	Yes	523	46.5
	No	601	53.5
Mask-wearing in crowded places before Covid-19	Yes	142	12.6
	No	981	87.3
	Missing	1	0.1
Mask-wearing in crowded places during Covid-19	Yes	1056	94.0
	No	66	5.9
	Missing	2	0.2
Masks keep you safe	Yes	887	78.9
	No	235	20.9
	Missing	2	0.2
Masks keep others safe	Yes	965	85.8
	No	157	14.0
	Missing	2	0.2
Main Source of Information of Covid-19	Social media	468	41.6
	family/friends	430	38.3
	Major news media	795	70.7

Coworkers/Classmates	116	10.3
National, state, city, or county health department/agency	758	67.4
Doctors or other health providers	601	53.5
Local news media	495	44.0
Others	64	5.7

4.3. Descriptive Statistics – Latent Variables

The major section (Section 3) of the survey collected opinions about mask-wearing onboard airplanes during COVID-19. Respondents were asked to evaluate nine latent variables – attitude, subjective norm, descriptive norm, perceived behavioral control, comfort, information avoidance, information searching, risk avoidance, individualism, and behavioral intention – using 46 statements (scale items) and rated their levels of agreement/disagreement on a five-point Likert scale. Table 6 shows Cronbach's alpha of the measurement scales as well as a summary of descriptive statistics of the responses.

The measuring scale of the constructs again demonstrated high levels of scale reliability. Values of Cronbach alpha were from α=.823 (Descriptive norm and individualism) to α=.969 (Attitude). These high values indicted high internal consistency among the set of items designed to measure the same construct. The validity of the scales was assessed in the phase of confirmatory factor analysis.

The computation of the mean and standard deviation (SD) for each construct allowed for a preliminary assessment of the effect of each construct on the intention to wear a mask when flying. Attitude, subjective norm, PBC, and behavioral intentions are the original factors of the TPB model. Means and SD scores for items measuring this group of factors ranged from M=3.88 and SD=1.09 (SN2: People who influence my behavior want me to wear a mask when flying) to M=4.57 and SD=.62 (PBC1: For me, putting on a mask when flying is an easy thing to do). Overall, the mean values can be described as high (between rank 4 and 5). For this group of

factors, items measuring PBC had the highest mean scores while those measuring Subject Norms scored the lowest. The remaining six factors were external factors added to the TPB model. Means scores for the items measuring these factors ranged from M=2.07 and SD=1.17 (IA2: To avoid information of mask-wearing, I scroll down web pages) to M=4.41 and SD=.72 (DN4: Airline employees wear a mask on the airplane). Four factors (DN, RA, IDV, and BI) showed high response values (at 4-level). IS showed moderate values (at 3-level), while CO and IA showed moderate to low values (at 2- or 3-levels). The mean scores of the 46 scale items provided some preliminary insight into the factor impact on mask-wearing intention during flight. Overall, respondents demonstrated higher levels of agreement on the effect of factors such as perceived behavioral control and attitude on the intention to wear a mask when flying, while such agreement was only moderately low for factors such as comfort and information avoidance.

As shown in Table 6, the majority of the scale items exhibited a negatively skewed distribution (indicated by the negative skewness values) while kurtosis showed a mixture of both heavy-tailed and light-tailed distributions as indicated by the positive and negative kurtosis scores. While slight skewness was suggested, the sample distribution did not show a significant departure from normal distribution.

Table 6

Mean and Standard Deviation Scores of Construct

Construct	Scale Item	α	Mean	SD	Skewness	Kurtosis
Attitude	AT1	0.969	4.20	1.05	-1.52	1.80
	AT2		4.14	1.10	-1.38	1.19
	AT3		4.16	1.06	-1.44	1.59
	AT4		4.10	1.18	-1.38	0.98
Subjective Norm	SN1	0.948	4.01	1.03	-1.13	0.87
	SN2		3.88	1.09	-0.85	0.12
	SN3		3.96	1.08	-1.07	0.57
	SN4		4.00	1.08	-1.10	0.60

Descriptive Norm	DN1	0.823	4.19	0.91	-1.31	1.84
	DN2		4.17	0.87	-1.16	1.59
	DN3		4.08	0.78	-0.73	0.78
	DN4		4.41	0.72	-1.29	2.16
	DN5		3.98	0.89	-0.84	0.77
Perceived Behavioral Control	PBC1	0.889	4.57	0.62	-1.54	3.38
	PBC2		4.38	0.87	-1.65	2.79
	PGC3		4.47	0.70	-1.52	3.37
	PBC4		4.53	0.67	-1.67	3.97
	PBC5		4.50	0.69	-1.63	3.86
Comfort	CO1	0.865	3.50	0.99	-0.37	-0.42
	CO2		2.60	1.32	0.44	-1.00
	CO3		2.65	1.30	0.33	-1.09
	CO4		2.78	1.33	0.14	-1.23
	CO5		2.83	1.33	0.07	-1.24
Information Avoidance	IA1	0.921	2.25	1.23	0.65	-0.76
	IA2		2.07	1.17	1.01	0.09
	IA3		2.13	1.24	0.90	-0.31
	IA4		2.22	1.27	0.77	-0.61
Risk Avoidance	RA1	0.887	3.94	0.90	-0.88	0.65
	RA2		4.25	0.84	-1.17	1.39
	RA3		4.03	1.17	-1.27	0.78
	RA4		4.01	1.14	-1.26	0.87
	RA5		4.08	1.16	-1.28	0.75
Individualism	IDV1	0.823	4.18	0.86	-1.05	1.06
	IDV2		4.15	0.96	-1.15	0.92
	IDV3		3.95	1.00	-0.77	0.01
	IDV4		4.14	0.88	-1.01	0.89
Information Searching	IS1	0.908	3.63	1.12	-0.70	-0.32
	IS2		3.40	1.24	-0.37	-0.98
	IS3		3.66	1.06	-0.83	0.16
	IS4		3.38	1.18	-0.39	-0.74
	IS5		3.21	1.18	-0.19	-0.92
Behavioral Intention	BI1	0.964	4.21	1.07	-1.58	1.96
	BI2		4.18	1.14	-1.48	1.36
	BI3		4.23	1.06	-1.60	2.12
	BI4		4.03	1.23	-1.22	0.46
	BI5		4.14	1.12	-1.46	1.46

4.4. First Data Analysis – Factor Impact on Mask-Wearing Intention

4.4.1. Intention to Wear a Mask – Total Sample

A two-phase structural equation modeling approach was employed to examine travelers' mask-wearing intentions when flying during COVID-19 in the US. First, confirmatory factor analysis was performed to evaluate and validate the measurement model. To start the CFA, multivariate and normality of the data were checked. All kurtosis values were less than seven, indicating no substantial departure from normality of the dataset (Byrne, 2010; Hair et al., 2010). Three cases with large Mahalanobis distance (D^2) were removed from the data to avoid impact of outlier. The CFA analysis was then performed on the survey sample containing 1,121 respondents. Three rounds of model estimation were conducted, with measures taken to improve the model fit following each round of estimation. Measures for model improvement included removing scale items with low factor loadings (< .70), removing scale items associated with large error scores, and model specification through correlating error terms with large values. The final measurement model met the CFI, GFI, CMIN/df and RMSEA requirements for a good model fit (cutoff values were adopted from Byrne, 2010: CFI>.95, GFI>.90, CMIN/df<3, and RMSEA<.05). Following model estimation, reliability and validity of the model were tested. Evidence of model reliability was obtained from two measures – Cronbach's alpha and construct reliability (CR). For the final measurement model, Cronbach's alpha values for all constructs were greater than .70, and the CR values for all constructs exceeded the recommended value of .70, indicating good reliability among scale items measuring their designated constructs. Construct validity of the model was established by convergent validity and discriminant validity of measurement. All factor loadings except for items DN4 and ID1 (both close to .70) exceeded the recommended threshold of .70 and all the average variance extracted (AVE) values passed

the .50 threshold, suggesting sufficient convergent validity among scale items. A comparison between the square root of AVE values for any two constructs and the correlation estimate between these two constructs provide evidence of discriminant validity of the measurement. For the proposed measurement model, all the squared root of AVE values for any two constructs were greater than the correlation between these two constructs, demonstrating discriminant validity of the model. Consequently, the measurement model was successfully validity and ready for structural model analysis. Table 7 summarizes the reliability and validity results for the measurement model. Table 8 shows discriminant validity of the measurement model.

Table 7

Model Reliability and Validity Results – All Sample

Construct	Item	Cronbach's Alpha	Factor Loading	CR	AVE
Attitude	AT1	.919	.946	.970	.888
	AT2		.942		
	AT3		.936		
	AT4		.946		
Subjective Norms	SN1	.903	.913	.949	.823
	SN2		.874		
	SN3		.927		
	SN4		.915		
Descriptive Norms	DN1	.847	.889	.840	.639
	DN2		.815		
	DN3*		-		
	DN4		.681		
	DN5*		-		
Perceived Behavioral Control	PBC1*	.892	-	.854	.662
	PBC2		.763		
	PBC3		.834		
	PBC4*		-		
	PBC5		.842		
Comfort	CO1*	.849	-	.938	.790
	CO2		.878		
	CO3		.896		

	CO4		.895		
	CO5		.886		
Information Avoidance	IA1	.875	.873	.926	.759
	IA2		.858		
	IA3		.876		
	IA4		.877		
Risk Avoidance	RA1*	.819	-	.947	.857
	RA2*		-		
	RA3		.943		
	RA4		.917		
	RA5		.917		
Individualism	ID1	.826	.658	.813	.594
	ID2*		-		
	ID3		.795		
	ID4		.846		
Information Searching	IS1	.903	.792	.908	.665
	IS2		.823		
	IS3		.763		
	IS4		.919		
	IS5		.769		
Behavioral intention	BI1	.93	.946	.957	.881
	BI2		.940		
	BI3*		-		
	BI4*		-		
	BI5		.929		

Note: * indicates removed items during model improvement

Table 8

Discriminant Validity – All Sample

	IS	AT	SN	DN	PBC	CO	IA	RA	IDV	IB
IS	**.815**									
AT	.471	**.943**								
SN	.457	.829	**.907**							
DN	.329	.648	.734	**.800**						
PBC	.312	.723	.647	.694	**.814**					
CO	-.309	-.663	-.527	-.450	-.605	**.889**				
IA	-.335	-.606	-.498	-.478	-.614	.671	**.871**			
RA	.453	.921	.789	.624	.703	-.662	-.624	**.926**		
IDV	.049	-.046	.009	.087	.100	.052	.021	-.008	**.770**	
IB	.470	.935	.781	.682	.732	-.656	-.624	.915	-.038	**.938**

The second phase of SEM addressed the full structural model, focusing on testing the relationship between the nine predictor variables and behavioral intentions to wear a mask onboard airplanes. Model fit assessment showed minimal changes from the CFA fit indices, again indicating satisfactory model fit for the structural model. Hypothesis statements were then tested. The results indicated that five paths – AT→BI, SN→BI, DN→BI, RA→BI, IS→BI – were statistically significant at $p < .05$ while the other four paths – PBC→BI, CO→BI, IA→BI, and IDV→BI – were not statistically significant. Further examination revealed that subjective norms, while statistically significant, generated a negative regression coefficient that was not in line with the hypothesis direction. Consequently, four constructs, namely attitude, descriptive norm, risk avoidance, and information seeking, were significant determinants of the behavioral intention to wear a mask onboard airplanes during COVID -19, while the remaining constructs were not significant predictors of the mask-wearing intention. In other words, air travelers' intention to wear a mask during flight was significantly influenced by their attitude toward masks, their tendency to avoid the risk of COVID-19, their information searching of mask-wearing, and whether or not others actually wear masks during flights. Among the four significant predictors, attitude had the largest standardized coefficient (.570), followed by risk avoidance (.323), descriptive norm (.135), and then information searching (.037). These coefficients indicated the magnitude of the effect, meaning air travelers were most strongly influenced by their attitude toward masks when deciding on mask-wearing onboard an airplane in COVID-19, followed by the tendency to avoidance risks of COVID-19, other people's mask behaviors, and information searching behaviors. Table 9 shows the model fit values for the measurement and structural models, and hypothesis testing results.

Table 9

Model Fit and Hypothesis Testing Results – All Sample

Model fit indices	Measurement Model	Structural Model
X	1578.552	1485.689
df	545	543
p	***	***
CMIN/df	2.896	2.736
CFI	.975	.977
GFI	.925	.929
RMSEA	.041	.039
Hypothesis testing	Standardized Coefficient	Null Hypothesis Decision
AT→BI	.570***	Reject
SN→BI	-.100***	Retain (wrong direction)
DN→BI	.135***	Reject
PBC→BI	.037	Retain
CO→BI	-.005	Retain
IA→BI	-.024	Retain
RA→BI	.323***	Reject
IDV→BI	-.024	Retain
IS→BI	.037**	Reject

Note: ** refers to $p < .05$; *** refers to $p < .001$

4.4.2. Intention to Wear a Mask – Age Group Comparison

The second goal of this study was to examine age group differences in the intention to wear masks when flying during COVID-19. For this to happen, the all-sample dataset was divided into three parts based on the variable of age: Young Group (age 18–40, n = 672), Mid-Age Group (age 41–60, n = 353), and Senior Group (age over 60, n = 96). As there is a close relationship between age and COVID-19, as indicated by the CDC's analysis of COVID-19 infection, hospitalization, and death by age group in 2021 (Appendix A), it is logical that group creation in this study considers the relationship between the age factor and COVID-19. The CDC analysis provided that the rate of death was 30 times higher in the 50 to 64 years olds, which was further increased to 90 times higher in those who were between 65 and 70 years old, compared to

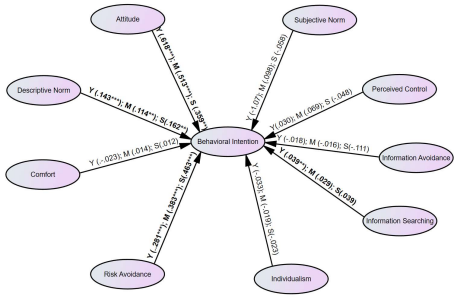
the reference age group (between 18 and 29 years old). This dramatic increase in the death rate served as a basis for creating a senior age group consisting of passengers older than 60. While this group had a relatively small sample size, analyzing the intention of travelers most at risk of COVID-19 infection can provide valuable insight into the vulnerable population facing the pandemic. A two-phase structural equation modeling analysis was performed on the three group datasets, following the same procedure in the all-sample analysis. The measurement models for the Young, Mid-Age, and Senior groups exhibited good, moderate, and acceptable model fit, respectively, and all of them demonstrated satisfactory convergent validity. For the senior group, the *p* value associated with the Chi-square test was less than .001. Due to the sample size of this group been slightly smaller than 100, additional goodness of fit indices were examined, including Tucker Lewis index (TLI) and 90% confidence interval for RMSEA. Specifically, TLI was used to replace GFI. Despite the similarity between the two model fit measures, TLI is less affected by sample size and the number of indicators (Sharma et al., 2005), making it more suitable for assessing a SEM model with a small sample size. Both the low and high confidence intervals for RMSEA were above 0.05, indicating generally unsatisfactory model fit (MacCallum et al., 1996). However, as both confidence intervals were not significantly higher than the cutoff value, and both the CFI and TLI values exceeded the recommended values (0.95 and 0.90, respectively), the decision was made to continue with the analysis of the senior traveler group while keeping in mind the limitation of its small sample size. Discriminant validity was then assessed. For BI in the Young Group and RA in the Mid-Age Group models, the square roots of their AVE were less than the absolute values of their correlation with AT. As the differences were minor (BI: .930 vs. 0.936; RA: 0.939 vs. 0.941) and the AVE values for both BI and RA exceeded the 0.50 threshold, both factors were retained in the models to avoid losing

information. Appendices B, C, and D show the measurement model fit and model validation for the three age groups.

The structural models were then tested, which showed minimal changes in model fit for the three age groups. Hypothesis testing again revealed the significant effect of four factors – AT, DN, RA, and IS on mask-wearing intention, although they affected the three age groups differently. For Young Group, the paths of AT→BI, DN→BI, RA→BI, and IS→BI were statistically significant, indicating that attitude, descriptive norms, risk avoidance, and information searching significantly influenced the decision of young travelers to wear a mask when flying during COVID -19. For models representing Mid-Age Group and Senior Group, only the paths of AT→BI , DN→BI, and RA→BI were significant, indicating that middle-aged and elderly travelers were affected by attitude, descriptive norms, and risk avoidance when deciding on mask-wearing during flight. Noticeably, the magnitude of the effect of AT, DN, and RA varied across age groups. AT has the strongest effect on Young Group, followed by Mid-age Group and Senior Group. The effect of RA showed a reversal pattern with the strongest impact on Senior Group, followed by Mid-Age Group and Young Group. The effect of DN was decreased from Young Group to Mid-Age Group, then increased again for Senior Group. Overall, the intention of Young Group and Mid-Age group to wear a mask when flying in COVID -19 was most strongly affected by attitude toward masks whereas for Senior Group the strongest impact came from risk avoidance. There is a decreased impact of attitude (.618, .513, .359) and an increased impact of risk avoidance (.281, .383, .463) on mask-wearing intentions across the Young, Mid-Age, and Senior groups. The factor of IS affected only the Yong Group with a small effect (.039). Figure 3 illustrates the hypothesis testing results and the magnitude of impact. Table 10 summarizes characteristics of the three groups.

Figure 3

Hypothesis Testing and Standardized Coefficient– Age groups



Notes: Y=Young Group; M=Mid-Age Group; S= Senior Group. ***indicates $p < .001$; **indicates $p < .05$.

Table 10

Age Group Characteristics – Summary

	Young Group	Mid-Age Group	Senior Group
Travel Characteristics	Air travel mostly 2-3 times annually before COVID -19, followed by once a year. During COVID -19, nearly 40% have not traveled	Air travel mostly 2-3 times annually before COVID -19, followed by once a year. During COVID -19, nearly half have not traveled	Air travel mostly 2-3 times annually before COVID -19, followed by once a year. During COVID -19, more than half have not traveled
Mask Behavior and perception	13% wore a mask when sick in crowded settings before COVID -19. During COVID -19, 93% wore a mask in crowed settings. 79% believed mask protected themselves and 87% believed mask protected others.	13% wore a mask when sick in crowded settings before COVID-19. During COVID-19, 94% wore a mask in crowed settings. 76% believed mask protected themselves and 83% believed mask protected others.	3% wore a mask when sick in crowded settings before COVID-19. During COVID-19, 96% wore a mask in crowed settings. 81% believed mask protected themselves and 85% believed mask protected others.
Top four sources of information for Covid-19 (in the order of frequency of use)	• Major News media • Health Agency • Doctor • Social media	• Major news media • Health agency • Doctor • Local news media	• Major news media • Health agency • Doctor • Local news media
Determinants of intention to wear a mask when flying (in the order of importance)	• Attitude • Risk Avoidance • Descriptive Norm • Information Searching	• Attitude • Risk Avoidance • Descriptive Norm	• Risk Avoidance • Attitude • Descriptive Norm

4.5. Second Data Analysis – Mediation Effect

4.5.1. Total Sample Analysis

The total sample analysis was comprised of two parts – direct factor impact without mediator (No Mediator) and mediating effect (With Mediator) (Referred to as Figure 1a and 1b in Section 2.2). For both parts, a two-phase structural equation modeling approach was used to test the measurement model and the structural model of SEM. The pre-assessment of the data showed that kurtosis values were less than seven, indicating satisfaction of the normality assumption of SEM analysis (Byrne, 2010). Three cases were removed based on Mahalanobis distance (D^2) values to avoid the impact of outliers. Confirmatory factor analysis (CFA) was then used to test and validate the measurement model (n=1,121). In this analysis, the cutoff values established by Byrne (2010) were adopted for model evaluation (CFI>.95, GFI>.90, CMIN/df<3, and RMSEA<.05). Measures taken to improve the model fit included removing scale items with low factor loadings (< .70), removing scale items associated with large error scores, and model specification through correlating error terms with large values. Following these measures, both measurement models achieved satisfactory model fit (No Mediator: Chi-square/df = 2.804; GFI = .973; CFI = .992; RMSEA = .040. With Mediator: Chi-square/df = 2.671; GFI = .968; CFI = .991; RMSEA = .039). Reliability and validity of the model were then tested. Both values of Cronbach Alpha measuring the internal consistency of scale items and Construct Reliability (CR) exceeded the threshold of .70, indicating good reliability among scale items measuring their designated constructs. Construct validity of the model was established by convergent validity and discriminant validity of measurement. For the final measurement models (With Mediator and No Mediator), factor loadings (>.70) and average variance extracted (AVE) (> .50) indicated sufficient convergent validity of the scale items.

Table 11

Measurement Model (With Mediator) – Model Fit, Reliability and Validity Results

	Items	Cronbach Alpha	Load Factor	AVE	CR	MSV
SN	People who are important to me think I should wear a mask when flying	0.949	.911	.823	.949	.691
	People who influence my behavior want me to wear a mask when flying		.874			
	Those whose opinion I value prefer that I wear a mask when flying		.928			
	People close to me recommend that I wear a mask when flying		.914			
RA	I'd rather wear a mask on the airplane, to feel protected against the virus	.940	.943	.857	.947	.861
	I'd rather wear a mask on the airplane, just to minimize uncertainty during flight		.918			
	I'd rather wear a mask on the airplane than regret not doing so		.916			
IS	I have actively sought out information about mask-wearing	.908	.791	.664	.908	.223
	I frequently check guidelines to face masks published by health organizations		.822			
	I rely on multiple sources for information of mask-wearing		.762			
	I always gather as much information as I can about mask-wearing		.920			
	I like to review information multiple times before making a decision about mask-wearing		.769			
AT	I think wearing a mask on the airplane is beneficial	.957	.939	.884	.958	.880
	I think wearing a mask on the airplane is wise		.936			
	I'm in favor of wearing a mask on the airplane		.945			
BI	I intend to wear a mask	.957	.945	.881	.957	.880
	My intention to wear a mask when flying is high		.941			
	I intend to continue to wear a mask when flying		.929			

SN=Subjective Norms; RA=Risk Avoidance, IS=Information Seeking; AT=Attitude; BI=Behavioral Intention

Discriminant validity (indicated by MSV) was assessed by comparing the AVE of a factor with the squared correlations of this factor with another factor. For No Mediator, all AVE scores were greater than MSV scores, indicating satisfactory discriminant validity. For With Mediator, only RA has a slightly higher score of MSV (.861) than its AVE (.857). As the difference is minor and the AVE of RA exceeded the threshold of .50, RA was retained in the model to avoid losing information. Table 11 summarizes the reliability and validity results of the measurement model for the With Mediator scenario.

Following the validation of the measurement model, the structural model was assessed for No Mediator regarding the direct relationship between the three factors (subjective norms, risk avoidance, and information seeking) and mask-wearing intentions onboard airplanes. The goodness-of-fit indices showed minimal changes from the measurement model, indicating satisfactory model fit of the structural model. Hypothesis testing showed that the paths of SN→BI, RA→BI, and IS→BI were statistically significant, and the results followed the hypothesized direction. Thus, subjective norms, risk avoidance, and information seeking had a significant impact on air travelers' intention to wear a mask on airplanes during COVID-19. Risk avoidance had the strongest effect on mask-wearing intention (standardized regression coefficient =.776), followed by subjective norms (standardized regression coefficient =.145), and then information seeking (standardized regression coefficient=.052). The results are summarized in the top section of Table 12.

Table 12

Hypothesis Testing and Mediation Analysis – Entire Sample

No Mediator	relationship	std regression coefficient	t-values	p-values		Conclusion
	SN→BI	.145	5.477	***		Reject null hypothesis
	RA→BI	.776	25.802	***		Reject null hypothesis
	IS→BI	.052	3.803	.002		Reject null hypothesis
With Mediator	relationship	Direct effect of factors[a]	Indirect effect via AT	Confidence Interval		Conclusion
				low	high	
	SN→AT→BI	-0.21	.163***	.111	.228	Full mediation
	RA→AT→BI	.319***	.461***	.357	.567	Partial mediation
	IS→AT→BI	.030**	.022**	.003	.044	Partial mediation
	AT→BI	.645***	-	-	-	-

Fit indices (without mediator): Chi-square/df = 2.804; GFI =.973; CFI =.992; RMSEA =.040.
Fit indices (with mediator): Chi-square/df = 2.671; GFI =.968; CFI =.991; RMSEA =.039.
*** p < .05; *** p < .001.*
Direct effect of factors[a]: direct impact of SN, RA, and IS on BI when AT was presented as a mediator.

While the hypothesis testing indicated significant, direct impact of SN, RA, and IS on BI, in the context of mask-wearing during flight in COVID-19 it is useful to examine if the influence between the constructs may take an indirect path through the mediator of attitude toward masks. The primary interest here was the possible existence of indirect effect, which in this study was represented by the influence flowing from SN, RA, and IS to AT (mediator) and then to BI (see Figure 1b). Traditionally, Baron and Kenny (1986) provided one of the fundamental frameworks for testing mediation, but more recent studies suggested the use of bootstrapping. Simply speaking, bootstrapping treats the data sample as a pseudo-population, taking many random samples with replacement to determine the confidence interval of the indirect effect, which is consistent with the *p* value. Given the wide acceptance of bootstrapping as a more accurate test of mediating effect, the current study adopted this technique to test the mediating effect of attitude.

The lower section of Table 12 presents the results of mediation analysis of the entire sample. The analysis started by testing the direct paths of SN→BI, RA→BI, and IS→BI (direct effect of factors) when the mediator (AT) was presented (see Figure 1b). Only two of the three paths (RA→BI and IS→BI) were significant. Noticeably, the magnitude of the effect from RA and IS to BI reduced dramatically compared to that in Figure 1a (No Mediator) (.319 and .030 vs. .776 and .052). This indicated that, while RA and IS still explained the variance in BI in the With Mediator scenario, a significant portion of the variance in BI was now explained through the mediator of attitude. The path of SN→BI was not significant, indicating that SN had no direct impact on BI when attitude was included as the mediator. Indirect effects were observed for all factors, which was the largest for the path of RA→AT→BI (.461), followed by SN→AT→BI (.163), and then IS→AT→BI (.022), indicating that the mediating effect of attitude was the strongest in the relationship between RA and BI, followed by SN and BI, and IS and BI. None of the three confidence intervals include the value of zero, indicating statistical significance of the indirect effects. The two-tailed *p* values produced the same results.

Because SN had no significant direct effect on BI when AT was presented, and SN had a significant indirect effect on BI through AT, AT fully mediated the relationship between SN and BI. In other words, the variance of BI in the path of SN→AT→BI was entirely explained by the mediator of AT. As RA and IS had both significant direct effect on BI and significant indirect effect on BI through AT, AT partially mediated the relationships of RA→BI and IS→BI. In other words, both RA and IS, and the mediator of AT explained the variance in BI.

4.5.2. Demographic Group Analysis

Further analysis was performed on whether variations existed within different demographic categories regarding mask-wearing intentions during flight. The understanding is

particularly important in the US, a country with greatly diverse population (US Census Bureau, 2020). Five demographic factors – age, gender, education, income, and ethnicity – were used to establish demographic groups for comparison. Structural equation modeling analysis was then performed based on Figure 1a and 1b to identify direct factor impact and mediating effect in the relationships between SN, RA, IS and BI across various demographic groups.

Appendix E summarizes the comparative results across the groups associated with the five demographic characteristics. For age, the comparison was made between three groups - Young Travelers (18-40), Mid-aged Travelers (41-60), and Senior Travelers (older than 60). AT directly influenced mask-wearing intention across all age groups (.685, .582, and .468 for Young, Mid-aged, and Senior, respectively). For Young Travelers, SN (.194), RA (.724), and IS (.055) significantly affected mask-wearing intention (BI), but when attitude was introduced as the mediator, only RA had a direct (but reduced) effect on BI (.276). The indirect effect of AT (mediator) in the relationships of SN→AT→BI and RA→AT→BI were found to be significant, while it was not significant in IS→AT→BI. This showed that AT fully mediated the relationship between SN and BI, partially mediated the relationship between RA and BI, and did not mediate the relationship between IS and BI for young travelers. For Mid-aged Traveler, only RA directly affected BI and this relationship remained significant when AT presented as the mediator. A significant indirect effect was found for the paths of SN→AT→BI and RA→AT→BI. Thus, AT fully mediated the relationship between SN and BI, and partially mediated the relationship between RA and BI for mid-aged travelers. For Senior Travelers, only RA significantly affected BI with and without attitude as a mediator. As such, AT partially mediated the relationship between RA and BI for senior travelers.

Regarding gender, AT, SN, RA, and IS directly affected mask-wearing intention of both male and female travelers, with similar magnitude of effect (.647, .154, .767, and .053 vs. .623, .143, .778, and .053). For both genders, RA was the only significant factor in BI when AT was included as a mediator (.319 vs. .335), while SN only demonstrated a significant indirect effect on BI through AT. Thus, for both male and female travelers AT fully mediated the relationship between SN and BI, partially mediated the relationship between RA and BI, and it had no mediating effect between IS and BI.

Concerning education, AT most strongly impacted on the group holding a bachelor's degree (.723), followed by the group with high school diploma (.526) and the group with master's degree and above (.511). All three factors – SN, RA, and IS – significantly influenced mask-wearing intention of bachelor's group (.129, .781, and .065) while SN and RA were significant in the master and above group (.207 and .710), and only RA was significant in the high school group (.854). When AT was presented as the mediator, only RA showed direct impact on BI across all groups. All three factors demonstrated significant, indirect effect on BI through AT for the bachelor's group while for the other two groups only SN and RA showed significant indirect effect. Therefore, for all educational groups, AT fully mediated the relationship between SN and BI and partially mediated the relationship between RA and BI. A full mediation via AT was observed between IS and BI in Bachelor's Group, while no mediation on this path was detected for the other two groups.

The income group comparison showed that AT most strongly affected middle income travelers' mask-wearing intention (.695), followed by high-income travelers (.640), and then low-income travelers (.611). SN, RA, and IS significantly influenced mask-wearing intention of low-income group while for the other two groups only some factors were significant (SN and RA

for the high-income group and RA for middle-income group). When AT was introduced as the mediator, only RA showed a significant impact on BI across the three groups. For the high-income group the mediating effect was found for all paths, while for the other two groups such mediation effect was only observed between SN and BI, and RA and BI. Accordingly, AT fully medicated the relationship between SN and BI and it partially mediated the relationship between RA and BI for all three groups. No mediating effect was detected for IS→BI in the low- and medium-income groups while for the high-income group AT fully mediated this relationship.

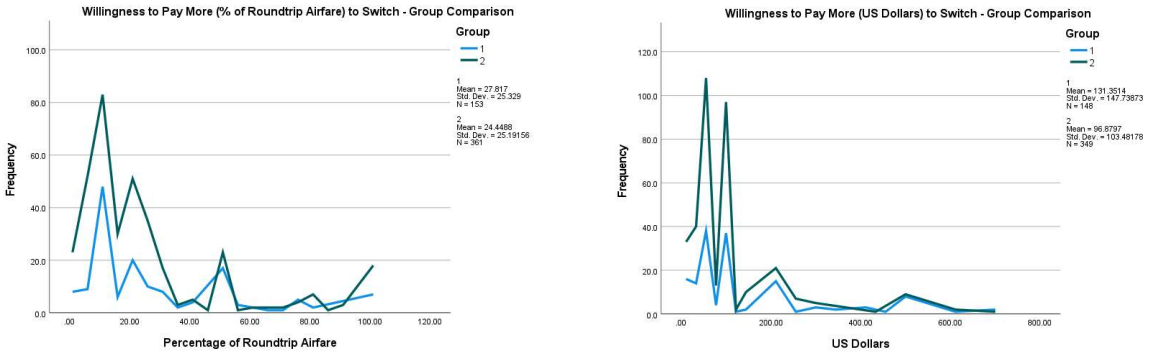
Three ethnical groups including White Travelers, Asian Travelers, and Other Travelers were formed for comparison. For the White Travelers and Other Travelers, AT had a significant impact on BI (.662 and .909, respectively), while for Asian Travelers a direct impact of AT was not observed. In the absence of mediator, SN, RA, and IS significantly affected BI in White Travelers, SN and RA significantly affected BI in Other Travelers, and only RA affected BI in Asian Travelers . When AT was introduced as the mediator, only RA showed significant impact on BI in White Travelers and Asian Travelers. Noticeably, the Asian group showed only marginal decrease in the effect of RA before and after the mediator was introduced (.945 vs. .801), indicating a weak mediating effect of AT in the relationship between RA and BI in this group. The significant indirect mediating effect was observed only in White Travelers (SN→AT→BI and RA→AT→BI) and Other Travelers (RA→AT→BI). Thus, AT fully mediated the relationship between SN and BI and partially mediated the relationship between RA and BI in White Travelers while for Other Travelers a full mediating effect was observed between RA and BI. Noticeably, AT had no mediating effect for any of the three factors in Asian Travelers.

4.6. Air Traveler's Willingness to Switch to Pay More to Switch Airline

Appendix F shows the questionnaire for collecting data about willingness to pay to switch airlines. Of the 1,121 respondents, 155 or 13.8% indicated the willingness to pay more to switch from a mask mandate flight to a non-mask mandate flight (referred to as M→NM), if they were to travel by air in the coming months. More respondents, 366 or 32.6%, were willing to pay extra to switch from a non-mask mandate flight to a mask mandate flight (referred to as NM→M). Respondents further indicated the amount they were willing to pay to switch airlines, in both US dollars and percentage of round-trip airfare. There were seven cases in which respondents stated the willingness to pay over 100% of the roundtrip airfare and four cases in which respondents stated the willingness to pay $1,000 or more to make the switch. These cases, small in numbers, were treated as outliers and removed from the analysis. Figure 4 compared two groups (M→NM vs. NM→M) in terms of the amount they were willing to pay (in percentage of roundtrip airfare and in US dollars) to switch airlines. The M→NM group was willing to pay between $2 to $700 dollars (M=131.35, SD=147.74), or 1% to 100% of roundtrip airfare (M=27.82, SD=25.33) to switch airlines. The most likely amounts to be paid were $100, 50, and 200, or 10%, 20%, and 50% of roundtrip airfare. The NM→M group was willing to pay between $1 to $700 (M=96.88, SD=103.48), or 1% to 100% (M=24.45, SD=25.19) of roundtrip airfare to switch, with $50, 100, and 200 or 10%, 20%, and 5% being the mostly frequently stated amounts.

Figure 4

The WTP Amount to Switch to Airlines that Adopt Different Mask Policies during Flight



Note: Group 1- Switch from mask mandate airline to non-mask mandate airline; Group 2 – Switch from non-mask mandate airline to mask mandate airline

As the amounts of WTP varied, a logistic regression analysis was performed to identify factors that can be used to predict the willingness to pay a large amount vs. a small amount to switch airlines for both M→NM and NM→M groups. This analysis was based on the percentage of roundtrip airfare that respondents were willing to pay to switch airlines, using 15% as a cutoff value to create a binary dependent variable. Thus, a respondent would be considered paying a small amount if he/she was willing to pay 15% or less of the roundtrip airfare to switch airline, whereas more than 15% was considered a large amount to be paid. The use of the 15% cutoff value was arbitrary based on two considerations. First, this value divided both the M→NM and NM→M participants into equal parts. This is beneficial as recent studies suggested a stricter event per variable (EPV) rule to determine sample size for logistic regression (e.g., EPV>20) (Ogundimu et al., 2016), especially given a relatively small number of participants (153) willing to pay to not wear a mask. Second, given that 5%, 10%, 20% and 50% of roundtrip fare were most likely to be paid to switch airline, the 15% cutoff value can be considered reasonable to distinguish large and small amounts to be paid to make the switch. Five demographic and travel factors– age, gender, education, income, and travel frequency since COVID-19 – were used as

the independent variables to predict the percentage of roundtrip airfare that respondents were willing to pay (small amount vs. large amount) to switch to airlines that offered different mask policies. Collinearity statistics showed low values of variance inflation factor (VIF) (< 5) for all predictors in the model, indicating minimal concern of multicollinearity.

Logistic regression analysis was performed, using a forward stepwise method to add predictors to the choice model in a stepwise procedure until the optimal model was achieved. Table 13 shows the model results for the two groups. For the M→NM group, -2LL scores, Hosmer and Lemeshow X^2 , and Cox and Snell R^2 showed improvement in the two-step modeling process, providing evidence of the validity of the final model. Logistic regression estimates the probability of willingness to pay a large amount to switch occurring. This is achieved by predicting whether cases can be correctly classified (predicted) from the independent variables. The classification table as part of the SPSS output was thus used to assess the effectiveness of the predicted classification against the actual classification. The classification accuracy of the final model was 60.8%, compared to 53.6% of the null model (no predictor was added). In other words, with the independent variables added, the final model can now correctly classify 60.8% of cases overall, compared to only 53.6% of the null model. Of the five predictors, Age ($\beta = -0.399$, Exp(B) = 0.671) and travel frequency since COVID-19 (β = 0.438, Exp (B) = 1.550) were significant factors to predict the willingness to pay a large amount for this group. The sign and value of the coefficients indicated that for each point increase in age, the odds of respondents paying a large percentage of roundtrip airfare (>15%) to switch to a non-mask mandate flight would decrease from one point to .671. For each point increase in travel frequency since COVID -19, the odds of respondents paying more percentage of roundtrip airfare to switch to a non-mask mandate flight would increase by 1.550. For the NM→M group,

the final model again showed model improvement, with an overall classification accuracy of 61%, compared to 52.1% using only the null model.

Table 13

Logit Regression Results – WTP Large Amount to Switch to Airlines that Offer Different Mask Policies

Model Factor	M→NM (n=153)	NM→M (n=361)
	Coefficient (Odd Ratio)	Coefficient (Odd Ratio)
Gender	NS	NS
Age	-.399(.671)**	NS
Educational Level	NS	.519(1.681)**
Income	NS	-.202(.817)**
Travel Frequency since Covid-19	.438(1.550**)	.271(1.311)**
Model Fit measurement		
2LL	195.805(Δ6.58)	477.227(Δ11.29)
Hosmer and Lemeshow X^2	.625(Δ.194)	.939(Δ.528)
Cox and Snell R^2	.096(Δ.039)	.054(Δ.031)
Nagelkerk R^2	.129(Δ.053)	.072(Δ.041)
Classification Accuracy	60.8%(Δ7.2%)	61%(Δ8.9%)

Note: NS = Not significant; ** refers to $p < .05$; Δ = Improvement from base model in absolute value

Of the five variables, educational level (β = 0.519, Exp (B) = 1.681), travel frequency since COVID-19 (β = 0.271, Exp(B) = 1.311), and income (β = − 0.202, Exp(B) = 0.817) were significant predictors of paying a large amount to switch to a mask mandate airline. Thus, for each point increase in educational level and travel frequency, the odds of respondents paying more percentage of roundtrip airfare to switch to a mask mandate airline would increase by 1.681 and 1.311, respectively. For each point increase in income, the odds of respondents paying more percentage of roundtrip airfare to switch to a mask mandate flight would decrease by .817.

5. DISCUSSION

5.1. Factor Impact on Mask-Wearing Intention Onboard Airplanes During COVID-19

Compared to the national average, participants in this study were generally younger, more educated, earned less income and, on race, they slightly underrepresented Hispanic

population (United States Census Bureau, 2019). These characteristics mirrored the findings of Berinsky et al. (2012) suggesting that demographic differences may exist between MTurk workers and national populations. Interpretation of the findings should take the variations into consideration.

Respondents demonstrated different patterns in air travel and mask use before and during COVID -19. They traveled more frequently before COVID-19 (two-three times were mostly selected) than during COVID-19 (less than one time was mostly selected), which was in line with the dramatic decrease in travel demand during the pandemic. Mask use in crowded settings increased largely, from 10% before COVID-19 to over 90% during COVID-19, demonstrating massive mask adoption following CDC's recommendations on mask use in the US. However, only less than 80% and slightly more than 80% of the respondents believed that wearing masks can keep them and others safe. Clearly, disagreement still exists in the US regarding the usefulness of mask-wearing in COVID-19. Respondents reported obtaining information of COVID-19 mostly from major news media, national, state, city, or county health department/agency, and doctors/other health providers. This demonstrated that traditional sources remain the most trusted and utilized sources for the information of COVID-19 in the US.

Factor impact on mask-wearing was examined through All Sample analysis and age group comparison. The All Sample analysis was based on the extended TPB model, assessing the impact of nine factors on the mask-wearing intention. Of the three TPB factors, attitude significantly influenced mask-wearing intention. Thus, the more favorable feeling air travelers have toward masks, the more likely they would intent to wear one when flying during COVID-19. The importance of attitude revealed in this study was consistent with prior findings of mask use in COVID-19 (Irfan et al., 2021; Kim et al., 2020, Si et al., 2021; Sun et al., 2020),

demonstrating the importance of attitudinal and cognitive effect on mask decisions during public health crises. Noticeably, attitudes, among all the predictors, had the strongest impact on mask-wearing intention. This may be related to the mixed attitudes toward masks in the US, a country that has no previous history of face-covering. While most people in the US consider masks important in limiting the spread of COVID-19, a small yet vocal groups of individuals (10-15%) hold a negative attitude toward masks, rarely or never wearing one in public (Taylor & Asmundson, 2020). This study revealed attitudinal impact on air travelers, indicating that the positive and negative attitudes toward masks were decisive in air travelers' intention to wear a mask onboard an airplane during COVID-19.

Of the two types of social norms tested in this study, subjective norms were not a significant factor. This finding differed from that in some previous studies (Irfan et al., 2021; Sun et al., 2020; Si et al., 2021) but it appeared to support the view that subjective norms alone may not provide a complete assessment of normative influence on behavioral intentions (Forward, 2009). Descriptive norms were found to be significant in this study. Thus, the behaviors of others to wear a mask (descriptive norms), rather than the expectations from important others for an individual to wear a mask (subjective norms), actually motivate air travelers to wear a mask when flying during COVID-19. The finding was consistent with prior studies highlighting the importance of normative influence including descriptive norms in mask behaviors during COVID-19 (Young & Goldstein, 2021). In the real world, this could be the air traveler observing friends, family members, airline employees, fellow passengers, and public figures wearing masks during flight, and wanting to wear one him/herself. The finding was not surprising given the role model effect. People tend to follow actions than words, and they are more likely to adhere to a recommendation if they see others are doing it (Young & Goldstein, 2021). The concrete action

of mask-wearing sends out a clear message that mask-wearing is a pro-social behavior. For air travelers, this can create a strong social and psychological impact, increasing their intention to wear a mask when flying in COVID-19.

Perceived behavioral control was not a significant factor in mask-wearing intention of air travelers. Previous studies of mask use produced mixed findings of the effect of PBC (Irfan et al., 2021; Kim et al., 2020; Si et al., 2021; Sun et al., 2021), partially supported the finding of this study. In this study, the PBC referred to perceived control on mask acquisition, and knowledge and ability to wear a mask. The insignificant effect of PBC may be related to the time of conducting this study (one and half years since COVID-19 started). While masks were in short supply and many people lacked the knowledge of masks at the beginning of COVID-19, supply and knowledge of masks dramatically increased one and half years into the pandemic. Many businesses including airlines provided masks for free if customers needed one. The findings indicated that American travelers can easily obtain masks and they were confident in their knowledge and ability to properly wear a mask during flight. Consequently, they may not perceive control-related factors to be important in their mask-wearing intention during flights.

Comfort was not an important factor in air travelers' intentions to wear a mask when flying during COVID-19. Previous studies found mask-wearing uncomfortable and the discomfort such as short of breath and sweating could negatively affect mask use (Gray et al. 2020; Cheok et al., 2021). While the finding of this study may seem to be counterintuitive, it should be understood in the specific context of this study. Respondents were asked to evaluate their intention to wear a mask during the COVID-19 pandemic when sitting in the enclosed airplane cabin for long duration without physical distancing. As respondents may perceive a higher risk of contracting the virus in such a circumstance, they may not consider comfort a

priority when deciding on mask use. This was in line with Cheok et al.(2021) indicating that mask compliance can be attained during the COVID-19 outbreak, despite the significant discomforts associated with mask-wearing in Singapore. It is likely that some other factors, such as the risks of COVID-19, would overtake comfort as more important contributors to mask-wearing intentions. In other words, in an environment where the risk of infection is potentially high, people may choose to sacrifice comfort in exchange for safety during flight.

Risk avoidance was a significant factor in this study, and it had the second strongest impact on the mask-wearing intention when flying during COVID-19. The finding was consistent with previous studies indicating the strong relationships between risk factors and mask use intentions and behaviors during COVID-19 (Irfan et al., 2021; Si et al., 2021). The significant, strong effect of risk avoidance identified in this study was not surprising given the risk awareness of COVID-19. It is widely known that COVID-19 transmits through invisible respiratory droplets that can be carried by air for a prolonged period of time (Wang et al., 2021), which would make enclosed, small environment such as the aircraft cabin potentially more likely for airborne transmission. To further complicate the matter, about 40% of COVID-19 transmission was made by asymptomatic individuals who were not aware of their infection. The findings of this study showed that air travelers were aware of the risk associated with the contagious virus, carefully assessed the risk of in-flight infection, and relied on masks to avoid the risk. In other words, air travelers' risk awareness and risk avoidance toward COVID-19 increased their mask-wearing intention onboard airplanes.

Of the two types of information behaviors (information avoidance and information seeking) tested in this study, information avoidance was not a significant predictor of the intention to wear a mask when flying during COVID-19. The finding was in line with previous

studies which showed that people engaged in information avoidance to avoid unwanted information, but by doing so they reduced the chance of receiving important information, which in turn prevented them from taking necessary actions in COVID-19 (Soroya et al., 2021). Information seeking was found to be a significant factor in this study. This was consistent with previous findings showing a positive relationship between information seeking and preventive behaviors including mask-wearing during COVID-19 (Liu, 2020). Contrary to information avoidance, information seeking is an act of actively searching information. When air travelers actively seeking information about COVID-19, they are able to stay informed about the latest development of COVID-19, which would allow them to exercise better judgement regarding mask-wearing onboard airplanes. In other words, information seeking is likely to provide air travelers timely and sufficient information of COVID-19 and masks, which increased their intention to wear a mask during flight.

Finally, individualism was not a significant predictor of mask-wearing intention. Prior studies of culture and mask-wearing in the US were mostly conducted at a macro level, showing that mask use was more common in collectivistic US states (Lu et al., 2020) and combination of individualism and opposition to government intervention undermined collective action against COVID-19 in the US (Bazzi et al., 2021). The present study examined individualism at a micro level, indicating that individualism was not an important factor affecting air travelers' intention to wear a mask when flying during COVID-19 in the US. It is worth noting that the *p* value associated with the hypothesis testing of individualism was close to the alpha level of .05, representing a borderline result. Further investigation of the relationship between individualism and mask-wearing onboard airplanes may be needed to verify the finding of this study.

Using the same theoretical framework, this study identified and compared important factors in mask-wearing intentions across age groups – Young (40 and below), Mid-Age (41-60), and Senior (over 60) - when flying in COVID-19. Results showed that attitude, descriptive norms, risk avoidance, and information seeking significantly affected mask-wearing intentions in these groups. The magnitude of factor influence, however, varied across the three groups. Young Group was affected by the four factors when making mask-wearing decisions, with attitude having the strongest impact. This indicated that young travelers' intentions to wear masks during flights were mostly driven by their favorableness and unfavorableness toward masks. Risk avoidance was the second most important factor, indicating that young travelers were aware of the risk of COVID-19 and intended to take measure to avoid the risk during flights. The mask-wearing intention of this group was also influenced by whether others wore a mask when flying. Noticeably, Young Group was the only group that was affected by information seeking, which aligned with the passenger profile in this study showing that young travelers were the only age group using social media as an important source for the information of COVID-19. This indicated that young travelers used a wide variety of different information sources, which contributed to their mask-wearing intention when flying during COVID-19.

The Mid-Age Group was most strongly affected by attitude, followed by risk avoidance and descriptive norms. Information seeking was not a significant factor for this group. Compared to Young Group, attitude had a decreased magnitude of impact while risk avoidance had an increased magnitude of impact. This may suggest that while attitude toward masks still had a dominant impact on the mask-wearing intention of middle-aged travelers, the factor of risk avoidance carried more weight in their mask use decisions compared to young travelers.

For Senior Group, attitude, risk avoidance, and descriptive norms remained the significant factors, but risk avoidance became the most important factor in mask-wearing intention for this group. This means that elderly travelers focused more on avoiding the risk associated with COVID-19 than their attitude toward masks (the second strongest impact) when deciding on mask-wearing onboard airplanes. The finding was supported by the literature indicating that mask use increased with age especially among elderly people (Barceló & Sheen, 2020; Haischer et al., 2020). The finding suggested that elderly travelers were more cautious and likely to make rational decisions in a high-risk environment during COVID-19. It may also be related to the CDC findings showing the impact of COVID-19 on seniors. The CDC has sent a clear message that older adults are at much higher risk for severe illness with COVID-19 (CDC, 2021) and this demographic group is expected to wear masks more than younger individuals (Haischer et al., 2020). The message may have re-enforced the risk perception of COVID-19 among senior travelers, increasing their intention to use masks to avoid the risk during flights.

5.2. Mediation Analysis

To find out the mediating effect of attitude in the mask-wearing intention, two sets of analysis was conducted based on the model presented in Figure 2. The entire sample analysis, in the absence of any mediator, revealed a significant impact of subjective norms, risk avoidance, and information-seeking on the respondents' mask-wearing intention when flying during COVID-19. Risk avoidance was the strongest factor, indicating that respondents were fully aware of the risks associated with COVID-19 and they intended to use masks to mitigate the risk of inflight infection. These findings are consistent with previous studies showing a strong relationship between risk factors and mask use during COVID-19 (Irfan et al., 2021; Si et al., 2021). Subjective norms were the second most important factor, suggesting that mask-wearing

intention during flight was significantly affected by the expectations of others. The mask use intention was also affected by information seeking, though to a lesser degree, indicating that active searching for information about COVID-19 kept air travelers informed about the development of COVID-19, which contributed to their mask-use intentions. These findings for the two factors have been supported by recent COVID-19 studies (Bento et al., 2020; Irfan et al., 2021).

The introduction of attitude as a mediator greatly altered the results. When attitude was included in the study model, risk avoidance and information-seeking had much weaker impacts on mask-wearing intention, and subjective norms had no impact at all. Thus, the relationship between the three factors and mask-wearing intention may be more complex than just a direct effect in the context of flying during COVID-19. The findings indicate that a significant portion of the influence of subjective norms, risk avoidance, and information-seeking on mask-wearing intention was actually carried by the mediator of attitude. Thus, both risk avoidance and information seeking, and the mediator of attitude can explain the mask-wearing intention, with the latter being a greater contributor. Subjective norms exerted its entire influence on mask-wearing via attitude, meaning that the expectations and pressure from important others to wear a mask only influence an individual's attitude, which then affects his or her intention to wear a mask when flying during COVID-19.

The comparative demographic analysis provided further insight in the factor impact and the mediating effect for mask-wearing. Attitude had a reduced impact on the young, middle-aged, and senior groups while risk-avoidance had an increased impact on these groups. Thus, young travelers were mainly influenced by their attitude toward masks when deciding to wear a mask on airplanes during COVID-19, while the decision of senior travelers was mostly driven by

their desire to avoid the risk of COVID-19. The same pattern emerged in the mediation analysis, where attitude was strongest in mediating the relationship between risk avoidance and mask-wearing intention in young travelers and the mediating effect was the weakest among the senior travelers. Information-seeking only directly affected the mask-wearing intention of young travelers, and it had no mediation effect across all age groups. This suggests that information-seeking is more important to young travelers, and their ability to obtain a wide range of information contributed directly to their mask-wearing intention.

The findings indicated that male and female travelers were similarly affected by risk avoidance, expectations of important others, and information-seeking in their decisions to wear a mask in the context of flying during COVID-19. For both groups, risk avoidance influenced their mask-wearing intention both directly as well as through the mediation role of attitude. The relationship between subjective norms and mask-wearing intention could be entirely explained by attitude. This means that the expectations of others only contributed to the forming of attitudes for both genders, which then affected their intention to wear a mask during flight. No mediating effect was observed for information seeking, suggesting that both male and female travelers actively searched for information about COVID-19, which directly explained their mask-wearing intentions during flight.

With regards to the respondents' education attainment, air travelers holding a bachelor's degree showed an impact of attitude that differed substantially from that of other travelers. While attitude had a significant, direct impact among all education groups, the group of respondents with a bachelor's degree demonstrated the largest impact. At the same time, attitude had a much stronger mediating effect on the relationship between risk avoidance and mask-wearing intention in this group, compared to the other two groups. The respondents with a bachelor's degree were

also the only group where the relationship between information-seeking and behavioral intention was fully mediated by attitude, while no mediating effect for this relationship was observed in the other two groups. Thus, information would first affect the attitude of the group with bachelor's degrees, with regards to mask-wearing, and then influence their mask-wearing intentions. This highlighted the importance of attitude for this education group.

With regards to the income level of the respondents, risk avoidance and attitude most strongly affected the mask-wearing intention of the medium-income group. This group also showed the strongest mediating effect, indicating that the mediator of attitude, rather than risk avoidance, contributed more significantly to the respondents' decision to wear a mask among the medium-income travelers. For all three income groups, subjective norms contributed to their attitude about mask-wearing, which then influenced their decision to wear a mask during flight. Information-seeking had a variable influence across the groups. The mask use intention of low-income travelers was affected directly by the information they obtained, but the information obtained by the high-income travelers first affected their attitude towards mask-wearing, which then influenced their intention to wear a mask. The mask-wearing intention of the medium-income travelers was not affected by information-seeking either directly or indirectly, suggesting that their decision to wear a mask was driven by other factors.

Among the three ethnic groups (White Travelers, Asian Travelers, and Other Travelers), in the absence of any mediators, the White Travelers and the Other Travelers were affected by the combination of factors for their mask-wearing intentions during flight. Asian travelers, however, were only affected by risk avoidance, a factor explained almost all of their mask-wearing intentions. Thus, the Asian Travelers appear to focus predominantly on avoiding the risk of COVID-19. With attitude as a mediator, both risk-avoidance and attitude explained the mask-

wearing intention of White Travelers, while the decisions of Others Travelers were mostly driven by their attitude to wear masks during flight. No mediating effect was observed for any of the three factors among the Asian Travelers. In other words, attitude did not affect the Asian Travelers' mask-wearing intention either directly or directly. Thus, the Asian Travelers' mask-wearing intention during flight was driven primarily by risk avoidance instead of attitude toward mask-wearing.

5.3. Willingness to Pay to Switch Airlines that Adopt Different Mask Policy

The analysis of willingness to pay more to switch airlines provided further insights into mask use of air travelers in the US. When having the option to pay more to switch from a mask mandate airline to a non-mask mandate airline (M→NM), or vice versa (NM→M), slightly over half of the respondents chose not to pay to switch either way. Among those who were willing to pay more to switch, 153 were willing to pay more to not wear a mask when flying, while 361 were willing to pay more to wear a mask when flying. The findings demonstrated that (1) more American travelers considered masks essential during flight in COVID-19 and (2) bipolar attitudes toward masks still existed in the US. The findings were supported by previous studies showing that majority of Americans (80-85%) supported the use of masks while a small group of individuals were strongly against masks (Taylor & Asmundson, 2021). Logistic regression analysis was performed to identify demographic and travel-related factors that can be used to predict the willingness to pay a large amount (>15%) vs. a small amount (<15%) to switch to airlines that offered different mask policies. For those wanting to pay more to switch to a non-mask mandate airline (M→NM), age and travel frequency during COVID-19 were significant predictors of their willingness to pay a large amount to switch. It showed that younger travelers were more likely to pay higher amount to not wear a mask during flight. The finding

was supported by previous studies indicating that younger age was often associated with less mask use during COVID-19 (Egan et al., 2021; Haischer et al., 2020). Not surprisingly, the more frequently travelers in this group had to fly during COVID-19, the more likely that they would be willing to pay a large amount to switch to an airline that did not require mask-wearing. For travelers willing to pay extra to switch to a mask mandate airline (NM→M), education, income, and travel frequency during COVID-19 were significant predictors of their willingness to pay a large amount to make the switch. For this group, the higher the education and travel frequency during COVID-19, the more likely the traveler would be willing to pay a large amount to switch to a mask-mandate airline. Consistent with the literature, this study showed that air travelers who had higher education tended to be more rational in mask decisions and they were generally more willing to wear a mask during COVID-19 (Zhou et al., 2021). Income was found to be negatively related to willingness to pay a large amount to switch airline. This finding may be related to the lower income levels of the respondents in this study, which is a common characteristic of the sample obtained from MTurk. The finding, while not consistent with Zhou et al. (2021), was in line with Radar et al. (2021) showing that mask-wearing was more commonly reported among certain socioeconomic groups including lower income groups in the US. Further investigation is warranted given the mixed evidence of the impact of income on mask-wearing intentions in the US.

6. CONCLUSIONS AND RECOMMENDATIONS

Masks have been widely adopted in the US to limit the spread of COVID-19, though mask-wearing is still a controversial subject. For airlines in the US, mask use is considered an effective measure to ensure the safety of passengers and crew members. At the time of writing this article, the airline industry has been recovering from the COVID-19 pandemic. With the

ongoing vaccination roll-out, airlines will begin to gradually relax their mask-wearing mandate, and eventually, mask-wearing will likely become a personal choice onboard airplanes. In general, masks will likely continue to be used for a long time given the risks and uncertainties about COVID-19, especially in the aircraft cabin environment. This study identified factors that affect airline passengers' intention to wear a mask when flying during this transition period.

Using an extended TPB model, it was found that attitude, risk avoidance, descriptive norms, and information seeking were significant determinants of the intention to wear a mask when flying during the COVID-19 pandemic. Attitude had the strongest impact, followed by risk avoidance. The four factors also affected the mask-wearing intention differently across age groups. While young and middle-aged airline passengers relied mostly on their favorable or unfavorable attitudes toward masks in making their mask-wearing decisions during flight, senior passengers focused mainly on avoiding the risk of COVID-19 in their decision about wearing a mask in the aircraft cabin. It was also found that more airline passengers were willing to pay extra to switch to an airline with a mask-wearing mandate than vice-versa, if given a choice. This demonstrated the general acceptance of mask wearing and the existence of opposing attitudes toward mask-wearing in the US. During COVID-19, Younger travelers and frequent travelers were willing to pay larger amounts to switch to an airline with a non-mask mandate, and for travelers who wanted to switch to an airline with a mask-wearing mandate their willingness to pay more to switch was influenced by their education, income, and travel frequency.

This study also examined the impact of risk avoidance, social norms, and information-seeking on the intention of air travelers to wear face masks when flying during COVID-19, and whether or not air travelers' attitude toward masks mediated the relationship. All three factors showed direct impacts on mask-wearing intention, but the analysis also revealed a significant

third-variable effect for the relationship between the three factors and mask-wearing intention, indicating that attitude strongly mediated toward mask-wearing. Thus, in the context of flying during COVID-19, the relationship between these factors and the decision to wear a mask may not be straightforward, and to more fully explain the mask-wearing intentions of air travelers, the effect of attitude as a mediator should be taken into account. The demographic analysis revealed group variations with respect to mask-wearing intention. Young respondents showed a stronger effect of attitude toward mask-wearing, while the mask-wearing intention of older travelers was mainly driven by their desire to avoid the risk of COVID-19. Air travelers with a middle-income or a bachelor's degree were also more driven by attitude, compared to the other groups in their respective variable, when deciding to use a mask during COVID-19. The largest difference was observed among the ethnic groups, primarily between Asian and non-Asian air travelers. Attitude toward mask-wearing played a significant role among non-Asian Travelers, both directly and as a mediator, whereas the mask-wearing intention of Asian Travelers was almost entirely determined by risk avoidance, with no direct or indirect impact of attitude. No significant group variations regarding gender were observed among the respondents in terms of their mask-wearing intention when flying during COVID-19.

This study contributes to the theories of mask use during a global health crisis. First, the findings help our understanding of mask-wearing intentions of airline passengers during COVID-19. Despite the research efforts into mask use during COVID-19, a substantial gap exists regarding how cognitive, attitudinal, normative, and information factors drive the intention to wear a mask in the aircraft cabin environment. To the best of our knowledge, this study is the first to investigate important factors that underlie the intention to wear a mask onboard an airplane during COVID-19. The findings are especially relevant in the US context where face-

coverings remain a subject of serious debate. Second, this study proposed a new conceptual framework based on the theory of planned behavior, with the context-specific factors as additional predictors. It extends the application of the TPB to air transportation, providing much-needed insights into cognitive and normative influences of the intention to wear a mask when flying during COVID-19. Thirdly, while attitude has been frequently considered in studies of behavior as a direct or a mediating factor, such relationships have not been fully tested in the context of mask-wearing by air travelers. Importantly, the attitude toward mask-wearing has been highly controversial in the US since the beginning of the pandemic. The findings reported here reveal generally strong direct and indirect impacts of attitude on mask-wearing intentions, to expand our understanding of how attitude may be driving the decision to wear a mask inflight during COVID-19. Fourthly, this study examined the mask-wearing intention of air travelers during COVID-19, in terms of a mediating effect and demographic characteristics. The demographic analysis revealed clear patterns in mask use by air travelers, which is especially important given the mixed findings reported in the literature on the demographic impacts on mask behaviors during COVID-19. Finally, the findings show that attitudinal and risk factors affect age groups differently in terms of their mask-wearing intention during flight, and certain demographic characteristics can be used to predict the willingness of travelers to pay more to switch to airlines that offer different mask-wearing policies. The results provide further empirical evidence to understand the impact of demographic characteristics on mask use in the US.

At a practical level, this study offers useful implications for airlines and policy makers to ensure in-flight safety during the recovery from COVID-19. Given the clear impact of attitude on mask-wearing intention, efforts should be made to foster positive attitudes toward mask-wearing. The mixed views on mask-wearing in the US revealed in this study mean that further changes in

attitude may be needed. The government and health agencies can play an active role communicating a clear and consistent message about mask use in the general public. Emphasizing the importance of wearing masks in crowded settings where social distancing is not possible can also promote a change in attitude toward mask-wearing, which in turn, would increase the mask-wearing intentions of airline passengers. As risk avoidance is another motivator for mask-wearing, air travelers need to continue acknowledging the risk of COVID-19 as it evolves and be aware of the protective behaviors that can limit the spread of the disease. The risk assessment of COVID-19 must be based on science to help air travelers make informed decisions about mask-wearing onboard an airplane. The significance of descriptive norms indicates that role modeling can be an effective way to drive the mask-wearing intention in air travel. For example, when public figures and celebrities model appropriate mask behaviors during flight, they provide visual proof of learning and inspiration for mask-wearing. This is particularly important for young travelers to increase their mask use intention when flying during the COVID-19 pandemic.

The findings from this study show that information seeking facilitates the cognitive process for determining mask use during flight. Thus, air travelers need to be able to access accurate and timely information about COVID-19. Moreover, an effort should be made to limit the spread of misinformation about mask-wearing. The various perceptions of mask-wearing are partly due to the varied exposure to information. The information and key facts about mask-wearing should be made uniform to provide consistent information for the decisions to wear a mask onboard airplanes. Finally, older air travelers, compared to younger ones, appear to pay more attention to risk avoidance when deciding about mask-wearing during a flight. Elderly travelers will likely continue to wear masks during flights as long as they perceive the risks of

COVID-19. Airlines should take necessary measures to accommodate the needs of this vulnerable population.

This study has some limitations. First, the survey used a cross-sectional design for collecting self-reported, online data about mask-wearing from MTurk. Consequently, the findings may not be representative of the national population of the US. Nevertheless, the findings can be generalized to online communities in the US and in other countries such as Canada and the UK where mask-covering is not a traditional practice. Second, while the four significant factors in this study provide a plausible explanation for mask-wearing intentions when flying during COVID-19, the remaining five factors that were not found to be significant merit further investigation. In particular, the effect of the two cultural factors – subjective norms and individualism – may warrant further examination given their relationship with mask use in previous studies. Finally, the use of online data may limit the understanding of demographic influences in the willingness of travelers to pay more to wear or not wear a mask during their flight. The results should be verified using different data from the US market. The findings of this study open new avenues for future research on mask use in air travel. Given that MTurk skews the data toward slightly younger, higher educated, lower income populations in the US, further research can be extended using different sampling and data collection methods to verify the findings of this study. Research efforts can also be made to test the effect of the non-significant factors in this study using different data in the US. For example, a new conceptual framework can be developed to test the relationship between cultural factors and mask-wearing intention in the air travel context during COVID-19. Another possible research direction is a comparative analysis of mask-wearing intentions of air travelers across countries. Given the global nature of air transport, a broader understanding of mask-wearing can help countries

recover from COVID-19 sooner and improve their readiness for future health crises. This study provides a starting point for discussions about air travelers' mask use intentions during a global pandemic.

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APPENDIX

Appendix A

Age and COVID-19 Hospitalization and Death

Compared to 18-29 years old	0-4 years old	5-17 years old	18-29 years old	30-39 years old	40-49 years old	50-64 years old	65-74 years old	75-84 years old	85+ Years old
Cases	<1x	1x	Reference group	1x	1x	1x	1x	1x	1x
hospitalization	<1x	<1x	Reference group	2x	2x	4x	5x	9x	16x
Death	<1x	<1x	Reference group	4x	10x	30x	90x	220x	570x

Source: CDC 2021 Report.

Appendix B

Measurement Model Estimation, Reliability, and Validity – Young Age Group

Construct	Item	Factor Loading	CR	AVE	Discriminant Validity
Attitude	AT1	.943	.967	.878	S
	AT2	.936			
	AT3	.932			
	AT4	.938			
Injunctive Norms	IN1	.923	.947	.819	S
	IN2	.866			
	IN3	.921			
	IN4	.908			
Descriptive Norms	DN1	.883	.831	.623	S
	DN2	.783			
	DN3*	-			
	DN4	.690			
	DN5*	-			
Perceived Behavioral Control	PBC1*	-	.838	.634	S
	PBC2	.739			
	PBC3	.817			
	PBC4*	-			
	PBC5	.829			
Comfort	CO1*	-	.931	.772	S
	CO2	.870			
	CO3	.878			
	CO4	.887			
	CO5	.879			
Information Avoidance	IA1	.882	.931	.770	S
	IA2	.863			
	IA3	.868			
	IA4	.897			
Risk Avoidance	RA1*	-	.940	.840	S
	RA2*	-			
	RA3	.933			
	RA4	.904			
	RA5	.912			
Individualism	ID1	.635	.807	.586	S
	ID2*	-			

	ID3	.786			
	ID4	.859			
Information Searching	IS1	.792	.907	.662	S
	IS2	.810			
	IS3	.766			
	IS4	.918			
	IS5	.774			
Behavioral intention	BI1	.943	.950	.864	NS[1]
	BI2	.929			
	BI3*	-			
	BI4*	-			
	BI5	.917			

Note: CMIN/DF=2.179; GFI=.911; CFI=.973; RMSEA=.042
S=Satisfied; NS=Not Satisfied.
SN[1]: Correlation of AT and BI (.936) slightly higher than square root of AVE of BI (.930)

Appendix C

Measurement Model Estimation, Reliability, and Validity – Mid-Aged Group

Construct	Item	Factor Loading	CR	AVE	Discriminant Validity
Attitude	AT1	.945	.971	.892	S
	AT2	.947			
	AT3	.931			
	AT4	.955			
Injunctive Norms	IN1	.901	.948	.820	S
	IN2	.870			
	IN3	.932			
	IN4	.918			
Descriptive Norms	DN1	.898	.852	.661	S
	DN2	.852			
	DN3*	-			
	DN4	.672			
	DN5*	-			
Perceived Behavioral Control	PBC1*		.884	.719	S
	PBC2	.800			
	PBC3	.866			
	PBC4*	-			
	PBC5	.875			
Comfort	CO1*	-	.949	.822	S
	CO2	.882			
	CO3	.922			
	CO4	.913			
	CO5	.910			
Information Avoidance	IA1	.861	.912	.723	S
	IA2	.838			
	IA3	.889			
	IA4	.811			
Risk Avoidance	RA1*	-	.957	.881	NS[1]
	RA2*	-			
	RA3	.956			
	RA4	.939			
	RA5	.921			
Individualism	ID1	.650	.790	.559	S
	ID2*	-			

	ID3	.779			
	ID4	.804			
Information Searching	IS1	.790	.914	.680	S
	IS2	.854			
	IS3	.749			
	IS4	.921			
	IS5	.799			
Behavioral intention	BI1	.945	.964	.900	S
	BI2	.954			
	BI3*	-			
	BI4*	-			
	BI5	.947			

Note: CMIN/DF=1.938; GFI=.859; CFI=.963; RMSEA=.052

S=Satisfied; SN=Not Satisfied.

NS[1]: Correlation of AT and RA (.941) slightly higher than square root of AVE of RA (.939)

Appendix D

Measurement Model Estimation, Reliability, and Validity – Senior Group

Construct	Item	Factor Loading	CR	AVE	Discriminant Validity
Attitude	AT1	.966	.986	.947	S
	AT2	.973			
	AT3	.987			
	AT4	.967			
Injunctive Norms	IN1	.876	.965	.873	S
	IN2	.951			
	IN3	.944			
	IN4	.963			
Descriptive Norms	DN1	.880	.856	.670	S
	DN2	.902			
	DN3*	-			
	DN4	.649			
	DN5*	-			
Perceived Behavioral Control	PBC1*	-	.850	.653	S
	PBC2	.796			
	PBC3	.843			
	PBC4*	-			
	PBC5	.785			
Comfort	CO1*	-	.944	.809	S
	CO2	.939			
	CO3	.921			
	CO4	.889			
	CO5	.845			
Information Avoidance	IA1	.815	.949	.824	S
	IA2	.908			
	IA3	.931			
	IA4	.969			
Risk Avoidance	RA1*	-	.966	.905	S
	RA2*	-			
	RA3	.977			
	RA4	.931			
	RA5	.946			
Individualism	ID1	.809	.881	.711	S
	ID2*	-			

	ID3	.859			
	ID4	.861			
Information Searching	IS1	.801	.889	.620	S
	IS2	.777			
	IS3	.795			
	IS4	.906			
	IS5	.632			
Behavioral intention	BI1	.975	.973	.924	S
	BI2	.965			
	BI3*	-			
	BI4*	-			
	BI5	.944			

Note: χ^2 (545, *N*=96)=874.679, p < .001; CMIN/DF=1.605; TLI= .915; CFI=.926; RMSEA=.080 (90% Confidence Interval: LO90=.07; HI90=.087).
S=Satisfied.

Appendix E.

demographic	Group (n)	relationship	Direct Effect Without Mediator	Direct Effect With Mediator	Indirect Effect	Confidence Interval Low	Confidence Interval High	Conclusion
Age	Young (672)	SN - BI	.194***	-.015 (.666)	.199***	.124	.297	Full mediation
		RA - BI	.724***	.276***	.459***	.346	.595	Partial mediation
		IS - BI	.055**	.028 (.073)	.025 (.052)	0	.058	No mediation
		AT - BI	n/a	.685***	n/a	n/a	n/a	n/a
	Mid-Age (353)	SN - BI	.083 (.054)	-.029 (.506)	.119**	.053	.214	Full mediation
		RA - BI	.855***	.394***	.454**	.196	.707	Partial mediation
		IS - BI	.027 (.344)	.016 (.532)	.012 (.341)	-.015	.048	No mediation
		AT - BI	n/a	.582***	n/a	n/a	n/a	n/a
	Senior (96)	SN - BI	.052 (.487)	-.009 (.885)	.062	-.042	.166	No mediation
		RA - BI	.855***	.468***	.383**[a]	.091	.675	Partial mediation
		IS - BI	.087 (.076)	.082 (.060)	.007	-.503	.517	No mediation
		AT - BI	n/a	.470***	n/a	n/a	n/a	n/a
Gender	Male (524)	SN - BI	.154***	-.020 (.619)	.165***	.073	.282	Full mediation
		RA - BI	.767***	.319***	.458***	.302	.625	Partial mediation
		IS - BI	.053**	.027(.231)	.023 (.111)	-.005	.059	No mediation
		AT - BI	n/a	.647***	n/a	n/a	n/a	n/a
	Female (590)	SN - BI	.143***	-.015 (.656)	.158***	.099	.232	Full mediation
		RA - BI	.778***	.335***	.443***	.304	.588	Partial mediation
		IS - BI	.053**	.031 (.121)	.022 (.063)	-.001	.053	No mediation
		AT – BI	n/a	.623***	n/a	n/a	n/a	n/a
Education	High School (229)	SN - BI	.090 (.113)	-.046 (.393)	.143***	.053	.279	Full mediation
		RA - BI	.854***	.474***	.372***	.181	.584	Partial mediation
		IS - BI	.024 (.454)	.020 (.491)	.005 (.676)	-.024	.040	No mediation
		AT – BI	n/a	.526***	n/a	n/a	n/a	n/a
	Bachelor (650)	SN - BI	.129***	-.034 (.280)	.160***	.090	.255	Full mediation
		RA - BI	.781***	.259***	.524***	.393	.666	Partial mediation

		IS - BI	.065**	.023 (.246)	.042 **	.013	.079	Full mediation
		AT – BI	n/a	.723***	n/a	n/a	n/a	n/a
	Master and	SN - BI	.207***	.046 (.474)	.148**	.022	.314	Full mediation
	Above	RA - BI	.710***	.362**	.366**	.042	.700	Partial mediation
	(241)	IS - BI	.060 (.154)	.053 (.175)	-.001	-.064	.040	No mediation
		AT – BI	n/a	.511***	n/a	n/a	n/a	n/a
Income	Low	SN - BI	.140***	-.012 (.737)	.146***	.077	.248	Full mediation
	(487)	RA - BI	.782***	.337***	.452***	.295	.617	Partial mediation
		IS - BI	.061**	.054 (.013)	.006 (.623)	-.020	.037	No mediation
		AT – BI	n/a	.611***	n/a	n/a	n/a	n/a
	Medium	SN - BI	.077 (.176)	-.059 (.246)	.140**	.031	.287	Full mediation
	(281)	RA - BI	.873***	.339***	.529***	.348	.773	Partial mediation
		IS - BI	.019 (.542)	-.007 (.800)	.027 (.138)	-.010	.071	No mediation
		AT – BI	n/a	.695***	n/a	n/a	n/a	n/a
	High	SN - BI	.184***	-.015 (.766)	.197***	.102	0.31	Full mediation
	(353)	RA - BI	.712***	.305***	.410***	.231	.589	Partial mediation
		IS - BI	.056 (.102)	.021 (.497)	.036**	.002	.085	Full mediation
		AT – BI	n/a	.640***	n/a	n/a	n/a	n/a
Ethnicity	White	SN - BI	.146***	-.031 (.277)	.173***	.114	.245	Full mediation
	(839)	RA - BI	.780***	.313***	.471***	.358	.592	Partial mediation
		IS - BI	.049**	.029 (.082)	.019 (.067)	-.001	.045	No mediation
		AT – BI	n/a	.662***	n/a	n/a	n/a	n/a
	Asian	SN - BI	-.018 (.768)	-.023 (.678)	.005 (.543)	-.024	n/a	No mediation
	(117)	RA - BI	.945***	.801***	.145 (.085)	-.029	n/a	No mediation
		IS - BI	.061 (.190)	.056 (.201)	.006 (.299)	-.004	n/a	No mediation
		AT – BI	n/a	.168 (.145)	n/a	n/a	n/a	n/a
	Others	SN - BI	.287 (**)	.032 (-.736)	.262 (.062)	-.013	.771	No mediation
	(162)	RA - BI	.601***	-.002 (.989)	.602**	.291	1.356	Full mediation
		IS - BI	.053 (.355)	.017 (.734)	.034 (.370)	-.054	.157	No mediation
		AT – BI	n/a	.909***	n/a	n/a	n/a	n/a

Note: [a] : For senior age group bootstrapping only produced standard error (no confidence intervals and p values were produced) likely due to relatively small sample size. Standard error was then used to construct confidence intervals around the mediated effect. For the three factors, ninety-five percent confidence intervals were calculated by adding and subtracting the product of 1.96 and the standard error from the mediated effect (Lockwood and Mackinnon, 1998).

Appendix F

Survey Instruction for Willingness to Pay to Switch Airlines

Scenario A (switch from mask-mandate airline to no-mask-mandate airline)
5.1. Suppose you will travel within the coming months and the airline you book to fly with *requires mask-wearing* on the airplane. Then you find out that a competing airline, with higher airfare, does not require mask-wearing on the airplane. Suppose both airlines offer direct flights on this route.
Are you willing to pay more in airfare to switch to the no-mask-mandate airline?
( ) Yes ( ) No (please skip 5.2)
5.2. If Yes, how much more money in the round-trip airfare would you be willing to pay to switch to the airline that has no mask mandate?
_____ In US dollars
_____ % of the round-trip airfare
Scenario B (switch from no-mask-mandate airline to mask-mandate airline)
5.3. Suppose you will travel within the coming months and the airline you book to fly with does not *require mask-wearing* on the airplane. Then you find out that a competing airline, with higher airfare, requires mask-wearing during flight. Suppose both airlines offer direct flights on this route.
Are you willing to pay more in airfare to switch to the mask-mandate airline?
( ) Yes ( ) No (please skip 5.4)
5.4. If Yes, how much more money in the round-trip airfare would you be willing to pay to switch to the airline that has mask mandate?
_____ In US dollars
_____ % of the round-trip airfare