Predicting a Consumer's Willingness to Fly with COVID-19 Passport: Domestic and International Models

Sean R. Crouse
Embry-Riddle Aeronautical University

Katherine Bell
Embry-Riddle Aeronautical University

Elizabeth Combs
Embry-Riddle Aeronautical University

Introduction: COVID-19 has created a problematic situation for the aviation industry. As vaccines are developed and deployed, more individuals will be vaccinated. A COVID-19 passport has been proposed to ensure those flying into different areas will not increase the risk of spread. **Method**: This study used a multi-model analysis to develop two regression equations to determine predictive factors for a consumer's willingness to fly with a COVID-19 passport, domestically or internationally. Participants answered demographics, universal emotions, perceived COVID-19 threat, personality traits, pre-pandemic flight habits, and their willingness to obtain the COVID-19 vaccine. A two-stage approach was used to conduct the data analysis. **Results**: Stage 1 found Gender, Willingness to receive the COVID-19 vaccine, Perceived COVID Threat, Anger, Disgust, and Happiness to be significant factors for domestic travel, accounting for approximately 32% of the variance. For international travel, Gender, Age, Willingness to receive the COVID-19 vaccine, Perceived COVID Threat, Anger, Disgust, Happiness, Surprise, and Republicans were significant factors accounting for approximately 25% of the variance. Stage 2 validated the regression equation through a t-test, Pearson's correlation, and cross-validated R^2. **Conclusion**: These factors will aid government agencies, the International Air Transportation Association (IATA), and the aviation industry's marketing departments to deploy a COVID-19 Passport.

The Novel Coronavirus Disease 2019 (COVID-19) was declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) on January 30, 2020 (World Health Organization (WHO), n.d.). The virus, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is emitted through breathing, talking, laughing, singing, sneezing, or coughing (Center for Disease Control (CDC), 2020b). A cause for concern is that COVID-19 is contagious and spreads quickly through airborne aerosols. Factors that may contribute to the severity of symptoms and the necessity for treatment or hospitalization include but are not limited to advanced age or underlying medical concerns (CDC, 2021b; WHO, n.d.). The purpose of this study is to identify factors that significantly predict a passenger's willingness to fly (WTF) with a COVID-19 passport on either domestic or international flights.

Impact to Travel

The first documented case of COVID-19 occurred on December 31, 2019, in Wuhan, China. The rampant spread and detrimental impact of COVID-19 caused governments to implement and enforce local and domestic movement restrictions on their populations. Government lockdowns and 'stay-at-home' orders caused the US and global economy to be impacted. The resulting unemployment, lack of physical contact, constant uncertainty, and contingent regulation change, rephrased daily as 'the new norm,' caused health professionals to predict a consequential mental health crisis (Banks et al., 2020; Debata et al., 2020). Adding confusion and skepticism to populations' psyche, initial assertions that face coverings were not recommended were later rescinded. For some, the vacillation between the polar opposite recommendations caused bewilderment, discombobulation, and a lack of faith in authority during a crisis (Smith & Wanless, 2020). Protests against lockdowns and mandatory mask regulations erupted worldwide as an expression of discontent, frustration, and distress. Disruption to travel and transportation of goods, domestic and international, also increased the sense of loss of control.

Countries, without advance notice, began to restrict individual entry based on nationality, recent travel history or close their borders completely (IATA, 2020b). There were inconsistent requests from countries and airlines for travelers to provide a negative COVID-19 test certificate before travel or after travel and within a set time frame from 24 - 96 hours (Emirates Airline, 2021; IATA, 2020a; ICAO., n.d. -a). A requirement to quarantine in a government-mandated hotel at the traveler's expense upon arrival was introduced in some countries (Australian Government Department of Health, 2021; Thai Embassy, 2021; United Kingdom Government, n.d.).

Governments worldwide have approved the use of multiple different vaccines under emergency use only orders that have reported efficacy of 90% or more at preventing severe symptoms of COVID-19 (Zimmer, 2020, 2021). These vaccines hope to contribute to herd immunity, reduce the number of people hospitalized by COVID-19, and enable societies to return to a sense of normalcy (CDC, 2021a). Governments need to feel safe to open their borders and that COVID-19 is a containable risk.

Currently, a passenger has to verify whether the destination or airline they are flying from requires a negative PCR COVID-19 certificate before arrival. There may also be requirements

for the number of hours in which the COVID-19 test must be completed 24-96 hours before check-in. There are limits to a COVID-19 negative test's reliability and validity. A document providing proof of COVID-19 vaccination could provide reassurance and eliminate this uncertainty. The aim of a COVID-19 passport to provide reassurance for the traveling public that passengers on the plane have received a COVID-19 vaccination.

The COVID-19 vaccination passport would be evidence that an individual has been vaccinated against COVID-19. Brown et al. (2020) and Phelan (2020) explore the ethical aspects of the divisive nature a COVID-19 vaccination passport could potentially create within a country. Those with a COVID-19 vaccination passport may have access to the social, civic, and economic freedoms they enjoyed before COVID-19. Those without a COVID-19 vaccination passport may be restricted. They may not be permitted access to areas prone to a rate of transmission, for example, enclosed spaces or densely populated areas such as workspaces, learning facilities, stadium arenas, or public transport. They may not be permitted to public spaces and may be deemed a public health risk. Businesses may restrict access to those who do not have a COVID-19 vaccination passport to promote reassurance that they are pursuing practices to be a COVID-19 free space.

Predictors

This study explored 24 possible predictors that may influence a passenger's WTF domestically or internationally with a COVID-19 health passport. The predictors are separated into six categories: demographics, affect (emotions), perceived threat of COVID-19, personality traits, pre-pandemic flight habits, and willingness to obtain the COVID-19 vaccine. Previous research has indicated that some of these factors may influence a consumer's WTF (Lamb et al., 2020; Rice et al., 2019; Winter et al., 2018; Winter et al., 2019).

Demographic Predictor Variables

Age. Members of the population over the age of 60 are more at risk, with more fatalities from COVID-19 occurring in the older population. Thus, the CDC has recommended that people aged 65 and over be prioritized for vaccination in the Phase 1 vaccination drive's initial stages. Age could impact an individual's willingness to fly, even with a COVID-19 passport, due to the estimated risk age poses and the more conservative approach to decision making that is generally adopted with increasing age.

Gender. In this study, an individual's gender was defined as either female, male or other. During gender-focused studies on the severity and mortality rate of COVID-19, males across Asia, Europe, and the US were, on average, found to be more vulnerable than females (Bwire, 2020; Jin et al., 2020). Sex-based immunological differences paired with risky lifestyle choices, such as higher alcohol consumption rates, smoking, and aversion to COVID-19 social distancing measures, were identified as potential causes. Prior studies have shown tendencies for gender to impact outcomes of risk and WTF (Ward, 2020).

Ethnicity. The predominant races and ethnicities in the US and those denominated by this study were: White or Caucasian, Black or African American. Hispanic or Latino, Asian or Asian

American, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, or Other. Intergenerational and socioeconomic hardship exposes some races more than others to comorbidities, increasing susceptibility to COVID-19 (CDC, 2021a). COVID-19 vaccination administration has been low among racial and ethnic minorities due to hesitation towards being exposed to a newly developed vaccine and histories of unfair and unethical treatment from medical bodies.

Education Level. The common perception is for highly educated people to make better decisions than those with less education regarding the subject matter in which they are not an expert. However, Rosenberger (2020) identifies that although this may occur more frequently, there is no significant trend. Regarding the COVID-19 disease, not only has the information from experts and politicians been fluid in a progressing pandemic, but it has often been conflicting. This conflict has influenced individuals of all education levels and resulted in people forming their own opinions, beliefs, and often allegiances.

Employment Status. The COVID-19 pandemic has caused record-level unemployment. An individual's perception of their financial circumstances may influence whether they would be WTF with a COVID-19 passport. This perception may be due to the cost of air travel compared to other modes of transport, the level of affordability of a COVID-19 passport, or the availability of the COVID-19 vaccine to someone who is unemployed and may not have comprehensive medical insurance coverage.

Income. Household income could reflect an individual's amount of disposable income and their willingness to spend it on air travel. Low-Cost Carriers in the United States are expensive in comparison to those on other continents. Lower-income participants or those who do not have the disposable income to spend on air travel may not be WTF. They may choose a more affordable mode of transportation, such as an automobile, or not conduct the journey at all.

Political Affiliation. In the US, an individual's political affiliations usually span the following: Democrat, Republican, Independent, or Other; these were therefore selected for the study. Political ties and chances of complying with safe COVID-19 practices might impact an individual's WTF with a COVID-19 passport.

Affect (Emotions)

The dichotomous emotional reaction evoked in response to an inquiry, action, or behavior affects an individual's attitude and decision-making ability (Diener & Emmons, 1984; Isen & Means, 1983; Raghunathan & Pham, 1999; Watson et al., 1988). Happiness and excitement are positive effects. Guilt, disgust, and sadness are negative effects. With the images of Ekman and Friesen (1971), these six emotions can be recognized across different cultures, nationalities, and ethnicities and shall be used in this study. Previous studies have found links between the six universal emotions and risk-taking behavior (Ferrer et al., 2016; Raghunathan & Pham, 1999), decision making (Guido et al., 2018), and purchasing habits (Cryder et al., 2008; Guven & Hoxha, 2015; Lerner & Keltner, 2000; Rains et al., 2017). Emotions that are significant to the model will be explored in the research discussion.

Perceived Threat of COVID

Conway et al. (2020) developed validated scales as part of a study of social psychological measurements of COVID-19. This perceived threat may influence an individual's WTF and will be explored in this study. The perceived threat of COVID-19 has aided in the reduction of travel. This perceived threat may influence an individual's WTF and will be explored in this study.

Personality Traits

Similarly, the Big Five personality traits, neuroticism, agreeableness, extraversion, consciousness, and intellect/imagination, have been evaluated for their impact on willingness to purchase, risk-taking behaviors, and decision making. Personality traits have been shown in previous studies to impact consumers' willingness to purchase (Dobre & Milovan-Ciuta, 2015, Tsao & Change, 2010), engage in perceived risky behavior (Khare et al., 2010) and decision making (Byrne et al., 2015).

Donnellan et al. (2006) whittled down the 50-item International Personality Item Pool-Five-Factor Model (Goldberg, 1999) and modified it to a 20-item short form. It is unknown whether these personality traits affect WTF in the sample. As the research is exploratory with multiple measurements, the mini-IPIP scale was selected. Characteristics significant to the model will be explored in the discussion section.

Pre-pandemic Flight Habits

The current study will explore four pre-pandemic flight habits: the number of round-trip flights per year, if the individual primarily travels alone or with others, if they mainly travel domestically or internationally, and if they mostly travel for business or pleasure. These factors will allow researchers to explore if any pre-pandemic flight habits would predict the current model.

Willingness to Obtain the COVID Vaccine

The WTF scale is a validated means to quantify passengers' attitudes about commercial airline travel using a COVID-19 passport. As an understanding of attitudes towards COVID-19 passports and flights do not currently exist, the proposed research will fill that gap.

Willingness to Fly

The WTF scale was developed to aid research into passengers' intentions and decision-making choices (Rice et al., 2015). It has since been used in several studies to investigate further consumer WTF in autonomous commercial airplanes (Rice, Winter, Mehta et al., 2019), WTF depending on the gender of the crew composition and configuration using automation (Mehta et al., 2017), WTF depending on pilot configuration (Rice & Winter, 2015) and WTF depending on depression medications taken by the pilot (Rice, Winter, Kraemer et al., 2015). The WTF scale was updated by Rice et al. (2020) and used by Lamb et al. (2020) to study the factors that predict

passengers' WTF during and after the pandemic. The WTF scale will be used as the dependent variable for this study.

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Current Study

The study used quantitative methods and a non-experimental research design to identify factors that predict a passenger's WTF with a COVID-19 health passport. The study proposed to produce two statistical models for a passenger's willingness to fly: domestic and international. The study proposed the use of 24 predictive factors, which were grounded in literature. The data analysis used a two-stage approach: Stage 1 to build the regression equation and Stage 2 to validate it. The following hypotheses were proposed:

> H1: At least one demographic variable is a significant predictor of a passenger's WTF with a COVID-19 Passport.
> H2: predictor of a passenger's WTF with a COVID-19 Passport.
> H3: The perceived threat of COVID-19 is a significant predictor of a passenger's WTF with a COVID-19 Passport.
> H4: At least one of the big five personality traits is a significant predictor of a passenger's WTF with a COVID-19 Passport.
> H5: At least one pre-pandemic flight habit is a significant predictor of a passenger's WTF with a COVID-19 Passport.
> H6: Willingness to obtain the COVID-19 vaccine is a significant predictor of a passenger's WTF with a COVID-19 Passport:

Methods

Participants. This study sampled five hundred and ninety-eight participants (305 males, 291 females, one other, one no response) who were citizens of the United States. Participants were recruited through a convenience sample via Amazon's ® Mechanical Turk ® (MTurk). Before the collection of data, the study received approval through Embry-Riddle Aeronautical University's institutional review board. The researchers all have current certificates on human subjects' ethical treatment through the Collaborative Institutional Training Initiative (CITI). MTurk allows requestors to set various criteria to help ensure quality data are collected. Three criteria were set to ensure the validity of the findings. First, participants were required to have completed more than 100 tasks through the MTurk platform. Next, participants were required to have a 98% or higher rating from completing previous tasks. Finally, all participants were required to be a US citizen.

Materials and Stimuli. Participants were provided with a link to Google Forms from MTurk. They were required to complete an electronic consent before entry into the study. After consenting, they were provided with the instructions for the study. All questions were randomized to prevent ordering effects. After answering questions regarding demographic and flight habits, personality traits, and perceived threat of COVID-19, they were presented with the same scenario, first for affect (emotion), then for domestic and international travel. The following is the scenario the participants read:

"Imagine you need to complete a flight on a commercial airline between two major cities. Prior to boarding your flight, it is proposed that you would need to provide a COVID-19 health passport to be eligible to complete your trip. In order to obtain the health passport, you must provide evidence that you have received the COVID-19 vaccine.

A health passport may: Be used to demonstrate inoculation from viruses (such as COVID-19) to the government and airline; Reduce or eliminate required quarantine periods upon arrival to your destination. (Source: International Air Transport Association)"

The participants were instructed to rate the scenario using the scales, which can be found in Appendix B (Affect Face Scales), Appendix A (Willingness to Fly Scale), and Appendix C (Perceived Threat from COVID Scale). After this was complete, participants were debriefed, provided with their code for payment, and released from the study. The survey took between 5 – 10 minutes to complete for the participants.

Results

Data analysis used a two-stage approach, with Stage 1 creating an equation and Stage 2 assessing the equation. The study used 24 possible predictors: age, political views, education, gender, employment status, average annual income, ethnicity, pre-pandemic flight habits (number of round trips per year, pleasure or business travel, travel alone or with others, domestic or international travel), personality traits (Extraversion, agreeableness, conscientiousness, neuroticism, and intellect/imagination), willingness to receive the COVID-19 vaccine, perceived coronavirus threat, and affect (anger, fear, disgust, surprise, sadness, and fear). The dependent variable for the model fit was the Willingness to Fly Scale (Rice et al., 2020).

Initial Data Analysis

The data were randomly divided into two separate datasets to facilitate the two-stage approach. Stage 1 consisted of 298 total participants. Seven cases were selected for removal because of missing data, leaving 292 (149 females, 143 males) participants with an average age of 41.62 ($SD = 13.27$) years old. Stage 2 consisted of 298 total participants. Five were selected for removal because of excessive missing data, leaving 294 (139 females, 155 males) valid participants with an average age of 40.76 ($SD = 11.78$) years old.

This method has been applied to previous studies and has been a successful approach (Rice et al., 2019; Winter, 2019). Employing a two-stage approach is valuable for creating predictive models (Pedhazur, 1997). The a priori sample size was determined using G*power (version 3.1.9.7) with settings of an estimated medium effect size = .15, alpha = .05, power = .95, and 24 predictors to result in a minimum total sample size of 238 per group. This requirement was exceeded by Stage 1 having 292 participants and Stage 2 having 295 participants.

Upon initial analysis of the data, several predictors were compressed due to a lack of other factors. Ethnicity had seven possible selections but was compressed to Caucasian or Non-Caucasian due to 79.1% of respondents identifying as White or Caucasian. Education level was changed from 6 possible answers to bachelor's degree or higher or less than a bachelor's degree, as respondents reported a bachelor's or higher in 71.8% of responses. Employment status had four possible answers but was reduced to Employed or Unemployed due to 82.7% of participants responding with employed. Political Ideology was reduced to 3 categories: Democrat, Republican, and Other. Known replacement value was used to provide missing data for reflective terms. Missing incomes were replaced with the mean income of the respective data set.

Reliability Analysis

All scales had their consistency measured using a Cronbach's alpha test. Coefficients from data set 1 as follows: Extraversion = .816; Agreeableness = .773; Conscientiousness = .702; Intellect = .711; Neuroticism = .784; Perceived Coronavirus Threat = .923; Domestic WTF = .970; International WTF = .969. Coefficients from data set 2 as follows: Extraversion = .856; Agreeableness = .819; Conscientiousness = .677; Intellect = .807; Neuroticism = .760; Perceived Coronavirus Threat = .927; Domestic WTF = .966; International WTF = .968. Higher Cronbach's alpha values indicate a higher internal consistency, with .70 being an acceptable level of reliability (Wilson & Joye, 2016). Thus, the average was used for the analysis.

Stage 1 – Development of The Regression Equation

The first stage used backward stepwise regression to remove any statistically insignificant values and develop a predictive equation for the dependent variable (WTF). Due to this being an exploratory study, backward stepwise regression was selected and chosen over forward regression to minimize suppressor effects (Field, 2018). The criteria set for removal was a cut-off of $p < .10$.

Willingness to Fly Domestically

There was the independence of residuals, as assessed by a Durbin-Watson statistic of 1.860 for domestic travel. There was homoscedasticity as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There were no independent variables with multicollinearity, as assessed by the correlations and tolerance collinearity statistic. An inspection of Cook's revealed no highly influential points. A review of Leverage points revealed no significant points. An inspection of Mahalanobis's Distance failed to identify any outliers. The standardized residuals were approximately normally distributed, as assessed from a visual inspection of the histogram and P-P Plot.

The resulting model for WTF with a COVID health passport domestically resulted in six significant predictors: Gender, Willingness to receive the COVID-19 vaccine, Perceived COVID Threat, Anger, Disgust, and Happiness. The model resulted in an R^2 of .319 (adjusted R^2 of .304), which accounted for approximately 32% of the variance in a participant's willingness to fly domestically with a COVID-19 health passport. The model was statistically significant, F(6,

282) = 21.52, $p < .001$. A summary of the regression analysis is found in Table 1, and a summary of the significant coefficients is found in Table 2.

Willingness to Fly Internationally

There was the independence of residuals, as assessed by a Durbin-Watson statistic of 1.816 for international travel. There was homoscedasticity as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There were no independent variables with multicollinearity, as assessed by the correlations and tolerance collinearity statistic. An inspection of Cook's revealed no highly influential points. An inspection of Leverage points resulted in one item being removed due to it being greater than .2. An inspection of Mahalanobis's Distance failed to identify any outliers. The standardized residuals were approximately normally distributed, as assessed from a visual inspection of the histogram and P-P Plot.

The resulting WTF model with a COVID health passport internationally resulted in eight significant predictors: Age, Gender, Willingness to Receive the COVID-19 Vaccine, Perceived COVID Threat, Anger, Disgust, Happiness, and Surprise. The model resulted in an R^2 of .245 (adjusted R^2 of .222), which accounted for approximately 25% of the variance in a participant's willingness to fly internationally with a COVID-19 health passport. The model was statistically significant, $F(8, 282) = 11.120$, $p < .001$. A summary of the regression analysis is found in Table 1, and a summary of the significant coefficients is found in Table 2.

	Willingness to Fly Domestically	Willingness to Fly Internationally
R^2	.319	.245
Adj. R^2	.304	.223
F	21.52	11.120
df	6, 282	8, 282
p	< .001	< .001

Table 1. Analysis of Regression Model Summaries from Stage 1

	M(SD)	Beta	β	t	SE	Sig.
Domestic						
Constant	-	2.121	-	7.240	0.293	< 0.001
Gender	-	-0.215	-0.101	-1.979	0.109	0.049
WTRV	5.61 (1.94)	0.228	0.412	6.383	0.036	< 0.001
PCT	4.10 (1.80)	-0.099	-0.166	-2.981	0.033	0.003
Anger	3.58 (3.29)	0.098	0.302	2.782	0.035	0.006
Disgust	3.52 (3.13)	-0.081	-0.237	-2.409	0.034	0.017
Happiness	6.61 (3.14)	0.111	0.328	4.547	0.025	< 0.001
International						
Constant	-	2.649	-	7.583	0.349	< 0.001
Age	41.62 (13.27)	-0.009	-0.114	-2.146	0.004	0.033
Gender	-	-0.194	-0.092	-1.691	0.115	0.092
WTRV	5.61 (1.94)	0.212	0.386	5.625	0.038	< 0.001
PCT	4.10 (1.80)	-0.102	-0.172	-2.920	0.035	0.004
Anger	3.58 (3.29)	0.104	0.324	2.815	0.037	0.005
Disgust	3.52 (3.13)	-0.099	-0.291	-2.800	0.035	0.005
Happiness	6.61 (3.14)	0.082	0.243	3.177	0.026	0.002
Political (Republican)	-	0.268	0.110	2.012	0.133	0.045

Table 2. Statistically Significant Regression Coefficients from Stage 1

Note. WTRV = Willingness to Receive COVID Vaccine; PCT = Perceived COVID Threat. Criteria for removal during the backward stepwise process were set to $p < 0.1$ due to this study's exploratory nature.

Stage 2 – Assess Model Fit

To assess model fit, three methods were used. The first was an independent samples *t*-test which compared actual WTF from the Stage 2 dataset to their predicted scores using the equations created in Stage 1. Next, a Pearson's bivariate correlation was conducted between actual WTF and predicted WTF scores. Last, the cross-validated R^2 value was calculated for the model and compared to the R^2 value from Stage 1. The equation for the cross-validated $R'^2 = 1 - ((1 - R^2)[(n + k) / (n - k)])$, where: R^2 = Stage 1 R^2, n = Stage 1 sample size, and k = degrees of freedom.

Willingness to Fly Domestically

The independent samples *t*-test conducted between actual WTF score ($M = 3.51$, $SD = 1.15$) from Stage 2 and predicted WTF score ($M = 3.58$, $SD = 0.62$) from stage 2 found $t(579) = -.711$, $p = .477$ with a mean difference of -.054, suggesting no significant difference between the two values. Next, a Pearson's bivariate correlation was conducted between the values resulting in $r(287) = .561$, $p < .001$, suggesting a statically significant correlation. Finally, the cross-validated R^2 was calculated ($R'^2 = .290$), providing a low difference in the values ($R^2 = .319$, $R'^2 = .290$). There are three tests used to ensure model fit. The *t*-test and R^2 comparisons support a strong model fit, but the correlations, while still highly significant, were not as strong as one would like to see. However, having a non-significant t-test, a significant correlation, and a close cross-validated R^2, we believe this shows an adequate model fit. A summary of the model fit can be found in Table 3.

Willingness to Fly Internationally

The independent samples *t*-test conducted between actual WTF score ($M = 3.38$, $SD = 1.17$) from Stage 2 and predicted WTF score ($M = 3.49$, $SD = 0.54$) from stage 2 found $t(579) = -.1.533$, $p = .126$ with a mean difference of .076, suggesting no significant difference between the two values. Next, a Pearson's bivariate correlation was conducted between the values resulting in $r(285) = .479$, $p < .001$, suggesting a statically significant correlation . Finally, the cross-validated R^2 was calculated ($R^{'2} = .202$), providing a low difference in the values ($R^2 = .245$, $R^{'2} = .202$). There are three tests used to ensure model fit. The t-test and R^2 comparisons support strong model fit, but the correlations, while still highly significant, were not as strong as one would like to see. However, having a non-significant *t*-test, a significant correlation, and a close cross-validated R^2, we believe this shows an adequate model fit. A summary of the model fit can be found in Table 3.

	t-test			Correlation		R^2	$\times R^2$
	t	*df*	Sig.	*r*	Sig.		
WTF Domestic	-.711	579	.477	.561	<.001	.319	.290
WTF International	-1.533	579	.126	.479	<.001	.245	.202

Table 3: Summary of Model Fit Statistics
Note. $R^2 = R^2$ from Stage 1*; $\times R^2 =$ cross-validated R^2

General Discussion

The purpose of this study was to identify factors that significantly predict a passenger's willingness to fly (WTF) with a COVID-19 passport on either domestic or international flights. Researchers investigated 24 possible predictors that could influence WTF. Several predictors presented in both the domestic and international models are in the same direction, strengthening our study's findings. The multiple regression summary can be found in Table 1, and the statistically significant regression coefficients can be found in Table 2.

The first hypothesis explored demographics and was found to be supported. The results showed that as a person moved from female to male in both models, they were less likely to fly with a COVID health passport, meaning men were less likely to fly with the health passport. This finding is supported in the literature as women tend to be more risk-averse than men, take more time in decision-making, consider the broader social impact, and desire more information (Borghans et al., 2009; Croson & Gneezy, 2009; Gill et al., 1987). Additionally, as an individual's age increases, their willingness to fly decreases. Understandably, older individuals would be less WTF, especially internationally. One possible reason is that as many individuals age, they are more conservative in their privacy concerns and thus may not want to provide health information to the airline or government, especially a foreign government. Finally, the international model showed that Republicans are less likely to travel with a COVID-19 passport. This could be due to the politicization of the vaccine and government mandates that are presented throughout the news and social media.

The second hypothesis explored affect (emotion). This finding was shown to be supported with three factors contributing to the domestic model and four factors contributing to

the international model. The results revealed, for both models, that as happiness increases, so does a consumer's WTF with a health passport. A person who is happy about the health passport may feel that it is a positive thing. As a consumer finds out that a health passport is mandatory for travel and their happiness increases, it is plausible to think that is due to the individual feeling safer on the flight because everyone must present the health passport. Second, as the consumer's anger increases, so does their WTF. This predictor yielded the most interesting results from the study. Anger needs further research to explore its effects as it relates to COVID-19 and WTF. However, the direction was consistent across both models, strengthening the findings. Anger has generally been identified as a negative emotion (Ben-Ze-ev, 2000; Berkowitz & Harmon-Jones, 2004; Lazarus, 1994) but does not follow typical negative emotional patterns. For example, fear and anger both are negative emotions; however, the former is associated with a sense of uncertainty, while anger is associated with a sense of certainty and individual control (Habib et al., 2015). Additional studies should look to see if there is a correlation between anger and perceived coronavirus threat.

The third emotion to factor into both models was disgust. The data found that as the individual's disgust increased, their willingness to fly decreased. Disgust has been identified as affecting consumer willingness and decision making as it is a negative emotion. Individuals who feel disgusted have stronger avoidance motives (Du, 2019). The last emotion of surprise was only associated with only international travel. The data revealed that as the individual became more surprised, their willingness to fly increased. Surprises can be perceived as good or bad, and their role is to fine-tune attention, increase focus, and prime for information gathering (Ekman & Friesen, 1971). It could be plausible that those who were surprised by the requirement of the COVID-19 health passport are encouraged by the less restrictive quarantine upon arrival in a foreign country.

Hypothesis three proposed that an individual's perceived threat of COVID-19 is a significant predictor of a passenger's WTF with a COVID-19 Passport. The analysis in both models supported this finding, as a consumer's perceived coronavirus threat increases, their willingness to fly decreases. This is a logical finding; as an individual perceives a more significant threat of COVID-19, it is understandable that they would be less likely to do many activities, including flying.

The fourth hypothesis predicted that at least one big five personality trait would contribute to the model. This hypothesis was not supported. The following hypothesis, 5, explored pre-pandemic flight habits and postulated that at least one habit would significantly predict a passenger's WTF with a COVID-19 Passport. This hypothesis was not supported. Pre-pandemic flight habits seem not to affect a passenger's travel habits in the pandemic.

Finally, the last hypothesis stated that the willingness to obtain the COVID-19 vaccine would be a significant predictor of a passenger's WTF with a COVID-19 Passport. This hypothesis was supported in both models and had the largest effect on either model, domestic and international (0.412 and 0.370, respectively). The assurance that people feel when vaccinated against the COVID-19 virus may increase their willingness to resume "normal" activities. Many people actively use social media to post their COVID vaccine results, making it a movement of sorts. The health passport could also be seen as an additional way to present to others that they

are vaccinated, increasing their willingness to fly under the scenario. If herd immunity is reached, more individuals may be willing to travel and return to pre-pandemic ways.

Practical Implications

The findings from the study provide some valuable practical implications and timely information. First, several emotional aspects were found to be significant predictors. This finding is consistent with prior studies that have demonstrated that emotions play a role in the decision-making process, especially when time and information are limited. As a result, governing agencies and airlines need to provide clear and consistent messaging to passengers. This messaging can alleviate concerns, limit conflicting or confusing reports, and better understand passengers when considering their willingness to fly if a COVID-19 health passport would be required. Second, the willingness to obtain a COVID-19 vaccine was a strong predictor of willingness to fly in both models. Those individuals who are most willing to get the vaccine may be most likely to participate in a health passport program of this nature, and they could be a potential target audience for a trial program. Lastly, female participants seemed more willing to use a program than males, along with younger participants.

Limitations

The primary limitation in the study is the use of an online survey platform MTurk. To encourage participation, financial compensation was provided to each participant that meets entrance criteria and signs the consent form. Using the online platform, researchers cannot make participants complete the survey. The age range for MTurk users is relatively representative of internet users' US population but can potentially introduce biases. The convenience sample from MTurk limits the generalizability of this study's findings to those who are a member of MTurk and are willing to complete online human tasks, such as completing surveys.

This study is also limited by the collection of attitudinal and not behavioral data. However, in the Theory of Reasoned Action model developed by Fishbein and Ajzen (1975), attitudinal behavior combined with accepted social norms appears to influence behavioral decisions. While we are not asking participants to book tickets for traveling, prior research is supportive that attitudinal behavior would be a predictor of behavior.

Another limitation may have caused the low correlations present in the two models. People's opinions are changing daily on COVID-19 and vaccines. Many are uncertain in how to answer questions relating to the pandemic, given that new information seems to be released daily. This may have caused a slightly weaker model that may not be accounting for a construct that has not been identified in people's opinions of COVID-19.

A final limitation of this study is overfitting or underfitting the model using backward stepwise regression (Field, 2018). Backward Stepwise regression was selected due to the exploratory nature of this study. Future iterations of this study could use alternate statistical regression methods or approaches, aiding in external validity

Conclusion

The purpose of the current study was to identify the type of person willing to fly with a COVID-19 passport. In stage one, a backward stepwise regression was used to develop the model resulting in six statistically significant variables, which explained 32% of the variance in willingness to fly domestically and eight statistically significant variables, which explained 25% of the variance in willingness to fly internationally with a COVID-19 passport. In stage two, the model was tested and shown through an independent sample t-test, Pearson's bivariate correlation, and a cross-validated $R2$ to have predictive value. Airlines could use the findings to determine which type of customer would be more susceptible to targeted advertising. It could also aid aviation organizations, such as ICAO or IATA, and government regulatory bodies, such as the FAA, in decision-making and strategizing for the release and rollout of health apps that show an individual's current COVID-19 PCR status or COVID-19 vaccination status.

Acknowledgments

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Willingness to Fly Scale (Rice et al., 2020)

Please respond how strongly you agree or disagree with the following statements.

1. I would be willing to fly in this situation with a COVID-19 Passport.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

2. I would be comfortable flying in this situation with a COVID-19 Passport.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

3. I would have no problem flying in this situation with a COVID-19 Passport.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

4. I would be happy to fly in this situation with a COVID-19 Passport.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

5. I would feel safe flying in this situation with a COVID-19 Passport.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

6. I have no fear of flying in this situation with a COVID-19 Passport.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

7. I feel confident flying in this situation with a COVID-19 Passport.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

Appendix B

Affect Scale (Ekman & Friesen, 1971)

*The faces represent anger, disgust, fear, happiness, sadness, and surprise, respectively.

Please respond how strongly you agree or disagree with the following statements.

1. Given the scenario, how strongly do you agree to the feeling in the image shown?

Do not feel this way 1 2 3 4 5 6 7 8 9 10 Extremely feel this way

2. Given the scenario, how strongly do you agree to the feeling in the image shown?

Do not feel this way 1 2 3 4 5 6 7 8 9 10 Extremely feel this way

3. Given the scenario, how strongly do you agree to the feeling in the image shown?

Do not feel this way 1 2 3 4 5 6 7 8 9 10 Extremely feel this way

4. Given the scenario, how strongly do you agree to the feeling in the image shown?

Do not feel this way 1 2 3 4 5 6 7 8 9 10 Extremely feel this way

5. Given the scenario, how strongly do you agree to the feeling in the image shown?

Do not feel this way 1 2 3 4 5 6 7 8 9 10 Extremely feel this way

6. Given the scenario, how strongly do you agree to the feeling in the image shown?

Do not feel this way 1 2 3 4 5 6 7 8 9 10 Extremely feel this way

Perceived Coronavirus Threat Scale (Conway et al., 2020)

Please respond how strongly you agree or disagree with the following statements.

1. Thinking about the coronavirus (COVID-19) makes me feel threatened.

1 = "not true of me at all" and 7 = "very true of me."

2. I am afraid of the coronavirus (COVID-19).

1 = "not true of me at all" and 7 = "very true of me."

3. I am stressed around other people because I worry I'll catch the coronavirus (COVID-19).

1 = "not true of me at all" and 7 = "very true of me."

20-Item Mini International Personality Item Pool Scale (Donnellan et al., 2020)

Please respond how strongly you agree or disagree with the following statements.

1. I am the life of the Party. (Extraversion)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

2. I sympathize with others' feelings. (Agreeableness)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

3. I get chores done right away. (Conscientiousness)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

4. I have frequent mood swings. (Neuroticism)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

5. I have a vivid imagination. (Intellect/Imagination)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

6. I don't talk a lot. (Extraversion; reversed)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

7. I am not interested in other people's problems. (Agreeableness; reversed)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

8. I often forget to put things back in their proper place. (Conscientiousness; reversed)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

9. I am relaxed most of the time. (Neuroticism; reversed)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

10. I am not interested in abstract ideas. (Intellect/Imagination; reversed)

Strongly Disagree　　　Disagree　　　Neutral　　　Agree　　　Strongly Agree

11. I talk to a lot of different people at parties. (Extraversion)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

12. I feel others' emotions. (Agreeableness)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

13. I like order. (Conscientiousness)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

14. I get upset easily. (Neuroticism)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

15. I have difficulty understanding abstract ideas. (Intellect/Imagination; reversed)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

16. I keep in the background. (Extraversion; reversed)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

17. I am not really interested in others. (Agreeableness; reversed)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

18. I make a mess of things. (Conscientiousness; reversed)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

19. I seldom feel blue. (Neuroticism; reversed)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

20. I do not have a good imagination. (Intellect/Imagination; reversed)

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree