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Impact of perception of COVID-19 on NPI, job satisfaction, and customer orientation: Highlighting three types of NPIs for the airline industry

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1. Introduction

Symptoms of a novel influenza-type virus, now known as COVID-19, were first noticed in December 2019 at a local seafood market in Wuhan, China, and within weeks the virus had spread to other countries (Wu et al., 2020). Research shows that COVID-19 can be transmitted by human-to-human respiratory droplets and from contaminated surfaces (Bourouiba, 2020). Compared to seasonal influenza, it has a relatively high mortality rate among adults, and because the virus spreads quickly, the World Health Organization (WHO) declared a global pandemic on March 11, 2020. As of June 2021, global deaths due to the virus had plummeted (Sobieralski, 2020). A recent survey by the International Air Transport Association (IATA) reports that more than half (55%) of respondents would not travel in 2020 due to the fear of COVID-19 (IATA, 2020). In April 2020, passenger numbers fell by more than 70% compared to the previous year (Curley et al., 2020). While the aviation market has continued to operate, it has done so at a significantly reduced rate. One underlying concern, beyond economics, is that flight attendants may be exposed to a high-level risk of infection (Hawkins, 2020). Following the H1N1 pandemic in 2009, World Health Organisation (2009) warned that the influenza virus can travel on aircraft as far as two rows ahead and two rows behind a contagious passenger. Not surprisingly, COVID-19 has infected hundreds of flight attendants since March 2020 (Wallace, 2020).

Even so, tourism and hospitality researchers have not examined the increased risk to inflight service providers or their workplace concerns. While some flight attendants have been required to work during the outbreak, little is known about how they generally view the risk of COVID-19 and whether they trust their employers, governments, or medical advice. By sampling South Korean flight attendants, this study classified the perceived risk of COVID-19 as an obstacle that undermines the employees’ work behavior and performance. According to protection motivation theory (Rogers, 1975), people will likely participate in health preventive behavior if they feel threatened. For this reason, we believe flight attendants who are afraid of or risk-averse to COVID-19 will likely participate in a recommended course of health preventive strategies inside and outside aircraft.

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actions such as non-pharmaceutical interventions (NPIs) while working on aircraft.

Previous research has shown that in the absence of vaccines or antiviral drugs, NPIs are the best hygiene strategy for reducing viral transmissions (Chung et al., 2021; Leventides et al., 2021; Teasdale et al., 2014). Some research has investigated the impact of NPI on consumer behavior. For instance, Chung et al. (2021) examined tourist behavior in terms of social NPI, whereas Lee et al. (2012) explored tourist behavior in terms of individual NPI. However, additional NPI may be involved in the airline industry. That is, airline crew should abide by governmental and organizational (airlines) NPIs as well as individual NPI. Despite the importance of NPIs in the COVID-19 pandemic, little research has explored the roles of different types of NPIs in previous research.

Thus, this study attempts to fill this research gap by exploring the roles of three types of NPIs (individual, organizational, and governmental). Specifically, this study examines how three types of NPIs play different roles in the relationship between perception of COVID-19 and job satisfaction, ultimately predicting customer orientation. This study also examines whether protection motivation theory can be used to ground a theoretical model in the study of the COVID-19 pandemic. The findings of this study should contribute to the aviation literature by: (1) introducing three NPIs in the research framework using protection motivation theory (2) shedding light on these roles in the relationships between perception of COVID-19, job satisfaction, and customer orientation, and (3) contribute to airline management by providing safety protection strategies for airline crew through NPIs, that can improve job satisfaction and customer orientation.

2. Theoretical background

2.1. COVID-19 and previous epidemics

COVID-19. According to World Health Organization (2021b), COVID-19 affects people in different ways. While confirmed infections typically include mild to moderate respiratory illness (e.g., fever, dry cough, tiredness), most people recover without special medical procedures. In serious cases, however, individuals may experience loss of taste or smell, shortness of breath, chest pain, loss of movement, and even death. During the first wave of COVID-19, a lack of information or false information exacerbated disease treatments (Roozenbeek et al., 2020). Fake ‘remedies and cures’ further confused and frustrated many people (Brennen et al., 2020). Misinformation also contributed to social and psychological concerns and to vaccination hesitancy, which aided the spread of the virus (Basol et al., 2021; Campbell et al., 2020; Galoni et al., 2020; Pennycook et al., 2020).

However, previous epidemics can shed light on the understanding of how outbreaks have influenced the airline industry and what types of health-protective measures have historically been taken. It is believed that this understanding can help identify ways for current individuals, organizations, and governments to cope with COVID-19 and future pandemics.

SARS. Severe Acute Respiratory Syndrome (SARS) was first identified in south China in late November 2003. It affected more than 8,000 people in more than 25 countries and led to nearly 800 deaths (Muzzatti, 2005). Some researchers maintained that airline passengers were the major cause of the SARS pandemic (John et al., 2005). For example, the source of SARS in Canada was found to be Canadian female passenger who had visited Hong Kong by air and later tested positive (Varia et al., 2003). From this one person, the virus spread rapidly to major Canadian cities, causing 44 deaths and hundreds of confirmed cases (Tam, 2019). Subsequently, a travel advisory was issued by the World Health Organization for countries where SARS cases were significant. Hence, governments in China, Taiwan, and Singapore imposed 14-day-quarantines for travelers who visited infected areas (McKercher and Chon, 2004). In Thailand travelers arriving from affected areas were ordered to wear face-masks during their stay, and failure to comply could lead to fines and/or imprisonment (McKercher and Chon, 2004). Further, the media’s coverage related to SARS increased the public’s fear and anxiety and affected travelers’ perceptions of air transportation which contributed to a decline in international travel that lasted for several years (Clegg, 2010).

H1N1. In April 2009, Influenza A (H1N1) was declared a pandemic, which ended fifteen months later (Manzoli et al., 2011). H1N1 was first discovered in Mexico and quickly spread to the United States. Like other influenza viruses, H1N1 can spread through cough and sneeze droplets (Kidy, 2009), spreading so quickly that in June 2009, two months after its discovery, the World Health Organization declared H1N1 a pandemic (World Health Organisation, 2010). According to Mukherjee et al. (2011), more than 19,000 people died of H1N1. During this H1N1 pandemic, the World Health Organization published health-protective guidelines exclusively for airlines (see World Health Organisation, 2009), which included more than fifty detailed non-pharmaceutical interventions. Among its recommendations were for airlines to provide appropriate personal protective equipment (e.g., gloves, masks), hand-hygiene products (e.g., antimicrobial soaps, sanitizers) for flight attendants, and tissues and medical masks for ill or symptomatic passengers.

Lessons learned from SARS and H1N1 are particularly important for flight crews. Dealing with unwell passengers is part of crew members’ duties, but many flight attendants are not trained to deal with highly infectious diseases. Since flight crews can only do so much in the confined spaces of their working environments, it is likely important to understand the efficacy of existing NPI guidelines for flight attendants during a pandemic.

2.2. Perceived risk

Perceived risk generally refers to a feeling of uncertainty towards a particular object, event, or situation (Cunningham, 1967). Given that people have different perceptions of risk, its degree can vary depending on the individual’s beliefs, memory, knowledge, and experiences relevant to that risk (Anderson, 2005). Further, risk perception comes in various forms, such as financial risk, performance risk, physical-/psychological risk, social risk, and time-loss risk (Cheron and Ritchie, 1982). Risk has been found to influence product purchasing behaviors (Yee and San, 2011), online transactions (Buttner et al., 2006; Maziriri and Chu Chu, 2017), and sexual behaviors related to HIV/AIDS (Akwara et al., 2003; Kayiki and Forste, 2011).

Risk perceptions have also been found to be prevalent in tourism settings. For example, many travelers consider safety and security a priority before making travel decisions (Rittichainuwat and Chakraborty, 2009). Further, Reisinger and Mavondo (2006) identified five major risk perception factors that travelers will likely consider before traveling: (a) terrorism, (b) political instability, (c) health, (d) crime, and (e) cultural language difficulties. Furthermore, Sommez and Graefe (1998) found that travelers holding an increased level of risk perception towards a geographic area often chose not to travel there (Sommez and Graefe, 1998). Similarly, Floyd et al. (2004) found that travelers tend not to travel when their perceptions of risk are high. Pennington-Gray and Schroeder (2013) found that travelers considering international travel weigh concerns about disease, finance, and cultural barriers before making travel decisions. In light of this, it seems reasonable to assume that perception of risk by flight attendants has increased due to the presence of COVID-19.

2.3. Protection motivation theory (PMT)

Protection motivation theory, developed by Rogers (1975), explains why people practice health-protective behaviors when they feel threatened. During natural disasters, terror attacks, and/or pandemics, for example, PMT states that people engage two appraisal processes:
“threat appraisal” and “coping appraisal.” The first is how individuals evaluate the seriousness of a situation and the second is how they respond (van Bavel et al., 2019). Hence, PMT explains how subjective evaluations of threats, lead to whether individuals intend to adopt self-protective measures (e.g., adaptive coping) or refuse to adopt safety procedures (e.g., maladaptive coping).

In a tourism context, Fisher et al. (2018) employed PMT in an experimental study to investigate the washing intentions of cruise passengers after a fictional norovirus incident occurred on a cruise ship. Their results revealed that when respondents had information about the symptoms and severity of the norovirus, they were more likely to engage in hand hygiene practices and reduce the risk of infection. Similarly, Wang et al. (2019) applied PMT to examine how Australian travelers reduced the risk of contracting rabies after traveling to Southeast Asia. The authors found that both threat appraisal and coping appraisal played significant roles in increasing the travelers’ intention to follow protective measures. In light of this, PMT will be employed in the current study to help explain how flight attendants perceive the risk of COVID-19 and which types of health-protective behaviors they adopt during a pandemic.

2.4. Non-pharmaceutical interventions (NPI)

According to the U.S. Centers for Disease Control, NPIs are “actions, apart from getting vaccinated and taking medicine, that people and communities can take to help slow the spread of illnesses like pandemic influenza” (CDC, 2020, para. 1). The CDC states that human populations are extremely vulnerable to new influenza-type viruses since people generally have no immunity to novel viruses and thus present a significant risk of spreading the disease. In the absence of a vaccine or pharmaceutical treatment, NPIs have been argued to be the most effective way to control infections during a pandemic (Askitas et al., 2021; Chung et al., 2021; Lee et al., 2012; Teasdale et al., 2014).

Although individual level NPIs are being adopted worldwide to combat COVID-19 (Askitas et al., 2021), there is little evidence in the literature about evaluating the effectiveness of organizational and governmental level NPIs. An interview with a cabin crew (Korean female) described how her colleagues cope with fear of COVID-19. “Most of my peers seek information from their employers and/or governments to assuage their fears”. However, we do not know how organizational NPIs (e.g., providing masks, seat distancing) and governmental NPI guidelines (e.g., pre-flight COVID-19 testing) influence the work behaviors of flight attendants during a pandemic. For this reason, we propose an NPI scale for the airline industry that includes measures at three levels: individual, organizational, and governmental.

2.4.1. Individual-level NPI (INPI)

Health researchers have recommended several public health interventions for communities and individuals. Teasdale et al. (2014), identified 9 types of health-protective behaviors (NPIs): (a) isolation—staying home for a minimum of 7 days if symptomatic, (b) respiratory hygiene—covering coughs and sneezes with single-use tissues, (c) hand hygiene—washing hands properly/frequently with hand soap or using hand sanitizer, (d) mask-wearing—wearing a medical face-mask, (e) personal distancing—keeping away from symptomatic people, (f) social distancing—a public health practice to mitigate social contact by encouraging people to stay 2 m apart, (g) social distancing in children—temporarily closing schools and childcare facilities, (h) social distancing in adults—avoiding large public gatherings and changing workplace environments, and (i) remote healthcare—seeking healthcare advice using websites and phones to avoid in-person visits. World Health Organization (2020) also suggested that frequent hand-washing with soap is the most effective way to protect personnel. Within the airline context, the president of JetBlue Airlines adds that wearing a facial mask can be effective in limiting the spread of disease on aircraft (JetBlue, 2020).

2.4.2. Organizational-level NPI (ONPI)

To safeguard their employees and passengers, major airlines have recently developed new NPI protocols and a mandatory code of conduct. For example, to keep passengers apart, South West and Alaska Airlines have left middle seats empty (Glusac, 2020). Also, Delta Airlines has minimized in-flight services to reduce contact between passengers and crew (Amankwah-Amoah, 2020). Further, Air Canada has replaced original catering services with pre-packaged meals and has suspended pillow/blanket services (Hunter, 2020).

Hence, flight attendants have followed company guidelines that include wearing safety eyewear, medical gowns, face-masks, and latex gloves on aircraft (see Fig. 1) (Korean Air, 2020). Furthermore, flight crews must (a) check their body temperature with a thermometer before and after taking a flight, (b) dispose of medical gloves in cabin waste, (c) wash hands before preparing inflight services, (d) reduce contact between flight attendants during meals, (e) avoid physical contact (handshakes, hugs, etc.) with passengers, (f) monitor passengers who seem unwell, and (g) avoid large gatherings on arrival at their destination.

Asiana Airlines, another major South Korean airline, has employed similar safety measures. The company encourages all flight passengers to use their web or mobile check-in services during the pandemic to minimize direct interaction with airline staff (Asiana Airlines, 2020). Further, the company is thoroughly disinfecting and sanitizing the entire cabin upon landing. Asiana Airlines have installed air circulation systems to ventilate the cabins every two to 3 min.

Prompted by such protocols and by interviews with Korean flight attendants, we developed a customized organizational-level of NPI (ONPI) for the airline industry, believing that this should provide a better understanding of whether flight attendants are aware of and follow organizational NPI guidelines diligently and whether it influences job satisfaction and performance.

2.4.3. Governmental level of NPI (GNPI)

The inclusion of a governmental component of NPI (GNPI) is
believed to be an important part of an airline NPI scale. For example, the South Korean government has advised all employees and travelers returning from overseas to choose either a certain day (e.g., 7 days or 14-days) leave of absence (LOA) or home-based telecommuting. To increase public awareness of COVID-19, the Korea Centers for Disease Control and Prevention Agency (KDCCA) has regularly published new infection numbers on television, websites, and mobile apps (UNDP, 2020). Through its cell broadcasting service, the government also provides emergency text messaging to millions of mobile users giving specific times and places of infection points (UNDP, 2020). Additionally, the KDCCA has drafted NPI guidelines specifically for airlines (CDC, 2021), which include wearing masks (both passengers and crews) beginning in the departure hall, prohibiting airport smoking zones, providing hygiene kits to arriving passengers and crews, encouraging passengers to use self-service kiosks for printing boarding passes, and bag tags, and providing COVID-19 diagnostic tests upon arrival. The government’s NPIs regulations have likely benefited aviation employees and passengers seeking to mitigate risk perceptions.

2.5. Job satisfaction

Job satisfaction has been defined as the positive emotional state derived from one’s occupation, and/or the comfortable, pleasant experience that someone might feel while working (Locke, 1976). Because many factors can affect job satisfaction, it is generally understood as a complex and often individualistic experience (Bakotic and Babic, 2013). Bakotic and Babic (2013) noted that job satisfaction can be a key factor affecting organizational behavior; that is, feelings about the company can lead to positive or negative behaviors depending on the level of job satisfaction. Lee et al. (2013) similarly found that employees who are satisfied with their work duties were more inclined to be client-oriented, which resulted in increases in customer satisfaction levels.

2.6. Customer orientation

Customer orientation has been defined as a “state-like variable regarding an employee’s attitude towards satisfying a customer and customer needs” (Mathe et al., 2016, p. 2). Companies that emphasize customer orientation typically place customers first to ensure that their needs are addressed. From the customer’s point of view, employees do not provide services only; they are part of the service product (Tajeddini, 2010). This suggests that customers want to feel valued and expect employees to provide high levels of customer service. While most service industries encourage employees to be customer-oriented, maintaining a qualitative service edge can considerably drain psychological energy and emotional resources.

2.7. Relationships among the perceived risk of disease, NPI, and job satisfaction

Generally, the perceived risks related to diseases are an individual’s perception of and concern about the probability of catching that disease (Kaptein et al., 2007). According to Rittichainuwat and Chakraborty (2009), tourists visiting remote areas can bring home unidentified bacteria when they return. There is evidence that tuberculosis, caused by the bacterium mycobacterium tuberculosis, is significantly more infectious on an aircraft than it is on the ground (Hocking and Foster, 2004). This is particularly relevant for an industry that provided an average of more than 100,000 flights and carried 12 million passengers each day prior to the coronavirus pandemic (ICAO, 2019). Since its inception, the aviation industry has doubled in size approximately every 15 years (ICAO, 2019), and may well double again in the next twenty years. Hence, there is a large potential for the quick spread of disease via airlines, increasing perceptions of risk for flight attendants.

Many health psychologists believe that those with higher risk perceptions are more likely to engage in health-protective behaviors (Pichon et al., 2010). Since flight attendants are at greater risk of catching influenza compared to many other working populations, their perceived risk might play a significant role in motivating them to engage in health-protective behaviors. Lee et al. (2012) argued that NPIs are the best risk-reduction methods for travelers during outbreaks. They further reported that when travelers perceived the 2009 H1N1 pandemic as dangerous, they were more likely to engage in personal NPIs such as washing hands and reducing facial touching. Thus, this study posits the following hypothesis:

H1a. Perception of COVID-19 is positively associated with individual NPI

Even though Lee et al.’s (2012) NPI measurement scale help researchers understand how travelers perceive pandemics and cope with them, most NPI tactics in their study applied only to leisure and business travelers with one type of NPI. Conclusive evidence for the most critical attributes (e.g., organizational/governmental NPI) remains understudied and researchers have not carefully investigated how people view pandemics and/or cope with organizational/governmental NPI guidelines. Given the rise in the number of air travelers and growing government expectations for hygienic airport environments (Park and Almanza, 2020), NPI research needs further investigation and an appropriate tool should be developed for flight crews who, along with their individual protective behaviors, follow airline and government guidelines. The present study, therefore, extends these to three types of NPI (i.e., individual-NPI, organizational-NPI, and governmental-NPI). We expect that extending individual, organizational, and governmental NPI will help to further the understanding of how flight attendants engage in NPIs during a pandemic. The present study, therefore, posits the following hypotheses:

H1b. Perception of COVID-19 is positively associated with organizational NPI

H1c. Perception of COVID-19 is positively associated with governmental NPI

H1d. Perception of COVID-19 is negatively associated with job satisfaction

2.8. Relationship between NPI and job satisfaction

For employees who work in safety-critical organizations (e.g., military, aviation, construction sites), unsafe and unhealthy working conditions present serious occupational stressors that can reduce job satisfaction while minimizing injuries (Nielsen et al., 2011). To protect workers, governments and companies provide protective equipment, draft safety protocols, and record incidents to improve safety measures (Nielsen et al., 2011; Wagner et al., 2013). In the construction literature, for example, Wagner et al. (2013) revealed that female construction workers who wear personal protective equipment at residential, commercial, heavy highways, or industrial construction sites had a noticeably higher level of job satisfaction. The present study, therefore, posits that flight attendants who practice self-hygiene (e.g., washing hands, wearing masks and glasses) at work may have a higher level of job satisfaction compared to those who do not. Thus, the present study...
proposes the following hypothesis:

**H2a.** Individual NPI is positively associated with job satisfaction

The Center for Disease Control (CDC, 2017) claimed that employees are more productive and satisfied with their work when supervisors provide appropriate NPI guidelines. Similarly Kang et al. (2021) revealed that tourism/hospitality employees are more satisfied when they believe that their organization cares about their safety and well-being. Furthermore, Nielsen et al. (2011) revealed that having a range of safety and health procedures can positively influence employee job satisfaction. It is likely, then, consistent with the above evidence, that flight attendants who follow self-protective behaviors based on organizational and governmental NPI guidelines are more likely to be satisfied with their work. Thus, the present study proposed the following hypotheses:

**H2b.** Organizational NPI is positively associated with job satisfaction

**H2c.** Governmental NPI is positively associated with job satisfaction

### 2.9. Relationship between job satisfaction and customer orientation

Research has consistently shown that job satisfaction can have a significant effect on customer-oriented behaviors (Hoffman and Ingram, 1992; Lee et al., 2013; Song et al., 2015). For instance, Lee et al. (2013) found that increased levels of job satisfaction among casino employees led to increased levels of customer orientation. This suggests that employees who are happy at work are motivated to provide their customers with higher levels of service. Similarly, Song et al. (2015) found a strong positive correlation between job satisfaction and customer orientation with Korean casino employees. Further, Hoffman and Ingram (1992) argued that feelings of work satisfaction are often linked to kindness-behaviors such as listening to and accepting customer concerns, opinions, and criticisms. Based on these findings, it is believed that flight attendants who are satisfied at work will improve their customer-oriented behaviors. Thus, the present study posits the following hypothesis:

**H3.** Job satisfaction is positively associated with customer orientation

Based on the literature and hypotheses above a research model is proposed as shown in **Fig. 2**.

### 3. Methods

#### 3.1. Measures

The present research adopted perception of influenza (H1N1) scale (4 items) and the NPI scale (5 items) from Lee et al. (2012), adjusting them appropriately and renaming the scales “perception of COVID-19” and “individual-NPI”. Because organizational or governmental NPI had not previously been operationalized, the present study established a new scale by adopting items from Park et al. (2020) and the Korean Airline (2020) guidelines. After consulting with an expert in tourism research (two university professors), 5 of the items were deemed to represent organizational NPI (see **Table 2**). The governmental NPI scale was similarly established with 5 items based on information from the Korea Centers for Disease Controls (KCDC, 2019, 2020). Moreover, job satisfaction was measured with 3 items adapted from Lee et al. (2013), and customer orientation with 3 items from Donavan et al. (2004). Overall, 25 survey items were evaluated on a 5-point Likert-type scale anchored by 1 (strongly disagree) and 5 (strongly agree). Respondents were also asked to give their gender, age, marital status, education level, airline company, job title, monthly income level, years of working experience, and changes in employment status during the COVID-19 pandemic.

Before data collection, measurement scales originally written in English were translated into Korean so that Korean flight attendants could more accurately understand them. Next, the items were reverse-translated into English so that they could be understood by English speakers. Two bilingual scholars fluent in both Korean and English cross-translated the items to ensure there were no mistranslations in either language. After the double-translation (reverse translation) process was confirmed, one native English speaker then checked the English survey. A pre-test was conducted by inviting eight panel-members (university professors and doctoral students) who specialized in tourism/hospitality research to check the survey’s validity. Panel members appropriately distinguished each construct, suggesting face-validity was confirmed. Also, survey structures and the flow of the survey were finessed.

![Conceptual model](https://via.placeholder.com/150)

### Table 1

| Characteristics       | N (371) | %    |
|-----------------------|---------|------|
| Gender                |         |      |
| Male                  | 34      | 9.2  |
| Female                | 337     | 90.8 |
| Age                   |         |      |
| 20–29 years old       | 52      | 14.0 |
| 30–39 years old       | 163     | 43.9 |
| 40–49 years old       | 136     | 36.7 |
| 50 years old or older | 20      | 5.4  |
| Marital status        |         |      |
| Single                | 144     | 38.8 |
| Married               | 227     | 61.2 |
| Education             |         |      |
| Two-year college      | 54      | 14.6 |
| University            | 261     | 70.4 |
| Graduate school       | 56      | 15.1 |
| Working years         |         |      |
| Less than 2 years     | 18      | 4.9  |
| 2–5 years             | 37      | 10.0 |
| 5–10 years            | 84      | 22.6 |
| 10–15 years           | 87      | 23.5 |
| 15–20 years           | 54      | 14.6 |
| Over 20 years         | 91      | 24.5 |

![Table 1](https://via.placeholder.com/150)

**Fig. 2.** Conceptual model.
received consent. A total of 403 participants visited the link and 371 Google Forms questionnaire to her fellow workers using snowball sampling via KakaoTalk after she explained the study. The researcher distributed the questionnaire by Google Forms. KakaoTalk is a popular mobile instant messaging application for smartphones in South Korea. The researchers linked the Google Forms questionnaire to respondents who could answer by clicking questions on their mobile phone. One of the study’s researchers works as a flight attendant. The researcher distributed the Google Forms questionnaire to her fellow workers using snowball sampling via KakaoTalk after she explained the study’s purpose and received consent. A total of 403 participants visited the link and 371 Korean flight attendants participated in the mobile survey with a response rate of 92%. The response rate was relatively high since we employed snowball sampling method which contacted colleagues and managers working in the airline industry. There were no missing responses since the Google survey questionnaire could not be completed unless the respondents answered all questions.

3.3. Data analysis

This study analyzed the data using SPSS 25.0 and AMOS 23.0. First, exploratory factor analysis (EFA) was implemented to extract underlying dimensions of NPI. Second, confirmatory factor analysis (CFA) was conducted to test the measurement model. Third, a structural equation model (SEM) was estimated to examine the underlying relationships among the constructs and test the hypotheses in the research model.

4. Results

4.1. Profile of the respondents

As shown in Table 1, the majority of the respondents were female (90.8%). To confirm that this sample was representative, a sampling bias check was conducted by comparing gender ratio with other research. In Chung and Jeon’s (2019) study, the average percentage of female Korean flight attendants was 86%, while Lee and Jun (2019) reported 98.2%. Given that the gender ratio was very similar with previous studies, it is believed the sample of the present study is representative of the population. Moreover, almost half (43.9%) were 30–39 years old, followed by 40–49 years old (36.7%) and 20–29 years old (14.0%). The majority of respondents were married (61.2%) and had a university education (70.4%). The respondents reported working for more than 20 years (24.5%), followed by 10–15 years (23.5%), 5–10 years (22.6%), and 15–20 years (14.6%).

4.2. Test of common method bias (CMB)

In this study, CMB was tested based on Harman’s one-factor test (Harman, 1967). If total variance extracted by one factor exceeds 50%, CMB is present (Podsakoff et al., 2003). The result of Harman’s one-factor test indicated that the total variance extracted by one factor was 29.01%, which is less than the recommended threshold of 50% (Podsakoff et al., 2003). Thus, CMB was deemed to not be a problem.

4.3. Exploratory factor analysis

First of all, this study implemented EFA for the construct validity of NPIs. Initially fifteen NPI items were factor analyzed using the principal component method with varimax rotation. However, communalities of 4 items were less than the criteria of 0.5 (Hair et al., 2010), and hence deleted (i.e., ‘I cover my mouth and nose with a tissue when sneezing’, ‘I avoid physical contact when I face passengers’, ‘I use hand sanitizers that are placed in public institutions’, ‘I check my body temperature before work’). Also, 2 items were deleted because of cross-loading (i.e., ‘I always wear a face-mask when I go out’ and ‘I check my body temperature before work’). The EFA was then re-run after excluding the 6 items of NPI. As shown in Table 2, EFA of NPIs were suitable based on KMO 0.75, Bartlett’s test of sphericity = 671.04 (p < .001) (Hair et al., 2010). Also, factor loadings were greater than 0.6, eigenvalues were greater than 1, and Cronbach’s alpha was greater than 0.6, exceeding their inherent criteria (Hair et al., 2010) along with total variance explained 66.24%. The result of EFA delineated NPI as three underlying dimensions which were labeled Individual NPI, Organizational NPI, and Governmental NPI.

Second, this study ran EFA to analyze the construct validity of perception of COVID-19, job satisfaction, and customer orientation. As shown in Table 2, EFA of these constructs were suitable based on KMO.

### Table 2

Results of exploratory factor analysis.

| Constructs                          | λ   | Mean | SD | EV  | VE  | α   |
|-------------------------------------|-----|------|----|-----|-----|-----|
| **Perception of COVID-19**          |     |      |    |     |     |     |
| COVID-19 is a very frightening      | 0.84| 4.68 | 0.03| 1.97| 65.64| 0.73|
| disease.                            |     |      |    |     |     |     |
| COVID-19 is more dangerous          | 0.83| 4.57 | 0.03|     |     |     |
| than SARS, avian flu, and           |     |      |    |     |     |     |
| H1N1.                               |     |      |    |     |     |     |
| I am afraid of COVID-19.            | 0.76| 4.33 | 0.04|     |     |     |
| KMO: .67, Bartlett’s Test of Sphericity: χ² – 548.99(p < .001), Total variance explained: 65.64% |     |      |    |     |     |     |
| **Individual NPI (INPI)**           |     |      |    |     |     |     |
| I do not touch my eyes, nose, or    | 0.78| 4.11 | 0.04| 1.73| 21.67| 0.62|
| mouth with unwashed hands.          |     |      |    |     |     |     |
| I wash my hands with soap for       | 0.75| 3.92 | 0.04|     |     |     |
| at least 30 s.                      |     |      |    |     |     |     |
| I frequently use hand sanitizer.    | 0.68| 3.95 | 0.05|     |     |     |
| **Organizational NPI (ONPI)**       |     |      |    |     |     |     |
| I always wear a mask, gloves,      | 0.86| 4.59 | 0.03| 1.98| 24.77| 0.73|
| goggles, and protective             |     |      |    |     |     |     |
| clothing at work.                   |     |      |    |     |     |     |
| I dispose of masks, gloves,         | 0.80| 4.59 | 0.03|     |     |     |
| and protective clothing used at work.| |      |    |     |     |     |
| I frequently change disposable      | 0.71| 4.42 | 0.03|     |     |     |
| gloves at work.                     |     |      |    |     |     |     |
| **Governmental NPI (GNPI)**         |     |      |    |     |     |     |
| I comply with the Korean government’s | 0.88| 4.53 | 0.03| 1.00| 11.97| 0.74|
| infection prevention guidelines.    |     |      |    |     |     |     |
| I strictly follow the directions of | 0.82| 4.50 | 0.03|     |     |     |
| the quarantine authorities.         |     |      |    |     |     |     |
| KMO: .75, Bartlett’s Test of Sphericity: χ² – 671.04(p < .001), Total variance explained: 66.24% |     |      |    |     |     |     |
| **Job satisfaction (JS)**           |     |      |    |     |     |     |
| I am satisfied with my work.        | 0.90| 4.02 | 0.03| 2.41| 80.46| 0.88|
| I feel my work is fun.              | 0.90| 3.93 | 0.03|     |     |     |
| I am satisfied with my current job. | 0.89| 3.99 | 0.04|     |     |     |
| KMO: .74, Bartlett’s Test of Sphericity: χ² – 579.60(p < .001), Total variance explained: 80.46% |     |      |    |     |     |     |
| **Customer orientation (CO)**       |     |      |    |     |     |     |
| I try to think from the customer’s | 0.84| 4.15 | 0.03| 2.16| 72.01| 0.81|
| point of view and provide services. |     |      |    |     |     |     |
| I try to understand what the        | 0.87| 4.11 | 0.03|     |     |     |
| customer wants.                     |     |      |    |     |     |     |
| I try to improve my work after I    | 0.84| 4.06 | 0.03|     |     |     |
| listen to the customer’s requests.  |     |      |    |     |     |     |
| KMO: .71, Bartlett’s Test of Sphericity: χ² – 359.27(p < .001), Total variance explained: 72.01% |     |      |    |     |     |     |

Notes: λ = factor loadings, M = mean (five-point Likert-type scale), SD = standard deviation, EV = eigenvalue, VE = variance explained, α = Cronbach’s alpha.

according to the panel’s suggestions. A total of 15 flight attendants were then asked to pilot-test the survey to help determine if the items were understandable. At this stage, face-validity was confirmed following minor changes in the vocabulary.

3.2. Data collection

Due to COVID-19, onsite surveys have been difficult to employ. Thus, this study employed a snowball sampling method using KakaoTalk based on Google Forms. KakaoTalk is a popular mobile instant messaging application for smartphones in South Korea. The researchers linked the Google Forms questionnaire to respondents who could answer by clicking questions on their mobile phone. One of the study’s researchers works as a flight attendant. The researcher distributed the Google Forms questionnaire to her fellow workers using snowball sampling via KakaoTalk after she explained the study’s purpose and received consent. A total of 403 participants visited the link and 371
variance explained 65.64 exceeding their inherent criteria (Hair et al., 2010) along with total 4.4. Measurement model

Notes. Measurement model fit:

Results of confirmative factor analysis. Regarding hypotheses testing, perception of COVID-19 was found to have a positive effect on individual NPI (PCOV INPI = 0.82, t = 5.40, p < .001), organizational NPI (PCOV ONPI = 0.66, t = 5.75, p < .001), and governmental NPI (PCOV GNPI = 0.84, t = 6.57, p < .001), supporting H1a, H1b, and H1c. Additionally, perception of COVID-19 (PCOV JS = −0.49, t = −1.97, p < .05) was found to be negatively affected by job satisfaction, thus supporting H1d. Further, job satisfaction was found to be positively affected by all three NPI: individual NPI (INPI JS = 0.32, t = 2.71, p < .01), organizational NPI (ONPI JS = 0.39, t = 3.05, p < .01), and governmental NPI (GNPI JS = 0.45, t = 3.78, p < .001), supporting H2a, H2b and H2c. It was noted that governmental NPI had the largest impact on job satisfaction, among the three NPI dimensions. Finally, job satisfaction was found to positively influence customer orientation (JS CO = 0.43, t = 7.85, p < .001), supporting H3.

5. Conclusion and implications

The primary purpose of this study was to: (1) formulate a new NPI measurement scale specifically for the airline industry, (2) determine the extent to which perception of COVID-19 influences flight attendants’ NPI, and (3) examine whether the three-types of NPI influence flight attendants’ job satisfaction and customer orientation. EFA identified eight NPI items which we classified into three domains: ‘individual NPI’, ‘organizational NPI’, and ‘governmental NPI’. Results revealed that the new edition of the NPI model for the airline industry was valid. The study’s results confirmed that perception of COVID-19 was a significant predictor of all three-types of NPI. Further, the three NPI domains were found to be significantly associated with job satisfaction which influence customer orientation. Based on these results, this study provides both theoretical and practical implications for the airline research and industry.

5.1. Theoretical implications

First, from a theoretical standpoint, the results of this study provide evidence that the developed scale can be an effective measurement tool for explaining how flight attendants engage in three types of NPIs during a global pandemic. Even though the original NPI model developed by Lee et al. (2012) received considerable attention from tourism scholars and practitioners, it proposed only a personal level of NPI. Thus, it is believed the present study contributes to airline studies by extending the NPI, and (3) examine whether the three-types of NPI influence flight attendants

Table 4
Correlations and discriminant validity.

|          | PCOV | INPI | ONPI | GNPI | JS  | CO  |
|----------|------|------|------|------|-----|-----|
| PCOV     | 0.65 | 0.41 | 0.35 | 0.37 | 0.42 |
| INPI     |      | 0.17 | 0.11 | 0.22 |     |
| ONPI     |      |      | 0.71 | 0.58 |     |
| GNPI     |      |      |      | 0.82 |     |
| JS       |      |      |      |      | 0.87 |
| CO       |      |      |      |      |      | 0.77 |

Note. Bold diagonal numbers are AVEs. Values in the parenthesis are squared correlation coefficients.

= 0.67–0.74, Bartlett’s test of sphericity = 359.27–579.60 (p < .001) (Hair et al., 2010). Also, factor loadings were greater than 0.6, eigenvalues were greater than 1, and Cronbach’s alpha was greater than 0.6,

Table 3
Results of confirmative factor analysis.

| Constructs and items | λ   | AVE | CR   |
|----------------------|-----|-----|------|
| Factor 1: Perception of COVID-19 | 0.67 | 0.65 | 0.84 |
| COVID-19 is a very frightening disease. | | | |
| COVID-19 is more dangerous than SARS, avian flu, H1N1. | 0.59 | | |
| I am afraid of COVID-19. | 0.70 | | |
| Factor 2: Individual NPI (INPI) | | | |
| I do not touch my eyes, nose, or mouth with unwashed hands. | 0.57 | 0.42 | 0.68 |
| I put my hands with soap for at least 30 s. | 0.60 | | |
| I frequently use hand sanitizer. | 0.61 | | |
| Factor 3: Organizational NPI (ONPI) | | | |
| I always wear a mask, gloves, goggles, and protective clothing at work. | 0.72 | 0.71 | 0.88 |
| I dispose of masks, gloves, and protective clothing used at work. | 0.80 | | |
| I frequently change disposable gloves at work. | 0.57 | | |
| Factor 4: Governmental NPI (GNPI) | | | |
| I comply with the Korean government’s infection prevention guidelines. | 0.82 | 0.82 | 0.90 |
| I strictly follow the directions of the quarantine authorities. | 0.72 | | |
| Factor 5: Job satisfaction (JS) | | | |
| I am satisfied with my job. | 0.90 | 0.87 | 0.95 |
| I feel my work is fun. | 0.95 | | |
| I am satisfied with my current job. | 0.77 | | |
| Factor 6: Customer orientation (CO) | | | |
| I try to think from the customer’s point of view and provide services. | 0.76 | 0.77 | 0.91 |
| I try to understand what the customer wants. | 0.79 | | |
| I try to improve my work after I listen to the customer’s requests. | 0.74 | | |

Notes. Measurement model fit: χ² = 110.57 (p < .05), df = 101, χ²/df = 1.10, GFI = 0.97, NFI = 0.95, TLI = 0.99, CFI = 1.00, and RMSEA = 0.02; AVE = average variance extracted, CR = composite reliability.

4.4. Measurement model

As shown in Table 3, the measurement model had an excellent fit to the data: χ² = 226.25 (p < .001), df = 108, χ²/df = 2.10, GFI = 0.93, NFI = 0.90, TLI = 0.93, CFI = 0.94, and RMSEA = 0.05, which are close to or exceeded the minimum criteria suggested by Hair et al. (2010).

Regarding hypotheses testing, perception of COVID-19 was found to have a positive effect on individual NPI (PCOV INPI = 0.82, t = 5.40, p < .001), organizational NPI (PCOV ONPI = 0.66, t = 5.75, p < .001), and governmental NPI (PCOV GNPI = 0.84, t = 6.57, p < .001), supporting H1a, H1b, and H1c. Additionally, perception of COVID-19 (PCOV JS = −0.49, t = −1.97, p < .05) was found to be negatively affected by job satisfaction, thus supporting H1d. Further, job satisfaction was found to be positively affected by all three NPI: individual NPI (INPI JS = 0.32, t = 2.71, p < .01), organizational NPI (ONPI JS = 0.39, t = 3.05, p < .01), and governmental NPI (GNPI JS = 0.45, t = 3.78, p < .001), supporting H2a, H2b and H2c. It was noted that governmental NPI had the largest impact on job satisfaction, among the three NPI dimensions. Finally, job satisfaction was found to positively influence customer orientation (JS CO = 0.43, t = 7.85, p < .001), supporting H3.

5. Conclusion and implications

The primary purpose of this study was to: (1) formulate a new NPI measurement scale specifically for the airline industry, (2) determine the extent to which perception of COVID-19 influences flight attendants’ NPI, and (3) examine whether the three types of NPI influence flight attendants’ job satisfaction and customer orientation. EFA identified eight NPI items which we classified into three domains: ‘individual NPI’, ‘organizational NPI’, and ‘governmental NPI’. Results revealed that the new edition of the NPI model for the airline industry was valid. The study’s results confirmed that perception of COVID-19 was a significant predictor of all three types of NPI. Further, the three NPI domains were found to be significantly associated with job satisfaction which influence customer orientation. Based on these results, this study provides both theoretical and practical implications for the airline research and industry.

5.1. Theoretical implications

First, from a theoretical standpoint, the results of this study provide evidence that the developed scale can be an effective measurement tool for explaining how flight attendants engage in three types of NPIs during a global pandemic. Even though the original NPI model developed by Lee et al. (2012) received considerable attention from tourism scholars and practitioners, it proposed only a personal level of NPI. Thus, it is believed the present study contributes to airline studies by extending NPI to three types of NPI that can be treated as a multi-dimensional construct: individual, organizational, and governmental NPI. It is believed that the proposed conceptual model provides a more structured and inclusive explanation of the roles NPIs play during pandemics, compared to previous studies (e.g., Chung et al., 2021; Lee et al., 2012).

Second, the findings of this study revealed that protection motivation theory better explains the behaviors of flight attendants during pandemics. The theory posits that people are more likely to use health-protective behaviors when they believe that a threat is real and clearly understood (Rogers, 1975). In recent tourism research, for example, Zheng et al. (2021) explored the relationship between travel fear and
self-protection among Chinese travelers. They found that passengers who fear traveling or feel threatened by COVID-19 were highly motivated to engage in protective activities (Zheng, 2021). Consistent with protection motivation theory (e.g., Rogers, 1975; Zheng et al., 2021), the current study found that flight attendants utilized health protective guidelines and followed all three-types of NPI procedures to reduce the risk of infection. This indicates that when flight attendants perceived COVID-19 as dangerous, they were more likely to engage in personal (e.g., washing hands), organizational (e.g., wearing personal protective equipment at work), and governmental NPIs (e.g., complying with the Korean government’s infection prevention guidelines). This suggests that the protection motivation theory can be applied to the airline crew in the context of COVID-19.

Third, the present study also contributes to the literature by shedding light on the relationship between perception of COVID-19 and job satisfaction. Because perception of COVID-19 has led to greater interest in airline research, several recent studies have focused on travelers perceptions of COVID-19 and how they impact travel intentions and willingness to fly (Elizabeth et al., 2021; Lamb et al., 2020; Li and Ito, 2021; Neuburger and Egger, 2020; Xu et al., 2021). Nevertheless, how employees (e.g., airline staff) perceive the recent pandemic and how their perceptions influence job satisfaction remains understudied. Therefore, it is believed to be important to investigate flight attendants’ perspectives on infectious disease since the perceived threat of COVID-19 can lead to reduced job satisfaction (Viehland et al., 2011; Xie et al., 2020). Consistent with previous studies, this study revealed that flight attendants with high-risk perceptions of COVID-19 had much lower job satisfaction. Thus, the current research model contributes to the air transport literature by identifying a significant relationship between perception of COVID-19 and job satisfaction.

Fourth, the present study contributes to the literature by shedding light on the role of the three levels of NPI on job satisfaction. Results revealed that individual/organizational/governmental NPIs are important antecedents for flight attendants’ job satisfaction. More specifically, governmental NPI had the strongest impact on airline crew’s job satisfaction, followed by organizational and individual NPIs. This finding suggests that governmental NPI plays an important role in satisfying their job by following strong safety measures from government in the COVID-19 pandemic. The three types of NPIs not only provide new insights for airline guidelines, but offer meaningful suggestions for flight attendants who want to become better acquainted with NPI and health protective strategies.

Finally, the study also confirms a significant relationship between job satisfaction and customer orientation, which corroborates the findings of previous studies (e.g., Hoffman and Ingram, 1992; Lee et al., 2013; Song et al., 2015). The present study revealed that those with higher job satisfaction also had greater customer orientation during COVID-19. Even though a substantial body of literature has examined

job satisfaction in airline crew (see, Chen, 2006; Kim and Back., 2012; Ng et al., 2011), few studies have examined the relationship between flight attendants’ job satisfaction and customer orientation. Thus, the present study is believed to have a meaningful theoretical implication for both academia and practitioners in the airline industry and provides a better understanding of how flight attendants’ job satisfaction links to customer orientation.

5.2. Practical implications

The study’s findings also have several managerial implications. The significant positive relationship between perception of COVID-19 and all three types of NPI suggests that companies should work to increase flight attendants’ awareness of the seriousness of influenza-type diseases and have comprehensive training to minimize the risk. Karanci et al. (2005) revealed that a disaster-awareness-training-program can be an effective strategy to raise risk perception. In their study, adults who participated in the risk-awareness-training program had higher threat perceptions and better preparedness behavior compared to non-participants (Karanci et al., 2005). This suggests the need for flight attendants to receive appropriate risk awareness training. Like doctors and nurses, pilots and flight attendants must also learn to identify symptoms of influenza-type diseases. Management could do this by providing documents and memos that alert aviation workers to new information regarding COVID-19. Moreover, weekly video meetings (e.g., Skype and Zoom) with health specialists and the provision of text-alerts about daily confirmed that new cases could help flight attendants to remain up-to-date and prepared to implement protocols related to NPIs.

A further practical implication of this study is the need for collaborative partnering with government and pandemic flu planners. As indicated in this study, governmental NPI were the most significant indicator leading to flight attendants’ job satisfaction. In other words, NPI guidelines, resources, and directions obtained from the government not only helped flight attendants to maximize safety, but also played an important role in increasing work satisfaction, which, in turn, bolstered their confidence when serving passengers (i.e., customer orientation). This implies that flight attendants have a high level of trust and reliance on governmental NPI. In this regard, organization and government related health officials should work together to provide a suitable NPI checklist, guidelines, and counseling programs to help overcome the difficulties that flight attendants presently confront. Additionally, hiring or inviting risk management specialists to educate flight attendants could enhance their job satisfaction during a pandemic.

Given that flight attendants’ job satisfaction was found to be positively correlated with customer orientation, management should look for additional ways to maintain their job satisfaction. Working in an environment where they need to wear facial masks, safety glasses, and gowns for long hours, has likely made it difficult for flight attendants to
perceive their jobs as satisfying. One way to assist with job satisfaction would be to have employees work fewer hours; allow ultra-long-haul flights to bypass busy international hubs (Bauer et al., 2020), and give them more rest time to aid in recovering from physical/emotional stresses caused by the pandemic. Management should also offer their flight attendants consistent testing of COVID-19 and provide them a “panic bubble”, “COVID-19-free-campus”, or “isolation zone” to which only aviation personnel have access. Controlling all aviation workers in a designated area and blocking unauthorized visitors could help flight attendants to feel safe.

5.3. Limitations and future research directions

Even though the present study provides several theoretical and practical implications for the airline industry, it is certainly not without limitations. Given that the sample consisted solely of South Korean flight attendants, it may be difficult to generalize the results to other airlines. Attendants of other ethnicities may have different perceptions of COVID-19 and use different NPI strategies. In particular, it is possible that respondents from Western cultures might find more utility in individual NPI than governmental or organizational NPIs. Hence, future investigations should include flight attendants from other ethnicities and conduct cross-cultural studies (eastern vs. western flight attendants). Moreover, the study’s proposed conceptual model examined the relationship between perception of COVID-19 and NPIs from the perspectives of flight attendants. It would be interesting and worthwhile to apply this conceptual model to other service industries. Lastly, future research is recommended to test alternative models such as reverse mediation which examines the indirect effect of job satisfaction on NPIs via perception of COVID-19. The findings of alternative models may provide better understanding of the pandemic and provide further implications in the airline industry.

CRediT authorship contribution statement

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Declaration of competing interest

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