

## Customers' behavioural immune system responses to pathogen cues at tourism and hospitality facilities during the COVID-19 pandemic

Arthur Huang<sup>1\*</sup>, Melissa Farboudi Jahromi<sup>2</sup> and Julia Marquez<sup>3</sup>

<sup>1</sup> Rosen College of Hospitality Management, University of Central Florida, Orlando, Florida 32819, USA. Email: [arthur.huang@ucf.edu](mailto:arthur.huang@ucf.edu)

<sup>2</sup> Rosen College of Hospitality Management, University of Central Florida, Orlando, Florida 32819, USA. Email: [Melissa.FarboudiJahromi@ucf.edu](mailto:Melissa.FarboudiJahromi@ucf.edu)

<sup>3</sup> Rosen College of Hospitality Management, University of Central Florida, Orlando, Florida 32819, USA. Email: [JuliaM09@knights.ucf.edu](mailto:JuliaM09@knights.ucf.edu)

\*Corresponding author

### Abstract

The COVID-19 pandemic has imposed various obstacles and restrictions for the tourism and hospitality industry. This paper adopts the concept of the behavioural immune system to discuss tourism and hospitality customers' potential behaviours during the pandemic and provide business strategies that can address these behaviours. The behavioural immune system is a motivational system that determines individuals' behaviours to pathogen infection. First, this study introduces the mechanism of the behavioural immune system including environmental evaluation and aversive perception, aversive emotional and cognitive responses, and avoidance behaviours. It also provides examples in the guest service context to better portray the mechanism. Second, the study suggests specific measures for tourism and hospitality businesses that may help them to prevent the aversive and avoidance responses of customers triggered by their behavioural immune system during the pandemic. Then, the study integrates customers' responses and businesses' measures in a framework, which extends the literature on customers' behaviour in the hospitality and tourism context. To the authors' knowledge, this is the first time the concept of behavioural immune system is adopted to discuss customers' behaviours towards tourism and hospitality services during a pandemic.

**Key words:** Customer behaviour, behavioural immune system, aversive behaviours, COVID-19 pandemic

**Citation:** Huang, A., Farboudi Jahromi, M. and Marquez, J. (2022). Customers' behavioural immune system responses to pathogen cues at tourism and hospitality facilities during the COVID-19 pandemic. *European Journal of Tourism Research* 30, 3015.



© 2022 The Author(s)

This work is licensed under the Creative Commons Attribution 4.0 International (CC BY 4.0). To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/>

## **Introduction**

The COVID-19 pandemic transformed the tourism and hospitality industry. Guests' behavioural changes during the pandemic require tourism and hospitality providers to modify their strategies and practices. Therefore, it is critical to understand guests' behavioural changes to support the vitality of tourism businesses amid and post COVID-19. This paper applies the concept of the behavioural immune system to describe guests' emotional, cognitive, and behavioural responses to pathogen cues at tourism and hospitality facilities during the COVID-19 pandemic. Insights gained from this paper inform the measures that tourism and hospitality service providers can adopt to prevent customers' aversive and avoidance responses during the pandemic.

The behavioural immune system is defined as a person's motivational system that triggers affective, cognitive, and behavioural responses to avoid pathogen infection (Ackerman et al., 2018; Schaller & Park, 2011). As infectious diseases are among the top threats for human survival, human beings develop a behavioural system that aims to minimize the infection risk and maximize their survival rate (Buck et al., 2018). Based on this system, whenever human beings are exposed to perceptual cues that indicate pathogen infection (pathogen cues), they show specific aversive emotional and cognitive responses that lead to avoidance behaviours (Schaller & Park, 2011). A greater understanding of these avoidance behaviours is instrumental for tourism and hospitality providers to improve guests' safety and satisfaction and curb disease transmission. To the authors' knowledge, this is the first time the behavioural immune system is used to discuss customers' behaviours towards tourism and hospitality services during a pandemic.

The notion of behavioural immune system provides a more complete picture of individuals' responses to pandemics than other relevant theories and models, such as the Theory of Planned Behaviour, Risk Perception Attitude Framework, and Health Belief Model, since it addresses the three aspects of emotion, cognition, and behaviour. The Theory of Planned Behaviour only focuses on volitional behaviours and hypothesizes that the individuals' behavioural intentions are explained by their attitudes, subjective norms, and perceived behavioural control (Ajzen, 1985). Thus, the theory overlooks the role of emotions and environmental (contextual) factors in human behaviour (Snihotta et al., 2014). The Risk Perception Attitude Framework also excludes emotions in explaining human behaviours towards risks since it posits that taking action to mitigate risks is a function of risk perception and efficacy beliefs (Rimal & Real, 2003). Similarly, the Health Belief Model (HBM) postulates that individuals' health-related behaviours are predicted by perceived susceptibility to and severity of disease and perceived benefits and barriers of health-related actions (Rosenstock, 1966). Thus, considering the shortcomings of mentioned theories and models, the current study adopts the notion of behavioural immune system to discuss behavioural responses during the COVID-19 pandemic.

This study first discusses the behavioural immune system mechanism and provides examples of each phase of the system activation. Next, it suggests specific measures that may help tourism and hospitality businesses to prevent customers' behavioural immune system aversive responses during the COVID-19 pandemic. Then, it develops a new conceptual framework that integrates customers' responses and businesses' measures during the pandemic. This paper further suggests promising research directions about quantifying the antecedents of customers' behavioural immune system responses in the tourism and hospitality context.

## **The behavioural immune system**

The behavioural immune system includes three activation phases: (1) environmental evaluation and aversive perception, (2) experience of aversive emotional and cognitive responses, and (3) emergence of avoidance behaviours (Culpepper et al., 2018; Schaller, 2006). They are described as follows.

### ***Environmental evaluation and aversive perception***

Environmental evaluation and aversive perception are the initial stages of the behavioural immune system activation. Individuals evaluate the environment to detect pathogen cues, which may be perceived through visual, olfactory, gustatory, or tactile senses (Tibur et al., 2014). Previous studies identified some extreme examples of visual pathogen cues, including feces, blood, vomit, and mucus (Lieberman et al., 2018). In terms of olfactory cues, a foul or pungent smell may indicate the presence of pathogens in the environment (Lieberman et al., 2018; Oum et al., 2011). Also, infected individuals' bodily odour, which is different from their regular odour, can be instinctively detected by healthy people (Cohut, 2018). Gustatory pathogen cues can be perceived when pathogens, such as bacteria, generate metabolites or other by-products in foods (Lieberman et al., 2018). Finally, tactile pathogen cues are typically perceived in moist, mushy, sticky, and/or slimy stimuli (Curtis & Biran, 2001; Lieberman et al., 2018; Oum et al., 2011).

Regarding the COVID-19 virus, less extreme cues may also be considered threatening due to its high transmission rates. For example, people's uncovered sneezes and coughs, feverish faces, shortness of breath, and non-sanitized hands, as well as dirty environments without proper social distancing layout and ventilation may be perceived as COVID-19 pathogen cues. Whenever customers detect and perceive any of these pathogen cues in tourism and hospitality facilities, their behavioural immune system becomes activated and triggers aversive emotional and cognitive responses (Schaller & Park, 2011).

### ***Activation of aversive emotional and cognitive responses***

#### ***Aversive emotional response: disgust***

The most common aversive emotional response to pathogen cues is disgust, defined as a feeling of strong dislike or disapproval aroused by an unpleasant object, situation, or person (Lexico by Oxford Dictionary, n.d.). Pathogen disgust is an affective state that motivates individuals to avoid pathogen threats in the environment (Culpepper et al., 2018). Previous studies categorized pathogen disgust stimuli into different domains. Haberkamp et al. (2017) identified six categories of pathogen disgust stimuli: food, animals, body products, injuries/infections, death, and hygiene. Examples of these categories are rotten vegetables/fruits, swarms of insects in a house, blood, bruises on hands/feet, dead animals, and dirty bathrooms, respectively. Haberkamp et al. (2017) assessed the disgust level associated with each category and showed that the food category had the highest disgust mean score. In another study, Culpepper et al. (2018) identified four major categories of pathogen disgust stimuli: hygiene issues, parasite/infection, food and environmental issues, and injury/viscera. Examples of hygiene issues are bad breath, bad body odour, hair in food, and dirty/unflushed toilets. Examples of parasite/infection include parasites/worms that grow in humans, intestinal parasites, skin diseases, and worms in the food. Some examples are mouldy food, rotten meat, and sour milk, while environmental issues examples are sewage, the smell of garbage, and stagnant water. Injury/viscera examples are dead bodies, open wounds, and human and animal entrails. According to Culpepper et al. (2018), parasite/infection and hygiene issues had the highest disgust mean scores, respectively. As these studies showed, the perception of pathogen cues triggers the aversive emotional response of disgust, which in return may result in aversive cognitive responses among individuals (Schaller & Park, 2011).

### *Aversive cognitive response: negative person-perception and judgement*

The affect-as-information hypothesis postulates that affects (e.g., emotions and moods) provide information about and assign value to judgement objects (Clore & Huntsinger, 2007). More specifically, when individuals are about to judge someone/something, they first refer to their feelings about it. If they have a positive feeling towards the subject/ object, they will make a positive judgement; if they have a negative feeling, their evaluation will be negative (Clore & Huntsinger, 2007). Regarding the negative state of disgust caused by the behavioural immune system, previous studies showed its influence on attitudes, moral judgements, stereotyping, and prejudice.

When individuals perceive pathogen cues in a person or environment and experience the emotional response of disgust, they form aversive attitudes towards that environment or person (Schaller & Park, 2011). A study on nurses revealed that perception of dirt in a patient or task activates the nurses' behavioural immune system and results in the experience of disgust and consequently aversive attitudes towards the patient or the task that seems dirty (Jackson & Griffiths, 2014). Occasionally, some cues are erroneously perceived as pathogenic, which leads to invalid judgements and stereotyping. For example, in a study on obese people, Park et al. (2007) showed that obesity is perceived as a pathogen cue in environments with a high risk of pathogen transmission. Thus, if individuals come into contact with obese people, their behavioural immune system will be activated and aversive emotions, attitudes, and judgements towards obese people will be formed. In another study, Duncan and Schaller (2009) showed that ageism is also perceived as a pathogen cue, and individuals who are vulnerable to pathogenic diseases or live at places with a high risk of pathogen transmission suppose that older adults are a threat to them and show aversive emotions and prejudicial attitudes towards them. The activation of the behavioural immune system may result in the stigmatization of individuals with anomalous appearance or characteristics (Schaller, 2011; Schaller & Park, 2011). During the COVID-19 pandemic, customers may stigmatize the employees/customers who show the signs of the disease (e.g., coughing) and the ones who seem non-normative to them (e.g., obese or old).

The activation of the behavioural immune system may also intensify judgements about moral violations. Previous literature showed that the experience of disgust through different means, such as smelling an unpleasant odour, working in a disgusting room, recalling a physically disgusting experience, and watching disgusting videos increase the probability and severity of aversive judgements about moral violations that contain physical or moral disgusts (Schnall et al., 2008; Ugazio et al., 2012). Disgust acts as a magnifier of judgements about transgressions (Ivan, 2015). Thus, customers may severely judge any facilities that commit transgressions and pose a risk to their health amid the COVID-19 pandemic. For example, during the pandemic, if a customer notices a hospitality facility doesn't provide hand sanitizers to its customers, he/she may assume that the facility doesn't follow the safety protocol and poses a risk to its customers' health, which may result in the feeling of disgust. The experience of disgust and negative attitude towards the facility may motivate the customer to call the health department and complain about the facility. In this situation, the lack of hand sanitizers is perceived as a transgression that should be penalized. In contrast, in a non-pandemic condition, the lack of sanitizers is not associated with any safety transgressions and the feeling of disgust.

### ***Emergence of behavioural avoidance responses***

Different studies supported the effect of pathogen cues and aversive emotional and cognitive responses of the immune system on behavioural responses. For example, Schaller et al. (2010) conducted an experiment in which a group of participants were shown photographs depicting symptoms of an infectious disease (pathogen cues) and then incubated with a model bacterial stimulus. This exposure led to a more aggressive response of their immune system compared to the control group of the study

that was not exposed to pathogen cues. In another study, Olsson et al. (2014) showed that individuals could differentiate healthy and sick people's body odour from each other and protect themselves by avoiding sick people. Other studies also supported behavioural avoidance from people who look or smell unhealthy (e.g., Regenbogen et al., 2017; Sundelin et al., 2015). After the outbreak of COVID-19, customers tend to pay greater attention to pathogen cues, particularly the ones related to a person's or environment hygiene, which may trigger aversive emotional and cognitive responses and, as a result, avoidance behaviour (Kavaliers & Choleris, 2018). During the pandemic, avoidance behaviours may emerge as the restriction of social interactions, conformity to norms, and reaction to transgressions.

#### *Restriction of social interactions*

The perception of pathogen cues compels individuals to avoid unfamiliar situations and people as they may be a source of contamination (Ackerman et al., 2018). Individuals tend to limit their contact with family members or close friends that are infected (Murray et al., 2013). In social interactions, individuals may avoid social gatherings or places where strangers are present even if they appear healthy. Also, individuals may show unpleasant behaviours, such as discrimination toward infected and anomalous-looking strangers (Ackerman et al., 2018; Schaller, 2011). At a more extreme level, avoidance behaviour may take the form of xenophobia and discrimination against foreign people. This avoidance behaviour is typically found in societies where pathogenic diseases are more prevalent (Schaller, 2011). In this context, people perceive that foreigners transfer exotic parasites to local communities or violate safety norms that protect the communities from infection. During the COVID-19 pandemic, all these avoidance behaviours may be found in tourism and hospitality consumers; for example, some customers may avoid facilities that operate at full capacity or do not have proper social distancing. Others may complain about employees/customers who have coronavirus symptoms or an odd appearance.

#### *Conformity to norms and reaction to transgressions*

The behavioural immune system shapes behaviours toward social and moral norms. When there is a disease threat, individuals are more likely to conform to norms (Ackerman et al., 2018). Social and moral norms typically provide a foundation for proper decision-making, and individuals tend to adopt them based on heuristic processing. Regarding pathogenic disease threats, these norms act as a buffer and prevent the spread of pathogens. Thus, individuals strive to conform to pathogen avoidance norms; however, their conformity behaviours are influenced by culture. Prior studies showed that collectivism is one of the major disease-controlling factors in geographical regions with high prevalence of pathogenic diseases. Collectivist behaviours in these regions show high levels of conformity to antipathogen norms, which facilitates the control and management of diseases. In contrast, individualistic behaviours may not function well in these regions since they increase the possibility of pathogen transmission (Fincher et al., 2008). Collectivistic societies emphasize the distinction between in-groups and out-groups; for example, if a non-local person wants to travel to or reside in a collectivistic society, local people may not accept him/her well and allow him/her to socialize with them easily. During the pandemic, this xenophobic behaviour makes managing pathogenic diseases simpler in collectivistic societies than individualistic ones that are more welcoming to strangers (Fincher et al., 2008).

In addition to conformity to pathogen avoidance norms, individuals tend to react adversely to norm violations (Murray & Schaller, 2012). As discussed earlier, the perception of pathogen cues and the experience of disgust intensify aversive judgements about transgressions, resulting in avoidance behaviours. These behaviours are more salient when the threat of pathogenic diseases is higher, or individuals are more vulnerable to them (Murray & Schaller, 2012). During the COVID-19 pandemic, if

customers of hospitality and tourism services perceive any transgressions by service providers, they may change the providers or complain about the transgressions.

### **Customers' behavioural immune system responses to pathogen cues in tourism and hospitality facilities**

During the COVID-19 pandemic, people's behavioural immune systems become activated easily when any pathogen cues are perceived. In the tourism context, pathogen cues can be perceived through the environment, staff, and other guests. Any visual, olfactory, gustatory, or tactile cues that indicate pathogen transmission and/or conformity violation activate the behavioural immune system in the service environment. For example, dust on a dining table, dirty plates or silverware, and lack of hand sanitizer stations in a restaurant are considered pathogen cues. Regarding the staff, sneezing, coughing, runny nose, untidy appearance, dirty clothes, bad body odour, and not wearing gloves and masks trigger guests' behavioural immune systems. Similar features in other guests may also appear threatening. In addition, anomalous-looking staff and guests may result in negative person-perception and judgement. With the activation of behavioural immune system, guests may experience disgust and aversive attitudes and thus show avoidance behavioural responses, such as leaving the tourism/hospitality facility where pathogen cues are perceived, on-site complaining to tourism/hospitality staff and managers, posting negative online reviews about the facility, spreading negative words of mouth about the facility, and formally complaining about the facility to authorities (e.g., department of health). Therefore, considering the behavioural immune system mechanism and the effect of pathogen cues on customers' emotion, cognition, and behaviour during the pandemic, it is proposed that:

*Proposition 1a: If customers perceive pathogen cues in a tourism/hospitality facility during the COVID-19 pandemic, they will show aversive emotional responses towards the facility.*

*Proposition 1b: If customers perceive pathogen cues in a tourism/hospitality facility during the COVID-19 pandemic, they will show aversive cognitive responses towards the facility.*

*Proposition 2a: If customers experience aversive emotional responses towards a tourism/hospitality facility during the COVID-19 pandemic, they will show avoidance behaviours towards the facility.*

*Proposition 2b: If customers experience aversive cognitive responses towards a tourism/hospitality facility during the COVID-19 pandemic, they will show avoidance behaviours towards the facility.*

Tourism and hospitality businesses should take the following measures to prevent customers' behavioural immune system responses during the COVID-19 pandemic.

### **Tourism and hospitality businesses' measures to prevent customers' behavioural immune system responses**

#### ***Visual safety cues***

Evolutionary studies state that human beings heavily rely on visual pathogen cues to avoid potential risk (Culpepper et al., 2018). Social, environmental, and ambient cues can significantly influence customers' perception and behavioural outcomes (Spielmann et al., 2012). According to the Signalling Theory, customers seek observable signs to provide insight on likely outcomes and attributes (Dunham, 2011). The theory is frequently used to strategize how businesses can minimize customer skepticism through visual signals (Dunham, 2011). This study uses the Signalling Theory to discuss servicescape elements that trigger customers' behavioural immune system responses to COVID-19 pathogen cues. Servicescape is a model that shows the importance of tangibles in the environment where the service process takes place (Booms & Bitner, 1981). Both exterior and interior tangible cues of the servicescape influence customers' perceptions (Reimer & Kuehn, 2005).

During pandemics, due to the activation of the behavioural immune system, tourists assess the likelihood of contracting diseases in facilities through a series of environmental observations. For example, they evaluate cleanliness visual cues and safety signals in restaurants by observing the exterior appearance, including the parking lot, building façade, and entrance doors, and the interior environment, including restrooms, dining area, dining tables, tableware, and the food (Barber & Scarcelli, 2010). The four factors that determine customers' perceived cleanliness in dining facilities are 1) premise and practices, 2) ambient scent, 3) staff and handling, and 4) food and location (Fatimah et al., 2011). These factors show that customers strongly associate food service hygiene with visual cues from the surrounding environment. Regarding accommodation facilities, the previous literature showed that unclean hotel conditions trigger customers' perceived risk, thus decreasing their interest in staying at or returning to a hotel (Choi, 2019). Cleanliness and safety cues impact customers' perceived quality and reputation as they associate the lack of cues with low quality and negative brand/store reputation (Mitchell & Harris, 2005).

Public health agencies and professional associations recommend the application of visual cues within the tourism and hospitality industry. During the COVID-19 pandemic, the Centers for Disease Control and Prevention (CDC) in the US provides in-depth re-opening plans for the tourism and hospitality sector, which include the implementation of visual cues like floor decals, coloured tapes, physical barriers, signage in high-traffic front-of-house and back-of-house areas (CDC, 2020). Sign placement in public areas acts as a reminder to practice social distancing and displays the proper way to wear a mask (American Hotel & Lodging Association, 2020). Physical barriers such as plexiglass, marking taps on the floor, and partitions are visible cues that demonstrate companies' actions to mitigate the risk of COVID-19 transmission (National Restaurant Association, 2020). Well-known tourism and hospitality brands implemented such visual cues to enhance safety measures. Marriott's Commitment to Cleanliness stated that the use of visual cues highlights the importance of wearing masks and gloves (Marriott, 2020). The Select Restaurant & Bar in Atlanta asked servers to change coloured gloves between each guest interaction to provide visual reassurance of proper COVID-19 practices (Severson, 2020). Popular theme parks also updated their online media to announce that they started to use social-distancing floor decals during the pandemic (SeaWorld, 2020; Universal Orlando, 2020; Walt Disney World, 2020). In addition to visual cues, tourism and hospitality facilities should consider other cues that positively influence customers' senses, such as a pleasant smell of an area and a pleasant taste of a dish.

### ***Safety protocols***

New safety protocols other than cleanliness and sanitization are needed amid COVID-19 to reduce the perception of pathogen cues. Density reduction and contactless technologies are the new safety measures that hospitality businesses can implement during the pandemic. Considering the behavioural immune system, when there is a high threat of pathogenic disease in an environment, individuals show aversive responses and avoid large or unfamiliar gatherings (Terrizzi Jr et al., 2013). Density reduction may help prevent behavioural immune system aversive behaviours since it requires individuals to maintain space with people who are not members of their immediate household (CDC, 2020). This notion was supported by a study on dining facilities, which showed that customers with a high perceived threat of coronavirus were more interested in restaurants with private rooms and private dining tables (Kim & Lee, 2020). During the pandemic, tourism and hospitality facilities tried to reduce capacity and adopt social distancing by assigning 6-foot space between their guests and providing more private experiences (Hong et al., 2020). For example, some restaurants used innovative social distancing measures, such as plexiglass shields, unique occupied table indicators, and plastic partitions, to reduce density (Liubchenkova, 2020). Large tourism destinations in the USA, such as Miami and New York,

also enforced lane closures to expand outdoor dining arrangements during state-mandated in-door dining closures.

The other safety protocol is the adoption of contactless technology, which helps limit personal contact. In the lodging industry, mobile applications can function as a front-desk agent or concierge. For example, the Four Seasons App, programmed in over 100 languages, allows guests to discover information before arrival, check-in/check-out, request room service, and schedule recreation activities (Four Seasons, 2020). Theme park apps help guests use virtual queues, place restaurant orders, purchase merchandise, monitor their accounts, and ask questions. In the foodservice industry, online orders and delivery through third parties, such as Doordash, exemplify the increased use of contactless technology. New research indicates that 64.71% of restaurant customers and 70.42% of hotel customers believe contactless technologies, such as keyless entry, QR code menu ordering, and virtual queues, are necessary to mitigate the risk of the COVID-19 transmission (Gursoy et al., 2020). The adoption of contactless technology enhances businesses' ability and agility to meet consumers' altered needs (Sengupta, 2020). However, companies should prioritize the usefulness and ease of using technologies as two major factors that motivate customers to adopt technologies (Davis, 1989).

### ***Transparent communication***

Corporate communication is a strategic approach to optimizing relationships with stakeholders, achieving company objectives, and coping with present and future external changes (Steyn, 2004). The COVID-19 pandemic fostered stress and uncertainty among industry stakeholders, particularly customers. To reduce uncertainty and maximize trust, industry leaders must make their communications transparent, consistent, credible, empathic, optimistic, and easily accessible (American Psychological Association, 2020). Also, communication messages should be devised according to the cultural norms of society. In the tourism and hospitality context, communication is fundamental to manage customers' perception of businesses' measures against the coronavirus spread. Previous research showed that rational and credible rhetoric appeals in corporate narratives during crises can help tourism and hospitality businesses position themselves as credible, responsible, and empathic entities (Im et al., 2021). Such appeals during the current pandemic send this message to customers' behavioural immune system that conformity to pathogen avoidance norms is implemented as an integral tactic. Businesses can use different technologies, including social media, to provide their narratives during the pandemic and keep their guests updated about their measures against the virus spread and ensure that safety is their priority. Also, transparent communication about safety rules shows businesses' expectations from customers; for example, dining facilities should communicate with customers about their in-door seating policy during the pandemic. Since some customers may believe that protecting public health is not their social responsibility, informing them about the rules and regulations is essential (Grout, 2015).

In the next step, businesses should collect and interpret customers' feedback as a fundamental attribute of business success (Fine et al., 2017). Due to the intangibility of tourism and hospitality services and the popularity of online media, e-WOM significantly impacts businesses' brand image and sales (Abubakar & Ilkan, 2016). Thus, businesses must capitalize on social media and review websites, such as TripAdvisor and Expedia, to identify customers' perceptions and expectations and adjust their strategies accordingly (Kapoor et al., 2013). Businesses' response to online reviews provides a means to communicate directly with customers and influence their satisfaction and intentional behaviours (Torres et al., 2014). After the current pandemic, review websites updated their main page to include pertinent COVID-19 updates and safety measures. Tourism and hospitality businesses may use these websites to communicate their current protocols and standards such as temporary closures, take-

out/delivery options, virtual options, enhanced sanitization, PPE, and social distancing to send safety signals to their customers and prevent behavioural immune system responses (TripAdvisor, 2020; Yelp, 2020). Businesses' websites are another communication tool. For example, cruise lines announced their new health protocols and partnerships with health experts on their websites (Carnival, 2020; Princess, 2020). Additionally, Airbnb, the vacation rental online marketplace, updated its website and added a section for hosts to list their actions to comply with Airbnb cleaning guidelines. Airbnb required hosts to communicate openly with guests regarding sanitization procedures and re-scheduling options through its website (Airbnb, 2020). Businesses' websites allow them to create a positive image and build trust with customers.

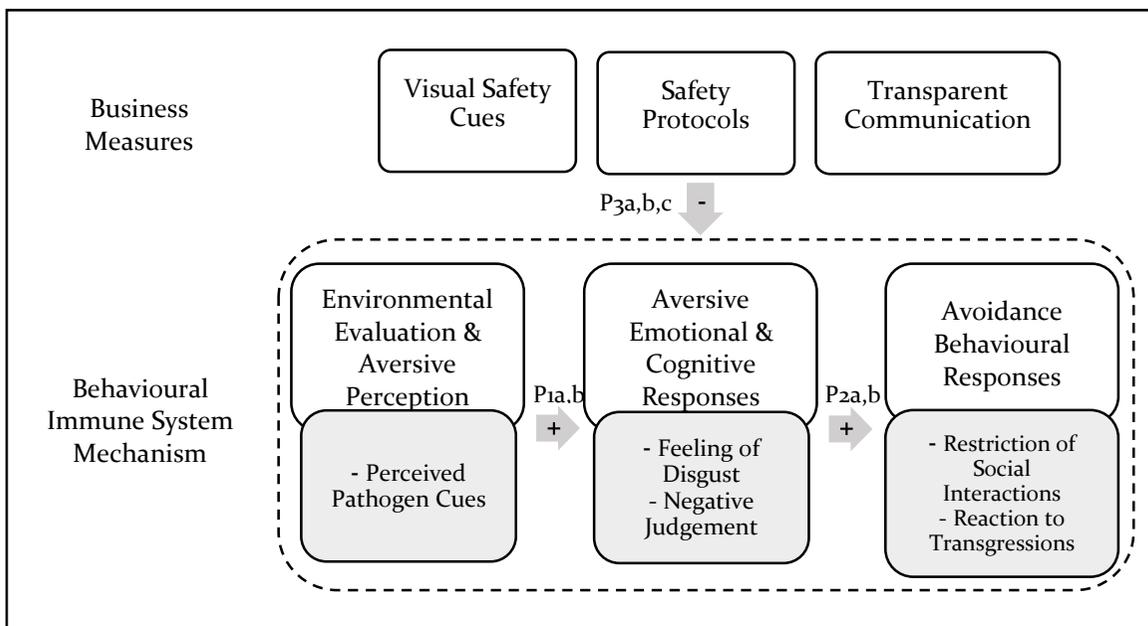
To sum up, all the measures mentioned above should be adopted to prevent customers' aversive emotional and cognitive responses and avoidance behaviours during the COVID-19 pandemic. Considering the preventive effect of these measures on the behavioural immune system activation, it is proposed that:

*Proposition 3a: If tourism/hospitality facilities use visual safety cues, they can prevent customers' behavioural immune system responses during the pandemic.*

*Proposition 3b: If tourism/hospitality facilities follow safety protocols, they can prevent customers' behavioural immune system responses during the pandemic.*

*Proposition 3c: If tourism/hospitality facilities develop transparent communications with customers, they can prevent customers' behavioural immune system responses during the pandemic.*

Based on this study's propositions, the following framework is developed to demonstrate the three activation phases of customers' behavioural immune system during the pandemic and businesses' measures to prevent its aversive and avoidance responses.



**Figure 1.** Tourism and Hospitality business measures to prevent customers' behavioural immune system responses during the COVID-19 pandemic

## **Conclusion and implications**

The COVID-19 pandemic presented unprecedented obstacles for the tourism and hospitality industry. Understanding customer behaviour during the pandemic is crucial to the industry's survival. Thus, this paper first discussed customers' behavioural immune system responses during the COVID-19 pandemic. Then, it suggested measures for tourism and hospitality businesses to prevent customers' aversive emotional, cognitive, and behavioural responses during the pandemic.

Theoretically, this paper expands the literature on the behavioural immune system by focusing on customer behaviour during the COVID-19 pandemic. Adopting the behavioural immune system concept during the COVID-19 pandemic is of particular theoretical significance since this pandemic poses a threat far beyond the other outbreaks' threats in terms of scope and duration (Kaushal & Srivastava, 2021). Considering the current pandemic situation, other health-related theories and models, such as Health Belief Model and Risk Perception Attitude Framework, that only focus on cognition cannot adequately portray customers' emotional, cognitive, and behavioural responses to the pandemic. Thus, the current study provides a more comprehensive explanation of customers' potential responses by elaborating on all the phases of behavioural immune system activation: perception of pathogen cues, feeling of disgust, experiencing negative attitudes, and showing avoidance behaviours. Additionally, the current paper contributes to the hospitality and tourism literature by focusing on customers' health-related behaviours and discussing business strategies that might prevent customers' behavioural immune system responses during the pandemic. Practically, the paper provides insights for tourism and hospitality businesses to accommodate their customers' needs during the pandemic. The findings suggest that the adoption of visual safety cues, implementation of safety protocols, and transparent communication with customers throughout the service processes can help tourism and hospitality businesses manage the crisis better.

## **Future research**

This paper provides a guideline for a promising future research field that may quantitatively address the antecedents of hospitality customers' behavioural immune system responses. For example, future quantitative studies may examine the propositions discussed in the framework (Figure 1) to determine whether the perception of the pathogen cues in hospitality facilities causes customers' feeling of disgust and negative attitudes towards the facilities and avoidance behaviours, such as on-site complaints, negative WOMS, and e-WOMS, or complaints to health authorities. In addition, future research can examine what pathogen cues trigger the behavioural immune system responses more than others. Furthermore, future studies can examine other factors, such as culture, that may influence customers' immune system emotional, cognitive, and behavioural responses. Moreover, future studies can examine the impact of adopting visual safety cues on the customers' perception of pathogen cues and aversive responses. Also, studies on the effect of customers' aversive responses on intentional behaviours, such as revisit intentions or complaining behaviours, may provide insightful findings. Regarding qualitative research, it is recommended that future studies further explore each stage of tourists' behavioural immune system mechanism, including environmental evaluation, emotional and cognitive responses, and aversive behaviours.

## **References**

- Abubakar, A. M., & Ilkan, M. (2016). Impact of online WOM on destination trust and intention to travel: A medical tourism perspective. *Journal of Destination Marketing & Management*, 5(3), 192-201. doi:10.1016/j.jdmm.2015.12.005.

- Ackerman, J. M., Hill, S. E., & Murray, D. R. (2018). The behavioural immune system: Current concerns and future directions. *The Journal of Analytical Psychology*, 12(2), 1-14. doi:<https://doi.org/10.1111/spc3.12371>
- Airbnb (2020). Extenuating Circumstances Policy and the coronavirus (COVID-19) - Airbnb Help Center. Retrieved September 22, 2020, from <https://www.airbnb.com/help/article/2701/extenuating-circumstances-policy-and-the-coronavirus-covid19>
- American Hotel & Lodging Association (2020). All Together Powerful. Retrieved October 2, 2020, from <https://www.ahla.com/>
- American Psychological Association (2020, March 20). How leaders can maximize trust and minimize stress during the COVID-19 pandemic. Retrieved September 12, 2020, from <https://www.apa.org/news/apa/2020/03/covid-19-leadership>
- Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In *Action control* (pp. 11-39). Springer, Berlin, Heidelberg.
- Barber, N., & Scarcelli, J. M. (2010). Enhancing the assessment of tangible service quality through the creation of a cleanliness measurement scale. *Managing Service Quality: An International Journal*, 20(1), 70-88. doi:[10.1108/09604521011011630](https://doi.org/10.1108/09604521011011630)
- Booms, B. H., & Bitner, M. J. (1981), Marketing strategies and organizational structures for service firms. In Donnelly, J.H. and George, W.R. (Eds), *Marketing of Services*, American Marketing Association, Chicago, IL., pp. 47-51.
- Buck, J. C., Weinstein, S. B., & Young, H. S. (2018). Ecological and evolutionary consequences of parasite avoidance. *Trends in Ecology & Evolution*, 33(8), 619-632.
- Carnival Cruise Line (2020). Health and Sailing Update. Retrieved September 28, 2020, from [https://www.carnival.com/health-and-sailing-updates?icid=default\\_butterbar\\_health](https://www.carnival.com/health-and-sailing-updates?icid=default_butterbar_health)
- Centers for Disease Control and Prevention (CDC). (2020, July 15). Social Distancing, Quarantine, and Isolation. Retrieved September 2, 2020, from <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html>
- Choi, J. (2019). Is Cleanliness Really a Reason for Consumers to Revisit a Hotel? *Journal of Environmental Health*, 82(5), 16+. [https://link.gale.com/apps/doc/A606675468/AONE?u=fcla\\_main&sid=AONE&xid=20f926a3](https://link.gale.com/apps/doc/A606675468/AONE?u=fcla_main&sid=AONE&xid=20f926a3)
- Clore, G. L., & Huntsinger, J. R. (2007). How emotions inform judgment and regulate thought. *Trends in Cognitive Sciences*, 11(9), 393-399.
- Cohut, M. (2018, September 24). *How the Smell of Disease Can Affect Healthy People?* MedicalNewsToday. <https://www.medicalnewstoday.com/articles/323151>
- Culpepper, P. D., Havlíček, J., Leongómez, J. D., & Roberts, S. C. (2018). Visually Activating Pathogen Disgust: A New Instrument for Studying the Behavioural Immune System. *Frontiers in Psychology*, 9 (1397). doi:[10.3389/fpsyg.2018.01397](https://doi.org/10.3389/fpsyg.2018.01397)
- Curtis, V., & Biran, A. (2001). Dirt, disgust, and disease: Is hygiene in our genes? *Perspectives in biology and medicine*, 44(1), 17-31.
- Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, (3), 319-340.
- Duncan, L. A., & Schaller, M. (2009). Prejudicial attitudes toward older adults may be exaggerated when people feel vulnerable to infectious disease: Evidence and implications. *Analyses of Social Issues and Public Policy*, 9(1), 97-115.
- Dunham B. (2011) The Role for Signaling Theory and Receiver Psychology in Marketing. In: Saad G. (eds) *Evolutionary Psychology in the Business Sciences*. Springer, Berlin, Heidelberg. [https://doi.org/10.1007/978-3-540-92784-6\\_9](https://doi.org/10.1007/978-3-540-92784-6_9)

- Fatimah, U. Z., Boo, H. C., Sambasivan, M., & Salleh, R. (2011). Foodservice hygiene factors — The consumer perspective. *International Journal of Hospitality Management*, 30(1), 38-45. doi: 10.1016/j.ijhm.2010.04.001
- Fincher, C. L., Thornhill, R., Murray, D. R., & Schaller, M. (2008). Pathogen prevalence predicts human cross-cultural variability in individualism/collectivism. *Proceedings of the Royal Society B: Biological Sciences*, 275(1640), 1279-1285.
- Fine, M. B., Gironde, J., & Petrescu, M. (2017). Prosumer motivations for electronic word-of-mouth communication behaviours. *Journal of Hospitality and Tourism Technology*, 8(2), 280-295.
- Four Seasons (2020). English. Retrieved September 24, 2020, from [https://www.fourseasons.com/?source=ppc\\_cx\\_google\\_acr\\_10170009342](https://www.fourseasons.com/?source=ppc_cx_google_acr_10170009342)
- Grout, A. (2015). 'To Spray or Not to Spray': Developing a Tourism-Linked Research Agenda for Aircraft Disinfection. *European Journal of Tourism Research*, 10, 35 - 50.
- Gursoy, D., & Chi, C. G. (2020). Effects of COVID-19 pandemic on hospitality industry: Review of the current situations and a research agenda. *Journal of Hospitality Marketing & Management*, 29(5), 527-529. doi:10.1080/19368623.2020.1788231
- Haberkamp, A., Glombiewski, J. A., Schmidt, F., & Barke, A. (2017). The Disgust-Related-Images (DIRTI) database: Validation of a novel standardized set of disgust pictures. *Behaviour research and therapy*, 89, 86-94.
- Hong, Y., Cai, G., Mo, Z., Gao, W., Xu, L., Jiang, Y., & Jiang, J. (2020). The Impact of COVID-19 on Tourist Satisfaction with B&B in Zhejiang, China: An Importance- Performance Analysis. *International Journal of Environmental Research and Public Health*, 17, 1-19. doi:10.3390/ijerph17103747
- Im, J., Kim, H., & Miao, L. (2021). CEO letters: Hospitality corporate narratives during the COVID-19 pandemic. *International Journal of Hospitality Management*, 92, 102701.
- Ivan, C. E. (2015). On Disgust and Moral Judgments: A Review. *Journal of European Psychology Students*, 6(1), pp.25-36. DOI: <http://doi.org/10.5334/jeps.cq>
- Jackson, C., & Griffiths, P. (2014). Dirt and disgust as key drivers in nurses' infection control behaviours: an interpretative, qualitative study. *Journal of Hospital Infection*, 87(2), 71-76.
- Kapoor, P. S., Jayasimha, K. R., & Sath, A. (2013). Brand-related, consumer to consumer, communication via social media. *IIM Kozhikode Society & Management Review*, 2(1), 43-59.
- Kaushal, V., & Srivastava, S. (2021). Hospitality and tourism industry amid COVID-19 pandemic: Perspectives on challenges and learnings from India. *International Journal of Hospitality Management*, 92, 102707.
- Kim, J., & Lee, J. C. (2020). Effects of COVID-19 on preferences for private dining facilities in restaurants. *Journal of Hospitality and Tourism Management*, 45, 67-70.
- Kavaliers, M. & Choleris, E. (2018). The role of social cognition in parasite and pathogen avoidance. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1751), 20170206.
- Lexico by Oxford Dictionary (n.d.). Disgust. <https://www.lexico.com/definition/disgust>
- Lieberman, D., Billingsley, J., & Patrick, C. (2018). Consumption, contact and copulation: how pathogens have shaped human psychological adaptations. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1751), 20170203. <https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2017.0203>
- Liubchenkova, N. (2020, July 24). In pictures: Restaurants find creative ways to enforce distancing. Retrieved August 20, 2020, from <https://www.euronews.com/2020/07/20/in-pictures-restaurants-find-creative-ways-to-enforce-social-distancing>
- Marriott (2020). Marriott Cleanliness Council: Marriott Bonvoy. Retrieved September 20, 2020, from <https://clean.marriott.com/>

- Mitchell, V., & Harris, G. (2005). The importance of consumers' perceived risk in retail strategy. *European Journal of Marketing*, 39(7/8), 821-837. doi:10.1108/03090560510601789
- Murray, D. R., Jones, D. N., & Schaller, M. (2013). Perceived threat of infectious disease and its implications for sexual attitudes. *Personality and Individual Differences*, 54(1), 103-108.
- Murray, D. R., & Schaller, M. (2012). Threat(s) and conformity deconstructed: Perceived threat of infectious disease and its implications for conformist attitudes and behaviour. *European Journal of Social Psychology*, 42(2), 180-188.
- National Restaurant Association (2020). Coronavirus Information and Resources. Retrieved September 22, 2020, from <https://restaurant.org/home>
- Olsson, M. J., Lundström, J. N., Kimball, B. A., Gordon, A. R., Karshikoff, B., Hosseini, N., ... & Axelsson, J. (2014). The scent of disease: human body odour contains an early chemosensory cue of sickness. *Psychological science*, 25(3), 817-823.
- Oum, R. E., Lieberman, D., & Aylward, A. (2011). A feel for disgust: tactile cues to pathogen presence. *Cognition and Emotion*, 25(4), 717-725.
- Park, J. H., Schaller, M., & Crandall, C. S. (2007). Pathogen-avoidance mechanisms and the stigmatization of obese people. *Evolution and Human Behaviour*, 28(6), 410-414.
- Princess (2020, September 15). Princess Cruises: CruiseHealth™ – Cruise with Confidence. Retrieved October 1, 2020, from <https://www.princess.com/plan/cruise-with-confidence/cruise-health/>
- Regenbogen, C., Axelsson, J., Lasselin, J., Porada, D. K., Sundelin, T., Peter, M. G., ... & Olsson, M. J. (2017). Behavioural and neural correlates to multisensory detection of sick humans. *Proceedings of the National Academy of Sciences*, 114(24), 6400-6405.
- Reimer, A., & Kuehn, R. (2005). The impact of servicescape on quality perception. *European Journal of Marketing*, 39(7/8), 785-808. doi:10.1108/03090560510601761
- Rimal, R. N., & Real, K. (2003). Perceived risk and efficacy beliefs as motivators of change: Use of the risk perception attitude (RPA) framework to understand health behaviours. *Human Communication Research*, 29(3), 370-399.
- Rosenstock, I. M. (1966). Why people use health services. *Milbank Memorial Fund Quarterly*, 44, 94-124.
- SeaWorld (2020). Health & Safety Commitments. Retrieved October 5, 2020, from <https://seaworld.com/orlando/park-info/park-safety/>
- Schaller, M. (2006). Parasites, behavioural defences, and the social psychological mechanisms through which cultures are evoked. *Psychological Inquiry*, 17, 96-101.
- Schaller, M. (2011). The behavioural immune system and the psychology of human sociality. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366(1583), 3418-3426. doi:10.1098/rstb.2011.0029
- Schaller, M., Miller, G. E., Gervais, W. M., Yager, S., & Chen, E. (2010). Mere visual perception of other people's disease symptoms facilitates a more aggressive immune response. *Psychological Science*, 21(5), 649-652.
- Schaller, M., & Park, J. H. (2011). The behavioural immune system (and why it matters). *Current Directions in Psychological Science*, 20(2), 99-103.
- Schnall, S., Haidt, J., Clore, G. L., & Jordan, A. H. (2008). Disgust as embodied moral judgment. *Personality and Social Psychology Bulletin*, 34(8), 1096-1109.
- Sengupta, K. (2020). Post-epidemic factors influencing customer intent of booking a hotel: An empirical study. 10.13140/RG.2.2.31249.25442/4.
- Severson, K. (2020, May 18). The New Face of Restaurant Hospitality Wears a Mask. Retrieved September 1, 2020, from <https://www.nytimes.com/2020/05/18/dining/restaurants-masks-coronavirus.html?auth=login-googleitap>

- Spielmann, N., Laroche, M., & Borges, A. (2012). How service seasons the experience: Measuring hospitality servicescapes. *International Journal of Hospitality Management*, 31(2), 360-368. doi: 10.1016/j.ijhm.2011.06.001
- Sniehotta, F. F., Pousseau, J., & Araújo-Soares, V. (2014). Time to retire the theory of planned behaviour. *Health psychology Review*, 8(1), 1-7.
- Steyn, B. (2004). From strategy to corporate communication strategy: A conceptualisation. *Journal of Communication Management*, 8(2), 168-183.
- Sundelin, T., Karshikoff, B., Axelsson, E., Höglund, C. O., Lekander, M., & Axelsson, J. (2015). Sick man walking: Perception of health status from body motion. *Brain, Behaviour, and Immunity*, 48, 53-56. doi:10.1088/13632540410807637
- Terrizzi Jr, J. A., Shook, N. J., & McDaniel, M. A. (2013). The behavioural immune system and social conservatism: A meta-analysis. *Evolution and Human Behaviour*, 34(2), 99-108.
- Torres, E. N., Adler, H., & Behnke, C. (2014). Stars, diamonds, and other shiny things: The use of expert and consumer feedback in the hotel industry. *Journal of Hospitality and Tourism Management*, 21, 34-43.
- Tripadvisor (2020, August 06). COVID-19: Travel Alerts and Info. Retrieved September 27, 2020, from [https://www.tripadvisor.com/Articles-l297-COVID\\_2019.html](https://www.tripadvisor.com/Articles-l297-COVID_2019.html)
- Tibur, J. M., Frankenhuys, W. E., & Pollet, T. V. (2014). Behavioural immune system methods: Surveying the present to shape the future. *Evolutionary Behavioural Sciences*, 8(4), 274-283.
- Ugazio, G., Lamm, C., & Singer, T. (2012). The role of emotions for moral judgments depends on the type of emotion and moral scenario. *Emotion*, 12(3), 579-590.
- Universal Orlando (2020). New Safety Guidelines. Same Fun. Retrieved September 18, 2020, from <https://www.universalorlando.com/web/en/us/plan-your-visit/safety-faqs>
- Walt Disney World (2020). Returning to a World of Magic. Retrieved September 15, 2020, from <https://disneyworld.disney.go.com/experience-updates/>
- Yelp (2020). How can I update my Yelp business page if my business is affected by the coronavirus (COVID-19)? Retrieved September 18, 2020, from [https://www.yelp-support.com/article/How-can-I-update-my-Yelp-business-page-if-my-business-is-affected-by-the-coronavirus-COVID-19?l=en\\_US](https://www.yelp-support.com/article/How-can-I-update-my-Yelp-business-page-if-my-business-is-affected-by-the-coronavirus-COVID-19?l=en_US)

Received: 27/02/2021

Accepted: 28/05/2021

Coordinating editor: Giacomo Del Chiappa