

# Perceived COVID-19 impacts and travel avoidance: application of protection motivation theory

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## Abstract

**Purpose** – The COVID-19 pandemic and the travellers' behaviour towards travel risk is an emerging issue. Nonetheless, the travellers' perceived COVID-19 impacts, travel risk perception, health and safety perception and travel avoidance concerning protection motivation theory is unnoticed. Following the protection motivation theory, the current study investigates the direct and indirect relationships between perceived COVID-19 impacts and travel avoidance. Moreover, the travellers' cognitive perceptions of risk may vary with their demographic characteristics; therefore, the present study aims to test the differences in group-specific parameter estimates using a multi-group analysis.

**Design/methodology/approach** – The authors approached travellers from Tianjin, China using different communication services, including WeChat and email, through a snowball sampling technique. The study used 553 valid questionnaires for analysis.

**Findings** – The results of 553 questionnaires in structural equation modelling (SEM) with AMOS 21 indicated that travellers' perceived Covid-19 impacts positively correlate with travel avoidance. The study model based on protection motivation theory specifies that travel risk perception and health and safety perception as a cognitive mediating process partially mediated the relationship between perceived COVID-19 impacts and travel avoidance. The findings specified that during COVID-19, travellers assessed the severity of travel risks and adopted preventive measures which influenced their travel behaviour and led to travel avoidance. The multi-group analysis results indicated no difference in perception for gender and education; however, concerning age, the significant nested p-value specifies a difference in perception.

**Practical implications** – The study offers implications for policymakers and the tourism industry to understand the travellers' perceptions of travel during the pandemic and ensure health and safety measures to encourage travelling and reviving the tourism industry.

**Originality/value** – The application of protection motivation theory to analyse the travellers' perceived COVID-19 impacts and travel avoidance in the presence of travel risk perception and health and safety perceptions as a cognitive mediating process is novel.

**Keywords** COVID-19, Pandemic, Travel risk perception, Travel avoidance, Protection motivation theory

**Paper type** Research paper

## 摘要

Covid-19影响感知和旅行避免：保护动机理论的应用

研究目的：COVID-19大流行下的旅行风险问题日益重要。目前，有关旅游者COVID-19影响感知、旅行风险感知以及健康安全感知与避免旅行之间关系的问题尚未引起学者广泛关注。基于保护动机理论，本文对COVID-19影响感知与避免旅行之间的直接关系和间接关系进行深入研究。鉴于旅游者旅行风险认知因其人口特征而异，本文采纳多组分析来检验群体间特定参数估计差异。

研究方法：采用滚雪球抽样方法在中国天津利用微信和电子邮件共收集了553份有效问卷。

研究结果：结构方程模型分析结果显示，旅游者Covid-19影响感知与避免旅行之间呈正相关关系。基于保护动机理论的研究模型表明，旅行风险感知和健康安全感知作为认知中间过程，在COVID-19影响感知与避免旅行之间起到部分中介作用。这说明在COVID-19期间，旅游者首先评估旅行风险等级并采取预防措施，而这将影响他们的旅行行为，甚至导致放弃旅行。此外，多组分析结果表明，Covid-19影响感知在性别和教育程度上并不存在显著差异，但在年龄上差异显著。

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实践启示：研究对于政策制定者和旅游业界理解旅游者在疫情期间对旅行的看法以及采取健康和安全措施鼓励游客出游进而实现旅游业复苏具有重要启示。

研究贡献：基于保护动机理论，引入旅行风险感知和健康安全感知作为中介变量来分析旅游者 Covid-19 影响感知对避免旅行的影响是本研究的重要创新点。此外，本研究通过检验 Covid-19 影响感知在受访者人口学特征上的差异也对现有研究具有一定理论贡献。

关键词：2019 冠状病毒病 大流行 旅行风险感知 避免旅行 保护动机理论

纸张类型：研究论文

## Resumen

*Impactos percibidos del COVID-19 y la evitación del viaje: Una aplicación de la teoría de la motivación de protección*

**Objetivo :** La pandemia de COVID-19 y el comportamiento de los viajeros hacia el riesgo del viaje es un asunto emergente. No obstante, los impactos percibidos de COVID-19 por los viajeros, la percepción del riesgo de viaje, la percepción de salud y seguridad, así como la evitación de viajes con respecto a la teoría de la motivación de protección es desapercibida. Por lo tanto, el estudio actual basado en la teoría de la motivación de protección investiga las relaciones directas e indirectas entre los impactos percibidos del COVID-19 y la evitación del viaje. Las percepciones cognitivas del riesgo de los individuos varían con sus características demográficas; por lo tanto, el estudio actual que utiliza un análisis de multigrupo prueba las diferencias en las estimaciones de los parámetros de grupo específico.

**Metodología :** Nos acercamos a los viajeros de Tianjin, China, utilizando diferentes servicios de comunicación, incluidos WeChat y email, a través de una técnica de muestreo de bola de nieve. El estudio utilizó 553 cuestionarios válidos para el análisis.

**Hallazgos :** Los resultados empíricos de los 533 cuestionarios en los modelos de ecuaciones estructurales (MES) indican que los impactos percibidos de Covid-19 se correlacionan positivamente con la evitación del viaje. El resultado implica que los encuestados primero evalúan los riesgos y luego toman las decisiones de viajar; por consiguiente, los hallazgos apoyaron la teoría de la motivación de protección. Los hallazgos también mostraron que la percepción del riesgo de viaje y la percepción de salud y seguridad median entre los impactos percibidos de Covid-19 y la evitación de viajes. Además, los resultados del análisis de multigrupo indican que para el género y la educación, no existe una diferencia; sin embargo, en cuanto a la edad, existe una diferencia significativa en la percepción.

**Implicaciones prácticas :** Las implicaciones del estudio son importantes para que los legisladores y la industria del turismo comprendan la percepción de los viajeros durante la pandemia y garanticen las medidas de salud y seguridad para animar a viajar.

**Originalidad :** La aplicación de la teoría de la motivación de protección para analizar los impactos percibidos de COVID-19 por los viajeros y la evitación del viaje en la presencia de la percepción de riesgo de viaje y la percepción de salud y seguridad como variables mediadoras es novedosa. También, el estudio actual contribuye a la literatura a través de probar el modelo teórico sobre las características demográficas de los encuestados.

**Palabras claves :** COVID-19, Pandemia, Percepción del riesgo de viaje, Evitación de viajes, Teoría de la motivación de protección

**Tipo de artículo :** Artículo de investigación

## Introduction

The COVID-19 pandemic proves that contagious diseases know no borders. On the 11 of March 2020, based on the severity of outbreaks in 114 countries, the World Health Organisation declared the novel coronavirus outbreak as a pandemic (World Health Organization, 2020a). The tourism industry is vulnerable to crisis events, pandemics, epidemics and health and safety risks discourage tourists and negatively affect tourism (Page *et al.*, 2012). The health-related concerns, including Ebola (Kongoley-Mih, 2014), MERS (Joo *et al.*, 2019), bed bug (Liu and Pennington-Gray, 2015), swine flu, Severe acute respiratory syndrome (SARS) and bird flu (Pine and McKercher, 2004; Wilder-Smith, 2006) exerted negative pressure on tourism demand (Breitsohl and Garrod, 2016). During the SARS outbreak, China, Hong Kong, Singapore and Vietnam lost almost three million tourism-related jobs and US\$20bn in GDP (Kuo *et al.*, 2008). Similarly, in 2020, the COVID-19 pandemic caused a sharp decline in international tourism and losses of almost \$910bn to \$1.2 trillion in revenue (UNWTO, 2020).

Previous studies acknowledged that crises and contagious diseases are unprecedented threats to the tourism industry that affect the tourists' travel behaviour (Uğur and Akbiyik, 2020) and deteriorate international tourism (Chen et al., 2020). Globally, the debate on the effects of the COVID-19 outbreak received much attention. Specifically, the existing literature focused on the tangible effects of COVID-19 on the tourism and hospitality industry and economic losses (Yu et al., 2021). However, the intangible effects of COVID-19 on the respondents' cognitive perceptions of travel avoidance received less attention. In addition, recently, scholars analysed tourists (Abraham et al., 2020) and residents' perceptions (Wen et al., 2020) about travel risks from different prospects. Scholars extensively applied the theory of planned behaviour to assess the individuals' behavioural intentions and cognitive decision-making intentions. However, they overlooked the application of protection motivation theory (PMT) concerning the COVID-19 pandemic. Therefore, following the PMT, the present research investigates the relationship between perceived COVID-19 impacts and travel avoidance (TA) in the presence of travel risk perception (TRP) and health and safety perceptions (HSP) as cognitive mediating processes.

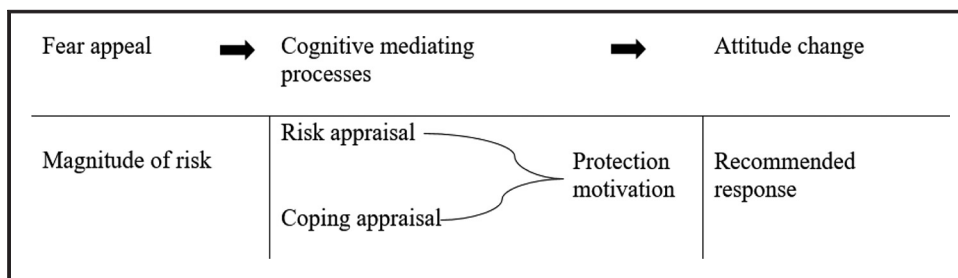
The current study bridges the research gap and contributes to protection motivation theory and existing literature in many ways. First, based on PMT, the study examined the relationships between perceived COVID-19 impacts and TA in the presence of TRP and HSP as a cognitive mediating process. Second, the present study advances a deeper understanding of these relationships to understand the travellers' perceptions of travel during the COVID-19 pandemic and suggests policies to revive the tourism industry. Third, it tests the multi-group analysis to check if perceived COVID-19 impacts and travel avoidance perception may differ concerning demographic characteristics.

## Literature review

### Protection motivation theory

PMT is an individual's risk assessment model; it describes how individuals cognitively perceive or assess any risk, which threatens their lives and how they adopt self-protective behaviours or measures (Rogers, 1975). Figure 1 shows the PMT model has three sections: fear appeal, cognitive mediating processes and attitude change. The fear appeal emphasises on the negative effects of a specific thing to motivate individuals to behavioural change. The cognitive mediating processes has two distinctive cognitive processes, i) risk appraisal and ii) risk coping appraisal. In the risk appraisal, individuals evaluate the threat's severity and assess their chance of suffering from that threat. It specifies that the individuals' perception of the severity of threat influences their behaviour cognitively. In the risk coping appraisal, individuals' through three cognitive processes, including response efficacy, self-efficacy and response-cost, adopt preventive measures that eliminate or minimise the occurrence of threat and build the confidence in their capacity to follow preventive measures. Therefore, risk and coping appraisals as mediators influence the

**Figure 1** Rogers' (1975) PMT model



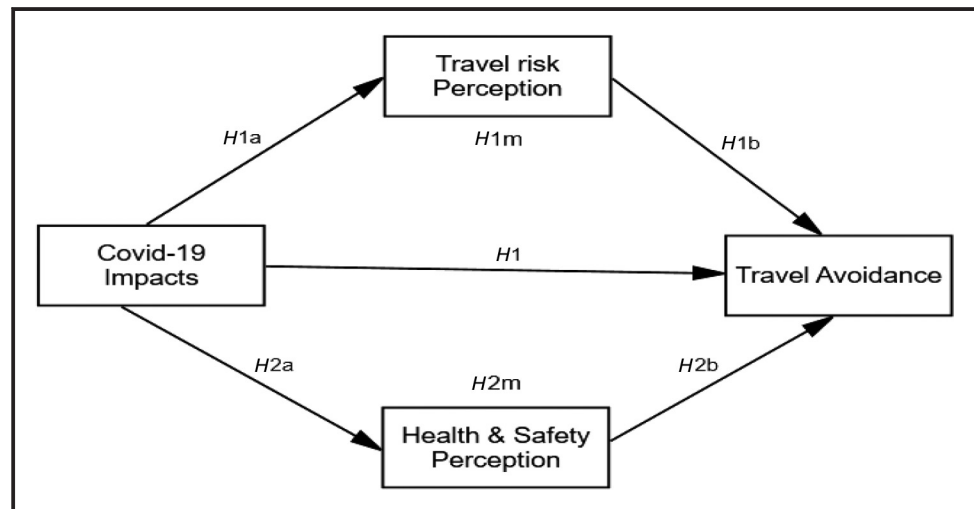
relationship between risk information and protective behaviour. The previous studies related to risk and crises widely applied PMT to evaluate the individuals' perception of risk (Lu and Wei, 2019). However, the application of PMT concerning the COVID-19 pandemic and the travellers' travel avoidance is novel.

Following the application of PMT concerning the COVID-19 pandemic and travel avoidance, risk appraisal states that individuals are at a higher chance of catching COVID-19 during the pandemic. Therefore, in the risk appraisal, individuals evaluate the severity of the travel risk and assess the possibility of suffering from COVID-19. In the risk coping appraisal, the individuals used three cognitive processes to adopt preventive measures that reduce the chance of catching COVID-19. First, through response efficacy, individuals perceive to avoid health and safety risks. Second, through self-efficacy, individuals perceive that they can successfully prevent health risks. Third, response-cost refers to spending more resources to avoid COVID-19. Therefore, the individuals' perceptions of risk appraisal and risk coping measures lead to their travel avoidance behaviour. The proposed conceptual PMT model for perceived Covid-19 impacts and travel avoidance is shown in Figure 2.

### The COVID-19 pandemic and tourism

Since 1950, tourism has become a rapidly growing industry globally, wherein the tourism influx contributed almost US\$1.7tn to revenue (UNWTO, 2019). Among countries, China has remarkably contributed to the global tourism industry. In the past 15 years (2003–2018), China's outbound tourists increased from 11 million to almost 87 million (Asian Development Bank, 2020). In 2020, three billion people were likely to travel during the Chinese spring festival. Nearly 440 million tourists by rail, about 45 million by sea, around 79 million by air and nearly 2.4 billion by automobile were likely to travel (CGTN, 2020). However, with the outbreak of COVID-19, the tourism industry is facing challenges. On 24 January 2020, due to the COVID-19 outbreak, China imposed travel bans (Chinadaily, 2020), which caused a sharp decline in tourism supply and demand. Until 7 February 2020, 72 countries have implemented travel bans (World Health Organization, 2020b). Travel and contagious diseases are directly linked; therefore, travel restrictions play a significant role in efficiently reducing the spread of contagious diseases (Camitz and Liljeros, 2006). However, it negatively affected the global travel and tourism industry, trade and GDP (Mariolis et al., 2020). The pandemic forced the airline industry to cancel flights, which led to a sharp decline in bookings and unpaid staff leave created unemployment (Staton and Provan, 2020).

**Figure 2** The proposed conceptual PMT model for perceived Covid-19 impacts



### ***Perceived COVID-19 impacts, travel risk perception and travel avoidance***

The COVID-19 is not the first coronavirus outbreak that led to travel and tourism uncertainties and negatively affected the global economy. Previous coronavirus diseases increased travel risks and negatively influenced the tourists' travel intention to affected regions (Pine and Mc Kercher, 2004). Perceived risk is an individual's cognitive evaluation of the severity of risk (Li *et al.*, 2021b), whilst severity indicators of risk indicated their concern for severe conditions (Brewer and Fazekas, 2007). Therefore, studies acknowledged that perceived risk significantly influences travel avoidance (Cahyanto *et al.*, 2016). Scholarly studies recognised the most critical role of travel risk perceptions in discouraging travel decisions (Kozak *et al.*, 2007). The travel risk perceptions influenced the tourists' travel decisions and destination choices; destination image perception influences the individuals' travel decisions to that destination (Wang *et al.*, 2021). Concerning the COVID-19 pandemic, the recent studies acknowledged that it negatively affected the individuals' travel intentions (Liu *et al.*, 2020) and negatively influenced their travelling decision (Teeroovengadum *et al.*, 2020). Similarly, studies recognised that the individuals' perception of risk influences their behaviour towards self-protection (Dryhurst *et al.*, 2020).

From a theoretical perspective, it is stated that travellers assessed the COVID-19 pandemic and the perception of the severity of the contagious disease influences their travel risk perception, which has a significant relationship with travel avoidance. Based on PMT and preceding literature, the following hypothesis is stated as follows:

- H1. Perceived COVID-19 impacts possess a positive relationship with travel avoidance.
- H1a. Perceived COVID-19 impacts influences TRP.
- H1b. TRP has a positive relation with travel avoidance.
- H1m. TRP mediates between the perceived COVID-19 impacts and travel avoidance.

### ***Perceived COVID-19 impacts, health and safety perception and travel avoidance***

Health-related risks may negatively affect the tourism industry (Kuo *et al.*, 2008). Perceived risks are subjective perceptions of individuals, which influenced their behaviour and decisions to travel. Therefore, the tourists' perception of risk is an essential predictor of avoiding travel to infected areas (Zou and Meng, 2020). In 2003, during the SARS outbreak, travel bans by countries affected tourist travel intentions and decreased international travel receipts (Wilder-Smith, 2006). Scholarly research acknowledged that inbound and outbound tourists avoided travelling to SARS-infected destinations (Cooper, 2008). Similarly, the tourists' perception of health and safety risks negatively affected their willingness to travel (Cahyanto *et al.*, 2016). Most studies also focused on the tourists' perception of health and safety risks in predicting their behaviour to revisit tourism destinations (Cooper, 2008). Likewise, Zou and Meng (2020) specified that the tourists' safety perception influences their cognitive behaviour towards travel. Previous studies also acknowledged that health and safety perception at destinations have positively influenced the tourists' behaviour to choose a destination for travel (Maclaurin, 2004). Concerning the COVID-19 pandemic, recent studies indicated that during the COVID-19 pandemic, the individuals' safety perception influenced their private dining preferences (Kim and Lee, 2020). However, clean and safe food messages positively influenced customer intention to avail of the service (Kim *et al.*, 2021). Ensuring hygiene and safety at hotels can encourage tourists to revisit and avail of the service (Yu *et al.*, 2021). A recent study determined that after the reopening of the tourism industry, the tourists' behaviour to avail the service depends on their safety perceptions (Dryhurst *et al.*, 2020). Therefore, studies have acknowledged that tourists perceived health and safety risks as the main factor influencing their travel decisions (Godovykh *et al.*, 2021).

From a theoretical perspective, that travellers assessed the health and safety risks and have taken protective measures to avoid the severe effects on their lives. Therefore, following the PMT and preceding literature, the hypothesis is stated as follows:

*H2a.* Perceived COVID-19 impacts has a positive relationship with HSP.

*H2b.* HSP have a positive relationship with travel avoidance.

*H2m.* HSP mediates between the perceived COVID-19 impacts and travel avoidance.

## Methods

### *Data collection and demographic characteristics*

The current study developed an online questionnaire and collected data from Tianjin, China, in May 2020 using different online communication services, including email and WeChat. We used the snowball sampling technique to approach individuals who travel frequently. We received 580 questionnaires and utilised 553 valid and filled questionnaires for analysis. [Table 1](#) outlines the socio-demographic characteristics.

### *Instrument development*

The current study developed a five-part questionnaire using a quantitative research approach. The first part investigated the demographic characteristics. The second part enquired about the perceived COVID-19 impacts and took relevant items from previous relevant studies ([Cahyanto et al., 2016](#); [Wen et al., 2005](#)). The third part investigated the risk appraisal using travel risk perception and adopted relevant items from previous studies ([Cahyanto et al., 2016](#)). The fourth part examined the risk-coping appraisal using health and safety perception and took relevant attributes from earlier studies ([Wen et al., 2005](#)). The risk coping appraisal includes four items, two for response efficacy where travellers perceive to avoid health and safety risks (I care more about the H&S in public transportation, and I care more about H&S in the recreation sites). One item for self-efficacy, where travellers perceive that they can effectively prevent health risks (I care more about the hygiene of the hotels to avoid health risks). One item is for response-cost, where travellers prefer to spend more resources to prevent COVID-19 (To ensure H&S, I will spend more to stay in high-quality hotels). The last part measured travel avoidance and adopted relevant items from ([Cahyanto et al., 2016](#)). We used a five-point Likert scale, with 1 = strongly disagree and 5 = strongly agree. A pilot study was conducted with a non-random

**Table 1** Demographic characteristics of data

<i>Variable</i>	<i>(%)</i>
<i>Gender</i>	
Male	42.9
Female	57.1
<i>Education level</i>	
Middle school	1.8
High school	5.6
Bachelors	30.7
Masters	42.9
PhD	19.0
<i>Age group</i>	
18–20	2.9
21–30	25.3
31–40	43.6
41–50	23.0
51–abv.	5.2



sample of 15 individuals to test the reliability and internal consistency of the instrument. The pilot study with the Cronbach's  $\alpha$  score of 0.812 was used for the study.

## Findings

### Measurement model

Using the structural equation modelling (SEM) technique, we measured the measurement and structural models following the two-step approach (Anderson and Gerbing, 1988). Firstly, using Cronbach's alpha, we assessed the internal consistency of constructs. Secondly, we verified the instruments' validity (convergent and discriminant validity) and reliability (composite reliability). The confirmatory factor analysis (CFA) results indicated that the composite reliability values were above 0.70, which fulfilled the recommended threshold (Nunnally and Bernstein, 1994), as shown in Table 2. The model's convergent validity showed the standardised factor loading ( $\lambda$ ), and the AVE values fulfilled the recommended criteria of 0.5 (Hair et al., 2011), as shown in Table 2. The discriminant validity results showed that each construct's AVE values were greater than the squared correlation between each construct (Fornell and Larcker, 1981), as shown in Table 3. The test results have shown that the measurement model is internally consistent, reliable and valid. Furthermore, Table 2 presents the descriptive statistics for the mean score, standard deviation and Cronbach's alpha values.

Finally, the goodness of fit (GOF) indices showed that the measurement model is acceptable with  $\chi^2 = 131.609$ ,  $df = 48$ ,  $\chi^2/df = 2.741$ ,  $p < 0.000$ , RMSEA = 0.056, AGFI = 0.941, GFI = 0.964, NFI = 0.958, TLI = 0.962 and CFI = 0.973, indicating the measurement model was statistically fit.

### Structural model

The structural model fit indices  $\chi^2 = 131.609$ ,  $df = 48$ ,  $p < 0.000$ ,  $\chi^2/df = 4.167$ , RMSEA = 0.056, NFI = 0.958, RFI = 0.942, IFI = 0.973, TLI = 0.962 and CFI = 0.973, indicating that the structural model was statistically fit to test the hypothesis.

### Hypothesis testing

The direct hypothesised results in Table 4 indicated that perceived COVID-19 impacts positively correlated with TA ( $\beta = 0.60$ ,  $p = 0.000$ ), TRP ( $\beta = 0.45$ ,  $p = 0.005$ ) and HSP

**Table 2** Measurement model results

Items	Mean	SD	FL ( $\lambda$ )	CR	AVE	$\alpha$
<i>Fear of COVID-19</i>						
Perceived COVID-19 impacts				0.75	0.50	0.756
Covid-19 has created international anxiety	4.30	0.60	0.69			
Travelling is unsafe	4.29	0.66	0.76			
Reduced travelling plans	4.21	0.69	0.68			
<i>Risk appraisal</i>						
Travel risk perception (TRP)				0.86	0.67	0.863
I avoid long-distance travelling because it is not safe	4.40	0.58	0.88			
I avoid travelling to crowded cities	4.38	0.57	0.83			
I avoid travelling high affected destinations	4.45	0.58	0.76			
<i>Risk coping appraisal</i>						
Health and safety perceptions (HSP)				0.85	0.60	0.851
I more care about the H&S in public transportation	4.39	0.62	0.77			
I more care about H&S in the public recreation sites	4.40	0.60	0.87			
I more care about the hygiene of the hotels to avoid health risks	4.47	0.62	0.79			
To ensure H&S, I will spend more to stay in high-quality hotels	4.36	0.67	0.67			
<i>Behavioural change</i>						
Travel avoidance (TA)				0.85	0.74	0.86
It negatively influenced my travel intention	4.24	0.65	0.88			
I completely avoid travelling	4.24	0.65	0.87			

Note: H&S: Health and Safety

Constructs	Perceived COVID-19 impacts	TRP	HSP	TA
Perceived COVID-19 impacts	0.50 <sup>a</sup>			
TRP	0.06 <sup>b</sup>	0.67		
HSP	0.11	0.22	0.60	
TA	0.18	0.19	0.16	0.74

Notes: <sup>a</sup>Indicates the average variance extracted values; <sup>b</sup>Inter-construct squared correlations

( $\beta = 0.52, p = 0.000$ ), thus supporting *H1, H1a* and *H2a*. Similarly, results showed that TRP positively correlated with TA ( $\beta = 0.68, p = 0.000$ ) and HSP also positively correlated with TA ( $\beta = 0.61, p = 0.000$ ), thus supporting *H1b* and *H2b*. Furthermore, the indirect hypothesised results in [Table 5](#) showed that the TRP and HSP partially mediated the relationship between perceived COVID-19 impacts and TA, thus supporting *H1m* and *H2m*. The partial mediation specified that the perceived COVID-19 impacts have a direct and indirect effect on TA.

### Multi-group analysis

The multi-group analysis allows us to identify if pre-defined data groups have significant differences in their group-specific parameter estimates. The findings of a multi-group analysis test indicated no difference concerning gender and education. However, there is a significant difference concerning the age group. [Table 6](#) presents the multi-group analysis results.

### Discussion and conclusions

The WHO report on the COVID-19 indicated that COVID-19 is highly contagious and unsafe. Therefore, tourism studies extensively focused on COVID-19 and the tourism

Hypothesised relationships	Estimates	t-value	Results
<i>H1</i> : Perceived COVID-19 impacts → TA	0.60	5.592 <sup>***</sup>	Supported
<i>H1a</i> : Perceived COVID-19 impacts → TRP	0.045	2.690 <sup>**</sup>	Supported
<i>H2a</i> : Perceived COVID-19 impacts → HSP	0.052	6.322 <sup>***</sup>	Supported
<i>H1b</i> : TRP → TA	0.068	5.353 <sup>***</sup>	Supported
<i>H2b</i> : HSP → TA	0.061	3.298 <sup>***</sup>	Supported

Notes: <sup>\*\*\*</sup>= $p < 0.000$ ; <sup>\*\*</sup>= $p < 0.001$ ; <sup>\*</sup>= $p < 0.005$

Hypothesised relationships	Direct effect	Indirect effect	Result
<i>H1m</i> : Perceived COVID-19 impacts → TRP → TA	0.296 <sup>**</sup>	0.139 <sup>***</sup>	Partially mediates
<i>H2m</i> : Perceived COVID-19 impacts → HSP → TA	0.296 <sup>**</sup>	0.139 <sup>***</sup>	Partially mediates

Notes: <sup>\*\*\*</sup>= $p < 0.000$ ; <sup>\*\*</sup>= $p < 0.01$ ; <sup>\*</sup>= $p < 0.05$

Demographic characteristics	Constrained model (chi sq.)	Constrained (df)	Unconstrained model (chi sq.)	Unconstrained (df)	Nested comparison (p-value)	Results
Gender	201	102	195	96	0.418	No difference
Age	450	260	411	240	0.007	Difference
Education	395	260	377	240	0.625	No difference



industry. However, the present study using protection motivation theory emphasises how COVID-19 as a fear appeal influenced the travellers' travel avoidance in the presence of TRP and HSP as a cognitive mediating process.

The theoretical underpinnings of study results are; Firstly, the findings demonstrated that travellers' perceived COVID-19 impacts positively correlated with their TRP, HSP and TA. The direct positive relationship between perceived COVID-19 and TRP specifies the adverse effects of the pandemic increased the travellers' fear of travelling. Travellers assessed the travel risk and they perceived travelling risk is higher during the pandemic. These findings supported the previous findings, which acknowledged that contagious diseases influenced the individuals' perceptions of travel risks severity (Li *et al.*, 2021a; Pine and McKercher, 2004). Similarly, the direct positive relationship between travellers' perceived COVID-19 impacts and their HSP shows a higher risk to health and safety during pandemics. Therefore, as a risk coping strategy, travellers take health and safety measures to avoid the risk of suffering from COVID-19. In response efficacy of risk coping appraisal, travellers perceive to prevent health and safety risks by taking more care at transportation services, recreation sites and hotels. In self-efficacy, they believe that they can avoid health and safety risks by taking care of the hygiene at the hotels, transportation services and recreation sites. In response-cost coping appraisal, travellers spend more money staying at high-quality hotels to prevent health and safety risks. Travellers' health and safety-related coping strategies help them in avoiding the possibility of risk occurrence. These results reinforced the previous literature, which shows that contagious diseases affect HSP and discourage tourists from travelling (Page *et al.*, 2012). Likewise, the direct positive relationship between perceived COVID-19 impacts and TA indicates that during the pandemic, the fear of COVID-19 changed the travellers' travel behaviour, leading to travel avoidance. These study findings are consistent with previous literature, which acknowledged the perception of COVID-19 negatively affecting the tourists' travel decisions (Uğur and Akbiyik, 2020), travel willingness (Hao *et al.*, 2021), travel intentions (Liu *et al.*, 2020) and revisit intentions (Yu *et al.*, 2021).

Second, results indicated that TRP and HSP cognitive mediating processes partially mediated the relationship between perceived COVID-19 impacts and TA in mediation analysis, specifying that perceived COVID-19 impacts are directly and indirectly related to TA. These findings acknowledged that the travellers' travel risk analysis and health and safety coping measures influenced their behavioural changes during the pandemic. These findings supported a previous study, which acknowledged perceived risk as an essential behavioural construct significantly affecting travel avoidance (Cahyanto *et al.*, 2016). The results also supported the literature that contagious diseases increased the travel risks and negatively influenced the tourists' travel intention (Pine and McKercher, 2004).

Third, the multi-group analysis results indicated that regarding gender and education, the travellers' perceptions are the same. However, concerning age, the noticeable difference between constrained and unconstrained chi-square leads to a significant nested p-value. The nested p-value results showed that different age groups possessed different perceptions. These findings support studies, which acknowledged that the individuals' cognitive perceptions of risk varied with their age, gender, experience and culture (Dryhurst *et al.*, 2020). The results are consistent with studies, which found that health and safety perception is not the same for individuals with distinct demographic characteristics (Cori *et al.*, 2020). The findings also support those studies that acknowledged that the SARS outbreak did not discourage elderly tourists from travelling (Lee and Chen, 2011).

### ***Theoretical contribution***

From the theoretical contribution perspective, the current study applies the PMT to develop a model that analyses the travellers' travel perception during the COVID-19 pandemic. Following the PMT, results indicated that travellers assessed the travel risks and the severity

of travel risks cognitively influenced their behaviour to avoid travelling. Based on their risk assessment, they have taken preventive measures through coping appraisal to decrease the chance of suffering from that risk. The travellers' health and safety measures changed their behaviour towards travelling and they preferred to avoid travelling. The results supported the PMT, which helps us understand the travellers' behaviour and specify the importance of their travelling perceptions during the pandemic.

### *Policy implications*

The tourism industry depends on travellers; the perceived effects of COVID-19 and travel avoidance are critical issues for the tourism industry. Therefore, our findings based on PMT suggested some critical implications which can assist governments, policymakers and the tourism industry in identifying the travellers' serious concerns. First, travellers TRP and HSP are predictors of their travel avoidance. Therefore, to manage the pandemic by minimising the spread of COVID-19 and regain travellers' trust, encourage their revisits and revive tourism supply and demand, a collaboration amongst the government, private organisations, travel agencies and the hotel industry is critical (Li *et al.*, 2021a, 2021b). Second, to minimise the travellers' fear of COVID-19 and assure their health and safety during travel and stay, the government and tourism industry must ensure the reliability of the health and safety information and promote health and safety measures to build trust. The health and safety measures include making the vaccination certificate compulsory for travelling, staying at a hotel and visiting the destination. Third, the COVID-19 test before travelling must be mandatory because many people suffered from COVID-19 after vaccination. Lastly, the entry and exit to destinations must be limited, as it will help tourism to re-grow by enforcing social distancing.

### *Limitations and future research*

The current study limitations provide further research insights; firstly, the generalisability of the findings is limited because we tested the model on a small sample size, but future studies can test the study model on a large sample size. Second, multi-group analysis results indicated the significant nested p-value for age; thus, considering these results, future studies can investigate the perceptions concerning age groups to understand the complexity of attitudes towards contagious diseases depth.

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