



Enhancing consumers' intention to stay in an eco-resort via climate change anxiety and connectedness to nature

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ABSTRACT

This research investigates the impact of consumers' environmental knowledge, connectedness to nature and climate change anxiety on their intention to stay in an eco-resort. Data (n = 388) were collected from Australian respondents through a structured online questionnaire and analysed using IBM SPSS AMOS 28. Drawing propositions from the norm activation theory and integrating positive and negative feelings in a single model, we find that consumers' environmental knowledge positively influences their pro-environmental behavioural intention ($\beta = 0.137$, SE = 0.047, $p = 0.007$). Moreover, this relationship is serially mediated by consumers' connectedness to nature and climate change anxiety ($\beta = 0.026$, SE = 0.008, CI: 0.012, 0.043). Our research expands the conceptual domain of the focal variables from environmental psychology to the area of consumer psychology in sustainable tourism. The implications of our findings are particularly relevant for marketers in the eco-resort industry, as they highlight the significance of leveraging connectedness to nature and climate change anxiety as mediating factors to develop compelling promotional strategies that communicate eco-friendly practices and immersive sustainable experiences, thereby appealing to environmentally conscious consumers and gaining a competitive edge in tourism.

1. Introduction

Consumers' environment-friendly actions in the tourism and hospitality industry have gained notable focus in academic research over the past decade (Wang et al., 2023; Wu et al., 2021; Rasoolimanesh et al., 2020; Miller et al., 2015; Mair and Laing, 2013). Notably, the current corpus of literature has predominantly examined the relationships among consumers' perceived value, attitudes, environmental concerns, perceived risks and behavioural intentions (Yarimoglu and Gunay, 2020; Teng et al., 2018; Agag and Colmekcioglu, 2020). An alternative line of inquiry adopted a business-level approach and examined the implementation of pro-environmental measures within hotels, employee training programs, and the proactive stance towards sustainable business practices (Dang-Van et al., 2022, 2023; Cop et al., 2020; Jiang et al., 2023). However, only a handful of studies have examined consumers' ecological emotions pertaining to climate change and consequent behaviours (Delistavrou et al., 2023; Habib et al., 2021; Scott and Gössling,

2022).

Extant literature largely posits that urgent measures are required in the tourism sector to strategically adapt and cope with the challenges posed by climate change (Filho, 2022; Gössling et al., 2023; Dube et al., 2023). In this treatise, aligning with UN Sustainable Development Goal (SDG) 13, we put forward that understanding consumers' ability to withstand and adapt to climate change-related risks is essential for encouraging environmentally conscious actions. In particular, within the context of eco-friendly hotels (i.e., eco-resorts), we argue that as a psychological disposition, consumers' climate change anxiety represents their inherent psychological state or inclination towards experiencing anxiety and distress specifically related to climate change that subsequently drives actions toward protecting the nature and patronising environment-friendly initiatives. While a stream of research has reported that climate change anxiety (hereafter, CCA) and pro-environmental behaviour (e.g., Whitmarsh et al., 2022) are positively related, others have found them to be either unrelated (Clayton

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and Karazsia, 2020) or negatively correlated (Zacher and Rudolph, 2023). The reason behind such mixed results lies in the notion that the link between reported anxiety and pro-environmental behaviour may be directly and indirectly influenced by other variables (Wullenkord et al., 2021). Hence, consumers' CCA may be driven by an individual's cognitive and affective understanding of the natural world. From a cognitive standpoint, for instance, an individual's environmental knowledge may increase their cognisance of climate change and its potential outcomes, leading to heightened concerns and anxieties (Liu et al., 2023). This knowledge equips consumers with a deeper understanding of environmental challenges, eliciting feelings of helplessness and distress associated with CCA (Clayton and Karazsia, 2020; Hindley and Font, 2017). Similarly, affective factors, such as consumers' psychological proximity (i.e., emotional connectedness) to nature, may instil a sense of accountability and worry for its welfare, leading them to take actions that preserve the environment (Perrin and Benassi, 2009). Put differently, when individuals feel connected to nature (hereafter, CTN), they develop a sense of kinship, appreciation, and responsibility towards the natural environment (Massingham et al., 2019). Therefore, emotional connection and psychological proximity to nature are expected to make an individual more concerned and worried about the adverse effects of climate change on nature, heightening the related anxiety. Taken together, consumers' environmental knowledge acts as a catalyst for generating both positive (i.e., CTN) and negative emotions (i.e., CCA), subsequently strengthening pro-environmental behaviour (e.g., intention to stay in an eco-resort).

This research interweaves the aforementioned three distinct yet closely knotted psychological dispositions of consumers to examine their pro-environmental behaviour. In particular, we integrate the literature on consumers' environmental knowledge, CCA and CTN within the context of sustainable tourism. Through the lens of norm activation theory (Schwartz, 1977), we theoretically argue that consumers' environmental knowledge positively influences their intention to stay in an eco-resort, and this positive relationship is both individually and sequentially mediated by consumers' perceived CTN and CCA. Our research makes valuable contributions to the extant domain of consumer research in sustainable tourism. To the best of our knowledge, this is one of the first few studies that examine the combined effect of consumers' environmental knowledge, CTN and CCA on pro-environmental behaviour in tourism. While the majority of the past studies are limited to consumers' perceived value, risks, and attitudes, we examine how CCA influences consumers' pro-environmental behaviour (Table 1). Thus, we not only respond to Reyes et al.'s (2021) call for further research but also expand the conceptual domain from environmental psychology to the area of consumer psychology within the context of sustainable tourism. Our findings also have important implications for marketers in the eco-resort industry. By utilising the mediating factors of CTN and CCA, marketers can create impactful promotional strategies that emphasise the resort's eco-friendly practices and immersive sustainable experiences, effectively appealing to environmentally conscious consumers and gaining a competitive advantage.

2. Literature review and hypotheses

2.1. Norm activation theory (NAT)

The NAT suggests that the sacrifice of personal interest to increase collective societal well-being is an underlying factor in determining prosocial behaviour (Schwartz, 1977; Nordlund and Garvill, 2003). By considering the underlying motivations and values that drive pro-environmental behaviour, the NAT provides insights into how individuals' attitudes, norms, and perceived responsibilities influence their actions in addressing environmental challenges. The NAT proposes three essential elements for predicting prosocial behaviour: (a) recognising the negative consequences on others or the environment from not acting in a prosocial manner (awareness of consequence), (b) taking

personal responsibility for the negative consequences (attribution of responsibility), and (c) conscience of participating in prosocial behaviour (personal norm) (Schwartz, 1977; Steg et al., 2005; Stern, 2000). Extant studies suggest that an individual's awareness and responsibilities are related to general environmental conditions and personal norm influences environment-related behaviour (Patwary et al., 2022; Fujii, 2006). In particular, awareness of the consequences refers to individuals realising the negative consequences of their environmentally unfriendly behaviour (Gärling et al., 2003). Regarding attribution of responsibility, scholars argue that individuals must perceive themselves to be personally responsible for the consequences of their environmental behaviour and have a degree of understanding that their responsible actions will lead to a more positive outcome (Steg et al., 2005). The NAT is supported by numerous empirical studies (e.g., De Ruyter and Wetzel, 2000; De Groot and Steg, 2009), particularly in explaining pro-environmental behaviours. Prior research has used NAT to explain overall prosocial behaviour wherein consumers are made aware of the consequences of their actions and the agency of their choices (Meng et al., 2020; Manosuthi et al., 2020; Nordlund and Garvill, 2002). Research on recycling behaviour utilised NAT to explain the consequences of uncontrolled waste production on the well-being of the environment (Nketiah et al., 2022; Wang et al., 2019). Drawing upon the NAT, studies on energy conservation have shown that raising awareness surrounding the reduction of energy wastage reduces environmental harm, which in turn incentivises energy-saving behaviour (Lopes et al., 2019; Rezaei et al., 2019; Song et al., 2019). NAT has also been integrated with other behavioural theories, such as the theories of planned behaviour (Kim and Hwang, 2020; Meng et al., 2020; Rezaei et al., 2019) to predict behavioural intention such as environmental conservation (Guagnano, 2001; Vaske et al., 2020), and in particular, engaging in eco-tourism (Confente and Scarpi, 2021; Wu et al., 2021), whereby consumers sense responsibility towards the environment after they are made aware of the consequences of not supporting eco-tourism.

2.2. Climate change anxiety (CCA)

CCA encompasses the experience of anxiety and concerns surrounding the impacts of climate change, characterised by uncertainties regarding their specific nature, timing, and locations (Heeren et al., 2023). CCA is associated with cognitive and emotional challenges experienced by individuals, including concerns, emotional distress, and climate change-related nightmares (Clayton and Karazsia, 2020). Individuals can develop these anxieties even in the absence of direct personal exposure to climate change impacts as a result of increasing media coverage and public attention (Albrecht, 2011; Clayton, 2020). Additionally, CCA can result in functional impairments, such as difficulties in social interactions, reduced work productivity, and challenges in maintaining concentration in academic or professional contexts that can significantly impact individuals' abilities to navigate their daily lives and fulfil their responsibilities (Clayton and Karazsia, 2020). By acknowledging the practical effects of CCA, studies highlight that it extends beyond purely psychological distress and can have tangible consequences on individuals' overall functioning and well-being. While CCA can have negative effects on environmental behaviour such as paralysis and inaction, greenwashing and misinformation, and emotional burnout (Brooks and Greenberg, 2023), this can also motivate individuals to take action and engage in environmentally friendly behaviours. CCA can serve as a catalyst for personal and collective change, leading individuals to make choices that reduce their carbon footprint and contribute to environmental conservation (Stollberg and Jonas, 2021).

2.3. Environmental knowledge and pro-environmental behaviour

Environmental knowledge is a general understanding of environmental facts, ecosystems, ideas, and relations (Fryxell and Lo, 2003).

Table 1
Contribution of this research into the current domain of eco-resort.

Authors	Antecedent	Outcome	Mediator*/Moderator**	Country	Key findings
Agag and Colmekcioglu (2020)	Moral Obligation, Justice, Religiosity, Perceived Benefits, Perceived Risk	Intention to Book Green Hotel, Actual Booking	Subjective Norm*, Attitude to Green Hotel*, Idealism**, Relativism**	Egypt	All positive relations except the relationship between justice and subjective norms. Effects of all the antecedents on intention to book green hotels are mediated by subjective norms and attitudes. Significant moderation of ethical ideology exists on the relationship between subjective norms, attitudes and intention to book the green hotel.
Cop et al. (2020)	Green Training	Organisational Citizenship Behaviour, Environmental Commitment	Perceived Behaviour Control*	Turkey	Green Training significantly affects the outcome variables. Perceived Behavioural Control fully mediates the relation
Dang-Van et al. (2022)	Green Hotel Practice	Visit Intention	Perceived Value Fit*, Promotion Focus*, Environmental Behaviour**	China	Green Hotel Practices positively affect visit intention. Both mediators affect this relationship. A positive moderating impact has been found as well.
Dang-Van et al. (2023)	Green Hotel Practices	Customer Brand Identification (CBI)	Perceived green service innovation, perceived utilitarian value, and perceived hedonic value*	China	Green Hotel Practices positively affects Customer Brand Identification, and all the mediators mediate this relationship.
Filimonau et al. (2022)	Environmental Knowledge: General Environmental Knowledge and Green Hotel Knowledge; Pro-environmental Attitudes	Patronage Intention: Intention to Stay in Green Hotels, Intention to Recommend Green Hotel, Willingness to Pay for Green Hotels	X	Poland	The strong impact of general environmental knowledge and pro-environmental attitude on patronage intention. Limited impact of Green Hotel Knowledge on Patronage Intention.
González-Rodríguez et al. (2020)	Customers' Environmental Concern (CEC), Hotel Environment Practices (HEP)	Willingness to Pay Premium Price	Hotel Environmental Image, Hotel Environment Practices	Spain	CEC has a greater impact on outcome variable compared to HEP. Both environmental image and hotel environment practices mediate the relationship between CEC and Willingness pay a premium price.
Han et al. (2018)	Hotel Practices of Water Conservation and Waste Reduction, Hedonic Value, Utilitarian Value	Hedonic Value, Utilitarian Value, Guests' Participation Intention for Green Hotel Practice, Loyalty Intention	Environmental Concern**		The positive effects of water conservation and waste reduction exist on outcome variables. Environmental concern does not moderate the relationship between utilitarian value and guests' participation intention for green hotel practice and utilitarian value and loyalty intention.
Jiang et al. (2023)	Green Practices	Customer Evaluations	External Environment (EE): Internet Penetration**, Market Complexity**, Firm Characteristics (FC): Hotel Type**, Service Innovativeness**	China	Positive relations exist between green practices and customer evaluations. This relation is weaker for EE but stronger for FC.
Patwary et al (2022)	Environmental knowledge (EK), Perceived Environmental Responsibility (PER), Altruism (AL)	Intention to visit green hotel	Ecocentric Attitude* and Anthropocentric Attitude*	Malaysia	The positive impact of EK, PER and AL was found on the intention to visit green hotels. An ecocentric attitude mediates this relationship, but an Anthropocentric attitude does not mediate the relationship.
Peng and Chen (2019)	Perceived Risks: Financial, Functional, Hedonic, Image	Hesitation, Intention to Purchase	Green Hotel Knowledge**	Taiwan	All positive relationships except the moderating impact on the relation between functional and image risk on hesitation.
Ponnareddy et al. (2020)	Attitude, Subjective Norm, Perceived Behaviour Control	Intention to Book Sustainable Hotel	Perceived Benefit (Environmental, Social, Economic) *	Switzerland	Perceived Benefit mediates the relation between attitude, subjective norm, perceived behaviour control and intention to book. The mediation differs significantly in three different markets.
Raza and Farrukh (2023)	Self-Transcendence Values, Self-Conservation Values, Ascribed Responsibility	Attitude, Consumers' Visiting Intention	Green Self-Identity**	Pakistan	Apart from the relation between self-conservation value and attitude, all the relationships are positive. GSI positively moderates

(continued on next page)

Table 1 (continued)

Authors	Antecedent	Outcome	Mediator*/Moderator**	Country	Key findings
Sukhu et al. (2019)	Beliefs and Attitudes about the elements of hotels' public areas, rooms, ambiance, social and Green Practices	Satisfaction, Emotion and WOM	X	USA	the relationship between self-transcendence Value and Self-Conservation value and attitude. Attitude is a better predictor of satisfaction and emotion compared to beliefs. Customers with higher emotional attachments are more likely to involve in WOM than satisfied customers.
Tang and Lam (2017)	Extraversion and Agreeableness	Willingness to Pay	Attitude Toward Green Hotel	China	A positive relation between personality traits and willingness to pay. Attitude towards Green Hotel mediates this relationship.
Teng et al (2018)	Environmental Value (EV) and Low Carbon Knowledge (LCK)	Staying Intention, Cooperating Intention	Perceived Value of Green Hotels* (PVGH)	Taiwan	EV and LCK positively affect staying intention. PVGH and consequently on two outcome variables. PVGH partially mediates this relationship
Trang et al. (2019)	Green Hotel Attributes: Customer Benefits, Energy Efficiency, Recycling Policy, Water Efficiency, Green Characteristic	Pro-Environmental Perceived Value, Pro-Environmental Attitude, Intention to Practice Eco-Friendly Actions, Intention to Visit Green Hotel	X	Vietnam	Positive effects of Customer Benefits, Energy Efficiency, and Green Characteristics exist on the outcome variables
Wang et al (2018)	Customer Effectiveness and Environmental Concern	Attitude, Intention to Visit Green Hotel	X	China	Customer effectiveness has the largest impact on attitude and intention to Visit Green Hotels whereas Environmental Concern has limited impact
Yarimoglu and Gunay (2020)	Attitude Towards Green Hotel, Subjective Norm, Perceived Control, Environmentally Friendly Activities, Overall Image, Visit Intention	Visit Intention, Willingness to Pay, Satisfaction, loyalty	X	Turkey	Only perceived control had no impact on visit intention. Visit intention had a significant impact on all the consequences
Current Study	Environmental Knowledge	Intention to Stay in Eco-Resort	Connectedness to Nature, Climate Change Anxiety	Australia	Environmental knowledge is positively related to their pro-environmental behavioural intention. Moreover, this relationship is serially mediated by consumers' connectedness to nature and climate change anxiety.

Individuals exposed to environmental knowledge have built an understanding, familiarity, affinity, and their personal actions towards aspects and impacts, causes, and consequences of the environment (Turnhout et al., 2016; Fryxell and Lo, 2003). The current corpus of literature largely suggests that general ecological knowledge influences an individual's eco-friendly behaviour (e.g., Lu and Shon, 2012). For instance, Meyer (2015) reported that education cultivates a greater awareness and concern for social welfare among individuals, resulting in a corresponding shift towards more environmentally friendly behaviours. Consumers possessing a greater understanding of long-term environmental matters demonstrate a higher propensity for increased expenditure on eco-friendly products (Ogbeide, 2015). Previous research has also shown that equipping eco-tour guides with environmental knowledge to be disseminated to tourists has shown an increase in PEB in visitors (Cheung et al., 2014).

In accordance with the NAT framework, having environmental knowledge may inform an individual of the part it plays in an environmental system and the consequences that may be the result of one's actions. NAT suggests that a person's ascription of responsibility is influenced by their understanding of the outcomes of their actions (Vining and Ebreo, 1992). When individuals are conscious of the consequences, they are more motivated to participate in environmentally conscious actions (Kaiser and Shimoda, 1999). Thus, environmental knowledge plays an essential role in encouraging sustainable tourism practices (Filimonau et al., 2022). When individuals possess a deep understanding of ecological issues, they tend to undertake responsible

and sustainable behaviours while travelling (Patwary et al., 2022). This knowledge enables them to make informed choices that minimise adverse impacts on the environment and support the preservation of natural and cultural resources (Trang et al., 2019). By embracing sustainable tourism practices and respecting wildlife and ecosystems, travellers contribute to the long-term viability and well-being of the destinations they visit (Hansen et al., 2023; Wang et al., 2018). Studies also showed that visitors with higher environmental knowledge are more likely to care for and display sensitivity toward nature (Cheang et al., 2019). Studies further reported that the higher the tourists' environmental knowledge, the greater their environmental empathy and an individual's subjective probability or likelihood that they will engage in green hotel visit intention (Filimonau et al., 2022; Yarimoglu and Gunay, 2020). Hence, building on the above discussion and on the premise of NAT, it can be posited that an environment-friendly tourist, equipped with an understanding of environmental issues and their systems, as well as how an individual's actions may affect the environment, is likely to engage in pro-environmental behaviour such as staying in an eco-resort. Therefore, we hypothesise that:

H1. Consumers' environmental knowledge is positively related to their intention to stay in eco-resort.

2.4. The mediating role of connectedness to nature (CTN)

CTN is the emotional and experiential bond individuals have with the natural world (Mayer and Frantz, 2004). It is an individual's sense of

belonging, affinity, and strong tie with the natural world. CTN is a holistic and emotional connection that goes beyond mere intellectual understanding or physical proximity to nature. From a tourist perspective, CTN refers to the emotional connection tourists feel to the natural surroundings (Massingham et al., 2019). While one stream of research reported a strong relationship between individuals' CTN and their level of happiness (Capaldi et al., 2014), the other found that CTN is one of the key drivers of pro-environmental behaviour (Whitburn et al., 2020). The convergence of these two perspectives indicates that developing a strong bond with nature has positive implications for both human well-being and the environment (Whitburn et al., 2020).

When individuals feel a strong connection to nature, it means they have a deep appreciation and affinity for the natural environment (Mayer and Frantz, 2004). This connection may arise from a sense of awe and wonder towards natural landscapes, a desire to be immersed in nature, or a recognition of the importance of environmental conservation (Massingham et al., 2019). For instance, tourists with a strong CTN are attracted to eco-resorts because they provide an opportunity to stay in a setting that respects and enhances the natural environment. These resorts often offer experiences that allow guests to immerse themselves in nature, such as eco-tours, outdoor activities, and access to pristine natural surroundings (Thompson, 2022). Tourists who feel a strong CTN are more likely to choose an eco-resort for their stay because it aligns with their values emanating from their knowledge of the environment (Hansen et al., 2023). Therefore, a tourist's CTN may unleash the motivation created by environmental knowledge to act pro-environmentally (i.e. to stay in an eco-resort). Put differently, individuals with greater environmental knowledge tend to develop a stronger CTN, which in turn influences their decision to choose an eco-resort for their stay. In summary, the CTN acts as a mediating factor between environmental knowledge and the decision to stay in an eco-resort. A strong CTN enhances the influence of environmental knowledge, leading individuals to choose eco-resorts as a conscious and meaningful way to support their values and engage in sustainable travel practices. This also aligns with the NAT framework, which supports that CTN requires a degree of understanding towards environmental systems and relationships (Fryxell and Lo, 2003; Frantz and Mayer, 2014). Without an understanding of the role one plays in nature's systems, one cannot appreciate the consequences of our actions. CTN also suggests assuming the responsibility for nature's well-being and by extension, oneself. Therefore, we hypothesise that:

H2. CTN mediates the relationship between environmental knowledge and the intention to stay in an eco-resort.

2.5. The mediating role of climate change anxiety

Climate change has a notable effect on the mental and physical health of the general human population (Doherty and Clayton, 2011; Manning and Clayton, 2018). Previous research on climate change is primarily focused on distress and negative emotions pertaining to climate change-related challenges (Searle and Gow, 2010; Reser et al., 2012; Berry and Peel, 2015; Helm et al., 2018). Some of these negative emotions manifest as stress (Bethune, 2018), worry (Leiserowitz et al., 2018), and hopelessness (Tschakert et al., 2019). Searle and Gow (2010) measured climate change distress through CCA which may cause respondents to feel worried, angry, stressed, scared, and depressed. The consensus in literature has primarily coined the negative emotional response as CCA (Clayton, 2020; Whitmarsh et al., 2022). However, one must first have awareness and knowledge of nature's systems (i.e., environmental knowledge) to appreciate the threat faced by the environment (Cheang et al., 2019). Therefore, there is a potential link between CCA, environmental knowledge and eco-friendly behaviour. This anxiety-driven motivation stems from the cognitive and emotional challenges experienced, as well as the recognition of the tangible outcomes of climate change. Consequently, individuals are motivated to act

and engage in environmentally friendly behaviours as a way to mitigate their own carbon footprint and contribute to broader environmental conservation efforts. The fear and concern associated with CCA serve as a catalyst for personal and collective change, leading to a stronger commitment to pro-environmental behaviour. Following Wullenkord et al. (2021), we posit that the relationship between environmental knowledge and climate anxiety is not as straightforward as was initially thought. By linking these two sets of relationships, we put forward that CCA mediates the link between consumers' environmental knowledge and the intention to stay in eco-resorts. Moreover, CCA relates to the NAT framework, whereby personal norms and other personal psychological factors affect one's propensity to experience negative emotions and subsequent motivation to seek relief from threats. As such, it can be argued that when one feels anxious towards climate change from the cumulation of environmental knowledge, one may choose to seek relief from this state of anxiety by engaging in pro-environmental behaviour (i.e., staying in an eco-resort). Therefore, we hypothesise that:

H3. CCA mediates the relationship between environmental knowledge and the intention to stay in an eco-resort.

2.6. The relationship between CTN and CCA

A personal connection to nature happens when an individual sees oneself as a component of the natural world (Mayer and Frantz, 2004). When someone establishes a bond or affiliation with something or someone, it naturally leads to a sincere concern for the well-being and whereabouts of that entity, which gives rise to genuine feelings of worry and apprehension (Kersten et al., 2022). Referring to the first component of the NAT framework (awareness of consequence), having a CTN can lead to CCA in individuals, particularly tourists. When tourists develop a close bond or appreciation for the natural world, they may become more aware of the negative impacts that climate change is having on ecosystems, biodiversity, and the overall health of the planet (Fryxell and Lo, 2003). Consumers are also constantly made aware of climate change through media exposure and various sources of environmental education (Clayton, 2020; Verplanken et al., 2020). Furthermore, the rise of social movements focused on the love and connectedness to nature such as veganism, yoga groups, and climate activism, have caused consumers to be deeply aware and entrenched into these communities, forming part of their core identity (Dutkiewicz and Dickstein, 2021; Grose, 2020; Rishi, 2022). This heightened awareness can evoke feelings of worry, concern, and anxiety about the future of nature and the potential loss of connection and attachment to the environment. Therefore, it is likely that tourists' CTN will positively influence their CCA. Hence, we propose the following:

H4. CTN is positively related to CCA.

2.7. The serial mediation effects

Most tourists possess a degree of environmental knowledge; however, the seamless translation of such knowledge into behavioural intention is not assured and automatic. Rather, the relationship between knowledge and behaviour is intricate and multifaceted (Zsóka, 2008). Therefore, a question remains as to whether there are other key variables involved in the relationship between tourists' environmental knowledge and their intention to stay in an eco-resort. This study posits that CTN and CCA stand as efficacious tools for elucidating the internal mechanism through which environmental knowledge transforms into tourists' intention to patronize eco-resorts. Using NAT arguments, this study proposes that both CTN and CCA serve as dual mediators between environmental knowledge and the intention to stay in an eco-resort. The proposed process model elucidates the interplay and hierarchical sequence between these mediating variables. Consequently, this analysis scrutinizes the collaborative functioning of different environmental components, namely CTN and CCA, in generating a robust intention to

stay in an eco-resort resulting from tourists' environmental knowledge.

In accordance with NAT, we argue that individuals' eco-friendly actions are shaped by their alertness to environmental issues and their personal values pertaining to such concerns. When tourists possess a deeper understanding of environmental matters, such as the importance of biodiversity, ecosystem health, and sustainable practices, they are more likely to develop a stronger CTN. Subsequently, those with a stronger CTN are more prone to experience CCA due to their own stronger connection with nature, affording them a clearer insight into the potential impacts of human activities on ecosystems, wildlife, and natural landscapes (Levine and Strube, 2012; Patwary et al., 2022). These individuals often bear witness to the tangible effects of climate change during their travels. Such firsthand experiences can elicit alarm and foster a sense of responsibility or guilt regarding their contribution to environmental problem through their own travel-related activities (Ogunbode et al., 2022), potentially culminating in a pronounced intention, such as the inclination to stay in an eco-resort as a form of environmental reciprocity.

Our above argumentations suggest that tourists' environmental knowledge leads to their CTN and that CTN stimulates the extent to which the tourists engage in eco-resort stay. Integrating these premises with the notion that individuals, specially tourists, can manifest their environmental knowledge into an intention to stay in an eco-resort through the intermediaries of CTN and CCA, we posit the following:

H5. The relationship between environmental knowledge and the intention to stay in an eco-resort is serially mediated by CTN and CCA.

Fig. 1 illustrates the hypothesised relationships (H₁ to H₅).

3. Methodology

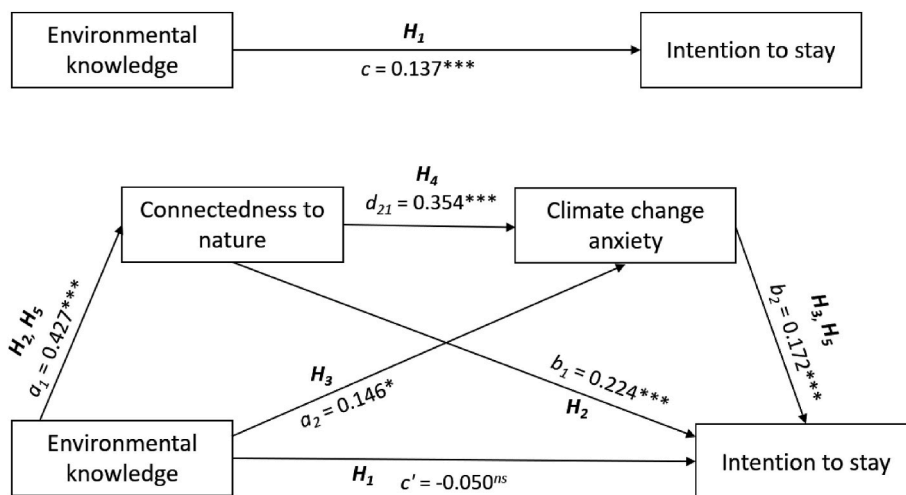
In this treatise, we posit that individuals' level of environmental knowledge will positively influence their intention to choose an eco-resort as their accommodation. Moreover, we propose that this positive relationship will be mediated by individuals' sense of CTN and CCA. Following the guideline of Hayes (2012), we propose a "three-path mediation model" (Fig. 1). We employed a measurement model in IBM SPSS AMOS 28 to assess the reliability and validity of the measurement constructs. To examine the mediation effects, we employed Hayes' (2012) PROCESS macro plugin in IBM SPSS 28.

3.1. Survey instrument and measurement items

We collected data online through a self-administered survey questionnaire. The questionnaire consists of several sections. The survey began with a brief introduction, providing an overview of the questionnaire format and the confidentiality of the responses. Then we obtained the respondents' informed consent and allowed them to proceed to the next section which included measurement items for environmental knowledge, CTN, and CCA. In the third section of the survey, the participants were provided with a definition of an eco-resort: "An eco-resort refers to a lodging that prioritises environmental sustainability and has implemented significant structural changes to reduce its negative effects on the natural environment". Consequently, they were exposed to a short video of Freycinet Lodge (<https://youtu.be/Cb32J.EJAxI>). Freycinet Lodge (www.freycinetlodge.com.au) was used as the stimulus in the survey of this research as it is regarded as one of the best eco-retreats around Australia (Curren, 2023).

Freycinet Lodge is located within Freycinet National Park on the east coast of Tasmania, Australia. The lodge offers stunning views of Great Oyster Bay and the Hazards mountain range. The lodge is known for its eco-friendly design and its integration with the surrounding natural environment. Guests can choose from a variety of accommodation options from 70 rooms, including cabins and suites. The rooms are designed to provide comfort while maintaining a connection with the natural surroundings. Common features at Freycinet Lodge include private balconies or decks with panoramic views, ensuite bathrooms, and amenities that cater to both relaxation and adventure. The lodge often provides easy access to hiking trails, pristine beaches, and other outdoor activities within Freycinet National Park.

After watching the video, the respondents reported their perception regarding the eco-friendly positioning of Freycinet Lodge. In particular, the respondents' perception was measured with a single item manipulation check question "In my perception, Freycinet Lodge is an environment-friendly hotel". Only the participants who selected "agree" or "strongly agree" were allowed to proceed to the subsequent section. Then the respondents were asked to imagine that they have been awarded a PAID 2 nights/3 days holiday trip from their work. Based on this, they recorded their intention to stay at Freycinet Lodge. Next, they reported their intention to visit Paris, measured on a three-item scale, which was used as a priori marker variable to assess Common Method Bias (CMB). The last part of the survey enquired about the respondents' demographic profile. We measured the respondents' environmental



Notes: n = 388, *p < 0.05, **p < 0.01, ***p < 0.001, ns = not significant

Fig. 1. Three-path mediation model.

knowledge with the five-item scale from Mostafa (2007). We adapted Mayer and Frantz's (2004) CTN and Clayton and Karazsia's (2020) CCA scales in our research. In addition, the scale for measuring respondents' intention to stay in an eco-resort was adapted from Wang et al. (2018). We used a five-point Likert scale (1 = Strongly disagree, 5 = Strongly agree) to measure the latent constructs (Table 2).

3.2. Data collection and sample

We recruited a market research agency to collect data for our research. The target sample frame included Australian residents aged 18 and above, with a preference for a balanced representation of both male and female participants. A total of 440 respondents completed the survey of which 34 failed in the attention trap questions, and an additional 18 were straight-liners. Thus, 388 valid and useable responses were included for further analysis, ensuring that the final sample size adhered to the recommended ratio of 10 observations (N) per estimated parameter (q) (Hair et al., 2010). The respondents' demographic profile is presented in Table 3.

3.3. Common method bias (CMB)

Because of the contemporaneous nature of data collection and reliance on self-reporting by respondents, potential CMB was a notable concern. To mitigate this, following the suggestions from MacKenzie and Podsakoff (2012), we undertook precautions by randomising the sequence of the scale items within the survey (MacKenzie and Podsakoff, 2012). Additionally, we conducted Harman's single-factor test, revealing that the unrotated single factor accounted for only 31.97% of the variance (below the 50% threshold). Furthermore, a marker variable (i.e., intention to visit Paris) that is unrelated to the theory was included, and it did not have a significant impact on the measurement model (Lindell and Whitney, 2001). Therefore, concerns about CMB were not considered relevant in this study.

Table 2
Measurement items with factor loading.

Measurement constructs and items	Loading
Environmental knowledge	
I know more about recycling than the average person.	0.81
I know how to select products and packages that reduce the amount of waste ending up in landfills.	0.73
I am very knowledgeable about environmental issues.	0.61
Connection to nature	
I think of the natural world as a community to which I belong.	0.75
I often feel connected to the nature.	0.75
I often feel a kinship with animals and plants.	0.59
I feel as though I belong to the Earth as equally as it belongs to me.	0.71
I often feel part of the web of life.	0.66
Climate change anxiety	
I find myself crying because of climate change.	0.72
I think, "why can't I handle climate change better?"	0.60
I write down my thoughts about climate change and analyse them.	0.69
I think, "why do I react to climate change this way?"	0.70
My concerns about climate change make it hard for me to have fun with my family or friends.	0.85
I have problems balancing my concerns about sustainability with the needs of my family.	0.77
My concerns about climate change undermine my ability to work to my potential.	0.82
My friends say I think about climate change too much.	0.73
Intention to stay	
I am willing to stay in Freycinet Lodge.	0.57
I am willing to recommend Freycinet Lodge to others.	0.63
I want to stay in Freycinet Lodge, because it protects environment.	0.72
There is a likelihood that I will book rooms in Freycinet Lodge.	0.78
I will prefer Freycinet Lodge over other general hotel.	0.71

Table 3
Respondents' profile (n = 388).

	Frequency	Percent
Gender		
Female	179	46
Male	205	53
Other	4	1
Age (years)		
18–25	59	15
26–35	111	29
36–45	183	47
45–55	35	9
Education		
Secondary/High School	173	45
Diploma/Certificate	78	20
University degree	126	32
Other	11	3
Annual income (AUD)		
0 - 20,000	8	2
20,001–40,000	27	7
40,001–60,000	85	22
60,001–80,000	132	34
80,001–100,000	65	17
100,001–120,000	63	16
120000+	8	2

4. Results

4.1. Measurement model

Following the approach recommended by Anderson and Gerbing (1988), we performed a Confirmatory Factor Analysis (CFA) in IBM SPSS AMOS 28 to optimise the measurement model and refine the scale items to achieve the reliability and validity of the variables. We removed a few items due to either low loading or cross-item loading and respecified the model. The CFA loadings are presented in Table 2. The measurement model resulted in a good fit with $\chi^2 = 347.579$, $df = 179$, $\chi^2/df = 1.942$, $PClose = 0.55$, Root Mean Square Error of Approximation = 0.05, Comparative Fit Index = 0.95, and Tucker–Lewis Index = 0.95 (Hu and Bentler, 1999).

4.2. Reliability and validity

The measures used in our study were reliable, with a composite reliability (CR) exceeding 0.73 for each measure (Hair et al., 2010). Additionally, the constructs demonstrated convergent validity, as the AVE (Average Variance Extracted) values exceeded 0.50 (Malhotra, 1988). Moreover, the square root of the AVE values surpassed the correlation between the constructs, ensuring discriminant validity (Fornell and Larcker, 1981), as shown in Table 4.

4.3. Hypothesis testing

We utilised the SPSS PROCESS macro (Model 6) to test the serial mediation. All reported effects included 95% confidence intervals (CIs). To evaluate the robustness of mediating effects, bootstrapping with 10,000 resamples was employed, with a 95% CI that did not encompass zero, signifying a significant effect (Hayes, 2012).

H1 examined the total effect of environmental knowledge on the participants' intention to stay in an eco-resort (c'). The findings demonstrated a significant statistical association ($\beta = 0.137$, $SE = 0.047$, $p = 0.007$) between environmental knowledge and intention, supporting H1. Subsequently, H2 predicted that CTN mediates the link between environmental knowledge and the intention to stay in an eco-resort. The findings showed a statistically significant indirect effect ($\beta = 0.096$, $SE = 0.027$, $CI: 0.045, 0.152$), supporting H2. Then we expected in H3 that the influence of environmental knowledge on behavioural intentions is mediated by CCA. We found a positive association between

Table 4
Validity and reliability of the measurement constructs.

	CR	AVE	EK	CTN	CCA	INT
Environmental knowledge (EK)	0.762	0.519	0.720			
Connection to nature (CTN)	0.832	0.510	0.575***	0.707		
Climate change anxiety (CCA)	0.906	0.547	0.360***	0.443***	0.740	
Intention to stay (Int)	0.841	0.514	0.150*	0.307***	0.290***	0.717

Notes: CR = Construct reliability. Figures in the diagonal (values given in bold) are the square root of the Average Variance Extracted (AVE); those below the diagonal are the correlations between the constructs.

*p < 0.05, **p < 0.01, ***p < 0.001.

environmental knowledge and CCA ($\beta = 0.146$, $SE = 0.062$, $p = 0.019$); also, CCA positively influenced intention to stay ($\beta = 0.172$, $SE = 0.042$, $p < 0.001$). As a result, CCA positively mediated the relationship between environmental knowledge and the intention to stay ($\beta = 0.146 \times 0.172 = 0.025$, $SE = 0.012$, $CI: 0.004, 0.052$), supporting H3. Subsequently, H4 was supported as CTN was positively associated with CCA ($\beta = 0.354$, $SE = 0.068$, $p < 0.001$, $CI: 0.221, 0.488$). Finally, we assessed the indirect effect of environmental knowledge - > CTN - > CCA - > intention to stay. The predicted (H5) serial mediation of CTN and CCA was statistically significant ($\beta = 0.026$, $SE = 0.008$, $CI: 0.012, 0.043$). We also controlled for key demographic variables (i.e., age, gender, and education) and did not find any confounding effects of these variables on the postulated relationships. Table 5 summarises the results of the mediation tests.

5. Discussion

Our research presents a novel examination of consumers' cognitive and affective traits and their influence on greener behaviour. It particularly explores how environmental knowledge, CTN and CCA shape intentions to patronize eco-resorts. Far from merely reiterating previous studies, we reveal how the interplay of these factors contributes to a nuanced understanding of consumers' eco-friendly behaviours: the best knowledge of the authors, it is the first to assess the impact of consumers' CTN and CCA on their intention to engage in eco-friendly behaviour, namely their choice to stay in eco-resorts. Extending concepts primarily studied within environmental psychology, this paper advances the understanding of consumers' ecological behaviour by applying the constructs of CTN and CCA into the context of sustainable tourism. Our findings validate past studies that environmental knowledge predicts patronage intention for eco-friendly hotels (e.g., Filimonau et al., 2022; Patwary et al., 2022). This further emphasises the significance of consumers' understanding, awareness, and information that they possess regarding environmental issues, particularly in relation to the impact of their consumption behaviours and choices on the environment (González-Rodríguez et al., 2020; Teng et al., 2018). We also found that consumers' environmental knowledge can foster a sense

of CTN by increasing their comprehension of the complex relationships between human actions and natural surroundings. As individuals become increasingly cognizant of the repercussions of their behaviours on the ecological milieu, they foster a heightened sense of responsibility and an augmented recognition of their interdependence with the natural ecosystem (Whitburn et al., 2020). Additionally, increased environmental knowledge can also lead to CCA as consumers become more aware of the urgent and complex climate change-related challenges that foster apprehensions concerning the fate of the Earth and the welfare of forthcoming generations.

While past research has found that consumers with a better understanding of environmental issues are likely to choose eco-friendly resorts (Filimonau et al., 2022; Patwary et al., 2022), we believe understanding this behaviour necessitates more than an analysis of consumers' environmental knowledge. Although critical, knowledge alone may not necessarily result in behaviour change (González-Rodríguez et al., 2020; Munro et al., 2023; Trang et al., 2019). Our research puts forth the argument that we also need to comprehend consumers' psychological dispositions, i.e., CCA and CTN, and their role in generating pro-environmental intentions (Atzeni et al., 2022; Chen et al., 2023). In this regard, we found that greater environmental knowledge can foster a sense of CTN, increasing comprehension of the intricate relationships between human actions and natural surroundings. As consumers' understanding of their actions' environmental impact grows, they cultivate a stronger sense of accountability and interconnectedness with nature (Whitburn et al., 2020). Concurrently, this knowledge can also spark CCA, generating concerns about the planet's future. Our findings support Barbaro and Pickett's (2016) assertion that consumers' CTN can motivate engagement in pro-environmental behaviours. Likewise, CCA can enhance such motivation as individuals strive to soften climate change impacts and contribute to sustainable resolutions. Thus, the synergy of CTN and CCA encourages individuals towards behaviours promoting environmental sustainability, marking a clear contribution to the advancement of sustainable consumer behaviour literature within the tourism domain.

Table 5
Regression coefficients, standard errors and model summary information for the serial multiple mediator models.

Antecedents	M_1 (CTN)			M_2 (CCA)			Y (Int)					
	Coefficient	SE	p	Coefficient	SE	p	Coefficient	SE	p			
X (EK)	a_1	0.427	0.49	<0.001	a_2	0.146	0.062	0.019	c'	-0.050	0.059	0.402
M_1 (CTN)	-	-	-	d_{21}	0.354	0.068	<0.001	b_1	0.224	0.060	<0.001	
M_2 (CCA)	-	-	-	-	-	-	-	b_2	0.172	0.042	<0.001	
Constant	i_{M1}	1.223	0.382	0.001	i_{M2}	-0.345	0.481	0.474	i_y	3.442	0.486	<0.001
Age		-0.010	0.016	n.s		-0.036	0.022	n.s		0.005	0.014	n.s
Gender		0.152	0.097	n.s		0.100	0.080	n.s		-0.159	0.090	n.s
Income		0.005	0.008	n.s		-0.004	0.011	n.s		-0.008	0.0009	n.s
			$R^2 = 0.266$				$R^2 = 0.214$				$R^2 = 0.129$	
			$F(5, 382) = 23.779, p < 0.001$				$F(6, 381) = 14.307, p < 0.001$				$F(7, 380) = 7.923, p < 0.001$	

Notes: EK: Environmental knowledge, CTN: Connection to nature, CCA: Climate change anxiety, Int: Intention. Controls: Age, Gender, Income level. M_1 : First mediator, M_2 : Second mediator, $M_1 = 1.223 + 0.427X$; $M_2 = -0.345 + 0.146X + 0.354M_1$; $Y_1 = 3.442 - 0.050X + 0.224M_1 + 0.172M_2$.

6. Conclusion

6.1. Theoretical implications

Our research makes a set of contributions to the theoretical understanding of research on sustainable tourism behaviour. First, the current paper has used NAT, a theory that is comparatively under-researched in prior literature, to find the impact of consumers' environmental knowledge on the intention to stay in an eco-resort and the mediating role of CTN and CCA on the aforementioned impact. Through the lens of NAT, integrating positive and negative feelings in a single model, the present paper extends our understanding of eco-friendly behaviour within the context of tourism. Second, the mediation of consumers' CTN between environmental knowledge and willingness to stay in an eco-resort brings further insight into the connection between individuals and nature (Cheng, & Monroe, 2012; Whitburn et al., 2020). It highlights the importance of emotional and psychological CTN in influencing pro-environmental behaviour, specifically in the context of eco-tourism. Third, the mediating role of CCA between environmental knowledge and intention to stay in an eco-resort provides insights into the emotional and psychological processes underlying consumers' decision-making towards ecological decisions (Clayton, 2020; Clayton et al., 2023). Thus, our findings highlight the importance of integrating cognitive, emotional, and psychological factors in sustainable tourism research. Taken together, this research provides empirical support to the complex roles between environmental knowledge, CTN, and CCA in shaping tourists' intention to stay in eco-resorts.

6.2. Managerial implications

This research provides valuable insights for eco-tourism practitioners, managers of tourist destinations, and policymakers. *First*, the results recommend that elevating consumers' understanding of the environment can serve as an effective approach to encourage sustainable tourism behaviours. Eco-resorts should consider implementing educational programs or initiatives to educate tourists about ecology and eco-friendly accommodations. By increasing tourists' environmental knowledge, eco-resorts can allow tourists to understand the reasoning behind some of the choices made by the establishment. Therefore, tourists will be motivated to support and participate in sustainable behaviours during their stay. The implications of these results underscore the need for hoteliers and marketers to focus on raising environmental awareness among consumers, as it can positively influence their intention to support sustainable practices in the hospitality industry. Furthermore, this research underscores the significance of promoting and communicating environmental initiatives to enhance consumers' perception of eco-friendly hotels and encourage their patronage. *Second*, the results show the importance of fostering a strong emotional connection between tourists and nature. Eco-resorts should focus on creating opportunities for guests to connect with nature, such as organising nature walks, wildlife encounters, or educational sessions about the local ecosystem. By nurturing tourists' CTN, eco-resorts can enhance their guests' intention to stay in eco-friendly accommodations. Eco-resort owners can also create emotional appeals by employing stunning visuals and compelling messages focusing on natural beauty and resorts' eco-friendly practices. For instance, they can craft their advertising campaign portraying how their guests can participate in activities like kayaking or wildlife observation, thus providing an immersive and sustainable vacation experience. Therefore, eco-conscious consumers can resonate with businesses adopting sustainable practices. Such strategies that are in line with customers' beliefs and take advantage of the mentioned mediators can give the resort a competitive advantage and attract new guests. For instance, Bruny Island in Tasmania incorporates eco-friendly tours as a crucial element of local storytelling and the tourist experience. This enhances engagement and fosters a deeper emotional connection between consumers and

nature (Pigram, 2023). *Third*, eco-resorts should emphasise their commitment to mitigating climate change impacts and communicate their eco-friendly practices and initiatives that reduce their carbon footprint. By providing relief to tourists' CCA and assuring that their stay contributes to sustainable solutions, eco-resorts can increase visitors' intention to choose eco-friendly accommodations. This will also help build consumer trust, brand image and reputation that will also enhance the competitive advantage of the eco-resort. For instance, the Margaret River region, located in Western Australia, is home to numerous certified eco-destinations. These establishments primarily offer tours aimed at educating consumers about the significant impact of initiatives like permaculture, highlighting the co-existence of animals, vegetables, and grapes within a self-sustained ecosystem (Beasley, 2023). *Fourth*, the results indicate that individuals who feel CTN may be more aware of environmental issues and, therefore, more concerned about climate change as a threat to the environment is a threat to the 'self'. This finding emphasises the importance of promoting nature-based experiences and fostering a sense of environmental responsibility among tourists. Moreover, eco-resort strategists can implement a psychographic segmentation strategy by focusing on those customers whose value matches the brands' value and sustainability practices. Such targeted approaches enable practitioners to effectively understand customers' preferences and create a stronger connection with them. An example of this in practice, Port Douglas in Queensland caters to consumers with high CTN. Those falling into this category are willing to sacrifice creature comforts if it means preserving the environment. Destinations like Port Douglas singularly focus on nature and its conservation as their primary goal (Yasa, 2023). *Finally*, the serial mediation effect highlights the intricacy of the decision-making process and underscores the need for a multifaceted approach. In combination with the aforementioned points, eco-resorts should integrate educational programs, nature-based experiences, and climate change awareness initiatives to create a comprehensive guest experience. By addressing both tourists' CTN and CCA, eco-resorts can maximise the impact of environmental knowledge on guests' intention to stay in eco-friendly accommodations. For instance, Holiday Inn and Suites-Virginia Beach's websites have communicated their sustainable initiatives, such as reducing the usage of plastic straws in their hotel. Similarly, eco-resorts can write blog articles on their website providing suggestions regarding eco-friendly living, encouraging the guests to participate in eco-friendly activities or posting videos on social media demonstrating the advantages of using sustainable solutions. These strategies will enable the resorts to enhance brand knowledge and establish them as an authority in the field to help the customers make informed decisions. Taken together, our findings are expected to facilitate the UN SDG 13 which aims at enhancing resilience to climate-related disasters, integrating climate change measures into policies, and building knowledge and capacity to address climate change. Additionally, the hospitality sector may use the mechanisms for capacity-building in planning and management, as well as improving education and awareness on climate change mitigation, adaptation, and early warning systems.

6.3. Limitations and future research

Future studies can consider addressing several limitations inherent in this research. Although this research examined two novel constructs (i. e., CCA and CTN) through a parsimonious model within the context of eco-resort, one can argue that the underlying motive for consumers' pro-environmental behaviour is driven by other socioeconomic and psychological factors (e.g., personal values, perceived benefits and barriers). In particular, the utilisation of novel theories (e.g., nudge theory) and application of relevant alternative methods and analyses (e.g., fuzzy-set qualitative comparative analysis, multilevel modelling) by incorporating additional moderators and mediators will advance the findings of our research. Additional research may interview individuals who have personally gone through climate change distress and examine

their pro-environmental behavioural intention. Finally, we warrant further research within specific tourism contexts (e.g., mountain landscape, Prideaux et al., 2010) across countries to investigate the impacts of CCA and CTN.

CRedit authorship contribution statement

Anwar Sadat Shimul: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Anisur R. Faroque:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis. **Kevin Teah:** Writing – review & editing, Writing – original draft, Investigation. **Sheikh Mohammad Fauzul Azim:** Writing – original draft. **Min Teah:** Writing – review & editing, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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