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How tourists' negative and positive emotions motivate their intentions to reduce food waste

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ABSTRACT

Food waste significantly contributes to complex socioeconomic and environmental problems. The tourism sector is not immune to these sustainability challenges. This research examines how both negative and positive emotions build tourists' intentions to reduce food waste. The study employs two experiments and a survey to establish causality among the key constructs and test the nomological network of those constructs. Results demonstrate a causal relationship between guilt, regret and hope and how these constructs interplay to explain the impact of a tourist's perceptions of potential cost and harm from not implementing food waste-reduction practices. Additionally, four tourist categories are developed using fuzzy-set Qualitative Comparative Analysis (fsQCA). The results of fsQCA identify different configurations of tourists who seek to reduce food waste. This study encourages tourism operators to leverage positive emotions, such as hope, in marketing communications to encourage food waste reduction. A key contribution of this work is the examination of the variable of 'hope', and its effect in the context of food waste behaviour among tourists. This is the first study to examine how the interaction between tourists' negative (guilt and regret) and positive (hope) emotions motivates their intentions to reduce food waste.

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Introduction

Despite an increased focus on global food safety, food waste remains a major concern for policy-makers, industry and social marketers (Jackson, 2018). It is estimated approximately 33% of total food (1.3 billion tonnes) is wasted, at a cost of approximately USD940 billion annually (Food & Agriculture Organization of United Nations (FAO), 2021). The tourism sector is not immune to these sustainability challenges. Food is an important element of the tourism experience (Kivela & Crofts, 2006), contributing to global food waste (Curtis & Slocum, 2016). For example, on cruise liners, total food waste (leftovers) may reach 30% (Li & Wang, 2020). Tekin

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and Ilyasov (2017) identified that guests in 'all-inclusive' resorts regularly waste food because the fully inclusive nature of such resorts removes the obligation to pay for food not consumed (Okumus et al., 2020).

However, food waste by tourists extends beyond resorts and cruise ships, impacting society more broadly. Accordingly, examining tourists' wasteful behaviour only within these contexts limits our understanding of these behaviours. Studies have found that restaurant food waste associates with tourist visitation (Manomaivibool, 2015). For example, in Mallorca, a 1% rise in the number of tourists produced a 1.25% increase in food waste (Arbulu et al., 2017). While recent studies have examined food waste problems impacting the broader hospitality sector within popular tourist destinations (see Kasavan et al., 2019), they include both food wastage by tourists and locals. Accordingly, the current work responds to this limitation, separating and examining only the behaviours of those identified as 'tourists'. Tourism scholars have argued that the 'tourist food-waste behaviour' literature remains underdeveloped (de Visser-Amundson, 2022; Gretzel et al., 2020; Murphy et al., 2019), specifically calling for a further research on tourist food-waste behaviour, the adoption of mixed-method approaches and a focus on solutions to mitigate food waste.

To date, most research on food waste behaviours by tourists has focused on antecedents, such as: (1) personal norms (value placed on sustainability, environmental concerns) (Alsuwaidi et al., 2022); (2) temporal factors (festive mood, holiday spirit, entertainment) (Gretzel et al., 2020); (3) demographic factors (age, education) (Wang et al., 2021); (4) operational factors (all-inclusivity, buffets) (Okumus et al., 2020); and (5) tourist anonymity (Çetin & Süren, 2022). While more recent work has begun to examine solutions, such 'solutions' appear directed towards tourism operators rather than tourists themselves. These have included: (1) policy/procedural solutions (government intervention, operator training) (Gretzel et al., 2020); or (2) planning/operational solutions (inventory management, accurate forecasting) (Amicarelli et al., 2022). While researchers have begun to examine ways in which tourists themselves can mitigate food waste, their solutions focus on psychological 'nudges' and 'multi-stakeholder partnership' field experiments (see de Visser-Amundson, 2022). However, how tourists' emotions may influence their intentions to reduce food waste has been absent from existing literature. Accordingly, despite growing academic interest in tourist food-waste behaviours and possible solutions, an important research question remains: What are the possible negative and positive emotions that might motivate tourists' intentions to reduce food waste?

Several contributions are offered. First, we add to the literature on Sustainable Development Goals (SDG 17) in a sustainable tourism setting (Boluk et al., 2019; de Visser-Amundson, 2022). Second, the present research responds to calls for more diverse methodologies (Murphy et al., 2019). It combines a systematic literature review, two experiments and an online survey. To provide a deeper understanding of tourist food-waste behaviours, and in line with Alsuwaidi et al. (2022), fuzzy-set Qualitative Comparative Analysis (fsQCA) is applied to identify tourist 'types' who indicate intentions to mitigate their food waste. Third, we examine how tourists' negative and positive emotions interact to motivate their intention to reduce food waste. We identify that negative emotions (guilt and regret) alone are not enough to motivate a tourist to mitigate food wastage. Instead, positive emotions (such as hope) must be generated, indicating that tourists who engage in food waste and who experience high levels of hope are more willing to meet the challenges and overcome the barriers to reducing food waste. This study thereby fulfils the gap in research by determining how tourists' emotions can impact their intentions to reduce food waste, improving sustainable tourism. For tourism managers, we suggest that anti-food waste mass media campaigns should leverage the interplay of both negative and positive emotions.

Literature review

Goal attainment theory (GAT) is applied as a foundation for this study. According to GAT, multiple factors can influence the attainment of goals, including emotions, attitudes and beliefs

(Maehr & Nicholls, 1980; Nicholls, 1984). Understanding an individual's emotions facilitates a deeper understanding of how they evaluate events (Smith & Ellsworth, 1985) and of their subsequent behaviour (Chadwick, 2015). The theory indicates that individuals set goals when they seek to succeed at challenging tasks or desire social validation through recognition (Maehr & Nicholls, 1980). GAT proffers that negative emotions, such as regret or guilt, may initially play a critical role in motivating tourists to reduce food waste, while positive emotions, such as hope, encourage them to develop stronger intentions to attain their goal (Goh & Jie, 2019; Saulters et al., 2017). Traditionally, research has adopted an 'either/or' approach, examining whether positive (or negative) emotions have a larger impact intentions, often through 'gain/loss' message framing (Khalil et al., 2022). For instance, 'we all win when we reduce waste' (generating hope) versus 'we all lose if we fail to reduce food waste' (generating regret or guilt). Aligned to GAT, rather than adopting an 'either/or' approach, this is the first study to investigate the interaction between negative and positive emotions that develops tourists' intentions to reduce food waste.

Governments have taken different approaches in response to food waste. Across Britain and North America, governments have focussed on food waste outcomes by implementing legislation, and formulating campaigns employing negative emotional appeals based on regret, guilt and fear (Skaf et al., 2021). For example, the United Nations' (2021) Think. Eat. Save campaign and the Australian Government's (2021) 'Love Food, Hate Waste' campaign focus on highlight the harmful outcomes of food waste behaviour for individuals, society and the environment. Skaf et al. (2021) explains that food waste contributes to the degradation of natural stocks and depletion of natural resources, hastens climate change and worsens food insecurity. Faced with this narrative, these researchers indicate that individuals experience fear (of hunger) or regret and guilt if they have contributed to food waste. It is claimed that framing messages in such a way works because consumers' food-wasting behaviours are exposed (or illustrated), which creates regret or guilt, and these negative emotions change behaviour (Skaf et al., 2021). However, alternative literature indicates appeals based only on negative emotions may not be effective in the long term (Witte & Allen, 2000). For example, Blondé and Girandola (2019) found the stronger the 'fear narrative' was, the less persuasive the message. This relationship can be explained through drive-reduction theories (see McGuire, 1968). Simply, when stimulating negative emotions, defensive reactions are more likely to occur. Such studies have identified that negative appeals invoke consumers' 'self-protection'—rather than taking positive steps, they simply fail to act (Brennan & Binney, 2010). Alternatively, research from positive psychology suggests that the employment of positive emotions within public campaigns may be the solution to reducing food waste (Porpino, 2016).

Despite the growing emphasis on the role of positive emotions, hope remains a relatively less explored concept in studies of food and tourism (Khalil et al., 2022). Hope is a positive emotion comprising two components: willpower (motivation) and pathway (action plans) (Snyder, 2005). Hope may induce motivations (e.g. considering food-waste reduction options) and action (e.g. taking less, sharing plates). Accordingly, we argue a combination of both guilt, regret and hope may more effectively encourage tourists to reduce food waste.

Theoretically, Brennan and Binney (2010) argue that the interaction between these emotions may result in sustaining pro-social behaviour. Schanes and Stagl (2019) describe that the act of wasting food defines an individual's 'social identity' (as a food-waster). To shift an individual's behaviour to consuming food sustainably, their role must be reconstructed to a new identity, as someone who 'values sustainable food consumption'. In line with GAT, the individual may experience positive or negative emotional reactions depending on their 'success' or 'failure' in attaining this goal (Schanes & Stagl, 2019). Hope works as a catalyst through instilling motivation in individuals by helping them devise ways to attain desired goals, i.e. consume more sustainably (Evans, 2014). This process of creating synergy between the new positive self and its actual

performance may be facilitated by moderating factors, such as ‘perceived social norms’, in developing intentions to reduce food waste. Hence, while previous research has examined both negative and positive emotions, goal attainment and intentions to mitigate food waste separately (Katt & Meixner, 2020; Septianto et al., 2020), this present study is the first to examine interconnecting relationships between them.

A PRISMA approach was employed to facilitate the systematic literature review (Moher et al., 2009). Scopus and Web of Science databases were examined for peer-reviewed academic articles published before June 2023. Studies were selected if they met the following conditions: (1) peer-reviewed and published in English; (2) discussed or tested ‘emotions’ that influenced intentions to reduce food waste; and (3) provided a full-text article. Studies excluded included: (1) non-peer-reviewed journal articles and/or published in any other language other than English; (2) only focused on non-relevant antecedents or consequences of tactics/strategies to reduce food waste (not specifically ‘emotions’ or ‘emotional responses’) or other irrelevant contexts, like ‘emotional intelligence’; and/or (3) full text not provided or inaccessible. The

Table 1. Systematic literature review on food waste and emotions.

References	Context	Measurement	Findings
Jabeen et al. (2023)	Household consumption	Positive emotions (optimism, pride) Negative emotions (guilt, frustration).	Delivery drivers’ positive/negative emotions impact on their attitude and behavioural intentions to reduce food waste.
La Barbera et al. (2022)	Household consumption	Negative emotions (anger, sadness, dislike, shame).	Negative emotions increase intentions (avoidance) to reduce food waste in households.
Mumtaz et al. (2022)	Hospitality	Anticipated positive emotions (pride, confidence).	Young consumers’ anticipated positive emotions impact food waste reduction intentions in restaurants.
Habib et al. (2021)	Consumer behaviour	Positive emotions (elevation, hope) and anticipated negative emotions (guilt).	Conceptually, negative emotions may encourage avoidance of unethical ‘made-to-order’ food products. Positive emotions may encourage intentions to buy.
Attiq et al. (2021)	Household consumption	Anticipated negative emotions (guilt).	Consumers with a higher level of anticipated guilt are more likely to avoid food waste.
Septianto et al. (2020)	Social marketing	Positive emotion (gratitude).	Individuals exposed to feelings of gratitude intend to reduce food waste.
Sheen (2020)	Hospitality	Positive emotions (optimism, pride, contentment).	Optimism, pride and contentment increase ‘plate-clearing’ tendencies to food waste.
Cooremans and Geuens (2019)	Retail marketing	Positive affect (positive state of mind).	Affective responses enhance taste perceptions, leading to increased purchasing and lower food waste.
Schanes and Stagl (2019)	Consumer behaviour	Positive emotions (sense of community).	Individuals’ positive sense of community to participate in food-sharing reduces food waste.
Yuan et al. (2019)	Consumer behaviour	Positive emotion (fun).	Feelings of ‘fun’ drive consumers’ intentions to buy imperfect (ugly) produce, reducing food waste.
Amato et al. (2019)	Household consumption	Positive emotions (joy and gaiety).	Individuals’ sense of joy and gaiety is negatively associated with food waste.
Chen et al. (2018)	Hospitality	Emotions are measured as positive/favourable attitudes.	Environmentally focused messages can evoke stronger positive attitudes in the context of preventing food waste in a buffet restaurant.
Russell et al. (2017)	Consumer behaviour	Anticipated positive/negative emotions (guilt, optimism, pride).	Respondents’ negative emotions increased intentions to reduce food waste. Anticipated effects of positive emotions on intentions to reduce food waste were nonsignificant.
Sirieux et al. (2017)	Hospitality	Negative emotions (guilt, regret, shame)	Diners avoided asking for a [restaurant] ‘doggy bag’ due to ‘shame’, while leaving leftovers produces regret and guilt.
Porpino (2016)	Household consumption	Research agenda: emotions (guilt, happiness).	Agenda suggests emotions (guilt and happiness) might help reduce food waste and improve sustainable consumption.
Graham-Rowe et al. (2019)	Household consumption	Negative emotions (guilt, regret, annoyance).	Qualitative interviews ($n=15$) found that households are motivated to reduce food waste to avoid experiencing negative emotions.

systematic literature review identified 91 studies. Only those studies that employed 'intentions to reduce food waste' and 'emotions' as measured constructs were selected. It was noted that within the tourism domain, no studies were identified based on these criteria, the literature being germane to consumer or household behaviour, social marketing, hospitality (restaurants) and retail. This criterion helped identify 16 relevant studies (see Table 1) on food waste and emotions.

The majority of earlier works examined household food-waste behaviours ($n=6$), followed by general consumer behaviour ($n=4$) and hospitality ($n=4$) studies. The remaining two works were germane to retail/social marketing. Four studies examined the influence emotions relating to food-waste behaviours; however, two of these were purely conceptual (Habib et al., 2021; Porpino, 2016). Four studies examined only the role of negative emotions, finding in line with existing knowledge, individuals demonstrated avoidance behaviours. Interestingly, Russell et al. (2017) identified that when experiencing guilt, respondents were more likely to increase food waste. This contradiction is explained by 'drive-reduction' theories (McGuire, 1968) that suggest motivating fear, regret or guilt will trigger defense mechanisms (e.g. defensive avoidance, denial). The remaining eight relevant works examined only positive emotions (pride, optimism, fun, joy, gaiety, gratitude). Of these, most employed positive emotions as an aggregate construct, and several used only 'anticipated positive emotions' constructs. In summary, no studies integrating 'hope' with 'intentions to reduce food waste' or studies that examine how the arousal of negative emotions (guilt, regret) may inspire positive emotions (hope), leading to goal attainment were identified within the tourism and vacation literature.

Hypotheses development

To address the research question through a GAT lens, a comprehensive set of testable hypotheses that examines the possible negative and positive emotions that might motivate tourists toward a goal of reducing food waste. Individuals may experience guilt if they believe their behaviours may negatively impact others (Kim et al., 2020), particularly, important social groups (family members, friends) (Katt & Meixner, 2020). Feelings of guilt may encourage individuals to develop a sense of obligation to correct their negative behaviour (Roe et al., 2020). This logic suggests that feelings of guilt are 'others focused' (Skaf et al., 2021). Guilt may also be a response to an individual's behaviour in relation to food waste. For instance, tourists eating at an all-inclusive resort restaurant may experience guilt when they 'over-fill their plate', recognising how their wasteful behaviours impact others or the environment (Khalil et al., 2022). Accordingly, it is hypothesised:

H1: *Tourists' perceived harm has a positive impact on their feelings of guilt.*

Food waste negatively impacts climate change (Nordin et al., 2020), finite resources, while increasing business costs and food insecurity (Barrera & Hertel, 2021). Accordingly, individuals may feel regretful after selecting food beyond their reasonable ability to consume (Sansone et al., 2013). An individual may perceive that the 'cost' of wasted food may exceed the 'benefits' of the food selected. These perceptions may give rise to regret—wasted money, and adverse effects on society, businesses and the environment (Septianto et al., 2020). It is argued that when a tourist selects too much food and then wastes it, they experience regret, understanding that their actions impose costs on others, society and the environment. Thus, it is hypothesised:

H2: *Tourists' perceived cost of food wastage has a positive impact on their feelings of regret.*

The moderating role of social norms

As explained by GAT and noted above, an individual's pursuit of a goal may be moderated by 'perceived social norms'. If reducing food waste is important to others, an individual may be more inclined to attain the goal of consuming more sustainably. An individual's social norms encourage a moral obligation to do 'the right thing' (Thürmer et al., 2020). These norms act as a compass for how to act, adhering typically to the conceptions of 'good or bad' and 'right or wrong' (Thøgersen, 2006). Social norms may encourage intentions to mitigate food waste (Lorenz et al., 2017). When individuals have values aligned with a broader society, they will likely comply with desired socially acceptable behaviours (McCarthy & Liu, 2017). Hence, tourists with higher perceptions of social norms may be influenced by peripheral cues to mitigate waste (de Groot et al., 2021).

When a tourist standing at a buffet loading up their plate becomes aware of society's desire to reduce food waste (e.g. signage or nudges), they may experience guilt or regret for their own behaviour and take steps to reduce their food waste (de Visser-Amundson, 2022). These perceptions of social norms may increase feelings of guilt and regret due to anticipated social disapproval. However, while feelings of guilt and regret originate from perceived harm and costs to others (and oneself), the direction of relationships is not linear for all individuals and depends on high or low levels of perceived social norms. Accordingly, it is hypothesised that without social norms, tourists' perceptions of harm and costs associated with food waste may not fully translate into guilt and regret so that they undertake the right actions of mitigating food waste and overcoming adverse consequences of food-waste behaviours:

H3: *Perceptions of social norms moderate the relationship between tourists' perceived harm and feelings of guilt.*

H4: *Perceptions of social norms moderate the relationship between tourists' perceived cost of food wastage and feelings of regret.*

Guilt and hope

Guilt is considered a negative emotion arising from one's perceptions of self-violation of norms (Ki et al., 2017). Simply put, individuals experience guilt when they perceive their acts as harming others or the environment (Stefan et al., 2013). The difference between guilt and regret is related to behavioural control and intentions preceding the action (Truelove & Nugent, 2020). People experience guilt when the action taken was done intentionally. On the other hand, regret is stimulated when individuals unintentionally cause harm and then wish to rectify the adverse effects of their actions. As a result of guilt, individuals who waste food will experience unpleasant feelings (Roe et al., 2020), and seek to take remedial action to mitigate those feelings (Truelove & Nugent, 2020). Thus, guilt encourages them to 'muster up their energy' and 'devise pathways' (will and ways) to find recourse. This motivation and course of action invoke the positive emotion of hope that they can rectify their wasteful behaviour. Despite our underpinning theoretical argument that supports the relationship between guilt and hope, no study has proposed and undertaken experiments to establish a causal link between them. Accordingly, we tested the following hypothesis by employing an experiment and survey:

H5: *Tourists' feelings of guilt have a positive impact on their hope to reduce food waste.*

Regret and hope

Regret is a negative emotion experienced when one appraises their unintentional actions and believe something better should have been done (Graham-Rowe et al., 2019). Regret has important implications for an emotional response to reducing food waste behaviour, such as hope (Sirieix

et al., 2017). For example, after being exposed to food sustainability messages/images at a buffet, a tourist who inadvertently wastes food may become aware that such behaviour is socially unacceptable (Do Carmo Stangherlin & De Barcellos, 2018) and consequently feel regretful. A tourist's feelings of regret motivate them to find ways to align their behaviour with social norms and, subsequently, they experience hope to change their wasteful behaviour (Burton & Smith, 2020). As with guilt and hope, the causal link between regret and hope has not been empirically established. Accordingly, the following hypothesis is tested by employing an experiment and survey:

H6: *Tourists' feelings of regret have a positive impact on their hope to reduce food waste.*

Hope and goal attainment

A goal is defined as a target, deliberately focussed upon, with the intention of attaining a positive result (Mantovani et al., 2018). Food-waste goal attainment by a tourist thus refers to a conscious effort to take action to save food and then feeling a sense of accomplishment when food waste is reduced. While TPB has often been employed in earlier works to examine food wastage (Setti et al., 2018), it does not fully explain the contribution of non-cognitive behaviour such as emotion (Russell et al., 2017). Food-related goals require positive emotions such as hope, which involves willpower and action plans (Rego et al., 2014). Hope thus consists of emotional (willpower) and behavioural (action) components. Importantly, a tourist may hope to reduce food waste yet not take action (Fazal-e-Hasan et al. 2019; Emmons et al., 2003). This is because hope is always future-oriented (Shorey et al., 2007) and shares some themes with the desire to achieve food-minimising goals. Tourists are more likely to recognise their role in preventing food waste if they experience positive emotions, rather negative emotions in isolation (Romani et al., 2018). This may be because hope signals the importance of an environmentally relevant issue and provides the motivational impetus for setting pro-environmental goals concerning food-waste minimisation. The argument, thus, leads to the seventh hypothesis:

H7: *Tourists' feelings of hope have a positive relationship with goal attainment.*

Goal attainment and intentions to reduce food waste

Intentions are related to the level of engagement within a particular behaviour. The immediate antecedent of behaviour is behavioural intentions (Ajzen, 2002). For example, a tourist may seek to mitigate food waste (behaviour) if they feel positive about reducing food waste (attitude), believe that their social network would disapprove if they wasted food (norms) and are confident in their efficacy to take action (self-control). We argue that this 'planned behaviour' may be augmented by including 'goal attainment' as an additional predictor of intentions, mainly because it relates to an individual's conscious desire to achieve food waste reduction goals. The relative strength of an individual's competing goals will determine behavioural intentions towards minimising food waste. This study considers goal attainment as 'the desire to achieve food waste reduction goals'; thus, a high level of goal attainment should strengthen a tourist's intention to reduce food waste, leading to the final hypothesis:

H8: *Tourist goal attainment has a positive relationship with intentions to reduce food waste.*

By integrating all the hypotheses, the following theoretical model is developed (see Figure 1).

Method

A mixed method approach was adopted to examine these relationships. First, an experiment (studies 1a and 1b) was utilised to examine the role of guilt and regret on tourist hope. Then,

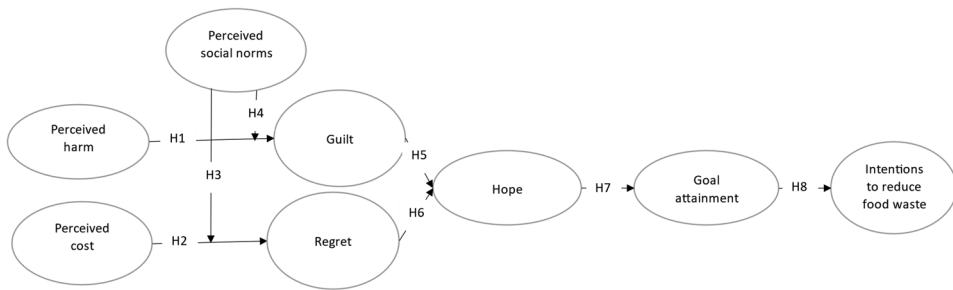


Figure 1. Theoretical model.

to expand the nomological network, the second study (an online survey) examined the relationship between variables in the conceptual model through structural equation modelling. All necessary ethics approvals were attained. Studies 1a and 1b—Ethics Approval Number HE18-007, Human Research Ethics Committee, University of OOO; and Study 2—Ethics Register Number: 2019-198E, Research Services, OOO University. All participants indicated informed consent after reading a participant information sheet that outlined the studies.

Study 1a: experiment and procedures

Study 1a investigated whether guilt about food waste increases tourist hope. A manipulation check was undertaken using the following question: *When waste leftover food, I feel (1 = low guilt, 7 = high guilt)*. Participants were primed with two short scenarios (high guilt vs low guilt) (see Appendix A), increasing or decreasing feelings of guilt. Amazon Mechanical Turk was employed to capture responses from 123 participants living in North America in May to June 2022 (average age = 38.58; 77 males, 46 females).

Participants were asked about their last travel experience (when and where) and their last dining experience as a tourist. Participants who advised that they had not travelled in the previous 12 months, failed integrity-check items, failed to fully complete the survey or completed too quickly were removed. After participants ($N=123$) had responded to the demographic questions, they were assigned to either a high/low guilt condition. Participants read a scenario that related to dining with family or friends at an all-inclusive resort (Appendix A). They were instructed to complete a manipulation-check question (employing a seven-point Likert scale) to measure the extent to which tourists feel guilty when they waste leftover food. Finally, participants responded to hope questions.

Results

A t -test validated the guilt manipulation: $t(121) = -3.89, p=0.000$. The participants with the high-guilt condition ($M=5.50, SD=0.95$) also indicated higher levels of hope when they wasted leftover food than those in the low-guilt condition ($M=4.71, SD=1.17$). Results demonstrated significant main effects of guilt on tourist hope ($F(1, 121) = 17.036, p=0.000$), supporting the prediction that if tourists feel highly 'guilty' while wasting leftover food, they feel more 'hopeful' they can mitigate food waste in the future.

Study 1b: experiment and procedures

Study 1b investigated if regretting food waste increased consumer hope. A manipulation-check question was employed for the independent variable (IV): *When I throw away leftover food, I feel (1 = low regret, 7 = high regret)*. Participants were primed with two short scenarios (high regret

vs low regret) (see [Appendix B](#)). Again, Amazon Mechanical Turk was employed to capture a sample of 143 respondents currently living in the United States in June to July 2022 (average age = 40.77; 88 males, 55 females). The same process described above was used to produce a clean sample. After participants responded to demographic questions, we assigned them to one high regret versus low regret condition ([Appendix B](#)). They were instructed to complete a manipulation-check question (employing a seven-point Likert scale: 1=no regret to 7=high regret). Finally, participants provided responses to hope questions.

Results

A *t*-test validated the regret manipulation: $t(141) = -6.325, p=0.000$. Respondents in the high-regret condition ($M=5.66, SD=0.82$) reported higher levels of hope when they waste food than those in the low-regret condition ($M=4.50, SD=1.34$). Results demonstrated significant main effects of regret on tourist hope ($F(1, 141) = 48.991, p=0.000$), supporting the prediction that if tourists feel highly 'regretful' while wasting leftover food, they feel more 'hopeful' they can mitigate food waste in the future.

Study 2: survey

While the two experiments identified implicit causal relationships between negative and positive emotions (regret and guilt to hope), this study sought to expand the nomological network of the constructs and relationships under investigation. Accordingly, a participant survey was employed.

Data collection and sampling

An Australian market research company was employed to source participants (August to September 2022). The participants were paid panel members of the market research company. A 'simple random sampling' technique was applied, whereby a survey link was randomly assigned to participants. The same process as described above was used to produce a clean sample of 290 participants. The sample consisted of $N=141$ males and $N=149$ females. Participants ranged from 18 to 84 years of age: 18–24 (9.7%), 25–34 (16.9%), 35–44 (20.3%), 45–54 (20.3%), 55–64 (16.9%), and 65 and above (15.8%). A mix of employment statuses was identified, including full-time (36.9%), part-time (21.4%), home duties (8.3%), student (6.6%), retired (18.3%) and unemployed (8.6%).

To ensure the quality of responses and to avoid recency bias, screening questions ensured that participants had travelled and had a dining experience in the past 12 months. Before being presented with the items, respondents were instructed to reflect on their last vacation and specifically their dining experience. Those participants who had not travelled and dined in the previous 12 months were exited at this point. Previously well established, validated scale measures from the extant literature were employed (see [Table 2](#)): three items measured 'perceived harm' (Baha & Le Faou, 2010), four items measured 'perceived cost' (Effertz & Mann, 2013), four items measured 'guilt' (Jones et al., 2000), three items measured 'regret' (Sansone et al., 2013), four items measured 'perceived social norms' (Thøgersen, 2006), three items measured 'state hope' (Snyder et al., 1996) and three items measured 'goal attainment' (Elliot & Murayama, 2008). Respondents intention to mitigate their food waste was captured with four items (Visschers et al., 2016). Items were randomised throughout the online survey. Content validity was established by having three external experts review all items for ambiguity (Netemeyer et al., 2003), ensuring that each item represented each dimension.

Common method bias

We employed both Harman's single-factor test and the 'Common Marker' variable technique to reduce systematic measurement error (Podsakoff et al., 2003). All the manifest variables were

explained *via* one common factor in this test, and the one-factor and multifactor models were compared *via* a chi-square difference test. Results indicated that the chi-square difference between both models was significant ($\Delta\chi^2 = 1316.308/351 - 767.98/322 = 548$, $df=29$; $p < 0.05$), which reflected that the measurement model is robust to common method variance. The Common Marker test was also used (Fuller et al., 2016). In this test, the common variance is the square of the common factor of every path (before standardisation). The threshold was set to 50%. The result of our test was below the threshold.

Data analysis

Confirmatory factor analysis

Confirmatory factor analysis (CFA) was conducted using AMOS 27, and the fit indices were acceptable (Table 2). Table 2 further illustrates that the inter-item consistency (α) and composite reliability (CR) scores were above the recommended threshold (i.e. 0.70), confirming good reliability. The reliability of 'perceived harm' was 0.675, which is conservatively acceptable (Bagozzi & Yi, 1988).

Table 2. Confirmatory factor analysis estimates.

Construct	Items	Item loadings	Z-score	Cronbach's alpha	CR	AVE
PH1	Wasting food is harmful to the environment.	0.512	8.457	0.675	0.648	0.484
PH2	My food waste may be harmful to others' health.	0.638	10.457			
PH3	My food waste may cause difficulties for others.	0.694	1	0.785	0.799	0.501
PC1	I spent considerable money on food that was wasted.	0.766	12.196			
PC2	I can save money if I stop wasting food.	0.589	9.391			
PC3	Wasting food costs me money.	0.734	11.701			
PC4	If the government penalised my food waste, it would be costly.	0.729	1	0.858	0.860	0.607
GU1	I often feel 'not right' with myself because of wasting food.	0.727	1			
GU2	I feel guilty because of my food-wasting behaviours.	0.745	12.509			
GU3	It feels unpleasant to identify myself as a food waster.	0.810	13.640			
GU4	When I waste food, my conscience bothers me.	0.829	13.983	0.702	0.740	0.500
REG1	Anytime I waste food, I feel regretful.	0.758	14.002			
REG2	I am ashamed that wasting food has lowered my quality of life.	0.567	10.067	0.810	0.809	0.517
REG3	I am remorseful about wasting food.	0.760	1			
PN1	My society disapproves of food waste.	0.832	1			
PN2	My friends believe that I should not waste food.	0.728	13.958			
PN3	My family disapproves of wasting food.	0.680	12.735	0.776	0.775	0.536
PN4	People around me expect that I should not waste food.	0.620	11.306			
SH1	If I found myself to be a food waster, I could think of ways to reduce food waste.	0.688	1	0.796	12.548	
SH2	At the present time, I am pursuing my goals to reducing food waste.	0.796	12.548			
SH3	Currently, I am hoping to achieve my goals in relation to reducing food waste.	0.707	11.240			
GA1	My goal is to reduce food waste better than others.	0.800	14.920	0.832	0.834	0.626
GA2	I am striving to reduce food waste ahead of others like me.	0.788	14.641			
GA3	My aim is to limit wasting food relative to others.	0.786	1	0.874	0.875	0.636
IFW1	I am willing to reduce food waste in the future.	0.803	13.824			
IFW2	I am willing to invest energy to reduce food waste.	0.730	1			
IFW3	I intend to reduce food waste.	0.806	15.780			
IFW4	I am planning to reduce food waste.	0.847	16.943			

Fit indices: $\chi^2 = 767.980$ $df = 322$, $\chi^2/df = 2.385$, ($p < 0.01$), CFI = 0.915, SRMR = 0.056, IFI = 0.916 and RMSEA = 0.069.

PH: Perceived Harm; PC: Perceived Cost; GU: Guilt; REG: Regret; PN: Perceived Social Norms; SH: State Hope; GA: Goal Attainment; IFW: Intentions to Reduce Food Waste.

Table 3. Discriminant validity.

No.	Variable	1	2	3	4	5	6	7	8
1	Perceived harm	1.000							
2	Perceived cost	.505	1.000						
3	Guilt	.759	.542	1.000					
4	Regret	.702	.657	.781	1.000				
5	Perceived social norms	.660	.446	.665	.607	1.000			
6	State hope	.669	.576	.712	.663	.651	1.000		
7	Goal attainment	.692	.477	.753	.714	.651	.775	1.000	
8	Intentions to reduce food waste	.642	.719	.720	.754	.629	.772	.700	1.000

(N=290). All values are significant at $p < 0.01$.

Table 4. Path analysis.

Hypothesis	Estimates	Z-value	p value
Perceived harm → Guilt	0.095	5.003	0.000
Perceived cost → Regret	0.060	2.493	0.013
Perceived harm*Perceived social norms → Guilt	0.080	2.460	0.000
Perceived cost*Perceived social norm → Regret	0.556	5.831	0.000
Guilt → State hope	0.171	1.446	0.148
Regret → State hope	0.782	6.008	0.000
State hope → Goal attainment	0.763	11.777	0.000
Goal attainment → Intentions to reduce food waste	0.720	14.130	0.000

$\chi^2 = 703.417$, $df = 257$, $\chi^2/df = 2.737$ ($p < 0.01$), CFI = 0.934, IFI = 0.934, SRMR = 0.056, and RMSEA = 0.078.

Significant item loadings ($p < 0.01$) support the constructs’ convergent validity. With the exception of ‘perceived harm’ (0.484), the average variance extracted (AVE) of all constructs was greater than the threshold score (i.e. 0.50), ensuring all constructs attained convergent validity.

Discriminant validity was established using the HTMT test. Henseler et al. (2015) suggested that the HTMT value between constructs should be < 0.90 . The HTMT value of each variable was less than the threshold value (i.e. 0.90), which indicated discriminant validity between the four latent variables (see Table 3). For multicollinearity, two constructs presented slightly elevated correlations with one another. Accordingly, we employed Bagozzi et al. (1991) chi-square difference test to investigate the discriminant validity between ‘perceived social norms’ and ‘intentions to mitigate food waste’. The chi-square difference test returned significant values for each ($\Delta\chi^2 = 32.47/19 - 38.03/20 = 5.563$, $df = 1$, $p < 0.05$), indicating that multicollinearity between these two constructs was not an issue. Further, these two constructs are well established, well researched and grounded in the literature with several validated scales (see Attiq et al., 2021). For data normality, before applying the AMOS test, we checked data for normality at the item level and construct level, and data were normal at both levels. Several outlier responses were deleted at the data-cleaning stage.

Path analysis

We employed AMOS 27 to test the relationships between variables. Table 4 shows the adequacy of fit indices of this structural model, and all hypotheses are supported, except H5.

Mediation analysis

Table 5 demonstrates the indirect effects of the IVs on the dependent variables (DVs) through mediators (Zhao et al., 2010). According to the results, all indirect effects are significant between

Table 5. Indirect effects.

Mediation	Independent variable (IV)	Dependent variable (DV)	Point estimates	(95% CI) Bootstrapping (Lower bound–Upper bound)
Perceived harm → Guilt → State hope	Perceived harm	State hope	-.064**	(-.128)–(-.031)
Perceived cost → Regret → State hope	Perceived cost	State hope	-.047	(-.137)–(.002)
Perceived harm and social norm → Guilt → State hope	Perceived harm and Perceived social norm	State hope	.694**	(.517)–(.914)
Perceived cost and Perceived social norm → Regret → State hope	Perceived cost and Perceived social norm	State hope	.435**	(.281)–(.687)
Guilt → State hope → Goal attainment	Guilt	Goal attainment	.690**	(.551)–(.838)
Regret → State hope → Goal attainment	Regret	Goal attainment	.805**	(.502)–(.1.353)
State hope → Goal attainment → Intentions to reduce food waste	State hope	Intentions to reduce food waste	.987**	(.943)–(1.024)

($N=290$), **values are significant at $p < 0.01$.

the respective IVs and DVs, except perceived cost, which leaves a nonsignificant indirect effect on state hope through the mediating effect of regret (Figure 2a,b).

Findings and discussion

All hypotheses were accepted, other than H5. Findings of study 2 (the survey) extend support to studies 1a and 1b (the experiments). Broadly, study 1 provided an overarching picture of the phenomenon, indicating that participants within the high-guilt/high-regret condition reported higher levels of hope that they could reduce food waste than those in the low-guilt/low-regret condition. Study 2 highlights the impact of social norms in motivating guilt and regret for tourists' food-waste behaviours. By accounting for an indirect effect caused by hope in the relationship between guilt and regret and intentions to reduce food waste, study 2 empirically confirms tourist food waste reduction intentions as a 'will and way' process. Therefore, the findings indicate that negative emotions, including guilt and regret, are not enough in isolation to develop intentions to reduce food waste. Instead, a tourist's hope for achieving a goal (reducing food waste), accompanied by an intent to do so, can invoke the pathways to reducing food waste. Hence, tourists with high levels of hope may better manage and attain their objectives (goals) of reducing food waste (Messner et al., 2020).

fsQCA

The authors adopted fsQCA to examine the combinations (or configurations) of tourists' characteristics that may be necessary to produce the outcome 'intention to mitigate food waste' behaviour (see Alsuwaidi et al., 2022). For instance, some tourists may not identify 'cost' and 'regret' as important factors, instead considering 'harm' and 'guilt' to be vital for building intentions to reduce food waste. This additional analysis contributes to a deeper knowledge of tourist food-waste behaviours. The same dataset was employed (survey) and examined to identify 'logically simplified statements' that specify different configurations of tourists' characteristics. These configurations of characteristics are a specific set of causal synergetic variables that serve as a set of causal factors indicating an outcome.

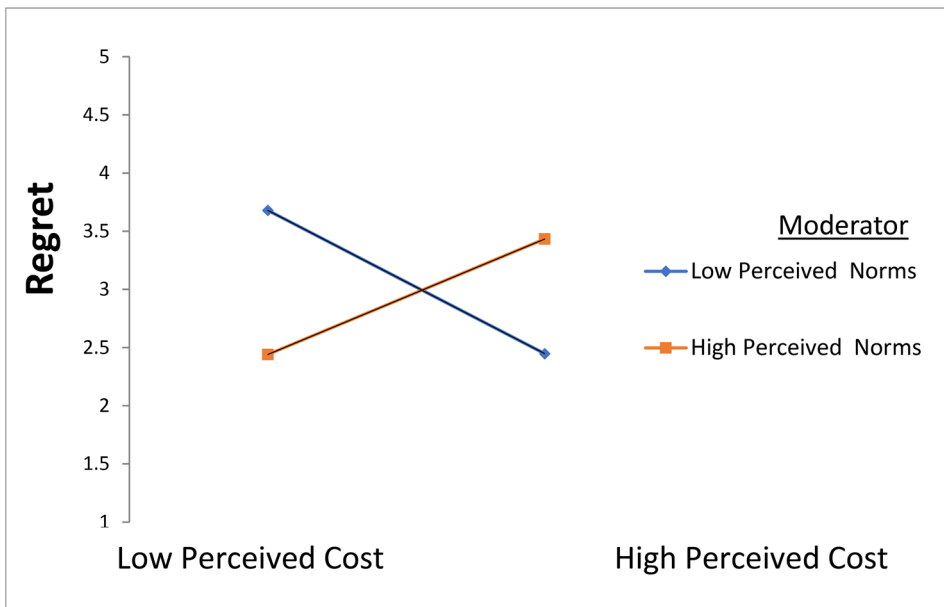
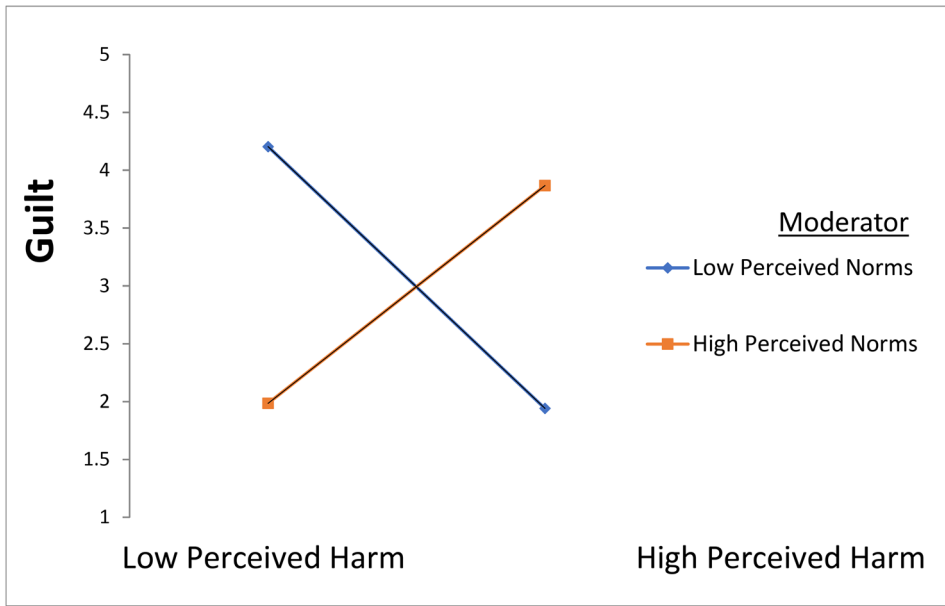


Figure 2. (a) Slope analysis. (b) Slope analysis.

fsQCA and results

'Intention to mitigate food waste' was identified as the outcome of the fsQCA. The conditions resulting in the appearance or non-appearance of the outcome are investigated in this section (see Mazzucchelli et al., 2021). A black circle (●) denotes the presence of a condition, whereas an open circle (⊗) denotes its absence. As suggested by Ragin (2008), a consistency level of 0.8 was considered appropriate to attain the solution. The configurations that led to high levels of intention to mitigate food waste are shown in Table 6.

Table 6. Configurations leading to intentions to reduce food waste.

	Conscious tourists	Harmless tourists	Moral tourists	Thrifty tourists
Configuration number	1	2	3	4
Perceived cost	●	●	⊗	●
Perceived harm	●	⊗	●	⊗
Perceived social norms	●	●	●	⊗
Guilt	●	●	●	⊗
Regret	⊗	●	●	⊗
Hope	⊗	●	●	⊗
Goal attainment	●	●	●	⊗
Row coverage	0.333	0.568	0.561	0.279
Unique coverage	0.026	0.039	0.038	0.065
Consistency	0.959	0.973	0.960	0.846
Solution coverage		0.707		
Solution consistency		0.900		

The reoccurring element present in all but one configuration was the presence of ‘perceived cost’. Configuration 1 identifies that the presence of all conditions except ‘regret’ and ‘hope’ can lead to higher intentions to mitigate food waste. Described as ‘conscious tourists’, this group was ‘aware’ of the cost and harm food waste creates and the normative social pressures to reduce food waste. This group experienced the negative emotion of guilt but not regret, suggesting that conscious tourists have experienced guilt when the action they have taken (or failed to take) was intentional; they want to mitigate food waste but are unable to develop the emotional (willpower) and behavioural (action) components—that is, the hope—to do so. Configuration 2, labelled ‘harmless tourists’, indicates a segment that recognises the costs but not the harm food waste may cause to others or the environment. Unlike conscious tourists, this segment experiences regret (for unintentionally wasting food) but appear to have hope to change their actions. Configuration 3, labelled ‘moral tourists’, illustrates a segment that cares more about the environment and others than about financial cost. The most interesting configuration identified in this study is Configuration 4, ‘thrifty tourists’, which refers to the presence of perceived cost only, and indicates the importance of perceived cost as a factor that can result in higher intentions to reduce food waste.

Discussion

Research on unsustainable consumption habits has highlighted the impact of negative emotions as antecedents for reducing food waste (Russell et al., 2017); however, the important role of positive emotions, like hope, have been previously overlooked. While the positive emotion of hope has attracted considerable attention in psychology and other cognitive disciplines (Fazal-e-Hasan et al., 2021), the use of hope in discouraging food-waste behaviour in tourism has not been studied until now. This current study demonstrates the important interaction between guilt, regret and hope in sustaining pro-social behaviour, and higher intentions to mitigate food waste (Brennan & Binney, 2010). Schanes and Stagl (2019) describe how the act of wasting food defines an individual’s ‘social identity’; hence, to shift a tourist’s behaviour to consuming food sustainably, their perceptions of ‘self’ must be reconstructed to a new identity, as someone who ‘values food sustainability’.

Following the approach taken by Alsuwaidi et al. (2022), the outcomes of the fsQCA identify the configurations of tourists’ characteristics that produce higher levels of food waste mitigation intentions. The results of the configurational analysis confirm that perceived cost is an important factor that can lead to intentions to reduce food waste. *Conscious tourists* appear to experience guilt after intentionally wasting food, but also lack any hope to change. *Harmless tourists* appear unable to connect the harm of their food waste behaviours to ‘others’ or the ‘environment’. *Moral tourists* signal a greater concern for the environment and others than for financial cost,

while *thrifty tourists* are motivated to reduce food waste due to perceived personal cost. The findings related to the moderation effect indicate a substantial relationship between perceived harm and guilt, and perceived cost and regret. This suggests that perceived social norms do play a dominant role in tourists' emotional responses arising from their perceptions that their unsustainable behaviours cost and cause harm to themselves, others and society. Interestingly, the coefficient value of the interactive effect between 'perceived cost' and 'social norms' ($B=0.556$) is significantly higher than the coefficient value of 'perceived social norms' (0.080) on the effect of 'perceived harm' on 'guilt'. This indicates that the 'cost' of food waste is a vital motivator to changing behaviours. Like the work of Schanes and Stagl (2019), this research recommends strategies to stimulate hope in tourists that enable their social connections to assist them in reducing food waste, that is: 'Together, we can reduce food waste'.

Theoretical implications

Underpinned by goal attainment theory, this new work contributes to sustainable tourism literature by demonstrating how tourists' negative and positive emotions interact to motivate their intention to mitigate food waste. This new work theorises that tourists' emotions drive their behavioural intentions toward the goal of consuming food sustainably. The study's findings confirm that the traditional 'either/or' approach (either 'gain' or 'loss') to message framing is insufficient to encourage tourists to take action to consume food more sustainably when on holidays, at a fully inclusive resort or on a cruise ship. Instead, it appears the interaction between these varying emotions motivate tourists' intentions to mitigate food waste. This study poses regret and guilt as emotions common among tourists who waste food (e.g. Attiq et al., 2021). It indicates that these negative emotions can stimulate hope in tourists to reduce food waste, but not in isolation, as hope is required to attain food-waste goals. Guilt has no significant impact on hope; thus, it is theorised that guilt develops due to harm to others and when self-perceived by study subjects (Ki et al., 2017). This perception will result in a feeling of loss. In other words, guilt is an outcome of the emotional evaluation of others and of being self-directed in doing harm, and does not cause consumers who waste food to think positively and objectively per se. Therefore, the negative emotion of guilt may be offset by developing perceptions that food-collection agencies will recycle the waste and minimise the adverse effects of individuals' unsustainable food-waste behaviour.

Managerial implications

Managerially, this study suggests that anti-food-waste mass media campaigns should leverage the interaction between avoidance and goal-directed emotions. Practically, this research provides the tourism industry and policy-makers with a better understanding of: (1) what anti-food-waste communication strategies might succeed with certain groups of tourists; and (2) how hopeful tourists may achieve their personal goals by reducing food waste to contribute to better socio-economic and environmental outcomes. In contrast to traditional 'avoidance' approaches to anti-food-waste behaviours (fear, regret or guilt) (Chen & Jai, 2018), the current study asserts that anti-food-waste campaigns should also consider positive emotions. Messages, or imagery that signal social norms and inspire goal-directed outcomes, have been used to positively influence individuals' waste behaviours (Salazar et al., 2021). Rather than framing only negative messages, like 'Food waste harms the environment', tourism operators should present positive messages that inspire hope for more sustainable outcomes, like 'Planning meals helps you to reduce your food waste' (see Bretter et al., 2023); or 'We can prevent food waste—save our precious natural resources and feed more people in the world' (see Chen & DeSalvo, 2022); or 'We are dedicated to reducing food waste as much as we can to benefit our local communities/society and the world' (see Zhang et al., 2020).

Managers should provide ways tourists can attain food-waste reduction goals (i.e. displaying images of suggested portion sizes at buffets). Drawing tourists' attention to financial costs may maximise tourists' efforts toward more sustainable food consumption (Barrera & Hertel, 2021). For example, 'We are a small family-owned hotel. Please help us reduce food waste, so we can continue to offer amazing vacation experiences'. Finally, educating tourists about food sustainability practices may result in higher intentions to reduce food waste. Kim and Hall (2020) found restaurants that communicated and demonstrated waste reduction practices positively impacted diners behaviours, that is, greater enjoyment, loyalty and being more likely to engage in sustainable and waste reduction practices. Like the work of Schanes and Stagl (2019), the present research recommends strategies to stimulate hope in tourists that enable their social connections to assist them in reducing food waste, that is, 'Together, we can reduce food waste'. Reinforcing these societal expectations may generate hope for a positive outcome (i.e. a sustainable environment) and strengthen the desire to refrain from wasting food (Khalil et al., 2022).

Future research and limitations

A longitudinal research design may develop deeper insights into intervention strategies to reduce food waste, while overcoming the limitation of a cross-sectional design (de Visser-Amundson, 2022). Such a design may unearth the nonlinear nature of emotional responses in the food-waste context, taking into consideration any temporal effects or compassion fade. This research does not distinguish between heavy, medium and light food-waste behaviour, which might be a potential research avenue. A study focusing on group moderation for 'usage frequency' may bring some insights and suggest alterations to the existing model. We adopted state hope in our research design, however, future research may focus on the enduring nature of hope; that is, people with a high level of hope as a trait of their personality compared to those whose hope is based on a particular stimulus (state hope). The scope of this design may also be extended to draw a comparison between contexts, that is, all-inclusive resorts vis-à-vis cruise ships or airport lounges. Finally, our model may be useful for other avoidance contexts that impact the tourist sector, such as waste of water, electricity, towels and bedding.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix A

High guilt

Imagine you are on holiday, dining with family/friends at an all-inclusive resort. After dinner, you see many of your family/friends have leftover food on their plates. As the servers clean up, you feel highly guilty. You realise that the food left over would need to be thrown out because of your, and your family's/friends' actions. This waste may cause harm to the environment, the sustainability of ecosystems, the financial viability of the resort and the physical health and wellbeing of others.

Low guilt

Imagine you are on holiday, dining with family/friends at an all-inclusive resort. After dinner, you see many of your family/friends have leftover food on their plates. As the servers clean up, you feel a little guilty. However, you realise that all food left over would normally be thrown out anyway. This waste most likely won't cause too much harm to the environment and the sustainability of ecosystems, as it could be composted. Resorts factor food waste into their financial viability and control for the physical health and wellbeing of others.

Appendix B

High regret

Imagine you are on holiday, dining with family/friends at an all-inclusive resort. After dinner, you see many of your family/friends have taken too much food and unintentionally left food on their plates. As the servers clean up, you feel highly regretful. You realise that the food left over would need to be thrown out because of your, and your family's/friends' actions. You realise that your and your family's/friends' actions may have a significant cost to the resort and the environment.

Low regret

Imagine you are on holiday, dining with family/friends at an all-inclusive resort. After dinner, you see many of your family/friends have taken too much food and unintentionally left food on their plates. As the servers clean up, you feel a little regretful. However, you realise that all food left over would normally be thrown out anyway. You think that preserving the food for later use may deteriorate the food quality, which may cause physical illness. Resorts factor food waste into their financial viability and control for the physical health and wellbeing of others.