

Sustainable green dining: The power of responsible consumption and waste reduction on revisit intention

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ABSTRACT

This research examines the determinants of consumers' revisit intention to green restaurants, drawing on the cognitive theory of emotion (CTE), the theory of interpersonal behaviour (TIB), and mood management theory (MMT). Specifically, the study explores how extrinsic factors (restaurant food sustainability and waste reduction practices) and intrinsic factors (excessive food ordering, responsible planning, and face-saving behaviour) influence perceived positive and negative moods, which in turn shape restaurant revisit intention. Additionally, the moderating role of responsible consumption behaviour (e.g., using doggy bags for leftovers) is examined. A total of 524 responses were collected from the Greater Bay Area, with data analysed using a quantitative approach via PLS-SEM. Results showed that food reduction practices impact perceived negative mood on food waste while waste reduction significantly affects both positive and negative moods. Individual excessive food ordering positively influences perceived positive mood and responsible planning positively impacts negative mood. More, responsible consumption behaviour influences the connections between mood and revisit intention to green restaurants, highlighting how habitual sustainability practices contribute to generating long-term pro-environmental dining behaviours. This study advances theoretical understanding by integrating cognitive, emotional, and social factors in sustainability-driven consumption. Practically, findings suggest that green restaurant managers should promote portion-transparent strategies, right-sized meal promotions, and eco-friendly takeaway packaging to reduce food waste. Finally, promoting eco-friendly takeaway options can mitigate food waste while preserving social image concerns.

1. Introduction

Global warming triggers global concerns, with the restaurant industry contributing significantly to these issues through food waste generation and air pollution. Food waste poses significant challenges not only to environmental sustainability but also to economic and societal well-being, particularly in urban areas where large-scale consumption occurs [1]. It is commonly defined as the portion of food originally intended for human consumption that is degraded, discarded, or lost at various points along the food supply chain [2]. Recent statistics indicate that urban regions in China create an alarming 137 million tonnes of food waste annually, with 55 million tonnes classified as edible waste leading to a substantial loss of resources [1]. The Chinese authorities recently launched an action plan on grain conservation and food waste

elimination [3]. This plan shows comprehensive strategies on the aspects of production, transportation, storage, and consumption to develop a sustainable food system in the long run. In Hong Kong, food waste is also a major challenge. The Environmental Protection Department reports that in 2022, a mean amount of 11,130 tonnes of municipal solid waste (MSW) was discarded every day, with food waste taking the biggest part at 30 % amongst other categories in MSW [4]. Given that developed countries contribute significantly to global food waste, addressing this issue requires fostering pro-environmental attitudes to discourage unsustainable consumption behaviours [5–7]. The environmental costs of food waste extend beyond discarded food. They also include resources consumed during food production and carbon emissions generated throughout the supply chain. Therefore, addressing food waste reduction is critical to minimising environmental degradation

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across the food life cycle. This research uses a more specific definition focusing on edible food waste at the consumption level in restaurant environments where uneaten food is discarded [8].

In response to these challenges, the hospitality industry has increasingly adopted green practices in reducing environmental impact, particularly through food waste reduction. However, how to ensure customer retention in green restaurants? Examining the variables influencing restaurant revisit intention is important, as repeat diners not only contribute to the economic sustainability of green restaurants but also reinforce sustainable consumption habits. While previous research has examined pro-environmental dining behaviours [9,10], limited studies have jointly explored extrinsic restaurant initiatives and intrinsic individual dining habits in shaping customers' emotional responses and subsequent revisit intentions.

Sustainable practices in green restaurants, such as minimising food waste, reducing use on single-use plastics, encouraging recycling, and sourcing local organic ingredients play a crucial role in reducing the hospitality sector's carbon footprint [11,12]. Beyond environmental benefits, these practices align with the growing consumer demand for sustainable dining options [13]. Such green restaurants can gain a competitive advantage [14], enhancing their brand image [15] and increasing customers' willingness to spend extra for eco-friendly dining experiences [16]. Waste reduction is an important part of sustainable dining [10]. However, most studies focus on how restaurants promote sustainability rather than how these efforts influence diners' behaviour [10].

How can green restaurants achieve both economic and environmental benefits from adopting sustainable practices while simultaneously generating customer retention? This study contributes to the literature by exploring the psychological and behavioural factors shaping revisit intention in green restaurants [17]. Specifically, this research focuses on three key areas. First, this study explores cultural influence of face-saving or '*mianzi*', describing the reputation and status in interpersonal interactions. This social norm shapes consumer behaviour, particularly in Confucian societies where maintaining social status and avoiding embarrassment are highly valued [18]. Despite prior research on food waste practices and revisit intentions, limited studies have examined how these behaviours vary across different cultural contexts. This study incorporates face-saving behaviours into the discussion of food waste practices [19–21], offering valuable insights into how social image concerns impact dining behaviours in green restaurants.

Second, this study introduces a mood management approach, offering a novel psychological lens to understand restaurant diners' behaviours [22,23]. While moods in both positive and negative aspects are recognised as non-cognitive determinants of behaviour, existing literature has not sufficiently explored their role in shaping food waste perceptions and revisit intentions [24]. This study investigates how extrinsic (restaurant sustainability and waste reduction practices) and intrinsic (excessive food ordering and responsible planning) stimuli, as well as face-saving behaviour, influence perceived positive and negative moods, which in turn affect restaurant revisit intention. Finally, this study examines responsible consumption behaviour, particularly the use of takeaway doggie bags, as a moderating variable in the relationship between mood and intention to revisit. Using doggie bags for leftovers is an environmentally responsible food waste reduction practice that aligns with sustainable consumption goals [19,20,25]. While past studies have examined food waste reduction, few have studied how regularly using doggie bags affects the link between emotions and the intention to revisit a restaurant. This study addresses this gap by exploring how responsible consumption strengthens the connection between mood and revisit intention in green restaurants.

Moreover, this study contributes findings into sustainable dining and food waste reduction by integrating three theoretical frameworks: cognitive theory of emotion (CTE), theory of interpersonal behaviour (TIB), and mood management theory (MMT). CTE suggests that

emotions arise from cognitive evaluations of environmental stimuli [26], showing that restaurant sustainability practices and personal dining habits evoke emotional responses that influence behavioural intentions. TIB emphasises habitual and social influences on behaviour [27], highlighting how culturally embedded norms, such as over-ordering to maintain social status (*mianzi*) develop food waste behaviours. Lastly, MMT explains how individuals manage emotional discomfort [28], such as guilt from food waste, through behavioural adjustments, such as using doggy bags or revisiting sustainable restaurants. The findings offer practical implications for green restaurant managers, demonstrating how sustainable practices can be leveraged to enhance customer retention. Additionally, this study advances the mission of *responsible consumption and production* from the United Nations Sustainable Development Goal (SDG) 12 [29], providing actionable strategies to promote sustainable dining behaviours.

The structure of this paper is as follows. Section 2 presents theories on food waste behaviour, leading to the development of conceptual model and hypotheses. Section 3 outlines research methodology, including sampling, data collection, measurement items, and structural model. Section 4 presents findings and explores their theoretical and practical implications, with discussion of limitations and directions for future research. By examining the psychological and social drivers of revisit intention, this study seeks to enhance knowledge by understanding sustainable dining practices, consumer emotions, and food waste reduction, ultimately contributing to the long-term prospects of green restaurants while promoting environmental responsibility.

2. Literature review

2.1. Cognitive theory of emotion (CTE)

Cognitive theory of emotion (CTE) suggests that emotions arise through an interaction between environmental stimuli, cognitive processes, and physiological responses [17,26]. Food sustainability and waste reduction practices of restaurants serve as external stimuli. Individual consumption habits, with excessive food ordering and responsible planning represent internal cognitive factors that shape emotional responses [30]. These emotions influence restaurant revisit intention, as moods play a mediating role between cognitive processing and behaviour formation [31]. Using CTE, this study explores how green restaurant practices affect diners' emotions and food waste behaviours. This process offers useful insights into consumer choices and helps develop strategies to reduce food waste through emotional engagement.

2.2. Theory of interpersonal behaviour (TIB)

Triandis's [27] theory of interpersonal behaviour (TIB) presents an integrative perspective on environmental behaviour with cognitive, social, and emotional factors [32]. TIB suggests five key components of behaviour: intention, affect, habit, social norms, and facilitating conditions [33]. Indeed, an individual's motivation to return to a green restaurant can be influenced by attitudinal, normative, and identity beliefs, while habitual behaviours, such as excessive food ordering or responsible planning, determine the frequency and routinisation of these actions [33]. TIB also emphasises the role of affect (i.e. emotions or mood states). They can be evoked by dining experiences and form future behavioural decisions [27]. Additionally, social norms or face-saving behaviour (*mianzi*) in Chinese societies play a significant role in food consumption practices as individuals may over-order food to maintain social status or avoid embarrassment in Chinese dining culture. Finally, facilitating conditions, that is the availability of doggy bags or takeaway containers, can support environmentally responsible waste reduction behaviours. This study applies TIB to explore how habitual and social influences interact with emotions to form food waste behaviour and revisit intention. It also examines the role of responsible consumption behaviour as a moderating factor, with a specific focus on face-sensitive

dining contexts [19,20,25].

2.3. Mood management theory (MMT)

Mood management theory (MMT) explains how individuals regulate their emotions through behavioural choices in sustainable dining experience [17,28]. This study applies MMT to examine how external stimuli from green restaurant practices, cognitive factors from individual food ordering habits, and social norms of face-saving behaviour influence perceived mood states, and subsequently shape revisit intention. This study further categorises perceived mood into positive and negative emotions [24]. Diners may feel good at green restaurants because sustainable dining supports their environmental values, creating pride and satisfaction [34]. Conversely, negative moods such as guilt and frustration may arise when individuals witness food waste at social gatherings, particularly in cultural contexts where excessive ordering is common [18]. MMT suggests that individuals engage in behaviours aimed at mood regulation, meaning that those who experience food waste guilt may be more likely to modify future consumption behaviours, including their intention to revisit green restaurants. Furthermore, emotions serve as strong motivational forces that demonstrate in external behaviours, influencing decision-making processes and consumption patterns [35]. As dining experiences evoke diverse emotional responses, individuals' revisit intentions vary based on their emotional associations with food waste and sustainability efforts. This study builds on MMT by examining how mood states affect the relationship between dining experiences and revisit intention, offering insights into emotional drivers of sustainable consumption choices.

2.4. Extrinsic stimuli to perceived moods

Green or sustainable restaurants are dining establishments that adopt environmentally responsible practices, particularly in food sourcing and waste management [36,37]. Food sustainability and waste reduction practices serve as extrinsic stimuli, directly influence diners' emotional responses [10]. While prior studies extensively investigated the adoption of green practices in the restaurant context [38–40], there is still a lack of understanding of how these practices shape consumers' moods and subsequent behavioural intentions.

Food sustainability practices and emotional responses. Green restaurants implement food sustainability strategies such as sourcing organic, seasonal, and Fair Trade products, aiming to reduce environmental impact and promote ecological balance [41,42]. For instance, the use of various organic food and sustainable seafood are proven to be fundamental and necessary practices for green restaurants through reduction in both using fertilisers and pesticides and methods which impair marine habitats and biodiversity respectively in the process [19]. That said, the imposition of such green practices not only adheres to certain local food safety laws but could also contribute to responsible agriculture and fishing practices thanks to the active conservation of biodiversity in farms and the waves [43]. Sustainable restaurants also employ informational strategies, such as menu labelling that includes nutrition details and carbon footprint indicators. Studies suggest that providing such information enhances consumer perceptions of sustainability efforts, with diners responding positively to climate-friendly menus [44]. Notably, these sustainability messages do not negatively influence customer satisfaction [45], reinforcing the idea that transparency in food sustainability efforts can shape consumer attitudes and emotions. These initiatives all align with environmental values but may also evoke mixed emotional responses among diners. Additionally, sustainability-conscious consumers may experience positive moods as they perceive their dining choices as ethically responsible [34]. Nevertheless, awareness of food sustainability concerns, such as resource-intensive agricultural practices and marine habitat destruction, may trigger negative emotions, particularly when diners feel complicit in unsustainable consumption [19]. This is in line with CTE, suggesting

that individuals' emotional responses are shaped by their cognitive appraisal of environmental stimuli [17,32].

Waste reduction practices and emotional responses. Beyond sustainability practices, green restaurants adopt waste reduction strategies to minimise food waste, including imposing buffet penalties to financially discourage excessive waste; providing incentives for smaller portion sizes, such as offering price reductions for reduced portions; giving pre-order recommendations based on the number of diners to prevent over-ordering; using durable and reusable tableware to reduce disposable packaging waste; and sourcing from local ingredients to reduce carbon emissions from long-distance transportation [10]. These strategies may induce both positive and negative emotional reactions. Diners who engage in waste-conscious behaviours may experience positive moods, feeling aligned with sustainable values. Conversely, witnessing food waste in social dining settings, where over-ordering is culturally accepted, may evoke guilt and frustration, reinforcing negative moods [18]. Additionally, face-saving concerns in Chinese society may further complicate emotional responses, as diners may feel pressure to order excess food to maintain social status, despite internal conflicts over wastefulness [46].

Both CTE and TIB suggest that emotional responses to external stimuli influence behavioural decision-making [17,27]. Diners' emotions serve as intermediary factors, shaping their future consumption behaviours and revisit intentions. Individuals who perceive strong negative emotions, such as guilt or frustration from food waste, may be more inclined to adjust their dining behaviours by choosing green restaurants that promote sustainable practices. Conversely, those who experience positive emotions from engaging in sustainability efforts may develop a stronger preference for green dining experiences. To empirically examine these relationships, the following hypotheses are proposed:

H1a. Restaurants' food sustainability practices negatively affect perceived positive mood.

H1b. Restaurants' food sustainability practices positively affect perceived negative mood.

H2a. Restaurants' waste reduction practices negatively affect perceived positive mood.

H2b. Restaurants' waste reduction practices positively affect perceived negative mood.

2.5. Intrinsic stimuli to perceived mood

Intrinsic stimuli influencing perceived mood include excessive food ordering routine, responsible planning routine, and face-saving behaviours regarding takeaway leftovers. While Talwar et al. [47] introduced the concept of "food ordering routine," this study refines the construct to excessive food ordering routine to better capture the behavioural tendency to order beyond actual consumption needs, ultimately leading to food waste and leftovers. This behaviour is shaped by both cognitive and habitual factors, as outlined in the CTE and TIB.

Excessive food ordering routine. From a cognitive perspective, individuals may engage in excessive food ordering due to misjudgment of portion sizes or social norms that associate over-ordering with generosity and hospitality. In Chinese dining culture, ordering an abundant amount of food is viewed as a display of affluence and status [48]. Additionally, diners may fear that insufficient food could create discomfort among guests, prompting them to deliberately over-order to avoid potential embarrassment [49]. These cognitive factors contribute to habit formation, reinforcing excessive ordering as a socially approved routine. Over time, individuals who repeatedly engage in excessive ordering in social settings may develop it as a habit, reducing their sensitivity towards food waste implications [47].

Responsible planning routine. Conversely, individuals with a responsible planning routine actively seek to minimise food waste through self-regulated consumption. This behaviour involves both cognitive thinking and habits. Individuals who feel negative about

wasting food may plan meals carefully to avoid guilt, while feeling positive about reducing waste can encourage sustainable choices [50, 51]. Over time, regularly practicing actions like portion control, pre-ordering, and following sustainability norms can build waste-conscious habits [27].

Face-saving behaviour towards takeaway leftovers. Face-saving is a deeply rooted cultural norm in Confucian societies, regarded as one of the most important social values [18,52,53]. Individuals with strong face consciousness aim to protect and enhance their social image, often prioritising material wealth and status over financial practicality [54]. This cultural focus on face influences many social behaviours [55], including food consumption and waste practices [46]. In Chinese dining culture, face-saving plays a significant role in food ordering and waste behaviours. Individuals may over-order food to show hospitality and generosity, even at great financial cost [56]. Similarly, face-saving concerns affect takeaway behaviour, where diners may avoid taking leftovers home to prevent embarrassment, as it could signal financial struggles or low social status [57]. Some also prefer freshly prepared food over reheated leftovers, reinforcing their choice to leave excess food behind [46].

In social dining situations, the decision to take leftovers home is influenced by face-saving concerns, emotions, and habits. Those with a habit of excessive food ordering may avoid taking leftovers home, as leaving surplus food signals wealth and a positive social image [49]. Excessive ordering can also evoke positive moods like pride and relaxation, as it matches with socially desirable behaviours in Chinese culture [17]. On the other hand, individuals who plan responsibly are more likely to take leftovers home, as wasting food may cause negative moods like guilt and frustration [17]. To counter these feelings, they adopt waste-conscious practices such as requesting doggy bags or reusable containers. Thus, the decision to take leftovers home depends on the complex interactions of face-saving concerns, emotional regulation, and waste-conscious habits. Drawing from the discussion above, the following hypotheses are:

H3a. Excessive food ordering routine positively affects perceived positive mood.

H3b. Excessive food ordering routine negatively affects perceived negative mood.

H4a. Responsible planning routine negatively affects perceived positive mood.

H4b. Responsible planning routine positively affects perceived negative mood.

H5a. Face-saving behaviour towards taking away leftover positively affects perceived positive mood.

H5b. Face-saving behaviour towards taking away leftover negatively affects perceived negative mood.

2.6. Intention to revisit green restaurants

An individual's revisit intention reflects their likelihood, willingness, desire, and decision to return to a previously visited business entity, largely driven by prior positive experiences [19,58,59]. The concept of revisit intention, when applied to sustainable dining, reflects consumers' preference for returning to restaurants that prioritise green initiatives, including using recyclable materials, implementing eco-friendly menus, serving organic food, and conserving energy and water [21,60]. Choosing a green restaurant aligns with consumers' pro-environmental behaviours, reinforcing their likelihood of revisitation.

Mood drivers of revisit intention. The formation of revisit intentions is largely mood-dependent, as individuals have higher tendency to revisit a restaurant that elicits positive emotional responses [61]. If a diner appreciates a restaurant's sustainability efforts, such as in-store recycling initiatives or ethically sourced food, they may experience positive moods, strengthening their intent to revisit. Social and peer approval can further reinforce habitual revisit intention of green restaurants, as individuals may feel encouraged to maintain

environmentally responsible dining behaviours [62]. Mood is an important aspect in affecting consumer decisions from psychological and behavioural standpoints [63,64]. Previous research shows that positive and negative moods impact on pro-environmental intentions [65]. In the hospitality industry, positive moods experienced in environmentally responsible hotels were positively linked to revisit intentions, while negative moods did not prevent revisit behaviour [66]. Similarly, Han and Ryu [67] argued that emotional responses can influence restaurant repurchase decisions as they directly influence customer satisfaction and future purchasing behaviours.

Given the strong emotional basis in consumer decision-making, it is essential to examine how positive and negative moods influence revisit intentions in food waste and sustainable dining. Individuals who experience negative mood about food waste may try to overcome these feelings by dining in green restaurants which reinforce their sustainable dining habits. Alternatively, individuals who experience positive moods from engaging in sustainability efforts may also develop a higher intention to revisit green restaurants as their dining choices can align with their environmental self-identity. Thus, both positive and negative moods, though distinct in nature, can serve as motivators for revisit intentions. According to this reasoning, hypotheses are proposed as below:

H6. Perceived positive mood negatively affects the intention to revisit green restaurants.

H7. Perceived negative mood positively affects the intention to revisit green restaurants.

2.7. Responsible consumption behaviour

Responsible consumption behaviour refers to conscious efforts to minimise food waste, with one common practice being the use of doggie bags to take away leftovers [50,51]. This behaviour shows a practical method of food conservation aligning with sustainable dining practices. However, consumers may not always takeaway leftovers back home after dining out for various reasons, such as eating habits, personal attitudes, and cultural norms [47,68].

Responsible consumption behaviour as a moderator. Diners' decision to take leftovers home is closely tied to their emotions and sustainability values, which can influence their intention to revisit green restaurants. Taking home a doggie bag reinforces a positive attitude toward reducing food waste and aligns with the values of green restaurants. This responsible behaviour moderates the connection between mood and revisit intention, reflecting a commitment to sustainability. Cognitively, diners who take leftovers view it as a socially and environmentally responsible act [47], fostering positive attitudes toward green restaurants and strengthening their revisit intentions. (Fig. 1)

Insights from mood management theory suggest that individuals experiencing a positive mood tend to be more risk-cautious and sensitive to losses such as food waste [69]. As a result, those in positive mood states may be more inclined to adopt sustainable consumption habits. When combined with their pre-existing sustainability commitment, this behaviour can further enhance their intention to revisit green restaurants. Similarly, diners experiencing negative mood about food waste may also be motivated to participate in responsible consumption behaviours so as to reduce their emotional discomfort. Using doggie bags then serves as a behavioural response to counteract negative moods and reinforce their intention to support green restaurants. As individuals repeatedly engage in this behaviour over time, it can become a habitual practice and further reinforcing sustainable dining choices. Thus, the presence of responsible consumption behaviour with the act of taking away leftovers is expected to strengthen the relationship between perceived mood and revisit intention. From the above discussion, two hypotheses are proposed:

H8a. Responsible consumption behaviour moderates the relationship between perceived positive mood and intention to revisit green restaurants, such that the positive influence of perceived positive mood on

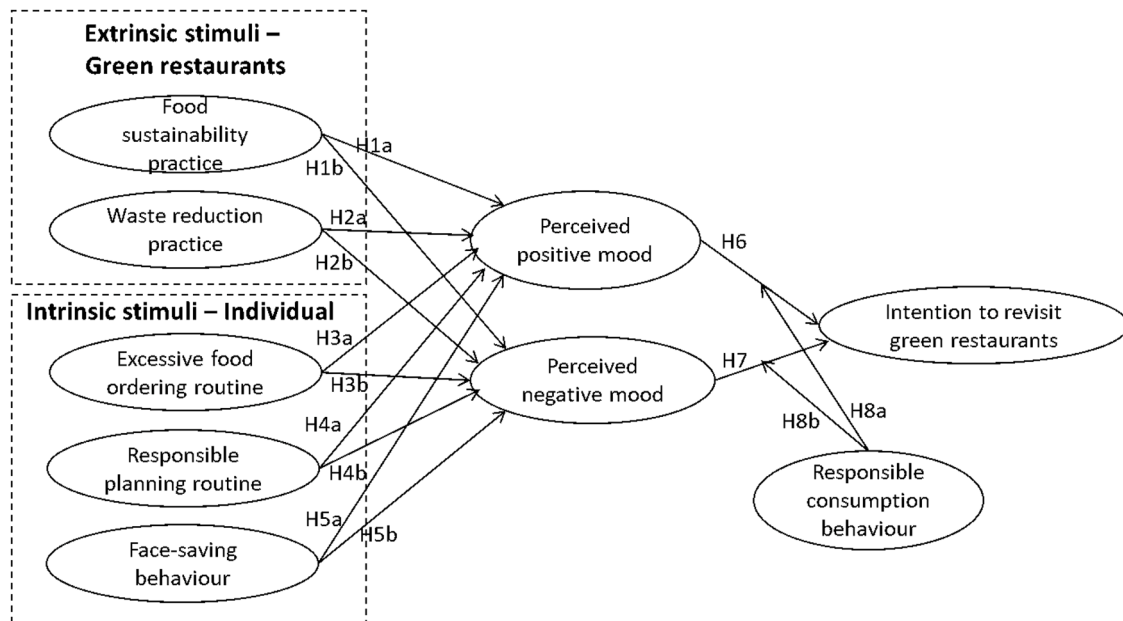


Fig. 1. Conceptual model of the study.

intention to revisit green restaurants is stronger when responsible consumption behaviour is frequent.

H8b. Responsible consumption behaviour moderates the relationship between perceived negative mood and intention to revisit green restaurants, such that the positive influence of perceived negative mood on intention to revisit green restaurants is stronger when responsible consumption behaviour is frequent.

3. Methodology

3.1. Sample and data collection

This research investigated revisit intentions to green restaurants using an online questionnaire survey for data collection. The questionnaire has three sections: the first collected information on respondents' dining behaviour, the second measured the main theoretical constructs and the final collected demographic details such as gender, age, education level, and job status. To determine appropriate sample size, a power analysis G*Power 3.1.9.7 software was performed [70]. The analysis was conducted with a statistical power of 0.95, an effect size of $f = 0.15$, and a significance level of $p < .05$, suggested that a minimum of 107 participants was necessary for the study. The final sample of this study comprised 542 participants from the Greater Bay Area (Guangdong, Hong Kong, and Macao), aged 15 to 25 years (38.1 % male, 61.9 % female). Data were collected through SoJump (www.sojump.com), a widely used online survey platform.

All respondents had prior experience dining at green restaurants, which were defined as establishments emphasising environmental sustainability, health-conscious practices, and organic food sources. These restaurants adopt eco-friendly practices such as using organic ingredients, minimising excessive packaging, providing environmentally friendly tableware, and utilising energy-efficient equipment. Green restaurants aim to reduce environmental impact while offering nutritious meals, encompassing both environmentally friendly restaurants and environmentally neutral restaurants. Regarding dining experiences, 37.6 % of respondents had visited casual or family-style full-service restaurants. The social nature of dining was evident, as most respondents dined with others. However, 217 respondents reported dining alone at least once within the past one month. Demographic variables and diners' past experience were shown in Table 1. The measurement

scales were adapted from existing literature, and back-translation method was employed to ensure accurate translation of all questionnaire items into Chinese [71].

3.2. Measurement items

Nine constructs were adapted and modified from literature to form the conceptual model of the study, including food sustainability practice and waste reduction practice from Kim and Hall [10], excessive food ordering routine, responsible planning routine, and taking away doggie bag from Talwar et al. [47], face-saving from Long et al. [18], perceived positive mood and perceived negative mood from Russell et al. [24] and intention to revisit from Riva et al. [21]. All respondents evaluated the items using a 7 Likert scale (1 = strongly disagree to 7 = strongly agree), except perceived positive and negative moods were rated with (1 = not at all to 7 = very much) and taking away doggie bag (1 = never to 7 = always). To display all questionnaire items in Chinese, a reverse translation method was used. Smart-PLS 4 was utilized to conduct Partial Least Squares Structural Equation Modeling (PLS-SEM) in order to assess both the measurement and structural models.

3.3. Data analysis

3.3.1. Common method bias

This research adopted a cross-sectional survey design. To address the potential issue of common method variance, a post-hoc statistical approach from Harman's one-factor test was implemented. This test examines whether systematic variation in responses resulted from the use of a single data source and a consistent scaling approach to measures [72]. An exploratory factor analysis (EFA) was conducted in SPSS, incorporating all study variables. The results indicated that the first factor had an eigenvalue accounting for 25.97 % of the total variance, which is well below the 50 % threshold, thereby confirming the absence of common method bias.

3.3.2. Measurement model

The model's reliability and validity were assessed using three key criteria: (1) discriminant validity, evaluated through the heterotrait-monotrait (HTMT) ratio, (2) convergent validity, determined by the average variance extracted (AVE) for each construct, and (3) composite

Table 1
Respondent profile.

Attributes	Category	N	%
During the past one month, have you eaten out at any green restaurants?	Yes	524	100
Gender	Male	217	38.1
	Female	307	61.9
Age	Below 20 years old	1	0.2
	20 – 29 years old	198	37.8
	30 – 39 years old	265	50.6
	40 – 49 years old	52	9.9
	40 – 49 years old	4	0.8
	60 years old and over 60	4	0.8
Education Level	Below secondary school education	3	0.6
	Secondary school education	31	5.9
	Sub-degree level (associate degree or higher diploma)	78	14.9
	Bachelor's degree	363	69.3
	Master degree	48	9.2
	Doctorate degree	1	0.2
Job Status	Part-time job	15	2.9
	Full-time job	493	94.1
	Full-time studying without any job	15	2.9
	Unemployed/job seeker	1	0.2
Job Role	Employee	383	73.1
	Manager/Boss	141	26.9
Marital Status	Single	109	20.8
	Married	413	78.8
	Other	2	0.4
Restaurant style recently visited	Vegan restaurant	13	2.5
	Vegetarian restaurant	55	10.5
	Environmentally friendly restaurant	176	33.6
	Environmentally neutral restaurant	280	53.4
Restaurant classification recently visited	Limited service (fast food) restaurant	55	10.5
	Specialty food services (e.g. caterer)	24	4.6
	Café	197	37.6
	Café	86	16.4
	Casual/family full-service restaurant	87	16.6
	Hotel restaurant	49	9.4
	Buffet restaurant		
	Upscale full-service restaurant		
Purpose of dining out within the past one month (<i>Sum</i>)	Date	237	
	Social or friends gathering	491	
	Family meeting	436	
	Business meeting	281	
	Eat alone	217	
	Others	2	

Source(s): Authors' work.

reliability. As recommended by Hair Jr et al. [73], outer loadings for all measurement items needed to exceed 0.699 to ensure item reliability (Table 2). Furthermore, composite reliability values were required to be above 0.70 (Table 2). The AVE values for all constructs surpassed the recommended threshold of 0.50 [74], confirming convergent validity (Table 2). Lastly, HTMT ratios (Table 3) remained below the 0.90 threshold suggested by Henseler et al. [75], indicating that discriminant validity was established.

3.3.3. Structural model

Following the recommendations of Hair Jr et al. [73], bootstrapping with 5000 re-samples was employed to assess the statistical significance of the hypothesized model. A t-value exceeding 1.96 was considered statistically significant (i.e., $t = 1.96, p \leq 0.05$). The research hypotheses were examined using PLS-SEM path analysis (Fig. 2 and Table 4). The results indicated that restaurants' food sustainability practice did not exhibit a significant relationship with perceived positive mood ($\beta = -0.006, n.s.$), but showed a positive association with perceived negative

mood ($\beta = 0.129, p < .05$). Similarly, restaurants' waste reduction practice was found to have a negative relationship with perceived positive mood ($\beta = -0.109, p < .05$) while being positively related to perceived negative mood ($\beta = 0.099, p < .05$). Additionally, excessive food ordering routine demonstrated a positive association with perceived positive mood ($\beta = 0.154, p < .05$) but was not significantly related to perceived negative mood ($\beta = -0.045, n.s.$). Furthermore, responsible planning routine did not have a significant relationship with perceived positive mood ($\beta = 0.021, n.s.$), though it was positively linked to perceived negative mood ($\beta = 0.109, p < .05$). In contrast, face-saving behaviour exhibited a positive relationship with perceived positive mood ($\beta = 0.148, p < .05$), while simultaneously showing a negative association with perceived negative mood ($\beta = -0.238, p < .001$). Regarding behavioural intentions, intention to revisit green restaurants was not significantly influenced by perceived positive mood ($\beta = -0.011, n.s.$), but was positively affected by perceived negative mood ($\beta = 0.231, p < .001$). Moreover, taking away doggie bag was positively associated with intention to revisit green restaurants ($\beta = 0.316, p < .001$). Examining the moderating effects, taking away doggie bag significantly moderated the relationship between perceived positive mood and intention to revisit green restaurants ($\beta = 0.244, p < .001$), whereas no significant moderation effect was found between perceived negative mood and intention to revisit green restaurants ($\beta = 0.052, n.s.$). Control variables included gender, age, job role, job status, and marital status. None of these control variables demonstrated a significant effect: gender ($\beta = -0.055, t = 0.698$), age ($\beta = -0.040, t = 0.897$), job role ($\beta = -0.037, t = 0.392$), job status ($\beta = -0.005, t = 0.929$), and marital status ($\beta = 0.074, t = 0.141$).

4. Discussion

The findings of this research highlight the significant roles of extrinsic and intrinsic stimuli and moods in shaping revisit intentions to green restaurants. The findings build on existing research by showing how both external and internal factors shape food waste perceptions and dining behaviour. As consistent with Kim and Hall [10], people who prefer green restaurants with sustainable practices like smaller portions and organic food tend to have stronger negative emotions about food waste. This indicates that environmentally conscious diners feel cognitive dissonance when their actions conflict with their sustainability values, leading to guilt and frustration [76]. More, wasting natural resources like water, land, and energy deepens these negative emotions, further discouraging food waste.

Beyond sustainability efforts, waste management practices of restaurants such as offering discounts for reduced portions or minimising buffet waste appear more effective in triggering negative moods toward food waste [77]. As noted by Kim and Hall [10], direct behavioural incentives create stronger emotional responses than passive sustainability initiatives. This supports the notion that external stimuli intensify consumer sensitivity toward food waste.

Findings also demonstrate that excessive food ordering routines are positively associated with food waste-related positive moods, consistent with Chen et al. [17]. In Chinese culture, ordering excess food symbolises prosperity, generosity, and hospitality, reinforcing short-term positive moods such as pride and satisfaction. This reflects previous studies that highlight how social dining occasions prioritise image-driven consumption over sustainability concerns [18]. However, although these positive moods may drive food waste behaviours, they may also pose long-term negative consequences such as guilt and overconsumption.

Similarly, face-saving behaviours strongly influence food waste perceptions. As Sun et al. [54], Chan and Ng [78], and Wang et al. [79] suggest, *mianzi* serves as an important factor in consumer decisions, where over-ordering and leaving food behind signal affluence and social status. Chen et al. [17] found that social norms around food consumption can override sustainability concerns, as taking away leftovers may be seen as a sign of frugality and embarrassment. This lead individuals to

Table 2
Measurement items.

Constructs	Measurement items	Source	Loadings	Composite reliability	AVE
Food sustainability practice	FSP1. This restaurant has menu labeling (e.g., calorie and/or nutrition information). FSP2. This restaurant primarily uses organic food. FSP3. This restaurant uses certified sustainable seafood/fish (e.g., Food Safety Law of the People's Republic of China). FSP4. This restaurant has a menu that states the carbon footprint of each dish.	Kim & Hall [10]	0.751 0.804 0.698 0.807	0.85	0.587
Waste reduction practice	WRP1. This restaurant uses strategies for reducing food waste (e.g. customers need to pay a fine if they waste food in a buffet, has a discount if customers ask for less rice, and recommends number of dishes when ordering food). WRP2. This restaurant uses durable items rather than disposable products. WRP3. This restaurant uses local produce in food preparation.	Kim & Hall [10]	0.728 0.781 0.702	0.782	0.545
Excessive food ordering routine	FOR1. I often order more food dishes than required when dining out. FOR2. I often order food dishes than needed for satisfying my hunger. FOR3. I often order food dishes that are too much for my appetite. FOR4. I often order more food dishes than required without thinking when dining out. FOR5. I often end up ordering more dishes because restaurants are offering bargains. FOR6. I often order more food dishes than required because of the variety in the restaurant's food. FOR7. I often order more food dishes when I am not sure about portion size.	Talwar et al. [47]	0.812 0.891 0.863 0.851 0.806 0.81	0.936	0.679
Responsible planning routine	RPR1. I often think about the dishes I will order prior to dining out. RPR2. I often plan my meal in advance before dining out. RPR3. I often check the menu of the restaurant online to plan the meal before dining out. RPR4. I often decide on the dishes I will order prior to dining out.	Talwar et al. [47]	0.722 0.834 0.852 0.817 0.85	0.904	0.703
Face-saving behaviour	FS1. My decision to take away leftovers after dining out is influenced by whether my reputation will be hurt by whom are important to me. FS2. I feel ashamed when people who are important to me see me take away leftovers after dining out. FS3. My decision to take away leftovers is influenced by whether my status will be improved to whom are important to me. FS4. I avoid taking away leftovers after dining out if I am with people who have a higher social status than me. FS5. I make an effort to save face and maintain my social image by not taking away leftovers in certain social situations, such as when I am with people who I want to impress.	Long et al. [18]	0.869 0.863 0.86 0.855 0.849	0.934	0.739
Perceived positive mood	Please describe how you feel about wasting food using the following words. (Not at all – Very much) PM1. Optimistic PM2. Proud PM3. Content PM4. Relaxed	Russell et al. [24]	0.823 0.891 0.891 0.881	0.927	0.761
Perceived negative mood	Please describe how you feel about wasting food using the following words. (Not at all – Very much) NM1. Frustrated NM2. Anxious NM3. Guilty	Russell et al. [24]	0.87 0.872 0.884	0.908	0.766
Responsible consumption behaviour	RCB1. How often do you think of a doggy bag to take away leftovers after dining out? RCB2. How often do you ask the staff for a doggy bag to take away leftovers after dining out? RCB3. How often do you agree when the staff offers you a doggy bag to take away leftovers after dining out? RCB4. How often do you fill/pack the doggy bag with leftovers to take them away after dining out? RCB5. How often do you carry leftovers in a doggy bag after dining out?	Talwar et al. [47]	0.835 0.815 0.761 0.82 0.834	0.907	0.661
Intention to revisit green restaurants	INR1. I recommend to my friend and near ones to come here. INR2. I consider myself a loyal patron of this restaurant. INR3. The probability that I will visit this restaurant in my next dining is high.	Riva et al. [21]	0.814 0.79 0.788	0.84	0.636

Source(s): Authors' work.

view food waste as an unavoidable social sacrifice, reducing guilt and reinforcing positive feels about wasteful behaviours.

Responsible planning routines, on the other hand, significantly increase negative moods toward food waste. According to Westbrook's [31] cognitive-affective theory, individuals who plan meals or check restaurant menus in advance are more likely to feel disappointment and frustration when food waste occurs as their efforts minimise excess consumption go to waste. This aligns with Gagnon et al. [33] who emphasise that habitual behaviours shape consumer emotions, ultimately influencing decision-making. Budget-conscious individuals who try to balance dining preferences with financial constraints may also associate food waste with monetary loss, further intensifying guilt and

frustration.

Findings indicate that negative moods toward food waste positively influence intentions to revisit green restaurants, supporting research from Russell [24]. Guilt and frustration motivate individuals to compensate for past food waste behaviours, reinforcing their commitment to sustainable dining choices. This is especially true for millennial consumers, who are known for their strong environmental awareness and willingness to support sustainable practices [80,81]. As observed by Atzori et al. [82], millennials prioritise sustainability-driven dining experiences, preferring restaurants with eco-conscious initiatives such as recycling bins, bioplastics, and food waste reduction strategies.

Interestingly, while negative moods significantly influence green

Table 3
Discriminant validity.

Construct	Food sustainability practice	Waste reduction practice	Excessive food ordering routine	Responsible planning routine	Face-saving behaviour	Perceived positive mood	Perceived negative mood	Responsible consumption behaviour	Intention to revisit green restaurants
Food sustainability practice	0.565								
Waste reduction practice	0.2	0.33							
Excessive food ordering routine	0.477	0.477	0.378						
Responsible planning routine	0.164	0.314	0.517	0.227					
Face-saving behaviour	0.111	0.237	0.252	0.108	0.264				
Perceived positive mood	0.306	0.345	0.26	0.291	0.361	0.511			
Perceived negative mood	0.292	0.433	0.222	0.225	0.316	0.095	0.312		
Responsible consumption behaviour	0.442	0.706	0.259	0.433	0.296	0.169	0.371	0.443	
Intention to revisit green restaurants									

Source(s): Authors' work.

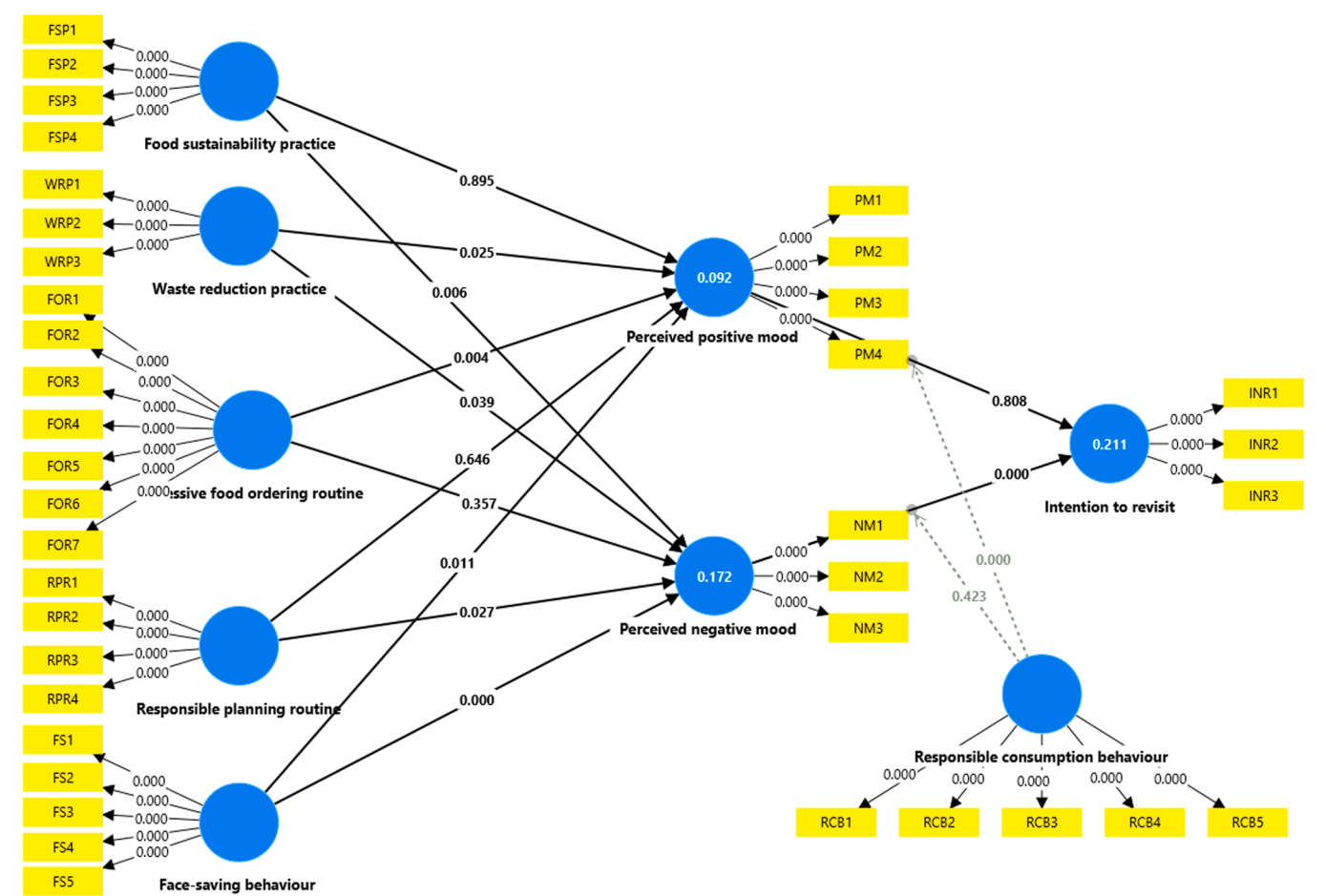


Fig. 2. Structural model.
Source(s): Authors' work.

Table 4
Summary of PLS-SEM path analysis.

Path	Hypothesis	Path coefficients	t-statistics	p-values
Food sustainability practice -> Perceived positive mood	H1a	-0.006	0.132	0.895
Food sustainability practice -> Perceived negative mood	H1b	0.129	2.776	0.006**
Waste reduction practice -> Perceived positive mood	H2a	-0.109	2.241	0.025*
Waste reduction practice -> Perceived negative mood	H2b	0.099	2.067	0.039*
Excessive food ordering routine -> Perceived positive mood	H3a	0.154	2.856	0.004**
Excessive food ordering routine -> Perceived negative mood	H3b	-0.045	0.922	0.357
Responsible planning routine -> Perceived positive mood	H4a	0.021	0.459	0.646
Responsible planning routine -> Perceived negative mood	H4b	0.109	2.209	0.027*
Face-saving -> Perceived positive mood	H5a	0.148	2.548	0.011*
Face-saving -> Perceived negative mood	H5b	-0.238	4.536	0.000***
Perceived positive mood -> Intention to revisit green restaurants	H6	-0.011	0.243	0.808
Perceived negative mood -> Intention to revisit green restaurants	H7	0.231	4.767	0.000***
Responsible consumption behaviour -> Intention to revisit green restaurants		0.316	6.307	0.000***
Responsible consumption behaviour x Perceived positive mood -> Intention to revisit green restaurants	H8a	0.244	3.578	0.000***
Responsible consumption behaviour x Perceived negative mood -> Intention to revisit green restaurants	H8b	0.052	0.801	0.423

Source(s): Authors' work.

* $p < .05$.

** $p < 0.01$.

*** $p < .001$.

restaurant revisitation, positive moods toward food waste do not, suggesting that guilt and frustration are stronger motivators for behaviour change than positive reinforcement. The availability of takeaway doggie bags moderates this relationship by offering diners a solution to reduce food waste. Although requesting a doggie bag can initially induce social discomfort, discarding leftovers leads to greater guilt and regret [83]. Additionally, Onwezen et al. [84] noted that self-regulatory emotions differ in social contexts, where shame is associated with requesting takeaway options, but guilt is linked to actual food waste. In the short term, consumers may not immediately appreciate takeaway options due to social embarrassment. However, as doggie bag usage becomes common, it may gradually reshape attitudes toward food waste, reinforcing positive emotions about reduction efforts. This suggests that long-term exposure to waste-conscious dining practices can shift behaviours toward more sustainable restaurant choices.

Overall, findings demonstrate the complex interactions between emotional responses, cultural norms, and sustainability behaviours in food waste perceptions. Negative moods encourage sustainable behaviours while social norms and cultural expectations can justify or even

reinforce food waste. The study highlights how both extrinsic (restaurant policies) and intrinsic (cultural values, habits) stimuli shape consumer emotions and subsequent behaviours, offering valuable insights into how emotional responses influence sustainable dining choices.

4.1. Theoretical implications

This study enhances the understanding of food waste behaviours, emotional responses, and sustainable dining choices by extending three key theoretical frameworks: the cognitive theory of emotion (CTE), the theory of interpersonal behaviour (TIB), and mood management theory (MMT). Findings extend CTE by demonstrating how moods towards food waste are shaped by cognitive judgement of sustainability and cultural expectations [26]. Individuals who value sustainability perceive food waste as conflicting their environmental values, leading to negative moods. In contrast, those influenced by cultural norms, such as excessive ordering as a sign of generosity, experience positive emotions despite food waste. This highlights the role of culture in shaping food waste-related emotions [17,79].

This study also builds on TIB by demonstrating how social norms and emotions together affect food waste behaviours [27]. Findings show that face-saving can outweigh sustainability concerns, as individuals prioritise maintaining social status over reducing waste. Offering takeaway doggie bags moderates this relationship. While it may initially cause shame, it gradually normalises waste reduction behaviours, supporting findings from Sirieix et al. [83]. These findings refine TIB by showing that habitual food waste behaviours are influenced by both social norms and emotions.

Finally, this study advances MMT by explaining how food waste behaviours are driven by mood regulation strategies [28]. Over-ordering creates short-term positive moods tied to abundance and generosity. On the other hand, using doggie bags may initially cause embarrassment and evoke negative moods but later foster lasting behavioural change. This advances MMT by showing how sustainability efforts reshape emotions over time, encouraging long-term pro-environmental behaviours. In sum, this study integrates cognitive, social, and emotional perspectives, offering a comprehensive understanding of food waste behaviours and sustainability-driven dining choices.

4.2. Practical implications

This section includes managerial suggestions to food waste reduction and encourage sustainable dining behaviours in Chinese societies. The results show a complex interrelationship between habitual food waste behaviours, emotional responses, and sustainability awareness, which offer several actionable strategies for restaurants, policymakers, and educators.

A major cause of excessive food waste is the culturally embedded habit of over-ordering, where abundant food symbolises generosity and social approval. As Chen et al. [17] suggest, Chinese dining traditions encourage leaving food behind as a sign of hospitality, which reinforced positive moods despite wasteful behaviours. To address this phenomenon, green restaurants and policymakers could implement portion-sizing transparency practices [85]. Restaurants can clearly indicate portion sizes on menus and offer flexible portion options to help diners make informed ordering decisions. Second, restaurants can introduce right-sized meal promotions rather than discounting bulk orders. Restaurants can also incentivise moderate portions through loyalty rewards or providing menu suggestions to diners towards portion-conscious meals or adding sustainability labels. Findings from Leksono and He [77] demonstrated that loyalty membership incentives are capable of significantly contributing to sustainable consumption results. Customers who have a strong preference towards value-seeking tend to utilise loyalty discounts in more of a thoughtful manner. They usually pick food quantities which align with their actual needs which in turn reduces waste. In contrast, individuals with lower value-seeking

tendencies may prioritize immediate financial gain, leading to over-purchase and more food waste. This contrast shows the criticality of designing loyalty schemes that encourage responsible value-driven behaviour and foster long-term ecological responsibility [77].

Findings confirm that negative moods associated with food waste can motivate diners to engage in sustainable practices, including using takeaway (doggie) bags. However, social discomfort and fear of appearing frugal may initially reduce the adoption. To normalise doggie bag usage, restaurants and policymakers could proactively offer takeaway solutions. Restaurants should automatically provide doggie bags, encouraging them as a normal practice rather than an optional request [86]. In addition, providing stylish takeaway packaging, or using eco-friendly materials doggie bags printed with positive messaging like “Smart Dining, Zero Waste” could reframe leftovers as a responsible and trendy choice [87], and in turn to transform this practice as a socially accepted norm.

4.3. Conclusion

This research sheds the light on the complex associations This study sheds light on the complex relationship between habitual excessive food ordering, emotional responses, and sustainable dining behaviours. Findings reveal that cultural dining norms reinforce excessive ordering as a symbol of generosity, often inducing positive moods despite food waste. However, growing sustainability awareness triggers negative moods, potentially motivating waste-reduction behaviours. The promotion of doggie bags emerges as a viable strategy to normalise food waste reduction while maintaining positive dining experiences. By integrating theoretical perspectives with practical insights, this study highlights key suggestions for the hospitality sector. As sustainable dining continues to evolve, understanding the emotional and cultural dimensions of food waste remains essential for fostering long-term pro-environmental behaviour.

4.4. Limitations and future research

While this study offers valuable contributions, several limitations must be addressed. Firstly, the research primarily focuses on Chinese dining behaviours, which may limit the generalisability of findings to other cultural contexts where food waste perceptions and norms differ. Future studies should address cross-cultural comparisons, examining how food waste emotions vary across diverse hospitality settings, such as fine dining restaurants, hotel restaurants, buffet restaurants, casual dining chains, and fast food restaurants [88]. Secondly, this study collected self-reported data, which may be influenced by social desirability bias, particularly when addressing sensitive topics such as food waste and guilt [89]. Future research could incorporate mixed-method approach, with experimental or observational methods to capture actual behavioural responses in dining environments. Finally, it is required to add potential factors in realising the complicated relationship between excessive food ordering routines and moods caused by food wastes. Future research could explore key aspects such as AI-based menu recommendations [90] to promote portion-conscious ordering, adding questions to examine respondents’ person-specific social desirability bias on self-reported waste behaviours [91], and other underlying psychological and cultural dynamics. Examining these factors in greater depth would enhance the overall understanding of this phenomenon and develop valuable insights for designing more effective research.

CRediT authorship contribution statement

Mei Mei Lau: Writing – original draft, Resources, Formal analysis, Conceptualization. **Peggy Mei Lan Ng:** Writing – review & editing, Project administration, Methodology, Formal analysis. **Jason Kai Yue Chan:** Writing – review & editing, Validation.

Declaration of competing interest

All the authors have no conflict of interests nor any relationships with Sustainable Futures.

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Data availability

Data will be made available on request.

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