

# Minimising plate waste at hotel breakfast buffets: an experimental approach through persuasive messages

Claudia Cozzio

*Department of Economics and Political Science, University of Valle D'Aosta, Aosta, Italy, and*

Oksana Tokarchuk and Oswin Maurer

*Faculty of Economics and Management, Free University of Bozen-Bolzano, Bolzano, Italy*

## Abstract

**Purpose** – The purpose of this study is to investigate how hotel guests can be nudged for more active engagement in hospitality plate waste prevention and moderation at buffets, through designing effective persuasive interventions. Plate waste is a main sustainability challenge, and it is considered one of the major drivers of food waste in the hospitality sector, whose operations generate excessive amounts of waste. The hospitality industry, featured by all-you-can-eat buffet-style settings, is somehow encouraging consumers to increase the amount of food ordered or taken and not been eaten.

**Design/methodology/approach** – This study reports a field experiment conducted in a real hotel setting, where persuasive interventions were targeted to consumers at the croissants buffet, when guests were making their selections. The research tests the persuasiveness of functional and experiential appeal messages to nudge hotel guests towards a more active engagement in avoiding plate waste. Each single treatment was carried out for three weeks in varying sequence.

**Findings** – The findings are based on 63 rounds of data collections and show the superiority of experiential appeal messages in positively influencing guests' behaviour. This implies that appropriate messages can persuade tourists to avoid plate waste in buffet-style settings, especially if these messages are grounded in participatory cues with an emphasis on altruistic values.

**Originality/value** – This is one of the few studies that empirically tests the effectiveness of different persuasive interventions in a real consumption setting, thus measuring actual behaviours which have been rarely studied. This study further contributes to the identification of concrete communication tools that can help to mitigate plate waste generation.

**Keywords** Food waste, Waste prevention, Responsible consumption, Hotel buffets, Foodservices, Persuasion  
**Paper type** Research paper

## 1. Introduction

The primary role of tourism in actively contributing to sustainable development has been emphasised by the United Nations Sustainable Development Goals (UN SDGs) that set the agenda for global development to 2030 by addressing challenges such as poverty reduction, gender equality, long-term maintenance of the ecosystem, responsible production and consumption (Boluk *et al.*, 2017). Against this background, eating behaviour is a relevant dimension of a sustainable transformation of tourism, as not only food production and consumption have a significant ecological footprint (Poore and Nemecek, 2018), but it also



represents an essential element during vacations (Gössling *et al.*, 2011). In addition, between 78% and 92% of food waste is considered avoidable (Betz *et al.*, 2015).

The purpose of this study is to investigate how hotel guests can be nudged for more active engagement in hospitality plate waste prevention and moderation at buffets, through designing effective persuasive interventions (Barnett *et al.*, 2017). Plate waste is a main sustainability challenge (Thyberg and Tonjes, 2016), and it is considered one of the major drivers of food waste in the hospitality sector, featured by all-you-can-eat configurations (Matzembacher *et al.*, 2020).

The largest share of food waste occurs in the final phase of the food supply chain (i.e. at the consumption level), thus explaining why household food waste has been a prime object of academic interest to date (Aydin and Yildirim, 2020; Katajajuuri *et al.*, 2014; Schanes *et al.*, 2018). Although in Europe, household food waste represents the primary source of food waste generated at consumption level, food waste associated with the hospitality industry holds the second position (Monier *et al.*, 2010). For example, in Italy, household food waste accounts for 54% of all waste at consumption level, followed by food waste generated by hospitality providers amounting to 21% (Coldiretti, 2017). Whereas tourist food consumption is a key driver of food waste generation within the hospitality sector, the magnitude of food wastage by tourists alongside the determinants of tourists' wasteful behaviour has been overlooked to date (Wang *et al.*, 2021; Filimonau and De Coteau, 2019; Gretzel *et al.*, 2019).

By means of a field experiment conducted in a real hotel setting where persuasive interventions were targeted to consumers at the croissants buffet, this study advances the understandings of the UN SDG n. 12 "Responsible Consumption and Production: Reversing current consumption trends and promoting a more sustainable future", thus contributing to the achievement of responsible consumption in tourism.

First, the field experiment approach adopted in this study is characterised by a high external validity and contributes to address the "attitude-behaviour gap", whereby tourists declare their willingness to be involved in sustainable practices, but with their actual behaviour frequently differing from what they declare (Juvan and Dolnicar, 2014). Sebbane and Costa (2018) unveil a huge discrepancy between stated and actual wasteful behaviour with regard to food consumption in restaurants, calling for more observational measures in order to avoid misleading results and interpretations provided by self-reported surveys about food waste. Hence, this study addresses the call for much more suitable approaches to generate a more robust understanding with regard to tourists' sustainable behaviour.

Second, relatively little is known about the magnitude of food wastage by tourists alongside the determinants of tourists' wasteful behaviour, as a very small number of academic studies have dealt specifically with hospitality food wastage (Filimonau and De Coteau, 2019; Matzembacher *et al.*, 2020). Hence, this study is one of the very few that aims at defining clear operational guidelines on how to design effective communication campaigns that are able to trigger guests' behaviour towards zero plate waste.

## 2. Literature review

### 2.1 Strategies for minimising plate waste in the hospitality industry

The hospitality industry with its all-you-can-eat buffet-style settings usually encourages the generation of food wastage, due to an increased consumer anonymity and a perception of abundance of food (Dolnicar and Juvan, 2019; Juvan *et al.*, 2018). Despite its magnitude, the food waste problem seems to be underestimated by hospitality providers (Filimonau *et al.*, 2021; Vizzoto *et al.*, 2020), as they appear skeptical towards adopting measurement activities to quantify the amount of food left over (Kasavan *et al.*, 2019; Sakaguchi *et al.*, 2018). This is somehow disturbing, as measurement activities are critical for involving staff in the fight against food waste and for raising customer awareness to prevent a mismatch between food taken from a buffet and food actually consumed (Principato *et al.*, 2018).

Although the implementation of strategies to reduce food leftovers is relatively infrequent (Filimonau *et al.*, 2019; Kasavan *et al.*, 2017; Sundt, 2012), some attempts have been made which are mainly focussing on the creation of messages that evoke consumers' awareness towards plate waste prevention. Social marketing activities based on informational campaigns (Kallbekken and Sælen, 2013; Stöckli *et al.*, 2018), normative-connoted messages (Ellison *et al.*, 2019) and *how-to* actions for reducing plate waste (Pinto *et al.*, 2018) show some contradictory effects in sensitising consumers to do their best to avoid food leftovers.

While motivating people to change their behaviours through persuasive interventions appears to be a common approach (Pelletier and Sharp, 2008), testing the messages' persuasiveness relative to the behaviour of taking food from a buffet while not eating it all remains understudied (Juvan *et al.*, 2021). Dolnicar *et al.* (2020) conducted one of the few field studies, unveiling that presenting a flyer or a stamp collection booklet is increasing hotel guests' awareness about plate waste and has a beneficial impact on the amount of food wasted. However, adding a pro-environmental appeal to the flyer, or the stamp collection booklet, does not reduce average plate waste significantly. Similarly, Kallbekken and Sælen (2013) illustrate the positive effect of providing social cues that encourage patrons to visit the buffet more than once, instead of taking all food desired at once. This has a positive impact on the amount of food left over in hotel restaurants.

Other strategies relate to hospitality providers' internal logistics, such as offering the possibility of smaller portions/kids' menu (Berkowitz *et al.*, 2016; Freedman and Brochado, 2010) or making take-home bags available (Hamerman *et al.*, 2018; Miroso *et al.*, 2018). In addition, buffet-style settings appear to encourage plate waste, due to psychological factors (e.g. the fear of missing out, people's reluctance to return to the buffet several times) which potentially enhance the probability of food leftover (Dolnicar and Juvan, 2019). Only a small number of academic studies confirm a few effective solutions to avoid plate waste in buffet-style settings: reducing plate size prevents up to 20% of food waste (Kallbekken and Sælen, 2013), as does limiting the number of buffet service stations (Juvan *et al.*, 2018) or avoiding live cooking at the buffet (Pirani and Arafat, 2016).

Despite the significance of food waste in the hospitality industry (Wang *et al.*, 2021), field work on the topic is hardly ever undertaken (Filimonau *et al.*, 2021). This study aims at investigating how hotel guests can be nudged into more active engagement in hospitality plate waste prevention and moderation at buffet-style settings through different types of persuasive messages. Persuasive messages represent stimuli that allow individuals to evaluate them (Levin *et al.*, 1998) and to generate a response which affects behaviour (Vakratsas and Ambler, 1999).

Broadly speaking, a persuasive message can be described in terms of its functional–rational or emotional–experiential components (Heath, 2011). Authors have assigned different labels to these appeals (“informational” vs “transformational”: Rossiter and Percy, 1987; “utilitarian” vs “value-expressive”: Johar and Sirgy, 1991; “hard-sell” vs “soft-sell”: Okazaki *et al.*, 2010; “functional” vs “experiential”: Zarantonello *et al.*, 2013). In this paper, the latter terms are used.

Typically, functional appeals contain accurate product descriptions with an emphasis on specific features (Kotler and Armstrong, 1994), while experiential appeals are grounded on emotions consumers experience when consuming the product (Bagozzi *et al.*, 1999). Thus, the persuasiveness of functional appeals focusses on a rational information process, whereas the persuasiveness of experiential appeals relates to emotional reactions. Advertising literature (De Pelsmacker *et al.*, 2007) underpins that appeals are not mutually exclusive, as communication can adopt either one or both at the same time. However, their effectiveness is still a matter of debate as there is a current lack of understanding on how to design effective sustainability messages (Tölkes, 2018).

### *2.2 Persuasion through functional appeals*

The functional appeal of a message focusses on emphasising utilitarian product features (e.g. attributes, applications, performances), as well as benefits associated with these features

(Zarantonello *et al.*, 2013). Thus, functional appeals are eliciting a cognitive consumer evaluation and response (Abernethy and Franke, 1996).

In the context of sustainable consumer behaviour, functional appeals are the most frequently used types of interventions (Stöckli *et al.*, 2018). Functional interventions are based on the idea that information about the negative consequences of an undesired behaviour (e.g. wasted resources) and the positive consequences of a desired behaviour (e.g. saved resources) sensitises consumers to change their behaviour (Chen and Jai, 2018). Only a few field implementations of persuasive functional messages are documented: Whitehair *et al.* (2013) report that a simple print message (i.e. All Taste No Waste – Eat What You Take, Don't Waste Food) reduced food waste by 15% in a university dining facility. An informative poster (i.e. Clean dish, Clean conscience! Ask for the right amount of food!) displayed in strategic areas of a university canteen caused a reduction in the waste index of 15% (Pinto *et al.*, 2018), and a written prompt with normative-connoted messages (i.e. Food waste is a global problem. Dining works hard to reduce waste. You can too.) contributed to changing students' beliefs related to food waste, which may be a first step towards achieving behavioural change (Ellison *et al.*, 2019).

While the implementation of informative campaigns reported in the literature was mainly conducted in university canteens, interventions in the hedonistic context of hotels, restaurants, resorts are still limited and inadequate. Kallbekken and Sælen (2013) report that an informative written prompt (i.e. Welcome back! Again! And again! Visit our buffet many times. That's better than taking a lot once!) placed at breakfast buffets enhanced hotel guests to reduce food waste by 20%. Stöckli *et al.* (2018) found that diners who were exposed to informative prompts about food waste have asked to take home their leftovers more frequently than diners who were not exposed to such prompts.

In the context of preventing plate waste while on holiday, portion control can further aid hospitality enterprises in obtaining reputational gains, as people often look for guidance in eating situations (Wang *et al.*, 2021; Wansink and Van Ittersum, 2013). Functional appeals, displaying caloric and nutritional values, support self-regulated eating behaviours and facilitate healthy eating (Kergoat *et al.*, 2019; Hwang and Lorenzen, 2008). While some studies reveal a positive influence of reporting nutritional and caloric properties of food products (Cozzio *et al.*, 2021; Howlett *et al.*, 2009; Yamamoto *et al.*, 2005), others show fewer evident findings (Cowburn and Stockley, 2005; Josiam and Foster, 2009). Prior studies have primarily analysed consumers' feelings about nutrition and caloric information displayed on a menu, without exploring if consumers consider them when choosing food (Filimonau and Krivcova, 2017). Other papers report that displaying nutritional information in the form of "traffic lights" (green, amber, red) and indicating more or less healthy food products are often triggering orders of lower caloric meals (Filimonau *et al.*, 2017; Osman and Thornton, 2019).

Against this background, a persuasive functional message with an emphasis on utilitarian food product features can be an influential prompt for portion control guidance, thus generating less plate waste. Hence, the following hypothesis is proposed:

- H1. The use of a functional appeal with an emphasis on utilitarian food product features has a favourable influence in minimising plate waste compared to no appeal.

### 2.3 Persuasion through experiential appeals

Experiential appeals with visual, emotional and participatory cues evoke sensations, feelings, sentiments and imaginations, thus leading to affective consumer response, such as liking (Brakus *et al.*, 2009). For example, visual cues and pictures able to trigger visual processing of product consumption generate more attention in advertising than purely text-based approaches (Underwood *et al.*, 2001; Wehrli *et al.*, 2017).

Evidence shows that experiential appeals using participatory cues can trigger sustainable behaviour in the tourism context. Goldstein *et al.* (2008) showed the effectiveness of a towel

reuse campaign that encourages guests to be active members of the hotel guests' community. Similarly, [Warren et al. \(2017\)](#) reported the success of an interactive persuasion campaign that sensitises guests to save water and energy while on vacation. This persuasive effort was based on the integration of interpersonal communication and sequential influence that included a daily eco-feedback, thus allotting a sense of shared responsibility between hosts and guests ([Warren et al., 2017](#)).

Calls for action encouraging receivers to do something resulted in increasing ethical behaviours towards paying visitor fees ([Steckenreuter and Wolf, 2013](#)) and picking up litter ([Brown et al., 2010](#)) in protected areas. In addition, choosing a relevant story line, such as a sequence of interrelated actions people can perform to mitigate a particular environmental issue, constituted the foundations of a green communication strategy ([Jameson and Brownell, 2012](#)). This gave guests the opportunity to play an active role through participation ([Cialdini and Goldstein, 2004](#); [Kachel and Jennings, 2010](#)).

Moreover, persuasive efforts that provide a chance to experience sustainability prompted the emotional aspects of tourism consumption, thus enhancing customer engagement ([Villarino and Font, 2015](#)). Messages with pictures or real stories helped to activate customer engagement, generating a behavioural response among receivers ([Kotler and Lee, 2011](#)). For instance, [Liu et al. \(2019\)](#) showed that handwritten typeface in menus instilled a sense of care at the receivers' end. [Zhou et al. \(2019\)](#) reported that restaurant meals are more likely to be consumed when advertised with intense adjectives (e.g. traditional, grandma's) that can stimulate joyful memories.

Hence the following hypothesis is proposed:

*H2.* The use of an experiential appeal with an emphasis on participatory cues has a favourable influence in minimising plate waste compared to no appeal.

#### *2.4 Egoistic appeals, altruistic appeals and credible sources*

Holidays are a pleasure-seeking activities ([Malone et al., 2014](#)), and tourism is traditionally perceived as a "non-essential, hedonic, aspirational consumption activity" ([Font and McCabe, 2017](#), p. 870) in which a mixed form of selfish altruism dominates ([Miller, 2003](#)). Although tourists may prefer products that are of benefit to them as well as to the external environment, rather than products which mainly benefit the rest of world ([Miller, 2003](#)), they hardly compromise on comfort for sustainable consumption ([Baker et al., 2014](#)).

According to [White and Peloza \(2009\)](#), these benefits (i.e. individual vs collective) may be defined as egoistic and altruistic appeals. Persuasion is commonly realised by self-centred messages that communicate the benefit for the individual self and by altruistic messages that emphasise the benefit for other people or for collective goods ([White and Peloza, 2009](#)). While the former focus on personal and egoistic values (e.g. health concern), the latter are grounded on something beyond the individual self, such as environmental protection ([Green and Peloza, 2014](#)).

In this study, functional messages emphasising the utilitarian food product features have a markedly egoistic appeal (i.e. personal health), while experiential messages emphasising participatory cues have an evidently altruistic appeal (i.e. support the hotel in its sustainability efforts). Altruistic appeals primarily refer to the environmentally friendly production and distribution of a product. Therefore, they seem to be more consistent with collective goals, such as to protect the environment for everyone's benefit, rather than with personal goals associated with health or economic savings ([Kareklas et al., 2014](#)). However, despite some initial work on the effect of these two appeals, it is still debatable which one is more effective in influencing tourists' behaviours ([Choi and Lee, 2020](#); [Gao et al., 2020](#)).

Moreover, following the theoretical underpinnings of the Elaboration Likelihood Model (ELM), tourism provides for a setting in which people are pursuing happiness and enjoyment ([Gössling and Buckley, 2016](#)) and, consequently, they are more likely to be distracted ([Petty and Cacioppo, 1984](#); [Sanjari et al., 2017](#)). In such a context, people tend to process information

via a peripheral route that involves little cognitive elaboration (Petty and Cacioppo, 1986). Thus, consumers might be greatly persuaded by the presence of credible information sources (Hanks *et al.*, 2016). This form of persuasion is based on the credibility of the source that conveys the message (Grewal *et al.*, 1994). The conveyor of the messages and her/his positive reputation increase the information's credibility and reliability with the addressee (Bolchini *et al.*, 2004; Metzger, 2007).

Against this background, Villarino and Font (2015) suggested the use of sustainability logos, awards, ecolabels and memberships in sustainable alliances as credible sources. Although research on sustainability logos in the tourism literature appears scant (Fairweather *et al.*, 2005) and shows little influence of ecolabels on tourists' motivation and behaviour (Chong and Verma, 2013; Kim and Kim, 2014; Reiser and Simmons, 2005), it is expected that they may play a role in complementing an appeal's ability to persuade. In fact, the display of sustainability logos that connect the company to a wider framework of environmental evaluation can provide explicit evidence of the enterprise's environmental commitment, thus avoiding receivers' confusion (Lowry *et al.*, 2007). Sustainability logos, as manifestations of perceived objectivity, can help in addressing skepticism (Alexander, 2010), as they allow a company to display its participation in a wider credible programme.

Overall, this informs the following hypothesis:

*H3.* The use of an altruistic appeal with an indication of a credible source has a greater influence on minimising plate waste compared to an egoistic appeal.

### 3. Method

#### 3.1 Research design and treatment messages

The study is based on a between-group experimental design and was carried out in an Italian four-star holiday hotel during the summer season 2020. The hotel can accommodate up to 650 guests. The hotel's room rate includes full board, and the length of stay is fixed at seven days (one week). Guests were not informed about the field experiment.

Two experimental conditions targeted at the breakfast croissants buffet were formulated as follows.

(1) Functional appeal

The nutritional values related to a single croissant [40 gr] are:

Energy Kcal: 178 Kcal (20 min running)

Saturated fat: 5.5 gr (going up 10 flights of stairs)

Protein: 3.2 gr

Sugar: 6 gr

For a healthy and balanced breakfast, the recommended quantity of consumption is one croissant. Please take only the quantity you are about to consume in order to avoid leaving uneaten croissants on your table. Thank you!

(2) Experiential appeal

[Ecolabel Legambiente] In 2020, this hotel has obtained Legambiente ecocertification for its direct and constant commitment in achieving sustainability. Investments in electric shuttles for transportation to the beach and the creation of an organic vegetable garden are some examples. Minimising food waste is a new goal that the hotel wishes to accomplish this summer season. Starting from breakfast, you can actively contribute to achieve this goal by avoiding leaving uneaten croissants on your table. Your cooperation is really appreciated and truly relevant to the hotel's green philosophy, thus supporting the Legambiente ecocertification for the present time and the upcoming years.

The experiment lasted for nine weeks, from Monday, 29th June 2020 to Sunday, 30th August 2020, a period that corresponded to the hotel opening due to the COVID-19 pandemic restrictions. Each single treatment was carried out for three weeks in varying sequence: baseline-no appeal, baseline-no appeal, functional, functional, experiential, experiential, functional, baseline-no appeal. Assignment of participants to the respective treatment was not random and was determined by the week of their respective stay. Data was collected daily, resulting in 63 rounds of data collection.

For breakfast, the hotel offered a croissants' buffet with three options: plain, chocolate, custard croissants. Guests were exposed to the treatment messages directly at the buffet, when making their selections (Plate 1).

Due to COVID-19 regulations, croissants chosen were served by waiting staff to each guest individually. Guests could ask for additional croissants without any limitation and revisit the buffet anytime. Treatment messages were displayed in a clearly visible manner at the croissants buffet.

### *3.2 Measures, variables and follow-up survey*

To assess the impact of the different persuasive messages on hotel guests eating behaviour, the number of croissants left uneaten on plates were registered by waiting staff and reported to the maître who recorded the data on a daily basis. For reporting simplicity and clarity, each waiter was instructed to report any full or almost full leftover croissant as "1" and any half or less unit of leftover croissant as "1/2".

Additionally, a short questionnaire aimed at investigating food waste habits at home and during vacation was displayed at the reception and available for download via a QR code at checkout. In total, 137 valid responses were collected.

From the survey it emerges that most guests (90%) were aware of the hotel's ecocertification.



**Plate 1.**  
Photograph of  
experimental set-up  
with treatment  
message at the  
croissant buffet

Guests in functional ( $N = 47$  respondents) and experiential ( $N = 22$  respondents) treatments noticed the messages and most of them declared that they paid more attention to their food consumption at breakfast, due to the message displayed. Regarding the statement “I believe that the message at the croissants buffet had a positive influence on my consumption behaviour”, average responses on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree) were 6,42 for the functional treatment and 6,40 for the experiential treatment, supporting the assumption that both interventions had a positive influence on guests’ behaviour. No significant differences were observed between guests staying in different weeks of experimental treatments.

Following Qui and Roe’s (2016) framework, several questions on food waste behaviour at home were asked. No significant differences between responses to different treatments emerged, except for respondents who stayed in the third week (week 3) of the functional treatment. They were the only group in which the degree of feeling guilty from throwing away food was significantly lower compared to all the other groups of guests. Hence, it appears that they have paid slightly less attention to food waste than all other groups of guests.

### 3.3 Statistical analysis

This study compares the number of wasted croissants according to varying treatments, based on croissants left uneaten by guests on the plates after breakfast. Given that guests stayed for one week, comparisons are done on daily waste produced by guests in different weeks. It has to be noted that each daily observation reflects the average of wasted croissants generated by 98 (minimum) – 597 (maximum) guests staying at the hotel during a specific week. More specifically, fewer guests stayed at the hotel at the beginning of the season, whereas in the peak season (August) the hotel reached its full capacity, accommodating up to 597 guests at a time. For instance, with regard to the baseline treatment (no appeal), daily observations reflect the average of wasted croissants generated by 122 guests per day in week 1 and 199 guests per day in week 2, corresponding to the initial opening period of the hotel (29.6.2020–12.7.2020), and by 546 guests per day in week 3, the peak summer period (24.8.2020–30.8.2020). Overall, our study is based on the individual behaviour of 6.069 guests in the baseline treatment, 8.057 guests during the functional treatment and 11.396 guests throughout the experiential treatment, thus accounting for a sample of 25.522 guests whose individual behaviour at the breakfast buffet has been observed and reported.

Since hotel guests, as well as treatment messages, changed following a weekly rhythm (Mon-Sun), the use of Student’s *t*-test for independent samples appears to be the most appropriate approach to determine whether guests’ daily average amount of plate waste differs according to the varying treatments (Box *et al.*, 1978). This approach is also one of the most commonly used methods in experimental research in tourism (Fong *et al.*, 2016).

## 4. Results and discussion

Table 1 reports the average weekly number of croissants baked and wasted per person. Only guests of 3 years of age or older were considered.

Data indicates that in the baseline treatment (no appeal), the number of baked croissants decreased gradually, starting from 0.94 units baked per person in week 1 to 0.64 units offered in week 3. It must be noted that week 1 of the baseline treatment corresponded to the first week of the opening period of the hotel (Week 29/6–5/7). This week was dominated by uncertainties due to the COVID-19 pandemic situation. In week 3 of the baseline treatment, the last week of the whole experimental period (24/8–30/8), the number of baked croissants significantly decreased due to a *routinisation* in setting the breakfast buffet, as the summer season progressed. This is further confirmed by the number of croissants baked during the last five weeks of the experimental period, with a range of 0.63–0.66 units per person.



**Table 1.**  
Average number of  
croissants baked and  
wasted per week

	Baseline treatment (no appeal)			Functional treatment			Experimental treatment		
	Croissants on buffet (unit per person)	Waste on plates (unit per person)	Total guests (weekly average)	Croissants on buffet (unit per person)	Waste on plates (unit per person)	Total guests (weekly average)	Croissants on buffet (unit per person)	Waste on plates (unit per person)	Total guests (weekly average)
Week 1	0.94	0.30	122	0.87	0.04	289	0.66	0.02	534
Week 2	0.79	0.14	199	0.83	0.06	301	0.63	0.02	562
Week 3	0.64	0.03	546	0.63	0.03	561	0.66	0.02	532

The number of wasted croissants in the baseline treatment followed the same trend, depicted by the number of croissants baked (Table 2). The number of wasted croissants generated in week 1 of the baseline treatment was the highest observed during the whole experimental period. It progressively decreased to 1/10th of the baseline treatment in week 3. This reduction in leftovers is statistically significant and in accordance with the reduction of croissants offered at the buffet.

A similar pattern was observed in the functional treatment (Table 3), where a significant decrease of the number of croissants baked in the last week (week 3) corresponded to a significant reduction in the amount of wasted croissants during the same period (week 3).

During the experiential treatment, there was a significant difference in the quantity of baked croissants in week 2, compared to weeks 1 and 3 of this treatment (Table 4). This difference was -3.7% and, in turn, only detectable by statistical analysis and not noticeable by guests. The number of wasted croissants was stable at 0.02 units per person for the whole duration of the experiential treatment.

Overall, numbers provided in Tables 2-4 support the assumption that larger quantities of food offered per person at the buffet generate larger amounts of waste, that is, food left uneaten on plates.

	Croissants on buffet				Waste on plates		
	Week 1 (0.94)	Week 2 (0.79)	Week 3 (0.64)		Week 1 (0.30)	Week 2 (0.14)	Week 3 (0.03)
Week 1 (0.94)		$t = 4.20$ $p = 0.001^{**}$	$t = 8.66$ $p = 0.000^{***}$	Week 1 (0.30)	$t = 5.14$ $p = 0.000^{***}$	$t = 10.36$ $p = 0.000^{***}$	
Week 2 (0.79)			$t = 8.12$ $p = 0.000^{***}$	Week 2 (0.14)		$t = 5.43$ $p = 0.000^{***}$	

**Note(s):**  $^{**}p < 0.01$ ,  $^{***}p < 0.001$

**Table 2.**  
Student *t*-test: baseline  
treatment (no appeal)

	Croissants on buffet				Waste on plates		
	Week 1 (0.87)	Week 2 (0.83)	Week 3 (0.63)		Week 1 (0.04)	Week 2 (0.06)	Week 3 (0.03)
Week 1 (0.87)		$t = 1.85$ $p = 0.11$	$t = 10.33$ $p = 0.000^{***}$	Week 1 (0.04)	$t = -1.03$ $p = 0.31$	$t = 2.19$ $p = 0.07^{*}$	
Week 2 (0.83)			$t = 10.26$ $p = 0.000^{***}$	Week 2 (0.06)		$t = 3.97$ $p = 0.009^{**}$	

**Note(s):**  $^{*}p < 0.1$ ,  $^{**}p < 0.01$ ,  $^{***}p < 0.001$

**Table 3.**  
Student *t*-test:  
functional treatment

	Croissants on buffet				Waste on plates		
	Week 1 (0.66)	Week 2 (0.63)	Week 3 (0.66)		Week 1 (0.02)	Week 2 (0.02)	Week 3 (0.02)
Week 1 (0.66)		$t = 3.30$ $p = 0.006^{**}$	$t = -0.28$ $p = 0.78$	Week 1 (0.02)	$t = 0.77$ $p = 0.45$	$t = -0.38$ $p = 0.70$	
Week 2 (0.63)			$t = -3.82$ $p = 0.002^{**}$	Week 2 (0.02)		$t = -1.17$ $p = 0.26$	

**Note(s):**  $^{**}p < 0.01$

**Table 4.**  
Student *t*-test:  
experiential treatment

Table 5 shows the effectiveness of the functional appeal with respect to no appeal (H1). Out of nine weekly comparisons of the number of croissants wasted, six of them outline the superiority of the functional treatment, thus showing significant reduced number of wasted croissants during this treatment.

The remaining three weekly comparisons between the last week of the baseline treatment (week 3) and the whole duration of the functional treatment reveal the following: Weeks 1 and 2 of the functional treatment were conducted during a time of greater food offer (0.87 and 0.83 croissants baked per guest, respectively) compared to week 3 of the baseline treatment (0.64 croissants baked per guest). Remarkably, the number of wasted croissants in week 1 of the functional treatment and in week 3 of the baseline treatment were similar, even if not statistically significant (0.04 and 0.03, respectively). This supports the effectiveness of the functional treatment further, even in the presence of excessive provision of food. Instead, the number of wasted croissants was significantly greater in week 2 of the functional treatment, compared to week 3 of the baseline treatment. However, the underlying excessive provision of food (0.83 vs 0.64) should be taken into consideration. Furthermore, no significant differences emerged between week 3 of the functional treatment and week 3 of the baseline treatment, in which a very similar number of croissants baked and croissants wasted was reported.

All in all, H1 is partially supported. Despite what happened in week 2 of the functional treatment, where a greater number of croissants offered led to a higher amount of waste compared to week 3 of the baseline treatment, the remaining weekly comparisons of the amount of wasted croissants decreased significantly during the functional treatment.

Table 6 shows that the number of croissants wasted in the experiential treatment was significantly lower than in the baseline treatment, thus fully supporting H2. The experiential treatment with its emphasis on participatory cues outperforms any no intervention setting.

Table 7 shows that the number of wasted croissants during the experiential treatment (altruistic appeal) was overall significantly lower than the quantity wasted in the functional treatment (egoistic appeal). Out of nine weekly comparisons, eight highlighted the

**Table 5.**  
Student *t*-test: baseline vs functional treatment

		Functional treatment		
		Week 1 (0.04)	Week 2 (0.06)	Week 3 (0.03)
Baseline	Week 1 (0.30)	<i>t</i> = 9.53 <i>p</i> = 0.000***	<i>t</i> = 9.13 <i>p</i> = 0.000***	<i>t</i> = 9.80 <i>p</i> = 0.000***
	Week 2 (0.14)	<i>t</i> = 4.49 <i>p</i> = 0.002**	<i>t</i> = 3.95 <i>p</i> = 0.002**	<i>t</i> = 4.86 <i>p</i> = 0.001**
	Week 3 (0.03)	<i>t</i> = 1.48 <i>p</i> = 0.17	<i>t</i> = -2.86 <i>p</i> = 0.01*	<i>t</i> = 1.06 <i>p</i> = 0.31

**Note(s):** \**p* < 0.1, \*\**p* < 0.01, \*\*\**p* < 0.001

**Table 6.**  
Student *t*-test: baseline vs experiential treatment

		Experiential treatment		
		Week 1 (0.02)	Week 2 (0.02)	Week 3 (0.02)
Baseline	Week 1 (0.30)	<i>t</i> = 10.71 <i>p</i> = 0.000***	<i>t</i> = 10.92 <i>p</i> = 0.000***	<i>t</i> = 10.74 <i>p</i> = 0.000***
	Week 2 (0.14)	<i>t</i> = 5.94 <i>p</i> = 0.001**	<i>t</i> = 6.32 <i>p</i> = 0.000***	<i>t</i> = 5.95 <i>p</i> = 0.001**
	Week 3 (0.03)	<i>t</i> = 1.90 <i>p</i> = 0.08*	<i>t</i> = 1.93 <i>p</i> = 0.08*	<i>t</i> = 1.96 <i>p</i> = 0.07*

**Note(s):** \**p* < 0.1, \*\**p* < 0.01, \*\*\**p* < 0.001

effectiveness of an altruistic appeal, thus confirming the powerful role of the experiential treatment with an emphasis on collectivism and participatory cues to reduce plate waste. The only exception was reported in the comparison between week 3 of the functional treatment (egoistic appeal) and week 3 of the experiential treatment (altruistic appeal), where a very similar amount of croissants baked (0.63 and 0.66, respectively) and wasted (0.03 and 0.02, respectively) was registered. Overall, H3 is partially supported.

Results have a high validity, due to the field experiment conducted in a real hotel breakfast buffet setting. They markedly suggest that creating persuasive interventions is a valuable means for nudging hotel guests towards minimising their plate waste, compared to no interventions. While an experiential message significantly outperforms a no-message setting, the effectiveness of its altruistic appeal over an egoistic appeal can only be partially inferred. Findings show that out of nine weekly comparisons of croissants wasted, eight weeks reported the superiority of the use of an altruistic appeal compared to the use of an egoistic appeal in significantly decreasing food leftovers.

The effectiveness of a functional message with respect to no message can be partially supported, too. Out of nine weekly comparisons of wasted croissants, six showed a significantly reduced amount of waste during the functional treatment, whereas one of the comparisons indicated a significant increase in waste, but in the presence of an excessive number of croissants offered.

## 5. Conclusion

### 5.1 Theoretical implications

This research has several theoretical implications. First, the study contributes to recent expectations of the potential of persuasive communication in reversing current consumption trends and making the tourism and hospitality industries more sustainable (Shahzadal and Font, 2018; Tölkes, 2018). It is broadening the body of research on framing strategies that might enhance sustainable behaviour in a tourism context (Grazzini *et al.*, 2018; Thaler and Sustein, 2008). In addition, it shows that nudging interventions that deliver accessible information to hotel guests play an important role in increasing guests' awareness toward zero food waste, contributing to the achievement of responsible consumption in tourism.

Second, to the best of our knowledge, this is one of the few studies that empirically tests the effectiveness of different persuasive interventions in a real consumption setting, thus measuring guests' actual behaviours which have been rarely studied (Juvan and Dolnicar, 2016). In addition, this study responds to the call for developing interventions to increase food waste awareness, particularly in a holiday context where guests not only pay full price for their meals but also engage in the pursuit of pleasure. Hence, incentivising sustainable behaviours appears challenging (Dolnicar, 2020).

		Experiential treatment (altruistic appeal)		
		Week 1 (0.02)	Week 2 (0.02)	Week 3 (0.02)
Functional treatment (egoistic appeal)	Week 1 (0.04)	$t = 2.63$ $p = 0.02^*$	$t = 3.24$ $p = 0.007^{**}$	$t = 2.64$ $p = 0.02^*$
	Week 2 (0.06)	$t = 4.45$ $p = 0.001^{**}$	$t = 4.54$ $p = 0.001^{**}$	$t = 3.90$ $p = 0.002^{**}$
	Week 3 (0.03)	$t = 2.94$ $p = 0.01^*$	$t = 2.46$ $p = 0.04^*$	$t = 1.41$ $p = 0.19$

Note(s): \* $p < 0.1$ , \*\* $p < 0.01$

**Table 7.**  
Student *t*-test:  
functional (egoistic  
appeal) vs experiential  
treatment (altruistic  
appeal)

Third, the experiential treatment with its emphasis on participatory cues leads to a significant decrease in plate waste, thus corroborating the fact that a key priority lies in engaging tourists to be active partners in reducing their environmental impact (Kachel and Jennings, 2010; Warren *et al.*, 2017). Results also substantiate the fact that in the context of minimising plate waste, consumers appear more sensitive to collectivism, thus leveraging more altruistic appeals (i.e. support the hotel in its sustainability efforts), rather than egoistic appeals (i.e. benefit for personal health). Moreover, this study shows that the use of credible information sources (i.e. sustainability logos) may complement a message's capability to persuade (Villarino and Font, 2015). Broadly speaking, when consumers perceive the source of the message to be credible, they are more likely to change their behaviour (Bergkvist and Zhou, 2016; Erdogan, 1999).

Fourth, the functional appeal with its emphasis on tailoring portion consumption size appears effective in managing food intake and, in turn, in decreasing waste. These results enrich the literature on healthy dining and menu psychology (Gao and Mattila, 2017; Hsiao *et al.*, 2016), thus supporting the role of caloric and nutritional value information in eliciting self-regulated eating behaviours (Kergoat *et al.*, 2019; Hwang and Lorenzen, 2008). Prior research shows mixed results on the role of reporting nutritional and caloric values of food product in a dining out context: while some studies revealed some positive influence (Howlett *et al.*, 2009; Yamamoto *et al.*, 2005), others reported less clear findings (Cowburn and Stockley, 2005; Josiam and Foster, 2009). Pointing at the relevance of a message's clarity and customer appeal, this study confirms the effectiveness of communicating nutritional values that indicate the benefits of food for personal health (Filimonau *et al.*, 2017; Osman and Thornton, 2019; Wansink and Love, 2014). In fact, displaying nutritional and caloric values shows an appreciable persuasive power, substantiating the idea that personal health goals tend to have an influence on food choices (Cozzio *et al.*, 2020; Vega-Zamora *et al.*, 2019).

Fifth, this study provides initial findings that consumers, in the context of plate waste prevention, tend to activate the collective level of self, thus focussing more on collectivism than on individualism (White and Peloza, 2009). Therefore, they seem to value an altruistic appeal with its emphasis on collectivism (i.e. support the hotel in its sustainability efforts) higher than an egoistic appeal (i.e. benefit for personal health). These preliminary results contribute to the current debate of which type of the two appeals is more effective in influencing consumer behaviours (Choi and Lee, 2020; Gao *et al.*, 2020).

### *5.2 Managerial implications*

This research stimulates strategies to formulate effective persuasive appeals able to minimise plate waste in a real-world eating environment. As responsible consumption in tourism is one of the UN SDGs for the tourism industry, it is becoming increasingly important to enhance customers' awareness about sustainability (Xu and Jeong, 2019; Warren *et al.*, 2017). Fostering guests' sustainable behaviour through effective communication is of paramount importance to reduce costs and to preserve natural resources.

Specifically, hotel practitioners will need to design messages grounded on participatory cues, where guests are prompted to be active members of a credible sustainability programme. In this way, the use of sustainability logos may reinforce guests' willingness to participate in the programme. Consumers appear often sceptical towards green marketing activities as sincere efforts, as they are unable to directly verify their reliability (Bech-Larsen and Grunert, 2003; Giannakas, 2002). In that light, the use of credible sources as conveyors of messages appears to be relevant.

This study also shows that starting waste measurement activities represents a first step towards achieving responsible consumption in tourism. Measurements enable hotel managers to set specific goals in term of food waste minimisation (Filimonau *et al.*, 2021). This is a

requirement to allow for further actions, such as offering rewards for the achievement of specific goals. In that context, this study sheds light on the quantification process of food waste that has been scarcely investigated to date (Vizzoto *et al.*, 2020).

### 5.3 Limitations and future research

This research is a pilot study and hence subject to several limitations. First, as the study focusses on a single hotel, caution is required with any generalisations of the findings. Repeating this research across different type of hotels in terms of category (e.g. upscale, luxury), as well as target clients (e.g. business, leisure), and in various tourism settings (e.g. cruise ships, aircrafts) would further increase the generalisability of the results. In addition, future studies should include different cultural contexts for comparison, as this study focusses on Italy by almost exclusively investigating the behaviour of Italian hotel guests.

Second, the functional message with its emphasis on portion control guidance lacks the monitoring of the amount of food prepared for consumption (i.e. uneaten croissants left at the buffet). Further research needs to focus on investigating if less discretionary food is consumed under functional messages that emphasise positive health implications for consumers (egoistic appeal).

Third, measuring the persuasive strength of different types of credible information sources (e.g. sustainable awards, celebrity, experts) would also represent a valuable stream of research.

Fourth, according to Construal Level Theory (Liberman and Trope, 2008), food waste provides for a context that is highly construal in which people tend to process information more abstractly and are looking at the big picture (Aggarwal and Zhao, 2015). Deepening the understanding about the effectiveness of different persuasive interventions, either functional or experiential, in other sustainable contexts with low level of construal (e.g. towels' reuse, Grazzini *et al.*, 2018) would be a further promising stream of research.

Fifth, the experimental approach used in this study might be applied to different food waste settings, besides plate waste (e.g. food storage, food preparation) in order to adopt an all-embracing perspective. Moreover, it could also be applied to food categories with high environmental impact (e.g. meat) in order to prioritise waste reduction (Beretta and Hellweg, 2019).

## References

- Abernethy, A.M. and Franke, G.R. (1996), "The information content of advertising: a meta analysis", *Journal of Advertising*, Vol. 25 No. 2, pp. 1-17.
- Aggarwal, P. and Zhao, M. (2015), "Seeing the big picture: the effect of height on the level of construal", *Journal of Marketing Research*, Vol. 52 No. 1, pp. 120-133.
- Alexander, R. (2010), *Framing Discourse on the Environment: A Critical Discourse Approach*, Routledge, London.
- Aydin, A.E. and Yildirim, P. (2020), "Understanding food waste behaviour: the role of morals, habits and knowledge", *Journal of Cleaner Production*, Vol. 280, 124250.
- Bagozzi, R.P., Gopinath, M. and Nyer, P.U. (1999), "The role of emotions in marketing", *Journal of the Academy of Marketing Science*, Vol. 27 No. 184, pp. 184-206.
- Baker, M.A., Davis, E.A. and Weaver, P.A. (2014), "Eco-friendly attitudes, barriers to participation, and differences in behaviour at green hotels", *Cornell Hospitality Quarterly*, Vol. 55 No. 1, pp. 89-99.
- Barnett, C., Clarke, N. and Cloke, P. (2017), "Whatever happened to ethical consumption?", *Journal of Consumer Ethics*, Vol. 1 No. 1, pp. 5-11.

- Bech-Larsen, T. and Grunert, K.G. (2003), "The perceived healthiness of functional foods: a conjoint study of Danish, Finnish and American consumers' perception of functional foods", *Appetite*, Vol. 40 No. 1, pp. 9-14.
- Beretta, C. and Hellweg, S. (2019), "Potential environmental benefits from food waste prevention in the food service sector", *Resources, Conservation and Recycling*, Vol. 147, pp. 169-178.
- Bergkvist, L. and Zhou, K.Q. (2016), "Celebrity endorsements: a literature review and research agenda", *International Journal of Advertising*, Vol. 35 No. 4, pp. 642-663.
- Berkowitz, S., Marquart, L., Mykerezi, E., Degeneffe, D. and Reicks, M. (2016), "Reduced-portion entrées in a worksite and restaurant setting: impact on food consumption and waste", *Public Health Nutrition*, Vol. 19 No. 16, pp. 3048-3054.
- Betz, A., Buchli, J., G€obel, C. and M€uller, C. (2015), "Food waste in the Swiss food service industry – magnitude and potential for reduction", *Waste Management*, Vol. 35, pp. 218-226.
- Bolchini, D., Cantoni, L. and Arasa, D. (2004), "Teaching web-sites as communication: a 'Coffee shop approach'", *World Conference on Educational Multimedia, Hypermedia and Telecommunications*, Vol. 6, pp. 4119-4124.
- Boluk, K., Cavaliere, C.T. and Higgins-Desbiolles, F. (2017), "Critical thinking to realize sustainability in tourism systems: reflecting on the 2030 sustainable development goals", *Journal of Sustainable Tourism*, Vol. 25 No. 9, pp. 1201-1204.
- Box, G.E., Hunter, W.H. and Hunter, S. (1978), *Statistics for Experimenters*, John Wiley and sons, New York, NY, Vol. 664.
- Brakus, J.J., Schmitt, B.H. and Zarantonello, L. (2009), "Brand experience: what is it? How is it measured? Does it affect loyalty?", *Journal of Marketing*, Vol. 73 May, pp. 52-68.
- Brown, T.J., Ham, S.H. and Hughes, M. (2010), "Picking up litter: an application of theorybased communication to influence tourist behaviour in protected areas", *Journal of Sustainable Tourism*, Vol. 18 No. 7, pp. 879-900.
- Chen, H.S. and Jai, T.M. (2018), "Waste less, enjoy more: forming a messaging campaign and reducing food waste in restaurants", *Journal of Quality Assurance in Hospitality and Tourism*, Vol. 19 No. 4, pp. 495-520.
- Choi, D. and Lee, H.K. (2020), "Beneficiary foci types and performance appeals in green advertising", *Sustainability*, Vol. 12 No. 15, p. 6251.
- Chong, H. and Verma, R. (2013), "Hotel sustainability: financial analysis shines a cautious green light", *Cornell Hospitality Report*, Vol. 13 No. 10, pp. 6-13.
- Cialdini, R.B. and Goldstein, N.J. (2004), "Social influence: compliance and conformity", *Annual Review Psychology*, Vol. 55, pp. 591-621.
- Coldiretti (2017), "Consumi", Coldiretti, 6 Italiani su 10 Tagliano Sprechi nel 2016, Coldiretti, available at: <https://www.coldiretti.it/coldiretti-it/consumi-coldiretti-6-italiani-su-10-tagliano-sprechi-alimentari> (accessed 14 May 2021).
- Cowburn, G. and Stockley, L. (2005), "Consumer understanding and use of nutrition labelling: a systematic review", *Public Health Nutrition*, Vol. 8 No. 1, pp. 21-28.
- Cozzio, C., Volgger, M., Taplin, R. and Woodside, A.G. (2020), "Nurturing tourists' ethical food consumption: testing the persuasive strengths of alternative messages in a natural hotel setting", *Journal of Business Research*, Vol. 117, pp. 268-279.
- Cozzio, C., Volgger, M. and Taplin, R. (2021), "Point-of-consumption interventions to promote virtuous food choices of tourists with self-benefit or other-benefit appeals: a randomised field experiment", *Journal of Sustainable Tourism*, Vol. ahead-of-print, pp. 1-19, doi: [10.1080/09669582.2021.1932936](https://doi.org/10.1080/09669582.2021.1932936).
- De Pelsmacker, P., Geuens, M. and Van den Bergh, J. (2007), *Marketing Communications: A European Perspective*, Pearson Education, Harlow.

- Dolnicar, S. (2020), "Eat up! Prevention of plate waste in tourism and hospitality: a perspective paper", *Tourism Review*, Vol. ahead-of-print, pp. 43-46, doi: [10.1108/TR-05-2019-0199](https://doi.org/10.1108/TR-05-2019-0199).
- Dolnicar, S. and Juvan, E. (2019), "Drivers of plate waste", *Annals of Tourism Research*, Vol. 78, pp. 1027-1031.
- Dolnicar, S., Juvan, E. and Grün, B. (2020), "Reducing the plate waste of families at hotel buffets—A quasi-experimental field study", *Tourism Management*, Vol. 80, 104103.
- Ellison, B., Savchenko, O., Nikolaus, C.J. and Duff, B.R. (2019), "Every plate counts: evaluation of a food waste reduction campaign in a university dining hall", *Resources, Conservation and Recycling*, Vol. 144, pp. 276-284.
- Erdogan, B.Z. (1999), "Celebrity endorsement: a literature review", *Journal of Marketing Management*, Vol. 15 No. 4, pp. 291-314.
- Fairweather, J.R., Maslin, C. and Simmons, D.G. (2005), "Environmental values and response to ecolabels among international visitors to New Zealand", *Journal of Sustainable Tourism*, Vol. 13 No. 1, pp. 82-98.
- Filimonau, V. and De Coteau, D. (2019), "Food waste management in hospitality operations: a critical review", *Tourism Management*, Vol. 71, pp. 234-245.
- Filimonau, V. and Krivcova, M. (2017), "Restaurant menu design and more responsible consumer food choice: an exploratory study of managerial perceptions", *Journal of Cleaner Production*, Vol. 143, pp. 516-527.
- Filimonau, V., Lemmer, C., Marshall, D. and Bejjani, G. (2017), "'Nudging' as an architect of more responsible consumer choice in food service provision: the role of restaurant menu design", *Journal of Cleaner Production*, Vol. 144, pp. 161-170.
- Filimonau, V., Krivcova, M. and Pettit, F. (2019), "An exploratory study of managerial approaches to food waste mitigation in coffee shops", *International Journal of Hospitality Management*, Vol. 76, pp. 48-57.
- Filimonau, V., Nghiem, V.N. and Wang, L.E. (2021), "Food waste management in ethnic food restaurants", *International Journal of Hospitality Management*, Vol. 92, 102731.
- Fong, L.H.N., Law, R., Tang, C.M.F. and Yap, M.H.T. (2016), "Experimental research in hospitality and tourism: a critical review", *International Journal of Contemporary Hospitality Management*, Vol. 28 No. 2, pp. 246-266.
- Font, X. and McCabe, S. (2017), "Sustainability and marketing in tourism: its contexts, paradoxes, approaches, challenges and potential", *Journal of Sustainable Tourism*, Vol. 25 No. 7, pp. 869-883.
- Freedman, M.R. and Brochado, C. (2010), "Reducing portion size reduces food intake and plate waste", *Obesity*, Vol. 18 No. 9, pp. 1864-1866.
- Gao, Y.L. and Mattila, A.S. (2017), "The impact of stereotyping on consumers' food choices", *Journal of Business Research*, Vol. 81, pp. 80-85.
- Gao, Y.L., Wu, L., Shin, J. and Mattila, A.S. (2020), "Visual design, message content, and benefit type: the case of a cause-related marketing campaign", *Journal of Hospitality and Tourism Research*, Vol. 44 No. 5, pp. 761-779.
- Giannakas, K. (2002), "Information asymmetries and consumption decisions in organic food product markets", *Canadian Journal of Agricultural Economics*, Vol. 50 No. 1, pp. 35-50.
- Gössling, S. and Buckley, R. (2016), "Carbon labels in tourism: persuasive communication?", *Journal of Cleaner Production*, Vol. 111, pp. 358-369.
- Gössling, S., Garrod, B., Aall, C., Hille, J. and Peeters, P. (2011), "Food management in tourism: reducing tourism's carbon 'foodprint'", *Tourism Management*, Vol. 32 No. 3, pp. 534-543.
- Goldstein, N.J., Cialdini, R.B. and Griskevicius, V. (2008), "A room with a viewpoint: using social norms to motivate environmental conservation in hotels", *Journal of Consumer Research*, Vol. 35 No. 3, pp. 472-482.



- Grazzini, L., Rodrigo, P., Aiello, G. and Viglia, G. (2018), "Loss or gain? The role of message framing in hotel guests' recycling behaviour", *Journal of Sustainable Tourism*, Vol. 26 No. 11, pp. 1944-1966.
- Green, T. and Peloza, J. (2014), "Finding the right shade of green: the effect of advertising appeal type on environmentally friendly consumption", *Journal of Advertising*, Vol. 43 No. 2, pp. 128-141.
- Gretzel, U., Murphy, J., Pesonen, J. and Blanton, C. (2019), "Food waste in tourist households: a perspective article", *Tourism Review*, Vol. 75 No. 1, pp. 235-238.
- Grewal, D., Gotlieb, J. and Marmorstein, H. (1994), "The moderating effects of message framing and source credibility on the price-perceived risk relationship", *Journal of Consumer Research*, Vol. 21 No. 1, pp. 145-153.
- Hamerman, E.J., Rudell, F. and Martins, C.M. (2018), "Factors that predict taking restaurant leftovers: strategies for reducing food waste", *Journal of Consumer Behaviour*, Vol. 17 No. 1, pp. 94-104.
- Hanks, L., Zhang, L. and McGinley, S. (2016), "Unconditioned superstition and sports bar fans", *Journal of Hospitality Marketing and Management*, Vol. 25 No. 1, pp. 113-131.
- Heath, R.G. (2011), "The secret of television's success: emotional content or rational information? After fifty years the debate continues", *Journal of Advertising Research*, Vol. 51 No. 1, pp. 112-123.
- Howlett, E.A., Burton, S., Bates, K. and Huggins, K. (2009), "Coming to a restaurant near you? Potential consumer responses to nutrition information disclosure on menus", *Journal of Consumer Research*, Vol. 36 No. 3, pp. 494-503.
- Hsiao, Y.H., Chen, L.F., Chang, C.C. and Chiu, F.H. (2016), "Configurational path to customer satisfaction and stickiness for a restaurant chain using fuzzy set qualitative comparative analysis", *Journal of Business Research*, Vol. 69 No. 8, pp. 2939-2949.
- Hwang, J. and Lorenzen, C.L. (2008), "Effective nutrition labeling of restaurant menu and pricing of healthy menu", *Journal of Foodservice*, Vol. 19 No. 5, pp. 270-276.
- Jameson, D.A. and Brownell, J. (2012), "Telling your hotel's 'green' story: developing an effective communication strategy to convey environmental values", *Cornell Hospitality Tools*, Vol. 3 No. 2, pp. 6-17.
- Johar, J.S. and Sirgy, M.J. (1991), "Value expressive versus utilitarian advertising appeals: when and why to which appeal", *Journal of Advertising*, Vol. 20 No. 3, pp. 23-33.
- Josiam, B. and Foster, C. (2009), "Nutritional information on restaurant menus", *International Journal of Contemporary Hospitality Management*, Vol. 21 No. 7, pp. 876-891.
- Juvan, E. and Dolnicar, S. (2014), "The attitude-behaviour gap in sustainable tourism", *Annals of Tourism Research*, Vol. 48, pp. 76-95.
- Juvan, E. and Dolnicar, S. (2016), "Measuring environmentally sustainable tourist behaviour", *Annals of Tourism Research*, Vol. 59, pp. 30-44.
- Juvan, E., Grün, B. and Dolnicar, S. (2018), "Biting off more than they can chew: food waste at hotel breakfast buffets", *Journal of Travel Research*, Vol. 57 No. 2, pp. 232-242.
- Juvan, E., Grün, B., Baruca, P.Z. and Dolnicar, S. (2021), "Drivers of plate waste at buffets: a comprehensive conceptual model based on observational data and staff insights", *Annals of Tourism Research Empirical Insights*, Vol. 2 No. 1, 100010.
- Kachel, U. and Jennings, G. (2010), "Exploring tourists' environmental learning, values and travel experiences in relation to climate change: a postmodern constructivist research agenda", *Tourism and Hospitality Research*, Vol. 10 No. 2, pp. 130-140.
- Kallbekken, S. and Sælen, H. (2013), "Nudging hotel guests to reduce food waste as a win-win environmental measure", *Economics Letters*, Vol. 119 No. 3, pp. 325-327.
- Kareklas, I., Carlson, J.R. and Muehling, D.D. (2014), "I eat organic for my benefit and yours': egoistic and altruistic considerations for purchasing organic food and their implications for advertising strategists", *Journal of Advertising*, Vol. 43 No. 1, pp. 18-32.

- Kasavan, S., Mohamed, A.F. and Halim, S.A. (2017), "Sustainable food waste management in hotels: case study Langkawi Unesco Global Geopark", *Planning Malaysia: Journal of the Malaysian Institute of Planners*, Vol. 15 No. 4, pp. 57-68.
- Kasavan, S., Mohamed, A.F. and Halim, S.A. (2019), "Drivers of food waste generation: case study of island-based hotels in Langkawi, Malaysia", *Waste Management*, Vol. 91, pp. 72-79.
- Katajajuuri, J.M., Silvennoinen, K., Hartikainen, H., Heikkilä, L. and Reinikainen, A. (2014), "Food waste in the Finnish food chain", *Journal of Cleaner Production*, Vol. 73, pp. 322-329.
- Kergoat, M., Meyer, T. and Legal, J.B. (2019), "Influence of 'health' versus 'commercial' physical activity message on snacking behaviour", *Journal of Consumer Marketing*, Vol. 37 No. 2, pp. 170-179, doi: [10.1108/JCM-07-2018-2765](https://doi.org/10.1108/JCM-07-2018-2765).
- Kim, S.B. and Kim, D.Y. (2014), "The effects of message framing and source credibility on green messages in hotels", *Cornell Hospitality Quarterly*, Vol. 55 No. 1, pp. 64-75.
- Kotler, P. and Armstrong, G. (1994), *Principles of Marketing*, Prentice Hall, Englewood Cliffs.
- Kotler, P. and Lee, N.R. (2011), *Social Marketing: Influencing Behaviours for Good*, Sage, Thousand Oaks.
- Levin, I.P., Schneider, S.L. and Gaeth, G.J. (1998), "All frames are not created equal: a typology and critical analysis of framing effects", *Organizational Behaviour and Human Decision Processes*, Vol. 76 No. 2, pp. 149-188.
- Liberman, N. and Trope, Y. (2008), "The psychology of transcending the here and now", *Science*, Vol. 322 No. 5905, pp. 1201-1205.
- Liu, S.Q., Choi, S. and Mattila, A.S. (2019), "Love is in the menu: leveraging healthy restaurant brands with handwritten typeface", *Journal of Business Research*, Vol. 98 May, pp. 289-298.
- Lowry, P.B., Roberts, T.L. and Higbee, T. (2007), "First impressions with websites: the effect of the familiarity and credibility of corporate logos on perceived consumer swift trust of websites", in Jacko, J. (Ed.), *Human-Computer Interaction*, Springer, Berlin, pp. 77-85.
- Malone, S., McCabe, S. and Smith, A.P. (2014), "The role of hedonism in ethical tourism", *Annals of Tourism Research*, Vol. 44, pp. 241-254.
- Matzembacher, D.E., Brancoli, P., Maia, L.M. and Eriksson, M. (2020), "Consumer's food waste in different restaurants configuration: a comparison between different levels of incentive and interaction", *Waste Management*, Vol. 114, pp. 263-273.
- Metzger, M.J. (2007), "Making sense of credibility on the Web: models for evaluating online information and recommendations for future research", *Journal of the American Society for Information Science and Technology*, Vol. 58, pp. 2078-2091.
- Miller, G.A. (2003), "Consumerism in sustainable tourism: a survey of UK consumers", *Journal of Sustainable Tourism*, Vol. 11 No. 1, pp. 17-39.
- Mirosa, M., Liu, Y. and Mirosa, R. (2018), "Consumers' behaviours and attitudes toward doggy bags: identifying barriers and benefits to promoting behaviour change", *Journal of Food Products Marketing*, Vol. 24 No. 5, pp. 563-590.
- Monier, V., Escalon, V. and O'Connor, C. (2010), *Preparatory Study on Food Waste Across EU. 27 October 2010*, European Commission, Bruxelles.
- Okazaki, S., Mueller, B. and Taylor, C.R. (2010), "Global consumer culture positioning: testing perceptions of soft-sell and hard-sell advertising appeals between U.S. and Japanese consumers", *Journal of International Marketing*, Vol. 18 No. 2, pp. 20-34.
- Osman, M. and Thornton, K. (2019), "Traffic light labelling of meals to promote sustainable consumption and healthy eating", *Appetite*, Vol. 138, pp. 60-71.
- Pelletier, L.G. and Sharp, E. (2008), "Persuasive communication and proenvironmental behaviours: how message tailoring and message framing can improve the integration of behaviours through self-determined motivation", *Canadian Psychology/Psychologie Canadienne*, Vol. 49 No. 3, p. 210.

- Petty, R.E. and Cacioppo, J.T. (1984), "Source factors and the elaboration likelihood model of persuasion", in Kinnear, T.C. (Ed.), *Advances in Consumer Research*, Association for Consumer Research, Provo, UT, Vol. 11, pp. 668-672.
- Petty, R.E. and Cacioppo, J.T. (1986), "The elaboration likelihood model of persuasion", in Berkowitz, L. (Ed.), *Advances in Experimental Social Psychology*, Academic Press, New York, NY, Vol. 19, pp. 123-205.
- Pinto, R.S., dos Santos Pinto, R.M., Melo, F.F.S., Campos, S.S. and Cordovil, C.M.D.S. (2018), "A simple awareness campaign to promote food waste reduction in a university canteen", *Waste Management*, Vol. 76, pp. 28-38.
- Pirani, S.I. and Arafat, H.A. (2016), "Reduction of food waste generation in the hospitality industry", *Journal of Cleaner Production*, Vol. 132, pp. 129-145.
- Poore, J. and Nemecek, T. (2018), "Reducing food's environmental impacts through producers and consumers", *Science*, Vol. 360 No. 6392, pp. 987-992.
- Principato, L., Pratesi, C.A. and Secondi, L. (2018), "Towards zero waste: an exploratory study on restaurant managers", *International Journal of Hospitality Management*, Vol. 74, pp. 130-137.
- Qi, D. and Roe, B.E. (2016), "Household food waste: multivariate regression and principal components analyses of awareness and attitudes among US consumers", *PloS One*, Vol. 11 No. 7, p. e0159250.
- Reiser, A. and Simmons, D.G. (2005), "A quasi-experimental method for testing the effectiveness of ecolabel promotion", *Journal of Sustainable Tourism*, Vol. 13 No. 6, pp. 590-616.
- Rossiter, J.R. and Percy, L. (1987), *Advertising and Promotion Management*, McGraw-Hill, New York, NY.
- Sakaguchi, L., Pak, N. and Potts, M.D. (2018), "Tackling the issue of food waste in restaurants: options for measurement method, reduction and behavioural change", *Journal of Cleaner Production*, Vol. 180, pp. 430-436.
- Sanjari, S.S., Jahn, S. and Boztug, Y. (2017), "Dual-process theory and consumer response to front-of-package nutrition label formats", *Nutrition Reviews*, Vol. 75 No. 11, pp. 871-882.
- Schanes, K., Dobernig, K. and Gözet, B. (2018), "Food waste matters-a systematic review of household food waste practices and their policy implications", *Journal of Cleaner Production*, Vol. 182, pp. 978-991.
- Sebbane, M. and Costa, S. (2018), "Food leftovers in workplace cafeterias: an exploratory analysis of stated behaviour and actual behaviour", *Resources, Conservation and Recycling*, Vol. 136, pp. 88-94.
- Shahzalal, M. and Font, X. (2018), "Influencing altruistic tourist behaviour: persuasive communication to affect attitudes and self-efficacy beliefs", *International Journal of Tourism Research*, Vol. 20 No. 3, pp. 326-334.
- Steckenreuter, A. and Wolf, I.D. (2013), "How to use persuasive communication to encourage visitors to pay park user fees", *Tourism Management*, Vol. 37 August, pp. 58-70.
- Stöckli, S., Dorn, M. and Liechti, S. (2018), "Normative prompts reduce consumer food waste in restaurants", *Waste Management*, Vol. 77, pp. 532-536.
- Sundt, P. (2012), *Prevention of Food Waste in Restaurants, Hotels, Canteens and Catering*, Nordic Council of Ministers, Copenhagen.
- Thaler, R.H. and Sunstein, C.R. (2008), *Nudge: Improving Decisions About Health, Wealth, and Happiness*, Yale University Press, New Haven, CT.
- Thyberg, K.L. and Tonjes, D.J. (2016), "Drivers of food waste and their implications for sustainable policy development", *Resources, Conservation and Recycling*, Vol. 106, pp. 110-123.
- Tölkes, C. (2018), "Sustainability communication in tourism – a literature review", *Tourism Management Perspectives*, Vol. 27, pp. 10-21.
- Underwood, R.L., Klein, N.M. and Burke, R.R. (2001), "Packaging communication: attentional effects of product imager", *Journal of Product and Brand Management*, Vol. 10 No. 7, pp. 403-422.

- Vakratsas, D. and Ambler, T. (1999), "How advertising works: what do we really know?", *Journal of Marketing*, Vol. 63 No. 1, pp. 26-43.
- Vega-Zamora, M., Torres-Ruiz, F.J. and Parras-Rosa, M. (2019), "Towards sustainable consumption: keys to communication for improving trust in organic foods", *Journal of Cleaner Production*, Vol. 216, pp. 511-519.
- Villarino, J. and Font, X. (2015), "Sustainability marketing myopia: the lack of persuasiveness in sustainability communication", *Journal of Vacation Marketing*, Vol. 21 No. 4, pp. 326-335.
- Vizzoto, F., Tessitore, S., Iraldo, F. and Testa, F. (2020), "Passively concerned: horeca managers' recognition of the importance of food waste hardly leads to the adoption of more strategies to reduce it", *Waste Management*, Vol. 107, pp. 266-275.
- Wang, L.E., Filimonau, V. and Li, Y. (2021), "Exploring the patterns of food waste generation by tourists in a popular destination", *Journal of Cleaner Production*, Vol. 279, 123890.
- Wansink, B. and Love, K. (2014), "Slim by design: menu strategies for promoting high-margin, healthy foods", *International Journal of Hospitality Management*, Vol. 42, pp. 137-143.
- Wansink, B. and Van Ittersum, K. (2013), "Portion size me: plate-size induced consumption norms and win-win solutions for reducing food intake and waste", *Journal of Experimental Psychology: Applied*, Vol. 19 No. 4, p. 320.
- Warren, C., Becken, S. and Coghlan, A. (2017), "Using persuasive communication to co-create behavioural change—engaging with guests to save resources at tourist accommodation facilities", *Journal of Sustainable Tourism*, Vol. 25 No. 7, pp. 935-954.
- Wehrli, R., Priskin, J., Demarmels, S., Schaffner, D., Schwarz, J., Truniger, F. and Stettler, J. (2017), "How to communicate sustainable tourism products to customers: results from a choice experiment", *Current Issues in Tourism*, Vol. 20 No. 13, pp. 1375-1394.
- White, K. and Peloza, J. (2009), "Self-benefit versus other-benefit marketing appeals: their effectiveness in generating charitable support", *Journal of Marketing*, Vol. 73 No. 4, pp. 109-124.
- Whitehair, K.J., Shanklin, C.W. and Brannon, L.A. (2013), "Written messages improve edible food waste behaviours in a university dining facility", *Journal of the Academy of Nutrition and Dietetics*, Vol. 113 No. 1, pp. 63-69.
- Xu, Y. and Jeong, E. (2019), "The effect of message framings and green practices on customers' attitudes and behaviour intentions toward green restaurants", *International Journal of Contemporary Hospitality Management*, Vol. 31 No. 6, pp. 2270-2296.
- Yamamoto, J.A., Yamamoto, J.B., Yamamoto, B.E. and Yamamoto, L.G. (2005), "Adolescent fast food and restaurant ordering behaviour with and without calorie and fat content menu information", *Journal of Adolescent Health*, Vol. 37 No. 5, pp. 397-402.
- Zarantonello, L., Jedidi, K. and Schmitt, B.H. (2013), "Functional and experiential routes to persuasion: an analysis of advertising in emerging versus developed markets", *International Journal of Research in Marketing*, Vol. 30 No. 1, pp. 46-56.
- Zhou, X., Van Tilburg, W.A., Mei, D., Wildschut, T. and Sedikides, C. (2019), "Hungering for the past: nostalgic food labels increase purchase intentions and actual consumption", *Appetite*, Vol. 140, pp. 151-158.

### Corresponding author

Oswin Maurer can be contacted at: [oswin.maurer@umibz.it](mailto:oswin.maurer@umibz.it)

---

For instructions on how to order reprints of this article, please visit our website:

[www.emeraldgrouppublishing.com/licensing/reprints.htm](http://www.emeraldgrouppublishing.com/licensing/reprints.htm)

Or contact us for further details: [permissions@emeraldinsight.com](mailto:permissions@emeraldinsight.com)