Take it or leave it: How an opt-out strategy for doggy bags affects consumer food waste behavior and restaurant evaluations

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ABSTRACT

Plate leftovers are an extensive source of food waste in restaurants. One solution to reduce this waste would be that consumers take plate leftovers home (i.e., use doggy bags). Yet, existing social norms in many countries and feelings of shame currently inhibit consumers from using doggy bags. The present research examines whether switching to an opt-out system, whereby consumers are offered a doggy bag by default, can decrease these feelings of shame and positively affect doggy-bag uptake. Yet, next to these positive effects, negative firm-related consequences may occur. Consumers may perceive a limitation in their freedom of choice, which can negatively affect their evaluations of the restaurant and its service staff. A series of five experiments (total n = 1166) shows that an opt-out strategy increases doggy-bag uptake more (on average 74% uptake compared to 27% for an opt-in strategy) than offering an explicit choice to consumers (average 49% uptake), but that an opt-out strategy indeed has negative effects on restaurant and service staff evaluations. Our research also shows that by (1) giving consumers a subordinate choice (e.g., a choice between different types of doggy bags) and by (2) providing friendly service when presenting the doggy bags, restaurants can ensure an effective doggy-bag uptake without detrimental effects on restaurant or service staff evaluations, or on household food waste. These findings provide new and valuable insights for research on food waste and on influence strategies towards sustainable behaviors.

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1. Introduction

Food waste is “a key barrier to sustainability” due to its negative effects on food security, resources, and on the environment (Xue et al., 2017). The hospitality and food service sector is the second to third largest contributor to food waste in Europe (Stenmarck et al., 2016; Wakefield and Axon, 2020), and 73%–79% of hospitality waste is estimated to be avoidable (Filimonau et al., 2019). Restaurants put substantial efforts into trying to reduce food waste and especially ‘plate waste’ (i.e., food left on consumers’ plates when they have finished eating). Restaurants, for example, offer different portion sizes, reduce plate sizes (Freedman and Brochado, 2010; Kallbekken and Satien, 2013), and provide training to their personnel (Thamagasorn and Pharino, 2019). At the same time, diverse consumer expectations, tastes, and demographics, as well as situational factors, make it almost impossible for restaurants to offer ideal portion sizes for every consumer (Hennchen, 2019; Filimonau et al., 2020a). There will thus always be some plate waste in restaurants (Filimonau et al., 2020b).

One potential solution to deal with plate waste is the use of doggy bags (Dhir et al., 2020). Doggy bags are containers or bags in which consumers can take home uneaten food to consume later (Mirosa et al., 2018; Zuraikat et al., 2018). Unfortunately, in many countries doggy bags are hardly used as the concept goes against the prevalent social norm (Mirosa et al., 2018; Sirieix et al., 2017; Zuraikat et al., 2018). Consumers often do not consider taking away uneaten food when eating out, and the group of consumers who would like to, does not actually do so (Di Talia et al., 2019). Consumers experience feelings of shame when asking for doggy bags, and therefore tend to avoid the use of doggy bags, when the normative behavior is to leave the leftover food on the plate (Hamerman et al., 2017; Sirieix et al., 2017). Despite their clear relevance, doggy bags continue “to be underexplored as a viable food waste recovery strategy” (Taiwar et al., 2021b, p. 2). Given the importance of diminishing food waste, and the challenge in changing consumer behavior, there is a need for research examining the effectiveness of...
influence strategies that can promote the uptake of doggy bags in the face of counterproductive social norms.

The current research builds on extant literature on opt-in and opt-out strategies for sustainable behavior (Dolnicar, 2020; Ebeling and Lotz, 2015; Lehner et al., 2016) and investigates whether an opt-out strategy would increase doggy-bag uptake compared to (1) the current opt-in strategy, and (2) the provision of an explicit choice. As the opt-out strategy may have disadvantages for other outcomes relevant to restaurants, such as consumers’ evaluations of the restaurant, we also introduce a new influence strategy where consumers receive subordinate options (i.e., two types of doggy bags) within an opt-out system. This influence strategy entails that the doggy bag is presented by default (consumers have to opt-out in order to forego the doggy bag), and that multiple doggy bag options are available.

Using such influence strategies can be considered as a Corporate Social Responsibility (CSR) activity that contributes to the goal of diminishing food waste. Prior research has argued that CSR activities are especially relevant in the hospitality industry and can benefit the companies that use these (Rhou and Singal, 2020). To assess such benefits, company-level outcomes need to be taken into consideration. Our research therefore provides insight not only into the effects of the influence strategies on doggy-bag uptake, but also into their effects on consumer evaluations of restaurants. This is relevant because not every strategy may be a win-win situation (Jung and Mellers, 2016; Steenaart et al., 2020). We also assess the broader sustainability goals by examining at-home consumption from the doggy bag. Previous research demonstrates that food waste avoidance actions at one supply chain actor may increase food waste at another supply chain actor (Devin and Richards, 2018). Effective food waste reduction strategies should therefore examine food waste from both a supplier and consumer perspective (Agovino et al., 2018). By including both, the current research provides valuable insights into whether influence strategies can be a successful tool for plate waste management, and do not simply transfer food waste from restaurants to households.

2. Theoretical background

In battling food waste, and in our case plate waste, restaurants may face social norms that can be counterproductive to the cause. Social norms are accepted rules and standards that guide consumers’ behavior (Cialdini and Trost, 1998). They help consumers to know what type of behavior to expect from others and to coordinate behavior. Yet, some social norms may be harmful for individuals or for society. For instance, social norms can induce a comparative mindset, in which consumers consider “which-to-choose” and focus on comparing the alternatives (Sanbonmatsu et al., 1991), without considering the option of not choosing any of the alternatives (Xu and Wyer, 2007, 2008). It shifts the focus from whether to “take or leave” the doggy bag, to “which doggy bag to take”. This may leave consumers’ perceived freedom of choice intact. We therefore postulate that presenting alternative subordinate options within the opt-out strategy will mitigate the negative effects on consumer evaluations of the restaurant and service staff.

A remaining important question is whether the food taken home in doggy bags will actually be consumed at home. Previous research has mostly examined barriers to the uptake of doggy bags (Sirieix et al., 2017; Mirosa et al., 2018), and rarely examined food consumption. A pilot study of Zero Waste Scotland (2014) showed that nearly all consumers who took food home in a doggy bag self-reported that they ate the food it contained. Likewise, a recent survey reports low scores on throwing away leftovers from doggy bags (Talwar et al., 2021a). Yet, it is not clear whether consumption of the leftover food depends on the influence strategy used. Consumers may for example feel less inclined to consume the food when they did not ask for or choose the doggy bag. Alternatively, visible environmental efforts by a company can trigger consumers to converse resources themselves (Wang et al., 2017), and thus may also trigger consumers to preserve food at home. We therefore explore food consumption at home. Fig. 1 presents the conceptual model.

As shown in Fig. 1, we expect that the influence strategies affect feelings of shame (i.e., higher feelings of shame for the opt-in strategy than for the other strategies) as well as perceived limited freedom of
choice (i.e., lower perceived freedom for the opt-out strategy). The strategies then increase doggy bag uptake, and additionally, perceived limited freedom of choice affects evaluations of the restaurant and service staff. We test this conceptual model in five experiments. The first experiment (within subjects design, targeted sample 50 participants) shows that the prominent social norm in the current cultural context is to not take a doggy bag, and that feelings of shame are crucial. Experiment 2 examines the uptake of doggy bags following the influence strategies in a laboratory study. Experiment 3 uses scenarios to test the effects of the influence strategies on feelings of shame and on perceived limited freedom of choice, as well as the influence on restaurant and waiters evaluations. A field study (Experiment 4) then examines uptake of doggy bags in a university canteen and subsequent at-home consumption from the doggy bags. Experiments 2, 3, and 4 have between-subjects designs with targeted samples of 40–50 participants per cell. Finally, Experiment 5 delves deeper into the effects of the subordinate-options strategy, and therefore has a target of 80–100 participants per cell. Data collection for Experiments 1 to 4 took place before the COVID-19 crisis.

3. Experiment 1 – norms and feelings surrounding doggy bags

3.1. Method

Fifty students of a Dutch university (30 female, \( M_{\text{age}} = 22 \)) were recruited on campus and assigned to a three-group (behavior: eating remaining food, leaving food, asking doggy bag) within-subjects design. Participants read a scenario in which they had dinner in a restaurant with family members. The food was delicious, but the portion was large. They imagined that there was food left on their plate while they felt full, and subsequently rated their feelings regarding three possible behaviors: eating the remaining food, leaving the food, asking doggy bag (random order). Feelings of shame, guilt, pride, satisfaction, remorse, anger with oneself, and carelessness were measured as single-item constructs on 7-point scales (1 = ‘not at all’; 7 = ‘very much’). Participants also indicated which of the three behaviors most people would perform (descriptive norm), and which of the behaviors people important to them would expect them to perform (injunctive norm), both as multiple choice questions.

3.2. Results and discussion

Repeated measures ANOVA’s with LSD comparisons were used to examine the feelings for the three behaviors (see Table 1). Results showed that taking a doggy bag had positive effects on consumers’ feelings compared to wasting: they felt less guilty, more proud, more satisfied, and were less angry with themselves. Taking a doggy bag felt similar to eating the food, but anger with oneself was lower and shame was higher. This suggests that the feeling of shame could be the feeling that prevents consumers from taking a doggy bag.

To examine social norms, we analyzed the responses to the norms measures. The descriptive norms measure revealed that participants thought that most people would leave the food (72%), followed by eating the food (22%). Three participants (6%) indicated that others would ask for doggy bags. This shows that the social norm strongly favors leaving the food \((\chi^2(2) = 35.56, p < .001)\). The injunctive norms measure showed that participants thought that others would want them...
to eat the food (48%) or leave the food (33%). Again, the minority chose asking for doggy bags (19%, $\chi^2(2) = 6.13, p = .047$). Thus, whereas consumers may feel positive about asking for a doggy bag (less guilt and anger, more pride and satisfaction), this behavior goes against the existing social norms and can generate shame feelings.

4. Experiment 2 – effects of influence strategies on doggy-bag uptake

Experiment 2 examines effects on doggy-bag uptake. Given the strong social norm to leave leftovers, it is a-priori unclear to which extent the influence strategies will change behavior.

4.1. Method

Participants were 180 students of a Dutch university, who were randomly assigned to one of four conditions (opt-in, opt-out, subordinate-options, explicit-choice). Two participants were accidently exposed to further analyses. A logistic regression predicting whether participants who had indicated to want one.

4.2. Results and discussion

Eleven participants (6.2%) ate all the crackers and were excluded from further analyses. A logistic regression predicting whether participants took a doggy bag (0 = no, 1 = yes) from condition (see Table 2) showed that the opt-in condition (35.7% uptake) did not differ from the explicit-choice condition (39.0%; Wald(1) = 0.03, $p = .867$), while the other two conditions differed from the opt-in condition (opt-out 69.6% uptake, Wald(1) = 9.69, $p = .002$; subordinate-options 76.3% uptake, Wald(1) = 12.40, $p < .001$). These latter two conditions did not differ from each other (Wald(1) = 0.48, $p = .491$).

These results show that presenting doggy bags as default is effective in persuading consumers to take them, whereas merely providing the crackers as they liked. The final instruction mentioned that they could take leftover crackers home. Depending on condition, participants were (1) asked to write a note if they wanted to take the crackers home (opt-in), (2) told they would be given a bag, and asked to write a note if they did not want to take the crackers home (opt-out), (3) asked whether they wanted to take the crackers home in a paper or plastic bag (subordinate-options), or (4) asked to indicate if they wanted to take the crackers home in a bag (yes/no) (explicit-choice). After all participants in a session had finished, the research assistant provided doggy bags to participants who had indicated to want one.

5. Experiment 3 – effects of choice freedom and evaluations

Experiment 3 examines the effects of the influence strategies on emotions, perceived limitation in choice freedom, evaluations of the restaurant and service staff, and on anticipated consumption of the leftovers.

5.1. Method

Participants and design. Participants were 294 Dutch consumers, recruited using the Qualtrics Panel service. Forty-nine participants failed to answer multiple or all questions. Seven participants took longer than 20 min, while 13 participants were extremely fast (less than 2 min). This left 225 participants (72% female; $M_{age} = 46.1$), randomly assigned to one of the four between-subjects conditions (opt-in, opt-out, subordinate-options, or explicit-choice).

Procedure and measures. Participants read a scenario in which they imagined going out to dinner with family members to an unfamiliar restaurant (see Appendix A). The end of the scenario described one of the four influence strategies (e.g., the waitress asks if the person wants to take leftover food home), and all scenarios ended with participants taking the leftover food home. Participants then answered how they would feel in this situation (similar to Experiment 1, measuring shame, guilt, pride, and satisfaction), and provided their evaluations of the restaurant (“This was a good restaurant”, “My experience in this restaurant was positive”, and “I thought this restaurant was pleasant”; $\alpha = .91$), and of the waitress (“The waitress was friendly” and “The waitress acted decently”; $\alpha = .86$). Perceived limitation in choice freedom was measured with two items (“I have the feeling that I was free in my choice to take the leftover food home” (reverse coded) and “In this situation, I would feel pressured to take food home”; $\alpha = .74$), and anticipated consumption of the food with one item (“I would surely eat the food at home”). All items were measured on 7-point scales (1 = ‘completely disagree’ to 7 = ‘completely agree’). Participants also answered some additional questions (see Appendix A).

5.2. Results

Emotions. In all conditions, participants imagined taking a doggy bag. The opt-out, subordinate-options, and explicit-choice strategies all lessened shame feelings about taking this doggy bag compared to the opt-in condition ($F(3, 221) = 7.09, p < .001, \eta^2_p = 0.09$; see Table 3).

There were no differences for the other emotions, with relatively low levels of guilt ($M = 2.01$) and high levels of pride ($M = 3.60$) and satisfaction ($M = 5.48$) in all conditions, which is in line with the findings of Experiment 1.

Perceived choice limitation. Participants perceived more limitation in their choice in an opt-out strategy ($M = 3.97$) than in the other conditions ($M = 2.21$); all comparisons with opt-out condition $p < .001$, differences between other conditions $p > .05$; $F(3, 221) = 20.41, p < .001, \eta^2_p = 0.22$). Thus, as expected, participants felt their freedom impaired.

Table 3

| Condition | Opt-in | Opt-out | Subordinate-options | Explicit choice |
|-----------|--------|---------|---------------------|-----------------|
| $M$ (SD)  | $M$ (SD) | $M$ (SD) | $M$ (SD)            |                 |
| Sham feelings  | 3.32$^a$ | 2.16$^b$ | 2.30$^b$ | 2.10$^b$ |
| (1.90) | (1.39) | (1.54) | (1.52) |
| Perceived choice  | 2.15$^a$ | 3.97$^b$ | 2.13$^b$ | 2.39$^b$ |
| (1.17) | (1.89) | (1.22) | (1.21) |
| Restaruant  | 6.52 | 5.95 | 6.32 | 6.17 |
| evaluation  | 0.66 | 0.96 | 0.73 | (0.98) |
| Waitress  | 6.29$^a$ | 5.38$^b$ | 6.30$^b$ | 6.29$^b$ |
| evaluation  | (0.62) | (1.24) | (0.92) | (0.87) |
| Anticipated  | 5.75 | 5.64 | 5.62 | 5.65 |
| consumption  | (1.68) | (1.75) | (1.64) | (1.83) |

Note. Row-wise means with different superscripts differ significantly from each other with $p < .05$. 


when the waitress offered doggy bags unsolicited, but not when she made the unsolicited offer including a choice between a paper and a plastic bag.

Restaurant and waitress evaluations. Restaurant evaluation differed marginally significantly between conditions ($F(3, 211) = 2.19, p = .09, \eta^2_p = 0.03$), with a tendency towards a lower evaluation in the opt-out condition. The difference between the opt-out ($M = 5.95$) and the subordinate-options condition ($M = 6.33$) was significant ($p = .015$), and the difference between opt-out and opt-in conditions ($M = 6.25$) was marginally significant ($p = .059$).

Waitress evaluation differed significantly between conditions ($F(3, 211) = 13.03, \eta^2_p = 0.15, p < .001$). Also here, evaluations were lower when using the opt-out strategy ($M = 5.38$) compared to the other conditions ($M = 6.29$; all comparisons with the opt-out condition $p < .001$, all other comparisons $ns$). Thus, the opt-out strategy seemed to decrease both waitress and restaurant evaluations, but appeared to primarily affect waitress evaluations.

Anticipated consumption. Anticipated at-home consumption from the doggy bags was high ($M = 5.67$) and did not differ between conditions ($F(3, 221) = 0.07, p = .977$). Thus, regardless of the influence strategy, participants expected to consume food from the doggy bag.

Mediation analysis. To test whether feelings of shame and perceived choice limitation mediated the effects on evaluations, we used PROCESS (Hayes, 2017; model 4) with 10,000 bootstrap samples. Condition formed the independent variable (with opt-in condition as reference category), feelings of shame and perceived choice limitation formed the parallel mediators, with separate analyses for restaurant and waitress evaluations. We expected a mediating effect of perceived choice limitation. We did not expect a mediating effect of shame, but tested for this nonetheless. Results for evaluations of restaurant and for evaluations of the waitress showed that feelings of shame did not mediate the effects of the influence strategies (none of the effects is significant), whereas perceived choice limitation was a mediator in the opt-out condition (an indirect effect of $-0.33; CI [-0.53, -0.16]$ for restaurant and $-0.34; CI [-0.57, -0.15]$ for waitress). As expected, perceived limitation in choice freedom was not a mediator in the other conditions.

5.3. Discussion

This experiment shows that opt-out, subordinate-options, and explicit-choice strategies are all effective in diminishing feelings of shame. Yet, providing doggy bags unsolicited decreases perceived freedom of choice and subsequently negatively affects consumer evaluations of especially the waitress. Providing a choice between two subordinate options that imply the default eliminates these detrimental effects.

6. Experiment 4 – effects on food consumption

Experiment 4 studies in a realistic restaurant experience whether the influence strategies affect, next to doggy-bag uptake and consumer evaluations, at-home consumption of the leftovers.

6.1. Method

Participants and design. Participants were 167 students of a Dutch university (83.8% female; $M_{age} = 21.8$), who were randomly assigned to one of the four conditions (opt-in, opt-out, subordinate-options, or explicit-choice); 155 participants answered the questionnaire that was administered a week after the lunch.

Procedure and measures. Participants were invited for lunch in a university canteen (maximum 20 participants per session). A research assistant welcomed the participants and acted as a waitress. Participants were seated at different tables, interspersed with regular visitors, to avoid verbal interaction between participants or overhearing conversations of the research assistant with other participants. They received a relatively large lunch (see Appendix B). While participants ate their lunch, as a cover for the aim of the study they filled in a questionnaire about the taste and variety of the provided foods (Appendix C). A note in the questionnaire mentioned that doggy bags were available.

When participants finished their lunch, the assistant verbally administered the doggy-bag condition. In the opt-in condition, the assistant did not mention the doggy bags: the availability of doggy bags was only noted in the questionnaire. In the opt-out condition, the assistant mentioned that she would pack the leftovers in a doggy bag, and continued to do so unless participants objected. In the subordinate-options condition, the assistant asked participants if they would like to take the leftovers home in a paper or plastic doggy bag. Finally, in the explicit-choice condition, the assistant asked participants if they would want to take leftovers home.

While the assistant took away the lunch items (packing these in doggy bags when appropriate), participants filled in a second questionnaire that contained measures of restaurant and waitress evaluations. Restaurant evaluation was measured using three semantic differentials (‘very poor – very good’, ‘very negative – very positive’, and ‘very unpleasant – very pleasant’; $a = 0.87$), and waitress evaluation with five semantic differentials about the service offered by the waitress (‘very bad – very good’, ‘very negative – very positive’, ‘very unpleasant – very pleasant’, ‘very unfavorable – very favourable’, ‘very indecent – very decent’; $a = 0.86$) (all on 9-point scales). The research assistant noted whether participants took doggy bags home and which items were included in the doggy bags or left as plate waste. Approximate grams and calories were calculated for each of the lunch items (see Appendix D). Finally, participants were informed that they would receive an email with additional questions one week later.

One week after their lunch, participants received the email with follow-up questions about the consumption of (part of) the leftovers from the doggy bag. In addition to questions to maintain the cover story (see Appendix B), participants were asked whether there were leftover products from the lunch and whether they had taken these home. If so, they were asked what had happened to these products (eaten by self/eaten by other people/eaten by pets/in storage/on compost heap/in waste container/other), and which product(s) it concerned. When participants indicated that products were stored at home, they were asked if these were still edible (yes/no/do not know) and if they planned to eat these (yes/maybe/no/do not know).

6.2. Results

Doggy-bag uptake. The likelihood to take a doggy bag was low in the opt-in condition (16.7%; see Table 4). A logistic regression on doggy-bag uptake using the opt-in condition as reference category showed that all influence strategies increased the likelihood of doggy-bag uptake compared to opt-in (all $p < .001$). In addition, the difference between opt-out and explicit-choice was significant ($p = .047$). The likelihood of doggy-bag uptake was highest when the opt-out or subordinate-options strategies were used.

In the questionnaire a week after the lunch, participants self-reported

| Condition                  | Opt-in ($n = 42/38^a$) | Opt-out ($n = 43/37$) | Subordinate-options ($n = 39/35$) | Explicit-choice ($n = 44/41$) |
|----------------------------|------------------------|-----------------------|----------------------------------|-------------------------------|
| Taking a doggy bag         | 16.7%                  | 78.6%                 | 71.8%                            | 59.1%                         |
| Self-report                |                        |                       |                                  |                               |
| Taking food home           | 44.7%                  | 94.6%                 | 88.6%                            | 92.7%                         |

* $a$ provides number of participants/number of participants that answered the self-reported measurement a week later.
whether they had taken leftovers home. Surprisingly, more participants (121) reported having taken food home than the number of participants who had taken doggy bags (84). The most likely explanation is that several participants took food home themselves, without asking for a doggy bag. A logistic regression with opt-in as the reference category showed that, also for the self-reported measure, opt-out, subordinate-choice, and explicit-choice increased the likelihood of taking food home compared to the opt-in condition (all $p < .001$). Differences between these three conditions were no longer significant, which is likely due to a ceiling effect.

**Restaurant and waitress evaluations.** Effects of the manipulation on restaurant evaluation did not reach significance ($F(3, 163) = 1.97; p = .12$), and on waitress evaluation were marginally significant ($F(3, 163) = 2.53; p = .06$). Pairwise comparisons indicated that restaurant evaluation was higher in the explicit-choice condition ($M = 7.24$) than in the opt-in condition ($M = 6.67$; $p = .008$). The waitress evaluation was higher in both the opt-out ($M = 7.86; p = .048$) and the subordinate-options conditions ($M = 7.87; p = .043$) than in the opt-in condition ($M = 7.51$). This is not in line with Experiment 3, and we will get back to this in the discussion.

**Consumption.** Table 5 describes what happened to the lunch items that were taken home. Only participants who self-reported that they had taken food home were included in these analyses ($n = 94$). Participants were able to indicate multiple categories, therefore percentages do not add up to 100. Overall, 83.0% of participants indicated that (part of) the taken-home products were consumed (by self and/or others). This number did not differ between conditions ($\chi^2(3) = 0.89, p = .83$). The number of participants who had placed products in storage likewise did not differ across conditions ($\chi^2(3) = 1.66, p = .45$). Thus, participants were equally likely to consume and store from the doggy bags, regardless of the influence strategy.

6.3. Discussion

In line with Experiment 2, the opt-out and subordinate-options strategies appear the most effective influence strategies to entice consumers to take home leftover food. We find no evidence that influence strategies transfer food waste from restaurants to households, and for all strategies the consumption from doggy bags is high.

Surprisingly, effects on restaurant and waitress evaluations differ from the results found in Experiment 3. Whereas Experiment 3 showed that the opt-out strategy decreased waitress evaluations, in the current experiment waitress evaluations were higher for the opt-out than for the opt-in strategy. Two potential reasons for this difference are the general conduct of the waitress and the reusability of the food. That is, in Experiment 3 the scenario indicated that the waitress offered the doggy bag unsolicited (without further explanation). In Experiment 4, the waitress offered food in a doggy bag with a friendly smile, as if it were a gift. Prior research has shown that perceived (un)friendliness of service staff affects consumer behavior (Albrecht et al., 2017), and this may also affect consumer evaluations. Moreover, Experiment 3 concerned meal leftovers that the restaurant could not re-use, whereas in Experiment 4 several of the lunch items, such as small packages containing spreads, were individually wrapped for a long shelf-life and could be re-used. Offering the latter products in doggy bags could appear as a generous act. Experiment 5 was designed to disentangle these possibilities and to clarify the outcomes of Experiments 3 and 4.

7. Experiment 5 – friendliness and reusability

7.1. Method

**Participants and design.** Participants were 601 Prolific members. They were excluded when taking less than 1 min (16) or more than 10 min (10) to fill the questionnaire; when failing the attention check (18); when providing the same score on all or all-but-one of the items with a 7-point answering scale (11). This left 546 participants (60.4% male, 0.9% no-gender; $M_{age} = 28.9$) in the dataset. Participants were randomly assigned in a 3 (waitress friendliness: friendly vs. unsolicited vs. control) x 2 (leftover reusability: reusable vs. non-reusable) between-subjects design.

**Procedure and measures.** Participants read a scenario in which they visited a restaurant together with family members for a high tea. The experience was described in positive terms, and the scenario mentioned leftovers. The foods were either individually wrapped, ensuring that leftovers could be used again by the restaurant (reusable condition) or various small portions that could not be used again by the restaurant (non-reusable condition). Subsequently, the waitress said with a friendly smile that she would put the leftovers in a doggy bag (friendly condition), she unsolicited provided the doggy bag (unsolicited condition), or the participant asked the waitress for a doggy bag (control condition). We measured perceived choice limitation ($\alpha = 0.74$), restaurant evaluation ($\alpha = 0.92$), and waitress evaluation ($\alpha = 0.88$) with the items from Experiment 3 (order of concepts counterbalanced). Participants also answered the attention check.

7.2. Results

**Perceived choice limitation.** A two-way ANOVA with waitress friendliness and reusability as independent variables on perceived choice limitation showed that waitress friendliness influenced perceived choice limitations ($F(2, 540) = 54.12, \eta^2_p = 0.17, p < .001$). Reusability ($F(1, 540) = 0.62, p = .433$) and their interaction ($F(2, 540) = 1.33, p = .265$) did not have an influence. All three friendliness conditions differed from each other (LSD post-hoc tests $p < .001$). Participants felt least limited when they chose doggy bags themselves ($M = 2.18$), somewhat more limited when the waitress offered doggy bags with a friendly smile ($M = 3.19$), and most limited when doggy bags were offered unsolicited ($M = 3.78$).

**Restaurant and waitress evaluations.** Restaurant evaluations did not depend on waitress friendliness ($F(2, 540) = 0.35, p = .703$) nor on the interaction ($F(2, 540) = 2.26, p = .105$). There was a marginally significant effect of reusability ($F(1, 540) = 3.25, \eta^2_p = 0.01, p = .072$). Participants evaluated the restaurant slightly less positive when food items were individually wrapped ($M = 6.26$) than when these were not wrapped ($M = 6.39$). It is possible that they disliked the implied packaging waste.

Only waitress friendliness had an effect on waitress evaluation ($F(2, 540) = 53.45, \eta^2_p = 0.08, p < .001$; reusability: $F(1, 540) < 0.01, p = .985$; interaction: $F(2, 540) = 1.86, p = .157$). Providing doggy bags unsolicited was evaluated less positively ($M = 5.75$) than not providing the doggy bags ($M = 6.24, p < .001$), which in turn was marginally less positively evaluated than providing doggy bags in a friendly manner ($M = 6.42, p = .078$).

| Table 5 | What happened to the products that were taken home (% answering yes). |
|---------|--------------------------------------------------|
| Action  | Any of the products | Fruit | Spreads | Sandwiches | Drink |
| Ate myself | 76.6% | 62.8% | 40.4% | 52.1% | 26.3% |
| Eaten by others | 28.7% | 7.4% | 22.3% | 7.4% | 2.1% |
| In storage | 33.0% | 3.2% | 30.9% | 1.1% | 0.0% |
| In the bin | 12.8% | 2.1% | 5.3% | 7.4% | 1.1% |

*Note.* Reported for participants who indicated to have taken food home. The options “eaten by pets” and “other” were never selected, and the option “on compost heap” was selected only once. Most participants who had products in stock indicated that these were edible (90.3%), and that they planned to (54.8%) or maybe would (35.5%) eat these.
7.3. Discussion

This experiment shows that friendliness of the service staff plays an important role in opt-out strategies. When the opt-out is offered with a smile, detrimental effects on perceived choice limitation and on waitress evaluations can be mitigated. This implies that firms need to pay attention to how an opt-out strategy is implemented, and train their staff well.

8. General discussion

While sustainable behavior serves a noble purpose, acting sustainable at times is met with hesitation. Our research confirms that consumers do not actively engage in certain sustainable behaviors, because the act itself is against the social norm and engaging in such behavior can induce feelings of shame. Many non-sustainable behaviors, such as energy consumption (Goldstein et al., 2008) and food waste (De Visscher-Amundson and Kleijnen, 2020), occur because these are considered “normal”, even when consumers acknowledge that the behavior is harmful (Smerdon et al., 2020).

Our findings show that it is essential not to leave the initiative for sustainable behavior with the consumer. Asking for doggy bags can generate feelings of shame, which withholds consumers from asking. Once consumers decide to take doggy bags, they experience positive feelings such as pride and satisfaction. Stimulating the uptake of doggy bags thus generates sustainable behavior as well as positive feelings in consumers. Yet, simply introducing the doggy bag as a service and providing consumers with a choice appears not the most effective strategy to stimulate doggy-bag uptake.

An important finding pivots around the opt-out strategy. We designed a series of experiments to investigate influence strategies that present doggy bags in different ways to consumers. While all examined influence strategies diminish feelings of shame, opting out is the most effective strategy when it comes to doggy-bag uptake. Nevertheless, an opt-out strategy does not come without risk. Previous research shows that strategies that are perceived as more forceful can backlash or have unintended consequences (Reinders et al., 2008). Indeed, we find that consumers perceive the opt-out strategy to diminish their freedom of choice, and the strategy to have negative consequences for consumers’ evaluations of restaurants and service staff. It is important to resolve these unintended consequences, as research shows that such negative evaluations could lead to restaurants or service staff not being comfortable to offer or even sabotaging the strategy (Harris et al., 2006; Chi et al., 2013). Moreover, negative evaluations of a restaurant could eventually lead to consumers not visiting the restaurant anymore.

The current study provides two potential solutions: shifting consumers’ attention to a different type of choice, and altering the way service staff presents doggy bags. First, while maintaining the opt-out strategy, consumers can be presented with a choice between two different types of doggy bags (subordinate options) to shift attention from “take it or leave it” to “which-to-take”. This influence strategy does not have detrimental effects on evaluations of the service provider, and the positive impact on doggy-bag uptake is maintained. Second, when the opt-out approach is presented in a friendly way, for example with a smile, the detrimental effects also vanish.

8.1. Theoretical contributions

Our findings contribute to literature on the promotion of sustainable behaviors that are experienced as being shameful or against existing social norms. While it is challenging to change social norms, we show that there are strategies to influence consumers towards more sustainable behaviors. In line with prior research (Hamerman et al., 2017), our findings show that offering an explicit choice can already be somewhat helpful to overcome feelings of shame. Moreover, the findings show that opt-out strategies are even more successful, and that the ways in which these strategies are implemented is essential for their success.

Our research also contributes to the extant literature on CSR in the hospitality industry (Rhou and Singal, 2020; Wang et al., 2017). We show that promoting the uptake of doggy bags can not only have positive environmental consequences (i.e., diminished food waste), but can also affect evaluations of the restaurant and its staff. Whereas prior research has primarily focused on positive effects of CSR activities on brand image, customer loyalty, and on willingness to pay (Rhou and Singal, 2020), we also demonstrate when the promotion of a CSR activity could backfire as a result of an opt-out strategy.

8.2. Practical implications

Our findings offer insights into how restaurants can encourage sustainable behavior. It appears that simply providing a choice to consumers may not be sufficient, and that opt-out strategies may be needed when sustainable behavior is not the norm. Yet, we caution against unintended consequences of not implementing these strategies in the right way. Prior research has demonstrated that blaming consumers for waste in communications about doggy bags can backfire (Birau and Faure, 2018). Our study adds to this finding by showing other issues surrounding the implementation of sustainability strategies. Specifically, opt-out strategies limit consumers’ feelings of choice freedom. Therefore, in designing opt-out strategies, consumers should be offered other relevant choices while maintaining the sustainable act as the default option. This insight can be applied to various types of sustainable behaviors, such as providing consumers with different options of green energy (solar, wind, hydropower) or different options of plant-based dishes.

Our study also has implications for policy makers who want to promote activities to diminish food waste. Stimulating the use of doggy bags in society could diminish feelings of shame and create a context where the use of doggy bags is more common. Our results indicate that fears of creating in-home food waste due to non-consumption from doggy bags are misplaced, and that these should not deter policy makers from promoting the use of doggy bags.

8.3. Limitations and future research

There are several limitations to our study that may inspire future research. A first limitation is the use of student samples in Experiments 1, 2, and 4. Prior research has found that socio-demographic variables, such as age, can affect the amount of household food waste (Schanes et al., 2018), with older participants wasting less in general. To increase the generalizability of our findings, we therefore also included two experiments (Experiments 3 and 5) in which representative samples were used. Given that results are consistent across the multiple student and multiple non-student samples in our manuscript, we conclude that findings are robust across these different consumer groups.

Another limitation is the type of food that was used in some of our studies (snack products, lunch), for which doggy bags are less common in reality. The uptake of doggy bags likely depends on contextual factors such as how much consumers like the food, its economic value, and the convenience of taking it home (Miroisi et al., 2018), on social factors such as the type of dining companions (Hamerman et al., 2017), and on individual differences such as moral norms (Talwar et al., 2021b). These factors may play a role in the effectiveness of the influence strategies. Future research could examine the role of potential moderators in more detail.

Future research could also explore the implementation of the influence strategies in more depth. We show that how an influence strategy is implemented (e.g., with a friendly smile) may be just as important as which influence strategy is used. A deeper understanding of this could help restaurants to implement an influence strategy in an effective way. To this effect, a recent study showed that communicating that waiters would provide a doggy bag by default generated fewer plate leftovers.
rather than doggy bag uptake, probably because consumers assumed that leftovers were considered inappropriate (Giaccherini et al., 2021). The wording and timing of the message thus may matter.

8.4. Conclusion

Feelings of shame may withhold consumers from acting sustainably when that behavior is considered a deviation from social norms. Our findings reveal that, in the context of food waste, it is possible to overcome such shame feelings and to motivate consumers to act sustainably. When restaurants are wrestling with plate waste that cannot be completely prevented, opt-out and subordinate-options influence strategies may provide a solution. These simple-to-implement and affordable strategies can motivate consumers to use doggy bags, if used in a suitable way. It is important that consumers do not feel that their freedom of choice is inhibited and that an opt-out approach is presented in a friendly way. Several researchers have questioned whether restaurants are simply shifting the food-waste problem to consumers when using doggy bags. We are one of the few studies that have evaluated the downstream effects of influence strategies, and reveal that an overwhelming majority of consumers does consume the leftover foods at home. Moreover, not only does providing subordinate options reduce food waste, it also generates positive evaluations of restaurants and service staff, and happy consumers. Providing subordinate choices is thus a win-win strategy indeed.

Appendix A. Scenarios and additional questions in Experiment 3

Scenario description. All scenarios start with:

“Imagine:

You are going for dinner with family members to a restaurant that you have not visited before. The restaurant is cozy. There are several other guests, the background music is pleasant, and service is fast. The food that you ordered tastes excellent. The portion however is too large for you, and you do not finish it. The waitress comes by to take the plates back to the kitchen.”

The last lines of the scenario depend on condition:

- Opt-in condition: You decide that you want to take the leftover food home, and ask the waitress if the can wrap it. The waitress gives you a bag with the leftovers, and you take this with you.
- Explicit-choice: She notices the leftover food and asks if you want to take it home or not. You decide that you want to take the leftover food home, and ask the waitress if the can wrap it. The waitress gives you a bag with the leftovers, and you take this with you.
- Opt-out: She notices the leftover food and, unsolicited, wraps it so that you can take the leftover food home. The waitress gives you a bag with the leftovers, and you take this with you.
- Subordinate-options: She notices the leftover food and asks if you want to take it home in a paper or plastic bag. You choose for a paper bag. The waitress gives you a bag with the leftovers, and you take this with you.

Additional questions. For exploration purposes, we included a few additional questions in this study.

Background questions. For background information, participants rated how important it is to them that no food gets wasted (7-point scale ranging from ‘completely disagree’ to ‘completely agree’). They also indicated how often they eat in a restaurant (‘once a week or more often’, ‘a few times a month’, ‘a few times a year’, ‘almost never’ or ‘never’), as well as how often they eat everything on their plate when eating out in a restaurant and how often they take leftover food home (both on 7-point scales ranging from ‘never’ to ‘always’). Results showed that most participants went out for dinner several times per year (56.9%) or several times per month (36.4%) (study run pre-covid). Participants indicated to clean their plate between never and half of the times in 15.7% of cases, and less than half of the times in 29.1% of cases, whereas 59.6% of participants cleaned their plate almost always, and 11.2% always. Although they indicated that they generally worried about food waste, it also generates positive evaluations of restaurants and service staff, and happy consumers. Providing subordinate choices is thus a win-win strategy indeed.

CRediT authorship contribution statement

Erica van Herpen: Conceptualization, Methodology, Investigation, Formal analysis, Writing. Ilona E. de Hooge: Conceptualization, Methodology, Writing. Anna de Visser-Amundson: Conceptualization, Methodology, Writing. MirellaP. Kleijnen: Conceptualization, Methodology, Writing.

Declaration of competing interest

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

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Perceived concern about the environment also differed between conditions ($F(3, 221) = 2.84, \eta_p^2 = 0.04, p = .039$). The pattern of results differed for this construct. Posthoc tests showed that, compared to the opt-in condition ($M = 5.54$), participants perceived that the restaurant was more concerned about the environment when it offered doggy bags as opt-out ($M = 6.13; p = .012$) or as subordinate options ($M = 6.06; p = .021$). The condition in which an explicit choice for a doggy bag was provided ($M = 5.76$) did not differ significantly from any of the other conditions.

**Perceived influence attempt.** Participants rated the statement “The waitress tried to influence me” (single item, 7-point scale with endpoints ‘completely disagree’ to ‘completely agree’). Results showed that, in line with the results for perceived limitation of choice, participants indicated a greater perception of being influenced in the opt-out condition ($M = 4.00$) than in the other conditions ($M_{\text{opt-in}} = 2.35; M_{\text{explicit choice}} = 2.61; M_{\text{subordinate}} = 2.56$; all $p$s < .001).

**Regret.** After rating the likelihood to eat the leftover food that was taken home, participants also rated whether they were likely to regret taking the food home (single item on 7-point scale). They indicated little regret ($M = 1.92$), and this did not significantly differ between conditions ($F(3, 225) = 0.03, p = .994$). These results are in line with the results for likelihood of eating from the doggy bag.

### Appendix B. Lunch items in Experiment 4

Participants in Experiment 4 were provided with a relatively large lunch, consisting of typical products for a lunch in the Netherlands. Due to liability concerns regarding food safety, the canteen did not allow us to provide perishable sandwich toppings. Figure B1 provides a picture of the lunch.

The lunch consisted of:

- Four sandwich buns
- Butter and margarine
- Four cups with spreads (taken from different flavours of jam, hazelnut paste, chocolate sprinkles, two types of cheese spread)
- Two pieces of fruit (apple and banana; due to delivery delays and quality issues on some of the days that the experiment was running, other pieces of fruit were on occasion provided to several participants)
- A choice of drink from milk, butter milk, and orange juice.

![Figure B.1. Example of lunch served in Experiment 4.](image)

### Appendix C. Additional measures in Experiment 4

Several measures were included in the questionnaire to provide a cover story for the study and obscure the focus on doggy bags. Before eating their lunch, participants indicated:

- Attractiveness of the lunch (5 items).
- Attractiveness, perceived tastiness, and desire to eat for each of the types of lunch items (sandwiches, fruit, spread), as well as scent for the sandwiches.
- If they would definitely not eat some of the lunch items (e.g. due to allergies).

After eating, participants indicated:

- Taste, variety, and desire to eat again.
- An overall score (between 1 and 10) for the total lunch.
- A short review of the lunch, as they would include on social media.
After the waitress had administered the doggy bag condition, participants filled in a survey. In addition to the constructs were reported in the main text, participants indicated:

- Friendliness of the waitress (6 items)
- An overall rating (between 1 and 10) of the waitress
- A short evaluation as they would include on social media.

One week after the lunch, participants were contacted again and received another questionnaire by e-mail. The following constructs were measured in this questionnaire:

- Attractiveness of the lunch (5 items)
- Friendliness of the waitress (6 items)
- Attitude towards the restaurant (3 items)

Appendix D. Analyses of grams and calories in Experiment 4

We examined the amount of food that was taken home in the doggy bag and the amount of food left as plate waste, calculated in both grams and calories. Table D.1 provides the details. In all cases, the ANOVA results showed significant effects of condition (p < .001), and in all cases significantly less was taken home and more was left as plate waste in the opt-in condition than in the other conditions. Even though participants may have taken home more food than we were aware of (i.e., taken food not included in the doggy bag), and the data on the amount taken home may thus be biased, the amount of plate waste (which is unaffected by this) clearly showed that plate waste in the canteen was diminished when the influence strategies were used. Overall restaurant plate waste thus decreased by promoting doggy bags.

Table D.1

|                   | Opt-in (n = 42) | Explicit choice (n = 44) | Opt-out (n = 43) | Subordinate options (n = 39) |
|-------------------|----------------|--------------------------|-----------------|-----------------------------|
| Amount taken home, in grams | 81.55 (104.53) | 191.82 (109.14) | 219.36 (128.24) | 241.41 (134.11) |
| Amount taken home, in calories | 97.98 (146.53) | 280.06 (171.42) | 384.01 (225.67) | 404.68 (238.27) |
| Left as plate waste, in grams | 150.83 (112.43) | 55.12 (69.85) | 35.12 (72.84) | 36.86 (79.58) |
| Left as plate waste, in calories | 291.07 (198.71) | 151.88 (142.58) | 68.43 (142.58) | 105.90 (211.15) |

Note. Means with standard deviations between brackets. Means with the same superscript across conditions are not significantly different based on posthoc tests (LSD).

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