

A DESCRIPTIVE-SOCIAL-NORM BASED INTERVENTION TO INCREASE A PRO-ENVIRONMENTAL BEHAVIOR IN A RESTAURANT

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Abstract

Food waste has emerged as a global issue with significant economic, social, and environmental implications. Regardless of the stage at which it occurs, food waste represents an opportunity to address the global challenge of hunger and malnutrition while exerting unnecessary pressure on the environment and resources. This paper investigates the use of a descriptive social norm to encourage restaurant customers to use doggy bags thereby reducing food waste. Two studies were run in two restaurants in Northern Italy. In the first study, we used a table tent already analyzed in the literature and the results showed a significant increase in the request for doggy bags in the presence of the table tent. Since the presence of the table tent also increased the likelihood of customers to leave food on their plates, we decided to run a second study, in another restaurant, to analyze by two separate table tents the effect of the pure social norm and the effect of the reminder. Results suggest that only the reminder effectively encourages customers to use doggy bags, but both conditions increase the amount of food leftover.

Keywords: *Nudging, environment, decision-making, social norms, pro-environmental behavior.*

1. Introduction

Food service waste is defined as food waste generated in settings where food is consumed in substantial quantities outside of the home (e.g., restaurants, cafeterias and canteens). Several studies focused their attention on food service waste in countries from all over the world. If we consider the studies defined as high confidence level studies by the United Nations Environment Program (UNEP) Food Waste Index, Report 2021 (based on how robust the estimate of food waste is for tracking food waste in the given country), the higher kg per capita food waste in food services is in Austria with 31 kg/capita (Caldeira et al., 2019), and the lowest in Estonia with 17 kg/capita (Moora et al., 2018).

2. Study 1

The aim of Study 1 is to test the effectiveness of the display of a social norm in a restaurant to induce customers to ask for a doggy bag. Following Giaccherini et al. (2021), in the experimental condition a table tent was used that read (here we provide an English translation of the original Italian message): “Doggy bag? Yes, please. From a recent Coldiretti survey, a significantly increasing number of Italian restaurant guests are asking for doggy bags to take their leftovers home. If you want, you can ask your waiter for a doggy bag here”. We decided to add “from a recent Coldiretti survey” and “significantly” to the message used by Giaccherini and colleagues in order to increase the authority of the message. In the control condition, no table tents were used.

The experiment took place over two weekends, the first from June 2nd to June 4th, 2023 (control group) and the following weekend from June 9th to June 11th (experimental group).

We provided the restaurant with an adequate supply of food containers. To minimize the environmental impact of the experiment, the food containers were made from 100% recycled and biodegradable materials.

We registered the number of people who left the food uneaten at the end of the meal, the amount of food left in the plate, and the number of people who asked for a doggy bag.

2.1. Results

During the two weekends, 367 people visited the restaurant (189 in the control condition and 178 in the experimental condition). The percentage of customers who asked for a doggy bag was 3% and 8%, respectively in the control and experimental conditions. The percentage of customers who left uneaten food in the plate was 5% and 10%, respectively in the control and experimental conditions. The amount of uneaten food was 61 grams and 123 grams, respectively in the control and experimental conditions.

Two logistic linear regressions were run to test for the effect of the independent dummy variable (presence Vs. absence (referent group) of the social norm information) on the two dichotomous dependent variables: request (1) vs. not-request (0) of the doggy bag and left (1) vs. not-left (0) food in the plate.

Results show that the slope of the independent variable is statistically significant in the first case ($\beta = 1.220$; $SE = 0.527$; z value = 2.313; $p = 0.021$; $\text{Exp}(\beta) = 3.39$), and marginally statistically significant in the second case ($\beta = 0.748$; $SE = 0.426$; z value = 1.754; $p = 0.075$; $\text{Exp}(\beta) = 2.11$).

A linear regression analysis was run to test for the effect of the independent dummy variable (presence Vs. absence (referent group) of the social norm information) on the continuous dependent variable "amount in grams of leftover". Results show that the slope of the independent variable is statistically significant ($\beta = 61.83$; $SE = 28.34$; t value = 2.182; $p = 0.039$).

Results show a consistent choice pattern. The presence of the table tent induces customers to leave more frequently food in their plate, in higher quantity, and asking more frequently for the doggy bag. This seems to reflect a strategic decision whereby customers decide to leave an appropriate amount of food in the plate to be lately eaten (e.g., at home).

From this study is not clear whether the reported findings are due to the presence of the social norm (e.g., the results of the Coldiretti survey displayed on the table tent that show how people behave in restaurants) or are simply due to a reminder effect. In the former case, the presence of the social norm is necessary to produce the reported effect. In the latter case, it is not necessary. For example, any message reminding people of the possibility to bring home food could induce them to ask for a doggy bag, without any reference to how people behave in restaurants. The aim of the second study was to test such a hypothesis.

3. Study 2

To test whether the provision of the social norm in the table tent accounts for the results reported in Study 1, two experimental conditions were devised. Based on the original message used in Study 1, in one experimental condition ("only social norm"), the table tent displayed only the social norm piece of information, that is "From a recent Coldiretti survey, a significantly increasing number of Italian restaurant guests are asking for doggy bags to take their leftovers home". In the second experimental condition ("only reminder"), the table tent displayed the message: "Doggy bag? Yes, please. If you want, you can ask your waiter for a doggy bag here". As in the previous study, in the control condition no table tents were displayed. In this study we used the same methodology used in the previous study. The second study was run in a second restaurant which is similar in type of served food and located in the same area (Northern Italy). Again, we registered the number of people who left uneaten food, the amount of food left in the plate, and the number of people who asked for a doggy bag.

3.1. Results

We collected the data during six meals (three lunches and three dinners) for each condition. The data collection continued for nine days. During these days 546 people visited the restaurant (183 in the "control" condition, 176 in the "only social norm" condition and 187 in the "only reminder" condition).

The percentage of customers who asked for the doggy bag was 7%, 9% and 14%, respectively in the control, "only social norm", and "only reminder". The percentage of customers who left food in the plate across the three conditions was 16%, 11% and 18%. The amount of uneaten food (in grams) across the three conditions was 105, 122 and 120.

Compared to the previous study, the same plan of statistical analysis was used to analyze the effect of the independent categorical variable "Type of table tent" (no tent, only social norm or only reminder) on each of the three dependent variables: Doggy bag request, food leftover and amount of uneaten food. The control condition (e.g., absence of table tent) was used as referent category.

Results of the first logistic regression analysis show that only the experimental condition "only reminder" induced customers to ask for more doggy bags compared to the control condition. The effect is statistically significant, $\beta = 0.877$; $SE = 0.364$; z value = 2.411; $p = 0.016$, $\text{Exp}(\beta) = 2.41$. We could interpret this finding by saying that the probability of asking for the doggy in this experimental condition is nearly two-and-a-half times greater than that in the control condition.

Results of the second logistic regression analysis show that the number of persons who left uneaten food is similar across the three conditions because the two slopes related to the two dummy variables are not statistically significant.

Results of the linear regression analysis show that in both experimental conditions customers leave a higher quantity of uneaten food than in the control condition. The slope for the condition “only social norm” is $\beta = 17.58$ (SE= 8.798; t value = 1.999; p = 0.049) and that for the condition “only reminder” is $\beta = 14.72$ (SE= 7.688; t value= 1.916; p= 0.059). However, it should be noted that although the mean differences are statistically significant, the importance of a difference of 15 grams of food (e.g., the equivalent of two cloves of garlic) is negligible for the issue of the study.

4. Conclusions

Customers tend to leave nonnegligible quantities of uneaten food in the plate for whatever reason. In our study, an average of slightly less than 100 grams of leftover was found in the control condition which corresponds, for example, to a typical portion of first dish (e.g., “pasta”). Is there a way to avoid such a food service waste? Yes, but probably not for the reasons we speculated at the start of the study.

Compared to a control condition, the experimental condition where “only the social norm” was displayed is not sufficient to induce more customers to ask for a doggy bag. However, the simple display of a reminder (without any reference to a social norm) is sufficient to induce customers to leave more food in the plate that will be later collected into a doggy bag.

From a theoretical side, the reported finding opens an intriguing interpretation of the several “positive effects” reported in the literature which are attributed to the display of a social norm. As in the case of Giaccherini et al., (2021), it might be that the information about what other people is doing (e.g., the social norm) is mixed together with other types of information (e.g., a reminder; an invitation) that can drive the target behavior. If this is the case, the potential confounding makes it difficult to unambiguously interpret the results. Future research should try to assess the effect of the presence of the social norm in a cleaner experimental setting where other potential variables are controlled for. Also, it should try to assess whether the effectiveness of “simple reminders” generalizes across other pro-environmental behaviours.

References

- Caldeira, C., Laurentiis, V. D., Corrado, S., van Holsteijn, F., & Sala, S. (2019). Quantification of food waste per product group along the food supply chain in the European Union: A mass flow analysis. *Resources, Conservation and Recycling*, *149*, 479-488.
- Giaccherini, M., Gilli, M., Mancinelli, S., & Zoli, M. (2021). Nudging food waste decisions at restaurants. *European Economic Review*, *135*, 103722.
- Moor, H., Piirsalu, E., & Viilvere, T. (2015). Analysis of food waste in the Estonian food trade sector and the food industry. *Stockholm Environment Institute*, *2*. <https://www.sei.org/wp-content/uploads/2017/12/summary-food-waste-in-estonianfood-trade-sector-and-industry-sei-tallinn-2016.pdf>