Supplementary Material (SM)

Addressing the Consumer Food Waste Crisis: A Decade of Psychological Interventions

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SM 1 Interventions on food waste reduction behaviour according to the type of food waste

Household food waste interventions (n=5)				
Country	**Demographics reported**	**Methodology**	**Results**	**Reference**
UK	- Staff and residents at 24 housing sites - Median residents: Recognition sites (n=39) and control sites (n=39)	- Cross-sectional - Intervention and questionnaire survey - Intervention: 2 intervention sites were selected: (i) Recognition sites where the intervention was conducted and (ii) Control sites (no intervention) - 4 phases of data collection for all sites: One month before workshops, after the intervention, halfway through the project, and at the end of the project. 4 to 6 weeks each phase - Various workshop activities were conducted: introduction, singalong, presentations, residents sharing their challenges and demonstration of the composter	- Increase in recycling by 10.4% - Median residual waste generated per flat at the recognition sites was reduced to 0.4 kg/week, but an increase of 0.1 kg/week at the control sites - Increase in social cohesion amongst residents and staff	[13]
	Affluent and low-income residents (n=30 for each group)	- Cross-sectional - Intervention: Informative leaflets on costs and impacts of food waste. "Collection of food waste samples took place over four weeks"	- Avoidable food waste did not change significantly after the delivery of either leaflet - Neither of the interventions tested had a discernible impact on the quantity and composition of avoidable food waste	[14]
Italy	- Adults were responsible for shopping and cooking at home Study 1: n=514 Study 2: n=456 Study 3: n=210	- Cross-sectional - Intervention: Study 1: Interview Study 2: A questionnaire survey Study 3: Pre-test diary (1 week), followed by an educational intervention- "reading an educational article, explaining how to organise a weekly menu quickly and simply", and post-test diary (1 week).	- Food storage appears to have the greatest adverse effect on minimising food waste - Lack of planning for domestic food preparation appears to be the most significant barrier to reducing household food waste - Educational intervention reduces the amount of domestic food waste	[10]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
Canada	- Single-family households: Treatment: n=54 Control: n=58	- Cross-sectional - Pre-intervention garbage waste data was collected (1 week) - Intervention (2 weeks): "Reduce Food Waste, Save Money" was developed to encourage reducing the amount of money wasted on food waste and strengthening perceived behavioural control, by providing food literacy messaging through: postcard, fridge magnet, explanatory letter, freezer stickers, grocery list pad, and a 4-L container - The intervention package was delivered to treatment households. - Post-intervention garbage waste collected (1 week)	- The average amount of garbage set out, for the post-intervention sample as compared with the pre-intervention sample: • decreased by 12% for treatment households • increased by 2% for control households.	[11]
Sweden	Households (n=1,632)	- Repeated treatment design: waste segregation behavior of participants was measured before and after two interventions - Intervention (44 weeks): (a) use of written information, distributed as leaflets amongst households, and (b) installation of equipment for source-segregation of waste to increase convenience food waste sorting in kitchens.	After the installation of sorting equipment in households, both the amount of separately collected food waste as well as the source-separation ratio increased.	[12]
Educational institutions food waste interventions (n=14)				
UK	University students and staff in Midlands	- Cross-sectional - Survey, semi-structured interview and intervention involving the use of social media (send messages when there are food leftovers within the study setting) for a 4-month period	- A lack of consumer awareness of the issue of food waste was apparent from the survey and focus group finding - Students who don't waste mainly due to lack of money: "too poor to waste food" - Barriers identified: The visceral interaction with food, notions of trust and cultural norms around acceptable sourcing of food - The intervention was not successful as trust is important in terms of knowing whether the leftover being posted on social media is clean and not contaminated	[17]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
U.S.A.	- Students at the university cafeteria (n=174) - 91% of participants lived in residence halls on campus - Participants ate at the cafeteria 10 times/week on average	- Longitudinal - Interventions: Survey; food waste audit - Intervention program: No Scrap Left Behind (Informational discussion tabling with trained volunteers and signage throughout the cafeteria - Cafeteria napkin holders also included brief fun and actionable messaging and a Food Waste Quiz (four versions throughout the cafeteria) that students could answer on a napkin and bring back to the program table for a prize - 3 semesters per year, one week per semester.	- Food waste kitchen audit: Students produced an average of 68.78 g/student of wasted food at the program onset. student food waste based on kitchen audits decreased significantly by 28% within one academic year (Fall 2015 to Spring 2016; one-tailed t-test, $p = 0.000967$). Food waste decreased from an average of 64.3 to 87.0 g/student, a 26% decrease, within one term of programming (Winter 2017; one-tailed t-test, $p = 0.0218$) - Survey results: At the end of the program, students were 11% more likely to agree that "I think about the food waste I generate" at the onset (65%) compared to the end (76%) of the programming year (one-tailed t-test, $p = 0.0382$). Students were also 10% more likely to agree that "I put effort into reducing food waste" at the beginning (62%) compared to the end (72%) of the year (one-tailed t-test, p-value = 0.0487).	[39]
	University students (n=540)	- Cross-sectional - Intervention: Prompt-type messages and personally relevant feedback-based data - A questionnaire and tray waste tracking were used to evaluate the intervention - 6-week program	- Students had a higher-than-neutral level of belief but did not indicate a strong conviction toward environmental sustainability or food waste - More than 57 g of edible food was disposed of per tray, which sums up to 1.5 tons of food waste during the 6-week study - The simple to-the-point prompt-type message stimulated a 15% reduction in food waste - The addition of a more personalised feedback-based message did not stimulate an additional change beyond that of the prompt message	[20]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
	Employees at a restaurant in the university (n=54) (full-time employees, graduate students assistants, and undergraduate student employees)	- Cross-sectional - Intervention: Pre-consumer and post-consumer food waste audits, survey - Interventions: Employee training session on food waste awareness - 12 weeks program	- 51.6% of employees had not seen or heard about food waste in the media - The motivators behind employee commitment to engage in food waste reduction were information related: (i) knowing the number of resources used to generate food waste, (ii) knowing the cost associated with food waste, (iii) employees wanting to make a difference - 36.6% of food waste reduction per week	[15]
	- Focus group n=6 - In dining hall: with trays, n=4901 without trays, n=4297	- Cross-sectional - Focus group and measuring food waste - Intervention: Switching from tray to trayless system for one week each - One week each system, four weeks apart	- Significant decrease in solid waste per patron was observed in switching from the tray to the trayless system (approximately 18%) - The trayless system showed waste reduction - Increased breakage of dishware and an increased need to wipe down tables were possible concerns from the switch	[25]
Germany	- Guests in the university canteen (n=880) - Baseline: n=503 Intervention: n=377	- Cross-sectional - Interventions: (1) the provision of information in the form of labels or posters, (2) the manipulation of portion sizes - Intervention program 2 weeks	- Smaller portion sizes significantly reduce plate leftovers - Reduced plate leftovers when guests react to the information by increased effort to finish their chosen food - Increased positive attitudes towards finishing all food	[37]
Italy	Teachers, parents and students at 12 primary schools	- Cross-sectional - Questionnaire and intervention: Food waste audit before and after the educational intervention (flipped classroom), where students learn new knowledge at home, and practice under the teachers' guidance - The portion size served 200 g for the first course, 60 g for second course, 100 g for side course - One-month period	- The first-course food waste average before the intervention was 1199.31g; after the intervention, it was 1054.8g (12% reduction) - The second course's food waste average before the intervention was 246.9g; after the intervention was 220.9g. (10% reduction) - Side dish food waste increased 13% after intervention	[16]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
Netherlands	Customers at a university restaurant	- Cross-sectional - Intervention: Information campaign (9 days), observation (3 weeks) and questionnaire survey	- 3% asking for a smaller portion of meals sold in the pre-intervention period and this doubled in the post-intervention period - Guilt and shame are linked to consumers' intentions to prevent food waste - Channels to be included in a successful information campaign nudging consumer towards food waste reduction	[30]
Spain	Primary school students from Nursery to Year 6 and teachers (n=17)	- Cross-sectional - Intervention implementation and pre/post-intervention survey - Intervention: Measurement of food waste pre and post-intervention, intervention in classrooms such as teaching sessions. Awareness activities as a group and individually such as poster drawing - Pre-intervention survey, 3-week intervention program, post-intervention survey	- Subtle changes in the level of knowledge and attitude towards FW were detected in teachers and pupils after the intervention - Around 30% of FW reduction at lunch was observed in the intervention group but not in the other groups - A decrease of almost half of the average weight was observed during the mid-morning break in the rest of primary groups - FW issue in classrooms can have a very positive effect on children's attitudes	[23]
Switzerland	Visitors at two canteens within the same university (n=1321)	- Cross-sectional - Pre and Post-intervention survey - Intervention A: disseminating information only. (2-week program) - Intervention B: disseminating information and offering smaller servings.	- Intervention B: 20% reduction of plate waste, whereas no reduction was found after Intervention A - In both interventions, there were more positive beliefs and stronger personal norms regarding avoiding plate waste - Personal norms regarding food waste were the strongest predictor of plate waste reduction behaviour, before and after the interventions - The information also caused attitudes to have a stronger influence on plate waste reduction behaviour, intention to reduce became less important for reducing plate waste	[22]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
UK and India	- University students in UK (n=260) and India (n= 375 pre-COVID-19 and 150 post-COVID-19 - Focus group in UK: n=6 Focus group in India: n=5	- Cross-sectional - Intervention: (table cards and posters) focus groups, surveys and weighing of food waste - Total data collection: Feb 2019-Jan 2021 - Intervention conducted from Jan 2020-Feb 2020	- Students in India had greater concerns about social FW issues, while students in the UK were more concerned about financial and economic impacts - The interventions were found to be highly successful in reducing FW quantities at the UK university by reducing the per capita FW by over 13%, while combined post-intervention and COVID-19 FW reduction at the Indian canteen was much higher, at over 50%	[18]
Australia	- 5 primary level schools between 5 to 12 years old (grade 1-6) - School sizes: n=20 to 330 students - Pre-intervention survey: n=755 Post-intervention survey: n=645	- Cross-sectional - Intervention: (i) student pre- and post-implementation surveys; (ii) post-parental interviews; (iii) pre-and post-visual audits of school waste streams to measure food waste outcomes in the school and students' homes - Intervention: lessons for students; parent engagement; hands-on workshops and "make your lunch" - 6-week intervention program in 2020	- Interventions had a significant effect on students' choosing food behaviours and preparing food behaviours - A greater interest and involvement from their children in choosing and making food to take to school - A greater involvement from their children created changes to different aspects of their food provisioning routines from supermarkets - Discomfort and pressure as food-related routines are changed and challenged - 35% reduction in avoidable food waste items for the entire school sample	[24]
Iran	Students from public health school (n=233) and students from medical school (n=233)	- Longitudinal - Quasi-experimental approach. Pre-test survey Intervention: education courses such as giving out pamphlets, posters and leaflets; making environmental changes in the restaurant setting such as offering containers and meeting students' demands for preferred food - One-month intervention program. Follow-up was conducted 2 months after the training.	- Awareness, attitude, and behaviour were significantly improved after the intervention in the intervention and control groups - Food waste was reduced to 224.98 kg/week after the 4 week-intervention - In the intervention group, the amount of food wastage per person was decreased from 116 g in pre-test to 76 g in post-test (30%)	[21]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
Portugal	Average of 240 students per day, between 19 to 23 years old	- Cross-sectional - Education campaign (intervention) and measuring food waste - Pre-intervention waste was measured for 10 days. Then intervention and further monitoring for 16 days	- There was a reduction in food waste by approximately 50% - The education campaign was successful in raising awareness among students	[19]
Food and Beverage Food Waste Interventions (n=4)				
Italy	- Customers at hotel buffet (63 rounds of data collection) - Maximum hotel guests: n=650 - Survey responses: n=137	- Cross-sectional - Intervention implementation: Persuasive messaging at the croissant stall at the hotel - 9 weeks intervention from June 2020 to August 2020	- Baseline Week 1 food waste decreased from 0.3 units per person to 0.02 units per person at experimental week 3 - Findings contribute to recent expectations of the potential of persuasive communication in reversing current consumption trends	[26]
Austria	- Hotel guest's ex-ante (forecast) sample (n=65) - ex-post (actual) sample : n=66	- Cross-sectional - Intervention: Eight different tools were tested, including four stand displays, small plate labels, buffet messages, food pickers, and place mats, placed at the entrance to the restaurant, at the buffet, and on the guest tables - 12 months	- 14.4% reduction in edible plate waste - Significant differences in attention to the tools were found between the three contact points 'entrance to the restaurant', 'buffet', and 'guest table' with 'guest table' being by far the strongest contact point	[23]
Switzerland	- Diners at the pizzeria (n=54) - *Diner is a person who eats	- Cross-sectional - Intervention conducted in a pizzeria: - Information cards (control vs. informational prompt vs. informational and normative prompt) and survey - Researchers recorded whether diners chose to discard or take away their leftovers - Data was collected on weekdays for 90 minutes during main dining time. The intervention duration was 6 weeks	- In the control condition, the percentage of diners that asked to take away their leftovers were only 25% - The percentage of diners who asked to take away their leftovers was in the informational (55%) and normative prompt conditions (64%)	[28]
Taiwan	Study 1 (intervention): n=360 adults Study 2 (survey): n= 45 male and n=45 female	- Cross-sectional - Intervention implementation, observation, quantifying food waste - Intervention 1: moral persuasion + penalty Intervention 2: moral persuasion + discount Intervention 3: moral persuasion alone - Data collection: on weekdays over three weeks (four days per week from August 1 to August 21, 2019) - The first 3 days before intervention was baseline collection	- Different serving styles have significant effects on food waste volume. - Moral persuasion in combination with a penalty (Intervention 1) produced more food waste than moral persuasion alone (Intervention 3), and moral persuasion with discount (Intervention 2) indicating that negative financial interventions (penalties) are counterproductive to the goal of reducing plate waste	[29]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
			- Positive moral education had a greater effect than negative coercion through financial penalties - Gender and age were found to have no significant effect on food waste volume under the condition of Intervention 2 - Occupation was found to have no significant effect on food waste by volume	
Municipality and Public Consumer Food Waste Interventions (n=7)				
UK.	- Customers and retail employees (n=107) - Sample 1: Male (27%), Female (73%) - Sample 2: Male (24%), Female (77%) - Focus group: 2-5 participants each	- Cross-sectional - Surveys at pre-intervention, post-intervention, and at delayed follow-up (3 months after intervention end), and focus groups where participants were divided according to life-stage (pre-family, family, retired) - Interventions (9 weeks): product hampers provided by the retailer containing more sustainable products; tailored advice including tips and hacks, and live expert webinars from nutritionists and chefs including cook-along; and a private Facebook group for study participants to interact	- The intervention mitigated individual barriers to change and had a positive impact on awareness, intention and behavior - Reduced meat consumption and food waste and cooking more frequently from scratch - The online community, 'ask the expert' videos and product samples were the most impactful intervention components, while recipes and cook-along were less effective	[31]
	Customers of Asda Retailing (n=107)	- Longitudinal - Intervention: Social influence using Facebook, e-newsletters and magazine. Surveys were used to track self-report food waste - Time 1 (1 month before the intervention), Time 2 (2 weeks following the intervention), Time 3 (five-month follow-up)	- Social media and e-newsletter interventions as well as the control group all showed significant reductions in self-reported food waste by customers	[32]
	Customers of Asda Retailing	- Longitudinal - Intervention: Waste reduction messages using 6 communication channels and a survey - 2 time-limited periods (4–6 weeks each), one in 2014 and another in 2015	- Combined communication channels and repeated messages over time from retailers had a significant effect on reducing food waste of customers - Communication channels are a good tool for retailers to influence consumers into being more pro-environmental	[33]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
U.S.A.	- Adults (above 18 years old) who speak Spanish and/or English - Focus group: n=38 Cooking classes: n=45 Follow-up interviews: n=12	- Longitudinal - Exploratory research: Focus group, intervention implementation, pre and post-intervention survey and follow-up interviews - Intervention: 6 cooking classes, once each week - Post-intervention: follow-up for 2-4 months	- Trade-offs between quality, cost and convenience of food, chronic disease management and lack of time and interest were identified as barriers to healthy cooking - Participants demonstrated increased confidence in cooking, experimenting with new ingredients, and knowing how to make use of food before it goes bad	[34]
	- Adult residents of single-family homes (n=370) - Female: n=248 aged 55 and above n=222 Non-Hispanic white: n=318 Educated with BA or higher: n=222	- Cross-sectional - Intervention (Curbside plan), and survey - The carts were delivered July-August 2015 - Total data collection: 7 months	- All respondents on average reported a significant reduction in perceived barriers from Time 1 (M = 2.16, SD = 0.88) to Time 2 (M = 2.04, SD = 0.88), z = 2.09, p = 0.036 after receiving curbside carts to leave food waste - While behavioral change interventions such as "making it easy" (i.e., OCPs) seem to improve participation among residents regardless of different perceptions of barriers and benefits, norm communication will be effective among those who perceive low barriers and low benefits to separation	[35]
Canada	Multi and Single-family households (n=501)	- Cross-sectional - Intervention 1: passive approach (handouts) Intervention 2: community engagement approach Intervention 3: gamification approach - Intervention testing: food waste audits (before and after the 12-week program), household surveys and focus groups.	- The passive and gamify-cation groups had higher self-reported awareness of food waste after the 12-weeks campaign and lower food wastage than the control group - Waste audits reported significant differences between the game group and the control - No difference between the campaign groups and the control group in edible food wasted - Frequent gamers were found to generate less edible food waste than infrequent gamers - There is a potential for gamification as a change tool to improve food waste reduction	[36]

SM 1 Interventions on food waste reduction behaviour according to the type of food waste (*continued*)

Country	Demographics reported	Methodology	Results	Reference
China	- The resident city of Shanghai - 13 buildings were chosen for baseline measurements, approx. 100 households each building	- Cross-sectional - Intervention: Volunteer advisers to provide training, bins with bright yellow cover and control (no training and no bin - Semi-structured interviews	- *Capture rates: bright yellow bin covers (32%), and volunteer advisers (44%) - The intervention using bright bin covers at low cost, no specialist staff, and easily implemented is recommended for large-scale implementation *Capture Rate (CR) is the amount of total food waste found in the bins (recycling or residual) and successfully diverted from the mixed waste	[38]