

Food-waste reduction: Examining the effectiveness of a monetary appeal in a behavioural intervention to reduce consumer food-waste



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Abstract

The United Nations want to reduce food waste by 50% in 2030. Although a lot of research suggests possibilities to reduce food waste, little research has examined their effectiveness on the actual amount of food waste. The aim of current study was to examine the effectiveness of a monetary appeal in a behavioural intervention to stimulate reusing leftovers and reducing food waste. The behavioural intervention consisted of information about food waste, reusing leftovers, and monetary savings, self-persuasion, and commitment. After a one-week pre-measure, participants were randomly assigned to one of three conditions (control, neutral intervention, economic intervention). Results showed that a monetary appeal might be effective to stimulate reusing leftovers among students, although it did not reach significance. Results also showed that attitudes towards food waste seemed to be less negative after one week. There were no differences in intention not to waste food between the three conditions. The amount of self-reported food waste did also not change over time between the three conditions. One explanation for not finding any significant results is the weak power in current study. More research is needed to examine the effectiveness of a monetary appeal in reducing food waste.

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1. Introduction

One quarter of all food produced for human consumption worldwide is lost or wasted each year (Kummu, de Moel, Porkka, Siebert, Varis, & Ward, 2012). In developed countries, most waste occurs at the consumer level (Lipinski, Hanson, Lomax, Kitinoja, Waite, & Searchinger, 2013). Households contribute to 53% of the food waste in Europe (Stenmarck et al., 2016). In the Netherlands, consumers waste 62 kilograms food per person per year. Almost half of this food waste (29.5 kg) could be avoided (CREM Waste Management, 2017). Food waste can be defined as the food appropriate for human consumption that is not consumed by humans, including food that is thrown away due to expiration or spoilage and food that was still edible when thrown away (Food and Agriculture Organization of the United Nations [FAO], 2013; Thyberg & Tonjes, 2016).

Household food waste has several negative environmental, social, and monetary effects. First, food production has ecological costs, specifically on water, land, and air. The production of food can contribute to less available freshwater (Kummu et al., 2012). Besides, the production of food demands for agricultural land and leads to deforestation (FAO, 2013). Furthermore, food production contributes to air pollution through the emission of greenhouse gasses by trucks and machines for producing and transporting food (Weber & Matthews, 2008). The environmental impact of food waste at the end of the food-life cycle (consumers) is larger than the impact of food waste earlier in the production chain. When consumers buy food, 85-90% of the necessary energy is already used (Milieu Centraal & Voedingscentrum, 2016). By throwing away the food, the energy and resources used to produce and transport the food are fruitlessly used (Gustavsson, Cederberg, Sonesson, van Otterdijk, & Meybeck, 2011). Second, food waste is a social problem in that it is expected that the global population will grow (United Nations [UN], 2011) and more food is needed to feed the people (FAO, 2013). Third, food waste is a waste of money. For example, people in the Netherlands spend on average 150 euros per person per year on food that is wasted (Wageningen University & Research, n.d.).

Food waste reduction is an item on the political agenda. The United Nations set a goal to reduce food waste worldwide with 50% in 2030 (United Nations, 2017). The Dutch government supports this goal and wants to reduce food waste at the consumer level (Rijksoverheid, n.d.). Investigating household food waste reduction is therefore highly relevant.

Although a lot of research suggests possibilities to reduce food waste, there is little knowledge of their effects on food waste levels (Hebrok & Boks, 2016). Stancu, Haugaard,

and Lähteenmäki (2016), for example, suggest that food waste could be reduced by targeting routines. Another way to reduce food waste, is via the intentional route. However, Stancu et al. (2016) never tested these suggestions. Schmidt (2016), for instance, developed a behavioural intervention to reduce food waste, using information, commitment, and goal-setting, and tested its effectiveness on behaviours related to food waste. Results showed that one month after implementing the intervention, participants performed more food waste-preventing behaviours. Nevertheless, the amount of food waste was not measured. Other researchers found that saving money was the most important motivator to reduce food waste (Graham-Rowe, Jessop, & Sparks, 2014; Quested, Marsh, Stunell, & Parry, 2013). Nevertheless, the effects of a monetary appeal to reduce food waste was never tested.

Current research's aim is to develop a behavioural intervention to reduce food waste and to test its effectiveness on behaviour and the amount of food waste. Based on Schmidt's (2016) behavioural intervention, participants receive information about food waste pointed to saving money. The information also contains ways to reuse leftovers, since targeting reusing leftovers can contribute to the largest effects on food waste (Stancu et al., 2016).

Providing information is not sufficient to change behaviour (Abrahamse, Steg, Vlek, & Rothengatter, 2005). Therefore, self-persuasion and commitment are added as behaviour change techniques. In self-persuasion, people generate arguments themselves, which leads to an attitude or behaviour change (Aronson, 1999). Commitment is a behaviour change technique in which people make a promise to perform certain behaviour. Because people want to be consistent in what they say and what they do, commitment leads to actually performing the behaviour which is pledged (Cialdini, 2001).

In the current study, information, a monetary appeal, self-persuasion and commitment are combined in a behavioural intervention to answer the question: Is a monetary appeal in a behavioural intervention effective to stimulate reusing leftovers and to reduce food waste?

2. Theoretical background

2.1 Drivers behind food waste

Not reusing leftovers is the biggest contributor to food waste (Koivupuro et al., 2012; Stancu et al., 2016). People buy and cook too much food and store it in the fridge or freezer to use it on a later occasion (Farr-Wharton, Hoth, & Choi, 2014). However, people forget about it, which leads to disposal (Hebrok & Boks, 2017; Mavrakis, 2014). Research also showed that people find it difficult or undesirable to use leftovers in a new meal. The reason is that people want to eat something new and fresh, or are not sure if it is still edible (Hebrok & Boks, 2017; Mavrakis, 2014). Other behavioural factors that lead to food waste are a lack of planning and avoiding food risk (Farr-Wharton et al., 2014; Graham-Rowe et al., 2014; Quedstedt et al., 2013).

Difficult to empty packages or excessive sizes are contextual factors that lead to food waste (Hebrok & Boks, 2017). Another contextual factor contributing to food waste is date labelling. Consumers do not know the difference between *use by* and *best before* date labels, and discarding food at the *best before* date contributes to food waste (Van Boxtael, Devlieghere, Berkvens, Vermeulen & Uyttendaele, 2014).

Finally, several socio-demographic factors are related to food waste. For example, households with children produce more food waste in general, but less food waste per capita (Parizeau, von Massow, & Martin, 2015). Previous literature showed that younger people waste more food than older people (Grainger et al., 2018; Quedstedt et al., 2013), with students producing most food waste (van Dooren & Mensink, n.d.; Grainger et al., 2018).

2.2 Motives to reduce food waste

Although food waste has a major impact on the environment, people do not necessarily link food waste to its environmental impact (Quedstedt et al., 2013; Quedstedt, Parry, Easteal, & Swannell, 2011), nor do people link food waste to food shortages somewhere else in the world (Quedstedt et al., 2013). Both environmental and social concerns are therefore rarely mentioned as a motivator to reduce food waste (Graham-Rowe et al., 2014; Quedstedt et al., 2013). Managing the home efficiently and eating a healthy diet are other encouraging factors to reduce food waste (Quedstedt et al., 2013; Quedstedt et al., 2011). People are also motivated to reduce food waste by feelings of guilt. People do not like wasting food, and when they waste food, they experience feelings of guilt throwing away food that could have been eaten (Quedstedt et al., 2013). The most powerful motive to reduce food waste is saving

money (Graham-Rowe et al., 2014; Quedsted et al., 2013). Interviews showed that people see food waste as a waste of money, and that people have the desire not to waste money (Graham-Rowe et al., 2014). Interviews also demonstrated that some people experience negative feelings because of the thought they had wasted money as a consequence of throwing away food they had paid for (Graham-Rowe et al., 2014).

2.3 Previous models

The theory of planned behavior (TPB) (Ajzen, 1991) is a useful model to explain food waste behaviour (e.g. Stancu et al., 2016; Stefan, van Herpen, Tudoran, & Lähteenmäki, 2013). According to TPB, intention is the primary antecedent for behaviour (Ajzen, 1991). Research showed that intentions not to waste food are related less food waste (Stancu et al., 2016). The intention not to waste food is determined by, among other things, negative attitudes towards food waste (Ajzen, 1991; Stancu et al., 2016). Thus, people who have a negative attitude towards food waste tend to have a higher intention not to waste food, and waste less food.

Stancu et al. (2016) found that combining TPB with household related routines explained more of the self-reported food waste than TPB alone. Behaviours related to food waste can be seen as routines, because these are repetitively performed. Examples of such household related routines are reusing leftovers, planning meals in advance, checking stocks, and making a shopping list. Performing these behaviours leads to lower food waste (Stancu et al., 2016). Moreover, shopping and leftover reuse routines are more important determinants of food waste than the intention not to waste food (Stancu et al., 2016). Shopping routines (e.g. buying unintended food products while shopping) are related to more food waste, while reusing leftover routines are related to less food waste.

Stancu et al. (2016) also examined awareness of food waste consequences as a background variable. Results showed that awareness of food waste consequences was related to less food waste. Moreover, awareness of economic impacts was stronger related to food waste compared to awareness of environmental and social consequences. Awareness of economic impacts was also stronger related with routines, such as planning, shopping, and leftover reuse routines. Figure 1 presents the most relevant factors related to food waste in a conceptual model.

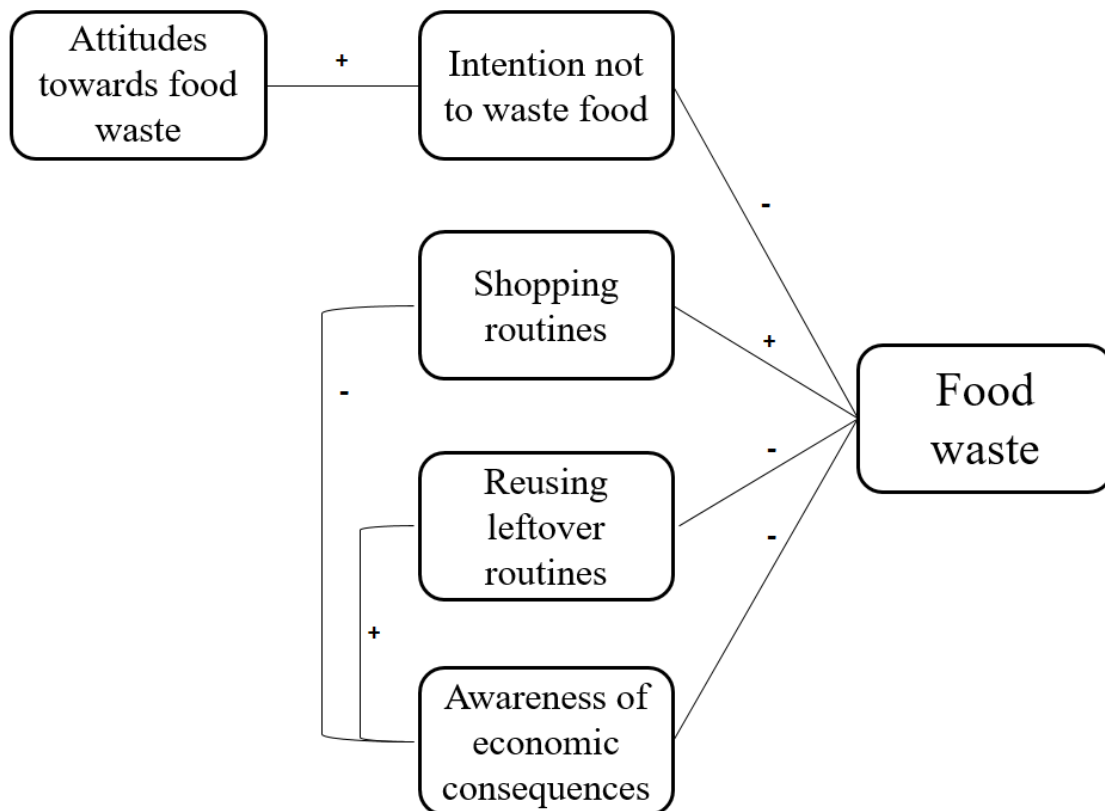


Figure 1. Conceptual model of factors related to food waste. A '+' demonstrates a positive relationship, a '-' demonstrates a negative relationship.

2.4 Behavioural intervention

Based on TPB and findings of Stancu et al. (2016) and Schmidt (2016), a behavioural intervention to reduce food waste is developed. According to Stancu et al. (2016) targeting leftover reuse routines can contribute to the largest effects on food waste. Therefore, the aim of current intervention is to stimulate reusing leftovers. The elements in the intervention are information, self-persuasion and commitment and will be described below.

2.4.1 Information

To stimulate reusing leftovers and to reduce food waste, participants receive information about the amount of food waste in the Netherlands. Because saving money is an important motivator to reduce food waste (Graham-Rowe et al., 2014; Queded et al., 2013), they also receive information about how much they can save reducing food waste ("You can easily save 150 euros per year by being aware of your buying, cooking, and storing behaviour and taking action to prevent food waste"). Besides, ways to reuse leftovers (e.g. "eat a leftover

as lunch”) are provided. Previous research showed that a monetary appeal increased intentions for saving energy (Steinhorst, Klöckner, & Matthies, 2015). Although providing information leads to higher knowledge, it does not necessarily lead to behaviour change (Abrahamse et al., 2005). Therefore, information is combined with behaviour change strategies.

2.4.2 Self-persuasion

According to TPB and results of Stancu et al. (2016), food waste can be reduced via the intentional route. Reducing food waste via this route requires an attitude change. Attitude changes can in turn lead to a reduction in food waste via intentions (Stancu et al., 2016). Attitudes and behaviour can be changed over a long time period with self-persuasion (Aronson, 1999). It is desirable to change attitudes towards food waste and food waste behaviours for a long time period. Self-persuasion is an effective strategy to change attitudes and behaviour, because self-generated arguments do not impair the freedom of choice, and thus psychological reactance is not activated. Reactance is the reaction to re-establish the feeling of impaired behavioural freedom (Brehm, 1966). If people experience psychological reactance, they can restore the restricted freedom by not complying to the suggested behaviour or by doing the opposite of what is expected (i.e. a boomerang effect) (Brehm, 1966). Previous research showed that self-persuasion was effective in changing attitudes towards a clean environment (Damen, Müller, van Baaren, & Dijksterhuis, 2015), as well as in reducing smoking behaviour (Müller et al., 2009) and alcohol consumption (Loman, Müller, Oude Groote Beverborg, van Baaren, & Buijzen, 2018).

2.4.3 Commitment

Commitment is the second behaviour change technique used in the behavioural intervention. When people explicitly commit to perform certain behaviour, in current study several ways to reuse leftovers, leads this to actually performing the pledged behaviour (Cialdini, 2001). This is because people want to be consistent in what they say and what they do (Cialdini, 2001). It is desirable to use commitment in reducing food waste, because commitment only and commitment combined with another treatment are more effective than control groups and are more effective over a long time period in changing behaviour (Lokhorst, Werner, Staats, van Dijk, & Gale, 2013). Moreover, commitment only and commitment combined with another treatment were more effective in changing behaviour over a long time period than other interventions (Lokhorst et al., 2013). To translate short

term commitments into long term behaviour, it is important that people feel they made the commitment voluntary (Lokhorst et al., 2013). Accordingly, commitment and self-persuasion are combined. People are asked to generate arguments themselves in self-persuasion and this leads to the belief that their motivation comes from the person himself (Aronson, 1999). It is therefore likely that through self-persuasion people have the idea they made the commitment voluntary. Previous research showed that commitment combined with goal-setting was effective in performing food waste-preventing behaviours (Schmidt, 2016), commitment combined with a pin as a reminder was effective in reusing towels in a hotel (Baca-Motes, Brown, Gneezy, Keenan, & Nelson, 2012), and commitment combined with an information sheet and an implementation intention was effective in first-time return behaviours for blood donors (Wevers, Wigboldus, van den Hurk, van Baaren, & Veldhuizen, 2015).

2.5 Study overview and hypotheses

In current study, food waste will be reduced by implementing a behavioural intervention combining leftover reuse routines and the intentional route. Moreover, the effectiveness of a monetary appeal is tested. After a pre-measure of attitudes toward food waste, reusing leftover behaviour, and food waste behaviour, participants are randomly assigned to one of three conditions, including a control condition, a neutral intervention condition, and an economic intervention condition. The neutral intervention condition consists of information about food waste and reusing leftovers, self-persuasion and commitment. Participants in the economic intervention condition receive the information directed towards saving money. Self-persuasion and commitment are identical to these techniques in the neutral intervention condition. Participants in the control condition receive no intervention. During the week after implementing the intervention, attitudes, reusing leftovers and the amount of wasted food were measured again. Intention not to waste food was only measured at the end of the study.

Four hypotheses are formulated, regarding attitudes towards food waste, intention not to waste food, reusing leftover behaviour, and food waste behaviour. Because previous research showed that self-persuasion and commitment can change attitudes (Aronson, 1999; Lokhorst et al., 2013), it is expected that attitudes become more negative over time in the experimental conditions than in the control condition (Hypothesis 1). Because Steinhorst et al. (2015) found that an economic appeal increased intentions to save energy, it is predicted that intention not to waste food is strongest in the economic intervention condition, followed by

the neutral intervention condition and the control condition (Hypothesis 2). Based on findings that information, commitment and goal-setting led to more food waste-preventing behaviour over time compared to no intervention (Schmidt, 2016) and the results that awareness of economic impact of food waste is related to food waste (Stancu et al., 2016), it is hypothesised that there is a stronger increase in reusing of leftovers in the economic intervention condition than in the neutral intervention condition and control condition (Hypothesis 3). Similarly, it is expected that there is a stronger decrease in food waste in the economic intervention condition than in the neutral intervention condition and control condition (Hypothesis 4).

3. Methods

3.1 Participants and Design

To examine the effectiveness of a behavioural intervention including a monetary appeal on reusing leftover behaviour and the amount of food waste, a field experiment was conducted. Participants in this study were students in the Netherlands. A requirement to participate was that the students were living away from home. This criterion was set to make sure the students had some responsibility for preparing their food. Participants were collected via the own network of the researcher (e.g. via Facebook, Whatsapp, LinkedIn), flyers placed in Radboud University Nijmegen, and via the research participation system of Radboud University Nijmegen. Participants received one course credit for participating in the study. Snowball sampling was also used to recruit participants. Participants were asked if they knew other students who would participate in the study. The person who recruited most participants was promised a 20-euro gift card. However, six participants recruited one other participant, so the winner of the gift card was chosen by a lottery.

Based on an a priori estimation of statistical power $(1 - \beta) = .80$ and an estimated effect size $\eta_p^2 = .05$ (derived from the effect size found by Schmidt, 2016), a minimum of 210 participants were required for this study. In total, 116 people started the survey. Fifty-three people were excluded from the analysis, because they did not agree with the consent ($n = 9$), did not meet the inclusion criteria ($n = 11$), did not complete at least 50% of the questionnaires ($n = 28$), were not assigned to one of three conditions due to not completing the questionnaire which assigned them into a condition ($n = 2$), or completed most of the questionnaires in one day ($n = 2$). The total sample consisted thus of 63 students. All of the participants were aged between 18 and 28 years ($M = 21.16$, $SD = 2.22$). The majority of the sample was female ($n = 46$, 73%). After one of baseline measure, participants were randomly assigned to one of three conditions. The design of the study was thus a 2 (Time: pre vs. post) x 3 (Condition: control, neutral intervention, economic intervention) mixed design, with Condition as between-subjects factor and Time as within-subjects factor. The control group consisted of 22 participants, the neutral intervention condition of 19 participants, and the economic intervention condition of 22 participants. The experiment was approved by the Radboud University Nijmegen Ethics Committee of the Faculty of Social Sciences (ECSW-2018-058R1).

3.2 Measures

The questionnaires contained attitudes towards food waste, intention not to waste food, reusing leftovers, and self-reported food waste behaviour. The questionnaires were presented in Qualtrics software. All questions were in Dutch (see the Appendix for an overview of the questionnaires).

3.2.1 Attitudes toward food waste

Attitudes towards food waste were measured with four items on a seven-point Likert scale. The items “Throwing away food is..” (1 = *Not at all negative* to 7 = *Extremely negative*) and “I think throwing away food is foolish” (1 = *Strongly disagree* to 7 = *Strongly agree*) were based on items used in previous literature (Stancu et al., 2016). The last two items “I feel guilty when I throw away food” and “Throwing away food does not bother me” (1 = *Strongly disagree* to 7 = *Strongly agree*) were translated from previous studies (Hamilton, Denniss, & Baker, 2005; Stefan et al., 2013).

A principal component analysis (PCA) was conducted on the four items of the attitude scale. The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis, $KMO_{T1} = .66$, $KMO_{T2} = .68$, $KMO_{T3} = .65$ (‘mediocre’ according to Field, 2009) for the attitude measures at the three measurements respectively. The reliability was acceptable ($\alpha_{T1} = .77$, $\alpha_{T2} = .68$, $\alpha_{T3} = .72$). A total scale was constructed by averaging the scores of the four items ($M_{T1} = 5.50$, $SD_{T1} = 0.96$; $M_{T2} = 5.25$, $SD_{T2} = 1.00$; $M_{T3} = 5.44$, $SD_{T3} = 0.91$).

3.2.2 Intention not to waste food

Intention not to waste food was measured with three items translated from Stancu et al. (2016). Items were “I intend not to throw food away”, “My goal is not to throw food away”, “I will try not to throw food away”. All questions were measured on a seven-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Participants were instructed to think of the upcoming two weeks by answering these questions.

A PCA was conducted on the three items of the intention scale. The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis, $KMO = .50$ (‘mediocre’, according to Field, 2009). The reliability was low ($\alpha = .47$). Reliability improved when the item “I will try not to throw food away” ($\alpha = .59$) was removed. This item was excluded from the analysis. A PCA was conducted on the resulting two items of the intention scale. The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis, $KMO = .50$

(‘mediocre’, according to Field, 2009). A total scale was constructed by averaging the scores of the two items ($M = 5.66$, $SD = 0.96$).

3.2.3 Reusing leftovers

Reusing leftovers was measured by one item which was developed by the researcher. The item was “Which of the following statements are appropriate to you (multiple answers possible)”. Examples of answering options were: “I ate a leftover as lunch”, “I used leftovers in a new recipe”, “None of the above are appropriate”. Options were developed based on information from Voedingscentrum (<https://www.voedingscentrum.nl/nl/mijn-boodschappen/eten-bereiden/koken-met-restjes-en-kliekjes.aspx>) and Milieu Centraal (<https://www.milieucentraal.nl/milieubewust-eten/voorkom-voedselverspilling/>). Participants chose the options that were applicable to them. The options were recoded into 0 (did not reuse leftovers) and 1 (used a leftover in some way) for the analysis of reusing leftovers. The amount of reused leftovers ranged from 1 to 15 times over a time-period of two weeks ($M = 6.10$, $SD = 3.09$).

3.2.4 Food waste behaviour

To measure food waste behaviour, a question asking “Could you estimate how much of the food you threw away today?” was used. This item was based on the question used by Grainger et al. (2018). Participants responded to this question Likert scale ranging from 1 (*Nothing*) to 6 (*More than 50%*) ($M = 1.58$, $SD = 0.36$).

3.2.5 Control variables

It was asked if the participants were students and living away from home, to make sure only non-residential students took part in the study. If a respondent did not meet the inclusion criteria, he or she was thanked for participating so far and was led to the end of the questionnaire. With whom and where the participants had dinner, was measured as a control variable. This was measured to control for having responsibility for preparing and keeping food, and thus for throwing away or reusing leftovers.¹

¹ There was a one-week holiday during the data collecting period; there are participants in the data analysis who went on holiday or stayed at their parents’ home during the study.

3.3 Intervention

The intervention was presented in Qualtrics software. In a pilot study it was tested if the manipulation of the economic intervention condition was sufficiently clear. Participants were recruited via the personal network of the researcher (Whatsapp). A total of 19 student participated in this pilot study. They were randomly assigned to the neutral intervention condition ($n = 9$) or the economic intervention condition ($n = 10$). Results showed that a large number of participants (70%) could remember how much money per person per year could be saved by reducing food waste, which suggests that the financial manipulation was sufficiently clear. However, participants in the economic intervention condition did not mention saving money as a more important reason to reduce food waste than participants in the neutral intervention condition ($p = 1$, Fischer's exact test). Based on these results, the intervention was implemented in the study and participants were assigned to one of three conditions.

Control condition. Participants in the control condition did not receive any information, self-persuasion or commitment. Participants only completed the necessary questionnaires for that day.

Neutral intervention condition. Participants in the neutral intervention condition received information about how much food is wasted in the Netherlands per year. It was also mentioned that about 30kg of this food waste was avoidable. The information concluded that by being aware of your buying, cooking, and storing behaviour and taking action to prevent food waste, participants could easily reduce food waste. Next, eight tips were presented how food waste could be reduced (e.g. "eat a leftover for lunch"). Participants had then to indicate on a five-point Likert scale if they wanted to reduce food waste (1 = *Yes*, 2 = *Probably*, 3 = *Not sure*, 4 = *Probably not*, 5 = *No*). After this, participants mentioned three reasons why they would be willing to reduce food waste (Self-persuasion). Then they had to indicate how they would reduce food waste (Commitment) by clicking pre-given options. Participants also had space to write down their own way to reduce food waste.

Economic intervention condition. The economic intervention condition was identical to the neutral intervention condition, except for some details in the information provided. Besides how much food per year is wasted in the Netherlands and how much of this waste is avoidable, it was also mentioned that Dutch people spend 150 euros per year on food that is thrown away. The information concluded that by being aware of your buying, cooking, and storing behaviour and taking action to prevent food waste, the participant could easily save 150 euros per year. The next section consisted of tips to save money by reducing food waste. These tips were exact the eight tips provided in the neutral intervention condition. Afterwards,

participants were involved in the self-persuasion and commitment techniques. Self-persuasion and commitment were identical to these techniques in the neutral intervention condition.

3.4 Procedure

Before participating in the experiment, participants received general instructions about the experiment. These instructions included the design, the estimated time required to complete the questionnaires, the anonymity of the given answers, the right to stop at any moment without giving a reason, that participants could earn one credit point, and that participants could win a 20-euro gift card if they recruited participants. After these instructions participants had to agree with the consent form to participate in the study. Participants could complete the questionnaires on their own smartphone, tablet or laptop. The first questionnaire contained socio-demographic characteristics and the attitude questionnaire. At the end of the first questionnaire participants were asked to leave their e-mail address, so they could be included in the e-mail system. Participants received an e-mail every day containing a short instruction and the link to the questionnaire of that specific day for two weeks. To link the answers to each participant and to guarantee confidentiality, the e-mail addresses were linked to an identification code. The daily measurements included the date, with whom and where they had dinner, which statements about leftovers were applicable to them, and how much of the food they had thrown away.

The intervention was implemented on day 8. This day, participants first completed the intervention, followed by the attitude scale and the daily measurements. The control condition completed only the attitude questionnaire and the daily measurements. On day 14, participants completed the daily measurements for the last time, followed by the attitude questionnaire and intention questionnaire. After this, participants were thanked for taking part in the study. If they wanted more information about the study or the results, they could contact the researcher. If participants did not complete the questionnaires on day 8 or day 14, they received a reminder by e-mail the next day.

3.5 Data analysis

Data were analysed using SPSS. Before the analyses, data were cleaned. If participants did not agree to the consent form, did not complete 50% of the questionnaires, did not complete the intervention questionnaire, or completed most questionnaires in one day, they were removed from the data. A factor analysis and a reliability analyses were conducted to

check the reliability of the attitude and intention questionnaires. Items were deleted when necessary. A Regression analysis was conducted to measure if responsibility for throwing away or reusing leftovers was related to reusing leftovers and food waste. A Repeated Measures ANOVA was performed to test if there was an interaction effect of time and condition on attitude. To test if there was a difference in intention not to waste food, a one-factor ANOVA was conducted. A Repeated Measures ANCOVA was conducted to test if there was an interaction effect of time and condition on reusing leftovers. A Repeated Measures ANOVA was performed to test if there was an interaction effect of time and condition on food waste.

4. Results

4.1 Descriptive statistics

A regression analysis showed that having responsibility for preparing and keeping food was significantly correlated to reusing leftovers ($r = .41, p = .001$). Responsibility was therefore added as covariate in the analysis. Because a regression analysis showed that responsibility was not significantly correlated with food waste ($r = -.12, p = .37$), responsibility was not included in the main analysis for food waste. Randomisation checks showed no significant differences between conditions regarding age ($F(2,62) = 0.65, p = .53$), gender ($p = .47$, Fischer's exact test_{control vs neutral}, $p = .49$, Fischer's exact test_{control vs economic}, $\chi^2_{neutral vs economic}(1) = 0.02, p = 1.00$), and having responsibility for preparing and keeping food ($F(2,62) = 1.58, p = .22$), indicating successful randomisation. Eight participants in the economic intervention condition and two participants in the neutral intervention condition mentioned saving money as a more important reason to reduce food waste. These frequencies were marginally significantly different ($p = .08$, Fischer's exact test). This seems to represent the trend, based on the odds ratio, the odds of participants mentioning saving money as the most important reason to reduce food waste were 4.86 times higher if they were in the economic intervention condition than in the neutral intervention condition. This indicates that the manipulation seems successful. Overall, environmental reasons are most often mentioned as the most important motivator to reduce food waste ($n = 14$), followed by monetary reasons ($n = 10$), and finding it too bad to throw away food ($n = 9$).

4.2 Attitudes towards food waste

To test the intervention effect on attitudes towards food waste, a Repeated Measures ANOVA with attitudes towards food waste as independent variable and time (pre-measure, post measure, follow-up) and condition (control condition, neutral intervention condition, economic intervention condition) as independent variables was conducted. Mauchly's test indicated that the assumption of sphericity had been violated, $\chi^2(2) = 6.22, p < .05$, therefore multivariate tests are reported ($\epsilon = .91$). Results showed there was no significant main effect of condition on attitude ($F(2,59) = 1.12, p = .33, \eta_p^2 = .04$), indicating that attitudes towards food waste were equal in the control, neutral intervention, and economic intervention condition. There was a marginal significant effect of time on attitude ($F(2,58) = 2.61, p = .08, \eta_p^2 = .08$). Table 1 shows the results. Contrasts revealed that attitudes towards food waste were less negative on day 8 ($M = 5.24, SD = 0.13$) than on day 1 ($M = 5.50, SD = 0.12$)

($F(1,59) = 5.01, p = .03, \eta_p^2 = .08$). There was no Time x Condition interaction effect ($F(4,116) = 0.23, p = .92, \eta_p^2 = .01$), indicating that attitudes towards food waste remained constant over time between the three conditions.

Table 1

Results of the Repeated Measured ANOVA for attitudes towards food waste: Time (Day 1, Day 8, Day 14) and Condition (control, neutral intervention, economic intervention) as independent variables.

	Day 1	Day 8	Day 14	Overall effect Time	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>F</i>	η_p^2
Attitudes towards food waste	5.50 (0.12)	5.24 (0.13)	5.46 (0.12)	5.01	.08

4.3 Intention not to waste food

A one-factor ANOVA with intention not to waste food as independent variable and condition (control condition, neutral intervention condition, economic intervention condition) as independent variable showed no significant effect ($F(2,59) = 0.13, p = .88, \eta_p^2 = .004$). There was thus no difference between the three conditions in the intention not to waste food.

4.4 Reusing leftovers

The effects of the intervention on reusing leftovers was examined with a Repeated Measures ANCOVA with reusing leftovers as independent variable and time (pre-measure, post measure) as within subject factor, condition (control condition, neutral intervention condition, economic intervention condition) as between-subjects factor, and responsibility as covariate. There was no significant main effect of condition on reusing leftover behaviour ($F(2,59) = 2.51, p = .30, \eta_p^2 = .04$), indicating that participants in the economic intervention condition reused leftovers as much as participants in the neutral intervention and control condition. Results showed that there was no significant effect of time on reusing leftovers ($F(1,59) = 0.001, p = .98, \eta_p^2 = .00$), meaning that reusing leftovers did not change over time. There was a marginal significant Time x Condition interaction effect ($F(2,59) = 2.76, p = .07, \eta_p^2 = .09$). Table 2 shows the results. A post hoc analysis showed that participants in the economic motives condition tend to reuse leftovers more often ($M = 3.80, SD = 0.47$) than participants in the control condition ($M = 2.34, SD = 0.47$), although it did not reach significance ($p = .10$).

A post hoc analysis also showed that there was a non-significant trend in the control condition, indicating that reusing leftovers decreased over time ($M_{T1} = 3.42$, $SD_{T1} = 0.37$; $M_{T2} = 2.34$, $SD_{T2} = 0.47$, $p = .07$).

Table 2

Results of the Repeated Measured ANCOVA for reusing leftover behaviour: Time (pre measure vs. post measure) and Condition (control, neutral intervention, economic intervention) as independent variables.

Experimental condition	Week 1	Week 2	Overall effect Condition		Overall effect Time		Interaction Time x Condition	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>F</i>	η_p^2	<i>F</i>	η_p^2	<i>F</i>	η_p^2
Control	3.42 (0.37)	2.34 (0.47)	2.51	.04	0.00	.00	2.76	.09
Neutral intervention	2.53 (0.40)	3.06 (0.50)						
Economic intervention	3.07 (0.37)	3.80 (0.47)						

4.5 Food waste

To examine the intervention effect on self-reported food waste, a Repeated Measures ANOVA with food waste as independent variable, and time (pre-measure, post measure) and condition (control condition, neutral intervention condition, economic intervention condition) as independent variables was conducted. There was no significant main effect of condition on food waste behaviour ($F(2,60) = 0.63$, $p = .54$, $\eta_p^2 = .02$), indicating that participants in the economic intervention condition wasted on average as much food as participants in the neutral intervention condition and control condition. There was no significant effect of time on food waste behaviour ($F(1,60) = 0.68$, $p = .41$, $\eta_p^2 = .01$), meaning that food waste behaviour did not change over time. There was also no Time x Condition interaction effect ($F(2,60) = 0.43$, $p = .66$, $\eta_p^2 = .01$), indicating that the amount of food waste remained constant over the three conditions and time period.

5. Discussion and conclusion

The aim of current study was to investigate the effectiveness of a monetary appeal in a behavioural intervention on reusing leftovers and the amount of food waste. Results showed that attitudes towards food waste did not become more negative in the economic intervention condition compared to the neutral intervention condition and control condition. However, attitudes towards food waste became less negative after one week compared to the pre-measure. Results also demonstrated that there was no difference in intentions not to waste food between the three conditions. Results showed that participants in the economic intervention condition seemed to reuse leftovers more often compared to the control condition. Results also showed that there was a tendency for participants in the control condition to reuse less leftovers at the post measure compared to the pre-measure. Finally, the amount of food waste did not change over time between the three conditions.

These results have to be interpreted with great caution due to a small sample size and a weak power. Based on previous research (Schmidt, 2016) and a power analysis $(1 - \beta) = .80$, a minimum of 210 participants were required. However, the analyses were conducted on a total sample size of 63 participants: the power of this study is thus weak. The weak power and small sample size is possibly the main reason for not finding significant effects in current study. Other explanations for the results are discussed below.

It was expected that attitudes towards food waste would become more negative over time in the experimental conditions compared to the control condition. The results did not support hypothesis 1. Surprisingly, there was a non-significant trend that attitudes towards food waste became less negative after one week compared to the pre-measure. An explanation for this finding might be found in cognitive dissonance theory (Festinger, 1962). This theory states that when an individual experiences a discrepancy between attitudes and behaviour, the individual is motivated to reduce this dissonance. One way to reduce dissonance is by changing attitudes. Research showed that people in general are not aware of their amount of food waste (Quested et al., 2011). Participants in current study reported their food waste every day and might therefore become aware of the amount of food they waste. Since wasting food is seen as negative, but participants do waste food, there is a discrepancy between attitudes and behaviour. It is possible that participants reduced the perceived dissonance by changing their attitudes, and therefore seeing food waste as less negative. A similar attitude change was found in texting while driving (Atchley, Atwood, & Boulton, 2011).

Hypothesis 2 expected that intention not to waste food was strongest in the economic intervention condition, followed by the neutral intervention condition and control condition.

This hypothesis was not supported. The results were not in line with previous research (Steinhorst & Klöckner, 2017; Steinhorst et al., 2015). A possible explanation for finding no differences in intentions might be that attitudes towards food waste were the same on day 14 compared to day 1. According to theory of planned behavior and results of Stancu et al., (2016), more negative attitudes towards food waste are related to a higher intention not to waste food. However, in current study attitudes towards food waste did not become more negative in the economic intervention condition compared to the neutral intervention condition and control condition, and thus it might be possible that intentions not to waste food remained the same between the three conditions.

It was predicted that there was a stronger increase in reusing leftovers in the economic intervention condition compared to the neutral intervention condition and control condition. Hypothesis 3 was partially supported. Results showed that there was a marginal significant effect of time and condition on reusing leftovers. This may be partially explained by the non-significant trend that, one week after implementing the intervention, participants in the economic intervention condition tended to reuse leftovers more often compared to participants in the control condition. This is in line with Schmidt (2016), who found that a behavioural intervention was effective to stimulate food waste-preventing behaviours. This non-significant trend is also in line with Graham-Rowe et al. (2014) and Quested et al. (2013), who found that saving money was an important motivator to reduce food waste. The tendency is in line with Steinhorst & Klöckner (2017) as well, who concluded that a monetary appeal could be effective for behaviours with monetary as well as environmental benefits. The result is not in line with, for instance, research of Tijs et al. (2017), who found that a monetary appeal was not effective in saving water. A possible explanation might be that for a monetary appeal to be effective, people have to perceive the monetary gains worth effort to change behaviour (Delmas, Fischlein, & Asensio, 2013; Dogan, Bolderdijk, & Steg, 2014; Steinhorst et al., 2015; Tijs et al., 2017). It is possible that participants in the study of Tijs et al. (2017) perceived saving money by saving water not as worth the effort, while participants in current study found the savings worth effort to reuse leftovers, and therefore changed their behaviour. The result indicates that an economic appeal might be effective in stimulating reusing leftovers among students. Although it might be appealing, this conclusion has to be interpreted with great caution because of the small sample size and weak power.

The marginally significant Condition x Time interaction effect on reusing leftovers could also partially be explained by a non-significant trend that participants in the control condition reused less leftovers at the post measure compared to the pre-measure. It is not clear

what exactly caused this decrease in reusing leftovers. A possible explanation is that participants in the control condition had no idea of the aim of the study, because they only completed the questionnaires without the intervention. This ignorance could lead to feelings of irritation or reactance, which led to a boomerang effect (Brehm, 1966) and therefore to not reusing leftovers. However, reactance was not measured and thus this explanation remains speculative.

Finally, it was hypothesised that there would be a stronger decrease in the amount of food waste in the economic intervention condition compared to the neutral intervention condition and control condition. Hypothesis 4 was not supported. A possible explanation is the low amount of food waste on the pre-measure: participants wasted on average 0 to 5% of their food. It is therefore very difficult to reduce the amount of food waste. Besides, research showed that participants tend to underestimate their amount of food waste as a consequence of relying on availability heuristics, positive illusion bias, or social desirability (Giordano, 2016), which also could lead to not finding intervention effects on food waste levels. Future research could let participants or researchers weigh the amount of wasted food in order to obtain a more objective measure of the amount of food waste.

Several limitations of current research have to be explained. First, present study has a small sample size and weak power. Therefore, findings should be interpreted with great caution. Future research should examine the effectiveness of the behavioural intervention to reduce food waste in a larger sample to draw better conclusions. Another limitation is that there was a one-week holiday during the intervention period. Participants went on holiday or stayed at their parents, and had thus no responsibility for preparing or storing food. This could have distorted the intervention effects. Future research should measure the effectiveness of a behavioural intervention over a time period in which eating behaviours remain constant. The final limitation is that food waste behaviour was measured with a self-report scale. It is therefore possible that participants underestimated their food waste (Giordano, 2016). Future research could let participants or researchers weigh the amount of food waste in order to obtain a more objective measure of the amount of food waste.

Current study examined the effects of a behavioural intervention for one week after implementing the intervention. Nevertheless, it not clear what the effects on attitudes, intentions and behaviour are for a longer time period. Future research could investigate the long term effects of the intervention.

The results of current research have to be generalised with caution to samples with higher incomes. Dutch students have an average income of 919 euros per month (van der

Werf, Schonewille, & Stoof, 2017), while the gross modal income in the Netherlands 2.816 euros per month (<https://www.gemiddeld-inkomen.nl/modaal-inkomen>) is. It is possible that student are more susceptible to a monetary appeal to reuse leftovers, because their income is lower than the gross modal income. It is therefore interesting to investigate the effectiveness of monetary appeals in samples with several income scales.

In conclusion, this study is one of the first studies which examined the effectiveness of a behavioural intervention to reduce food waste on actual food waste levels. Results showed that a monetary appeal might be effective to stimulate reusing leftovers among students. However, the results have to be interpreted with caution due to a weak power. Further research is needed to examine the effectiveness of a monetary appeal on food waste reduction in a larger sample and among participants with higher incomes.

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Appendix – Questionnaires

Introductie

Beste deelnemer,

Dit onderzoek voer ik uit voor mijn masterscriptie Communicatiewetenschap. Het onderzoek gaat over voedselverspilling. Het is de bedoeling dat je gedurende twee weken iedere dag vier korte vragen invult die gaan over je eetgewoonten en weggegooid voedsel. De link naar de vragen krijg je toegestuurd via mail. Op nog drie momenten vul je een extra vragenlijst in die gaan over jouw demografische gegevens en mening. De vragen kun je online invullen via een telefoon, tablet of laptop. Het invullen van de vier vragen per dag zal minder dan twee minuten in beslag nemen. Het invullen van de extra vragenlijsten zal ongeveer vijf minuten duren. Met deelname aan dit onderzoek kun je 1 proefpersoonpunt verdienen.

Probeer eerlijk antwoord te geven, er zijn geen goede of foute antwoorden. De verzamelde gegevens worden anoniem verwerkt en zullen niet terug te leiden zijn naar jou als persoon. Tijdens het onderzoek kun je op elk moment stoppen, zonder hiervoor redenen op te geven.

Je helpt mij al enorm door deel te nemen aan dit onderzoek! Dat is nog niet alles! Je kunt me nog meer helpen door anderen te informeren over dit onderzoek en te overtuigen mee te doen. Degene die de meeste deelnemers werft, krijgt een VVV Cadeaukaart van 20 euro. Dus vertel je vrienden, huisgenoten, studiegenoten, etc. over dit online onderzoek!

Heb je nog vragen? Stuur dan een mail naar:
nicole.luijten@student.ru.nl

Ook als je aan het eind van het onderzoek op de hoogte gesteld wilt worden van de resultaten, kun je dat bij mij aangeven.

Alvast bedankt voor je deelname!

Nicole Luijten

Informed consent

Ik bevestig hierbij het volgende:

- Ik ben naar tevredenheid over het onderzoek geïnformeerd en ik heb de informatie over het onderzoek goed gelezen en begrepen.
- Ik ben in de gelegenheid gesteld om vragen over het onderzoek te stellen.
- Ik heb gelegenheid gehad om goed over deelname aan het onderzoek te kunnen nadenken.
- Ik doe uit vrije wil mee met dit onderzoek.
- Ik begrijp dat ik op ieder moment mijn deelname aan het onderzoek kan stoppen, zonder daarvoor een reden voor op te geven.
- Ik begrijp dat mijn gegevens anoniem verwerkt zullen worden.

Ik heb deze pagina goed doorgelezen en doe vrijwillig mee aan dit onderzoek

Ik neem niet deel aan dit onderzoek

1. Ben je student?

a. Ja

b. Nee

2. Ben je uitwonend?

- a. Ja
 - b. Nee
-

3. Wat is je geslacht?

- a. Man
- b. Vrouw
- c. --

4. Wat is je leeftijd?

.....

5. Welke opleiding doe je?

.....

6. Woon je op kamers?

- a. Ja
- b. Nee

7. Hoe groot is het huishouden?

- a. 1 persoon
- b. 2 personen
- c. 3 personen
- d. 4 personen
- e. 5 personen
- f. 6 personen
- g. 7 of meer personen

8. Hoe vaak per week eet je samen met huisgenoten of vrienden?

- a. Nooit
 - b. 1 keer per week
 - c. 2 keer per week
 - d. 3 keer per week
 - e. 4 keer per week
 - f. 5 keer per week
 - g. 6 keer per week
 - h. 7 keer per week of meer
-

9. Hoe heb je over dit onderzoek gehoord? Als je via een persoon over dit onderzoek hebt gehoord, vul dan de voor- en achternaam van deze persoon in.

.....

10. Wil je me helpen met het werven van respondenten en kans maken op de VVV Cadeaukaart van 20 euro?

- a. Nee

b. Ja

- i. Indien je deelnemers wilt werven en kans wilt maken op de VVV Cadeaukaart, vul dan hieronder je gegevens in. Deze gegevens worden alleen gebruikt om contact op te kunnen nemen wanneer je de VVV Cadeaukaart gewonnen hebt. De gegevens worden op geen enkele manier verbonden aan de gegeven antwoorden.

Wat is je voornaam?

Wat is je achternaam?

Wat is je e-mailadres?

Geef aan in hoeverre je het eens bent met de volgende stellingen:

1. Weggooien van voedsel is

Helemaal niet negatief	Niet negatief	letwat negatief	Enigszins negatief	Matig negatief	Behoorlijk negatief	Extreem negatief
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Weggooien van voedsel vind ik dom.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Ik voel me schuldig als ik voedsel weggooi.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Weggooien van voedsel doet me niets.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Dit was al het eerste deel van het onderzoek. Bedankt voor het invullen! Voor de rest van het onderzoek vul je iedere dag enkele vragen in. Deze vragen krijg je per mail toegestuurd. Vul daarvoor hieronder je e-mailadres in.

Het e-mailadres wordt alleen gebruikt om de vragenlijsten naar je te kunnen verzenden en wordt op geen enkele manier verbonden aan de gegeven antwoorden. Aan het eind van het onderzoek wordt je e-mailadres verwijderd uit het mailprogramma.

.....

Helaas mogen alleen studenten die op zichzelf wonen deelnemen aan het onderzoek. Bedankt voor je deelname tot hier!

Mocht je vragen hebben, kun je contact opnemen via: nicole.luijten@student.ru.nl

Nicole Luijten

Dagelijkse metingen (Dag 1 t/m 7 en dag 9 t/m 13)

Beste deelnemer,

Vandaag vul je vier vragen in. Je antwoorden worden anoniem verwerkt. Er zijn geen goede of foute antwoorden, dus probeer zo eerlijk mogelijk te antwoorden. Het invullen duurt maximaal 2 minuten.

Bij vragen of opmerkingen kun je me mailen naar: nicole.luijten@student.ru.nl

Nicole Luijten

1. Wat is de datum?
.....
2. Met wie en waar heb je gegeten?
 - a. Samen met vrienden of huisgenoten gekookt bij mij thuis
 - b. Samen met vrienden gekookt bij iemand anders thuis
 - c. Uiteten (restaurant, snackbar etc.)
 - d. Bij mijn ouders en mijn ouders hebben gekookt
 - e. Bij mijn ouders en ik heb gekookt
 - f. Ik heb voor alleen mezelf gekookt
 - g. Anders, namelijk:.....
3. Geef aan welke van de volgende stellingen voor jou van toepassing zijn vandaag: (meerdere antwoorden mogelijk)
 - a. Ik heb een restje bewaard om het op een ander moment op te eten
 - b. Ik heb een restje uit de vriezer gegeten
 - c. Ik heb een klikjesdag gehouden
 - d. Ik heb een restje gegeten als lunch
 - e. Ik heb een restje gebruikt in een nieuw recept
 - f. Ik heb een restje opgewarmd en opgegeten
 - g. Ik heb restjes weggegooid
 - h. Geen van deze stellingen is op mij van toepassing
4. Kun je inschatten hoeveel procent van je voedsel je vandaag hebt weggegooid?
 - a. Niets
 - b. Minder dan 5%
 - c. 6 tot 15%
 - d. 16 tot 30%
 - e. 31 tot 50%
 - f. Meer dan 50%

Interventie (Dag 8)

Beste deelnemer,

Vandaag vul je de vier vragen en een extra vragenlijst in. Je antwoorden worden anoniem verwerkt. Er zijn geen goede of foute antwoorden, dus probeer zo eerlijk mogelijk te antwoorden. Het invullen zal ongeveer vijf minuten in beslag nemen.

Bij vragen of opmerkingen kun je me mailen op nicole.luijten@student.ru.nl

Bedankt voor je tijd om de extra vragenlijst in te vullen!

Nicole Luijten

Economische interventie

Per jaar gooien Nederlanders ruim 700 miljoen kg voedsel weg. Per persoon komt dit neer op gemiddeld 62 kg per jaar. Meer dan de helft hiervan, namelijk zo'n 33 kg, is te vermijden. Het gaat dan om voedsel dat nog gegeten had kunnen worden, zoals aardappels, pasta, rijst, brood, fruit, groenten en restjes. Met het weggooien van dit voedsel, gooien we per persoon ongeveer 150 euro per jaar weg. Door bewust te zijn van je koop-, kook- en bewaargedrag en maatregelen te nemen om minder te verspillen, kun je makkelijk tot wel **150 euro** per jaar besparen!

Enkele manieren om geld te besparen door minder voedsel weg te gooien:

1. Laat restjes snel afkoelen en berg het restje op in een koelkast of vriezer. Bedenk wel wanneer je dit op wilt eten. In de koelkast kun je restjes twee dagen bewaren. In de vriezer blijven restjes drie maanden houdbaar.
2. Introduceer een klikjesdag, waarop je overgebleven eten opeet
3. Eet eens een dag uit de vriezer
4. Restje over? Eet dit als lunch!
5. Van overgebleven saus kun je soep maken. Lekker met wat brood erbij.
6. Pasta en rijst kun je makkelijk verwerken in een salade, met wat groenten, tonijn of kip.
7. Overgebleven vlees kun je opbakken met wat groenten, rijst of noodles voor een lekker wokgerecht.
8. Kijk eens op [Receptenzoeker](#) of download de Slim Koken app voor recepten met restjes.

Let op! Heb je een restje opgewarmd en blijft er alsnog wat over, gooi dat eten dan weg.

Neutrale interventie

Per jaar gooien Nederlanders ruim 700 miljoen kg voedsel weg. Per persoon komt dit neer op gemiddeld 62 kg per jaar. Meer dan de helft hiervan, namelijk zo'n 33 kg, is te vermijden. Het gaat dan om voedsel dat nog gegeten had kunnen worden, zoals aardappels, pasta, rijst, brood, fruit, groenten en restjes. Door bewust te zijn van je koop-, kook- en bewaargedrag en maatregelen te nemen om minder te verspillen, kun je gemakkelijk je voedselverspilling verminderen!

Enkele manieren om minder voedsel weg te gooien zijn:

1. Laat restjes snel afkoelen en berg het restje op in een koelkast of vriezer. Bedenk wel wanneer je dit op wilt eten. In de koelkast kun je restjes twee dagen bewaren. In de vriezer blijven restjes drie maanden houdbaar.
2. Introduceer een klikjesdag, waarop je overgebleven eten opeet.
3. Eet eens een dag uit de vriezer.

4. Restje over? Eet dit als lunch!
5. Van overgebleven saus kun je soep maken. Lekker met wat brood erbij.
6. Pasta en rijst kun je makkelijk verwerken in een salade, met wat groenten, tonijn of kip.
7. Overgebleven vlees kun je opbakken met wat groenten, rijst of noodles voor een lekker wokgerecht
8. Kijk eens op [Receptenzoeker](#) of download de Slim Koken app voor recepten met restjes.

Let op! Heb je een restje opgewarmd en blijft er alsnog wat over, gooi dat eten dan weg.

1. Zou je voedselverspilling verminderen?
 - a. Ja
 - b. Waarschijnlijk
 - c. Onzeker
 - d. Onwaarschijnlijk
 - e. Nee

 2. Waarom zou jij voedselverspilling willen verminderen? Zet op nr.1 je voornaamste reden, gevolgd door nr. 2 en nr. 3.
 1.
 2.
 3.

 3. Geef aan op welke manieren jij voedselverspilling zou willen verminderen: (meerdere antwoorden mogelijk)
 1. Door restjes te bewaren en te bedenken wanneer ik deze ga eten
 2. Door een kiekjesdag te introduceren
 3. Door een dag uit de vriezer te eten
 4. Door een restje op te eten als lunch
 5. Door restjes te verwerken in een nieuw gerecht
 6. Door recepten op te zoeken waarin ik restjes verwerk
 7. Anders, namelijk.....
-

Geef aan in hoeverre je het eens bent met de volgende stellingen:

1. Weggooien van voedsel is

Helemaal niet negatief	Niet negatief	Ietwat negatief	Enigszins negatief	Matig negatief	Behoorlijk negatief	Extreem negatief
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Weggooien van voedsel vind ik dom.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Ik voel me schuldig als ik voedsel weggooi.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Weggooien van voedsel doet me niets.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Wat is de datum?

.....

6. Met wie en waar heb je gegeten?

- h. Samen met vrienden of huisgenoten gekookt bij mij thuis
- i. Samen met vrienden gekookt bij iemand anders thuis
- j. Uiteten (restaurant, snackbar etc.)
- k. Bij mijn ouders en mijn ouders hebben gekookt
- l. Bij mijn ouders en ik heb gekookt
- m. Ik heb voor alleen mezelf gekookt
- n. Anders, namelijk:.....

7. Geef aan welke van de volgende stellingen voor jou van toepassing zijn vandaag: (meerdere antwoorden mogelijk)

- a. Ik heb een restje bewaard om het op een ander moment op te eten
- b. Ik heb een restje uit de vriezer gegeten
- c. Ik heb een kiekjesdag gehouden
- d. Ik heb een restje gegeten als lunch
- e. Ik heb een restje gebruikt in een nieuw recept
- f. Ik heb een restje opgewarmd en opgegeten
- g. Ik heb restjes weggegooid
- h. Geen van deze stellingen is op mij van toepassing

8. Kun je inschatten hoeveel procent van je voedsel je vandaag hebt weggegooid?

- a. Niets
- b. Minder dan 5%
- c. 6 tot 15%
- d. 16 tot 30%
- e. 31 tot 50%
- f. Meer dan 50%

Afsluiting (Dag 14)

Beste deelnemer,

Vandaag vul je voor de laatste keer de vier vragen in. Ook vul je een extra vragenlijst in. Je antwoorden worden anoniem verwerkt. Er zijn geen goede of foute antwoorden, dus probeer zo eerlijk mogelijk te antwoorden. Het invullen zal maximaal 5 minuten in beslag nemen.

Bij vragen of opmerkingen kun je me mailen op nicole.luijten@student.ru.nl

Bedankt voor je tijd om de extra vragenlijst in te vullen!

Nicole Luijten

1. Wat is de datum?
.....
2. Met wie en waar heb je gegeten?
 - o. Samen met vrienden of huisgenoten gekookt bij mij thuis
 - p. Samen met vrienden gekookt bij iemand anders thuis
 - q. Uiteten (restaurant, snackbar etc.)
 - r. Bij mijn ouders en mijn ouders hebben gekookt
 - s. Bij mijn ouders en ik heb gekookt
 - t. Ik heb voor alleen mezelf gekookt
 - u. Anders, namelijk:.....
3. Geef aan welke van de volgende stellingen voor jou van toepassing zijn vandaag: (meerdere antwoorden mogelijk)
 - a. Ik heb een restje bewaard om het op een ander moment op te eten
 - b. Ik heb een restje uit de vriezer gegeten
 - c. Ik heb een klikjesdag gehouden
 - d. Ik heb een restje gegeten als lunch
 - e. Ik heb een restje gebruikt in een nieuw recept
 - f. Ik heb een restje opgewarmd en opgegeten
 - g. Ik heb restjes weggegooid
 - h. Geen van deze stellingen is op mij van toepassing
4. Kun je inschatten hoeveel procent van je voedsel je vandaag hebt weggegooid?
 - a. Niets
 - b. Minder dan 5%
 - c. 6 tot 15%
 - d. 16 tot 30%
 - e. 31 tot 50%
 - f. Meer dan 50%

Geef aan in hoeverre je het eens bent met de volgende stellingen:

1. Weggooien van voedsel is

Helemaal niet negatief	Niet negatief	Ietwat negatief	Enigszins negatief	Matig negatief	Behoorlijk negatief	Extreem negatief
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2. Weggooien van voedsel vind ik dom.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Ik voel me schuldig als ik voedsel weggooi.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Weggooien van voedsel doet me niets.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Geef aan in hoeverre je het eens bent met de volgende stellingen. Denk bij het beantwoorden aan de komende twee weken.

1. Ik ben van plan geen voedsel weg te gooien.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Mijn doel is om geen voedsel weg te gooien.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Ik probeer geen voedsel weg te gooien.

Helemaal niet mee eens	Mee oneens	Enigszins mee oneens	Noch eens noch oneens	Enigszins mee eens	Mee eens	Helemaal mee eens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Heb je nog opmerkingen?

.....

Beste deelnemer,

Je bent nu aan het einde van het onderzoek. Je hoeft geen vragenlijsten meer in te vullen.

Als je kans wilt maken op de VVV Cadeaukaart van 20 euro, vertel dan personen in je omgeving over dit onderzoek! Indien je de VVV Cadeaukaart gewonnen hebt, zal ik contact met je opnemen via het opgegeven e-mailadres.

Heb je nog vragen of wil je meer informatie over het onderzoek of de resultaten, kun je me mailen via nicole.luijten@student.ru.nl

Bedankt voor je deelname!

Nicole Luijten