EVALUATION OF TOOLS TO REDUCE FOOD WASTE AT THE HOUSEHOLD LEVEL

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Evaluation of tools to reduce food waste at the household level

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Preface

Food waste is a pressing global issue with far-reaching economic, environmental, and social consequences that undermines efforts to ensure food security. In the EU alone, millions of tons of edible food are discarded each year, contributing significantly to greenhouse gas emissions as well as soil erosion, nutrient depletion, and loss of biodiversity and water resources. This paradox of wasting food while millions struggle to afford nutritious meals highlights the urgent need for effective solutions. Households, particularly those with children, are among the largest contributors to food waste, making them a key target for intervention strategies.

Developed by the MAPP Research Center on behalf of the Danish Veterinary and Food Administration, this report studies the usability, usefulness, and potential impact of three practical tools designed to help consumers reduce avoidable food waste in Danish households. The report focuses on households with children living at home and it includes a quantitative intervention study with 322 survey participants as well as a qualitative interview study. By evaluating these tools, the report aims to support the EU's broader goal of halving food waste by 2030 and fostering more sustainable consumption habits across Europe.

Content

1 Summary

In 2022, the Danish Veterinary and Food Administration launched a campaign to reduce food waste by developing and sharing specific tools to reduce food waste from households (FVM, 2022). The objective of the study is to evaluate three such tools in terms of consumer perceptions of their 1) usability, i.e. the ease of implementing and using the tools, 2) usefulness, i.e. the value or benefits of using the tools, and 3) effectiveness of the tools in changing consumer behaviour. The study focuses on households with children living at home.

The report consists of two studies: 1) An intervention study (N=322) where participants tried out selected tools for two weeks to find out whether these tools are feasible and effective in food waste reduction. 2) A qualitative interview study (N=13) with household representatives on the user experience after they had used the tools for up to two weeks.

The intervention participants were divided into three groups, two treatment groups and a control group. Both treatment groups received the *Fridge Signs* tool (advice on organising the fridge content. In addition, Group A received the *FW Diary* tool (raising awareness on what causes food waste) while Group B received the *Bonus Meal* tool (advice on how to create a meal from existing ingredients at home).

The intervention significantly increased food waste awareness in Group B. When comparing self-reported food waste amounts before and after the intervention, there was a decrease in self-reported amount of food waste regardless of intervention group (Group A, Group B, and control). However, when comparing the intervention groups, this reduction can only be observed among those who report that they have used the tools in practice in Group B, who received the *Bonus Meal* and *Fridge Signs* tools. This interaction effect between intervention groups and before/after measure of food waste only approaches significance (p=.077) and we will need further research to verify how well this finding holds in future studies.

The tools were generally received positively and participants found them easy to use and perceived them as helpful in reducing food waste and saving money. The interview study highlights the potential of these tools to foster discussion and awareness about food waste, though further research is needed on the use of tools to confirm their long-term effectiveness.

2 Resume

I 2022 lancerede Fødevarestyrelsen en kampagne for at mindske forbrugernes madspild ved at udvikle og dele udvalgte værktøjer til madspildsreduktion (FVM, 2022). Denne undersøgelse evaluerer tre sådanne værktøjer med hensyn til forbrugernes opfattelse af 1) brugervenlighed, det vil sige letheden ved at implementere og bruge værktøjerne, og 2) anvendelighed, det vil sige værdien eller fordelene ved at bruge værktøjerne, samt 3) værktøjernes effektivitet i forhold til at ændre forbrugeradfærd. Undersøgelsen fokuserer på husstande med hjemmeboende børn.

Rapporten består af to studier: 1) Et interventionsstudie (N=322), hvor deltagerne testede to udvalgte værktøjer i to uger. 2) En kvalitativ interviewundersøgelse (N=13) med husstandsrepræsentanter efter at de havde testet to værktøjer i op til to uger.

Interventionen øgede bevidstheden om madspild markant i Gruppe B. Ved sammenligning af selvrapporterede madspildsmængder før og efter interventionen, var der et fald i selvrapporteret madspild i alle interventionsgrupper, inklusiv kontrolgruppen. Men når interventionsgrupperne sammenlignes, kan denne reduktion kun observeres blandt deltagere, der rapporterer, at de har brugt værktøjerne i praksis i Gruppe B, som modtog værktøjerne Bonusmåltid og Køleskabsskilte. Denne interaktionseffekt mellem interventionsgrupper og før/efter måling af madspild nærmer sig kun signifikans (p=.077), og der er behov for yderligere forskning for at verificere, hvor godt dette fund holder i fremtidige undersøgelser.

Værktøjerne blev generelt modtaget positivt, og deltagerne fandt dem nemme at bruge og hjælpsomme til at reducere madspild samt til at spare penge. Interviewundersøgelsen fremhæver disse værktøjers potentiale til at fremme diskussion og bevidsthed om madspild, selvom der er behov for yderligere forskning i brugen af værktøjer til at bekræfte deres langsigtede effektivitet.

3 Introduction

Food waste carries serious economic, social, and environmental consequences. The issue of food waste has been linked to climate change, air pollution, biodiversity loss, water resource challenges, soil erosion, or nutrient depletion (Thyberg & Tonjes, 2016). In 2020 in the EU an estimated 252 Mt of CO_2 was generated due to approximately 59 million tons of food wasted, which is the equivalent of nearly 132 kg of food waste per person (Eurostat, 2024; Sala et al., 2023; European Commission, 2023). Food waste leads to needless spending for consumers in times where food affordability is of growing concern in the EU as well as globally (Candeal et al. 2023). It is estimated that around 32.6 million people in the EU alone cannot afford a nutritious meal every second day (Eurostat, 2021). Throwing away edible food while millions of people struggle to afford a daily nutritious meal is counterproductive to combating the world's increasing food security challenges (Candeal et al. 2023), and moreover, it is also morally wrong in the eyes of consumers (Bretter et al., 2023).

The European Commission defines food waste as "discarded food and its associated inedible parts (such as bones or fruit cores)" (Directorate-General for Health and Food Safety, European Commission, n.d). More specifically, according to the EU Platform on Food Losses and Food Waste (European Union, 2024), food waste refers to "food as defined in Article 2 of Regulation (EC) No 178/2002 of the European Parliament and of the Council that has become waste" (Zambrzycki, 2018: p. 3), which includes perceivably inedible parts that are not removed from the edible parts during production.

Food waste can be categorised into two groups, namely total food waste ("madaffald") which also includes parts of food which are usually perceived as inedible, such as bones, eggshells, banana peels, etc., and avoidable food waste ("madspild"), which according to the Danish Food Ministry is defined as food that could have been eaten, but which for some reason or other was thrown out (Miljøstyrelsen, 2023). Unless otherwise specified, when using the term "*food waste*" hereinafter in this present report, we refer to avoidable food waste, "*madspild*", i.e. only those parts of food which are usually perceived as edible are included.

3.1 Consumer-generated food waste

While food waste, including inedible parts, such as bones, peels, shells, etc., arises throughout the entire food supply chain, in the EU the biggest share, 54%, comes from households, while 19% comes from manufactures of food products and beverages, 11% comes from restaurants and other food services, 8% comes from retail, and 8% comes from the primary production (Eurostat, 2024; Directorate-General for Health and Food Safety, European Commission, n.d). Danish single-family homes and apartment households were in 2021 estimated to throw 507,000 tons of food away (including inedible parts) which is equivalent to 36% of the total amount of household waste in 2021 (Miljøstyrelsen, 2023). Hereof, roughly 300,000 tons consists of food that could have been eaten, but which for some reasons or other was discarded.

Among households, those who have children tend to generate more food waste per person than households with only adults (van der Werf et al., 2020; van Geffen et al., 2017; WasteMinz, 2018; van Geffen, van Herpen & van Trijp, 2016). A study by the Danish Agriculture and Food Council (Landbrug & Fødevarer, 2024) found that 57% of Danish households with children reported throwing away food on a weekly basis, whereas only 36% of households without children report throwing away edible food weekly. For this reason, households with children living at home are of particular interest when trying to find ways to reduce food waste in households.

3.2 Reducing food waste

EU has set a goal to reach the United Nation's global Sustainable Development Goal (SDG) Target 12.3 of reducing the food waste per capita by 50% from consumers and retail by 2030 (Directorate-General for Health and Food Safety, European Commission, n.d). To reach this goal, the EU is proposing that member states should aim to reduce food waste by 30% (compared to the average in the years 2021-2023) per capita in retail and consumption sectors, including restaurants, food services, and households. If the goal is reached, the Commission estimates that a household with four people can save around €400 per year.

In light of the growing concern for the food waste problem, there has been an increased interest in research on food waste reduction in recent years (Jobson et al, 2024). These include intervention studies related to e.g. awareness campaigns (Soma et al, 2021), tools (Candeal et al., 2023), and other initiatives that can reduce food waste through changing consumers' awareness (Soma et al, 2020), attitude (Li & Roe, 2023), and behaviour (Jobson et al, 2024). Tools refer to "*physical, textual or digital prompt to encourage consumers to reduce food waste at home and adopt new habits and routines*" (Candeal et al., 2023 p. 16). Examples of tools are recipes for utilising leftover ingredients or food waste diaries to track and reflect on food waste.

Several interventions have been developed and tested in terms of their effectiveness in changing behaviour (e.g., Candeal et al., 2023, Casonato et al., 2023, Swannell et al., 2023), however, they show mixed results. Some previous interventions, including tools to reduce food waste, have shown reductions in food waste whereas others did not have any significant impact (Casonato et al., 2023). The Joint Research Centre and the Directorate-General for Health and Food Safety has launched the European Consumer Food Waste Forum, a multi-disciplinary forum for all activities related to consumer food waste prevention (Swannell et al., 2023). The forum has evaluated 78 interventions, mostly from the EU, and the results indicate that the majority of food waste prevention interventions were effective in reducing consumers' food waste. However, depending on the specific tool as well as the context in which they were implemented, interventions varied significantly in terms of effectiveness (Candeal et al., 2023).

3.3 Research Objective

In Denmark, a campaign that involved the development and sharing of specific tools to reduce food waste was launched in 2022 (FVM, 2022). The campaign material was not evaluated in terms of its effectiveness to change consumer perceptions or behaviours.

This study aims to evaluate three potential tools for food waste reduction in terms of consumer perceptions of the tools' usability, i.e. the ease of implementing and using the tools in practice, and usefulness, i.e. the value or benefits of using the tools, as well as initial indications of the tools' effectiveness in changing consumers' behaviour. This study focuses on households with children living at home, as these are more vulnerable to food waste generation.

3.4 Description of tools for reducing food waste

This study used two main sources of tools to promote reduction of food waste, namely the tools developed in the "Ta' Madansvar" campaign launched in Denmark in 2022 (FVM, 2022; "Begræns dit madspild hjemme", n.d.), and the JRC report that summarises European Consumer Food Waste Forum's recommendations on reduction of consumer food waste (Candeal et al., 2023). The first source devised tools for households with children, however, aspects of acceptability and potential behavioural outcomes of these tools were not studied. The second source suggests potential tools to reduce food waste in households in general and provides some evidence for the effectiveness of these tools in behaviour change. This study has selected the following three tools and will assess participants' perception related to using them and their effectiveness in reducing food waste.

- Food Waste Diary Tool: "Vores Madspildsuge" sourced from the "Ta' Madansvar" campaign launched in Denmark in 2022 ("Begræns dit madspild hjemme", n.d.). (Appendix 1)
- Fridge Signs Tool: "Et køligt overblik til jeres køleskab" sourced from the "Ta' Madansvar" campaign launched in Denmark in 2022 ("Begræns dit madspild hjemme", n.d.). (Appendix 2)
- Bonus Meal Tool: "3+1 Bonus Måltid" sourced from the JRC report (Candeal et al., 2023) and adapted with inspiration from Hellmann's "Flexipes" (Hellmann's, n.d.). (Appendix 3)

Food Waste Diary Tool (FW Diary)

The Food Waste Diary tool (FW Diary) is a weekly scheme where consumers can record and track situations where food waste is generated during the week, which is expected to raise awareness on reasons behind food waste (Candeal et al., 2023). The tool provides brief instructions on how to fill out the scheme. Households log their current food waste situations into seven different categories as to why food was thrown out, for example *because the kids did not like the food*, *the leftovers were not eaten*, *the food went past the date mark*. The idea is that households become aware of any patterns of why food waste most frequently occurs in their home. The FW Diary also includes seven tips for reducing food waste on the backside, so once a household knows why food waste usually occurs, they can then turn to the seven tips to find solutions for their specific situation.

Although this specific tool has not been studied in terms of consumer acceptability and potential behavioural outcomes, studies have shown that the use of kitchen diaries can contribute to the reduction of food waste (Candeal et al., 2023). For the remaining of this report, this tool will be referred to as "FW Diary".

Fridge Signs Tool (Fridge Signs)

The Fridge Signs tool (Fridge Signs) consists of physical reminders that provide information on which food products need to be used soon, and which can be saved for later. The tool includes two types of stickers/signs, namely "Do not touch, I am for dinner" ("Nix pille. Jeg er til aftensmad" in Danish), and "Eat me" ("Spis mig" in Danish). Users can print these signs from a PDF-file. The tool's instructions describe how users can put the signs into the refrigerator to highlight which foods can/should be eaten soon ("Eat me") due to these foods being close to expiring date marks. Similarly, those foods that should not be eaten yet can be marked with ("Do not touch") indicating that someone in the household has plans on using these foods, for example for making supper.

There is some evidence that this type of tool may function as visual reminders that consequently may prevent food waste. An intervention study from 2021 found that respondents who used freezer stickers that indicate how to keep different foods in a freezer had a 31% decrease in food waste, which was a significant difference compared to the control group (van Herpen et al., 2023, Van der Werf et al., 2021). For the remaining of this report, this tool will be referred to as "Fridge Signs".

Bonus Meal Tool (Bonus Meal)

The Bonus Meal tool provides a structure of a flexible recipe that aims to encourage consumers to use up the leftover food they already have on hand. The instructions introduce three basic components of any nutritious meal, namely a base, protein, and fruits and vegetables, and it encourages the use of ingredients which the user already has available in their kitchen including leftovers from a previous meal. The ingredients work as building blocks where the user can easily substitute one ingredient with another depending on what they have available at home. This way, the user can take inspiration from their preferred recipes, to which the tool helps the user to substitute the ingredients. Dishes, such as soups, wraps, casseroles, and salads are ideal Bonus Meals.

Bonus Meal is an adaptation of Hellmann's "Flexipes" tool which was tested with families with children in Canada and US (Cooper et al., 2023). The tool showed a significant decrease in self-reported food waste amounts compared to that of the control group. Cooper et al., 2023 also found that having hardcopies of the flexible recipes did not increase the impact significantly on self-reported food waste amounts, indicating that sending the tool via email as done in the present study is sufficient. For the remaining of this report, this tool will be referred to as "Bonus Meal".

4 Study approach

The study consisted of two parts (Table 1): 1) An intervention where consumers used the tools at home and reported their experiences with the tools and their food waste before and after the intervention; 2) An interview study where participants were interviewed about their experiences with the tools to get a richer view on how the tools were perceived.

The method and results of the survey intervention are reported first, and then the interview study methods and results are presented, which are then followed by a general discussion of the findings.

Table 1: *Data collection overview*				
	Group A (N=100)	Group B (N=110)	Control Group (N=112)	Interviews (N=13)
Days 1-7	Pre-survey	Pre-survey	Pre-survey	
Days 7-21	Intervention Fridge Signs + FW Diary	Intervention Fridge Signs + Bonus Meal		Intervention Fridge Signs + FW Diary OR Bonus Meal
Days 21-28	Post-survey	Post-survey	Post-survey	Semi-structured post-intervention online interview (20-30 min).

The study has received ethical approval from Aarhus University Institutional Review Board (Approval number: BSS-2024-119-S2).

5 Surveys

The quantitative study of this report consists of online surveys in pre-post intervention design. During a two-week intervention, household representatives used two of the selected three tools as part of their everyday activities. Participants were randomly allocated to one of the three groups.

First, all groups were given one week to complete the online pre-survey. Intervention groups then received two tools per household, i.e. the Fridge Signs were used by both treatment groups combined with either the FW Diary (Group A) or Bonus Meal (Group B). The control group did not receive any tools. Post-surveys were completed by all groups two weeks after Group A and B had received the tools in order to measure perceptions related to the tools and reported food waste and efficacy related to decisions on food waste (Table 1).

5.1 Participants

The survey data were collected in Denmark in September-October 2024. Participants were recruited by the third-party data collection organisation, Norstat, with an inclusion criterion of having child(ren) below age 18 living in the household. To ensure variety in children's ages, the age ranges of the participants were weighted so that the sample had an even representation of three age groups (18-34; 35-49; and 50-99), therefore increasing the likelihood that the survey would cover all age groups of children as well.

A total of 380 individuals (Group A: N=126, Group B: N=126, and control group: N=128) initially participated in the survey. Fifty-eight participants were later excluded from analyses either because they had not completed the post-survey or because their response time was below 250 seconds which was considered unrealistic. A total of 322 participants were thus included in the final analyses (Group A: N=100, Group B: N=110, and control group: N=112).

The three experimental groups were similar in terms of gender, age groups, education level, occupation, region, and the size of the city in which participants live (Pearson's chi-square tests, see Appendix 4). Moreover, the three groups are also similar in how many children there are in the age groups 1-5; 6-11; 12-17 years old (Appendix 5). The majority of households follow the same diets, and most households described their household's current diet as omnivorous (92%) (Appendix 6).

In terms of household income, i.e. how much money the household has available for grocery shopping, Group A had the lowest prevalence of households who have enough money to buy the food they want; however, the effect was not statistically significant (Table 2).

Table 2: *Household income*

	All (N=322)	Group A (FW Diary & Fridge Signs) (N=100)	Group B (Fridge Signs & Bonus Meal) (N=110)	Control (N=112)
There is enough money to buy the foods I want.	54.0%	44.0%	59.1%	58.0%
It is necessary to consider the price, which limits some choices when it comes to buying foods.	35.1%	40.0%	34.5%	31.3%
It is necessary to pay close attention to the price, as this limits the choice of many foods.	10.9%	16.0%	6.4%	10.7%
"If you were to consider how much money your household has available for grocery shopping, which of these statements would be most appropriate?" Pearson's Chi^2(4) test= 8.3613, sig. = .079				

There were no statistically significant differences between groups in terms of households' Environmental Practices, Economic/thrifty Practices, food waste Awareness, Self-efficacy related to households' management skills, and how picky the children of the household are when it comes to food (based on the results of Kruskal-Wallis tests), and any observed differences are likely due to random variation rather than a true difference in the populations (see a list of all relevant summary variables and p-values in Appendix 7).

In summary, the three respondent groups are similar in terms of household background characteristics.

5.2 Measures

The pre- and post-surveys contained a number of items that were asked in both surveys, and a number of items that were asked only before or after the intervention (see a list of all survey items and measures with references in Appendix 8 & 9).

Self-reported food waste adopted from Geffen et al. (2017) was the first measure in both pre- and post-surveys. The measure has two steps: first, participants were asked (yes or no) if they had thrown away food from any of 12 different food categories in their household during the last week. If entire meals have been thrown away, participants were asked to report the main ingredients. As suggested by van Herpen (2019b), some categories were combined into single categories based on earlier findings from Denmark (Laasholdt et al., 2021). Participants were subsequently asked to estimate the amounts they had thrown out for each of those food categories that they had reported wasting in step one; the amounts were demonstrated with household measures (e.g. portions, spoonful, litres, etc.) along with some examples. Amounts were subsequently calculated into grams based on van Geffen (et al. 2017).

In addition, subjective household waste was asked in comparison to other similar households on a 7-point scale (1=much less, 4=about same, 7= much more) as well as awareness of food waste as a problem in the household (two items; 7-point scale (1= strongly disagree, 7= strongly agree)). Motivation to reduce food waste was asked by ranking six reasons according to importance. Measures related to subjective waste, Food Waste Awareness (see items under the Food Waste Awareness summary

variable in Appendix 7), and motivations to reduce food waste were included in both the pre- and post-surveys for all groups (see a list of all survey items and measures with references in Appendix 8 & 9).

In the pre-survey, perceived household Self-efficacy, i.e. skills related to cooking and managing food provisioning, was asked with six items; Child Pickiness with three items; the households' Economic/thrifty Practices with three items; and Environmental Practices with three items (see a list of all relevant summary variables in Appendix 7). All items were answered on 7-point scales (1=strongly disagree, to 7= strongly agree). These concepts were chosen as they have in previous studies been linked with food waste.

For the treatment groups (Groups A and B), post-surveys concentrated on the use and perception of the tools after the food waste part in the survey was completed. These measures concerned respondents' use of the tools, i.e. frequency and potential barriers of use, as well as respondents' evaluation of the tools. Treatment groups were asked how often they had used the tools during the past two weeks, if at all. If respondents reported that they had not used the tool(s), they were asked why not. Those respondents who reported not using a tool did not receive any questions related to that tool's evaluation.

Measures related to the effectiveness of the tools in reducing food waste amounts and changing behaviour included the degree to which participants felt that the tools improved their understanding of where food waste originates and how to tackle it in daily practices. Three summary variables were formed to assess tool evaluation: 1) Practice Impact Evaluation (5 items) focused on effectiveness to help in household food provisioning practices; 2) User Experience Evaluation (4 items) focused on how clear, easy, flexible, and enjoyable the tools are; and 3) a Future Engagement Evaluation (2 items) concerning the likelihood of future use and recommending the tools to others (see a list of all relevant summary variables in Appendix 7). The one-dimensionality of these scales was verified by factor analysis.

As the control group did not receive any tools, certain measures from the pre-survey were repeated in the post-survey in addition to the food waste measures (see Appendix 8).

For all groups, the post-surveys also included questions on whether the households' general attitude and behaviour towards food handling had changed during the previous two weeks, for example, "*We make a greater effort to use up food that would have otherwise ended up in the trash*" and "*We are more resourceful in the kitchen*" (see Appendix 9).

5.3 Data analysis

For testing differences between categorical variables, Pearson's chi-square tests were used to find any associations between such variables. For testing differences in means of continuous variables, paired t-tests, t-tests and ANOVAs were run after checking the equality of variances with Levene's tests. To test the effect of the intervention groups while accounting for the repeated measure of self-reported food waste, mixed between-within ANOVAs were used.

5.4 Results

The first part of results explores the use and perception of the tested tools, whereas the second part explores whether provision of the tools had an impact on self-reported food waste, subjective food waste, and food waste awareness.

5.4.1 Use of tools

Some participants did not use certain tools in practice at all, which speaks to participants' acceptability of the tools. The Bonus Meal was the most frequently used tool (85%), whereas around 60% reported to use the FW Diary and the Fridge Signs in practice (Table 3).

Table 3: *Use of tools*

	Group A (N=100)				Group B (N=110)			
	FW Diary		Fridge Signs		Fridge Signs		Bonus Meal	
	Used	Did not use	Used	Did not use	Used	Did not use	Used	Did not use
Total	60.0%	40.0%	57.0%	43.0%	58.2%	41.8%	85.5%	14.5%

Seeing as older children are more independent and consume more food than younger children, children's ages may have an impact on how participants use and evaluate the tools. However, there is no statistically significant association between using any of the tools and having children at different ages in the household (Pearson's chi-square tests, see Appendix 10). Furthermore, the use of tools did not differ significantly by participants' education (Appendix 11).

Tool use did not differ significantly by participants' Economic/thrifty Practices. Those who used the FW Diary and Fridge Signs scored higher in Environmental Practices in Group A (Table 4) compared to those who did not use the tools, but there were no differences between users and non-users in Group B for any of the tools.

Table 4: *Participants Environmental Practices scores and Economic/thrifty Practices scores (before intervention) by use of tools*

	Group A (N=100)				Group B (N=110)			
	FW Diary		Fridge Signs		Fridge Signs		Bonus Meal	
	Used	Did not use	Used	Did not use	Used	Did not use	Used	Did not use
Total (N)	60	40	57	43	64	46	96	16
Environmental Practices Mean (SD)	4.3[a] (1.33)	3.8[b] (1.34)	4.4[a] (1.25)	3.8[b] (1.42)	4.0[a] (1.49)	4.1[a] (1.47)	4.0[a] (1.42)	4.0[a] (1.83)
	P-value=.047		P-value=.023		P-value=.740		P-value=.944	
Economic/thrifty Practices Mean (SD)	5.2[a] (1.12)	5.2[a] (1.05)	5.3[a] (1.12)	5.1[a] (1.04)	5.2[a] (1.13)	4.7[a] (1.19)	5.0[a] (1.16)	4.9[a] (1.28)
	P-value=.990		P-value=.461		P-value=.0519		P-value=.794	

Scale from 1. (strongly disagree) to 7. (strongly agree).
Two samples t-test. Means with different superscript letters are significantly different at p<.05

No statistically significant differences were found in Self-efficacy scores nor Child Pickiness scores between those participants who used the tools and those who did not, for any of the tools (Appendix 12, see a list the summary variables in Appendix 7).

5.4.2 Evaluation of tools

The following section will examine how those participants who used the tools evaluated them according to user experience, practical impact and future engagement. Hence, only participants who used the tools in practice are included in this section.

Participants generally found all the tools fairly easy to understand and use. The Fridge Signs were perceived best in terms of ease of use, understanding, and flexibility in use (Figure 2). They were followed by the FW Diary (Figure 1) and then the Bonus Meal (Figure 3).

Similarly, when it comes to participants' evaluation of the practical impact of the tools, all three tools got moderately positive scores, and the Bonus Meal received the lowest score (Figure 4-6). Whereas all the tools were seen as motivating to avoid food waste, only few participants reported that the tested tool helped make cooking easier.

Finally, when it comes to participants' inclination to continue to use a tool in the future as well as recommend it to others, all tools got similarly moderate scores (Figure 7). More than 40% of participants (except for FW Diary where the percentage was lower) were willing to continue to use the tools in the future and even more would recommend these tools to others.
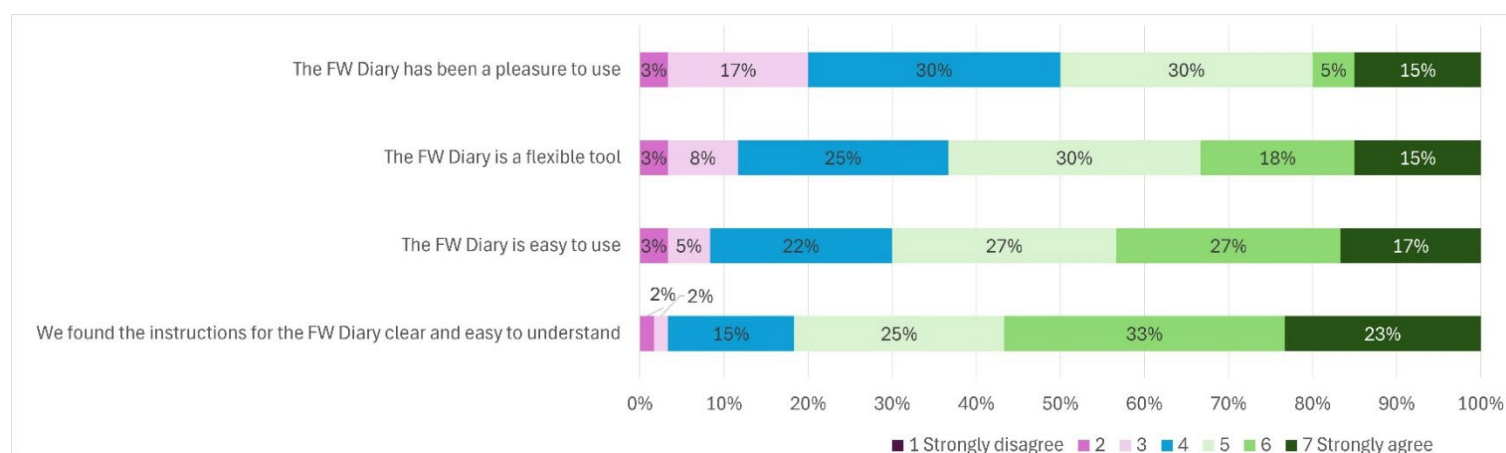
Figure 1: *User Experience Evaluation – FW Diary (N= 100)*

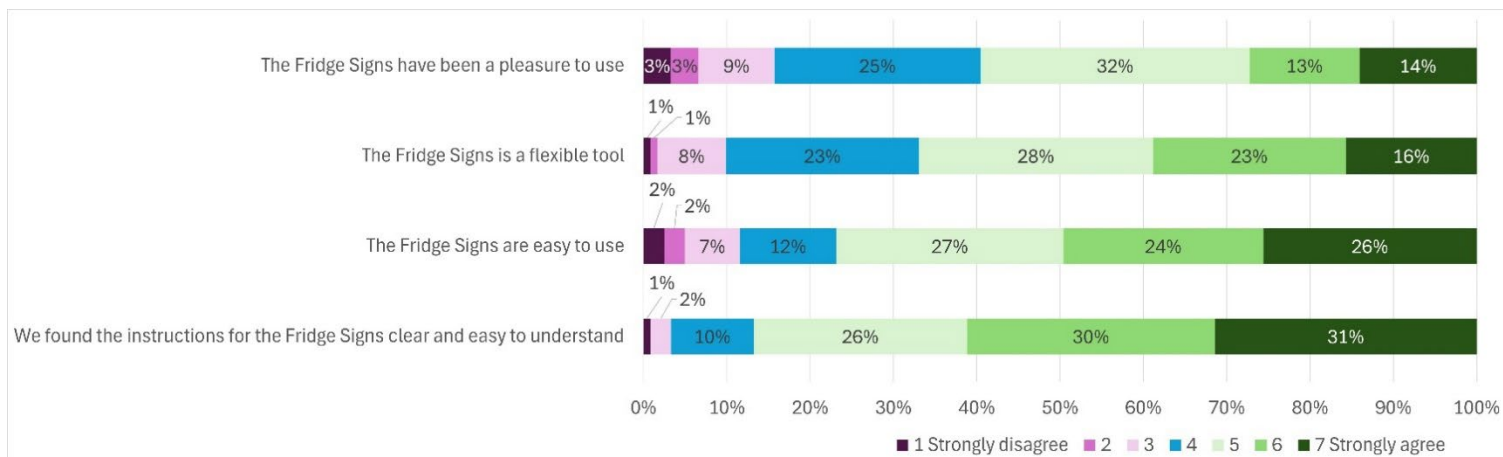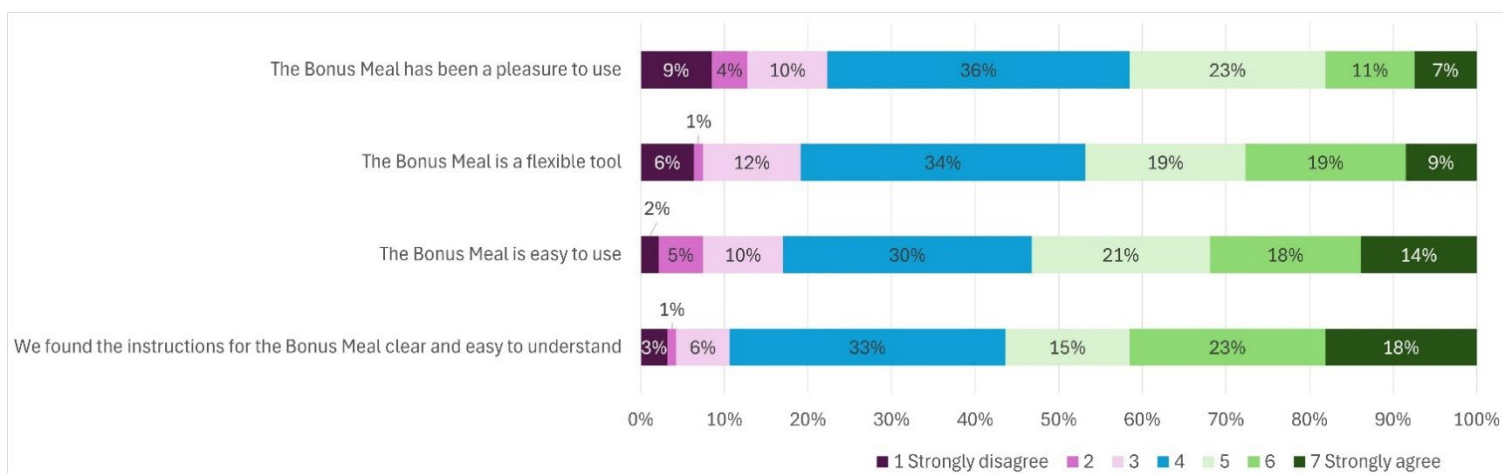**Figure 2:** *User Experience Evaluation – Fridge Signs (N=210)*

Figure 3: *User Experience Evaluation – Bonus Meal (N=112)*
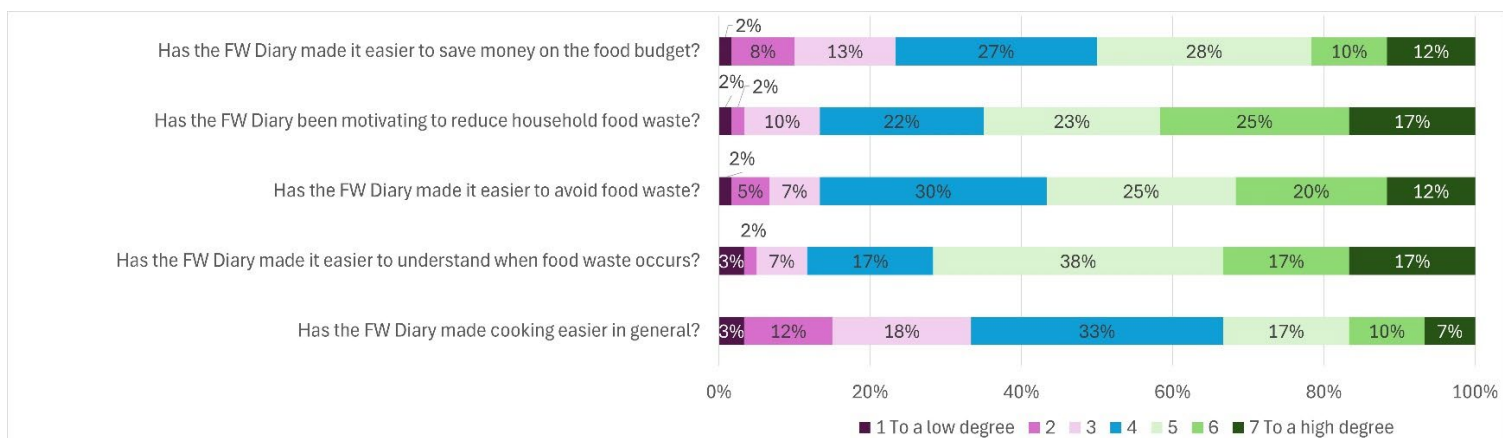

Figure 4: *Practice Impact Evaluation – FW Diary (N=100)*
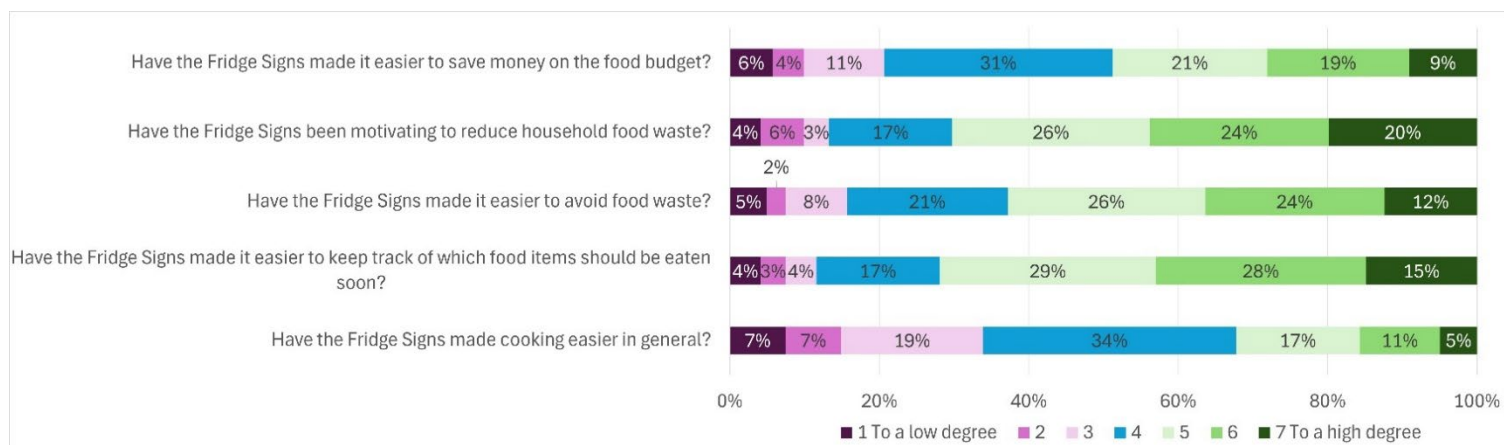
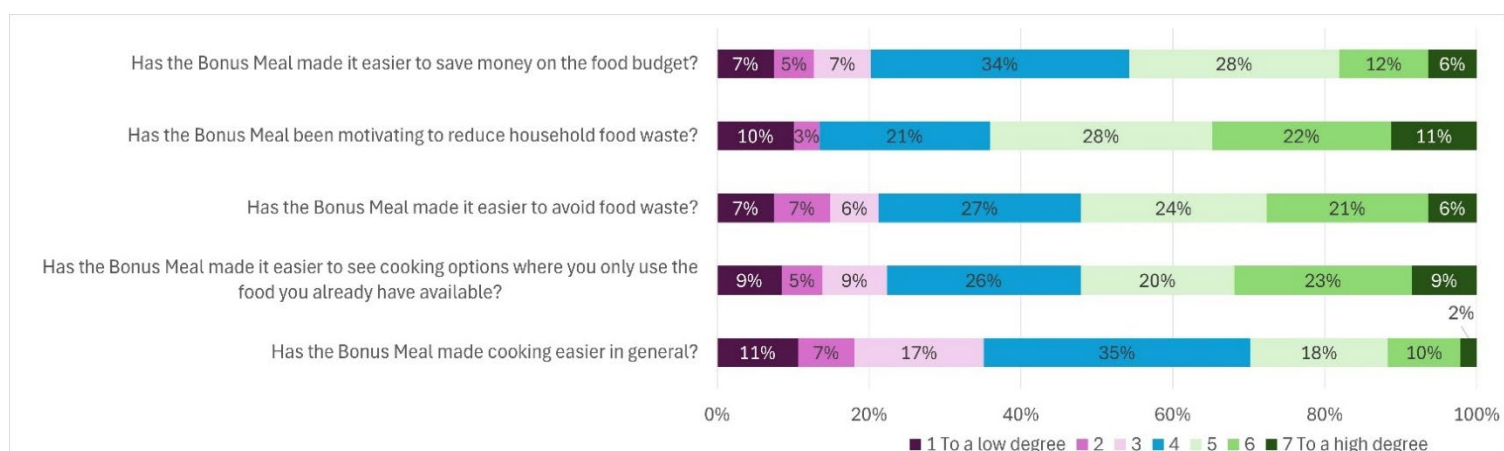**Figure 5:** *Practice Impact Evaluation – Fridge Signs (N=210)*

Figure 6: *Practice Impact Evaluation – Bonus Meal (N=112)*
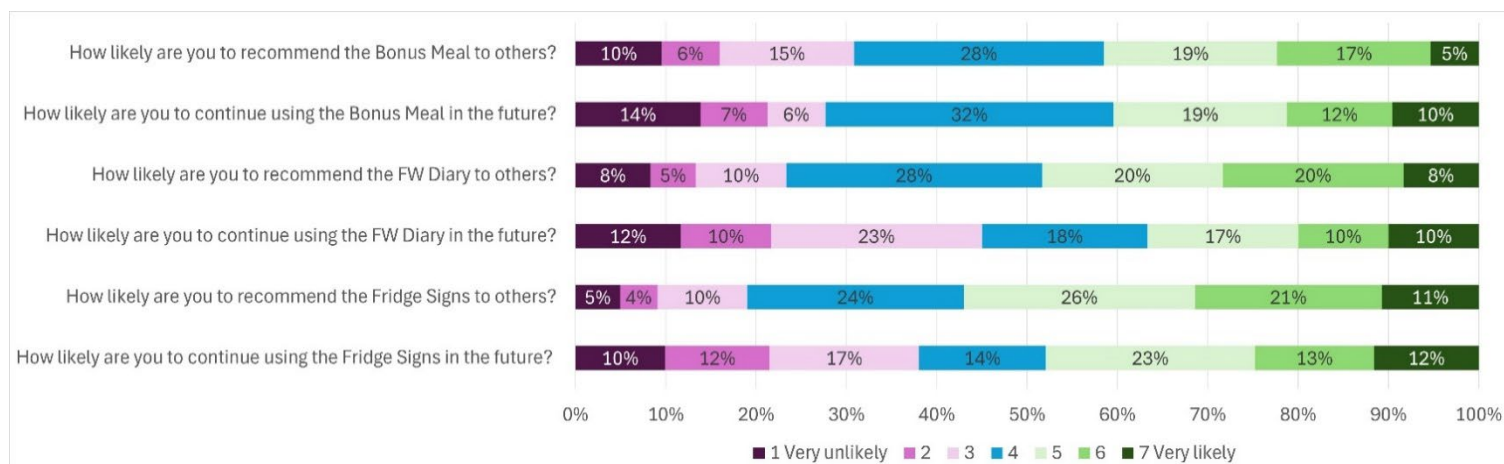

Figure 7: *Future Engagement Evaluation – All tools (N=322)*

While the Bonus Meal saw the highest usage rate in practice (Table 3), it received somewhat lower scores on evaluation measures by those who used it.

5.4.2.1 Relationship between evaluation of tools and background characteristics

There are no statistically significant differences in the means of the three tool evaluation summary variables (User Experience Evaluation, Practical Impact Evaluation, and Future Engagement Evaluation) between respondents who have older children (aged 12-17) and those who do not have children in this age group. Hence, whether respondents have older children living at home or not does not seem to influence how respondents evaluate any of the tools (T-tests, see Appendix 13). Similarly, there are no statistically significant differences in the means of any of the three tool evaluation summary variables between respondents with a short or long education (T-tests, see Appendix 14).

Further, the relationships between how participants evaluated the tools and their Environmental Practices and Economic/thrifty Practices, Self-efficacy, and Child Pickiness (see a list of all relevant summary variables in Appendix 7) were explored.

There is a significant moderate positive correlation between participants' Environmental Practices and the Practice Impact Evaluation scores of the FW Diary (r= .28, p= .025) and the Fridge Signs both in Group A (r= .35, p= .007) and Group B (r= .25, p= .03). When examining the User Experience Evaluation of the tools, a significant moderate positive relationship was found between Environmental Practices scores and the User Experience Evaluation scores for the Fridge Signs, but only for participants in Group A (r= .32, p= .04). Furthermore, there is a significant moderate positive relationship between Environmental Practices and the Future Engagement Evaluation for the Bonus Meal (r= .26, p= .01) and the Fridge Signs in Group B only (r= .32, p= .01). Hence, participants with higher Environmental Practices tend to give higher tool evaluation scores in some cases.

There is a significant negative correlation for the Fridge Signs in Group A between Child Pickiness scores and the User Experience Evaluation scores (r= -.27, p= .04).

There is a significant positive correlation for the Fridge Signs in Group A between respondents' Self-efficacy scores and the means of participants' User Experience Evaluation scores (r= .31, p= .01). This suggests that higher Self-efficacy scores are associated with higher User Experience Evaluation scores for the Fridge Signs but only for participants in Group A.

See a list of all correlation values between tool evaluation measures (User Experience Evaluation, Practical Impact Evaluation, and Future Engagement Evaluation) and Environmental Practices and Economic/thrifty Practices, Self-efficacy, and Child Pickiness in Appendix 15.

5.4.3 Effectiveness of tools in changing attitudes and behaviour

The potential effectiveness of the tools in changing participants' attitudes and behaviour was assessed accounting for the intervention group as well as the fact that measures were taken before and after the intervention. Regarding attitudes we looked at the effect on food waste awareness, whereas in terms of behavioural outcomes we looked at self-reported food waste and subjective food waste.

5.4.3.1 Change in self-reported food waste

The food waste amounts in grams of each of the 12 categories were summated to form an overall estimate of total food waste in the household in grams. The variation in the reported food waste was large and those participants (N=12) who reported more than 4000 grams of total food waste in either the pre- or post-survey were levelled to the maximum of this amount in statistical analyses to avoid strong outlier effects.

Bread is the most wasted food category. Fruit (including fresh and non-fresh, glass, canned, frozen, dried, etc.) was the second most wasted food category in terms of weight, while vegetables and salads (including fresh and non-fresh, glass, canned, frozen, dried, etc.) was the third most wasted food category in terms of weight (Appendix 16).

The self-reported food waste has decreased after the intervention compared to before regardless of the intervention groups (Group A, who had FW Diary and Fridge Signs; Group B, who had Bonus Meal and Fridge Signs, and the control group, who did not receive any tools) (F(1,319)= 16.7, p<.001). This effect did not vary by intervention group (there was no interaction, F(2,36)= 1.95, p= .14). The intervention group did not have an effect (F(2,319)= .63).

However, when excluding from the analysis those people who had not used any of the intervention tools in practice, the interaction effect between time (before vs after the intervention) and intervention group approached significance (F(2,278)= 2.59, p= .077). This interaction implies that the decrease in self-reported food waste varies by intervention group. As Figure 8 shows, the decrease in self-reported food waste was larger in Group B, who has received the Bonus Meal and Fridge Signs, compared to the other two groups, however this result only approached statistical significance. Further tests comparing the decrease in food waste per intervention group show that the self-reported food waste has only decreased significantly in Group B who was exposed to Bonus Meal and Fridge Signs (Group A (t(72)= .818, p= .42), Group B(t(95)= 4.09, p<.001), Control (t(111)= 1.4, p= .16) (Figure 9).
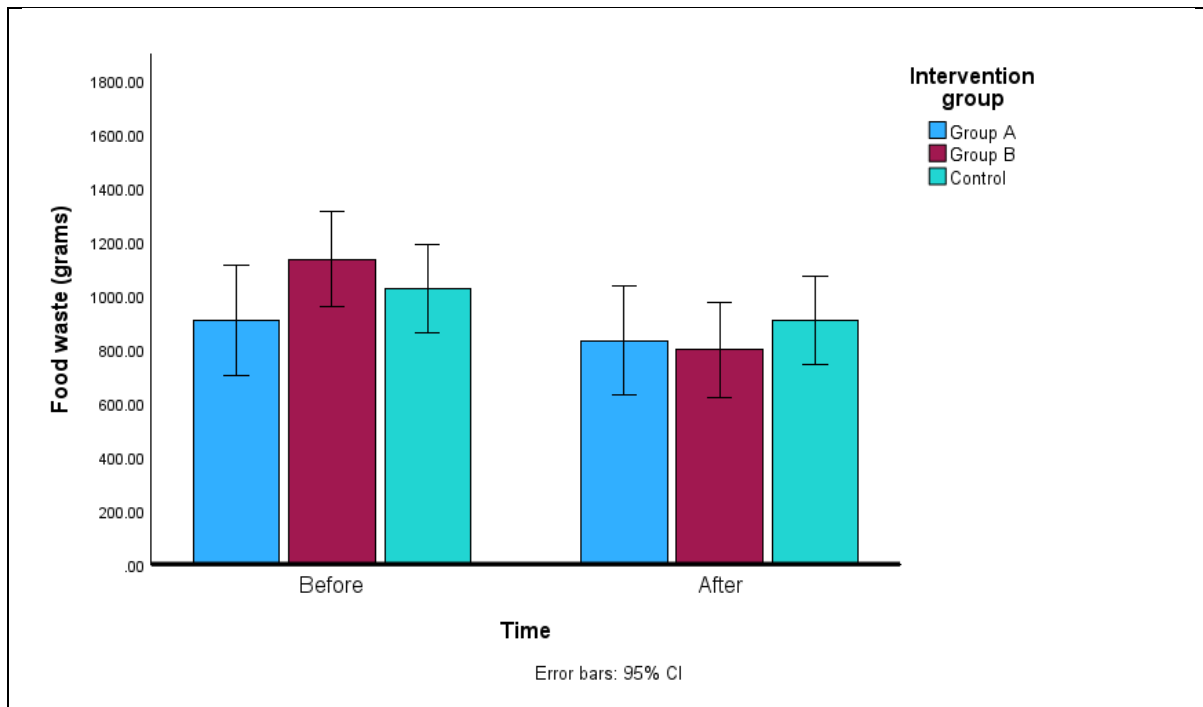
Figure 8. *Interaction between time and intervention groups on self-reported food waste. Mixed within-between subjects ANOVA with Time (food waste before vs food waste after) as within-subjects variable and Intervention group (Control, Group A with FW Diary + Fridge Signs, Group B with Bonus Meal + Fridge Signs) as between-subjects variable.*
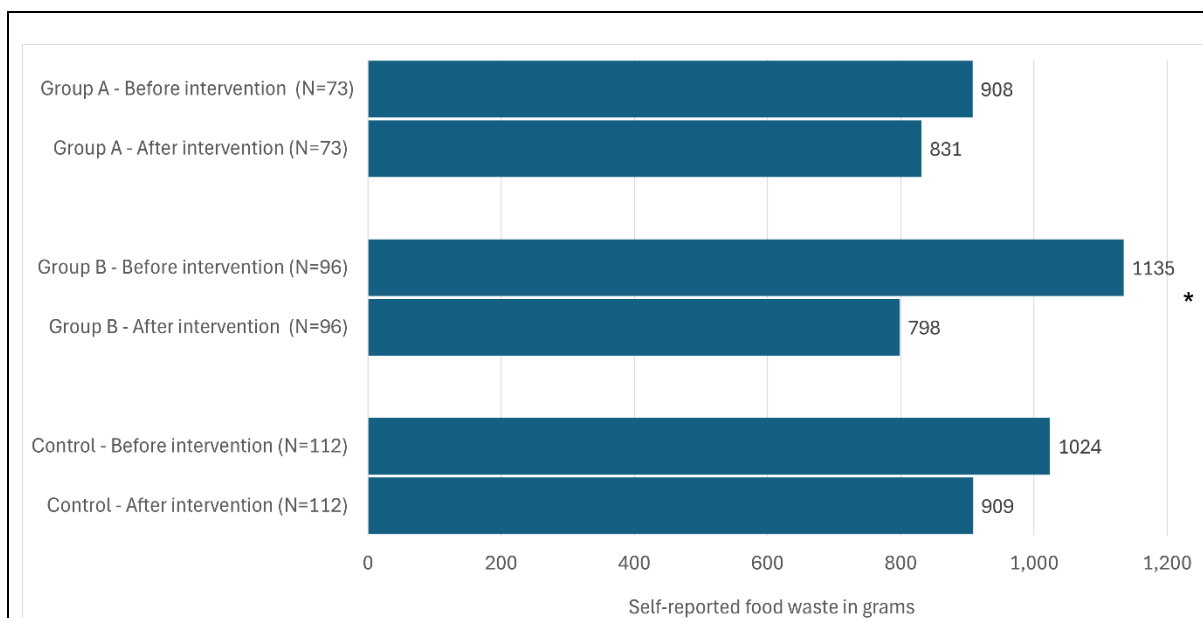
Figure 9: *Self-reported food waste in grams before and after intervention per intervention group (excluding those participants who did not use any of the tools)*
Paired t-test. (shows statistically significant difference at p<.001)*

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5.4.3.2 Change in food waste awareness

The effect of time (before versus after the intervention) on food waste awareness varied by intervention group, thus, there is only an interaction effect that is significant ($F_{(2,319)}=3.04$, $p=.049$).

As Figure 10 shows, the increase in Food Waste Awareness was larger in Group B who has received the Bonus Meal and Fridge Signs. Further tests comparing the change in food waste awareness per intervention group, show that the food waste awareness has only increased significantly in Group B who was exposed to Bonus Meal and Fridge Signs (Group A ($t_{(99)}=-1.01$, $p=.31$), Group B($t_{(109)}=-3.29$, $p<.001$), Control ($t_{(111)}=.61$, $p=.54$) (Figure11). These results were similar when excluding those participants who reported not using any of the tools (Figure 11).
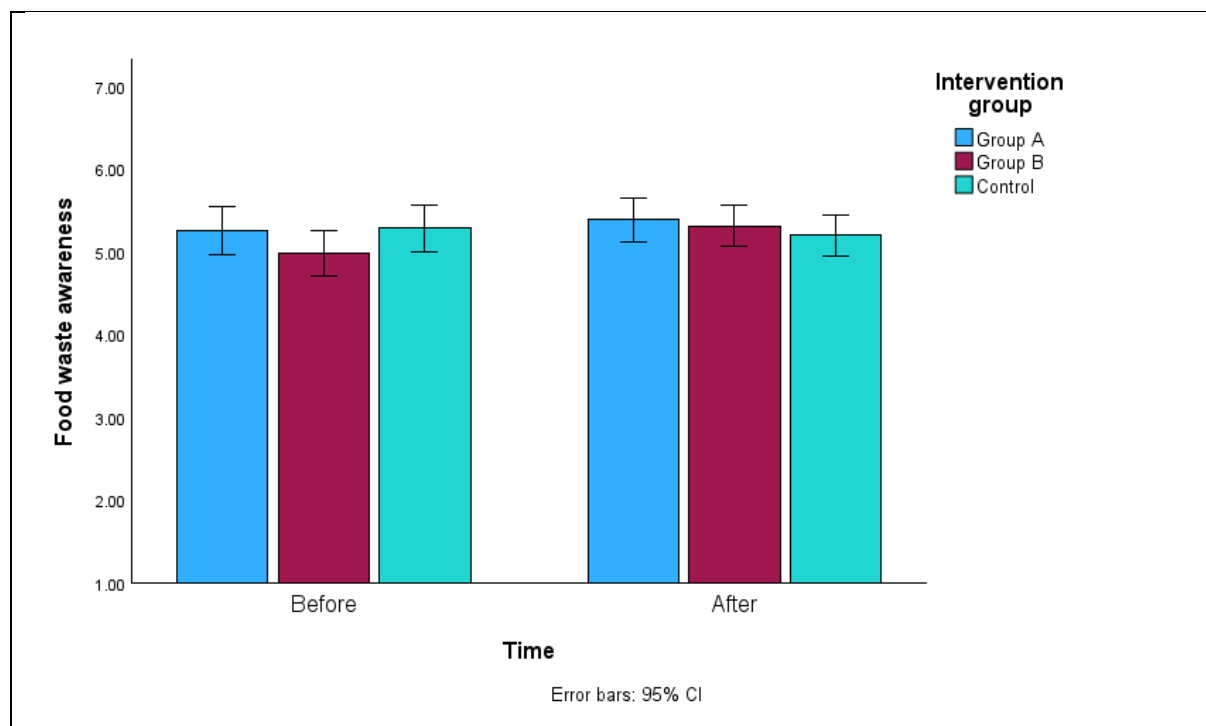
Figure 10: *Interaction between time and intervention groups on food waste awareness*
Mixed within-between subjects ANOVA with Time (food waste awareness before vs food waste awareness after) as within-subjects variable and Intervention group (Control, Group A with FW Diary + Fridge Signs, Group B with Bonus Meal + Fridge Signs) as between-subjects variable
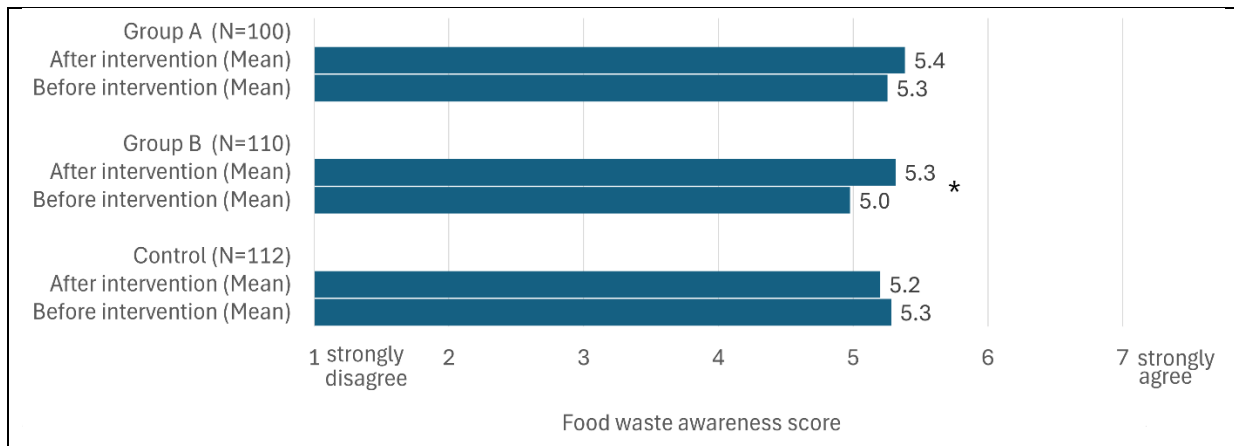
Figure 11: *Food Waste Awareness before and after intervention by intervention group*
Paired t-test. (shows statistically significant difference at p<.01)*

5.4.3.3 Change in subjective food waste

In answering the question, "How do you think your household's level of food waste compares to other households like yours (households with similar/same characteristics as yours)? Our level of food waste is…" (scale from 1. (much less) to 7. (much more)), respondents generally believe that they have lower food waste than other families (Figure 12).

There was no significant effect of time (before versus after the intervention) $(F(1,319)=1.52, p=.21)$, intervention group $(F(2,319)=.08, p=.91)$ or interaction between the two $(F(2,319)=1.78, p=.16)$ on subjective food waste, i.e. how much food participants estimate they waste compared to other similar families. This was the case when excluding participants who reported not using any of the tools as well.
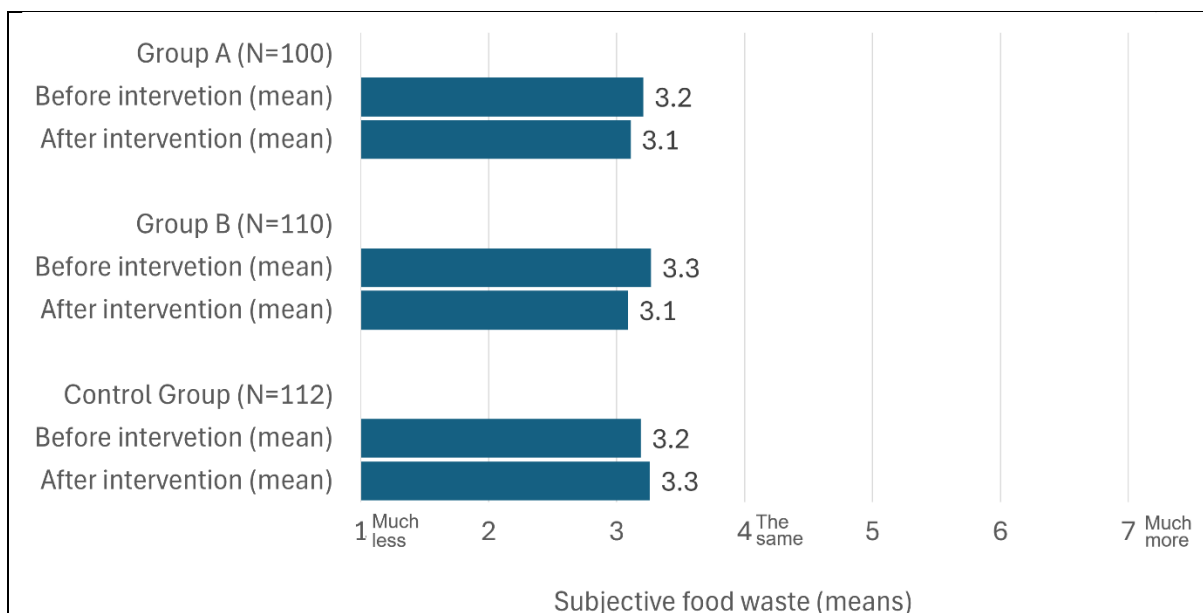
Figure 12: *Subjective food waste (means) before and after intervention by intervention group.*
Paired t-test.

5.4.3.4 Effect of children's age on changes in self-reported food waste and awareness

Children's age may have an impact on how easy or difficult it is to assess the amount of food needed at home. As older children have more independence and higher food consumption than younger children, those households with teenage children (12-17 years old) may have more challenges in reducing food waste and therefore also benefit more from the tools compared to other households with younger children. In this subsection we look at the effect of having teenage children (12-17 years old) versus having younger children on changes in self-reported food waste accounting for the intervention group as well.

Having teenage children versus younger children had a main effect ($F_{1,316}$=4.13, p=.04) on self-reported food waste so that those families with older children living at home had reported lower food waste than families without older children living at home (mixed within-between subjects ANOVA with time – before versus after intervention, intervention group and teenage children versus younger children). However, when excluding those who reported not using the tools the effect was not significant. As there were no significant interaction effects, having teenage children or not did not have an impact on the effectiveness of the intervention tools.

Having older children versus younger children had a main effect ($F_{1,316}$=13.6, p<.001) on food waste awareness so that those families with older children had reported higher food waste awareness compared to families without teenage children (mixed within-between subjects ANOVA with time – before versus after intervention, intervention group and teenage children versus younger children) regardless of intervention tool.

5.4.3.5 Motivation to reduce food waste

Participants were asked to rank six possible reasons that may motivate them to reduce their food waste according to their importance. The average rankings were similar before and after the intervention (Table 5). Saving money followed by loss of resources as a source of frustration had highest rankings, whereas being responsible parent had the lowest importance.

Table 5: *Incentives to reduce food waste by group – before and after intervention.*

Pre-survey		Group A (FW Diary & Fridge Signs) (N=100)	Group B (Fridge Signs & Bonus Meal) (N=110)	Control (N=112)
Rank		Mean	Mean	Mean
1	The thought of saving money	2.0	2.0	2.0
2	The desire to avoid the frustration of time spent shopping, storing, and cooking food that will not be eaten	2.9	2.8	2.9
3	The desire to help the environment	3.5	3.5	3.5
4	Their values	3.9	3.7	3.7
5	The desire to keep the kitchen tidy/organized	3.9	4.3	3.9
6	The desire to feel like a responsible parent	4.8	4.8	5.1
Post-survey		Group A (N=100)	Group B (N=110)	Control (N=112)
Rank		Mean	Mean	Mean
1	The thought of saving money	2.0	2.1	2.2
2	The desire to avoid the frustration of time spent shopping, storing, and cooking food that will not be eaten	2.8	2.8	2.9
*3	Their values	3.7	3.6	3.2
*4	The desire to help the environment	3.8	3.8	3.6
5	The desire to keep the kitchen tidy/organized	3.9	4.0	4.2
6	The desire to feel like a responsible parent	4.9	4.8	4.9

Ranking scale from 1 (most important) to 6 (least important)
* Shows change in ranking order after intervention

5.4.3.6 General changes in attitude and behaviour

In the final section of the post-surveys (after intervention), participants in all intervention groups were asked to what degree they thought their household's attitude and behaviour towards food handling had changed in general, since participating in the study. The responses suggest that all the groups, including the control group, reported to pay more attention to food waste (Table 6). Group B (Bonus Meal and Fridge Signs) reported that they felt to a lower extent that they were resourceful in the kitchen compared to the other groups, whereas both Groups A (Food waste diary and Fridge Signs) and B (Bonus Meal and Fridge Signs) reported they felt less confident in the kitchen compared to the control group (Table 6).

	All groups (N=322)	Group A (FW Diary & Fridge Signs) (N=100)	Group B (Fridge Signs & Bonus Meal) (N=110)	Control Group (N=112)
Table 6: *Changes in attitude and behaviour (Mean)*				
"We are more mindful of the food we throw away."	4.9	5.0[a]	4.7[a]	5.1[a]
"We make a greater effort to use up food that would have otherwise ended up in the trash"	4.9	4.9[a]	4.7[a]	5.0[a]
"We are more resourceful in the kitchen"	4.3	4.4[a]	4.1[b]	4.6[a]
"We feel more confident in the kitchen"	4.2	4.1[b]	3.8[b]	4.6[a]

"We are interested in hearing whether you feel that the household's attitude and behaviour towards food handling has changed since you [received the two tools (Group A & B) / partook in this study (Control Group)]." Scale from 1 (strongly disagree) to 7 (strongly agree)

ANOVA, post-hoc tests with Bonferroni adjustment, means with different superscript letters indicate significant differences at p<.05.

6 Interviews

In addition to the surveys presented above, this study also carried out a qualitative study consisting of semi-structured interviews. The objective of the interviews was to gain a more in-depth understanding of how the tools have been integrated in the participating households' everyday life, i.e. to gain a deeper understanding of the participants' experiences with the tools, use of the tools, and the perceived effectiveness of the tools on changing households' food practices and food waste.

The interviews took place several weeks after the surveys took place, and none of the interviewees had participated in the surveys. Overall, 13 household representatives received two tools each and were asked to use them for 1-2 weeks, after which they were interviewed about their perceptions and experiences with the tools. All 13 interviewees tested the Fridge Signs, 6 of whom also tested the FW Diary, while the remaining 7 interviewees tested the Bonus Meal. The online interviews lasted around 20-30 minutes.

6.1 Participants

Similarly to the quantitative part of this study, the recruitment criteria for the qualitative part were representatives from households with children below the age of 18 years living at home. Participants included different genders and age groups and participants came from different regions (Table 7 and Table 8).

Table 7: *Interviewees characteristics*

	Participants (N=13)
Gender	
Men	9
Women	4
Region	
Hovedstaden	3
Sjælland	2
Syddanmark	3
Midtjylland	3
Nordjylland	2
Parents age group	
18-34	4
25-44	2
45-54	1
55-65	6
Participants with children of different age groups living at home	
0-5	5
6-12	4
13-17	7
Above 18	2

Table 8 provides more detailed information about each participant.

Table 8: Overview of interviewed participants			
Participant number	Gender	Level of food waste	Level of tool use
	Woman	Low to medium	Low to medium
2	Man	Low	Medium to high
3	Woman	High	Low
4	Man	Medium	High
5	Woman	Low	Low
6	Woman	Low to medium	Medium
7	Man	Medium	High
8	Woman	Low	Low
9	Man	Low	Low
10	Woman	Low to medium	High
11	Woman	Low	Low
12	Woman	High	Low
13	Woman	Low	Low

6.2 Interview protocol

A semi-structured interview protocol was developed for this qualitative approach. The questions of the interview protocol were primarily adapted from the survey measures described above to allow a deeper understanding of the experiences of the households after trying the tools. See the full interview protocol in Appendix 17.

The interview guide included a welcome section, which presented the project in brief and provided information about audio-recording and transcribing, participants' rights, Aarhus University's data treatment, and consent to participate. Prior to the interview, participants received an information document (Appendix 18) specifying these issues in more detail, and in the very beginning of the interview, participants were asked if they consent to the interview being audio recorded and whether they had read and understood the information document.

After having consented to participate and starting the audio recording, participants were asked about their general eating- and food waste awareness and habits, including why and when food is typically wasted in their household; how much food they estimate they waste compared to other families; if/how food waste is addressed in the household; if they have any ambitions or intentions to change their habits; and what might motivate them to reduce their food waste. Participants were subsequently asked several questions about their usage and experience with each of the two tools they had tested, including frequency of use; situations; pros and cons of the tools; perceived effectiveness of the tools in reducing food waste; and if they knew of any similar tools or strategies. Participants were also asked if they believe

there has been any change in their approach to food waste since the beginning of their participation, as well as whether they would use any of the tools in the future and whether they would recommend any of the tools to others.

The interviews were audio-recorded and subsequently transcribed and pseudonymised. The interviews were coded using a predetermined codebook building on the interview guides. This included codes referring to behavioural changes, use of the tools, evaluation of the tools, intentions relating to future use, level of food waste, motivation to use the tools, and willingness to recommend tools to others. The coding was however not limited to the predetermined codebook, and an exploratory code covering other suggestions was created. The description of this code was "Suggestions for other tools not related to the tested tools".

6.3 Food waste and motivations

The participants describe different levels of food waste and different reasons why they experience it. The common trends described in the interviews are Children's Eating Habits, Over-Purchasing and Unused Groceries, Meal Planning and Leftovers and specific food items. Most of the interviewed participants report that they are aware of their food waste and make conscious efforts to minimize it. This includes using leftovers, freezing excess food, and being mindful of what they purchase.

Children's Eating Habits are described to be unpredictable, and parents frequently mention that their children do not finish their meals, leading to a considerable amount of food being discarded. Many households also report buying more food than needed, especially when items are on sale or sold in bulk. This often results in food spoiling before it can be used, particularly vegetables and fruits. Some households describe themselves as being good at planning meals and using leftovers and hereby reducing their food waste. However, even in these households, there are instances where food is forgotten or not used in time:

"I don't think we throw away much, but of course it happens, doesn't it, and when it does, well, it's typical if there's just something that just didn't turn out well, or in some way or another so you don't really feel like eating it, or you put it in the freezer and it happens that there's something hiding in there every now and then." (P8, l. 9-13)

Motivation for limiting food waste is a blend of environmental, economic, ethical, and personal reasons. Many interviewees emphasize the environmental impact of food waste, noting that reducing waste can help lower CO_2 emissions and conserve resources. Several participants highlighted the economic benefits of reducing food waste, such as saving money on groceries. Efficient use of food resources can lead to better financial management both at home and in society:

"[...] both for the sake of the environment and economically speaking, it is stupid to just throw out food. So, it could be nice to save some money on this." (P1, l. 45-46)

Ethical concerns are also prominent, with some interviewees expressing that it is morally wrong to waste food when there are people in the world who do not have enough to eat. One interviewee e.g. describes

food waste as unethical. The interviews reflect a sense of social responsibility and the desire to set a good example for others, including children.

6.4 Use and evaluation of the tools

The use of the tools varies among participants. In households with a lower level of food waste, the tools are often deemed less necessary because these households already employ similar strategies to manage their food consumption effectively. As a result, the tools may seem irrelevant for them:

> "[...] maybe it was a bit unnecessary for our family [...].
> So, I actually didn't experience a big change for us, because we already pay so much attention to this"
> (P11, l. 59-64)

Regardless of how much interviewees used the tools, most participants share the common approach, that they experiment with the tools and adapt them to fit their household's needs and level of food waste:

> "We did not print them out as they were but instead we made some post-it [notes], which we put on the shelves." (P2, l. 47-48)

Other ways the tools were implemented include laminating the signs for durability; making verbal agreements within the household; and making conscious efforts to include leftovers in meal plans. These methods helped participants tailor the tools to their specific needs.

The participants' feedback on the tools was mostly positive (Table 9). The positive feedback from the interviews highlights several key points about the effectiveness and reception of the food waste reduction tools. Participants generally found the tools to be practical and beneficial in increasing their awareness of food waste.

However, the feedback also reflected individual preferences. For instance, some participants found the tools' instructions fitting, while others found it excessive or lacking, which can be attributed to personal preferences or needs. Another point common to all three tools is that it is probably not necessary to keep using them over time, as they become habits or naturally integrate into everyday behaviour.

Table 9: *Overview of feedback*

Positive feedback	Negative feedback
- Increasing Awareness and having a Positive Impact - Ease of Us/ Practicality of the Tools/Versatility - Easy to integrate in already established behaviour like Meal Planning - Educational Value - Visual Appeal - Improved Communication	- Lack of ease of use/ Practicality of the Tools (need for printer and space in fridge) - More durable materials needed - Level of information/tone: some participants finding it too complex/cumbersome or condescending - Lack of inspiration/food ideas - Lack of visual appeal: too messy

6.4.1 Fridge Signs

The feedback on the Fridge Signs was mainly positive. Participants found it visually appealing and easy to understand and use, with only a few exceptions. It was described as a good idea, a good way of thinking, and positive:

[…] my daughter sometimes sends me text messages or calls me when I'm at work to ask me, 'hey, can I take this or that because I am hungry now'. […] But now, she has actually reduced these calls, because she can tell by herself, well here it says 'eat me,' so I will take this right away, I am allowed'. […]. It actually also helps our family's communication with each other

[…]" (P7, l. 81-91)

"Yes, I could imagine some situations, for example if I am not at home, then it would be good to put on the shelves so that my daughter can tell what she is allowed to take. That would be really good." (P5, l. 74-76)

The tool was used in various ways. Some participants mainly preferred one of the signs:

"[…] 'Do not touch, I am for dinner', that one did not work for us because it was a bit unnecessary […]. So, in that way I think the other one ['Eat me'] was better, […] so one kind of had a better overview of what should be used first." (P1, l. 57-65)

Others used boxes, drawers, or whole shelves in the fridge to sort the food.

"I think, in order for it to work for me, I would essentially have to divide it into shelves" (P3, l. 163-154)

These different uses indicate that participants found the tool flexible and adapted it to their own lifestyle.

In the negative feedback, the need for a lot of space in the fridge to organize properly was mentioned. Some participants complained that the signs were made of paper, which was not seen as durable:

"I thought it was a bit much to put such a big piece of paper into the refrigerator, and such a big green sheet, you know? It might be better with a little green sticker or maybe one should mark a shelve. I think it is a bit disgusting with paper in there like that." (P13, l. 186-189)

Many participants also mentioned the hassle of printing as a barrier:

"Yes, as soon as there is something about you need to print it yourself, even if it just says 'print', then I am done, so no. That is way too unmanageable, it needs to be super easy." (P5, l. 85-87)

6.4.2 Bonus Meal

Overall, the participants thought the tool Bonus Meal was easy to understand, was adaptable, introduced a meaningful way of thinking when cooking and had some good suggestions.

"Overall, I thought it was super good. It was nicely useful and easy." (P13, l. 143-144)

"I can imagine it hanging on the refrigerator door [...]" (P2, l. 204)

"[...] I think some of the food I have used, if I hadn't used it now, they would soon have gotten too old and then it would have been thrown away." (P8, l. 250-252)

On the other hand, the more negative feedback specifically on the tool was that, even though the information is clear, it might still be difficult to use if the person is not used to cook freely and creatively.

"Yes, well, it is easy enough to understand and say 'ah that's how'. But again, to get from there and then to get your brain to produce a recipe, there is still some way." (P5, l. 267-269)

"[...] maybe with some examples of recipes." (P3, l. 289-290)

In relation to the short stories on the second page, most people appreciated them as a supplementary way to understand the tool, while some did not like them.

6.4.3 Food Waste Diary

The participants also liked the FW Diary. They described it as effective in providing an overview of personal food waste, a good idea, and easy to use and understand. Participants have generally become more conscious of food waste as a result of the tool and experienced some kind of behavioural change:

"[...] it has helped us reduce at least the cold cuts we throw away. I think it is, it has been drastically less, because we have been aware of what should be eaten." (P1, l. 156-159)

Some of the more negative feedback mentioned its boring appearance and that it might be cumbersome and unnecessary. This tool was also specifically noted as being relevant only for a limited time, i.e. not useful on a more regular basis:

"It is really good, but you know, it is kind of an eye-opener, and then you are done using it." (P4, l. 170-171)

6.4.4 General evaluation and changes

Several participants highlighted an increased awareness and mindfulness about food waste. One participant mentioned that the tools have made them more attentive to what needs to be consumed soon:

"I think we have become much more observant on it, or that you just get a bit more awareness" (P1, I. 289-290)

"It has highlighted the narrative we have that we will not accept food waste as a starting point." (P11, I. 175-176)

Some participants have changed their shopping and meal preparation habits by integrating the tools into their meal planning and using more of already stored pantry goods to ensure nothing goes to waste:

"I starting using some of the beans and dried thing which I had otherwise just used as decorations." (P13, I. 194-195)

The tools have also fostered better coordination and communication within households about food waste. Discussions about food waste have become more common, leading to more conscious efforts to reduce it. One participant noted that the tools helped improve family communication and coordination regarding meal planning and food consumption:

"I didn't think I needed it, but we have realised that we have become better at coordinating with each other, and we do not buy too many vegetables. For example, both of us might have bought one and a half kilo carrots each – that does happen anymore." (P4, I. 65-67)

Overall, the tools have inspired participants to adopt a more mindful approach to food waste, integrating new habits and practices into their daily routines to minimize waste and make better use of available food.

All participants described an intention to use the tools in the future, except for P9, who has not used them and will not be using them moving forward. Some participants mentioned that they will continue using all of the tools, although some described that they will mainly continue practicing the mindset and awareness of food waste that the tools have inspired in them:

"Well, I don't think [we will continue using the tool] but I think the concept perhaps I would." (P5, I. 91)

All participants except P8, P9 and P11, who reported having very little food waste and who seldomly used the tools, expressed their willingness to recommend food waste reduction tools and methods to various groups. Generally, they would suggest these tools if the topic of food waste came up in conversation, especially to those who have also dealt with food waste issues.

Participants also mentioned they would discuss these methods with friends and colleagues, sharing their experiences and the benefits they observed. Some participants had already introduced these tools at their workplaces, finding that colleagues were interested and even requested materials to try at home.

The participants appeared enthusiastic about sharing these tools and methods with a wide range of people, from families and friends to colleagues, emphasizing the practical benefits and positive impact on reducing food waste.

6.5 Suggestions of other strategies or tools

Participants also mentioned other ways to minimize food waste. One common method was meal planning to avoid over-purchasing; using ingredients across multiple meals; or making a list/keeping track of what food needs to be eaten so it is not forgotten.

Another practical way is to change shopping behaviour, such as shopping for foods with a short shelf-life like milk in smaller quantities multiple times a week instead of all at once. In the same vein, they proposed not buying in bulk and suggested that shops start packing items in smaller portions to prevent food from going bad. For instance:

> "[...] that the portions don't have to be so big, that you can buy a packet of four buns instead of eight, when you would like to eat buns right?" (P10, l. 121-123)

Educational initiatives were also suggested, such as introducing food waste reduction education in schools to teach children the importance of minimizing waste and its impact on the environment and economy.

Cooking courses that focus on using surplus ingredients and leftovers creatively were seen as beneficial. These courses provided inspiration and practical skills for reducing food waste. Participants requested apps to track what is in the refrigerator in comparison to what needs to be bought or apps that could generate recipes based on what one already had available. In the same line, some proposed using AI to generate recipes.

Some participants also mentioned different brands of meal boxes that contain the specific amounts of food for a meal, so there is no leftover food that becomes waste. Finally, participants found creative ways to use leftovers, such as incorporating them into breakfast or snacks:

> "I found some dried fruit and old granola bars that my daughter didn't want anymore, so I chopped them into pieces and then I ate them with my breakfast with some A38 [...]. So, you can use things for many things, it's not necessarily what they were intended for." (P8, l. 295-300)

Taken together, participants suggested various other strategies to minimize food waste, such as educational initiatives, cooking courses, and apps to track food and generate recipes. Additionally, smaller portion packaging in food shops and using meal boxes were also proposed.

7 Conclusion and discussion

This study has provided insights into consumers' acceptability and evaluation as well as the effectiveness of three tools designed to help households reduce their food waste.

Regarding effectiveness of the tools in changing self-reported food waste or awareness, we find only small effects or indication to support their effectiveness. When it comes to changes in food waste awareness, there was a significant increase in food waste awareness, but only in Group B (who used the Bonus meal and the Fridge Signs) after the intervention compared to before.

Self-reported food waste had decreased overall after the intervention compared to before when not taking considering the intervention groups. Among those using the tools, there was an interaction between time and intervention group that approached significance, implying that self-reported food waste decreased in Group B (who used the Bonus meal and the Fridge Signs). Although the effect only approached significance, it could indicate potential effectiveness regarding the main outcome of interest, namely reduction in food waste. However, the measurements of food waste amounts in grams exhibited high standard deviations and according to van Geffen (2017), "the method has been shown to give an underrepresentation of the actual amount of food wasted". Therefore, the results can be seen as only indicative of effectiveness for the tools used in Group B, given as well that the interaction effect on self-reported food waste was only approaching significance. On the other hand, given the rather small number of participants and relatively short intervention time, it is noteworthy that we notice this interaction effect that approaches significance. While Group B saw a reduction in self-reported food waste amounts as well as an increase in food waste awareness, it is also noteworthy that a higher proportion of the households in this group reported having enough income available for grocery shopping on average compared to Group A, although the difference was not statistically significant. Group B had higher food waste to begin with which could be related to the fact that they have higher income available for food shopping and maybe the reduction in food waste was larger in this group also because they had more waste that they could reduce from. In addition, Group B received two tools (Bonus Meal and Fridge signs), and we cannot know which one may have led to the effect. However, there is previous evidence that Bonus Meal is effective in reducing food waste (Cooper et al., 2023). Furthermore, there were no significant differences in the tools' effectiveness in reducing food waste based on having children aged 12-17.

The subjective food waste compared to other families was not affected for any groups. Moreover, the tools did not seem to impact how participants rank different motivational factors to reduce food waste amounts as saving money remains the most important factor for reducing food waste for all groups both before and after the intervention.

In addition to the changes in measures taken before the intervention compared to after intervention, people also reported their perceived changes in motivation and confidence in the kitchen after the intervention. There were few differences between groups in these perceptions, namely both intervention groups felt less resourceful in the kitchen compared to the control and Group B (Bonus Meal and Fridge

Signs) perceived less confidence in the kitchen. That the groups receiving tools may have felt less resourceful or confident in the kitchen compared to the control could be because they reflected more about their practices in the kitchen. This reflection may act as a trigger to change behaviour as well.

This report also examined to what degree participants have used each tool in practice and how they evaluate the tools across a range of evaluation measures. We also examined how background variables, such as educational backgrounds, household compositions, household behaviour, self-efficacy, etc. might influence how participants use and evaluate each tool. For example, whether participants have older or younger children living at home does not seem to influence the usage and evaluation of any tools, while households' Environmental Practices may be relevant in how participants use and perceive the tools.

Both interview- and survey participants generally gave positive feedback for all three tools. Participants generally reported that the tools were easy to understand and use; they have made cooking easier in general; they helped participants to save money on their food budget; they made it easier to avoid food waste in general; they positively motivated participants to reduce their food waste; and participants reported that they would likely continue to use the tools in the future and recommend the tools to others. This implies that the tools are well received, especially since people are willing to continue using them and even recommend them to others. This also means that people find them relevant enough to bring up in discussions with others and this can foster more communication and awareness regarding ways to avoid food waste in society. However, people were less likely to continue using the FW Diary, which was seen more as a tool that can be used to get an understanding of the food waste situation in one's household but found it less relevant for long-term use.

Notably, the Bonus Meal tool had a very high usage rate among participants, yet the tool received lower evaluation scores compared to the other tools, suggesting room for improvement. For instance, some interviewees mentioned that an app with recipes could have been better than the open recipe format.

As for the Fridge Signs, interviewees stated that the tool was useful in different ways for example on refrigerator shelves, drawers, boxes or individual items. Therefore, if a particular use is intended then this should be clarified more explicitly in future uses.

Although all three tools are well evaluated and people would recommend them to others, we only find some indicative support that the tools tested in Group B, namely the Bonus Meal and the Fridge Signs, may lead to a reduction in consumers' self-reported food waste amounts as well as an increase in their awareness of the food they waste. However, this was a relatively small study with a two-week intervention period, thus more such research is needed into the effectiveness of the tools. Future studies can also look at longer term effect, for example by measuring food waste in these households after a two-month period post intervention as well.

The tools were generally well-received, with participants finding them easy to use and helpful in reducing food waste and saving money. The interview study highlights the potential of these tools to foster discussion and awareness about food waste. The three tools have sparked discussions in people's

households, but also in their broader network and many people would recommend the tools to others, wherefore the tools have potential to foster motivation and measures that promote reduction of food waste. This implies that the tools may not only lead to short term reductions in food waste, but they can contribute to learning and longer-term changes in norms in society due to the way they are received and discussed about by users.

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9 Appendixes

Appendix 1: FW Diary tool

Vores madspildsuge

Vi smed mad ud da ...

Ta' madansvar
Undgå madspild

I kan potentielt skåne både klima og egen pengepung ved at mindske jeres madspild. Det kræver selvfølgelig, at I ved, hvornår madspildet opstår.

Følg jeres madspild i en uge. Sæt kryds i de små bokse, der bedst beskriver netop jeres madspildssituation. Sætter du mange krydser i en boks i løbet af en uge, kan du vende siden for et fif til, hvordan I kan undgå jeres madspild.

1 ... ungerne ikke kunne lide maden

2 ... der var mad tilbage på tallerkenen

3 ... der var mad tilbage i skålen eller på panden

4 ... de gemte rester ikke blev spist

5 BEDST FØR 20/02/1981 ... datomærkningen var overskredet

6 ... maden var blevet dårlig

7 ... madpakken ikke blev spist op
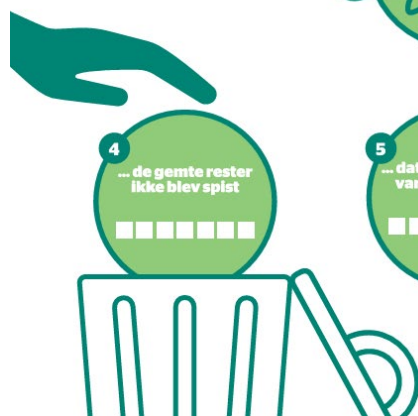
Ministeriet for Fødevarer, Landbrug og Fiskeri
Fødevarestyrelsen

Det er let at tage madansvar
– her har I et par gode fif

1 **Camouflér nye smagsvarianter.**
Brug velkendte retter til at gemme nye smagsvarianter. Prøv eks. blendet squash eller champignon i kødsovsen.

2 **Brug mindre tallerkener.**
Alternativt kan I anrette jeres måltider i mindre portioner. Resten af maden kan I gemme til i morgen.

3 **Gem de små restportioner.**
Det gælder også de rester, der ikke udgør et helt måltid. De er gode som mellemmåltider.

4 **Etablér en resteplads.**
Lav en hylde eller kasse til mad, der snart skal spises, så det bliver synligt i køleskabet og i fryseren.

5 **Lugt til eller smag på varen.**
Datomærket "Bedst før" er en vejledende datomærkning. Maden kan ofte spises selvom datomærkningen er overskredet – så længe den dufter fint, og du har fulgt anvisningerne på pakken. Den rynkede peberfrugt er også stadig god i kødsovsen.

6 **Brug din fryser oftere.**
Madvarer som hvidløg, chili, friske krydderurter, grøntsager, brød, dej og meget mere kan sagtens tåle at blive frosset ned.

7 **Lav madpakken sammen med dine børn.**
På den måde sikrer du dig, at de kan lide det, de får med, og at de ikke får mere med, end de kan spise.

Ministeriet for Fødevarer, Landbrug og Fiskeri
Fødevarestyrelsen

Appendix 2: Fridge Signs tool

Et køligt overblik til jeres køleskab

Hjælp din familie ved at skabe opmærksomhed om de varer, der snart skal spises. Stil den lille portion rester fra i går eller posen med de bløde gulerødder frem i køleskabet.

Nedenfor finder du to skabeloner, som du kan klippe ud og bruge i dit køleskab. Husk også at markere, de madvarer, som du allerede nu ved, I skal bruge til eks. aftensmaden, så I ikke behøver at handle ind igen.

FOLD HER

Spis mig

FOLD HER

Nix pille. Jeg er til aftensmaden

Appendix 3: Bonus Meal tool
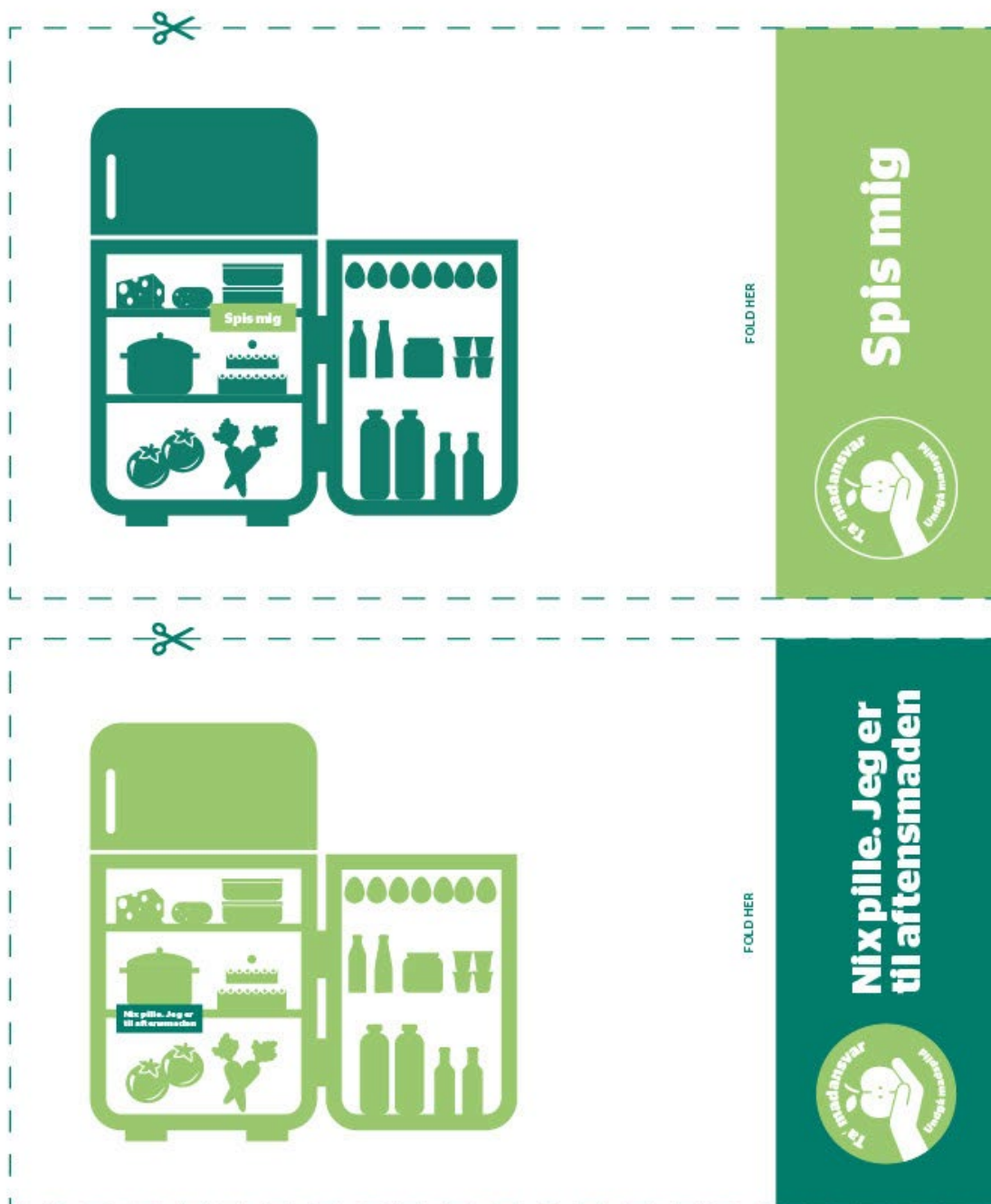
3 (+1) Bonusmåltid

Næsten 900.000 ton spiseligt mad ender i skraldespanden hvert år i Danmark, hvilket er dyrt for både økonomien og miljøet. Denne fleksible guide kan hjælpe dig med at reducere din husstands madaffald.

Start med at udvælge en dag på ugen til at lave et Bonusmåltid.

3+1 Bonusmåltider tager udgangspunkt i de ingredienser du allerede har til rådighed i dit køkken, som fx madrester fra et tidligere måltid. Ingredienserne fungerer som en slags byggeklodser, hvor du nemt kan substituere ingredienserne, afhængigt af hvad du har til rådighed. Du kan således stadig tage inspiration fra dine foretrukne madopskrifter, hvortil 3+1-guiden hjælper dig med at substituere ingredienserne. Retter, som fx suppe, madpandekager, gryderetter, salat, m.m. er ideelle Bonusmåltider.

1 → Base
Først skal du vælge en base for din ret. En base består af grundlæggende ingredienser, såsom ris, pasta, mel, bouillon, dåsetomater, kartofler osv. Tag udgangspunkt i de baser du allerede har til rådighed i dit køkken. Vi foreslår, at du sørger for altid at have nogle basisingredienser på lager.

2 → Frugt & Grønt
Tilføj frugt og grønt til din base. Tag udgangspunkt i frugt og grønt du allerede har til rådighed i dit køkken.

3 → Protein
Tilpas din ret ved at tilføje en proteinkilde, såsom bønner, linser, ærter, seitan, æg, nødder, kød, fisk osv.

+1 → Dit Personlige Præg
Gør din ret mere personlig ved at tilføje dit foretrukne supplement, såsom urter, krydderier, dressing, osv.

Tip: Skab overblik over de madvarer, der snart skal spises ved at bruge Fødevarestyrelsens gratis madspildsredskab:
Skab et køligt overblik.
https://foedevarestyrelsen.dk/Media/638203467939907806/MADANSVAR_REDSKAB_2_210x297mm

3 (+1) Bonusmåltid

Inspiration

Det var en kold vinteraften, og Zara glædede sig til at tilberede familiens første Bonusmåltid. Men der var et problem: Der var ikke meget mad tilbage i køleskabet. Zaras mor kiggede på de få madrester, de havde, og tænkte hårdt. "Vi har lidt kartofler, nogle gulerødder, porrer, hvidløg og en rest kylling," sagde hun.

Zara smilede og sagde: "Vi kan lave varm suppe til aftensmad". Så begyndte de at skrælle kartoflerne og skære dem i små terninger. Zara hjalp med at skrælle gulerødderne og hakke dem fint. De ville gerne have haft løg i suppen, men de havde ikke flere tilbage. Heldigvis kunne porrerne bruges som erstatning. Mor tog den sidste lille rest kylling og skar den i små stykker imens Zara fandt nogle brødrester, som hun smuldrede til brødcroutoner.

Zara kom de hakkede kartofler, gulerødder, porrer, hvidløg og kylling sammen i en stor gryde med lidt vand. De tilsatte også lidt salt, peber og en smule timian. Snart fyldte duften af suppe hele køkkenet, og de blev ivrige efter at smage.

Hjemme hos Emil var det blevet tid til at lave det ugentlige Bonusmåltid, og Emil havde haft en uimodståelig trang til madpandekager med fyld hele dagen. "Men vi har ikke flere æg i køleskabet," sagde Emils storebror. "Man kan da ikke lave pandekager uden æg. Skal vi ikke bare bestille noget take-away?"

"Man kan da sagtens lave pandekager både med og uden æg" sagde Emils far og kiggede i skabene. Han fandt en pose majsmel, salt, lidt sukker og noget mælk. "Det må være nok til at lave pandekager," sagde han. Så begyndte han at blande ingredienserne i en stor skål og rørte rundt indtil dejen blev tyk. "Nu mangler vi bare fyldet," sagde han og gik i gang med at lede i køleskabet. Der var ikke meget at vælge imellem. De fandt en dåse bønner, et halvt løg, en dåse majs, en pose chilipulver, lidt spidskål, og en halvtom dressing.

"Det bliver vores fyld!" erklærede Emils far. Han begyndte at stege pandekagerne på en pande, samtidig med at han varmede bønnerne i en gryde sammen med en smule chilipulver.

Snart sad hele familien omkring spisebordet med varme pandekager. De fyldte dem med bønner, løg, majs, spidskål og dressing. "Det smager fantastisk!" udbrød Emil så højt at far blev helt forskrækket. De begyndte alle at grine, og Emil glædede sig allerede til næste uges Bonusmåltid.

Appendix 4: Participants' backgrounds

Participants' backgrounds				
	All (N=322)	Group A (N=100)	Group B (N=110)	Control (N=112)
Participant age groups				
18-34 years	32.9%	31.0%	32.7%	34.8%
35-49 years	32.3%	32.0%	34.6%	30.3%
50-99 years	34.8%	37.0%	32.7%	34.8%
Pearson's Chi2(4) test= .8166, sig. = .936				
Gender				
Woman	51.9%	53.0%	52.7%	50.0%
Man	48.1%	47.0%	47.3%	50.0%
Pearson's Chi2(2) test= .2404, sig. = .887				
Education [1]				
Short education	67.3%	65.0%	75.5%	61.3%
Long education	32.7%	35.0%	24.6%	38.7%
Pearson's Chi2(2) test= 5.4025, sig. = .067				
Region				
Hovedstaden	33.2%	31.0%	31.8%	36.6%
Sjælland	12.1%	9.0%	14.6%	12.5%
Syddanmark	23.3%	24.0%	23.6%	22.3%
Midtjylland	23.3%	26.0%	22.7%	21.4%
Nordjylland	8.1%	10.0%	7.3%	7.1%
Pearson's Chi2(8) test= 3.1878, sig. = .922				
City size				
Capital	24.2%	23.0%	20.0%	29.5%
Large city (over 100,000 inhabitants)	9.9%	12.0%	9.1%	8.9%
Large provincial town (20,000-100,000 inhabitants)	22.7%	21.0%	21.8%	25.0%
Small provincial town (1,000-20,000 inhabitants)	23.6%	24.0%	30.0%	17.0%
Village (50-1,000 inhabitants)	11.2%	7.0%	15.5%	10.7%
Countryside/not a city	8.4%	13.0%	3.6%	8.9%
Pearson's Chi2(10) test= 16.1154, sig. = .096				

[1] Education was merged into two categories for statistical analysis:

Education summary variable	
Primary school	
Secondary education (gymnasium)	= Shorter education
Vocational education	
Short higher education 2-3 years	
Medium higher education 3-4	= Longer education
Long higher education 5 years or	
Research education (PhD)	

Appendix 5: Children age groups per group

Participants' children's age groups				
	All (N=322)	Group A (N=100)	Group B (N=110)	Control (N=112)
Participants have 1 or more children between 0-5 years				
Total	40.7%	41.0%	40.0%	41.1%
Pearson's Chi2(2) test= .0324, sig. = .984				
Participants have 1 or more children between 6-11 years				
Total	28.3%	32.0%	27.3%	25.9%
Pearson's Chi2(2) test= 1.0524, sig. = .591				
Participants have 1 or more children between 12-17 years				
Total	54.0%	52.0%	53.6%	56.3%
Pearson's Chi2(2) test= .3950, sig. = .821				

Number households with children in different age groups (obs)			
	Group A (N=100)	Group B (N=110)	Control Group (N=112)
0-5 years			
No children in this age group	59	66	66
1 child	29	34	34
2 children	11	10	11
3 children	1	0	1
Total	41	44	46
Pearson's Chi2(6) test= 1.3216, sig. = .970			
6-11 years			
No children in this age group	68	80	83
1 child	27	20	20
2 children	5	10	8
3 children	0	0	1
Total	32	30	29
Pearson's Chi2(6) test= 6.0756, sig. = .415			
12-17 years			
No children in this age group	48	51	49
1 child	37	48	53
2 children	12	10	10
3 children	3	1	0
Total	52	59	63
Pearson's Chi2(6) test= 6.1493, sig. = .407			

Appendix 6: Diet

"Does everyone in your household generally follow the same diet?"				
	Group A (FW Diary & Fridge Signs) (N=100)	Group B (Fridge Signs & Bonus Meal) (N=110)	Control (N=112)	Total (N=322)
Yes	73.0%	73.6%	79.5%	75.5%
No	26.0%	26.4%	18.8%	23.6%
Prefer not to answer	1.0%	0.0%	1.8%	0.9%

"Which of the following categories describes your household's current diet(s) best?"				
For households that generally follow the same diet (single answer):				
	Group A (obs)	Group B (obs)	Control (obs)	Total (obs)
Omnivore	65	74	84	223
Semi-vegetarian/flexitarian	5	5	3	13
Vegetarian	1	1	1	3
Lacto-ovo vegetarian	0	1	1	2
Ovo-vegetarian	1	0	0	1
Vegan	1	0	0	1
Total	73	81	89	243
For households that generally do not follow the same diet (multiple answers):				
Omnivore	21	27	19	67
Semi-vegetarian/flexitarian	4	5	5	14
Vegetarian	1	1	3	5
Lacto-ovo vegetarian	0	1	0	1
Ovo-vegetarian	1	0	1	2
Vegan	1	0	0	1
Total	26	29	21	76

Appendix 7: Summary variables list

Household characteristics summary variables		Difference between groups (Kruskal–Wallis equality-of-populations rank test)
Food Waste Awareness	• We are aware of how much food we throw away in our household • We are aware of how much money we spend each week in our household on food that ends up being thrown away	chi2(2) with ties = 2.074 Prob = 0.3546
Economic/thrifty Practices	• In our household, it is normal to use the food we already have • In our household, we are economical when it comes to food • In our household, we are thrifty when it comes to food	chi2(2) with ties = 2.377 Prob = 0.3047
Environmental Practices	• We are eco-friendly in our household • In our household, it is normal to act environmentally conscious • Our household is environmentally conscious	chi2(2) with ties = 0.863 Prob = 0.6494
Self-efficacy	• I consider our skills in planning meals and shopping to be adequate (e.g. making shopping lists, checking what we have in stock) • I consider our skills in buying the right items in the right quantities for meals and housekeeping in general to be adequate • I consider our cooking skills to be adequate • I consider our skills in assessing whether or not food is still edible to be adequate • I consider our skills in storing food correctly to be adequate (e.g. whether or not something should be refrigerated, what temperature is appropriate for different foods) • I consider our abilities in assessing how much is eaten for a meal at home to be adequate	chi2(2) with ties = 1.473 Prob = 0.4789
Child pickiness	• It is difficult to make my child/children happy with food • The child/children often decide they do not like the food before they have tasted it. • The child/children like a wide variety of foods	chi2(2) with ties = 1.583 Prob = 0.4533

Tool evaluation summary variables	
User Experience Evaluation	• We found the instructions for the [tool] clear and easy to understand • The [tool] are easy to use • The [tool] is a flexible tool • The [tool] have been a pleasure to use
Practice Impact Evaluation	• Have the [tool] made cooking easier in general? • Have the [tool] made it easier to avoid food waste? • Have the [tool] been motivating to reduce household food waste? • Have the [tool] made it easier to save money on the food budget?
Future Engagement Evaluation	• How likely are you to continue using the [tool] in the future? • How likely are you to recommend the [tool] to others?

Appendix 8: Pre-survey measures (Danish)

Question code	Question	Scale	Source	Group A (X)	Group B (X)	Control group (X)
Pre-survey (all groups)				**If marked with "X", the question has been repeated in the post-survey (Appendix 9) (by group)**		
1. Background (1)						
1.1	Bor der et eller flere børn under 18 i din husstand?		(Laasholdt, Lähteenmäki, & Stancu, 2021)			
1.2	Notér venligst, antallet af børn i din husstand i de følgende aldersgrupper (hvis antallet af børn i husstanden varierer, notér venligst antallet af børn, der regelmæssigt bor i husstanden).		(ibid)			
1.3	0-5 år (notér antal børn i dette aldersinterval)	1. Ingen børn i dette aldersinterval, 2. 1 barn, 3. 2 børn, 4. 3 børn	(ibid)			
1.4	6-11 år (notér antal børn i dette aldersinterval)	1. Ingen børn i dette aldersinterval, 2. 1 barn, 3. 2 børn, 4. 3 børn	(ibid)			
1.5	12-17 år (notér antal børn i dette aldersinterval)	1. Ingen børn i dette aldersinterval, 2. 1 barn, 3. 2 børn, 4. 3 børn	(ibid)			
1.6	0-5 år - Children age	1. Ingen børn i dette aldersinterval, 2. 1 barn, 3. 2 børn, 4. 3 børn	(ibid)			
1.7	6-11 år - Children age	1. Ingen børn i dette aldersinterval, 2. 1 barn, 3. 2 børn, 4. 3 børn	(ibid)			
1.8	12-17 år - Children age	1. Ingen børn i dette aldersinterval, 2. 1 barn, 3. 2 børn, 4. 3 børn	(ibid)			
2. Self-reported food waste by category						
2.1	Det sker i alle husholdninger, at man sommetider må kassere mad […]		(ibid)	X	X	X
2.2	Markér venligst alle de produkter der er blevet smidt ud i din husholdning i løbet af den sidste uge. Hvis hele måltider er blevet smidt ud, markér da venligst hovedingredienserne separat.		(ibid)	X	X	X
2.3	Grøntsager og salater, friske og ikke-friske (inkluderer også glas, dåse, frost, tørret, osv.)	1. ja 2. nej	(ibid)	X	X	X
2.4	Frugt, frisk og ikke-frisk (inkluderer også glas, dåse, frost, tørret, osv.)	1. ja 2. nej	(ibid)	X	X	X
2.5	Kartofler (inkluderer tilberedte og rå kartofler)	1. ja 2. nej	(ibid)	X	X	X
2.6	Pasta, ris og andre slags kornprodukter (inkluderer wraps, couscous osv.)	1. ja 2. nej	(ibid)	X	X	X
2.7	Kød og fisk (ekskl. pålæg)	1. ja 2. nej	(ibid)	X	X	X
2.8	Pålæg (inkluderer kødpålæg, ost, leverpostej, hummus, osv.)	1. ja 2. nej	(ibid)	X	X	X
2.9	Brød	1. ja 2. nej	(ibid)	X	X	X
2.10	Yoghurt, creme fraiche, vaniljecreme, osv.	1. ja 2. nej	(ibid)	X	X	X
2.11	Æg	1. ja 2. nej	(ibid)	X	X	X
2.12	Supper og gryderetter	1. ja 2. nej	(ibid)	X	X	X
2.13	Mælk og koldskål	1. ja 2. nej	(ibid)	X	X	X
2.14	Drikkevarer (inkluderer juice, sodavand, saftevand, alkoholiske drikke, osv. Ekskl.: vand, te, kaffe)	1. ja 2. nej	(ibid)	X	X	X
3. Self-reported food waste amounts by category						
3.1	I din husstand, hvor mange grøntsager og salater, friske og ikke-friske (inkluderer også glas, dåse, frost, tørret, osv.), er blevet kasseret i løbet af den sidste uge? En serveringsske er 50 gram. Det svarer til en halv porre eller fire svampe.	1. Mindre end en serveringsske, 1-2 serveringsskeer, 3-4 serveringsskeer, 5-6 serveringsskeer, 5. Mere end 6 serveringsskeer	(ibid)	X	X	X
3.2	I din husstand, hvor meget frugt, frisk og ikke-frisk (inkluderer også glas, dåse, frost, tørret, osv.), er blevet kasseret i løbet af den sidste uge? Et æble/en banan/en fersken er 1 stykke frugt. En fersken fra dåse er 1 stykke frugt. Ved mindre frugter, såsom jordbær eller vindruer, svarer en lille skål til 1 stykke frugt.	1. Ca. et kvart stykke frugt eller mindre, Ca. et halvt stykke frugt, Ca. 1 stykke frugt, 2-4 stykker frugt, 5. Mere end 4 stykker frugt	(ibid)	X	X	X
3.3	I din husstand, hvor mange kartofler er blevet kasseret i løbet af den sidste uge? En serveringsske er 50 gram. Det svarer til en mellemstor kartoffel	1. Mindre end en mellemstor kartoffel/ en serveringsske, 1-2 serveringsskeer, 3-4 serveringsskeer, 5-6 serveringsskeer, 5. Mere end 6 serveringsskeer	(ibid)	X	X	X
3.4	I din husstand, hvor meget pasta, ris og andre slags kornprodukter (inkl. wraps, couscous osv.) er blevet kasseret i løbet af den sidste uge? En serveringsske er 50 gram	1. Mindre end en serveringsske, 1-2 serveringsskeer, 3-4 serveringsskeer, 5-6 serveringsskeer, 5. Mere end 6 serveringsskeer	(ibid)	X	X	X
3.5	I din husstand, hvor meget kød og fisk er blevet kasseret i løbet af den sidste uge? En portion kød svarer til et kyllingebryst/en steak osv. Ved mindre stykker kød, såsom	1. Ca. en halv portion eller mindre, Ca. en portion, 2-3 portioner, 4-	(ibid)	X	X	X

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	hakkekød, prøv at evaluere det som hele stykker kød (fx svarer en lille pakke hakkekød til to portioner). En portion fisk svarer til en fiskefilet/et stykke laks osv.	5 portioner, 5. Mere end 5 portioner				
3.6	I din husstand, hvor meget pålæg (inkluderer kødpålæg, ost, leverpostej, hummus, osv.) er blevet kasseret i løbet af den sidste uge? En portion er hvad der bruges til en skive brød/en sandwich.	1. Ca. en halv portion eller mindre, Ca. en portion, 2-3 portioner, 4-5 portioner, 5. Mere end 5 portioner	(ibid)	X	X	X
3.7	I din husstand, hvor meget brød er blevet kasseret i løbet af den sidste uge? En bolle/en sandwich svarer til en skive brød. Et brød svarer til et helt franskbrød/rugbrød.	1. Mindre end en skive brød, 1 eller nogle få skiver brød, Ca. halvdelen af et brød, Ca. et helt brød, 5. Mere end et helt brød	(ibid)	X	X	X
3.8	I din husstand, hvor meget yoghurt, creme fraiche, vaniljecreme osv. er blevet kasseret i løbet af den sidste uge? En portion er en lille skålfuld.	1. Mindre end en halv portion, En halv til en halvanden portion, Flere portioner (ca. en halv liter), Ca. en hel liter, 5. Mere end en liter	(ibid)	X	X	X
3.9	I din husstand, hvor mange æg er blevet kasseret i løbet af den sidste uge?	1. Mindre end 1 æg, 1 æg, 2-3 æg, 4-5 æg, 5. Mere end 5 æg	(ibid)	X	X	X
3.10	I din husstand, hvor meget suppe/gryderet er blevet kasseret i løbet af den sidste uge?	1. Mindre end en halv suppeskefuld, En halv til halvanden suppeskefuld, Flere suppeskefulde (ca. en halv liter), Ca. en liter, 5. Mere end en liter	(ibid)	X	X	X
3.11	I din husstand, hvor meget mælk og koldskål er blevet kasseret i løbet af den sidste uge?	1. Mindre end et halvt glas, Et halvt til halvandet glas, Flere glas (ca. en halv liter), Ca. en liter, 5. Mere end en liter	(ibid)	X	X	X
3.12	I din husstand, hvor mange drikkevarer (inkluderer juice, sodavand, saftevand, alkoholiske drikke, osv. Ekskl.: vand, te, kaffe) er blevet kasseret i løbet af den sidste uge?	1. Mindre end et halvt glas, Et halvt til halvandet glas, Flere glas (ca. en halv liter), Ca. en liter, 5. Mere end en liter	(ibid)	X	X	X
4. Food waste awareness, environmental awareness, and subjective food waste						
4.1	Angiv venligst, hvor uenig eller enig, du er i følgende udsagn:					
4.2	Vi er bevidste om at vores madspild udgør et problem for miljøet	1. Meget uenig - 7. Meget enig	(ibid)	X	X	X
4.3	Hjemme hos os er vi opmærksomme på, hvor meget mad, vi smider ud	1. Meget uenig - 7. Meget enig	(ibid)	X	X	X
4.4	Hjemme hos os er vi bevidste om, hvor mange penge vi ugentlig bruger på mad, der ender med at blive smidt ud	1. Meget uenig - 7. Meget enig	(ibid)	X	X	X
4.5	Food Waste Awareness: Index of 4.3 and 4.4	1. Meget uenig - 7. Meget enig	Summary variable	X	X	X
4.6	Hvordan tror du, at din husstands niveau af madspild er sammenlignet med andre husstande som jeres (husstande med lignende/samme karakteristika som jeres)?	1. Meget mindre - 4. Cirka det samme - 7. Meget større	(ibid)	X	X	X
5. Motivation - Incentives to reduce food waste						
5.1	Du bedes rangere følgende aspekter, alt efter hvor vigtigt aspektet er, for at motivere dig til at mindske mængden af madaffald. 1 er vigtigst og 6 er mindst vigtig.					
5.2	Tanken om at spare penge	Rank 1. Vigtigst - 6. Mindst vigtigt	ibid	X	X	X
5.3	Ønsket om at føle mig som en dygtig husmor/far	Rank 1. Vigtigst - 6. Mindst vigtigt	ibid	X	X	X
5.4	Mine værdier	Rank 1. Vigtigst - 6. Mindst vigtigt	ibid	X	X	X
5.5	Ønsket om at holde orden i køkkenet	Rank 1. Vigtigst - 6. Mindst vigtigt	ibid	X	X	X
5.6	Ønsket om at hjælpe miljøet	Rank 1. Vigtigst - 6. Mindst vigtigt	ibid	X	X	X
5.7	Ønsket om at undgå ærgrelsen over den tid der er gået med at købe ind, opbevare og lave mad, der ikke blive spist	Rank 1. Vigtigst - 6. Mindst vigtigt	ibid	X	X	X
6. Household practices (1) – Cooking and eating, storage, economic/thrifty, environmental, and impulsive buying						
6.1	Hvor ofte, hvis overhovedet, sker følgende i din husholdning i forbindelse med madlavning og tilberedning af mad?					
6.2	Vi prioriterer at bruge rester og fødevarer, der er tæt på udløb, når vi laver mad	1. Det gør vi ikke og vil heller ikke gøre, 2. Det gør vi ikke, men det lyder som en god ide, 3. Det gør vi sjældent, 4. Det gør vi sommetider, 5. Det gør vi ofte	ibid			X
6.3	Vi bruger målebægere/redskaber til at afveje en passende mængde mad til vores husstand	1. Det gør vi ikke og vil heller ikke gøre, 2. Det gør vi ikke, men det lyder som en god ide, 3. Det gør vi sjældent, 4. Det gør vi sommetider, 5. Det gør vi ofte	ibid			X
6.4	Vi bruger særlige systemer til opbevaring af fødevarer for at undgå at maden bliver for gammel og/eller glemt	1. Det gør vi ikke og vil heller ikke gøre, 2. Det gør vi ikke, men det lyder som en god ide, 3. Det gør vi sjældent, 4.	ibid			X

			Det gør vi sommetider, 5. Det gør vi ofte			
6.5	Angiv venligst, hvor uenig eller enig, du er i følgende udsagn:					
6.6	I vores husholdning er det normalt at bruge de fødevarer vi allerede har	1. Meget uenig - 7. Meget enig	ibid			X
6.7	I vores husholdning er vi økonomiske omkring mad	1. Meget uenig - 7. Meget enig	ibid			X
6.8	I vores husholdning er vi sparsommelige, hvad angår mad	1. Meget uenig - 7. Meget enig	ibid			X
6.9	Economic/thrifty Practices: Index of 6.6, 6.7, and 6.8	1. Meget uenig - 7. Meget enig	Summary variable			X
6.10	Vi er miljøvenlige i vores husholdning	1. Meget uenig - 7. Meget enig	ibid			X
6.11	I vores husholdning er det normalt at handle miljøbevidst	1. Meget uenig - 7. Meget enig	ibid			X
6.12	Vores husholdning er miljøbevidste	1. Meget uenig - 7. Meget enig	ibid			X
6.13	Environmental Practices: index of 6.10, 6.11, 6.12	1. Meget uenig - 7. Meget enig	Summary variable			X
6.14	Det er i vores husholdning normalt at planlægge indkøb nøje	1. Meget uenig - 7. Meget enig	ibid			X
6.15	I vores husholdning køber vi ofte ting spontant	1. Meget uenig - 7. Meget enig	ibid			X
6.16	Index of 6.14 and 6.15		Summary variable			

7. Diet

7.1	Følger alle i jeres husstand generelt den samme type diæt?	1. ja, 2. nej. 3. ønsker ikke at oplyse	(Lähteenmä ki, Stancu, & WP4 workgroup, 2022) & self-developed			
7.2	Hvilken af følgende kategorier beskriver bedst din husstands nuværende type diæt?	Single	ibid			
7.3	Omnivore (udelukker ikke nogen fødevaregrupper)	Multiple	ibid			
7.4	Semi-vegetar/flexitar (primært vegetarisk-baserede diæter, men inkluderer lejlighedsvis kød, mejeriprodukter, æg osv.)	Multiple	ibid			
7.5	Vegetarisk (ingen kød, fisk eller skaldyr, men inkluderer andre animalske produkter, såsom mejeriprodukter eller æg)	Multiple	ibid			
7.6	Lakto-vegetarisk (ingen kød, fisk eller æg, men inkluderer mælkebaserede produkter såsom mælk eller ost)	Multiple	ibid			
7.7	Lakto-ovo vegetarisk (ingen kød eller fisk, men inkluderer æg og mejeribaserede produkter såsom mælk og ost)	Multiple	ibid			
7.8	Ovo-vegetarisk (ingen kød, fisk eller mejeriprodukter, men inkluderer æg)	Multiple	ibid			
7.9	Vegansk (ingen animalske fødevarer)	Multiple	ibid			

8. Self-efficacy – Planning and shopping, cooking and eating, edibility assessment, storage knowledge

8.1	Når du tænker på din husholdning, angiv venligst, hvor uenig eller enig, du er i følgende udsagn					
8.2	Jeg anser vores færdigheder i at planlægge måltider og indkøb som tilstrækkelige (fx lave indkøbslister, tjekke hvad vi har på lager)	1. Meget uenig - 7. Meget enig	(Stancu & Lähteenmäki, 2018)			X
8.3	Jeg anser vores færdigheder i at købe de rigtige varer i de rigtige mængder til måltiderne og husholdningen i det hele taget som tilstrækkelige	1. Meget uenig - 7. Meget enig	ibid			X
8.4	Jeg anser vores madlavningsfærdigheder som tilstrækkelige	1. Meget uenig - 7. Meget enig	ibid			X
8.5	Jeg anser vores færdigheder i at vurdere om fødevarer stadig kan spises eller ej som tilstrækkelige	1. Meget uenig - 7. Meget enig	ibid			X
8.6	Jeg anser vores færdigheder i at opbevare fødevarer korrekt som tilstrækkelige (fx om noget skal opbevares i køleskab eller ej, hvilken temperatur der er passende for forskellige madvarer)	1. Meget uenig - 7. Meget enig	ibid			X
8.7	Jeg anser vores evner til at vurdere, hvor meget der bliver spist til et måltid derhjemme som tilstrækkelige	1. Meget uenig - 7. Meget enig	ibid			X
8.8	Self-efficacy: Index of 8.2, 8.3, 8.4, 8.5, 8.6, and 8.7	1. Meget uenig - 7. Meget enig	Summary variable			X

9. Child pickiness & eating habits

9.1	Når du tænker på dit barn/dine børn, hvor uenig eller enig du er i følgende udsagn					
9.2	Det er svært at gøre mit barn/mine børn tilfreds(e) med måltiderne	1. Meget uenig - 7. Meget enig	(Laasholdt, Lähteenmäki, & Stancu, 2021)			X
9.3	Barnet/børnene bestemmer sig ofte for ikke at kunne lide maden før de har smagt den.	1. Meget uenig - 7. Meget enig	ibid			X
9.4	Barnet/børnene kan lide en bred vifte af mad	1. Meget uenig - 7. Meget enig	ibid			X
9.5	Child pickiness: Index of 9.2, 9.3, and 9.4	1. Meget uenig - 7. Meget enig	Summary variable			
9.6	Barnet/børnene har en tendens til at spise mad fra køleskabet uden at tænke på, hvad maden skulle bruges til	1. Meget uenig - 7. Meget enig	ibid			X
9.7	Det er svært at holde overblikket over hvad der er i vores køleskab, fordi barnet/børnene ofte laver forskellige mellemmåltider til sig selv i løbet af dagen.	1. Meget uenig - 7. Meget enig	ibid			X
9.8	Det er svært at forudse hvad der er behov for, fordi barnets/børnenes madforbrug varierer meget fra den ene dag til den anden.	1. Meget uenig - 7. Meget enig	ibid			X

10. Household practices (2) – Planning and shopping, impulsive buying

10.1	På en skala fra 1-7, hvor nemt/svært er følgende for jer? At undgå impulsive køb, når vi handler (i fysiske butikker/online)	1. Meget nemt - 7. Meget svært	ibid			

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| 10.2 | Normalt planlægger jeg mine indkøb nøje | 1. Meget uenig - 7. Meget enig | ibid | | | |
| 10.3 | Jeg køber ofte noget spontant | 1. Meget uenig - 7. Meget enig | ibid | | | |

11. Background (2)

11.1	Hvor mange voksne (over 18 år) bor der i alt i din husstand (inkl. dig selv)?	single	ibid			
11.2	Hvad er dit højest gennemførte uddannelsesniveau?	single	ibid			
11.3	Hvor bor du?	single	ibid			
11.4	Hvad er din nuværende beskæftigelse?	single	ibid			
11.5	Hvis du skal overveje, hvor mange penge din husholdning har til rådighed til dagligvareindkøb, hvilken af disse udsagn passer bedst?	single	ibid			

Appendix 9: Post-survey measures (Danish)

(not including the repeated questions from the pre-survey – see Appendix 8, marked "X")

Question code	Question	Scale	Source
1. Use of Fridge Signs Tool (frequency, situation, meals) – Group A & B			
1.1	Det er nu cirka to uger siden I modtog værktøjet, "Et køligt overblik til jeres køleskab", til reducering af madspild. Værktøjet indeholdt to skabeloner, som kan klippes ud og bruges i køleskabet. Når du tænker tilbage på den sidste uge		
1.2	Printede I de to skabeloner ud?	1. ja 2. nej	(Cooper, et all, 2023) & Self-developed
1.3	Har I anvendt "Spis mig" skabelonen, som beskrevet i værktøjet?	1. ja 2. nej	ibid
1.4	Har I anvendt "Nix pille. Jeg er til aftensmaden" skabelonen, som beskrevet i værktøjet?	1. ja 2. nej	ibid
1.5	Hvorfor har I ikke anvendt "Et køligt overblik til jeres køleskab" værktøjet i løbet af den sidste uge? (vælg alle relevante)		
1.6	Tidsbegrænsninger	Selected/not selected	ibid
1.7	Manglende energi/overskud	Selected/not selected	ibid
1.8	Vi har ikke haft lyst	Selected/not selected	ibid
1.9	Vi har ikke haft behovet	Selected/not selected	ibid
1.10	Vi glemte dem	Selected/not selected	ibid
1.11	Vi kunne ikke lide værktøjet	Selected/not selected	ibid
1.12	Vi forstod ikke instruktionerne	Selected/not selected	ibid
1.13	Anden årsag	Selected/not selected	ibid
1.14	Hvor ofte har I anvendt "Et køligt overblik til jeres køleskab" værktøjet i løbet af den sidste uge?	1. Aldrig, 2. Sjældent, 3. En gang imellem, 4. Ofte, 5. Det meste af tiden	ibid
2. Fridge Signs Tool evaluation – Group A & B			
2.1	På en skala fra 1-7, med hvor stor sandsynlighed vil I fortsætte med at bruge "Et køligt overblik til jeres køleskab" i fremtiden?	1. Meget usandsynlig - 7. Meget sandsynligt	ibid
2.2	Tænk på husholdning og angiv venligst, hvor uenig eller enig du er i følgende udsagn:		
2.3	Vi fandt instruktionerne til "Et køligt overblik til jeres køleskab" klare og nemme at forstå	1. Meget uenig - 7. Meget enig	ibid
2.4	Værktøjet, "Et køligt overblik til jeres køleskab", er nemt at bruge	1. Meget uenig - 7. Meget enig	ibid
2.5	Værktøjet, "Et køligt overblik til jeres køleskab", er et fleksibelt værktøj	1. Meget uenig - 7. Meget enig	ibid
2.6	Værktøjet, "Et køligt overblik til jeres køleskab", har været en fornøjelse at bruge	1. Meget uenig - 7. Meget enig	ibid
2.7	User Experience Evaluation: Index variable of 2.3, 2.4, 2.5, and 2.6	1-7	Summary variable
2.8	I hvor høj grad har "Et køligt overblik til jeres køleskab"...		ibid
2.9	Gjort madlavning nemmere generelt?	1. I lav grad - 7. I høj grad	ibid
2.10	Gjort det nemmere at holde styr på hvilke varer, der snart skal spises?	1. I lav grad - 7. I høj grad	ibid
2.11	Gjort det nemmere at undgå madspild?	1. I lav grad - 7. I høj grad	ibid
2.12	Været motiverende til at reducere husholdningens madspild?	1. I lav grad - 7. I høj grad	ibid
2.13	Gjort det nemmere at spare penge på madbudgettet?	1. I lav grad - 7. I høj grad	ibid
2.14	Practice Impact Evaluation: Index variable of 2.9, 2.10, 2.11, 2.12, and 2.13	1-7	Summary variable
2.15	På en skala fra 1-7, med hvor stor sandsynlighed vil du anbefale "Et køligt overblik til jeres køleskab" til andre, fx familie eller venner?	1. Meget usandsynligt - 7. Meget sandsynligt	ibid
2.16	Future Engagement Evaluation: Index variable of 2.1 and 2.15	1-7	Summary variable
3. Use of Food Waste Diary Tool (frequency, situation, meals) – Group A			
3.1	Det er nu cirka to uger siden I modtog værktøjet, "Ta' Madansvar" til reducering af madspild. Når du tænker tilbage på den sidste uge	1. ja 2. nej	ibid
3.2	Har I udfyldt "Ta' Madansvar" skemaet en eller flere gange?	1. ja 2. nej	ibid
3.3	Har I brugt "Ta' Madansvar" 7 gode fif?	1. ja 2. nej	ibid
3.4	Hvorfor har I ikke udfyldt "Ta' Madansvar" skemaet i løbet af den sidste uge? (vælg alle relevante)		
3.5	Tidsbegrænsninger	Selected/not selected	ibid
3.6	Manglende energi/overskud	Selected/not selected	ibid
3.7	Vi har ikke haft lyst	Selected/not selected	ibid
3.8	Vi har ikke haft behovet	Selected/not selected	ibid
3.9	Vi glemte dem	Selected/not selected	ibid
3.10	Vi kunne ikke lide værktøjet	Selected/not selected	ibid

3.11	Vi forstod ikke instruktionerne	Selected/not selected	ibid
3.12	Anden årsag	Selected/not selected	ibid
3.13	Hvor mange gange har I udfyldt "Ta' Madansvar" skemaet i løbet af den sidste uge?	1. Sjældnere end ugentligt, 2. 1-3 dage om ugen, 3. 4-6 dage om ugen, 4. Hver dag (4)	ibid

4. Food Waste Diary Tool evaluation – Group A

4.1	På en skala fra 1-7, med hvor stor sandsynlighed vil I fortsætte med at bruge "Ta' Madansvar" skemaet i fremtiden?	1. Meget usandsynligt - 7. Meget sandsynligt	ibid
4.2	Tænk på husholdning og angiv venligst, hvor uenig eller enig du er i følgende udsagn:		
4.3	Vi fandt instruktionerne til "Ta' Madansvar" klare og nemme at forstå	1. Meget uenig - 7. Meget enig	ibid
4.4	Værktøjet, "Ta' Madansvar", er nemt at bruge	1. Meget uenig - 7. Meget enig	ibid
4.5	Værktøjet, "Ta' Madansvar", er et fleksibelt værktøj	1. Meget uenig - 7. Meget enig	ibid
4.6	Værktøjet, "Ta' Madansvar", har været en fornøjelse at bruge	1. Meget uenig - 7. Meget enig	ibid
4.7	User Experience Evaluation: Index variable of 4.3, 4.4, 4.5, and 4.6	1-7	Summary variable
4.8	I hvor høj grad har "Ta' Madansvar"...		
4.9	Gjort madlavning nemmere generelt?	1. I lav grad - 7. I høj grad	ibid
4.10	Gjort det nemmere forstå hvornår madspildet opstår?	1. I lav grad - 7. I høj grad	ibid
4.11	Gjort det nemmere at undgå madspild?	1. I lav grad - 7. I høj grad	ibid
4.12	Været motiverende til at reducere husholdningens madspild?	1. I lav grad - 7. I høj grad	ibid
4.13	Gjort det nemmere at spare penge på madbudgettet?	1. I lav grad - 7. I høj grad	ibid
4.14	Practice Impact Evaluation: Index variable of 4.9, 4.10, 4.11, 4.12, and 4.13	1-7	Summary variable
4.15	På en skala fra 1-7, med hvor stor sandsynlighed vil du anbefale "Ta' Madansvar" skemaet til andre, fx familie eller venner?	1. Meget usandsynligt - 7. Meget sandsynligt	ibid
4.16	Future Engagement Evaluation: Index variable of 4.1 and 4.15	1-7	Summary variable

5. Use of Bonus Meal Tool (frequency, situation, meals) – Group B

5.1	Det er nu cirka to uger siden I modtog værktøjet, "3+1 Bonusmåltid", til reducering af madspild. Når du tænker tilbage på den sidste uge		
5.2	Har I lavet et eller flere måltider, hvor I brugte den mad I allerede havde til rådighed i køleskabet/køkkenet?	1. ja 2. nej	ibid
5.3	Har I brugt metoden fra "3+1 Bonusmåltid" til at lave et eller flere måltider	1. ja 2. nej	ibid
5.4	"3+1 Bonusmåltid" indeholdt også to små historier om familier, der lavede bonusmåltid. Fandt I en eller flere af disse historier inspirerende for jeres husholdnings egne bonusmåltid(er)?	1. ja 2. nej	ibid
5.5	Hvorfor har I ikke brugt "3+1 Bonusmåltid" i løbet af den sidste uge? (vælg alle relevante)		
5.6	Tidsbegrænsninger	Selected/not selected	ibid
5.7	Manglende energi/overskud	Selected/not selected	ibid
5.8	Vi har ikke haft lyst	Selected/not selected	ibid
5.9	Vi har ikke haft behovet	Selected/not selected	ibid
5.10	Vi glemte dem	Selected/not selected	ibid
5.11	Vi kunne ikke lide værktøjet	Selected/not selected	ibid
5.12	Vi forstod ikke instruktionerne	Selected/not selected	ibid
5.13	Anden årsag	Selected/not selected	ibid
5.14	Hvor mange gange har I brugt "3+1 Bonusmåltid" til at lave bonusmåltider i løbet af den sidste uge?	1 gang, 2 gange, 3 gange, 4 gange eller derover	ibid

6. Bonus Meal Tool evaluation – Group B

6.1	På en skala fra 1-7, med hvor stor sandsynlighed vil I fortsætte med at bruge "3+1 Bonusmåltid" i fremtiden?	1. Meget usandsynligt - 7. Meget sandsynligt	ibid
6.2	Tænk på husholdning og angiv venligst, hvor uenig eller enig du er i følgende udsagn:		
6.3	Vi fandt instruktionerne til "3+1 Bonusmåltid" klare og nemme at forstå	1. Meget uenig - 7. Meget enig	ibid
6.4	Værktøjet, "3+1 Bonusmåltid", er nemt at bruge	1. Meget uenig - 7. Meget enig	ibid
6.5	Værktøjet, "3+1 Bonusmåltid", er et fleksibelt værktøj	1. Meget uenig - 7. Meget enig	ibid
6.6	Værktøjet, "3+1 Bonusmåltid", har været en fornøjelse at bruge	1. Meget uenig - 7. Meget enig	ibid
6.7	User Experience Evaluation: Index variable of 6.3, 6.4, 6.5, and 6.6	1-7	Summary variable

6.8	I hvor høj grad har "3+1 Bonusmåltid"...		
6.9	Gjort madlavning nemmere generelt?	1. I lav grad - 7. I høj grad	ibid
6.10	Gjort det nemmere at se madlavningsmuligheder, hvor man kun bruger af den mad man allerede har til rådighed?	1. I lav grad - 7. I høj grad	ibid
6.11	Gjort det nemmere at undgå madspild?	1. I lav grad - 7. I høj grad	ibid
6.12	Været motiverende til at reducere husholdningens madspild?	1. I lav grad - 7. I høj grad	ibid
6.13	Gjort det nemmere at spare penge på madbudgettet?	1. I lav grad - 7. I høj grad	ibid
6.14	Practice Impact Evaluation: Index variable of 6.9, 6.10, 6.11, 6.12, and 6.13	1-7	Summary variable
6.15	På en skala fra 1-7, med hvor stor sandsynlighed vil du anbefale "3+1 Bonusmåltid" til andre, fx familie eller venner?	1. Meget usandsynligt - 7. Meget sandsynligt	ibid
6.16	Future Engagement Evaluation: Index variable of 6.1 and 6.15	1-7	Summary variable

7. Changes in attitude & behavior – All groups

7.1	Vi er interesserede i at høre, om du føler at husholdningens attitude og adfærd i forhold til fødevarehåndtering har ændret sig [i løbet af de sidste 2 uger / siden I modtog de to værktøjer, ("Ta' Madansvar" og "Et køligt overblik til jeres køleskab" og "3+1 Bonusmåltid")]. Tænk på husholdning og angiv venligst, hvor uenig eller enig du er i følgende udsagn:		
7.2	Vi er mere opmærksomme på den mad vi smider i skraldespanden.	1. Meget uenig - 7. Meget enig	ibid
7.3	Vi gør en større indsats for at få brugt den mad der ellers ville havne i skraldespanden	1. Meget uenig - 7. Meget enig	ibid
7.4	Vi er mere ressourcestærke i køkkenet	1. Meget uenig - 7. Meget enig	ibid
7.5	Vi føler os mere selvsikre i køkkenet	1. Meget uenig - 7. Meget enig	ibid

Appendix 10: Age groups of participants' children by use of tools

Age groups of participants' children by use of tools								
	Group A (N=100)				**Group B (N=110)**			
	FW Diary		**Fridge Signs**		**Fridge Signs**		**Bonus Meal**	
	Used	**Did not use**	**Used**	**Did not use**	**Used**	**Did not use**	**Used**	**Did not use**
Total	60.0%	40.0%	57.0%	43.0%	58.2%	41.8%	85.5%	14.5%
Households with >1 children between 0-5 years old	70.7%	29.3%	56.1%	43.9%	56.8%	43.2%	84.1%	15.9%
	Pearson's Chi2(1) test= 3.3347, sig. = .068		Pearson's Chi2(1) test= .0231, sig. = .879		Pearson's Chi2(1) test= .0560, sig. = .813		Pearson's Chi2(1) test= .1097, sig. = .740	
Households with >1 children between 6-11 years old	71.9%	28.1%	62.5%	37.5%	63.3%	36.7%	86.7%	13.3%
	Pearson's Chi2(1) test= 2.7650, sig. = .096		Pearson's Chi2(1) test= .5808, sig. = .446		Pearson's Chi2(1) test= .4499, sig. = .502		Pearson's Chi2(1) test= .0488, sig. = .825	
Households with >1 children between 12-17 years old	55.8%	44.2%	61.5%	38.5%	64.4%	35.6%	86.4%	13.6%
	Pearson's Chi2(1) test= .8080, sig. = .369		Pearson's Chi2(1) test= .9104, sig. = .340		Pearson's Chi2(1) test= 2.0267, sig. = .155		Pearson's Chi2(1) test= .0996, sig. = .752	

Appendix 11: Relationship between tool usage and education and the region and city size by tool.

Participants' education by use of tools								
	Group A (N=100)				Group B (N=110)			
	Used Food Waste Diary Tool	Did not use Food Waste Diary Tool	Used Fridge Signs Tool	Did not use Fridge Signs Tool	Used Fridge Signs Tool	Did not use Fridge Signs Tool	Used Bonus Meal Tool	Did not use Bonus Meal Tool
Total (%)	60.0%	40.0%	57.0%	43.0%	58.2%	41.8%	85.5%	14.5%
Shorter education (%)	60.0%	40.0%	55.4%	44.6%	59.0%	41.0%	84.3%	15.7%
Longer education (%)	60.0%	40.0%	60.0%	40.0%	55.6%	44.4%	88.9%	11.1%
Pearson's Chi2								

Region and size of the city in which participants live by use of tools								
	Group A (N=100)				Group B (N=110)			
	FW Diary		Fridge Signs		Fridge Signs		Bonus Meal	
	Used	Did not use	Used	Did not use	Used	Did not use	Used	Did not use
Total	60.0%	40.0%	57.0%	43.0%	58.2%	41.8%	85.5%	14.5%
Region								
Hovedstaden	77.4%	22.6%	67.7%	32.3%	51.4%	48.6%	80.0%	20.0%
Sjælland	55.6%	44.4%	33.3%	66.7%	68.8%	31.3%	81.3%	18.8%
Syddanmark	54.2%	45.8%	54.2%	45.8%	61.5%	38.5%	88.5%	11.5%
Midtjylland	46.2%	53.8%	53.8%	46.2%	56.0%	44.0%	88.0%	12.0%
Nordjylland	60.0%	40.0%	60.0%	40.0%	62.5%	37.5%	100.0%	0.0%
Pearson's Chi2								
City size		*						
Capital N	91.3%	8.7%	69.6%	30.4%	50.0%	50.0%	81.8%	18.2%
Large city (over 100,000 inhabitants)	41.7%	58.3%	66.7%	33.3%	70.0%	30.0%	100.0%	0.0%
Large provincial town (20,000-100,000 inhabitants)	57.1%	42.9%	57.1%	42.9%	41.7%	58.3%	87.5%	12.5%
Small provincial town (1,000-20,000 inhabitants)	41.7%	58.3%	41.7%	58.3%	63.6%	36.4%	18.2%	81.8%
Village (50-1,000 inhabitants)	71.4%	28.6%	42.9%	57.1%	64.7%	35.3%	82.4%	17.6%
Countryside/not a city	53.8%	46.2%	61.5%	38.5%	100.0%	0.0%	100.0%	0.0%
Pearson's Chi2								

* shows statistically significant association at .05 level

Appendix 12. Participants self-efficacy scores & child pickiness scores (before intervention) by use of tools

Participants self-efficacy scores & child pickiness scores (before intervention) by use of tools								
	Group A (N=100)				Group B (N=110)			
	FW Diary		Fridge Signs		Fridge Signs		Bonus Meal	
	Used	Did not use	Used	Did not use	Used	Did not use	Used	Did not use
Total (N)	60	40	57	43	64	46	96	16
Self-efficacy Mean (SD)	5.4 (1.06)	5.3 (0.91)	5.5 (1.06)	5.3 (0.91)	5.5 (0.91)	5.4 (1.11)	5.4 (0.94)	5.7 (1.29)
	P-value=.685		P-value=.389		P-value=.659		P-value=.301	
Child pickiness Mean (SD)	3.4 (1.53)	3.4 (1.41)	3.4 (1.48)	3.4 (1.49)	3.4 (1.53)	3.6 (1.33)	3.5 (1.47)	3.0 (1.23)
	P-value=.985		P-value=.994		P-value=.390		P-value=.151	

Scale from 1. (strongly disagree) to 7. (strongly agree).
Standard two-sample t-tests

Appendix 13: Tool evaluation summary variables by age groups of participants' children per tool

User Experience Evaluation (Mean) by age groups of participants' children per tool				
	Group A		Group B	
	Food Waste Diary Tool (N=60)	Fridge Signs Tool (N=57)	Fridge Signs Tool (N=64)	Bonus Meal Tool (N=94)
≥1 children between 0-5 years old Mean	5.2	5.5	4.9	4.5
	P-value=.450	P-value=.076	P-value=.075	P-value=.725
≥1 children between 6-11 years old Mean	5.2	5.2	5.2	4.6
	P-value=.510	P-value=.658	P-value=.914	P-value=.989
≥1 children between 12-17 years old Mean	5.1	5.1	5.3	4.7
	P-value=.880	P-value=.259	P-value=.491	P-value=.577

Scale from 1. (low) to 7. (high).
Two-sample t-test (Welch's t-test was used for those analyses where the assumption of equal variances is violated)

Practice Impact Evaluation (Mean) by age groups of participants' children per tool				
	Group A		**Group B**	
	FW Diary (N=60)	**Fridge Signs (N=57)**	**Fridge Signs (N=64)**	**Bonus Meal (N=94)**
≥1 children between 0-5 years old Mean	4.8	5.1	4.3	4.2
	P-value=.288	P-value=.275	P-value=.213	P-value=.610
≥1 children between 6-11 years old Mean	4.8	4.8	4.5	4.5
	P-value=.400	P-value=.943	P-value=.704	P-value=.519
≥1 children between 12-17 years old Mean	4.7	4.9	4.7	4.4
	P-value=.928	P-value=.857	P-value=.453	P-value=.855

Scale from 1. (strongly disagree) to 7. (strongly agree).
Two-sample t-test (Welch's t-test was used for those analyses where the assumption of equal variances is violated)

Future Engagement Evaluation (Mean) by age groups of participants' children per tool				
	Group A		**Group B**	
	FW Diary (N=60)	**Fridge Signs (N=57)**	**Fridge Signs (N=64)**	**Bonus Meal (N=94)**
≥1 children between 0-5 years old Mean	4.3	4.6	4	3.9
	P-value=.341	P-value=.746	P-value=.229	P-value=.239
≥1 children between 6-11 years old Mean	4.4	4.5	4.1	4
	P-value=.262	P-value=.702	P-value=.546	P-value=.800
≥1 children between 12-17 years old Mean	4.1	4.6	4.5	4.2
	P-value=.674	P-value=.745	P-value=.246	P-value=.434

Scale from 1. (strongly disagree) to 7. (strongly agree).
Two-sample t-test

Appendix 14: Tool evaluation summary variables by participants educational backgrounds per tool

User Experience Evaluation (Mean) by participants' education per tool				
	Group A		**Group B**	
	Food Waste Diary Tool (N=60)	**Fridge Signs Tool (N=57)**	**Fridge Signs Tool (N=64)**	**Bonus Meal Tool (N=94)**
Shorter education Mean	5.1	5.2	5.3	4.6
Longer education Mean	5.0	5.3	5.0	4.7
P-value	.679	.654	.351	.650

Scale from 1. (low) to 7. (high).
Two-sample t-test

Practical Impact Evaluation (Mean) by participants' education per tool				
	Group A		**Group B**	
	Food Waste Diary Tool (N=60)	**Fridge Signs Tool (N=57)**	**Fridge Signs Tool (N=64)**	**Bonus Meal Tool (N=94)**
Shorter education Mean	4.7	4.8	4.6	4.4
Longer education Mean	4.7	4.8	4.5	4.1
P-value	.927	.870	.900	.430
Scale from 1. (low) to 7. (high). Two-sample t-test				

Future Engagement Evaluation (Mean) by participants' education per tool				
	Group A		**Group B**	
	Food Waste Diary Tool (N=60)	**Fridge Signs Tool (N=57)**	**Fridge Signs Tool (N=64)**	**Bonus Meal Tool (N=94)**
Shorter education Mean	4.1	4.5	4.3	4.1
Longer education Mean	4.3	4.6	4.2	4
P-value	.610	.869	.778	.763
Scale from 1. (low) to 7. (high). Two-sample t-test				

Appendix 15: Tool evaluation correlation values

		User Experience Evaluation	Practice Impact Evaluation	Future Engagement Evaluation
Environmental Practices				
	FW Diary	0.1431	**0.2884 ***	0.1473
	Fridge Signs (Group A)	**0.3212 ***	**0.3504 *** *	0.1629
	Fridge Signs (Group B)	0.1338	**0.2586 ***	**0.3272 *** *
	Bonus Meal	0.1754	0.1766	**0.2647 *** *
Economic/thrifty Practices				
	FW Diary	0.0612	0.0030	-0.0594
	Fridge Signs (Group A)	0.0368	-0.0157	-0.0101
	Fridge Signs (Group B)	-0.1041	-0.1847	-0.1325
	Bonus Meal	-0.0471	-0.0452	-0.0087
Child Pickiness				
	FW Diary	-0.1145	-0.0810	-0.0948
	Fridge Signs (Group A)	**-0.2719***	-0.0838	-0.1321
	Fridge Signs (Group B)	0.1000	0.1116	0.0441

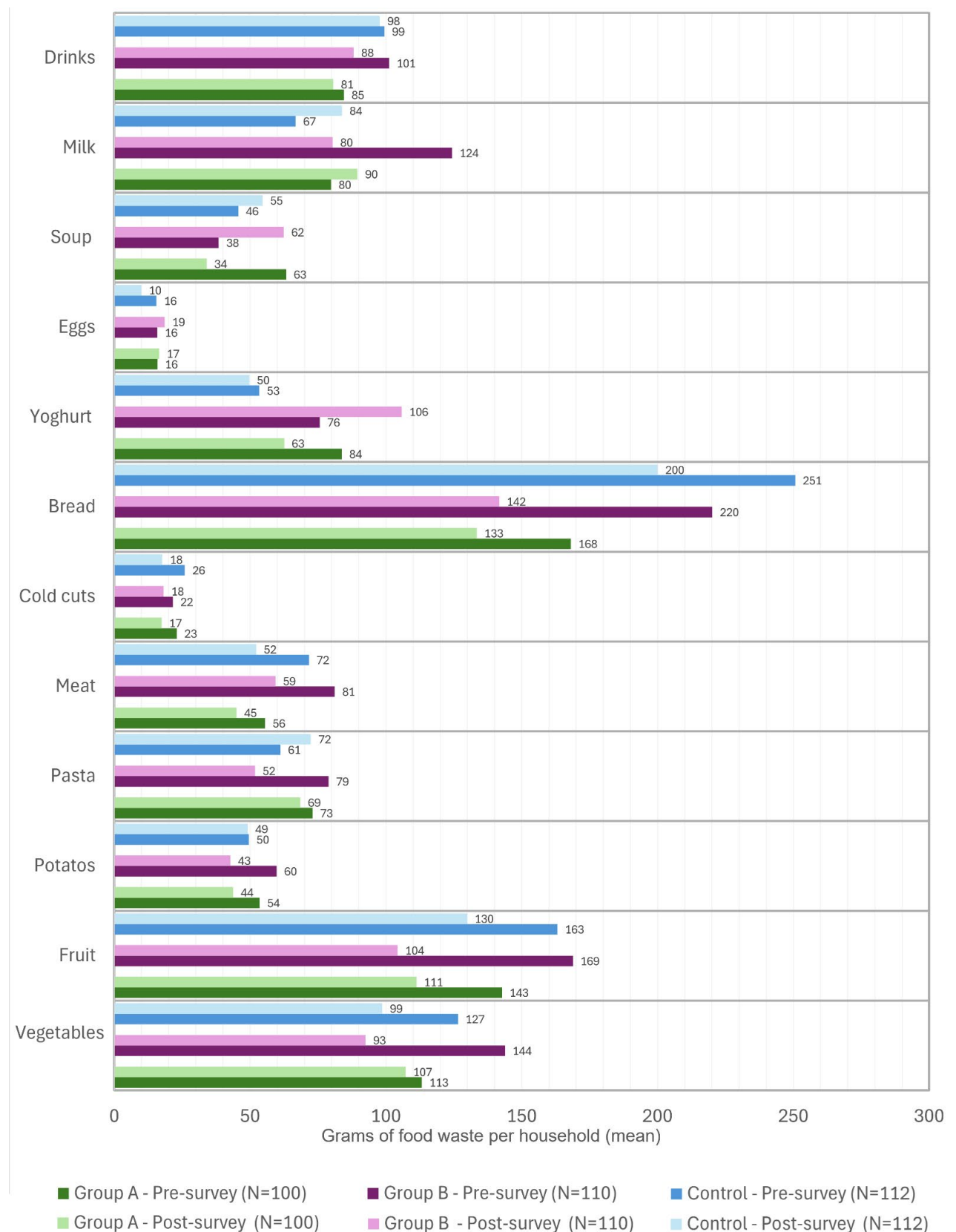|				
	Bonus Meal	-0.0375	-0.0039	-0.0942
Self-efficacy				
	FW Diary	0.1730	0.1248	0.0993
	Fridge Signs (Group A)	**0.3144 ***	0.0664	0.2224
	Fridge Signs (Group B)	-0.0050	-0.0760	-0.0376
	Bonus Meal	0.0684	-0.0516	0.0925

Scale from 1. (strongly disagree) to 7. (strongly agree).

Pearson's correlation analyses are used to assess the associations (** shows statistically significant association at .01 level, * shows statistically significant association at .05 level)

(see a list of all summary variables in Appendix 7)

Appendix 16: Food waste in grams

Per household by food waste category before and after the intervention

Drinks
- 98
- 99
- 88
- 101
- 81
- 85

Milk
- 84
- 67
- 80
- 124
- 90
- 80

Soup
- 55
- 46
- 62
- 38
- 34
- 63

Eggs
- 10
- 16
- 19
- 16
- 17
- 16

Yoghurt
- 50
- 53
- 106
- 76
- 63
- 84

Bread
- 200
- 251
- 142
- 220
- 133
- 168

Cold cuts
- 18
- 26
- 18
- 22
- 17
- 23

Meat
- 52
- 72
- 59
- 81
- 45
- 56

Pasta
- 72
- 61
- 52
- 79
- 69
- 73

Potatos
- 49
- 50
- 43
- 60
- 44
- 54

Fruit
- 130
- 163
- 104
- 169
- 111
- 143

Vegetables
- 99
- 127
- 93
- 144
- 107
- 113

Grams of food waste per household (mean)

■ Group A - Pre-survey (N=100)   ■ Group B - Pre-survey (N=110)   ■ Control - Pre-survey (N=112)
■ Group A - Post-survey (N=100)   ■ Group B - Post-survey (N=110)   ■ Control - Post-survey (N=112)

Appendix 17: Interview protocol

Tema	Linje	Beskrivelse / spørgsmål	Noter
Velkommen og praktikaliteter	1 2 3 4 5 6 7 8	"Tak fordi du gider at deltage i denne undersøgelse og stille op til dette interview. Interviewet vil tage ca. 30 minutter og vil omhandle jeres husholdnings madspild og brugen af de udleverede værktøjer, som I fik udleveret, og har haft godt og vel 2 uger til at bruge." "Før jeg begynder at spørge lidt ind til dette, vil jeg lige kort forklare lidt mere om undersøgelsen."	
Info om undersøgelse	9 10 11 12 13 14 15 16 17 18 19 20 21 22	"Vores undersøgelse omhandler madspild, herunder hvor meget madspild I har I jeres husholdning og hvordan brugen af nogle af de værktøjer, som vi har tilsendt jer, kan hjælpe jeres husholdning med at mindske disse." "Vi er derfor interesseret i at vide lidt om jeres erfaring omkring måltider, rester og madspild, samt jeres erfaringer og holdninger om brugen af de her værktøjer, som I fik tilsendt." "Undersøgelsen er foretaget af MAPP centret på Aarhus Universitet på bestilling fra Ministeriet for Fødevarer, Landbrug og Fiskeri."	
Deltagersamtykke	23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	"Før vi starter, er det vigtigt for os at sige, at deltagelse i interviewet er frivilligt og at du til en hver tid kan trække dig fra undersøgelsen. Du er ikke tvunget til at svare på spørgsmål, du ikke har lyst til at svare på." "Jeg vil også gøre opmærksom på at dette interview vil blive optaget i forskningsøjemed og senere transskriberet, hvor data vil blive pseudonymiserede , og optagelsen af interviewet vil herefter blive slettet. Du vil forblive anonym i alle potentielle afrapporteringer." "Du skulle ligeledes gerne havde modtaget en informationsark om hvorledes AU behandler dine data" "Har du modtaget og læst informationsarket om databehandling?" "Er det ok vi optager vores samtale, for så tænder jeg for optagelsen nu?" "Har du nogle spørgsmål inden vi begynder?" ***Tænd optagelse, hvis der gives samtykke***	

	48	
	49	"Nu er der tændt for optagelse, så jeg vil endnu
	50	engang spørge om du giver samtykke til at vi optager interviewet og om du har læst og forstået informationsarket om databehandling på AU?"
Madspild	51	"Det sker i alle husholdninger, at man sommetider
	52	må smide mad ud. Kan du fortælle lidt om i hvilke
	53	situationer dette sker?"
	54	Probe: "Er det fx fordi maden bliver for gammel,
	55	inden i når at spise den, at i får lavet for meget mad
	56	til aftensmaden, at nogle i jeres husholdning ikke kan
	57	lide maden?"
	58	
	59	"Hvordan vil du beskrive jeres husholdnings
	60	madaffald sammenlignet med andre familier?"
	61	
	62	"Har I, i husholdningen, snakket jeres madspild?"
	63	
	64	"Kunne du tænke dig at I havde et mindre
	65	madspild?"
	66	
		"Hvad ville være godt ved at I smed mindre mad ud?"
Brug af værktøjerne	67	"Hvor ofte har i brugt [værktøj X] inden for de sidste
	68	2 uger?"
	69	
	70	"Hvornår har i typisk brugt [værktøj X]?"
	71	Probe: "I hvilke situationer? I forbindelse med
	72	aftensmad? Frokost? I weekenderne? I hverdagen?"
	73	
	74	"Hvad ville gøre at I vil bruge det mere?"
	75	
	76	"Kunne I finde på at bruge værktøjerne i fremtiden?
	77	Hvorfor/Hvorfor ikke?"
	78	
	79	"Kender du til andre lignende værktøjer til
	80	madspild?"
	81	Probe: "Vil du beskrive disse?"
	82	
	83	"Er der nogle værktøjer, du synes, du mangler?"
	84	
	85	"Er der ellers noget der kunne hjælpe dig med at reducere jeres madspild i hverdagen?"
Overordnede evaluering af værktøjer	86	"Hvad er din overordnede mening om [værktøj X]?"
	87	
	88	"Hvor brugbare synes du de er, på en skala fra et 1 til
	89	10? Hvorfor?"
	90	Probe: "Kan du snakke lidt om fordele og ulemper
	91	ved [værktøj X]?"
	92	
	93	

	94	"Hvor nemt eller svært synes du det har det været at
	95	forstå [værktøj X], på en skala fra et 1 til 10? Hvorfor?"
	96	"Hvad har mere specifikt været nemt/svært at
	97	forstå?"
	98	
	99	"Hvor nemme synes du værktøjerne har været at
	100	bruge, på en skala fra et 1 til 10? Hvorfor?"
	101	
	102	"Kunne du lide hvordan [værktøj X] blev
	103	præsenteret?"
	104	"Synes du det var godt opsat?"
	105	"Hvad kunne du lide / ikke lide ved det grafiske
	106	udtryk?"
	107	
	108	"Er der nogle elementer af [værktøj X] som du fandt
	109	særligt godt/brugbart/fint?"
	110	
	111	"Synes du at værktøjerne har hjulpet med at
	112	nedbringe jeres madspild i husholdningen?"
	113	"Hvad har virket godt ved værktøjet?"
	114	"Hvad har virket mindre godt?"
Adfærdsændringer efter brug af værktøjer	115	"Tror du der er sket en ændring på måden I tilgår
	116	jeres madrester, inden for de sidste 2 uger? Kan du
	117	forklare lidt om hvordan/hvordan ikke?"
	118	
	119	"Hvis du selv skulle komme med et forslag til hvordan
	120	man bedre kan mindske den mængde mad man
	121	smider ud, hvad ville du så foreslå?"
Fremtidig brug af værktøjer/ strategier	122	"Ville I kunne finde på at ´bruge værktøjerne i
	123	fremtiden?"
	124	"Hvorfor/Hvorfor ikke?"
	125	
	126	"Ville I anbefale værktøjerne til andre?"
Afrunding	127	"Det var de spørgsmål vi havde, mange tak for din
	128	tid."
	129	
	130	"Er der noget, som du ikke føler du fik sagt, som du
	131	tænker du vil have med her til sidst?"
	132	
	133	***Sluk for optagelse og gør opmærksom på dette***
	134	
	135	"Har du nogle spørgsmål?"
	136	
	137	"Vi takker endnu engang for din tid og din deltagelse
		i undersøgelsen."

Appendix 18: Interview consent form

Samtykke til deltagelse i undersøgelse om i forbrugeradfærd i forhold til madspild samt vurdering af effekt af specifikke redskaber til madspildsreduktion i hjemmet

Kære deltager,

Velkommen og tak for din interesse for din deltagelse i denne undersøgelse om madspildsreducering.

Med henblik på at skabe de bedst mulige værktøjer til reducering af madspild, har denne undersøgelse til formål at evaluere hvordan danske forbrugere tager imod udvalgte, potentielle værktøjer til reducering af madspild, samt at vurdere hvor effektive værktøjerne er.

Før deltagelse i undersøgelsen, bedes du venligst læse dette oplysningsskema grundigt. Her kan du læse mere om projektet og om behandlingen af dine personoplysninger. Under selve interviewsamtalen, både før og efter lydoptagelsen igangsættes, bedes du bekræfte at du har læst og forstået nedenstående information, at du indforstået med at deltage i undersøgelsen, samt at du giver Aarhus Universitet tilladelse til at bruge dine pseudonymiserede data i forskningsøjemed.

Din deltagelse i denne undersøgelse indebærer følgende:
- Jeres husholdning har fået tilsendt to udvalgte værktøjer til reducering af madspild, som I bedes anvende i de kommende to uger. Medfølgende brugsanvisninger beskriver hvordan værktøjerne skal anvendes.
- Vi vil gerne afholde interviewet om husholdnings oplevelser med de to værktøjer om cirka to uger. Dette interview vil tage ca. 20-30 min. og foretages enten telefonisk eller online på et tidspunkt der passer dig.

Undersøgelsen henvender sig primært til danske børnefamilier med børn under 18 år. Der forventes ingen risici ved deltagelse i denne undersøgelse, ud over dem man støder på i hverdagen.

Det er videre vigtigt, at du er indforstået med følgende rettigheder som deltager:
- Det er frivilligt at deltage. Det vil sige, at du ikke er forpligtet til at deltage.
- Du kan trække dit samtykke tilbage under dataindsamlingen ved ikke at stoppe interviewet. Ufuldstændige besvarelser slettes og medtages ikke i undersøgelsen. Du kan til enhver tid trække dig fra undersøgelsen. Hvis du ønsker at tilbagekalde dit samtykke, bedes du kontakte markedsanalysefirmaet Norstat: support-dk@norstatpanel.com
- Vi behandler naturligvis oplysningerne strengt fortroligt og i henhold til databeskyttelsesloven
- Oplysningerne fra interviewet behandles pseudonymiseret
- Interviewet vil tage ca. 20-30 minutter
- Interviewet bliver lydoptaget og der tages noter, med henblik på transskription. Efter transskription og pseudonymisering, vil optagelsen blive slettet.

Resultaterne fra undersøgelsen bruges til udvikling af rådgivningsrapporter om madspild og andre eventuelle videnskabelige publikationer.

Har du spørgsmål, er du altid velkommen til at kontakte Videnskabelig Assistent Mark Henriksen: mahe@mgmt.au.dk

Ansvarlige for undersøgelsen hos Aarhus universitet: Professor Liisa Lähteenmäki: liisal@mgmt.au.dk

Sådan behandler Aarhus Universitet dine personoplysninger
I forbindelse med din deltagelse i et forskningsprojekt på Aarhus Universitet, skal vi efter databeskyttelsesforordningen oplyse dig om, hvordan dine personoplysninger vil blive behandlet.

Du kan læse mere om projektet og behandlingen af dine personoplysninger i oplysningsskemaet.

Deltagelse er frivilligt, og du kan til enhver tid trække dig fra undersøgelsen. Har du spørgsmål til undersøgelsen, kan du kontakte Videnskabelig Assistent Mark Henriksen, som kan kontaktes på e-mail: mahe@mgmt.au.dk

Oplysninger om behandling af personoplysninger til deltagere i forskningsprojekter på Aarhus Universitet

Den dataansvarlige	**Aarhus Universitet** **Nordre Ringgade 1 8000 Aarhus C CVR-nr.: 31119103** er dataansvarlig for behandlingen af personoplysninger i forskningsprojektet. Forskningsprojektet er ledet af Professor Liisa Lähteenmäki: liisal@mgmt.au.dk
Databeskyttelsesrådgiver ved Aarhus Universitet	Søren Broberg Nielsen Databeskyttelsesrådgiver/DPO dpo@au.dk
Forskningsprojektets titel	Indsigt i forbrugeradfærd i forhold til madspild samt vurdering af effekt af specifikke redskaber til madspildsreduktion i hjemmet
Formålet med projektet og behandlingen af dine personoplysninger	Projektet er bestilt af Ministeriet for Fødevarer, Landbrug og Fiskeri og Fødevarestyrelsen. Formålet med projektet er at evaluere potentielle værktøjer og tilskyndelser til reduktion af madspild med hensyn til forbrugeraccceptabilitet, samt at give en indledende indikation af værktøjernes effektivitet til at ændre adfærd i forhold til madspild. Værktøjer og opfordringer til reduktion af madspild inkluderer fysisk, tekstuel eller digital opfordring til at tilskynde forbrugerne til at reducere madspild derhjemme og tilegne sig nye vaner og rutiner. Vi behandler personoplysninger strengt fortroligt og i henhold til databeskyttelsesloven. Oplysningerne fra interviewet behandles pseudonymiseret.
Hvilke personoplysninger behandles i projektet?	Der vil under interviewet blive lydoptaget og tages noter, med henblik på transskription. Efter transskription og pseudonymisering, vil optagelsen blive slettet. Du kan trække dit samtykke tilbage til hver en tid under interviewet, hvorefter data slettes og udelukkes fra undersøgelsen. Du kan ikke trække dit samtykke tilbage efter interviewet, fordi vi ikke kan identificere enkelte deltagere i det transskriberede datasæt. I projektet behandles følgende oplysninger om dig som deltager: ☒Navn ☒E-mailadresse ☒Eventuelt telefonnummer ☒Transskription af interviewsamtale (udtalelser om holdninger og opfattelser)
Anvendelsen af automatiske behandlinger (profilering)	Profilering er en automatisk behandling af dine personoplysninger, fx behandlinger, der er bestemt af en algoritme. Her kan du se, om der indgår automatiske behandlinger af dine personoplysninger.

	☐Der anvendes automatisk behandling af personoplysninger. ☒Der anvendes ikke automatisk behandling af personoplysninger.
Hvor længe opbevares dine øvrige personoplysninger?	Vi kan ikke på nuværende tidspunkt sige, hvor længe dine personoplysninger vil blive behandlet. Dine personoplysninger behandles af Aarhus Universitet i personhenførbar form så længe, det er nødvendigt for forskningsformålet og reglerne om opbevaring efter ansvarlig forskningspraksis. Når dine personoplysninger ikke længere er nødvendige for behandlingen, vil de blive anonymiseret, overført til Rigsarkivet eller slettet.
Vil personoplysninger blive overladt eller videregivet til andre, fx forskere på andre universiteter?	☒Dine personoplysninger, som er indsamlet til projektet, vil ikke blive videregivet til andre.
Personoplysninger er indhentet fra	☐Fra dig ☒Fra andre* og dig ☐Fra andre* Kontaktoplysninger samt navn kan være fundet fra offentligt tilgængelige websider og databaser. Dine meninger, holdninger og opfattelser vil kun tages fra interviewet og derfor komme direkte fra dig.
Vi har ret til at behandle dine personoplysninger efter regler i databeskyttelsesforordningen og databeskyttelsesloven Vi skal oplyse dig om, hvilke regler, der gælder for vores arbejde med dine personoplysninger.	☒Artikel 6, stk. 1, litra e, som giver Aarhus Universitet ret til at behandle ikke-følsomme personoplysninger om dig uden dit samtykke, da forskningsprojektet er en opgave i samfundets interesse, og det er nødvendigt at behandle personoplysninger for at gennemføre forskningsprojektet. ☐Artikel 6, stk. 1, litra e og databeskyttelseslovens § 10, stk. 1, som giver Aarhus Universitet ret til at behandle dine følsomme personoplysninger og eventuelt oplysninger om strafbare forhold til videnskabelige forskningsformål uden dit samtykke. ☐ Databeskyttelseslovens § 11, stk. 1, der giver Aarhus Universitet ret til at behandle dit CPR-nummer med henblik på entydig identifikation.
Dine rettigheder efter databeskyttelsesforordningen	Du har følgende rettigheder, hvis Aarhus Universitet behandler dine personoplysninger som et led i et forskningsprojekt, der er i samfundets interesse. • Ret til sletning eller "retten til at blive glemt". • Ret til dataportabilitet - Du har i visse tilfælde ret til at modtage dine personoplysninger og til at anmode om, at personoplysningerne bliver overført fra én dataansvarlig til en anden. • Ret til ikke at være genstand for en automatisk afgørelse udelukkende baseret på automatisk behandling, herunder profilering. Du skal være opmærksom på, at dine rettigheder kan være begrænset af anden lovgivning eller underlagt undtagelser, fx i relation til forskning og offentlig myndighedsudøvelse.
Klagemuligheder	Hvis du ønsker at klage over behandlingen af dine personoplysninger, kan du rette henvendelse til tilsynsmyndigheden: **Datatilsynet** **Carl Jacobsens Vej 35** **2500 Valby**

About DCA

DCA - Danish Centre for Food and Agriculture is the entrance to research in food and agriculture at Aarhus University (AU).

The Centre comprises AU departments with food and agricultural science activities. These are primarily Department of Agroecology, Department of Animal Science, Department of Food Science, Centre for Quantitative Genetics and Genomics, and parts of Department of Engineering.

DCA has a Centre Unit, which supports and coordinates DCA activities in relation to research based policy support, industrial and sector collaboration, international collaboration, and communication.

Research results from DCA
Research results are published in international scientific journals, and they are available at the university publication database (pure.au.dk).

DCA reports
DCA also publishes a report series, which primarily communicates policy support tasks from DCA to the Ministry of Food and Environment of Denmark. Further publications include reports that communicates knowledge from research activities. The reports may be downloaded free of charge at the DCA website: dca.au.dk.

Newsletters
A Danish and English DCA newsletter communicate knowledge within agricultural and food research, including research results, advice, education, events and other activities. You can register for the free newsletter at dca.au.dk.

SUMMARY

Food waste has major environmental, economic, and social impacts. Reducing food waste is crucial for addressing current and future food security challenges.

In 2022, the Danish Veterinary and Food Administration launched several tools to help households reduce food waste. Focusing on households with children, this study evaluated three such tools (the Fridge Signs, the Food Waste Diary, and the Bonus Meal tool) in terms of users' perceptions of usability and impact.

The tools were generally well received in a two-week intervention study with 322 participants. However, only the intervention group that tested the Fridge Signs and the Bonus Meal showed a significant increase in food waste awareness as well as a reduction in the amount of self-reported food waste.

Moreover, an interview study participants liked the tools and found them easy to use, effective, and motivating.

Though further research is needed to confirm the effectiveness of the tools, participants generally found them to be helpful in reducing food waste and saving money. The tools have sparked discussions, and some people even recommended the tools to others. The tools therefore have potential to foster motivation and measures that promote reduction of food waste.