Latest insights on food waste reduction interventions

Task 1.2: Latest insights on food waste reduction interventions

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This research project has been carried out by Wageningen Food & Biobased Research (WFBR), Wageningen Economic Research (WECR), which are part of Wageningen University & Research, and by KWR Water Research Institute (KWR).
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Table of content

Introduction project

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Overall project goal

To select, develop and test behavioural change interventions to move consumers towards pro-environmental behaviours.

➢ To develop effective and feasible interventions that are accepted in real-life situations and consistently reduce water usage and food waste in households.

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Project structure

Aim: To select, develop and test behavioural change interventions to move consumers towards pro-environmental behaviours.

WP1: Overview of current knowledge

Insights from literature and research methodology

WP2: Select or develop measurement methods

WP 3: Water Use Case:

testing interventions in practice

WP 4: Food Waste Case:

testing interventions in practice

WP 5: Project coordination & dissemination:

Project communication and exchange of generic learnings from both cases

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WP1 – Activities & partners

WP1: Overview of current knowledge Insights from literature and research methodology	
Activities	1.1 **Literature and practice scan on promising consumer household water reduction interventions** including scan of existing initiatives, ways to measure water use and other activities from the water utility companies (interviews with 'case owners' from the different companies).
	1.2 **Literature scan about latest insights on household interventions to reduce food waste** including mapping of outcome measures to assess effectiveness, acceptance and feasibility.
	1.3 **Review literature on maintenance of behaviour change**: habit formation, reward & reinforcement and scope relevant models and theories for food waste reduction behaviours.
Partners	WR, KWR, Unilever in lead with support of PWN, WML, TGTG
Timing	April 2023 – December 2023

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Introduction literature scan

1.2 Literature scan about latest insights on household interventions to reduce food waste

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Introduction

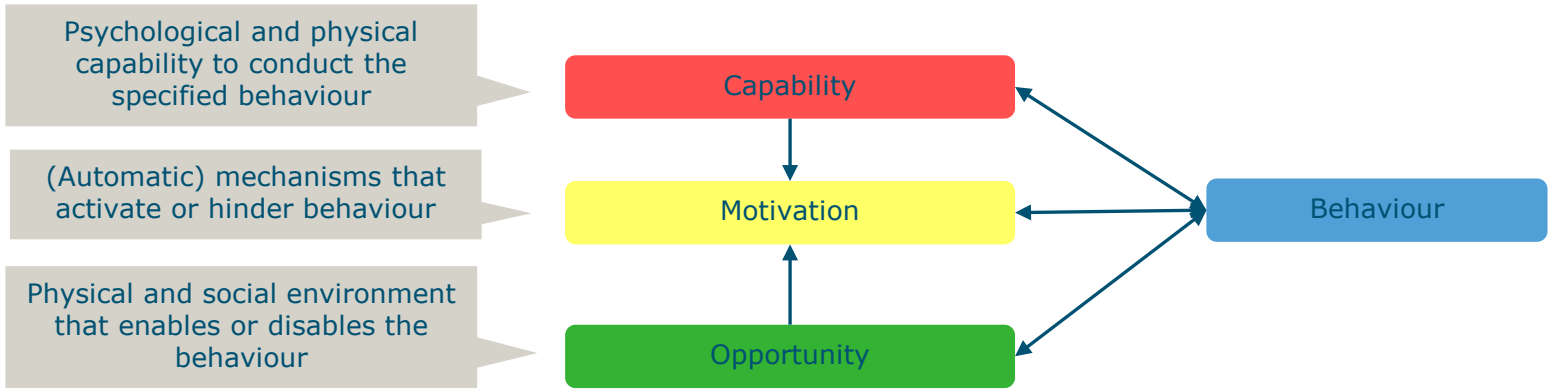
- This literature scan aims to provide an overview of latest insights on drivers, barriers of household food waste reduction.
- Moreover, it helps to identify effective intervention strategies to change the target behaviour, and to formulate the intervention design that will be tested in WP4 (Food Waste Case: testing interventions in practice)
- Finally, the literature provides input for the selection of outcome measures to assess food waste behaviour (*i.e., follow-up in Task 2.2*) as well as for other measures and methodologies that can be used in interventions (*i.e., follow-up in Tasks 2.3 and 2.4*)
- This deliverable provides a 'highover' and concise overview of what has been found in the literature, and is not intended as a detailed reference work on the existing literature.

Approach

- Gathering insights from scientific articles from the past 10 years
    - What interventions are proven effective?
    - What do those interventions look like?
    - Long-term effects?
- Supplement with non-scientific (grey) literature
- Conclusions and recommendations for food waste reduction interventions

Conceptual framework: the COM-B model

- The studies selected from our literature search were placed in the COM-B behaviour change model. This model describes three conditions for behaviour in which individual characteristics, the role of the environment, conscious and unconscious processes are taken into account (Michie et al., 2011). To change behaviour, all three factors come into play, and one or more of the three factors may be stimulated.
- In the case of, for instance, reducing food waste, it could be that only the physical capability is lacking (e.g. one does not know what to do with leftovers), or the social environment disables the behaviour (e.g. one is not encouraged by others to avoid food waste), or the motivation is lacking (e.g. one does not find food waste important enough), or a combination of one to three of these factors.

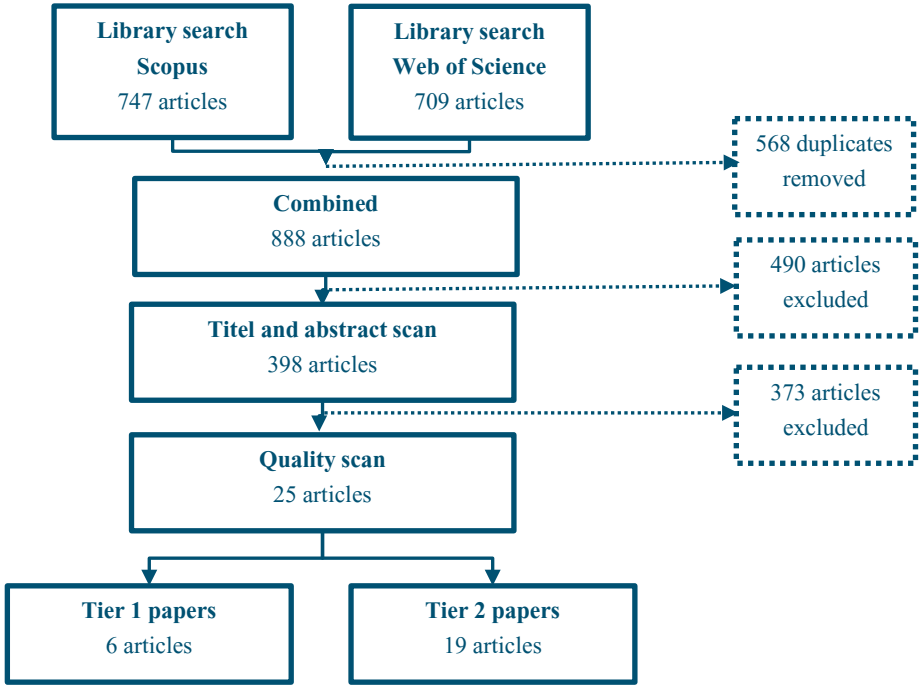


Approach literature search – Three steps

1. Determine search terms
    - Based on brainstorm with partners to determine framework (21 March 2023)
    - Together with librarian WUR specified
    - Search in Scopus and Web of Science
2. First screening
    - Read relevant review papers
3. Second screening
    - Quality assessment of papers

The selection of papers pertaining to each step is graphically depicted in the flow chart on the next slide

Flow chart for the selection of relevant papers



1. Determine search terms

- Four criteria were used to define the query to identify studies in the scientific literature:
    1. The study should focus on food waste;
    2. The study should focus on consumers and/or households;
    3. The study's outcome variable should be some kind of reduction or prevention behaviour;
    4. The study design should be an intervention (experiment).
- For each criterion, search terms consisting of several keywords were combined into a query.
- Two separate queries were specified in the syntax of Web of Science and Scopus.

1. Article search: Scopus and Web of Science

Search query (example Scopus):

Concept	*Query*	*Results*
Food waste	TITLE-ABS-KEY ("food waste")	15956
Consumer / household	TITLE-ABS-KEY (consumer OR household)	853838
1 and 2	TITLE-ABS-KEY ("food waste" AND (consumer OR household))	2874
Reduction	TITLE-ABS-KEY (reduc* OR decreas* OR prevent* OR	20315765
3 and 4	TITLE-ABS-KEY ("food waste" AND (consumer OR household) AND (reduc* OR decreas* OR prevent* OR less))	1880
Intervention	TITLE-ABS-KEY (strateg* OR intervent* OR experiment OR tool* OR nudg*)	15031041
5 and 6	TITLE-ABS-KEY ("food waste" AND (consumer OR household) AND (reduc* OR decreas* OR prevent* OR less) AND (strateg* OR intervent* OR experiment OR tool* OR nudg*))	747

Other search criteria:

Language	English OR Dutch
Year of publication	past 10 years (from 2013 onwards)
Type of documents	articles, reports, review papers
Databases	Scopus, Web of Science

Result Scopus: 747 articles; Results Web of Science: 709 articles

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Relevant review papers

- 2 recent and relevant reviews were found in this set of papers → decided to read those two first

Journal of Cleaner Production 373 (2022) 133866

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Review

How to influence consumer food waste behavior with interventions? A systematic literature review

Joana Simões [a,*], Ana Carvalho [b], Margarida Gaspar de Matos [c]

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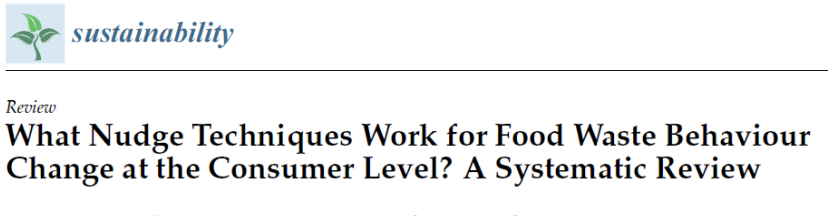

sustainability

Review

What Nudge Techniques Work for Food Waste Behaviour Change at the Consumer Level? A Systematic Review

Hannah Barker [1,*], Peter J. Shaw [1], Beth Richards [2], Zoe Clegg [2] and Dianna Smith [1]

Review 1: Simões et al (2022)

- 96 papers included, including 18 interventions
- Conceptual map linking interventions to drivers and barriers for food waste behavior (which can be linked to the COM-B model)
- Conclusion:
  "*Interventions that provide information and raise awareness are the most common ones reported in the literature and are considered crucial to change consumer food waste behavior. However, they need to be complemented with other types of interventions to promote effective behavior changes*."

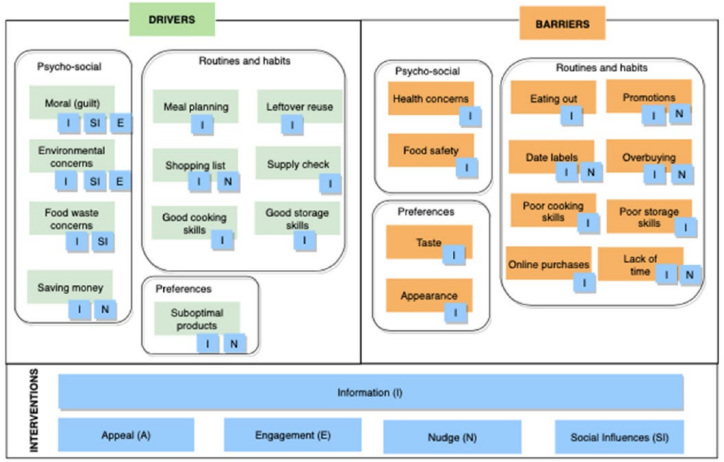

Fig. 2. Conceptual map linking drivers and barriers of consumer food waste behavior and interventions.

- This review paper aimed to draw a conceptual map and does not look at the effectiveness of interventions

2. Review 2: Barker et al. (2021)

- 16 articles and 2 reports in scope, subjected to 'critical appraisal checklist'
- 4 studies remained that were determined to be of higher quality that showed reliable results with three nudges used: use of social norms, reminders and disclosure.
- This systematic review aimed to get insight in the evidence around interventions using nudges for food waste behaviour change. However, only evidence for nudging effects on food waste recycling were found, which is not our focus in this project
- Self-reported waste is relevant and reliable for the project, if used in an intervention context (pre-measurement) and specifically asked about (van Herpen et al. 2019)
- Conclusions

  "Paucity of quality primary studies using interventions with nudge for food waste behaviour change" [...] "There is reliable information on the effectiveness of nudges for food waste recycling interventions when incorporating nudges of social norms, reminders or disclosure alongside use of social norms."

Second screening

- Articles from Simões et al. review complemented by (potentially) relevant papers from Scopus/Web of Science search
- Second round screening (scope): 25 articles
- Subjected to quality assessment and further analysis (see excelfile)

Authors	Title	Year	Journal	Outcome.measure	Waste.measure	Study.type	Intervention.desc	Duration	Intervention.type	MultiCom	MOA	M	A	D	Household.Stage	Sample
Romani S.; Grappi S.;	Domestic food practices: A study of food management behav	2018	Appetite	self-reported amount of foods	self-reported waste	field experiment	participants read an educational article explaini	1 moment	information, instructions	1	MA	1	1	0	planning, preparing, storing	N=210, Group 1 (n=57):
Shaw P.J.; Smith M.M.	On the prevention of avoidable food waste from domestic hou	2018	Recycling	kerbside waste audit	actual waste	field experiment	information leaflets on impact of FW on (1) enviro	1 moment	information	0	M	1	0	0	NA	60 households (30 affl
Soma T.; Li B.; Maclar	Food waste reduction: A test of three consumer awareness in	2020	Sustainability (Switze	waste audit (subset) + self-rep	actual waste	field experiment	3 types of awareness campaigns 12-weeks (pas	12 weeks	information, instructions, prompt, so	1	MA	1	1	0	planning, shopping, storing, preparin	Single-family household
Roe B.E.; Qi D.; Beyl R.	A Randomized Controlled Trial to Address Consumer Food W	2022	Resources, Conserv	self-reported avoidable food w	self-reported waste	RCT	tailored individual coaching	1 week	information, commitment, instructior	1	MA	1	1	0	planning, shopping, storing, preparin	n=40: 18 treatment (FW
Cooper A.; Lion R. et a	Use-up day and flexible recipes: Reducing household food w	2023	Resources, Conserv	self-reported food waste	self-reported waste	RCT	5 week interventions: use-up day + flexible recip	5 weeks	information, instructions, prompt, ma	1	MA	1	1	0	storing, preparing	families with children; S
van der Werf P.; Seab	"Reduce Food Waste, Save Money": Testing a Novel Interve	2021	Environment and Beh	food waste within curbside gar	actual waste	RCT	"Reduce Food Waste, Save Money": encourage	2 weeks	information, instructions, prompt, ma	1	MOA	1	1	1	planning, shopping, storing, preparin	Single-family household
Morone P.; Falcone P.	Does food sharing lead to food waste reduction? An experime	2018	Journal of Cleaner Pr	organic waste, waste composi	actual waste	field experiment	food sharing intervention vs control (within-subje	5 days (mo-fri) pe	commitment, social influence (financ	0	M	1	0	0	shopping	N=5 households (stude
Mathisen, TF; Johans	The Impact of Smartphone Apps Designed to Reduce Food W	2022	JMIR FORMATIVE RE	self-reported waste (kg/week)	self-reported waste	field experiment	2 smartphone apps designed to a.o. reduce wa	1 month app use	information, instructions, making it e	1	MA	1	1	0	planning, shopping, storing, preparin	N=6 students
Schmidt K.	Explaining and promoting household food waste-prevention I	2016	Resources, Conserv	self-reported food waste-prev	waste-prevention behaviou	field experiment	tailored set of recommendations: a list consisting	1 moment	instructions, commitment	1	MA	1	1	0	planning, shopping, storing, preparin	T1 (pretest): N=217 (inte
Trewern J.; Chenowet	Sparking Change: Evaluating the effectiveness of a multi-cor	2022	Appetite	self-reported food waste frequ	self-reported waste	field experiment	multi-component intervention by retailer, targetii	9 weeks	information, instructions, prompt	1	MA	1	1	0		N=107 retailer custome
Pelt A.; Saint-Bauzel I	Food waste: Disapproving, but still doing. An evidence-base	2020	Resources, Conserv	food waste amount + waste co	actual waste	field experiment	3 door-to-door (F2F) interventions: a classical ir	10–15 minutes visi	information, instructions, feedback,	1	MA	1	1	0	planning, shopping, storing, preparin	n=64 households: infor
Lim V.; Bartram L.; Fur	Eco-Feedback for Food Waste Reduction in a Student Resid	2021	Frontiers in Sustainat	waste audit: visual inspection	actual waste	field experiment	E-COmate (Lim et al., 2015) installed for 8 weeks	8 weeks	feedback, social influence	1	M	1	0	0	NA	9 student residence kit
Shu Y.; Booker A.; Kai	Evaluation of a community-based food waste campaign usin	2023	Waste Management	curbside audits + self-reportec	actual waste	field experiment	"Save more than food": community-based camp	3 months	information, instructions, making it e	1	MA	1	1	0		Survey: N=1151 Arlingto
Wharton C.; Vizcaino I	Waste watchers: A food waste reduction intervention among	2021	Resources, Conserv	self-collected solid edible fooc	self-reported waste	field experiment	Waste Watchers' website with general FW info +	5 weeks	information, instructions	1	MA	1	1	0	shopping, storing, preparing	n=53 (no control group
van Dooren C.; Mensir	Development and Evaluation of the Eetmaatje Measuring Cup	2020	Frontiers in Nutrition	annual waste of cooked pasta	actual waste	field study (no interve	introduction of Eetmaatje	1 moment	information (?), instructions, making	0	A	0	1	0	preparing	survey (2013–2015–201
Young, CW; Russell, S	Sustainable Retailing - Influencing Consumer Behaviour on F	2018	BUSINESS STRATEG	self-reported waste quantity ('	self-reported waste	field study (no interve	longitudinal waste campaign (October 2014 – Au	6 months	information, instructions, social influe	1	MA	1	1	0	planning, shopping, storing, preparin	N=631 Asda customers
Young, W; Russell, SV	Can social media be a tool for reducing consumers' food was	2017	RESOURCES CONS	self-reported waste ("Over the	self-reported waste	field study (no interve	Retailer (Asda) intervention: magazine (monthly)	10 months	information, instructions, social influe	1	MA	1	1	0	planning, shopping, storing, preparin	n=2018 Asda customer
van der Werf, P; Larse	How Neighbourhood Food Environments and a Pay-as-You-	2020	SUSTAINABILITY	waste audit	actual waste	field study (no interve	Pay As You Throw = financial incentive to minimize	waste generatic	financial	0	M	1	0	0		200 households in Torc
Schuster, S; Speck, M	Do meal boxes reduce food waste from households?	2022	JOURNAL OF CLEAN	3 types of self-reported waste:	self-reported waste	field study (no interve	meal box		instructions, making it easy	1	QA	0	1	1		N=314 households (Hel
Prelez J.; Wang F.; Sh	For the love of money and the planet: Experimental evidence	2023	Resources, Conserv	composite FVW measure: 1 *T	intention	online experiment	4 information conditions: control, monetary, env	1 moment	information	0	M	1	0	0	NA	N=1008
Neubig, CM; Vranken,	Action-related information trumps system information: Influen	2020	JOURNAL OF CLEAN	intentions	intention	online experiment	Treatment groups: food waste quiz + feedback (	1 moment	information, instructions	1	MA	1	1	0		N=2248 (748 from Belg
Zhang Y.; van Herpen	Save near-expired food: Does a message to avoid food wast	2023	Journal of Cleaner Pr	willingness to purchase, intenc	waste-prevention behaviou	online experiment	on-pack waste message	1 moment	information	0	M	1	0	0	NA	Exp1: n=280, Exp2: N=2
Nisa C.F.; Bélanger J.;	Assessing the effectiveness of food waste messaging	2022	Environmental Scien	Intentions (willingness to tackle	intention	online experiment	Study 1 (N = 261) tested three common prompts (	1 moment	information	0	M	1	0	0	NA	Study 1: N = 261, Study
Septianto, F; Kemper,	Thanks, but no thanks: The influence of gratitude on consum	2020	JOURNAL OF CLEAN	Intentions	intention	online experiment	2 (emotion: gratitude for having, gratitude for no	1 moment	information, emotional appeal	0	M	1	0	0	NA	Study 1: N=163, Study 2
Weis C.; Narang A.; Ri	Effects of date labels and freshness indicators on food waste	2021	Sustainability (Switze	Likelihood to discard	intention	online experiment	date label type with(out) freshness indicator (8 c	1 moment	information	0	A	0	1	0	consumption	N = 579 (US), N= 583 (U

Quality assessment

- Quality assessment (from: A National Strategy to Reduce Food Waste at the Consumer Level (2020))

1. Was an intervention implemented?
2. Was wasted food measured (not just changes in intentions to waste or in behaviours that could reduce waste)?
3. Did the study design permit analyses to isolate the causal effect of the intervention?
4. Were statistical analyses adequate for determining statistical significance?

NB. If all are answered with yes: Tier 1; if not: Tier 2

- Results:
  - 6 articles Tier 1 (4x yes)
  - 19 articles Tier 2 (< 4x yes)

Results: Tier 1 articles

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Tier 1 articles

- Intervention duration ranging from one moment (which consisted for example of participants that had to read an educational article on food waste) up to 12 weeks
- 5 of the 6 articles combine multiple intervention techniques: significant effects found
    - Often based on the 'Love food, hate waste' campaign of the Waste and Resources Action Programme (https://wrap.org.uk/)
    - Always a combination of 'goal setting' (*information*, *prompts*) and 'goal striving' (*instructions*, *making it easy*) techniques (COM-B: motivation & ability)
    - Few 'opportunity'-interventions from COM-B model → difficult to adapt personal environment (household)
- 1 article presented a 'information-only' intervention (Shaw et al. 2018): no effect found

Example intervention: van der Werf et al. 2021

- Example of a relevant intervention: "Reduce Food Waste, Save Money"
- Aim: Encouraging reducing money wasted on food by enhancing perceived behavioral control through food literacy messaging.
- The messaging focused on the following tips: improve food planning; efficiently purchase, store, and prepare food; and utilize leftovers effectively
- Intervention Package *(see also the visualization on the next slide)*:
  - A 4-L container to extend produce life
  - "Reduce Food Waste, Save Money" postcard affixed on the container, Fridge magnet version of the postcard, Explanatory letter, Freezer stickers & Grocery list pad
- Email Reinforcement: Over 2 weeks, five email messages sent to treatment households, aimed at reinforcing the idea that reducing food waste saves money.

Example intervention: van der Werf et al. 2021

Motivation

Capability

+

Information

Instructions

Making it easy

Prompt

+

5 e-mails in 2 weeks after receiving box

Information

Instructions

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Tier 1 articles

- 4 out of 6 studies found a significant reduction in food waste
  - 3 x self-reported (measured in detail) (Romani et al. 2018, Roe et al. 2022, Cooper et al. 2023)
  - Largest effect (79% reduction of food wasted during dining) after a tailored intervention with a personal coach (Roe et al. 2022) → working with personal coaches seems not feasible in the scaling up of interventions
- No evidence of long-term effects
  - 2 studies did a post-measurement
    - Cooper et al. 2023 (8 weeks post-intervention): less waste than pre intervention, but no difference with control group
    - van der Werf et al. 2021 (2.5 years post-intervention (T2), reported in Everitt et al. 2022): no difference from T1 in treatment households, interpreted as a sustained effect of the intervention, but (a) no comparison done with T0 (baseline), and (b) no Time x Treatment interaction effect.
  - Study with longest intervention (12 weeks; Soma et al. 2020): no effect
    Possible cause: low engagement (participants involved showed a trend in the right direction, but made little use of the tools offered)

Results: Tier 2 articles

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Tier 2 articles

- 13 field studies
  - 8 intervention studies
  - 5 ‘natural’ experiments (no intervention)*
- 6 online experiments

* A natural experiment can be defined as a study in which individuals are exposed to the experimental and control conditions that are determined by nature or by other factors outside the control of the investigators. The process governing the exposures arguably resembles random assignment. Thus, natural experiments are observational studies and are not controlled in the traditional sense of a randomized experiment (an intervention study).

Tier 2 articles: interventions

- Food waste (FW) measurements: waste audits (4x), self-reported FW (3), FW prevention behaviours (1x)
- Duration varying from 1 moment to 3 months
- Usually combination of 'goal setting' (*information*, *prompts*) and 'goal striving' (*instructions*, *making it easy*) techniques (COM-B: motivation & ability)
- 2 technology interventions: smart bin (E-COmate; Lim et al. 2021), FW apps (To Good To Go, TotalCtrl Home; Mathisen et al. 2022)
    - Small-scale, mostly qualitative (FW not the primary outcome measure)
- 6 of 8 articles report a significant reduction in FW, but
    - no control group in 3 studies (participation in intervention alone could explain effect)
    - 3 studies statistically questionable (e.g. no comparison with baseline; unclear how many/which participants were included; questionable outcome measures)

Tier 2 articles: ‘natural’ experiments

- Information campaign of retailer (2 articles: Young et al. 2017, 2018)
    - Survey of supermarket customers: (overly) optimistic interpretation results (self-reported FW reduction, even for customers who have not seen or read about the campaign)
- ‘Pay-as-you-throw’ program (van der Werf et al. 2020): pay for bin size (S, M, L, XL) + free organic waste & recycling bins
    - More waste separation/recycling, but not less FW
- Introduction “Eetmaatje” in NL (distributed free of charge to AH customers) (van Dooren et al. 2020)
    - Indirect impact measurement (via national surveys & waste audits before vs. after introduction); downward trend in amount of cooked pasta/rice in waste audits since introduction “Eetmaatje” (but not significant); Users “Eetmaatje” report less FW plate waste

Tier 2 articles: ‘natural’ experiments (continued)

- Meal boxes: survey among ‘Hello Fresh’ customers in 6 countries (Schuster et al. 2022)
  - FW probability and quantity compared between meal boxes and traditional meals; distinction between preparation waste (food that was supposed to be prepared but not prepared), cooking waste (food that was prepared but not served on a plate) en plate waste (food left on plate uneaten)
  - Preparation waste was more likely to occur for meal boxes than for traditional meals, but when it occurred, the amount was smaller.
  - Cooking waste was less likely to occur for meal boxes than for traditional meals, and when it occurred, the amount was smaller.
  - Probability of plate waste was higher for meal box meals than for traditional meals, but when it occurred, the amount was similar

Tier 2 articles: online experiments

- Effects of ‘information’ on FW reduction intentions (5x) / waste-prevention behaviours (1x)
- Comparisons between different 'information' conditions (usually no comparison with control/'no information' condition)
    - General information (environmental and/or financial benefits of FW reduction)
    - System-related (‘knowing what’) vs. action-related (‘knowing how’) information
    - On-pack waste message: “Reduce waste” vs. “don't waste” vs. “stop waste”
    - Framing (gain vs. loss) X Emotion (gratitude for having vs. gratitude for not having)
    - Date label types (safety-related vs. quality-related) with or without freshness indicators
- General conclusion: framing matters
  (but specific results not directly relevant for WP4)

Results:‘Grey’ literature

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‘Grey’ literature

- Waste and Resources Action program (WRAP): Love Food, Hate waste (https://www.lovefoodhatewaste.com/)
    - Toolkits/materials free to download from the website
    - Used in multiple scientific studies
- Oz Harvest report (2021). Halving household food waste: which behaviours matter?
    - 35 behaviours identified and prioritized based on Impact Likelihood matrix (*see graphic on next slide*)
    - Presented as “evidence-based” (but unclear what is meant by that)

Impact likelihood Matrix (OZ Harvest (2021))

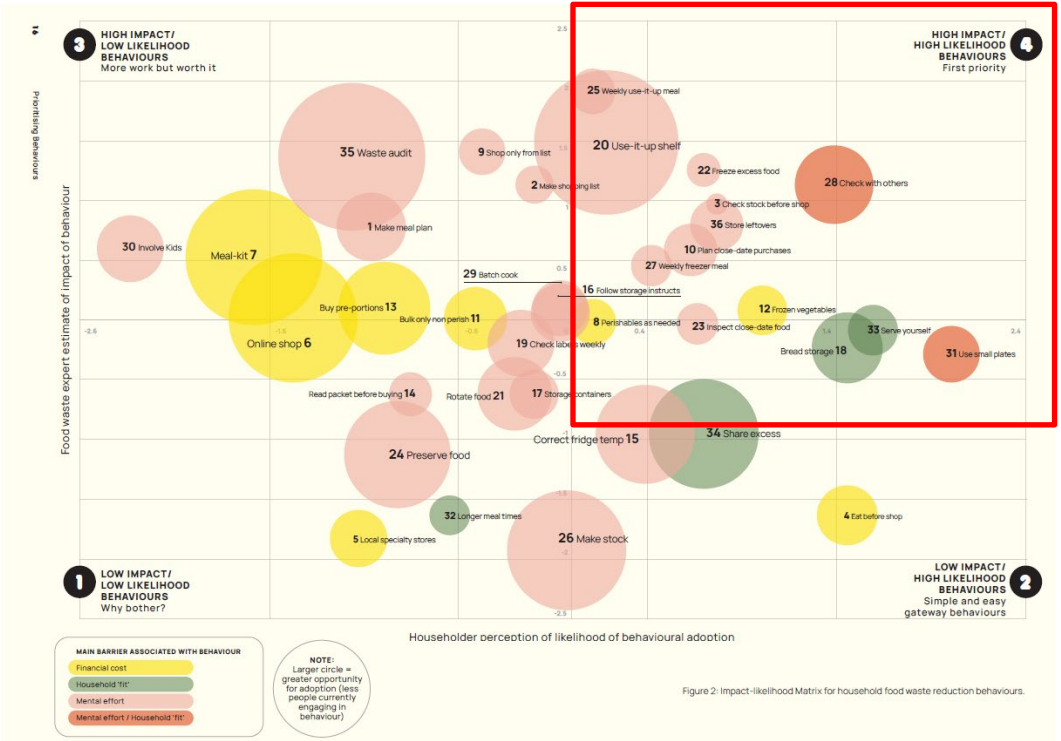

Figure 2: Impact-likelihood Matrix for household food waste reduction behaviours.

OZ Harvest (2021)

- "Identified target behaviours that combine the highest impact, likelihood and opportunity factors are:"

= intervention WP4

Oz Harvest (2022): **Use-it-up Tape**
Use leads up to 40% FW reduction
(Tier 2 study: no control group, sample bias, lack of methodological detail)

In Sept '23 in the Netherlands introduced by STV & Voedingscentrum

Conclusions & recommendations

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Conclusions & recommendations for WP4

- Evidence for effective interventions still very limited
- Use a combination of intervention techniques (motivation + ability) to induce desired behaviour
- No evidence (yet) that consumers retain the desired behaviour
    - Engagement seems key
    - Self-monitoring (*feedback)* possibly effective, but how long do people keep it up?
- What is needed for sustained behaviour change? → *this will be studied in Deliverable 1.3 (Review literature on maintenance of behaviour change)*

References

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References

- *Barker, H., Shaw, P. J., Richards, B., Clegg, Z., & Smith, D. (2021). What nudge techniques work for food waste behaviour change at the consumer level? A systematic review. Sustainability, 13(19), 11099.*
- *Cooper, A., Lion, R., Rodriguez-Sierra, O. E., Jeffrey, P., Thomson, D., Peters, K., ... & van Herpen, E. (2023). Use-up day and flexible recipes: Reducing household food waste by helping families prepare food they already have. Resources, Conservation and Recycling, 194, 106986.*
- *Van Dooren, C., Mensink, F., Eversteijn, K., & Schrijnen, M. (2020). Development and evaluation of the eetmaatje measuring cup for rice and pasta as an intervention to reduce food waste. Frontiers in Nutrition, 6, 197.*
- *Lim, V., Bartram, L., Funk, M., & Rauterberg, M. (2021). Eco-Feedback for Food Waste Reduction in a Student Residence. Frontiers in Sustainable Food Systems, 5, 658898.*
- *Mathisen, T. F., & Johansen, F. R. (2022). The Impact of Smartphone Apps Designed to Reduce Food Waste on Improving Healthy Eating, Financial Expenses and Personal Food Waste: Crossover Pilot Intervention Trial Studying Students' User Experiences. JMIR Formative Research, 6(9), e38520.*
- *Morone, P., Falcone, P. M., Imbert, E., & Morone, A. (2018). Does food sharing lead to food waste reduction? An experimental analysis to assess challenges and opportunities of a new consumption model. Journal of cleaner production, 185, 749-760.*
- *Neubig, C. M., Vranken, L., Roosen, J., Grasso, S., Hieke, S., Knoepfle, S., ... & Masento, N. A. (2020). Action-related information trumps system information: Influencing consumers' intention to reduce food waste. Journal of Cleaner Production, 261, 121126.*

References

- *Nisa, C. F., Bélanger, J. J., & Schumpe, B. M. (2022). Assessing the effectiveness of food waste messaging. Environmental Science & Policy, 132, 224-236.*
- *Pelt, A., Saint-Bauzel, R., Barbier, L., & Fointiat, V. (2020). Food waste: Disapproving, but still doing. An evidence-based intervention to reduce waste at household. Resources, Conservation and Recycling, 162, 105059.*
- *Prelez, J., Wang, F., & Shreedhar, G. (2023). For the love of money and the planet: Experimental evidence on co-benefits framing and food waste reduction intentions. Resources, Conservation and Recycling, 192, 106904.*
- *Roe, B. E., Qi, D., Beyl, R. A., Neubig, K. E., Apolzan, J. W., & Martin, C. K. (2022). A randomized controlled trial to address consumer food waste with a technology-aided tailored sustainability intervention. Resources, Conservation and Recycling, 179, 106121.*
- *Romani, S., Grappi, S., Bagozzi, R. P., & Barone, A. M. (2018). Domestic food practices: A study of food management behaviors and the role of food preparation planning in reducing waste. Appetite, 121, 215-227.*
- *Schuster, S., Speck, M., Van Herpen, E., Buchborn, F., Langen, N., Nikravech, M., ... & Bickel, M. (2022). Do meal boxes reduce food waste from households?. Journal of Cleaner Production, 375, 134001.*
- *Septianto, F., Kemper, J. A., & Northey, G. (2020). Thanks, but no thanks: The influence of gratitude on consumer awareness of food waste. Journal of Cleaner Production, 258, 120591.*
- *Shaw, P. J., Smith, M. M., & Williams, I. D. (2018). On the prevention of avoidable food waste from domestic households. Recycling, 3(2), 24.*

References

- *Shu, Y., Booker, A., Karetny, J., O'Keefe, K., Rees, K., Schroder, L., & Roe, B. E. (2023). Evaluation of a community-based food waste campaign using a national control group. Waste Management, 160, 101-111.*
- *Simões, J., Carvalho, A., & de Matos, M. G. (2022). How to influence consumer food waste behavior with interventions? A systematic literature review. Journal of Cleaner Production, 133866.*
- *Schmidt, K. (2016). Explaining and promoting household food waste-prevention by an environmental psychological based intervention study. Resources, Conservation and Recycling, 111, 53-66.*
- *Soma, T., Li, B., & Maclaren, V. (2020). Food waste reduction: A test of three consumer awareness interventions. Sustainability, 12(3), 907.*
- *Trewern, J., Chenoweth, J., & Christie, I. (2022). Sparking Change: Evaluating the effectiveness of a multi-component intervention at encouraging more sustainable food behaviors. Appetite, 171, 105933.*
- *Weis, C., Narang, A., Rickard, B., & Souza-Monteiro, D. M. (2021). Effects of date labels and freshness indicators on food waste patterns in the United States and the United Kingdom. Sustainability, 13(14), 7897.*
- *van der Werf, P., Larsen, K., Seabrook, J. A., & Gilliland, J. (2020). How neighbourhood food environments and a pay-as-you-throw (PAYT) waste program impact household food waste disposal in the city of Toronto. Sustainability, 12(17), 7016.*
- *van der Werf, P., Seabrook, J. A., & Gilliland, J. A. (2021). "Reduce food waste, save money": testing a novel intervention to reduce household food waste. Environment and Behavior, 53(2), 151-183.*

References

- *Wharton, C., Vizcaino, M., Berardy, A., & Opejin, A. (2021). Waste watchers: A food waste reduction intervention among households in Arizona. Resources, Conservation and Recycling, 164, 105109.*
- *Young, W., Russell, S. V., Robinson, C. A., & Barkemeyer, R. (2017). Can social media be a tool for reducing consumers' food waste? A behaviour change experiment by a UK retailer. Resources, Conservation and Recycling, 117, 195-203.*
- *Young, C. W., Russell, S. V., Robinson, C. A., & Chintakayala, P. K. (2018). Sustainable retailing–influencing consumer behaviour on food waste. Business Strategy and the Environment, 27(1), 1-15.*
- *Zhang, Y., van Herpen, E., Van Loo, E. J., Pandelaere, M., & Geuens, M. (2023). Save near-expired food: Does a message to avoid food waste affect food purchase and household waste prevention behaviors?. Journal of Cleaner Production, 384, 135555.*

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Link to webpage

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