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Food waste as the consequence of competing motivations, lack of opportunities, and insufficient abilities

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ABSTRACT

This study explores the motivations, opportunities, and abilities that consumers have for reducing food waste in everyday contexts that involve competing (food-related) goals. The framework of motivations, opportunities, and abilities is used to disentangle the complex array of factors that contribute to food waste. Results from 24 focus groups conducted in four European countries reveal that household food waste is the unintended result of balancing multiple competing goals. The results also indicate that abilities and opportunities influence the ease with which consumers can reduce food waste and act upon other goals (to which they assign greater value). These insights imply that, in addition to strengthening the importance that consumers attach to reducing food waste, interventions should focus on providing opportunities and abilities that will enable consumers to comply with multiple goals, including food-waste reduction.

1. Introduction

One third of all food that is produced is never eaten (Gustavsson et al., 2011). In the developed world, almost half of this waste is generated in consumer households (Monier et al., 2010). This is unfortunate, as food waste is accompanied by undesirable and unnecessary losses of water, energy, and land, despite an urgent need to reduce the impact of human behavior on the ecosystem (Scherhaufer et al., 2018; Stenmarck et al., 2016) and to prepare for a growing world population (Vörösmarty et al., 2000). It is therefore important to understand why consumers waste food in their households.

Consumers are averse to food waste for monetary, environmental, and moral reasons (Roodhuyzen et al., 2017), and they report that they expend effort to reduce such waste (Eurobarometer, 2014). This implies that there is a gap between what consumers aim to do and they actually do. This gap is not unique to food waste, as it apparently exists for many other pro-environmental behaviors as well (Kollmuss and Agyeman, 2002). Such situations occur when awareness of the negative outcomes of a given behavior are not translated into the intention to avoid such outcomes (Kollmuss and Agyeman, 2002) or into actual behavior (Nielsen, 2017). This raises questions concerning whether consumers might not be sufficiently motivated to set goals for reducing their levels of food waste, or whether they might be hindered in their efforts to implement such goals. Given the risk of food-borne illness, it might be nearly impossible to prevent food waste completely. It should nevertheless be possible to achieve a drastic reduction of the overall levels of food waste. To this end, this study investigates why consumers might *not* adopt intentions or implement goals to reduce their in-home levels of food waste.

1.1. Literature on setting and implementing goals to reduce food waste

Food that enters a household is subjected to routinized household practices. Research on these practices has demonstrated that the likelihood that food will be wasted is influenced by the ways in which consumers plan, shop for, store, and prepare their food, as well as by the ways in which they handle their leftovers (Block et al., 2016; Russell et al., 2017; Stancu et al., 2016; Stefan et al., 2013; Quested et al., 2013). Less knowledge has been generated concerning the drivers of these routines or, in other words, why consumers engage in food-handling practices that result in waste.

Studies examining the goals of consumers have provided initial evidence to suggest that food-handling practices might be influenced by motivational factors. When handling food, consumers are likely to assign importance to multiple goals, including that of being a good provider (i.e., providing plenty of healthy and tasty food to children, guests, or partners) (Evans, 2011, 2012; Visschers et al., 2016) and that of ensuring food safety (Watson and Meah, 2012). In some situations,

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these goals may conflict with the goal of reducing food waste, as when consumers are faced with deciding whether to eat or discard potentially spoiled foods (Evans, 2011; Watson and Meah, 2012). The presence of more valued competing goals might thus have an impact on goal implementation. For many people, food waste is a normative goal (i.e., it is linked to acting in a pro-environmental or pro-social way), with benefits that are largely distant and non-personal. Due to the nature of its benefits, this goal may be easily overruled by goals that are more hedonic (i.e., linked to pleasure and instant gratification) or gain-oriented (i.e., linked to maintaining one's health, money, or other resources) (Lindenberg and Steg, 2007; Nielsen, 2017). In addition to goal implementation, the presence of competing goals may also have an impact on the setting of intentions. Consumers are generally less likely to adopt a new goal (set an intention) when they realize that this new goal is in conflict with existing goals that they value (Nielsen, 2017). It is therefore important to enhance understanding concerning when and why certain goals are likely to interfere with the reduction of food waste.

The Theory of Planned Behavior (Ajzen, 2002) provides further insight into motivational factors that might influence food-handling practices. According to studies in this line of research, attitudes and subjective norms influence the intention to reduce levels of in-home food waste, thereby decreasing the actual waste of food (Graham-Rowe et al., 2015; Mondéjar-Jiménez et al., 2016; Stancu et al., 2016; Stefan et al., 2013; Visschers et al., 2016). As also suggested by these studies, however, factors other than motivation are of influence as well. Perceived behavioral control has been shown to influence intention, while also having a strong direct impact on food-waste levels directly (Stancu et al., 2016; Stefan et al., 2013; Visschers et al., 2016). These findings suggest that consumers who feel in control are not only more motivated to reduce food waste but are also more likely to implement behaviours which lead to food waste reduction. Yet, these studies do not identify the factors that determine when a consumer will feel in control. The current study addresses this gap in the available knowledge by adopting a framework centering on consumer motivation, as well as on perceived abilities and environmental constraints. By taking this perspective, the study responds to the call to explore food-waste behaviors and, more generally, behaviors relating to sustainability more holistically (Steg and Vlek, 2009; Roodhuyzen et al., 2017; Schanes et al., 2018). It also provides valuable and indispensable input for the development of effective behavioral-change interventions (Stöckli et al., 2018).

1.2. The motivation, opportunity and ability framework

The current study draws on the framework of motivation, opportunities, and abilities (MOA; Olander and Thøgersen, 1995; Rothschild, 1999) to investigate why goals interfere with food-waste reduction and which factors are involved. This framework takes into account motivational antecedents to setting specific goals, as well as barriers that hinder their implementation in the form of environmental structures (opportunities), as well as in terms of gaps in skills and knowledge (abilities). More precisely, *motivation* includes drivers of intention-setting, including values, attitudes, and subjective norms. *Opportunities* refer to the influences of structures in the environments of consumers that influence their behavior. The food infrastructure, technical appliances, lifestyle (i.e., work and social life), or other factors can impose restrictions on the behaviors that consumers are able to perform. *Abilities* refer to skills and knowledge sets that are required to perform a behavior successfully. Given that food waste is linked to many food-handling practices, the framework could refer to a wide range of abilities, including knowledge concerning date-labeling or planning skills (Neff et al., 2015; Quested et al., 2013). The abilities addressed here do not have to do with actual food-handling behaviors, but to the capacity of consumers to perform them. For example, while we might know that consumers do not plan their shopping trips, we might not understand why they do not. The MOA framework could reveal an actual or perceived lack of capabilities that could cause consumers to feel that they are not able to plan.

The MOA model has been used in a variety of fields, including advertisement processing (Batra and Ray, 1986), knowledge sharing (Siemsen et al., 2008), and health behavior (Brug, 2008). This framework is especially useful for explaining behaviors that are linked to normative or gain goals, as these types of goals require discipline, abilities, resources, and technical means to not be overruled by hedonic goals (Olander and Thøgersen, 1995). For this reason, the framework proposes that the motivation to act upon a goal should be present and that barriers that hinder its implementation should be absent. Such potential barriers are factors that drive consumers to believe that they are unable to reduce food waste. They thus serve to specify the factors underlying what the theory of planned behavior (Ajzen, 2002) summarizes as the perceived behavioral control of consumers.

In summary, the current study is intended to explore the motivations, opportunities, and abilities that people have for performing food-handling behaviors related to the reduction of food waste. Of particular interest is the identification of any elements that could potentially hinder and/or facilitate alignment between food-waste reduction and other (food-related) goals. We focus on in-home food waste and exclude out-of-home food consumption and waste, as consumers have the most control over the handling of food in the home context, including control over the planning of, shopping for, and preparation of meals. This article reports on an in-depth investigation of the complex multitude of factors possibly underlying in-home food waste, based on focus groups.

2. Methodology

2.1. Participants

Data for this study were collected in four European countries: Germany, Hungary, the Netherlands and Spain. In all, 24 focus groups were conducted (six in each country, with 6–8 participants in each focus group) in February and March of 2016. Participants were recruited by local recruitment agencies, applying the same inclusion and exclusion criteria in each of the four countries. To ensure that the participants were involved in and aware of how food was handled in their households, one inclusion criterion specified that all participants must be responsible for at least half of the shopping and cooking in their households. We excluded individuals who either worked in the food or waste sectors or who had partners working in these sectors, thus preventing experts from biasing the results (i.e., to avoid group confirmation towards the opinions of experts).

To ensure that the focus groups would generate a variety of opinions and experiences, participants of all ages and income levels were included. Based on evidence that participants have difficulty discussing sensitive topics in groups with large differences in age or income level (Krueger, 1994; Rabiee, 2004), we ensured that the composition of each focus group consisted of participants of roughly the same age (20–45 years and 46–70 years) and income level ("low to average" and "average to high"). In contrast, to stimulate discussion, we purposely mixed the groups according to gender and household composition. The inclusion of various age groups and household compositions was of particular interest, as these demographic factors have been found to influence food waste (Visschers et al., 2016). In all, 147 participants were involved (for details, see the methodological data appendix).

2.2. Procedure

Focus groups were selected as a research method, given that the main aim of the study was to exhaust the range of potential barriers to food-waste reduction. In focus groups, consumers reflect on each other's answers, thereby making it possible to investigate why some elements might be perceived as barriers by one person, but not by another. A semi-structured protocol was developed in English and

Table 1
Focus-group procedure.

Topic	By making use of:	Content
Part 1: Introduction Warm-up		Consent form, welcome, and short introduction. Discussion of participants' photographs of foods that they had discarded in their households during the week prior to the focus group.
Part 2: Motivation to waste food	Two cartoons, one with a person discarding leftovers and another person discarding decayed fruits and vegetables.	How and why did the individuals depicted in the cartoons end up with food waste? How would they feel about wasting food?
Part 3: MOA to reduce food waste	Scenario: The challenge to prevent food waste for 30 days.	Why would the cartoon set a goal of preventing food waste for 30 days? What could make it difficult for them? Would you accept such a challenge and why (or why not)? What would make it difficult for you and your household? What would help your household to prevent food waste?
Part 4: Acceptability of wasting food	Drawings: dinner with family; dinner with guests; unforeseen events. Drawings: bread, pasta & rice, meat & fish, sweets & cookies, fast food, fruits & vegetables, dairy.	How would you rank these situations based on the acceptability of wasting food in that situation? Why? How would you rank the categories based on the acceptability of wasting food from that category? Why?
Part 5: Wrap- up		Explanation of the research context and word of thanks.

Note: Participants wrote down their answers to the questions regarding the cartoons and drawings individually, prior to discussing them as a group. Other topics discussed during the focus groups, which fall outside the scope of this study, include stereotypes surrounding food waste, the acceptability of intervention, and out-of-home food waste.

translated into the four national languages. Frequent contact among the translators, who also moderated the discussions, ensured that each topic, question, and task was understood in the same way. The protocol made use of interpretative questions. Photographs (made by the participants themselves), projective techniques, and individual pen-and-paper tasks were used to enhance the participants' awareness of their own food-waste levels, to reduce the likelihood of socially desirable answers, and to enhance the likelihood of collecting a wide variety of opinions, respectively. A brief description of each task and topic is presented in Table 1.

Following an introduction and warm-up exercise, the focus groups started with a discussion of reasons why food is wasted (i.e., competing goals), attitudes toward wasting food, and reasons for preventing food waste. This was followed by a discussion of perceived barriers to the prevention of food waste and aspects that could be helpful in preventing food waste, in order to explore opportunities and abilities that could potentially hinder food-waste reduction. Finally, we continued to explore goals that could potentially interfere with food-waste reduction by presenting a variety of situations and asking participants to rank and discuss the acceptability of wasting food in these situations. We also presented a variety of food categories and discussed the acceptability of wasting food from each category. Although several other topics were discussed during the focus groups as well (e.g., stereotypes surrounding food waste, the acceptability of interventions, and out-of-home food waste), they fall outside the scope of the current study.

2.3. Analyses

The focus group discussions were transcribed and subsequently translated into English before being analyzed. The transcripts were coded and analyzed using NVivo 11 Pro. We used a combination of deductive and inductive thematic content analysis (Krueger, 1994). More precisely, the first author read through several transcripts to become familiar with the data; to search for themes related to the MOA framework (e.g., attitude, skills); and to identify themes emerging from the data. Based on this search, an initial code book was compiled and sent to the other coders. Each coder subsequently coded one focus group according to this codebook, noting any additional themes that had emerged in the focus group. They also noted whether they thought that particular codes should be renamed, merged, or split into multiple codes.

In the next step, the first author carefully reviewed parts of the coding performed by the other coders, to identify any differences in the interpretation of specific codes. Thereafter, a meeting was arranged to discuss differences in interpretations and to update the code book. An example of such a difference, concerned the perceived quality of food. In the beginning one code was used, but it appeared that some coders used this code only for quotes related to food borne illness, while others also used it for the healthiness of eating 'old' foods or foods that did not taste as expected. After noticing this difference in interpretation, we decided to use three codes; health - nutrition, taste – quality and food borne illness. This process was repeated until all the focus groups had been coded. The coders then reviewed all transcripts again, to include any codes that had been added later in the process. It was decided in advance that each quotation should be as short as possible, but long enough to be understood on its own. The codes in the final codebook are related to the stages of management in the household (i.e., planning, shopping, storing, preparing, consuming, and disposing), to barriers, and to feelings, attitudes, and awareness. Although demographic information on the participants was recorded, it was not considered in the data analysis, given that this study focuses on exploring a large variety of aspects relating to MOA, and not on identifying specific segments. In a few cases, however, interesting insights emerged to suggest differences between socio-demographic groups (e.g., based on nationality). These differences are reported in this article. Parts of the code book are provided in the methodological data appendix.

3. Results

The discussion of the results is organized around the three pillars of the framework: motivation, opportunities, and abilities. An overview of the three pillars and the underlying aspects that emerged in the analysis is presented in Fig. 1.

3.1. Motivation

Consistent with results from prior research, the participants in the current study expressed a dislike for wasting food. They reported that it makes them feel guilty to waste food (e.g., it is regarded as morally wrong, as there are still people who experience hunger). Other reasons for their dislike of wasting food were of a monetary and environmental character (although the latter was not mentioned often). In contrast to previous studies, however, our results reveal greater nuance in such thoughts and feelings when discussing food waste in everyday contexts.

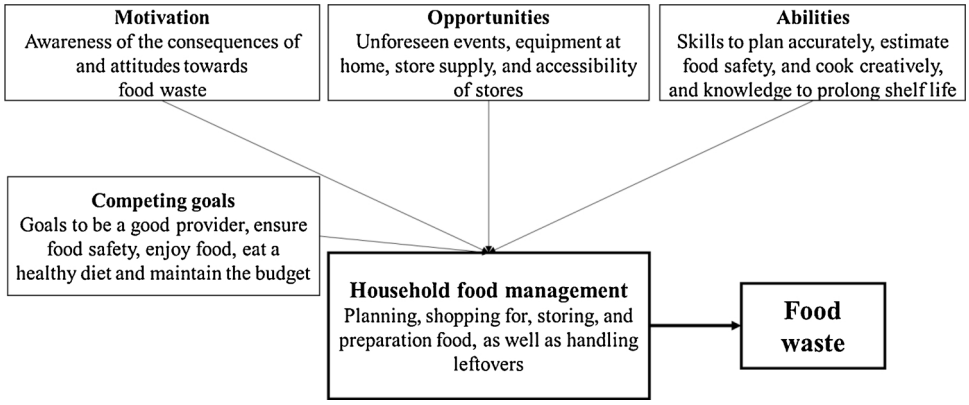

Fig. 1. Overview of the MOA Framework and aspects emerging from the analysis.

3.1.1. Beliefs and attitudes about reducing food waste in everyday contexts

When discussing food waste in everyday contexts from the first-person perspective, the participants did not seem to feel very guilty about discarding food. They considered food waste inevitable from time to time, and they trivialized its consequences. They argued that the financial impact of food waste is limited, given that food is currently so inexpensive. In a similar vein, they argued that, from a moral perspective, their food waste was irrelevant, as it would not be possible to give their leftovers to those in need anyway. Moreover, some participants expressed several benefits of wasting food. For example, food waste was seen as a reflection of financial stability (e.g., earning enough money to be able to waste food), of successful dieting (e.g., wasting food instead of eating it), and/or of being organized (e.g., wasting food instead of having a disorganized kitchen). During these discussions, however, the participants continually confirmed their negative general attitudes towards food waste. This seems to imply a discrepancy between the moral beliefs that the participants held with regard to the concept of food waste in general and of the actual waste of food in the context of everyday life.

> "The moral from all this for me was that we always complain but we have very good lives, as long as we have food to throw away." Female, 47, Hungarian
> "Wasting is not acceptable to me at all. But if it happens from time to time, then it happens. For me that doesn't count as wasting. It's just the attitude that's not acceptable to me at all." Female, 40, Hungarian

3.1.2. Goals that compete with the reduction of food waste

As mentioned in the previous section, the participants often linked food waste to benefits in other domains. As expected, the goal to reduce food waste was sometimes in competition with other goals, like being a good provider and ensuring food safety. Other competing goals included the goal to enjoy eating, to eat a healthy diet, and to pay attention to food prices. As the former goals have been discussed extensively in prior research, only the latter goals are discussed in detail here.

3.1.2.1. Competition between enjoyment and food waste. The major reason that the participants cited for food to remain uneaten was taste. Many participants expressed a strong belief that eating should be pleasurable. They considered it unthinkable, undesirable, or – at the very least – difficult to eat distasteful foods simply to reduce food waste. In addition to foods with defects (e.g., fruits that failed to ripen), the discussion referred to foods that the participants no longer liked or wanted. The participants apparently often bought food in the expectation that they (or their families) would like it, but ended up wasting the food, as it was not preferred before it spoiled. Taste preferences seemed to change easily and unexpectedly, thus rendering it impossible to make good predictions. Although several participants noted that they tried to anticipate such fluctuating preferences by shopping shortly before dinner time, food ended up as waste in these households as well, due to changing taste preferences.

> "Tomorrow, [if]I feel like [having] cauliflower. No, in the morning, [if] I feel like [having] cauliflower, well then I'm going to get cauliflower that day. So I go each day to the store, and if something is left over, and, then I throw it away. Or then, I suddenly feel like going out for dinner, and then there's still something left over too." Male, 62, Dutch.

3.1.2.2. Competition between health and food waste. The discussion about reducing food waste also triggered thoughts on the relative healthiness of foods. This discussion was not restricted to food-safety issues (e.g., the risk of food-borne illness), but also concerned the prevention of overeating, the consumption of foods that are perceived as unhealthy foods and the encouragement of a healthy consumption. These discussions revealed that participants sometimes discarded food as a consequence of acting upon a goal to have a healthy diet and the associated beliefs concerning what that would entail.

Participants were quite straightforward in stating that they discarded foods (e.g., leftovers or unhealthy products) in order to prevent weight gain. In some households, however, participants noted that leftovers were discarded due to the belief that eating the same food multiple times in a row is less healthy than eating a variety of foods, as this reduces variation in nutrients. Similarly, some participants believed that "old" food is less healthy than new food, as it decreases the intake of nutrients. They therefore discarded old foods and ate only freshly bought or cooked foods.

> "I already have enough fat, so [I'd] rather [have it] in the bin than around my waistline." Male, 67, Dutch
> "At ours it is often the case that my husband then cooks. And if he [were to] gives me the same meal two days in a row, I think I would throw up. I think it would be too unbalanced." Female, 36, German

Another way that health goals interfered with waste reduction involved the encouragement of healthy eating. Participants noted that they often purchase healthy perishables (e.g., fruits and vegetables) as a means of continuously promoting a healthy diet for themselves and the members of their households. Although they acknowledged that these perishables often were not eaten, they considered not buying these foods undesirable, as they wished to continue encouraging a healthy diet.

> "Sometimes, you buy something because you say 'Okay, I'm going to eat more of this, because it will be good for me,' even though you know that you usually don't eat it." Male, 30, Spanish

3.1.2.3. Competition between maintaining the budget and food waste. Participants identified saving money as a motive for reducing food waste. Nevertheless, the relationship between price and food waste appeared to be more complex and, at times, even counterintuitive. As mentioned before, several participants trivialized the monetary consequences of food waste by noting the current low food prices and the fact that they do not incur many costs from wasting food. In contrast, other participants, mainly in Hungary, stated that they would need *more* money in order to reduce food waste. They argued that food waste was often the consequence of low-quality products that spoil sooner than expected or of mismatches in packaging size. They therefore felt the only way for them to be able to reduce food waste would be to buy products of better quality and in more suitable packaging sizes, even though such products are more expensive.

> "[Supermarket] and [supermarket] are so really cheap. So I think, 'yes it didn't cost anything, the onion'. If it had been a little more expensive, I could imagine thinking differently [about food waste]." Male 29, German
>
> "You need money [to reduce food waste]. If something is good, you have to pay more for it. You have to pay for quality." Female, 57, Hungarian

3.1.3. Summary on motivation

In summary, participants experienced discrepancies between their beliefs about general food waste and their experiences with food waste when discussed in an everyday context. This appears to be the consequence of having several prioritized goals that are traded off in everyday situations. When handling food, the participants did not focus solely on waste reduction, but also on the enjoyment of food, its relative healthiness, and their budgets. The trade-offs between these priorities apparently determined the food-handling routines that they performed. Interestingly, many participants considered it justified to discard foods as a consequence of acting upon a goal with higher priority, particularly if the foods were thrown away routinely for the same reason.

> "[Bread is] most acceptable [to throw away], because I always eat fresh bread anyway, so a lot of it goes away anyway, but that's me." Male, 56, Dutch

In the following sections we discuss opportunities and abilities that influence the implementation of the goal to reduce food waste.

> "We said a lot of things, […]But I think the most important is to eat healthy, not pollute the environment with food waste, and bring it all together. Obviously, your wallet makes the biggest decisions. But if you do it consciously, then I think the most important is whether what you eat is harmful for your body, how many calories it has, what its quality is like, how many vitamins or minerals it contains, and how you can use them. Because you can get sick from food." Male, 58, Hungarian

3.2. Opportunities

Participants mentioned aspects in their environmental structures that hindered them from reducing their levels of food waste. The main issue seemed to be limitations in the amount of time, energy, and money available to allocate to food handling. Opportunities that apparently influenced the availability of these resources included unforeseen events, equipment at home, accessibility of stores, and store supply.

Participants expressed that their household dynamics and busy lifestyles made it difficult to reduce waste. They often felt hindered in their ability to shop and cook as planned, as their busy lives made them feel rushed and tired. In addition, their jobs or social appointments were often subject to change unexpectedly, thus leaving foods unused and spoiled.

> "I think everybody is tired. All of us are in a hurry when we go to these shopping trips, [supermarket] and such places. Everybody is nervous! Nobody tells me that, regardless of the kind of list you have, you will not be tired of shopping [by the time you reach] the 36th aisle, and you don't feel like throwing everything in your basket just so you can go already, because my legs hurt, I am tired, I have a headache and, in the meantime, I have 1000 other things to take care of and I have to wake up at 5 AM tomorrow. Isn't it like this? I think this is how we live. Or at least I do." Female, 57, Hungarian

Another barrier to reducing food waste had to do with the lack of equipment (e.g., space and material) at home to optimize food storage and prolong shelf-life. Participants reported "solving" this problem by not saving leftovers and by disposing of older unused foods as soon as they returned from the grocery store, in order to make space in the refrigerator for the new foods.

Participants also felt that the lack of appropriate packaging sizes for a fair price led them to waste food. They regarded the available packaging sizes as being too large, with the smaller sizes being too expensive. Participants in single-person households were particularly likely to report this problem. A few participants reported shopping at markets in order to avoid these fixed quantities, but markets were not easily accessible to most participants.

The distance to the supermarket and its opening hours also hindered participants in their efforts to reduce their levels of food waste. They felt that they would be able to shop more accurately if markets and supermarkets were to be more easily accessible, so that they could go shopping every day and buy only what they liked and needed.

A final factor that the participants identified as being important was the quality of food, especially in the case of perishables. Participants mentioned that the quality often turned out to be lower than expected. The discussion centered on perishables that spoiled sooner than expected or perishables that failed to ripen.

Interestingly, participants found it acceptable to waste food due to one of the factors mentioned above. They felt that, in such situations, they could not avoid food waste, and they considered it pointless to feel guilty about it. More specifically, participants found it acceptable to waste perishables that are of bad quality or that are sold in fixed quantities (that are too large). Others found it acceptable to waste food due to unexpected changes in their own schedules or those of their family members.

> "If I don't control it [the situation in which food is wasted], I don't have to feel bad either." Female, 30, Spanish

Taken together, opportunities (or the lack thereof) apparently had an impact on the participants' food-waste levels, as well as on their perceived control over the situation. The lack of perceived control led participants to perceive that, in these cases, it is acceptable to waste food without guilt.

3.3. Abilities

Across focus groups, the majority of participants felt that they could lower their food waste levels by improving certain abilities. In particular, they agreed that improving the accuracy of their planning skills would help them decide how much to purchase, cook, and consume. Better cooking skills would help them to use up their leftovers, and better skills in estimating food safety and additional knowledge concerning how to prolong the shelf-life of products would help them to eat the food that they purchased before it spoiled.

These abilities were discussed primarily from the perspective that improving them would make it easier to reduce in-home food waste, while simultaneously fulfilling other goals. For example, better cooking skills would help participants to use foods that would otherwise be

wasted to cook meals that they consider tasty. In contrast, however, participants who questioned the positive effects that improved abilities would have on their other valued goals appeared unmotivated to improve their abilities. These participants worried that the new skills would decrease their enjoyment of food and make their diets less healthy. For example, accurate planning was associated with less freedom to make spontaneous decisions concerning what to eat. In a similar vein, improved cooking skills were associated with forcing their families to try new recipes that they might not like. In addition, several participants stated that they often intentionally stored food in suboptimal ways. For example, some kept fruits outside of the refrigerator in order to encourage healthy consumption, and others did not store bread in the freezer, thereby preventing the disagreeable taste of defrosted food.

> "But [not wasting food] is obviously difficult though, of course, because then you really have to plan everything […], you can't do anything spontaneously anymore." Male, 44, Dutch

Participants varied in their perceptions regarding the difficulty of reducing their food waste. Participants claiming to be already engaged in, skilled at, and knowledgeable about food-waste reduction found it easy and "*just a matter of being aware.*" Participants who did not feel engaged or skilled expected it to require a great deal of effort and even to be undoable.

> "[It is unnecessary to improve skills and knowledge] because I think [food-waste reduction] is impossible. You can try, everyone tries, but, in the end, we either eat bad food or stuff ourselves. I don't think it's doable." Male, 38, Hungarian.

These discussions showed that abilities are important. It also shows that food waste reduction cannot be considered separately from other (food related) goals. This is because participants seemed unwilling to improve their abilities unless they were convinced that it would not hinder their efforts to fulfill their other goals of higher priority.

3.4. Barriers linked to the household food management practices

The barriers discussed (i.e., competing goals, lack of opportunities, and insufficient abilities) appear linked to different household food management practices. Table 2 gives a schematic overview of the various barriers in relation to the different practices. Only one barrier was discussed in the context of all practices, namely the goal to enjoy eating. All other barriers were discussed only in terms of a few practices. For example, the goal to eat healthily was discussed in terms of the planning, storing and consumption of foods and the goal to maintain a budget only in terms of the shopping for food. Unforeseen events were discussed with regard to the planning, shopping and preparation of food and the consumption of leftovers, whereas the lack of optimal store supply or store accessibility only seemed to impact the shopping for food. The lack of equipment was discussed to influence the storing of foods and leftovers. Abilities only seemed to impact those practices which need the specific skill or knowledge. The discussed linkages between barriers and various practices were made spontaneous by our participants. No explicit question regarding the impact of a certain barrier on a certain food handling practice was asked nor prompted, thus more linkages between barriers and practices could be present.

4. Discussion

This study explores the motivations, opportunities, and abilities that consumers have with regard to reducing their levels of food waste by discussing consumer food waste in everyday contexts, in which competing (food-related) goals are present. The results confirm the conclusions of other empirical studies, which suggest that the reduction of food waste is typically subordinate to and in conflict with other goals (Evans, 2011, 2012; Stancu et al., 2016; Stefan et al., 2013; Visschers et al., 2016; Watson and Meah, 2012). Our research adds to this work by providing more detailed insight into why and when competing goals interfere with food-waste reduction, as well as by suggesting ways to mitigate such interference.

4.1. Motivation: setting an intention to reduce food waste

Contrary to our expectations, our results indicate that the beliefs and attitudes of consumers with regard to food waste are not solely negative. The participants in this study condemned food waste only when discussing it as a general concept, based on its negative social, environmental, and financial consequences, as well as because it made them feel guilty. When discussing food waste in the context of their everyday lives, the thoughts and feelings of these consumers in this regard were not necessarily negative. In this context, they tended to express attitudes about food waste that were more neutral or positive, while seeming to trivialize its consequences. Our results thus suggest an apparent discrepancy between the beliefs that consumers hold about food waste as a general issue and those that they hold about food waste as an issue in their everyday lives. This discrepancy is unlikely to be caused by social desirability. Participants expressed less socially desirable views when talking about food waste as an issue in their everyday lives than they did when talking about food waste as a general issue. These results are in contrast to those of studies on social-desirability bias, which have shown the opposite pattern (Fisher, 1993).

A more likely explanation of this discrepancy could be that it is the consequence of cognitive dissonance (Harmon-Jones and Harmon-Jones, 2007). When discussing food waste in the context of everyday life, participants may have realized that, in practice, they often act upon goals other than waste reduction. The incongruence between their disapproval of wasting food and their own wasteful behaviors may have made them feel uncomfortable. According to cognitive dissonance theory (Harmon-Jones and Harmon-Jones, 2007), cognitive dissonance is rarely solved by changing behaviors, given the amount of effort that such solutions require. More common strategies for reducing the discomfort associated with cognitive dissonance include attitude change (Harmon-Jones and Harmon-Jones, 2007) and trivialization (Simon et al., 1995). Participants in the current study also regarded behavioral change in order to reduce food waste levels as requiring considerable effort and as being difficult or even impossible. Instead, these consumers expressed mixed and, at times, even positive feelings about their own food waste, while trivializing its negative impacts.

Alternatively, this discrepancy could be the result of moral licensing, in which consumers use good behaviors that they have performed in the past to justify a subsequent immoral action (i.e., "I've behaved well before, so now I can behave poorly") (Blanken, van de Ven and Zeelenberg, 2015). In everyday life, consumers may feel satisfied that they have successfully acted upon an important goal, thereby feeling less guilty about wasting food at a later time. Also in this study, participants seemed to feel less guilty about food waste if it served another goal. For example, participants who discard perishables did not feel guilty, as they had at least bought these foods in the attempt to eat a healthy diet.

Future research might want to continue exploring consumers' attitudes towards food-waste reduction in the context of everyday life, to expose the underlying mechanism for the shown discrepancy. Meanwhile, our results show that scholars should be perceptive of the way they measure attitude as this will impacts their findings.

4.2. Opportunities and abilities: implementing a goal to reduce waste

The presence of perceived or actually conflicting goals also seems to have an impact on the implementation of goals. Consumers feel they cannot ensure satiety, enjoy food, eat a healthy diet, manage time efficiently, maintain their budgets, and show affection while simultaneously reducing food waste. They therefore handle their food in ways

Table 2
Barriers linked to the household food management practices.

	Planning	Shopping	Storing	Preparing	Consumption
Competing goals[1]					
Enjoyment	Less planning to facilitate spontaneity	Impulse purchases of foods which are fancied at the moment	No preference for freezing as it diminishes taste	Preparing what is tasty, not what is about to spoil Preparing extra meals to match the preferences of household members	No preference for eating leftovers
Health	Planning to buy (surplus) perishables to promote a healthy diet		Storing perishables in sight to promote a healthy lifestyle		Not saving left-overs or not eating 'old' foods as it is believed to be unhealthy. Not finishing the plate to avoid gain weight
Maintain the budget		Buying larger packaging sizes for less money Buying low quality foods which spoil sooner for less money			
Lack of opportunities					
Unforeseen events	Difficulty to act upon a planning	More impulse purchases as a consequence of a hurried lifestyle		Food is not prepared as planned and/or too much food is prepared as household members do not join for diner	Leftovers are not eaten as planned
Lack of equipment at home			Non-optimal storage of food or disposal of old foods to make space for new ones		Inability to save leftovers
Store accessibility		Low accessibility leads to overbuying to avoid running out of food High accessibility leads to frequent shopping trips and fuels eating what is preferred instead of what is in stock			
Unsatisfactory store supply		Too large packaging sizes / bad quality of products fuels buying surplus			
Abilities					
Skill to plan accurately	Less surplus purchases			Less surplus cooking	
Skill to cook creatively				Being better able to cook with leftover food	
Skill to estimate food safety			Better storage of foods		More certain about judgment if food can be consumed safely
Knowledge on prolonging shelf-life			Increased time to eat foods before they spoil		

[1] The goal to be a good provider and to ensure food safety were discussed in our focus groups, but not included in our results as these have been extensively discussed in prior research.

that allow them to fulfill their goals that have the highest priority, with unintentional food waste as a result. The consumers who participated in this study agreed that improving their food-handling routines by improving their abilities would help them to waste less food. More concretely, they expected that they would become better in reducing food waste if they could improve their ability to plan accurately, cook creatively, estimate food safety, and prolong the shelf-life of foods. It would nevertheless be too simplistic to state that food waste could be solved by providing consumers with information on the best ways to handle food. According to our results, consumers are likely to be unwilling to learn new skills that would enhance their food handling if they fear that implementing these abilities might hinder their efforts to fulfill other goals (to which they assign higher priority). This is the case for cooking skills, as also suggested by Evans (2011), as well as for planning more accurately and improving knowledge about food storage, as consumers are likely to perceive these skills as limiting their spontaneity (in the case of accurate planning) and healthy eating (in the case of food storage).

Lack of opportunities apparently places more pressure on consumers to make trade-offs between goals. For example, appropriate packaging sizes and high-quality foods are perceived to be more expensive than their alternatives. In addition, large packaging sizes imply that consumers will have to eat the same food multiple times in a row, which is in conflict with the health beliefs of some consumers. Lack of opportunities can also influence the ease with which consumers can perform behaviors that can reduce food waste. For example, unexpected events can require consumers to expend more effort in order to act upon their planning. The accessibility of stores was mentioned as an opportunity, in the sense that closer shops with generous opening hours would make it easier to buy exactly what is needed at a given time. It is nevertheless debatable whether such availability would actually lead to lower waste levels, as it might also fuel the preference to eat only meals that one desires at that moment, instead of eating what is already in stock. Another important result from our study is that the lack of opportunities can have an impact on the perceived responsibility of consumers for their levels of food waste. This ascription of responsibility is a cause for concern, as it makes it less likely that consumers will change their food-handling behaviors (Bamberg & Möser, 2007).

4.3. Practical implications

Given that food waste is the consequence of many food-handling routines (Block et al., 2016; Russell et al., 2017; Stancu et al., 2016; Stefan et al., 2013; Quested et al., 2013), practitioners currently have a tendency to launch general information and awareness-raising campaigns to facilitate behavioral change (Stöckli et al., 2018). By providing information, they hope to make the problem of food waste more salient, while improving peoples' general attitudes towards food waste and making them more aware of its consequences. Our results indicate that such campaigns may be not be sufficient. First, practitioners should ensure that their campaigns trigger actual behavioral change rather than only attitudinal change. If they do not, such campaigns are likely to backfire, as was the case for advertisements blaming consumers for their food waste (Birau and Faure, 2018). Practitioners should also investigate whether strengthening the goal to reduce food waste will lead to actual food-waste reduction. Given the nature of such goals, it is likely that food enjoyment or healthy eating will continue to take higher priority over the reduction of food waste (Lindenberg and Steg, 2007).

Our results suggest that a more fruitful strategy would be to ensure alignment between food-waste reduction and competing goals. This could be done by enhancing the abilities of consumers, but only when such efforts are combined with information on how these improved abilities will also help consumers to fulfill other high-priority goals. In the absence of such information, people might not be receptive to information on abilities. Goal alignment could also be facilitated by making changes in the environment. For example, stores could offer more suitable packaging sizes and high-quality products for fair prices, thereby eliminating the necessity of trade-offs between money and food waste. In addition, consumers could benefit from in-home changes (e.g., having a toaster on the kitchen table) that could make it easier to reduce food waste (von Kameke and Fischer, 2018). Similarly, consumers could benefit from tools that help them to anticipate potential unexpected circumstances (e.g., apps that provide better insight into the schedules of other members of the household).

A different way to align conflicting goals would be to increase the perceived compatibility between goals (Steg et al., 2014). For example, this could be done by communicating that the reduction of food waste is an important aspect of being a good role model for children or by challenging peoples' beliefs about the unpleasantness or even unhealthiness of eating leftover products. Particularly the latter deserves attention as multiple misperceptions regarding the healthiness of eating stocked foods or leftovers appear present.

Our research further shows that barriers impact different household food management practices. The linkages that we found were made spontaneously without specific questioning. This suggests that it is important to take into account that specific barriers impact specific practices, when designing intervention studies. It is for future research to investigate if more linkages between barriers and practices are present.

4.4. Limitations and directions for future research

We selected a qualitative approach for this study, in order to compensate for a possible lack of awareness on the part of consumers concerning the level of food waste in their households and the factors that influence these levels. The focus-group dynamics has allowed us to collect information on a wide range of barriers that impact food waste. Yet, a limitation of focus groups is that they do not allow the discussion of factors that influence behavior unconsciously. For example, although social norms are known to have a strong influence on behavior (Cialdini et al., 1991), people tend to underestimate the influence of such norms on their own behavior (Nolan et al., 2008). Perhaps as a consequence, the topic did not emerge explicitly during our focus-group discussions, although the private nature of most food-handling behaviors may have been a contributing factor as well (Visschers et al., 2016). We nevertheless stress the importance of examining the effect of social norms on food-waste behaviors (Stefan et al., 2013; Stancu et al., 2016).

Similarly, the impact of self-control did not emerge as a topic, despite its importance in the pursuit of multiple goals. Self-control could be of particular interest, given the nature of food-waste reduction. It has been shown that consumers with poor self-control have greater difficulty acting in morally acceptable ways when faced with hedonic urges (i.e., opting for taste, pleasure, or convenience) than is the case for consumers with high levels of self-control (Fishbach and Zhang, 2009; Hofmann et al., 2018; Mann et al., 2013). Our findings did suggest that improving opportunities could lower the need for self-control, as it would make it easier to opt for food-waste reduction. Theories of self-regulation theories therefore might provide interesting leads for future research.

In our design, we excluded individuals who either worked in the food or waste sector or had partners working in these sectors, in order to prevent experts from biasing the results. Although exclusion of experts made it possible to gather a wide range of beliefs from many consumers, this inevitably came at the cost of excluding the beliefs from such experts from our analysis.

Future studies should continue investigating food waste in the context of competing goals. Our results clearly demonstrate the importance of including the context in which food is handled when investigating food waste. We did so by applying the MOA framework, which allowed us to exhaust the potential range of factors driving food waste in the context of competing goals. Nevertheless, behavioral

change is a dynamic and multi-phased process, as suggested by theories including the Transtheoretical Model of the stages of change (Moore, 2005). This implies that the strength of the effect of each barrier to food-waste reduction can vary according to the stages of change. In other words, the drivers of food-waste reduction could differ as consumers become aware that food waste is a problem, as they set intentions to do something about it, as they start to implement these intentions, and as they continue to implement them (Bamberg, 2013; Moore, 2005). Also, our focus on factors that hinder the likelihood to reduce food waste allowed us to examine abilities and opportunities in detail, but came at the expense of not explicitly probing consumers' self-efficacy, which is left for future research.

4.5. Conclusions

The results of this study indicate that, although consumers consider it important to reduce food waste, they struggle to do so in their daily lives. This is due to the presence of competing goals, which seem to have an impact on the intentions of consumers to reduce food waste, as well as on the implementation of these intentions. The MOA framework has proven useful for disentangling the various factors that affect food-waste levels. It has been demonstrated that the ways in which consumers currently handle food are the result of a balancing act between multiple competing goals, in light of available opportunities and abilities. This study provides the essential insight that, rather than solely investigating the goal to reduce food waste among consumers, scholars should also address the context of competing goals in which the target behaviors take place. From a practical perspective, interventions should provide opportunities and enhance abilities that improve the ease with which consumers can reduce their food waste, while also addressing how these improvements can simultaneously help consumers to fulfill their other higher-priority goals.

CRediT authorship contribution statement

Lisanne van Geffen: Conceptualization, Investigation, Methodology, Visualization, Formal analysis, Writing - original draft. **Erica van Herpen:** Funding acquisition, Conceptualization, Methodology, Writing - review & editing. **Siet Sijtsema:** Conceptualization, Investigation, Methodology, Writing - review & editing. **Hans van Trijp:** Funding acquisition, Conceptualization, Methodology, Writing - review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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