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Dances with potential food waste:

Organising temporality in food waste reduction practices

Abstract

This study describes and analyses how practices organise temporality to reduce food waste. The study builds upon the material turn in practice theories and an ontological approach that together highlight emerging relations between humans and nonhumans in practices. Three theoretical propositions are constructed that inform the empirical analysis. The study utilises empirical qualitative data from a Finnish blog campaign ‘From Waste to Delicacy’. The study identifies four bundles of practices organising temporality: scheduling, pausing, stretching and synchronising. Within these bundles of practices, potential food waste is enacted differently: as not realised food waste, revitalised food, refuted food waste and harmonised food (waste). The study produces novel understanding about temporal interrelations between humans and nonhumans – the dance of agency – in household food waste reduction.

Keywords: Food waste; practice theories; material turn; temporality; agency; time; ontology

1. Introduction

Household food waste is an increasing sustainability problem facing developed countries. For example, in the EU area, about 40 percent of food waste produced arises from households (Bräutigam et al., 2014). Previous research on food waste has pointed out time as a critical denominator in food waste emergence. Food that is not used in time has been found as a major contributor to household food waste, along with too much food cooked, prepared, or served (Parfitt et al., 2010). Furthermore, food has been presented as having an ‘unforgiving’ timeframe (Papargyropoulou et al., 2014; Parfitt et al., 2010). From this perspective, time is implicitly or explicitly considered as chronological, linear, and given – edible food is open to spoilage, decay and rapid transformation and becomes waste due to the passing of time. This temporal aspect is further emphasised through both academic research and policy debates about the role of ‘best before’ and ‘use by’ dates in the food waste phenomenon (Milne, 2013; Southerton and Yates, 2015; Yngfalk, 2016). In this paper, the linear view of time is, however, contested, both by the research approach as well as by the informants of the study.

Our informants, Finnish food bloggers, initiated a campaign ‘From Waste to Delicacy’ where they consciously aimed at reducing food waste in their own households, reported about it in their blogs and discussed it with their audiences. This textual data from the blogs, complemented with personal interviews with the bloggers, offers us the opportunity to study everyday consumption and waste related practices as they emerge in

the bloggers' everyday lives, intertwined with various social and material entities (see Domaneschi, 2012; Evans, 2011, 2012a, 2012b).

The practice-theoretical approach has been found useful in studying everyday life and food consumption because it pays attention to mundane, routine and habitual activity (see e.g., Nicolini, 2012; Warde, 2014). The concept of practice denotes to a configuration of discursive, material, embodied and affective elements (Warde et al. 2017) that are scrutinised in relation to their various contexts, including spatial and temporal organisation (Southerton and Yates, 2015). Practices can be identified both as repeated performances and as more or less stable and identifiable entities.

Recently, the practice theoretical approach has also been adopted to study the phenomenon of food waste (see e.g., Evans et al., 2013; Southerton and Yates, 2015; Watson and Meah, 2013). For example, Evans (2011, 2012a) has argued that food waste results partly from a discrepancy between the biodegradable, perishable materiality of food and the rhythms of consumer everyday practices. The temporalities of foodstuffs' decay challenge consumers as they are trying to match their unstable everyday schedules with cooking proper food. In these myriad everyday life situations, the matter that is food becomes (or does not become) the matter that is waste through practices (Watson and Meah, 2013). In this paper, our conceptualisation of practices is influenced by an 'ontological turn' (Mol, 2002; Pickering, 1993, 2017; van Heur et al., 2012). Hence, we acknowledge that practices are inherently heterogeneous and sociomaterial, including the

relations of humans and nonhumans between whom agency is distributed and temporally emergent (Nicolini, 2012: 171; Pickering, 1993; Schäfer 2017), formed during a ‘dance of agency’ (Pickering, 2017).

The purpose of this paper is to describe and analyse how practices organise temporality to reduce food waste. To do this, we work with an ontological understanding about multiple practices enacting certain objects and realities (Mol, 2002; Woolgar and Lezaun, 2013), which allows us to scrutinise practices involved in food waste reduction and consequently varying food waste ontologies. We challenge the view of food waste as a clear-cut, definite entity and the view of food as an environment for or means to human action exclusively. Although materials alone cannot explain how consumer food waste is reduced, recent studies suggest that they play an active role in sustainable food consumption (D’Antone and Spencer, 2015; Evans, 2011, 2012a, 2012b; Ozaki et al., 2013). This role needs to be better disentangled and analysed.

This paper contributes to a better understanding about the temporal interrelations of consumers (humans), foodstuffs, kitchen appliances, and other nonhumans in the phenomenon of household food waste reduction. The findings are relevant to researchers in the social sciences working at the intersection of food, waste and consumption. Our findings highlight four practice bundles that order temporality in food waste reduction: *scheduling, pausing, stretching* and *synchronising*. Ordering temporality in certain ways affects the ontology of the food waste, enacting it differently. For instance, food waste

might not emerge at all because of good scheduling, or it might be in an indeterminate state deep inside a freezer, nearly forgotten. It is crucial to scrutinise these different ontologies, as identifying them helps prevent practices which lead to the environmentally, ethically and economically harmful food waste.

The remainder of the article is structured as follows. First, we present our theoretical framework that consists of the conceptualisation of time as a social practice and an ontological approach to food waste. At the end of this section, we integrate the theoretical elements into three propositions. These propositions inform our empirical analysis. Before the findings section, we also discuss the methodology of the study. After delineating the findings of the study, we discuss the implications for theory and future research in the concluding discussion.

2. Theoretical framework

2.1 Time as a social practice

Time is a central element in everyday practices and hence in practice theory. For instance, practices-as-entities have a trajectory of development in time, that is, how the practices of managing household (food) waste have developed historically in different cultural contexts (Evans et al., 2013). Time is also a relevant dimension in studies that concern the temporal coordination and sequencing of activities in daily life – from food provisioning to preparation, eating the meal and disposal (see Southerton and Yates,

2015). However, practice theorists have varying views on how time and practices relate. Blue (2017) identifies three main approaches to time in practice theory: 1) time as a subjective experience, where time is considered to exist in practices, 2) practices themselves can make time or create socio-temporal order, and 3) timespace as an essential feature of practices. In this study, in line with the second approach, we adopt the stance of *time as a social practice*, where “time is an enacted, material, social practice that organizes the functions of temporality” (Moran, 2015: 289). In this, human experience of time is only one constituent (when experiencing time in practices), influenced by materials that together enable making time as a social practice.

Through practices, time organises the heterogeneous functions of temporality. We argue that the focus of our study □ food waste reduction □ highlights certain functions of temporality. Firstly, the consumer intention to reduce their household food waste, as part of a higher intention of living a more sustainable lifestyle, brings forth a future orientation as such. It must be acknowledged, however, that this intention itself is always open and emergent rather than fixed. It is a property of sociomaterial practices rather than the individual human (consumer) (Reckwitz, 2002) and emerges temporally as a result of human-nonhuman relations in practices (Pickering, 1993).

Secondly, as Moran (2015) notes, nonhumans play an important role in the functions of temporality. In the case of food waste, the biological decay process of food as matter connects potential food waste with the temporal functions of *inevitability*,

duration, speed, and anticipation. Inevitability occurs when in the present we cannot deny the fact that eventually, at some point in the future (Moran, 2015) food as a biological matter will decay to a stage where it is inedible and thus becomes waste. The temporal function of inevitability thus sets the future-oriented consumer intention of reducing food waste on a mission to act before the inevitable happens. Duration concerns transformation between states (Moran, 2015), i.e., the stage when food is still in its edible rather than waste state (see e.g., Alexander et al., 2013; Evans, 2012b, 2017; Southerton and Yates, 2015). However, the speed of the decay process of food as matter is often considered unpredictable by consumers, thus creating further elements of uncertainty to duration and thus to the practices related to food waste reduction. Usually, consumers can only anticipate both speed and duration, but we argue that with the intention of food waste reduction, certain practices can organise both speed and duration so that for example the speed of decay is slowed down to extend the duration as food.

Approaching times as social practices enables us to examine the role of materials in how times relate to each other. As summarised by Moran (2015: 298), “times influence each other materially, blocking each other, privileging some times over others, accelerating other times, or interacting in some other way”. For example, earlier research has shown that food waste emerges due to a “mismatch between the rhythms of everyday life and temporalities of food” (Evans, 2012a: 51), indicating that creating more

synchronisation between the times, temporalities and rhythms of consumers and food can yield potential for food waste reduction.

2.2 An ontological approach to food waste

In this study, we utilise an ontological approach to food and food waste. On the one hand, this approach resonates with previous studies that scrutinise the materiality of food as they argued that food is an active agent existing in constant flux with no a priori rigid properties (Bennett, 2007, 2010; Roe, 2006). Regarding food reduction practices, they are understood to exist in a web of relations with several nonhumans and humans, such as bacteria and fridges (Waitt and Phillips, 2016), food packages (Hawkins, 2013a) and food date labels (Milne, 2013). On the other hand, an understanding about food waste provided by this approach highlights the multiple realities of food waste, as well as its recalcitrance and occasional unmanageableness, both of which are at the crux of the efforts of reducing food waste.

To follow the chosen ontological approach means being sensitised to the different “... *ontologies* [which] are brought into being, sustained, or allowed to wither away in common, day-to-day, sociomaterial practices.” (Mol, 2002: 6). Objects and materials are not immutable entities to be observed and represented. Instead, focusing on ontology means paying attention to *how* the apparent stability of different objects and materials is enacted and done in various sociomaterial settings (Mol, 2002; Woolgar and Lezaun,

2013). For instance, Jasarevic (2015) analysed ontological speculations about mushrooms fermented for medical remedies in Bosnia and Post-Yugoslavia, demonstrating that the mushroom is not reducible to a single state of being: it is multiple, a thing that grows madly, invigorates curative flows, and is cultivated and made up across social as well as geographical borders and spaces.

The ontological approach highlights that food is in a continual state of becoming waste (see Watson and Meah, 2013). In other words, all food has potential to become food waste, but its emergence is contingent, dependent on the everyday practices, habits and care for foodstuffs (or the lack thereof) that either push food towards waste or pull it away from it. Food's multiple ways of being defy any clear-cut categories – it can turn from waste to 'delicacy' and back again. Also, these processes are not reducible to only consumers having agency (different perspectives, intentions and/or definitions on food waste). Instead, agency is distributed among those who are taking part in food related practices, and it emerges as a result of a 'dance of agency' in these practices (Pickering, 2017). We adopt this metaphor from Pickering (2017), who describes it as an ontological view of 'multiplicity of reciprocally coupled emergent agents, human and nonhuman' (Pickering, 2017: 6). The 'dance of agency' metaphor not only fits with the relational ontological approach, but also foregrounds the temporal evolution of relational entities. Hence, human and nonhuman agencies emerge during the dance rather than exist out there initially.

Furthermore, practices concerning food bring objects into existence, make them tangible, visible and knowable that is depicted by the verb to *enact* (Mol, 1999, 2002). The enactment concept denotes that realities are made and unmade within everyday practices; choosing between practices, between which realities to bring into existence, is thus always an open, contested and political process (Mol, 1999; Woolgar and Lezaun, 2013: 326; for food, see Atkins, 2011). Some practices are incompatible, exclude one another. For example, an overripe banana may be either baked into a bread or tossed to the compost bin or good scheduling can render other practices related to ordering time useless. Sometimes the same foodstuff can be part of several practices such as when a consumer buys a mango at its ‘optimally’ ripe, but then it nonetheless becomes overripe on a kitchen counter – and finally, it may end up in a smoothie, where the excessive ripeness is not an issue. Some practices can also be carried out simultaneously. Scheduling grocery shopping, buying the chosen items at the ‘right’ time (e.g., seasonal fruits) and having previously frozen food portions in the freezer to be used in the planned dish, are all examples of practices which can coexist quite harmoniously. Sometimes different practices bring certain entities into lights, while others remain “a penumbra of not quite realized realities” (Law and Lien, 2012: 363). A bunch of bananas may be on the countertop, visibly and tangibly real, while simultaneously a loaf of banana bread is at the bottom of the freezer, in perpetual darkness, nearly forgotten.

Following the aforementioned premises, it is not possible to give a fixed definition of food waste beforehand. Rather, it is defined and acted upon in everyday practices, thus while it is being enacted. Therefore, we use in this article a concept of *potential food waste* to both emphasise and capture foodstuffs' unpredictable and ephemeral ways of being (see Hawkins, 2013b). The concept also allows us to question the timeframe of food as 'unforgiving' (see e.g., Papargyropoulou et al., 2014; Parfitt et al., 2010) by highlighting its relational, non-linear and materialised characters (Jespersen and Jensen, 2012; Steinberg and Peters, 2015). Thus, time is not a given and stable entity, but something which is continually (re)negotiated in the relations between the involved participants (Jespersen and Jensen, 2012; Steinberg and Peters, 2015). Therefore, maintaining an identity of an object, in this case edibility of foodstuff, requires continual efforts and over time this identity may change (Mol, 2002). The ability to adapt and gradually change enables the object to continue its existence over time and different sites (de Laet and Mol, 2000; Law and Singleton, 2005). Also, like seas, rivers, ice and wind that move through space and time (re)forming the various geological strata (Steinberg and Peters, 2015), material patterns provide stability in a constantly changing environment.

2.3 *Synthesis*

To integrate the elements of our theoretical framework, we present three propositions that guide our empirical analysis.

1. *There is no single practice of reducing food waste. Instead, there are bundles of practices related to reducing food waste.*

From this proposition, we argue that individual practices within and between bundles of practices can be overlapping, mutually exclusive and/or co-existing in harmony. Also, some individual practices organise temporality and thus make times in food waste reduction. Hence, these practices are more central in our analysis for understanding temporality. Here, we follow recent suggestions that encourage food waste research to focus on conceptualizing practice bundles that consist of constituent activities, rather than attempting to identify separate food waste reduction practices (Southerton and Yates, 2015). In empirical research that combines insights from practice theory and the ontological approach, it is useful to “follow the multiple connections between heterogeneous elements linked in a relational network” (Schäfer, 2017: 42).

2. *Agency in practices that organise temporality is distributed between humans and nonhumans during a dance of agency.*

In line with the ontological approach, we argue that both humans and nonhumans have agency in organising temporality to reduce food waste. This agency is distributed to the actors during a ‘dance of agency’ (Pickering, 2017). However, even though we do not

privilege humans over nonhumans, we acknowledge that it is the human capacity upon which we analyse food waste related practice bundles. Hence, in our analysis, we want to be sensitised to the agency of nonhumans in these practices, even though our data comes from the humans. We see that the bloggers have a reflexive awareness of their own agency as well as that of nonhumans – manifesting itself as anthropomorphising food as matter in their blog texts. Similarly, we use the metaphor of dance between consumers and nonhumans (foodstuffs and other materials) to interpret our data.

3. Food waste is a temporal phenomenon, and therefore we call it potential food waste.

This proposition is based on the idea that the identity of food changes all the time, highlighting the porous, situational and practical boundaries between food and waste. Thus, food waste is not ‘just’ food that has ended up in the garbage(bin). Rather, it is to be considered as a result of the enacted interactions of various entities over time: a consumer, a foodstuff, home, a kitchen utensil, for instance. The concept of potential food waste provides us with an opportunity to become attuned to the emergence of manifold temporalities and their relations in food waste reduction related practices. It enables us to study the more nuanced times made in the relations between humans and potential food waste: when the coordination of different time(s) goes smoothly, or, conversely, when there are tensions and disruptions.

These three propositions discussed above inform our analysis of various food waste ontologies where bundles of practices organise temporality and potential food waste is enacted in different ways.

3. Methodology

The data utilised in this study comes from a food waste related blog campaign 'From Waste to Delicacy', which was initiated by several active food bloggers in Finland. These consumers wanted to both raise the awareness of food waste and offer their readers useful tips on how to reduce food waste in everyday life. The campaign started in May 2012 as a 5-week-period campaign but is still ongoing. Studying this blog campaign offers an excellent way to scrutinise potential food waste reduction practices because it renders them visible through text and images as well as interactions both online and offline. It would have been difficult to gain access to the mundane everyday lives of the bloggers as researchers which is why the campaign data provides a unique entry point. The generated qualitative data consists of both blog posts, their comments, and interviews. Interview data is considered as suitable for the analysis of sociomaterial practices, particularly in situations where the informants have become reflexively aware of their routines (Hitchings, 2012). We posit that by participating in the blog campaign, the bloggers had become aware of the food waste reduction phenomenon, making them especially suited to reflecting it linguistically. Further, the blog post data shows how the

bloggers gave voice to the materials too by documenting their actions and interactions through words and images and by anthropomorphising them.

Blog posts with the tag 'From Waste to Delicacy' between May 2012 and August 2016 were collected, adding up to approximately 597 postings. In addition, we approached 14 food bloggers that 1) have participated in the campaign since its beginning, 2) have continued food blogging, 3) have used the campaign tag at least three times after the initial campaign, and 4) live in Finland. We conducted in-depth interviews with seven of these bloggers in the autumn of 2016. The interviews followed an open interview structure. The informants had a chance to freely tell about their views and experiences about themes including blogging, the campaign, food, cooking, food waste, and food waste reduction. The interviews ranged from 80 minutes to over two hours in length. They were recorded and transcribed verbatim, resulting in 168 pages.

The interview transcripts and blog posts offer an entry point to the researchers to scrutinise the sociomaterial practices, the kinds of ontologies they produce and the relations of these practices to time and to each other. As part of the analysis process, the researchers must construct their representation of these practices through language – hence there is no direct access to the practices as such, but it is always mediated: first through the discursive practices of bloggers themselves and then through researchers' interpretation. Also when studying temporality, writing provides a “technique by which

we can discern, describe, navigate, and respond to temporality as it functions” (Moran, 2015: 287).

During the analysis, the interviews and blog postings were read profoundly through by the authors. Next, sociomaterial practices related to time were identified from the data, with a special focus put on the ‘dance of agency’ (Pickering, 2017). We recognised how materials and consumers enacted potential food waste in these practices, and how temporality related to these practices. Finally, the processes of analysis and interpretation resulted in categorising the identified practices into four bundles of organising temporality that are discussed in more detail in the next section.

4. Findings

From our data, we delineated four bundles of practices organising time: scheduling, pausing, stretching and synchronising. Within these bundles, we identified several sociomaterial practices, in which various human and nonhuman actors together enacted potential food waste differently (see Table 1).

Table 1. Organising temporality – practices, agencies and potential food waste ontologies

Bundles of practices organising temporality	Key sociomaterial practices	Dance of agency – examples of human and nonhuman agencies	Potential food waste is enacted as
Scheduling	Planning for purchases and making meal	The future choreography between foodstuff and the consumer are anticipated through identified practices.	Not realised food waste

	plans; regularising shopping trips	The consumer rehearses the future dance steps with foodstuff so that food waste would not be realised. Materials (shopping lists, recipes, packages, pantries, online stores) direct the consumer to stick to the plan.	
Pausing	Freezing food for future use	A new rhythm is created between foodstuff and the consumer through the identified practice. The foodstuff enters into a dance with the freezer during which the decay process is slowed down. The consumer takes a break from the dance with foodstuff by putting it in the freezer. The consumer also restarts it when taking foodstuffs out of the freezer at appropriate times. Materials like freezers and freezer containers invite foodstuffs into another dance and pause their timeframes. After the restart, kitchen appliances and utensils as well as dishes enable the future dance between the consumer and preserved foodstuffs.	Revitalised food
Stretching	Transforming potential food waste into edible food; disregarding date labels	The duration of the dance between foodstuff and the consumer is lengthened through identified practices. The consumer is leading the dance through creatively improvising with foodstuff. The consumer uses embodied experience to determine whether her partners are still able to continue the dance. Materials like kitchen appliances and utensils are like an orchestra, allowing shifting to another tune. Materials such as mould stop the dance completely by enacting the thin line between food and waste.	Refuted food waste
Synchronising	Buying and using food at the 'right' time; using leftovers to handle the hurriedness of everyday life	The consumer and foodstuffs dance to each others' tunes. The consumer matches their past, present and future dance choreography to that of foodstuffs. Materials like the seasonal food calendar inform the consumer of the appropriate dance partners at each season. Materials like stocks, kitchen appliances and utensils, freezer and make-ahead meals allow matching foodstuffs' choreographies with those of the consumer.	Harmonised food (waste)

Next, we will elaborate each bundle in detail.

4.1 Scheduling

The first identified bundle of practice organising temporality is that of scheduling. The practices within this bundle focussed on scheduling time and food in order to reduce food waste by not having it emerge at all, thus enacting *not realised food waste*. In these

practices, food was not yet (physically) present, allowing the consumer to seemingly organise their relations with food through for example planning, predicting and making lists. These practices were directed toward the consumer's future relation with food.

The first sociomaterial practice identified was *planning for purchases and making meal plans*. Here consumers attempted to foresee the demand for food. A myriad of issues was considered, such as own or spouse's travel plans, hobbies and children's food preferences.

These days I do think more carefully in the store whether we can eat this, or if I know that I'm going to travel for work, I have already learnt that there's no point buying certain things, my family will not eat them during the time that I'm not present. [...] I have tried to pay attention, if I know I'm going to make the kind of food that my kids don't especially like, then we have more bread...
(Blogger C, interview)

One way to plan was to make meal plans (such as one vegetarian day a week) beforehand and purchase groceries based on them. Making these kinds of meal plans can also be seen as a practice of setting 'boundary conditions', which helped ensure that all purchased food was accounted for and did not end up as waste.

Let's say that we have a fish day, then we have one vegetarian day and one day we eat chicken, one day a soup [...] These are flexible, we don't have to have, but for me, these are guiding things. I think that we should have potatoes on one day and pasta on the second. So that kids and adults would have variety in their diet and to have a lot of vegetables. Then of course it is largely defined by what kind of meat we have in the freezer. [...] The plan is flexible and changes according to

what is on offer, but then there's certain kind of boundary conditions to it that I follow. (Blogger C, interview)

Critical materials participating actively in the planning were shopping lists, pantries, recipes, food packages and online stores. The shopping lists directed the consumers to buy exactly the products needed as well as to stick to the meal plan. At the same time, however, they constrained the consumers from making impulse purchases or buying things only because they were at a discount, for instance. In some cases, the shopping lists were very detailed. The lists might have included the exact amount needed for making certain dishes, hence restricting consumers from buying extra food. For others, however, the shopping lists were more abstract and sometimes existed only mentally.

Looking in the pantry or fridge before going to the store was a related practice that allowed the consumers to make findings and avoid buying things that they already had. Hence, pantries or fridges participated in the practice of proactive food waste reduction as reference points from where to start planning. In addition, making the order online pushed the consumers to think very carefully about the meal plans and sticking to them. Online stores provided an interface which caused the consumers to make more intentional choices (see Ramus and Nielsen 2005: 340–342), thus participating actively in the potential food waste reduction.

Another sociomaterial practice identified from the data was *regularising shopping trips*. This finding suggests that the consumers' intention to reduce potential food waste starts already before food purchasing. However, consumers' views on the optimal

frequency of grocery shopping trips varied. Shopping for the whole week often required more careful planning and was, hence, connected to previously introduced ‘planning for purchases and making meal plans’. In some cases, the consumers made some of the grocery purchases more seldom and some almost daily. For example, one blogger told that she bought meat in big batches that lasted for a long period but purchased bread more frequently.

To summarise, scheduling creates the future choreography between the consumers and the foodstuffs in which consumers – rehearsing the future dance steps – anticipate their future encounters with food and consequently with the potential food waste. The nonhumans participating in this bundle are other materials than food, such as shopping lists and online stores, directing consumers to stick to their plans. Food – with its occasional recalcitrance, unpredictability, unmanageableness – is not yet physically present within these practices. Here, time is practised as something that the consumer seemingly has at her disposal. The consumer can, for instance, plan how they are going to use their time and how they allocate their time for different activities in their everyday life, in this case for planning and doing their shopping in different ways with the intention to reduce their household food waste. Time related planning is important in preventing food waste before its emergence. The sociomaterial practices thus enact not realised food waste: properly planned purchases and meal plans mean that food does not have the time to become waste before it is eaten.

4.2 Pausing

The second identified bundle of organising temporality is that of pausing. The sociomaterial practice of *freezing food for future use* was central in this bundle. This practice paused the process of food becoming waste beforehand as well at a particular moment, thus enacting *revitalised food*. Besides freezing, other ways of food preservation, such as using salt or vinegar, were also enacted, but more rarely.

In freezing, the consumers put the food into the freezer either in accordance with their plans or in a more ad hoc-like manner. In the former, the intention to put the food into the freezer was the consumers' plan from the moment they purchased the food, such as when buying a big lot of organic meat from a local producer. Some consumers even utilised several freezers for different purposes such as storing meat, make-ahead meals, or berries. In some cases, the consumers placed some food in the freezer 'just in case' even though they knew that the product could be preserved otherwise. In ad hoc-like freezing, freezing occurred for example when consumers noticed that the use by date was closing and they did not have the time or need to use the food product. This practice concerned especially meat products that were valued over other foodstuffs (vegetables).

The type of waste that practically does not occur is meat and fish. With these, I try to be [careful] and I am too, so that I throw them directly in the freezer, if they don't seem to become used. [...]
We eat meat and are not vegetarians but the animal has lived, and it has not lived so that we can put it in the garbage bin. (Blogger C, interview)

For the consumers, freezers rendered freezing possible, related closely to food preservation and procurement (see Hand and Shove, 2007). The important role of a freezer in food waste reduction has also been supported in earlier research. Shove and Southerton (2000) have argued that the freezer's role is that of a 'time machine'. Also, Evans (2011) has noted that the use of the freezer can be seen as a way to avoid the collisions between the materiality of food and consumer's life rhythms. However, freezing does not on its own reduce food waste, instead freezers may also operate as 'coffins of decay' if the consumer forgets the product in the freezer (Evans, 2012b: 1132). In order to reduce potential food waste, pausing must also include the practices when consumers take the food out of the freezer, thaw and further process, prepare, or cook it for consumption.

In pausing, freezers and other materials (e.g., freezer containers and resealable bags) formed direct relations with food. The freezer slowed down the decay process of food by altering its material properties. Freezer containers and resealable bags participated by allowing consumers to divide food from their original packages into smaller entities or to gather food to be used later. They also maintained the material properties of food better when frozen. Furthermore, materials such as markers and 'freezer maps' reminded consumers about the contents of the freezer. After freezing, other materials participated in reducing potential food waste. These included certain dishes that

consumer cooked from preserved ingredients as well as kitchen appliances and utensils to cook and prepare them.

To summarise, in pausing a new rhythm is created between foodstuff and the consumer. The sociomaterial practice of freezing is employed when the consumer's everyday life temporality is at odds with the materialities of food: the quantity of the foodstuff might be too much for immediate use or conversely, the amount of foodstuff is so small, it needs to be accumulated before being used in a dish. As a result, the consumer puts the food into the freezer. Consequently, food enters into a relation – or a dance – with the freezer during which its decay process is slowed down. Other nonhumans like freezer containers, freezer maps and resealable bags participate in this dance as well. Meanwhile, consumers take a break from their relation with the frozen food. In order to reduce food waste, it is not sufficient to only 'pause' the timeframe of food, it also has to be 'restarted' when the consumer takes the food out of the freezer. This enacted revitalised food.

4.3 Stretching

The third bundle of practices organising temporality is that of stretching. The practices within this bundle reduced potential food waste by lengthening the duration of food as food. When consumers felt that food started to approach the blurred line between food and waste, stretching was employed to enact *refuted food waste*.

The first identified sociomaterial practice involved in stretching concerned *transforming potential food waste into edible food*. This was apparent especially in the blog postings where bloggers gave tips and recipes for their readers about how to reduce food waste by cooking new delicious food from leftover ingredients and dishes. Using their creativity and improvisation, together with a multitude of materials, the consumers were able to create a completely new life for the leftovers that might have otherwise ended up in the trash. In some cases this meant using leftovers from cooking and in other cases it meant utilising inedible parts of food products, such as seeds, peels or bones.

Today I put [leftover Christmas] turkey in a salad with avocado and pomegranate for a change. And what do you know, it was really fresh again. It's nice how 'flexible' these Christmas foods are. (Blogger A, blog, audience comment)

From all this [using apples] you end up with a varying amount of apple peels and cores, which are better to be fermented as vinegar instead of putting them in the trash with biodegradable foods.

They will have time to go to the compost after the vinegar making. (Blogger H, blog post)

Certain dishes recurred in both the interviews and blog postings. They were identified as critical enablers for transforming leftovers into new food, referred by the consumers as 'easy leftover dishes'. These dishes included purée soups, pies, omelettes, fried rice, and oven meals. All of these dishes allowed the practice of using leftover foods and individual surplus food products. Consumers often used words such as 'hiding', 'stashing', or 'burying', to express how easily the leftovers could be incorporated into other dishes, without affecting the 'usual' taste (material properties) of these dishes. Food waste was

thereby doubly refuted: not only did it avoid disposal (and becoming actual food waste), it was also rendered inconspicuous and unnoticeable in the leftover dishes.

Also, certain ingredients were critical when making leftover dishes. For example, eggs or frozen pre-made pie crust were useful in creating a new life for leftover food and thus had an active role in stretching. Some of the dishes eliminated the (subjectively experienced) importance of food products' freshness. As one blogger noted, "an oven dish does not care whether the carrot has been harvested two minutes or two months ago or if it has gone soft or not". Certain materials such as blenders, juicers, or stoves, transformed leftovers or ingredients into a completely new category of food by changing their texture. Bloggers also gave some relatively unconventional advice on how to use leftovers or ingredients in a completely different way to prevent food waste, such as using banana skins for shining shoes, orange skins for cleaning and assorted chocolates in a mouse trap.

Another sociomaterial practice identified within stretching was *disregard for date labels*. Earlier research has shown that as consumers have become distanced from food production and packaging, date labels now signal 'governmentality', thus enabling an individual choice for the consumers to act in a responsible, healthy and safe way (Yngfalk, 2016). According to our data analysis, consumers stressed the importance of assessing the freshness of the food by themselves, rather than blindly relying on products' date labels. As suggested by Blichfeldt et al. (2015), consumers thus relied on a strategy

of internalisation as opposed to objectification. Certain senses were crucial in disregarding date labels. Consumers smelled, tasted, and looked at the products and then determined whether the food was still edible.

Cultured milk products can well be used despite their [expired] dates, your senses will tell whether the product is still usable. I trust my senses, and as I have noticed that my senses of taste and smell are more sensitive than usual, I will definitely know if the product is spoilt. [...] In case I'm having doubts whether the milk product is still OK, I will nevertheless pop it into the oven (however, visible mould means that the product cannot be used). (Blogger C, blog post)

As the previous citation illustrates, mould had a critical role in disregard for date labels. Mould indicated unambiguously for the consumer that the food is no longer edible. Accordingly, mould gave consumers permission to throw food away (see Waitt & Phillips 2016: 373).

Furthermore, it seemed that date labels possessed less power in some products versus others, for instance the date labels of milk products had less power than those of meat or fish. Hence, they allowed a longer usage time frame and consequently participated longer in stretching. In addition, our data analysis showed that senses had a hierarchy when consumers disregarded date labels. As the quotation about cultured milk products shows, if the date (visual cue) had expired, the sense of taste was often more powerful and trusted than the sense of smell. Likewise, as discussed above, sight would overpower other senses if mould was present.

Disregard for date labels was thus closely interconnected with the ‘body’, more specifically embodied and sensory knowledge, and the material properties of the food. The consumers very often trusted their ‘gut’ while assessing the edibility of food and cooking meals out of leftovers. This observation complements the argument of Waitt and Phillips (2016: 376) about the human body’s capacities (senses) to determine whether some food product is edible or not. At the same time, it challenges the current discussion on date labels that has stressed how different date labels seem to confuse consumers (Milne, 2013) or how they should be seen as ways to build trust, responsibility, and control (Watson and Meah, 2013). In our data, the consumers’ embodied knowledge and the materiality of food together both enabled and constrained the reduction of potential food waste¹.

To summarise, organising temporality through stretching concerns lengthening the duration of the relation – or dance – between the consumer and the foodstuffs. The consumer leads this dance by stretching the edibility of a single ingredient, leftover or meal by creatively improvising and interfering with the materialities of food products near their experienced endpoint. To assess this, the consumer uses her embodied experience instead of trusting external cues such as date labels. Materials, such as blenders, participate in stretching by transforming potential food waste into new dishes.

¹ However, it is important to note that the bloggers studied here can be seen as experts when it comes to different competences related to cooking, such as utilising embodied knowledge for assessing the (in)edibility of foodstuffs: indeed, sometimes the bloggers themselves expressed concern that some of their readers might not for instance be able to tell the difference between soured and spoiled milk products.

The various situational sociomaterial practices around food eventually enact its being: the scales might tip towards food, especially if the consumers innovate new ways to utilise leftovers (working together with specific leftover dishes or kitchen appliances), or towards waste, if visible mould for example makes the consumer throw the food away. Stretching thus indicates that the boundaries between food and waste are porous and fickle, enacting refuted food waste: would-be-waste is consumed before its spoilage and disposal.

4.4 Synchronising

The fourth bundle of practices organising temporality is that of synchronising. In this bundle, the temporalities of consumers' everyday life are synchronised with those of food products. These sociomaterial practices thus enacted *harmonised food (waste)*: the food purchased or leftovers utilised did not end up as waste because of the consumers' matching efforts and the 'willingness' of materials to join in these efforts.

The first sociomaterial practice identified within synchronising was that of *buying and using food at the 'right' time*. The consumers related this right time with the subjectively experienced decay process of food. In order to reduce potential food waste consumers bought food at an appropriate moment to match their intended time to use it with the foodstuffs timeframe. In some cases, buying food products at the right time meant not buying them at all:

I would really like to use fresh herbs, but I have consciously tried to avoid buying them during the winter. Firstly, they cost a lot, as you need to buy many bundles. Of course it would be awfully nice to show food with a lot of nice looking herbs on my blog, but... Some of them tend to be left [over]. (Blogger G, interview)

When consumers purchased fruits and vegetables during their best season, they stayed fresh and tasty longer. The consumers' common sense or traditions often supported this practice, but in our analysis also different materials (e.g. seasonal food calendar) informed the consumers about the 'perfect' time to purchase and use food products.

However, food has its own lifecycle. As one blogger put it, in order to survive without sprouting, a potato "wants a root cellar, but that's probably unrealistic wishful thinking". If that lifecycle does not match with the consumer's timeframe for using the food, food waste can emerge. For instance, if the consumer cannot find fruits at the grocery store when they are ripe, consumers must synchronise their timetables for cooking to that of the ripening fruit.

The second sociomaterial practice involved in synchronising was that of *using leftovers to handle the hurriedness of everyday life*. This concerned reducing the amount of food waste while 'saving' time in consumers' busy lives. For some consumers, the use of leftovers was seen as a way to prepare themselves for upcoming cooking.

One way to use leftovers to save time was to cook a stock. The stock swallowed up fish and chicken bones that the consumers could not eat otherwise. Although the stock

was a ‘time-consumer’ while it was prepared, it also reduced time spent when cooking in the future:

Many think that it’s a tough job. [...] But it isn’t so that you stand two hours by the stove, you just put things into the pot, and it takes two minutes. And then after two hours you strain it, which takes probably three minutes. But what a relief it is. I know, many say that it’s easy to use meat stock cubes, but I think this is much better. When I have taken it out of the freezer, I just put chicken pieces or fry some minced meat, and I’ll have a really good-tasting soup without taking much time then. (Blogger C, interview)

Frozen make-ahead portions to be used later also participated in this practice. They included freezing leftovers in lunch-sized portions and cooking bigger batches of food at once to be frozen in portion sizes.

Previous studies have argued that domestic technologies enable consumers to save and shift time, thus transforming self-prepared frozen leftover food into convenience food and allowing the temporal coordination of daily lives (Evans, 2012a; Hand and Shove, 2007; Shove and Southerton, 2000; Southerton, 2003). In our analysis, the freezer, along with other materials such as stocks, pots and food containers, participated in the practice of using leftovers to handle the hurriedness of everyday life. This practice is somewhat related to pausing. However, the distinction is that here time is used *now* in order to save time *in the future* instead of just trying to influence the lifecycle of a food product for a (certain) period of time. This can be seen as a practice that makes time instead of consuming it (Shove et al., 2009).

To summarise, in synchronising consumers and food dance to each others' tunes at least momentarily. Consumers try to match their past, present and future practices – their dance choreographies – to that of foodstuffs to reduce potential food waste. Materials like the seasonal food calendar notify the consumer of the appropriate dance partners at each season. Materials like stocks, kitchen appliances and utensils, and freezer and make-ahead meals allow matching foodstuffs' choreographies with those of the consumers. All this enacted harmonised food (waste), wherein operating on the foodstuffs' own terms allowed reducing potential food waste.

Harmonised food (waste) bears a resemblance to not realised food waste enacted in scheduling. The difference is that within this bundle, the practices enact food on its own terms: for example, raw fruit is left to ripen or leftover bones are used to make stock, instead of trying to eliminate them beforehand via planning. However, sometimes the materialities of food create discord within this bundle of synchronising times – foodstuffs' multiple ways of being escape human dominance.

5. Discussion

This study sought to describe and analyse how practices organise temporality to reduce food waste. The study mapped out the temporary stabilisations of time and matter to examine practices rarely considered as time. Focusing on other practices than those commonly perceived as chronological time ('what the clock does'), broadens our

understanding about time (Moran, 2015: 299). Increasing our knowledge of what times can do is of special importance when it comes to food waste, because food – with all its cognate unpredictable processes of decaying – is simultaneously the *sine qua non* for our continued existence *and* the source of ethically, environmentally and economically harmful food waste. Next, we reflect our findings in relation to the three propositions (see Figure 1) presented in the theoretical section.

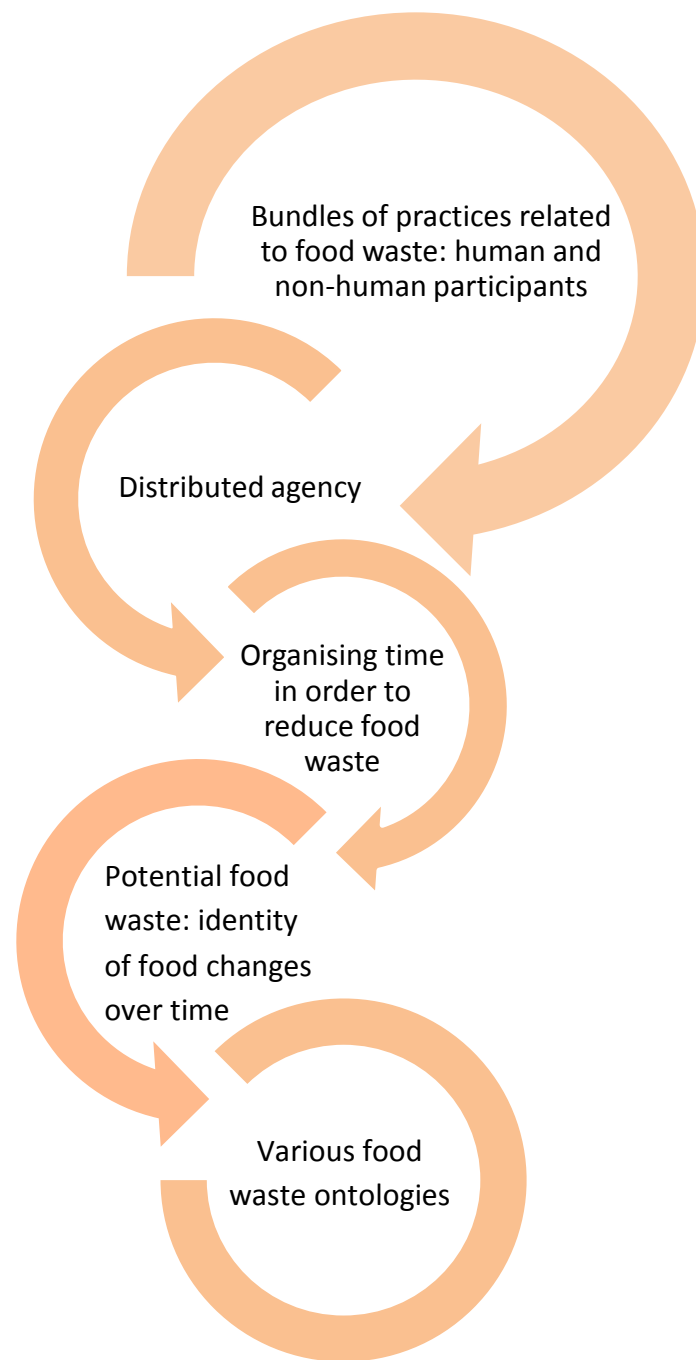


Figure 1. Potential food waste during temporal dance(s) of agency

Our first proposition argued that food waste reduction related practices do not involve only one practice but bundles of practices. The study identifies four bundles of practices that organise temporality to reduce food waste: scheduling, pausing, stretching and synchronising.

We also argued that within and between these bundles of practices, individual practices can be overlapping, mutually exclusive or co-existing in harmony. Our findings highlight that the bundles of practice consist of heterogeneous elements (Schäfer, 2017). It is only when we analyse these bundles of practices in relation to how they organise temporality, the elements come to hang together in a certain way. An individual nonhuman actor may be participating in various practices in different roles. Also, an individual practice, such as freezing, can be part of various bundles of practices such as stretching or synchronising, depending on how they are linked in relations. Some practices within the bundles can also compete with other practices and be mutually exclusive: e.g. whether freezing or drying is used in stretching.

In the second proposition, we argued that agency in food waste reduction is distributed, thus putting an emphasis on both humans and nonhumans during a ‘dance of agency’ (Pickering, 2017). In the study, we demonstrate several sociomaterial practices where both humans and nonhumans were present and consequently show the ephemeral and situational natures of time and food as well as those who take part in them. Thus, our findings contribute to the studies of food waste which have not yet fully accounted for

the important role of materiality in trying to address the issue (for exceptions, see Alexander et al., 2013; Evans, 2017; Waitt and Phillips, 2016). Our way of conceptualising practices through the metaphor of dance of agency highlights the variety and heterogeneity of practices available for food waste reduction where the materials have a significant role.

In our data, we witnessed how the ‘dance of agency’ between human and nonhuman actors was reflected by the bloggers, who also gave the materials a voice by anthropomorphising them. Hence, our findings highlight the value of using this type of data in analysing relations between humans and nonhumans. Furthermore, the bloggers seemed to be forming a more positive and caring relation with food which can be argued to be one potential way to solve the problem (Närvänen et al., 2018). Relations between consumers and food are unavoidably political, because in the end, they define how we can be with food in sustainable ways, and the processes of enacting potential food waste are not predetermined.

The third proposition argued that food waste is a temporal phenomenon and exists in a constant flux of becoming waste. Previous research has identified this aspect as central in the food waste phenomenon (Alexander et al. 2013; Evans, 2012b, 2017; Southerton and Yates, 2015). Hence, the reduction of food waste through the identified bundles of practices is essentially about fighting against the inevitable – the decay of food. However, we challenge this more pessimistic view by introducing the term ‘potential food

waste’, which we argue is more appropriate than mere ‘food waste’. Recent political and academic discussion on food waste has focussed on calculating food waste (see e.g. Bräutigam et al., 2014; Papargyropoulou et al. 2014; Parfitt et al. 2010), which may downplay possibilities to affect the issue already before food becomes waste. Our study demonstrates that food waste is enacted in various different ways: as not realised, revitalised, refuted or harmonised. Understanding food waste as a potential future tense of food and focusing on its fluctuating ontologies provides a more nuanced account of the phenomenon. Future research elaborating on these ontologies of food waste (as well as others not yet discovered; we do not presume to have mapped them out exhaustively) could also take into account the politics of enacting food waste in a certain way: for example, is it better to aim for not realised food waste, or should we focus on enacting harmonised food (waste) – are some enactments better than others? What kind of consequences, and for whom, do these different enactments of potential food waste have?

6. Conclusion

This study was built upon practice theories influenced by an ontological approach and utilised data from a Finnish food waste related blog campaign ‘From Waste to Delicacy’ to describe and analyse how practices organise temporality to reduce food waste. The study develops an understanding about the temporal interrelations of humans and nonhumans in the phenomenon of household food waste reduction. Food waste reduction,

integrating time and temporality, human and nonhuman action, appears as a complex phenomenon. Even though we have focussed on practices aimed at reducing household food waste, we acknowledge that these practices are not always successful. There can be various disturbances and breaks during the dance of agency, bringing forth fragility. The first future research opportunity we suggest is to focus on these moments of disruption more fully. Secondly, understanding the embodied nature of food waste reduction could also provide future insights on solving this issue. There are only a few studies theorizing the body in the field of materiality and food (Bennett, 2007, 2010). In theorizing the body, however, the social and the material are intertwined in highly complex ways, which is why further research is needed. Future research could adopt the transitive methodology proposed by Schäfer (2017), enabling to take into account the aspects of spatiality and embodiment in the analysis of food waste reduction practices. Thirdly, moving out of the food waste context, we recommend researchers to adopt a similar approach as utilised in this study to investigate various other sustainability issues and their relation to time(s).

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