

Lotta Alhonnoro

# Turning Points of Food/Waste

Tracing Actors, Relations and Practice-networks in a Retail  
Setting



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<b>Tiivistelmä</b> Tämän tutkimuksen tarkoitus on rakentaa systeeminen kuva ruokahävikistä vähittäiskaupan kontekstissa. Arviolta kolmasosa ruoasta päättyy hävikiksi. Tämä on niin <i>ekologisesti, taloudellisesti</i> kuin <i>sosiaalisestikin</i> kestäväntöntä. Tarvitsemme välittömiä toimia, jotta ruokahävikin määrää ruokaketjussa saadaan vähennettyä. Tutkimus vastaa haasteeseen keskittymällä leipä- ja leipomotuotteisiin ja tuottamalla syvällistä ymmärrystä siitä, kuinka ruoasta tulee – tai ei tule – hävikkiä vähittäiskaupan kontekstissa. Samalla tutkimus lisää ymmärrystä toimijaverkkoteoriatutkimuksesta ja esittelee uuden, toimijaverkkoteoriaan perustuvan lähestymistavan käytänteiden tutkimukselle. Tutkimus sisältää kolme vertaisarvioitua tutkimusartikkelia.  Rakentuen toimijaverkkoteorialle kaksi ensimmäistä artikkelia avaavat kaksi erilaista näkymää ruokahävikkiin vähittäiskaupassa. Ensimmäinen artikkeli analysoi kaupan ruokahävikkiä ylensyönnin käsitteen kautta ja tarkastelee kuinka hävikki syntyy suhteissa. Toinen artikkeli analysoi ruokahävikkiä jaetun toimijuuden kautta. Artikkelit tuo esiin kuinka ei-inhimilliset toimijat ottavat osaa ruokahävikin syntyyn ja/tai vähenemiseen vähittäiskaupassa. Näiden tutkimusten pohjalta tarkastellaan ruokahävikin konseptuaalista luonnetta ja laatua. Lisäksi rakennetaan periaatteet toimijaverkkoteoriaan perustuvalla empiiriselle tutkimukselle.  Kolmas tutkimusartikkeli käsittelee mahdollisuutta laajentaa ja uudelleensuunnata käytäntötutkimusta sosiomateriaalisen toimijaverkkoteorian avulla. Toimijaverkkoteoriaa ja käytäntöteoriaa yhdistämällä luodaan sosiomateriaalinen, käytätöverkkoihin perustuva lähestymistapa.  Johtamisen ja yhteiskunnan näkökulmasta tutkimus auttaa ymmärtämään ruokahävikin syntyä (vähittäiskaupassa). Huomio kiinnitetään <i>potentiaalisen</i> ruokahävikin johtamiseen.		
<b>Asiasanat</b> Ruokahävikki, toimijaverkkoteoria, toimija, suhteet, verkosto, käytäntöteoria, vähittäiskauppa		



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<b>Abstract</b> <p>The purpose of the research is to build a systemic perspective on the network of food turning into waste in a retail setting. Approximately one third of the food produced for consumption is wasted each year. This is <i>ecologically, economically and socially</i> unsustainable and action must be taken in order to reduce the amount of food waste along the food chain. To address this problem, this study follows the empirical case of bread and bakery products, to develop an in-depth understanding on how food may – or may not – turn into waste. Further, the research increases our theoretical understanding about practising actor-network theory, as it introduces a novel approach on actor-network theory-based practice research. The research includes three peer-reviewed articles.</p> <p>Building on actor-network theory, the first two articles open up two different perspectives on food waste in retailing. The first article analyses food waste in retailing through the concept of gluttony and how food waste evolves out of relations. The second article analyses distributed agency in food waste by focusing on how non-human actors participate in the production and/or reduction of food waste in retailing. Based on these articles, the conceptual nature of food waste is analysed. Further, principles for carrying out actor-network theory-based empirical research are developed.</p> <p>The third article explores the possibility of widening and redirecting the scope of practice research, based on the sociomaterial approach of actor-network theory. Bridging actor-network theory and practice theory, a sociomaterial practice-network approach is introduced.</p> <p>When it comes to managerial and social implications, the research helps to understand how the formation of food waste (in a retail setting) could be reduced. Attention is directed at managing <i>potential</i> food waste.</p>		
<b>Keywords</b> Food waste, actor-network theory, actor, relations, network, practice theory, retailing, food waste management		



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Vaasa, 29 January 2020

Lotta Alhonnoro



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## Abbreviations

ANT	actor-network theory
ARA	activities, resources and actors
CCT	consumer culture theory
ERDF	European Regional Development Fund
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
IMP	International Marketing and Purchasing group
IPCC	Intergovernmental Panel on Climate Change
RQ	research question
STS	science and technology studies
UN	United Nations
USDA	United States Department of Agriculture

## Publications

Alhonnoro, Lotta & Norrgrann, Anu (2018). Gluttony: no taste without the waste? Gluttony in bakery product retailing. In H. Syrjälä & H. Leipämaa-Leskinen (Eds.) *Seven Deadly Sins in Consumption*. Cheltenham, UK: Edward Elgar Publishing Limited.<sup>1</sup>

Alhonnoro, Lotta, Leipämaa-Leskinen, Hanna & Syrjälä, Henna (2020). Distributed agency in food waste – a focus on non-human actors in retail setting. In E. Närvänen et al. (Eds.) *Food Waste Management: Solving the Wicked Problem*. Cham, Switzerland: Palgrave Macmillan.<sup>2</sup>

Alhonnoro, Lotta (2014). Practice as a patterned network of heterogeneous materials – an actor-network approach to practice theory. *Kulutustutkimus. Nyt [ConsumerResearch.Now]* 8: 2, 16-28.<sup>3</sup>

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# 1 INTRODUCTION

Approximately one third (Gustavsson et al. 2011) or even half (Parfitt, Barthel & Macnaughton 2010) of the food produced for consumption is lost or wasted each year. Throwing food away is also a serious problem in Finland. Katajajuuri et al. (2014) have estimated the amount of food waste in Finland to equate to approximately 62 to 86 kilograms per person in a year, totalling 335 to 460 million kilograms of food waste a year (excluding primary production) for the whole of Finland. This is environmentally, economically and socially unsustainable. Food waste needs to be reduced in order to secure a more sustainable future.

Firstly, food waste has enormous environmental and climate impacts across its lifecycle (Hall et al. 2009). Farming and agriculture have an effect on biodiversity and contribute to excess consumption of freshwater and fossil fuels used overly in factory farming. Food products' journey from producers to retailers is based on oil, producing significant greenhouse gas emissions. If left uneaten, decomposing food produces methane and CO<sub>2</sub> emissions. This means food waste has a double cost in terms of environmental impacts compared to food that is eaten. The impacts of the production of food that will never be eaten are combined with those caused by the collection and treatment of food that is wasted (ibid.).

According to an estimate by the UN FAO (2013), every year, food losses and waste generate more than 3.3 gigatons of CO<sub>2</sub> equivalent. This equals the combined annual CO<sub>2</sub> emissions of Japan and the Russian Federation. In the EU, the food sector is, along with housing and transport, one of the three sectors with the greatest environmental impacts. Further, according to Hyde, Smith, Smith and Henningson (2001), minimization of food waste in the food industry leads to many improvements in other sectors, in terms of energy efficiency, reductions in raw material use, reductions in water consumption. The FAO (2017) estimates that food losses and waste account for more than 10 per cent of the world's total energy consumption. Improvements in reducing food waste can thus lead to unexpected advantages, such as increased profitability in the food sector.

Secondly, the economic losses of food waste are significant (Buzby & Hyman 2012: 568; Gustavsson et al. 2011). Gustavsson et al. (2011) have estimated the economic impact of food waste to sum up to 1.3 billion tons per year. Food turning into waste not only involves food waste, but wastes money. Resources such as work, time, cropland and energy are used in order to produce and distribute food that is never sold or eaten. The above-mentioned environmental improvements, such as energy

efficiency, reductions in raw material use and reductions in water consumption, can also lead to increased profitability (Hyde et al. 2001).

Thirdly, in addition to environmental and economic impacts, food waste also has social implications. Food security, access and availability to nutritious food for all people are big challenges. Ethical and moral questions are related, in particular, to the inequality between wasteful practices and food poverty. The FAO (2015) estimates 800 million people around the world suffer from hunger and malnutrition. Further, in developed countries, 15 million people suffer from malnourishment (FAO 2015). Thus, reducing food waste could also have a positive impact on food security. While the growing population in Third World countries is increasing demand for food production, there are also people living below the poverty line in Europe. In Finland, breadlines have become commonplace since the 1990s recession. The moral question about throwing away food while there are people who do not have enough to eat remains topical. In a world that faces both a scarcity of natural resources and poverty, how is it still possible to waste one third of the food meant for consumption?

Having recognized the environmental, economic and social impacts of food waste, reductions have been taken at the policy level (EPA 2012; EU 2012; EU Waste Directive 2008/98/EG). The EU has set a 50 per cent food waste reduction target for 2020, with 2014 designated as the 'European year against food waste' (Katsarova 2014). In 2015, the UN agreed on the 2030 Agenda on Sustainable Development and 17 Sustainable Development Goals, including Target 12.3, to halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains by 2030 (UN 2015). The goal of reducing food waste by 50 per cent by 2030 is also included in the Circular Economy Package adopted by the EU in 2015, seeking a transition to a circular economy (European Commission 2015a). More recently, the IPCC released a report on climate change and land, addressing the role of food systems in relation to climate change (IPCC 2019). To conclude, there is both scientific and political consent to reduce food waste.

## 1.1 Positioning the study

Consumption of products and services is a cyclical process consisting of different phases: production, acquisition, use and disposition (Jacoby 1978). Disposition is an evident, yet underresearched, part of consumption (Arnould & Thompson 2005). Disposition of food, i.e., food waste, occurs not only in households, but also in the earlier stages of the food chain, representing a significant issue along the

food chain. Nonetheless, when comparing research across the supply chain stages, prior works have concentrated especially on the household and individual levels (Koivupuro et al. 2012; Mattila et al. 2018; Parfitt, Barthel & Macnaughton 2010). Research on food waste in a retail setting has been more neglected (Gruber, Holweg & Teller 2016; Cicatiello et al. 2017; Filimonau & Gherbin 2017).

However, following Gruber, Holweg and Teller (2016: 3), there are several reasons why the role of the distribution stage and retail sites in reducing the amount of food waste is of particular importance. Firstly, the retail sector fulfils a key function in the food chain and serves as gatekeeper to the food system. In the highly concentrated grocery retail market, retailer organizations have developed significant buying power. Retailers decide which food products, and in what quantity and quality, are offered and promoted to consumers. In relation to households and consumers, retailers influence purchasing and consumption decisions by controlling the point of sale and through their marketing measures. Thus, retailers exert major influences on the amount of food waste generated. Second, a retail site constitutes the physical place where food is sold and, thus, where food waste occurs. Food that reaches the retail stage has already gone through numerous processes from cultivation to production, packaging and logistics. As resources have already been utilized, waste at this stage means that all of these resources as well as the work in the previous stages have been wasted. Third, given the high transaction volumes taking place in retailing, the absolute amount of food waste occurring at retail sites is significantly higher and, concurrently, more concentrated than that among individual households. Thus, food waste in retail represents an important area for investigation. The greatest potential for cutting down food waste in the developed world lies not only in consumption, but also in retailing practices (Parfitt, Barthel & Macnaughton 2010: 3079; Papargyropoulou et al. 2014: 8).

Most of the extant studies carried out at the retail stage have concentrated on the quantification of food waste (Cicatiello et al. 2017; Eriksson, Strid & Hansson 2012; Katajajuuri et al. 2014; Teller et al. 2018) or adopted a managerial perspective to the issue (Evans, Campbell & Murcott 2013; Gruber, Holweg & Teller 2016; Mena, Adenso-Diaz & Yurtc 2011). These studies either focus on the volume of food waste, take a methodologically distant view of managers higher up in the organization hierarchy or industry experts, or rely on secondary data (Teller et al. 2018: 982). Thus, researchers have not especially concentrated on the phenomenon of food waste at the retail site, in the in-store environment (*ibid.*). Hardly any empirical research has centred on the specific activities, processes, day-to-day practices and the material aspects through which food turns into waste in a retail setting. Consequently, there appears to be a need for empirically

grounded, situated research on the practices of food waste (as well as on the managerial challenges that are involved). As such, the literature builds on distant views and perceptions from the outside, instead of in-depth, at-site understanding. It does not adequately take into consideration the complexity of the food waste issue (Gregson & Crang 2010; Närvänen et al. 2020; Teller et al. 2018). While numbers provide information on waste amounts and raise awareness of this weighty issue, they do not offer adequate understanding about the reasons behind wastage, nor do they provide insights into how food waste could be prevented. It is not enough to study waste only after it has occurred.

The present research is based on theory and methods from consumption and marketing research. In order to gain a more encompassing understanding of food waste in a retail setting, the research leans towards the stream of sociomaterial studies and emerging post-humanist studies from the aforementioned field (e.g., Bettany 2007; Bettany & Kerrane 2011; Borgerson 2013; Canniford & Bajde 2016; Canniford, Riach & Hill 2018; Canniford & Shankar 2013; Epp & Price 2010; Giesler 2012; Lugosi & Quinton 2018; Martin & Schouten 2014) and is informed by the work of seminal thinkers such as Bruno Latour, Michel Callon and John Law. Building on these theorizations enables us to highlight and follow the messy and heterogeneous elements that are found in retail food waste occurrence and reduction and to illuminate previously overlooked aspects of food waste at retail sites.

Recently, in marketing studies, Gollnhofer (2017) analysed how alternative food waste practices became normalized and included into the marketplace. In the normalizing process, she paid attention not only to the non-material, but also to the material culture. In the household context, Mattila et al. (2018) studied human and non-human actors to discover their potentials in organizing temporality, thus preventing and reducing food waste. Further, Evans (2011, 2012) from sociology and Waitt and Phillips (2016) from the field of geography have investigated the role of material in household food waste processes. However, the ways in which food turns into waste in the interaction between human and non-human actors in the sociomaterial network within a retail setting have remained unresearched to date.

In the context of retail food waste, Gollnhofer and Schouten (2017) use ethnographic methods to investigate tensions and practices that allow different stakeholders – consumers, retail firms and regulators – to work together for a common cause without compromising their own idiosyncratic objectives. There are many actors such as other retailers, policymakers, food charities and food banks (Gollnhofer & Schouten 2017) that take part in food waste formation.



Building a systemic perspective on food waste is a question of incorporating the material, as well as all related actors. This is what this research sets to do, following the phenomenon of bread/waste in Finland, the research moves away from the subject actor to analyse all actors participating in the process of food becoming waste. This is done by referring to ANT. Finally, a network approach for food waste is built.

I will next specify the RQs and the overall purpose of the thesis. Then I will delve deeper into the research method and open up the theoretical perspective.

## 1.2 Purpose of the research and research questions

**The purpose of the research is to develop a systemic perspective on the network of food turning into waste in a retail setting.** In order to achieve this purpose, the research is to answer four RQs.

The research begins by asking, **what is the current understanding on food waste in the consumer society?** The RQ is approached via a literature review to determine what research on food waste has been carried out previously. This is presented in Chapter 2. Since waste research is situated at the intersection of numerous research fields, a comprehensive understanding of food waste is pursued by approaching the issue from the perspectives of logistics and consumption studies in order to achieve a synthesis of the current knowledge. The existing concepts and theoretical thought are presented, while the current shortcomings and research gaps are also highlighted, underlining the need for research that takes the material aspect of waste into account and is able to capture the multisightedness of food waste instead of holding onto a traditional food chain approach.

The second RQ is, **how does food turn into waste in a retail setting?** It focuses on the empirical interface of food turning into waste. Here, the objective is on extending current research, which concentrates mostly on existing food waste, to the process of food becoming waste. By answering the RQ, the understanding on food waste formation is extended by analysing the heterogeneous relations and actors in the process of bread turning into waste in a retail setting. To reach this objective, the RQ is divided in to two subquestions. Firstly, the research ask, how does food turn into waste within actor relations? This subquestion is answered in Article 1 by analysing food waste as an effect of network relations, concentrating on the relations between different retail elements and the retailer. This way, it becomes possible to reveal how retail practices and the retail site as a material-sensory environment take part and perpetrates in food becoming waste. Secondly,

the research asks, what is the role played by non-human actors in food waste formation? This is answered in Article 2. The research explores and analyses the role of non-human actors in food waste production and/or reduction. Recognizing the distributed agency and re-emerging relations between humans and non-humans, I contribute to the emerging stream of food waste studies interested in the sociomaterial networks of food waste.

The third RQ asks, **what is the nature of food waste?** Based on the conducted empirical research and the ANT-based framework, the research seeks to make an empirical contribution by extending our understanding of the phenomenon of food waste and developing a novel conceptualization of food waste. The construct of food waste in itself is an actor in the food waste network, taking part in our knowledge formation. A conceptual discussion on food waste is significant, not only to academic, but also to practitioner audiences such as retailers, and further assists in how effectively it is dealt with (MacInnis 2011: 141). In contrast to the previous conceptualization of food waste, the ANT framework reveals the fluid, non-linear, relational nature of food waste, unravelling the food/waste dualism.

The fourth RQ is, **how to trace the network of relations in ANT research?** The RQ is methodological and based on the needs and experiences confronted while carrying out ANT research in order to answer the second RQ. It sets the stage for investigating the network of sociomaterial practices. The RQ, involving cases developing and advocating a networked, sociomaterial practice approach as a procedure of conducting research, is divided into two subquestions. The first subquestion is, how to proceed in ANT research? To answer the question, the inductive empirical understanding from the food waste research carried out in this study is utilized to suggest a procedure for ANT research. The second subquestion is, how to specify practices in ANT research? Based on the gaps and needs in food waste research, as identified in the literature review, the RQ is answered by bridging the practice approach and the theoretical and methodological perspectives of ANT. A networked, sociomaterial practice approach is introduced.

As a result, the researcher contributes conceptually and methodologically by proposing a sociomaterial practice-network approach for analysing a heterogeneous, networked world. A review of the research process is presented in Figure 1.

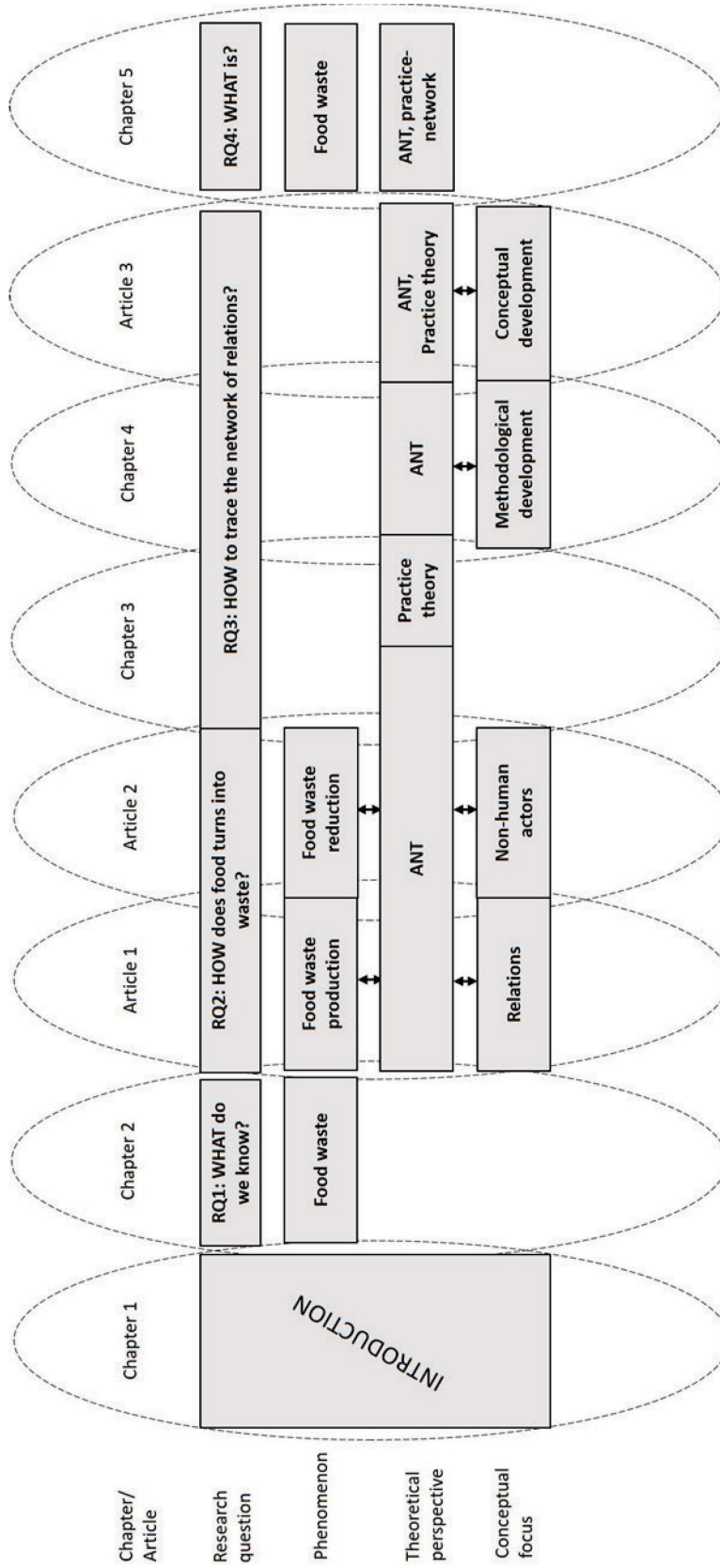


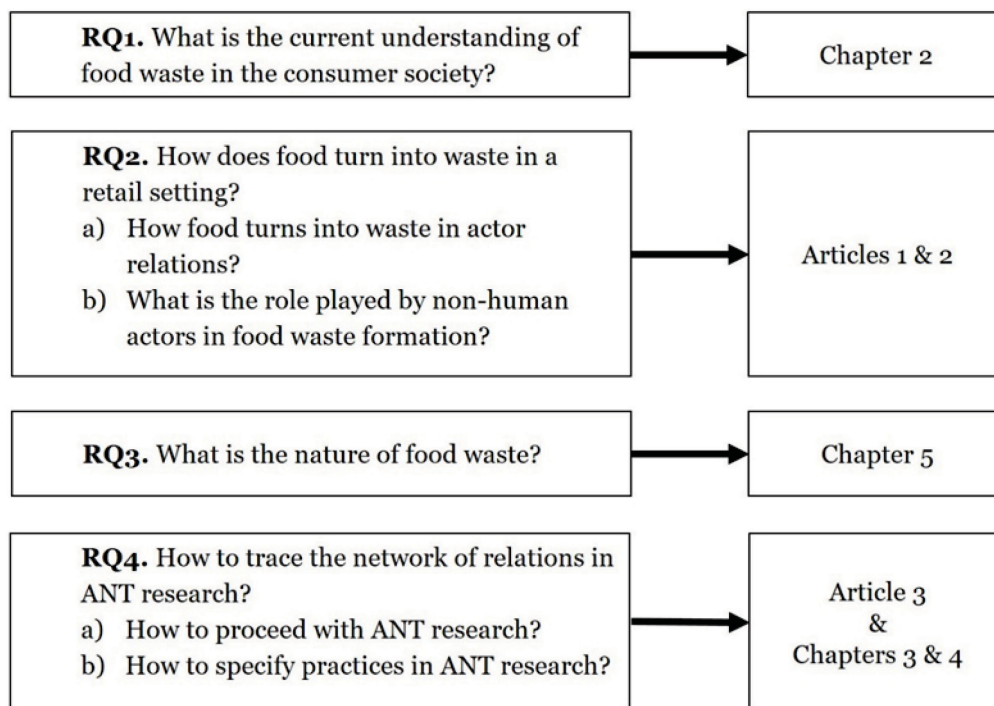
Figure 1. Review of the research process

In conclusion, in order to achieve the purpose of the research and **develop a systemic perspective on the network of food turning into waste in a retail setting**, the following four RQs are proposed:

1. What is the current understanding of food waste in the consumer society?
2. How does food turn into waste in a retail setting?
  - a) How food turns into waste in actor relations?
  - b) What is the role played by non-human actors in food waste formation?
3. What is the nature of food waste?
4. How to trace the network of relations in ANT research?
  - a) How to proceed in ANT research?
  - b) How to specify practices in ANT research?

### 1.3 Structure of the thesis

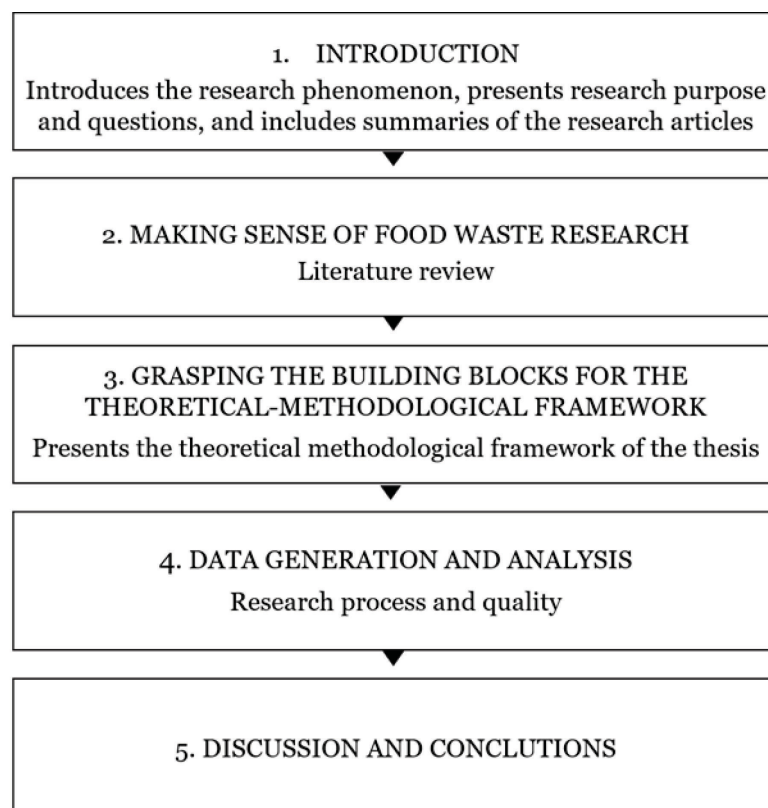
The general purpose of the research is to answer to the RQs. Figure 2 connects the RQs with the corresponding articles and/or chapters.



**Figure 2.** Overview of the research questions and corresponding articles/chapters

The structure of the thesis is illustrated in Figure 3. The quest begins with this introduction, setting the stage for the research. It presents the phenomenon of interest, research aim and objectives, the structure of the thesis, familiarization with the concept of food waste as well as the summaries of the three research articles. The first two articles are empirical. Building on ANT, the articles open up two different perspectives on food waste. Article 1 discovers food waste from the perspective of actor relations. Article 2 has its focus on the non-human actors of food waste. Together, the articles answer the second RQ, how does food turn into waste in a retail setting? (The first article answers the first subquestion about how food turns into waste in actor relations and the second article answers the subquestion about the role played by non-human actors in food waste formation?) Article 3 presents ANT-based practice research in order to answering the subquestion about how to specify practices in ANT research.

Chapter 2 answers the first RQ, what is the current understanding of food waste in the consumer society? Previous research and background knowledge on the phenomenon under study are reviewed and a current understanding on food waste is derived.



**Figure 3.** The structure of the thesis

Chapter 3 presents the building blocks for the theoretical-methodological framework of the thesis. It first presents the practice theory, followed by the ANT approach, both of which form the basis of the research articles and the entire thesis.

Chapter 4 addresses data generation and data analysis. Based on the methodological outcomes from conducting the research, the chapter answers the first subquestion of the fourth RQ, how to proceed in ANT research? Further, a discussion on reliability, validity and research ethics is included.

Chapter 5 comprises a discussion and conclusions. It includes the contributions and implications of the research, while setting the direction for future research. The third RQ (what is the nature of food waste?) is addressed in this chapter.

## 1.4 Research context

In order to answer these questions, I have chosen to follow the phenomenon of bread/waste in Finland, focusing on the marketing phase of the food network, following bread/waste in bakeries, retail outlets, food charities and bins, rather than focusing on consumers' homes and kitchens.

According to Mena, Adenso-Diaz and Yurtc (2011: 650) the manufacturer and retailer interface is one of the areas that has remained neglected in food waste research. Thus, a hypermarket, a space for both retail and consumption, serves as a good entry point to food/waste, and the research site for Articles 1 and 2.

Hypermarkets and big supermarkets are the most popular outlets for buying groceries in Finland, and the effect on waste amount is also the largest in biggest stores. In Finland, a food store that has over 2,500 square metres of sales space and stocks both food and non-food products under the same roof is called a hypermarket. Though a larger share of the space is dedicated to non-food items, the largest share of sales comes from food products.

Since chain logic in retailing is based on uniformity and duplicate processes, generating data on the outlet of a big retailer has the potential to lead to bigger food waste reductions than if looking at less popular and smaller grocery stores. While the empirical data are based on findings from one store, the retailer seeks to operate all the chains with a common logic, making a single store in the chain a duplicate of the others. Thus, focusing on a hypermarket can potentially help to reduce more food waste compared to a smaller retail unit would.



A retail setting, i.e., the bread and bakery section of a certain hypermarket, is used as an entry point to the food waste network. Recent research papers (Evans 2018; Welch, Swaffield & Evans 2018) have reminded us of the need to address not just individual parts of the food chain, but also understand the complexity of the network of participants, from farmers to manufacturers, retailers and consumers, and from individual and small actors to large companies and multinationals. Thus, the hypermarket itself serves as an entry point to the food waste network, from where the researcher follows the network of food/waste to bakeries, food charities, bins and bags vulnerable to dumpster divers.

The empirical object of interest is the bread market. The Finnish bread market is an interesting context for food waste in many ways. Bread is one of the main product groups causing waste in Finnish food retailing (Silvennoinen et al. 2012: 6). Further, according to Brancoli, Kamran & Bolton (2017), bread represents a large fraction of food waste for many Swedish supermarkets, superior in proportional terms by mass. This might be the case elsewhere, since Mena, Adenso-Diaz and Yurtc (2011) found bread to be one of the biggest product groups causing food waste in retailing in the UK and Spain with waste levels higher than 7 per cent. Bread is also an important part of Finnish meals and food culture. An average Finn eats around 40 kilograms of bread in a year and around 6 kilograms of sweet bakery products in a year (Leipätiedotus ry 2017).

To be able to understand and analyse food waste, an account of the complexities involved in the food waste network, along with a description of the Finnish bread market, is now presented. The description is based on the research literature and on the research data generated for this thesis. Processual aspects and contextual conditions reveal what has happened and is happening in the Finnish market in relation to bread waste. Excerpts from the data are used to valorize the food/waste market.

The baking industry is the biggest form of food industry in Finland when measured by the amount of companies (684 in 2015). The measure also includes companies that produce pasta and similar products from wheat and cereal. The industry employs 7,818 (the second-biggest workforce after the meat industry), but the turnover, 1,054 million euros, falls behind that of the meat industry and the production of milk products. The bakery market is composed of firms operating within local, national and global markets. Most of the bakeries in Finland are small and local, employing fewer than six people. Only one company, Fazer Bakery employs over 1,000 people (Työ- ja elinkeinoministeriö 2019).

Moving from the industry perspective to consumption, bread represents an interesting consumption context. Bread is a traditional and important part of a

Finnish meal and works as an allegory for the entire meal. While many Europeans mostly eat white bread and visit bakeries or grocery stores with a confined selection of choice, Finnish bakeries bake and grocery stores offer a highly varied selection of breads, ranging from white to dark, fresh to dry, from sliced to unsliced bread, readily packaged to be sold separately and self-picked, from delivered to bread baked onsite in an in-house bakery, and from single items to family-sized packs. While bakeries offer a wide selection of bread brands, each one can still offer a wide selection of differentiated products. For example, Reissumies, a bread brand that previously used to mean wholegrain rye bread sold in a pack of four, now includes numerous taste variations in different package sizes, a line of buns and a line of ready-made sandwiches sold as quick snacks. In addition to Reissumies' wholegrain rye bread, the line offers oats, extra dark bread and 100-per-cent rye bread, packs of four and 12. Line extensions and a large variety of different tastes and product options under one brand are common, while the variety of brand and product names held by each bakery is also considerable. For example, a middle-sized bakery that was interviewed for the research can supply large-scale grocery stores with orders that include a variety of 20 product names (interview with a bakery owner). This means that a moderate-sized grocery retailer has a selection of over 100 different breads, while a large-sized retailer, supermarket or hypermarket offers a selection of hundreds of bread products. Line extensions and product variation are pursued to acquire more self-space and grow sales.

In the 21st century, in-house bakeries have conquered grocery stores. The German-based grocery chain, Lidl, was the first to expand its selection and introduce in-store baked products to lure new customers, with Finnish grocery retailers following quickly behind. Thus, competition among bakeries and across the baking industry has grown. This is how one owner of a middle-sized bakery explains the situation:

“Lidl reorganized the back wall in their Seinäjoki store, I don't now remember if there was milk or what, but they changed the layout and added an in-store bakery which attracted people. They started to sell 'football rolls' for 7 cents each, which is now sold for 29 or was it 39, they dumped the price so that it was senselessly cheap, and then they say that Lidl is cheap and the back wall and the in-store bakery bring in the clients, and so they got such a rush that bread is almost for free in Lidl. And a lot of customers from S and K-markets [S-group and Kesko] switched to Lidl.”  
(Interview with a bakery owner)



While there had been in-store bakeries in selected stores previously, Lidl's decision to introduce freshly baked products in its stores has made in-store baking commonplace in other stores. In addition to introducing in-store baked bread, marketing campaigns have pushed down the prices of bread.

In-store bakeries represent not only a change in the selection of bread products, but also a change in the origin of the produce. In-house bakeries, despite being called "bakeries", do not actually bake; rather, they only heat up frozen, prebaked products that are baked somewhere else, and delivered to in-house bakeries for heating. These prebaked, frozen goods are mostly delivered from Europe:

"And now we are suddenly in the so-called European market, and we have, err, Germans, Polish, Balts bringing in prebaked, frozen bread, and they are baked, or actually frozen bread is warmed up in Finnish stores, and now that they are in every store, and of course they take these products to the best places, so then, 20 per cent has moved away from buying Finnish bread to foreign markets." (Interview with a bakery owner)

Thus, as the excerpt above highlights, international competition has grown stronger and imports from abroad have increased. Before Finland joined the EU, bread was mostly domestically produced. The EU's internal, single market area allows people, goods, services and capital to move more freely, which has changed bread markets in turn. In the EU inner market, the farming of grain is more productive in countries like Poland and Germany, where the area under cultivation is bigger and the weather is favourable all year round. Further, Eastern newcomers to the EU have benefited from the ERDF.

In addition to new bakeries in the Finnish market, food and dietary trends have also expanded markets. Bakeries, under constant pressure to get their products sold, while especially trying to yield large-enough margins in the highly competitive market to stay alive, have been eager to launch and get out new products, sometimes striking gold with a specialized product. As a low-carbohydrate diet grew popular around 2010, bakeries also faced a threat due to consumers moving from carbohydrate-intensive bread products to other product categories. According to Finnish Bread Information, the total consumption of Finnish fresh bread dropped by around 20 million kilograms in 2010-2013 (Leipätiedotus ry 2017). However, instead of losing markets, developing low-carbohydrate bread was seen as a possibility to gain markets. The interviewed bakery owners regenerated their recipes and introduced protein full breads. Later, when gluten-free diet gained popularity, it invested in a new bakery, expanding its product line to gluten-free breads and bread products. Taking into consideration increasingly health-conscious consumers, new recipes include

supplementary vitamin D and iodized salt. Other consumer trends include ecologically derived organic products, fragmenting the market even further.

In addition to bakery-owned brands, private-label brands, owned by retail chains, are also competing for their share of consumers' spending in the bread market. Since the introduction of private labels to grocery markets, their share in consumers' shopping basket has grown considerably, approaching 25 per cent of consumer sales in Finland, although the growth has been moderate compared to other countries in Europe (PTY 2017). Owned and managed by retail chains, private labels or retail brands are a way for retail firms to increase their profits. Compared to national or global brands, private labels are a way to differentiate the retailer from other chains with products that are sold exclusively via the label-owning chain (Richardson, Jain & Dick 1996). While private-label brands constitute a threat and competition for self-space, they are, at the same time, an opportunity and another channel for bakeries to grow their market share in this competitive market by becoming manufacturers for private labels.

From a retail perspective, offering wider selections, including a large variety of breads, in order to meet consumer demands has been seen as one of the most important functions of the grocery trade in Finland (PTY 2008-2009, 2013). "Taking consumers into account means supporting their choices by creating new selections and expanding on existing ones", underlined Terho Kalliokoski, President of Kesko Food Ltd. and the Chairman of the Finnish Grocery Trade Association in *Finnish Grocery Trade* (2008-2009: 3). Formerly a shopkeeper, now an active organizer of food-based assistance, Mauri describes how customers always used to demand certain bread items that were missing from the selection on offer (field notes). The bakeries responded by producing a vast array of products. According to Mauri, there is no other place in the world that would have a wider selection of bread available than Finland (field notes).

According to the Finnish Grocery Trade Association, extensive selections are also linked to efficiency. Developing food supply chain efficiency and productivity benefits the consumer with lower prices and extensive product selection, which are further supported by ensuring the availability of several purchasing channels (PTY 2013).

While extensive selections are valued, efficiency and lower prices are also sought out. The centralization of grocery retail in Finland has given the two major grocery retail chains (Kesko and S-group) bargaining power and the possibility to invite tenders and negotiate cheap deals. While, 20 years ago the market was divided more evenly between four retail chains, namely, Kesko, S-group, the Spar-group and Elanto/Tradeka (Aalto-Setälä 2002), continuing buyouts (Kesko bought

Suomen Lähikauppa in 2016 and, in 2017, S-group announced it was buying the grocery business from Stockmann) have led to Kesko and S-group dominating 90 per cent of the market. The two chains also handle wholesale and logistics, meaning that 90 per cent of sales take place via these two actors. Without specialization and differentiation, products are subjected to tough competition:

“Well, ok, there are two buyers. If you want to succeed in Finland, you have to sell to both of them, and the buyers know it. Three to four deliverers and only a couple of buyers. Okay. This year, they won’t pay more than about 95 per cent of last year’s price. Well, okay, you sell. Next year, we will again pay 95 per cent. But then it was announced that the central wholesale business would auction off their selection for next year. And the auction would be held with falling prices. And there would be 30 seconds to bid, and it would happen on the Internet. So, we were given a web address, a username, and there we were on Friday 13 April at 2 p.m., offering sugar rusks, 400 grams, to the central wholesale business, for the coming year, with the sales amount estimated from the history. Who wants to deliver for 98 cents? Click, 30 seconds. And so it went to 70 cents and we dropped out during the game and lost it. We laid off bakers and, in the end, all the participants got a thank you message from the auction that they will negotiate with the one who offered the lowest price. Those who didn’t manage to succeed today, expect to bid low again next year.” (Interview with a bakery owner)

Given such a highly competitive market for groceries and, in this case, bread products, bakeries need a wide range of products that allow for differentiation and grow market potential. With a wider variety, it is easier to grow shelf share and avoid being compared to and possibly being replaced by other brands and bakeries. By finding a niche product that no one else produces, one interviewed bakery has been able to move away from price competition and develop bargaining power:

“[We are] the only producer of gluten-free rusks and crispbread in Finland. If they force us to an auction, we will bid only against our selves. So, we say that it’s really good, that auction thing you have, but we do not have time. It’s okay, you do not want to buy our products, but fortunately the other wholesaler wants to. Now, our negotiating position is different. Before, there were two buyers and many producers. Now, there are two buyers and one producer. Which chain can be without Finland’s only gluten-free rye crispbread? No one. Well of course you can be, but it is not profitable to be without us.” (Interview with a bakery owner)

While the food chain follows the logic of a supply chain, a logistical chain from farms through production to grocery stores, consumers and finally refuse bins and waste fields, recently, new market actors have absorbed new practices and challenged the traditional way of distribution and sales e.g., producers selling straight to consumers.

## 1.5 Defining food waste

How do we define food waste? Existing at the intersection of various disciplines and fields of study, but in the interest of barely anyone, there is no universally shared concept and meaning for food waste (Buzby & Hyman 2012) (Table 1). Different fields of study have different conceptualizations of food waste that valorize different perspectives and give different meanings to food waste.

Object-driven conceptualizations determine what to include as food waste. Garrone, Melacini and Perego (2014: 130) make a difference between food waste and surplus food, defining surplus food as safe food which, for various reasons, at any stage of the supply chain, is not sold to or consumed by the intended customer, while food waste is surplus food which is not used to feed people or animals or to produce new products (e.g., jams or juices), new materials (e.g., fertilizers) or energy. However, these are debatable and not universally shared concepts.

Food losses usually refers to harvested or produced food which is not consumed (Buzby & Hyman 2012) and can include losses that are inedible, such as production-line leftovers at the manufacturing stage and discarded mouldy fruit from the produce shelf at the supermarket to ensure consumer safety (Kantor et al. 1997). Garrone, Melacini and Perego (2014) label non-edible food waste as food scraps.

Intriguingly, many conceptualizations take into account the possible reasons behind food waste. Gustavsson et al. (2012) and Beretta et al. (2013) refer to Parfitt, Barthel and Macnaughton's (2010) definition of food waste as something that applies and relates to behavioural issues in the retail and consumption stages. These kinds of definitions are problematic, as they predefine the problem. What makes this more disconcerting is that Parfitt, Barthel and Macnaughton (2010) make no reference to or give any justification for "behavioural issues". What seems to be their research paper's presumption has been copied and referred to in other studies. In 2014, the FAO, in order to enhance and harmonize research on food loss and waste, introduced a definitional framework of food loss. In this working paper, food waste is defined as food which is removed from the food supply chain despite being fit for consumption, by choice, or which has been left to spoil or

expire as a result of negligence by the actor – predominantly, but not exclusively, the final consumer at the household level (FAO 2014: 4). More recently, while Teller et al. (2018) refer to this definition, Gruber, Holweg and Teller (2016) and Filimonau and Gherbin (2017) point out the extant heterogeneity of definitions. While defining food waste seems anything but unambiguous, the ANT approach applied in the present thesis opposes any presumptions and analytically lethargic thinking, while seeking to discover manifold actors behind food waste.

**Table 1.** Different definitions of food waste

Definition of food waste	
Parfitt, Barthel & Macnaughton (2010); Gustavsson et al. (2011)	Food losses refer to the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption. Food losses occurring at the end of the food chain, retail and final consumption, are known as “food waste”, which relates to retailers’ and consumers’ behaviour.
Buzby & Hyman (2012)	Food waste is a subset of food loss. Food loss is a subset of post-harvest losses (or post-production) and represents the edible amount of food available for human consumption but is not consumed.
Garrone, Melacini & Perego (2014)	The surplus food that is not recovered to feed people, to feed animals, or to produce new products, new materials or energy.
FAO (2014)	Food waste refers to the removal from the food supply chain of food which is fit for consumption, by choice, or which has been left to spoil or expire as a result of negligence by the actor – predominantly, but not exclusively, the final consumer at household level.

Different conceptualizations of food waste and their recoverability can also be looked through the lens of the “inverted pyramid of sustainability” which presents a hierarchy of dispositional behaviours: refuse, reduce, reuse, repair, redistribute, recycle and throw away. Food waste from a social perspective is defined as surplus food that is not used for feeding people. On the other hand, food waste from a zootechnical perspective is defined as surplus food that is not used for feeding

humans or animals. Finally, food waste from an environmental perspective is defined as surplus food that is not reused or recovered in any form and is disposed of (Garrone, Melacini & Perego 2014).

Looking at the recoverability of waste, it is increasingly realized that waste cannot be taken as an ontologically fixed category, but something with a dynamic/volatile/ambivalent shape. However, until recently, including in social studies, waste has mostly been received as a terminal, fixed and unquestionable category. This end-of-the-pipe, linear way of treating waste has led researchers to identify and approach waste as something that needs to be managed instead of moving beyond and questioning categorization (Gregson & Crang 2010). If something has been labelled food waste, then it has been treated as waste. A deterministic approach like this has been commonplace, for example, in retailing (compare Stenmarck et al. 2011: 27-28; Silvennoinen et al. 2012: 36). To date, research has focused on the treatment of waste, managing waste once it has occurred and directing attention to human-led processes and on the expense of waste. Food waste has been black-boxed, taken for granted and a given, without too much thought on its nature.

Based on the presented conceptualizations of food waste, it becomes clear that defining food waste is not a simple task, but is connected to more profound and fundamental aspects on how the world is seen and the underlying philosophical standpoints. In order to overcome the shortcomings of previous research, the boundary between food and waste is reconsidered while predefined conceptualizations of food waste are rejected. Defining food/waste is based on ANT, emphasizing the relational nature of things coming together and questioning the dualistic categorization of food and waste. This research opens up the black box of food waste with an interest in alternative frames to understand it. It is argued that food and waste are defined in relational terms, contextually and temporally coming together in practice network. Thus, it becomes possible to gain a better understanding of the heterogeneity of food waste.

Instead of setting boundaries or fractioning physical food waste to include fruit and vegetable peelings or exclude bones and packaging (compare Mena, Adenso-Diaz & Yurte 2011), the interest is in food waste as a relational effect, defined in heterogeneous networks. Here, the research follows the premises of ANT, as it is based on relational ontology, where bread/waste is negotiated in relation to other actors in the network.

Adopting waste as ontologically predefined and unchallenged does not fit the ANT perspective, which prohibits all *a priori* categorizations. Instead of presuming a determinist view of food waste, it is treated as a dynamic and relational category.



ANT and its ontological and methodological assumptions are discussed in more depth in Chapters 3 and 4 on the theoretical-methodological framework and data generation and analysis.

## 1.6 Summary of the articles

### ***Article 1: Gluttony – no taste without the waste? Gluttony in bakery product retailing***

The article discovers retail food waste in bread and bakery products through the concept of gluttony, one of the “seven deadly sins”. While gluttony relates to excessive eating and indulgence and, as such, to individual’s decision-making, lack of control and vanity, the concept has also been utilized to analyse values of advertising and size labels which encourage lavish eating (Caywood & Langrehr 1990; Aydinoğlu & Krishna 2011). Building on this, we consider the role of bakery product retailing in fueling (over)consumption and producing food waste. In comparison to the previous literature, we are interested in moving away from blaming the individual to analysing the role of grocery stores and the desires they build, and whether they are in fact also guilty of gluttony.

The theoretical framework is based on ANT. Thus, we understand retail gluttony and the resulting food waste as relational, symmetrical and distributed phenomena which we follow in the sociomaterial space of the retail milieu. The research context is the bakery and retail market in Finland. Our data are based on illustrative multimethodology and multisite data from the bread and bakery category.

The article contributes to the discussion on food waste by highlighting the role of retail sites in relation to food waste through the constructs of abundance, allurement and apposition. Grocery retail stores are places of abundance: they are built to allure, and their items need to be in apposition to others, in perfect shape. Thus, the retail site is constructed like a paradise, from which rotten apples, as imperfect products, are removed. Abundance takes shape in a wide variety of bread, packaging and production methods used to encourage lavish eating; at the same time, as a spillover effect, part of the bread is left in the store and unconsumed. Allurement is used to describe the network and relations between consumer and milieu, with the sensory cues distributed between different products, display facilities, packages and practices which invite gluttonous behaviour. In addition to providing allurement and enticing customers to consume, even in gluttonous ways, producing sensory overload can be regarded as a type of gluttony. With apposition, we describe the relationalities between

products that are seemingly the same – the need for every product to be like the others, to be without a defect.

The contribution made by the first article is in approaching gluttony not as a personal trait, but as a relational effect. While the article discovers the multiple actors at play in gluttony, it reveals how the retail site as a material-sensory environment takes part and perpetrates in food becoming waste. Thus, the article extends our understanding of distributed agency in the process of retail food waste. Further, as we highlight the active role of production (food retailing) in consumption (gluttony that results in food waste), we problematize the institutionalized categorization of production as productive.

In the end, in order to reduce food waste, we question the need for abundance. Could we manage with a little bit less? Or, is it even convenient to choose from a wide variety? An example of augmented choice from the French retailer Auchan indicates this might also be profitable (Paché 2007), while moderate reductions in variety have been shown to have no effect on consumers' perception of the product assortment as long as favourite references remain available (Broniarczyk et al. 1998: 174).

The theme of apposition points to the attention given to product perfection by both employees and customers. Faultlessness is looked for not only in the product (bread in this case), but also in the byproduct, such as the packaging. The other side of the coin is that imperfect products, due to torn packaging or a bag of bread on the verge of its use-by date, are more easily discarded and wasted.

While our research is able to highlight the distributed agency in food waste, which is characterized by the themes of abundance, allurement and apposition, the actors involved in food waste remain vague. Thus, the next article aims to explore the role of different actors, human and non-human, in producing food waste.

### ***Article 2: Distributed agency in food waste – a focus on non-human actors in a retail setting***

The second article delves deeper into the role of non-human agency in food waste, exploring and analysing how non-human actors participate in the production and/or reduction of food waste in a network of actor relations. Recognizing the distributed agency and re-emerging relations between humans and non-humans, the article contributes to the emerging stream of food waste studies interested in



the sociomaterial networks of food waste (Evans 2018; Mattila et al. 2018; Waitt & Phillips 2016).

We build our research on the ideas stemming from ANT (Latour, 1999a, 1999b, 2005) and emerging post-humanist studies from marketing and consumption research (for example, Borgerson 2013; Canniford & Bajde 2016; Canniford, Riach & Hill 2018; Lugosi & Quinton 2018). Thus, we see the food waste network as an emerging and changing arrangement of humans (e.g., customers, grocery store managers and employees) and non-humans (e.g., bread and its packaging, date labels and displays) producing and/or reducing food waste.

As in the first article, the research concentrates on food waste in the case of bread and bakery products within grocery retailing in Finland. In practice, the article reveals how bread may or may not otherwise turn into waste. Our data are based on a variety of multimethod ethnographic materials. The primary data consist of participant observations, while our supplementary data include online and offline news articles concerning food waste in Finland.

In our analysis of the food waste network, we identified three sets of non-human actors taking part in producing and/or reducing food waste: the focal object of bread and its packaging, the natural-temporal actors, and the techno-material actors.

The value of our article is in describing and analysing how multiple heterogeneous actors interact to produce and/or reduce food waste, with a special focus on non-human agency. The focal contribution to the marketing literature is the understanding that food waste production and reduction bounds together heterogeneous actors, and that all of these actors should be taken into consideration when searching for ways to reduce food waste. In other words, we argue that, instead of looking at food waste in terms of a human-led process, let alone a question of top-down management, answers about how to reduce the amount of food waste need a retentive analysis of the system. Most importantly, we argue that the mobilization of various non-human actors, until recently, shadowed by the interest concerning humans and human-led management, in the process of food turning into waste, needs to be acknowledged and dealt with, if the wicked problem of food waste is to be resolved.

***Article 3: Practice as a patterned network of heterogeneous materials  
– an actor-network approach to practice theory***

The concluding article is conceptual and reveals the possibility of widening and redirecting the scope of practice research based on the material-semiotic approach of ANT. It suggests that the ANT framework can open up new avenues in practice research in three ways. Firstly, the ANT conception of distributed agency recognizes the substantial role of sociomaterial relations, directing more attention to the role of non-humans participating in practices. Secondly, the conceptualization of ANT moves the focus from micro-level social practices to a wider network of relations. Thirdly, adopting the ANT guideline about following the actor can methodologically help to answer recent calls for embedding consumption into its wider cultural and institutional context. While sociomaterial practices have received more attention recently, the theoretical and methodological underpinnings remain somewhat vague. Thus, the paper attempts to elaborate on the possibility of conceptualizing practice in an ANT way: as a patterned network of heterogeneous materials.

The idea behind applying the symmetrical tenet of ANT to practice research is to overcome the limited “contextual” view and shift focus on the network of connections between different actors. In more detail, conceptualizing practices as a practice-network moves attention away from micro-level social practices to a wider network of relations, responding to the need to go beyond the consumer and tie the research to the “context of context” (Moisander 2010; Askegaard & Linnet 2011: 384). Combining the network perspective (Latour 2005; Law 1992, 2009) with practice theory thus enables us to discover not only waste-causing practices per se, but practices in an altogether wider context. It acknowledges that such practices are networked to form the institutional dynamics of the food chain, such as food manufacturers, retailers and consumers, the infrastructure, as well as the policies and regulation. Further, by using ANT as a methodological lens in practice research, I propose that it becomes possible to move from description to analysis.

The focal contribution for the marketing literature is theory building. The article forms the basis for advocating a sociomaterial, practice-network approach.

## 2 MAKING SENSE OF FOOD WASTE RESEARCH

To be able to develop a thorough understanding of food waste, this chapter traces the evolution of waste research with a focus on food waste and research undertaken in the Finnish context. Existing at the intersection of many research fields, but not really a field of research in itself, waste has been left unheeded and often without interest expressed. It has been only recently that researchers from different disciplines have paid growing attention to waste research. This chapter first presents how waste as a research subject has commonly been treated (object of measuring). Next, the chapter provides an overview of food waste research from the perspectives of food waste policy, research on retailing and logistics, and consumption research. Through presenting and linking together different perspectives and conceptualizations on waste, this chapter builds a common understanding of food waste and the synthesis of food waste research. While doing this, the literature review points out research gaps and pitfalls in food waste research.

### 2.1 (Food) waste as an object of measuring

Most of the literature on food waste has concentrated on measuring how much food is being wasted (Eriksson, Strid & Hansson 2012, 2014; Gregson & Crang 2010: 1026) and its impact in selected geographic settings and across different stages of the food chain (Teller et al. 2018). Approximately one third (Gustavsson et al. 2011) or even half (Parfitt, Barthel & Macnaughton 2010) of the food produced for consumption is lost or wasted each year. This equates to at least 1.3 billion tons of food waste per year (Gustavsson et al. 2011).

Though measuring food waste is an important step in raising global awareness of the wicked problem of food waste, it is not a straightforward operation, and the research results are not always easy to compare. Different research methods, different definitions and different objectives produce different results. First of all, what is considered as food waste needs to be defined in order to know what to measure. For example, are inedible parts of food waste included, and what is considered as edible or inedible? Are peelings from fruit and vegetables included? Secondly, units of measurement vary: some research papers focus on kilograms, others on monetary losses. Further, the selected time span (food waste/week/year) can differ. Thirdly, selected measurement strategies are different. Consider, for example, the peelings from fruits and vegetables. If they are included in research, are they measured wet or dry? Further, studies (Eriksson, Strid & Hansson 2012; Cicatiello et al. 2017) have reported problems in recording of food waste, revealing

significant differences between reported data and the extent of unrecorded food waste in retail stores. Thus, there are many reasons why different research projects can end up with differing results and why estimates of food waste should be treated with caution. While the research results differ, they give an impression of the magnitude of food waste. In the following, an overview of the amount(s) of food waste is given.

Food waste is a global problem. However, there are differences in the amount of food waste in terms of geographical distribution and in which parts of the food chain food waste is generated. While, in low-income countries, food is lost mostly in the early and middle stages of the food chain, in medium- and high-income countries, food is to a higher extent wasted at the end of the food chain. Whereas retailers and consumers in the Third World hardly waste food, in the West, retailers and consumers are to blame: it is estimated that an average consumer in Europe or North America throws away around 95-115 kilograms food waste a year, while, in sub-Saharan Africa and South/South East Asia, the figure is only 6-11 kilograms per year (Gustavsson et al. 2011; Parfitt, Barthel & Macnaughton 2010). Further, Gustavsson et al. (2011) estimate that 280-300 kilograms of food per person is wasted every year in Europe and North America. Compared to sub-Saharan Africa and South/South East Asia (120-170 kilograms/year), food wastage is particularly severe in developed countries.

Concentrating on Europe, Stenmarck et al. (2016) estimated food waste in the 28 member states of the EU in 2012 to have reached 88 million tons of edible food and inedible parts associated with food, equating to 173 kilograms of food waste per person. Thus, the researchers found that 20 per cent of food produced in the EU is wasted (Stenmarck et al. 2016). However, the research did not take into consideration the amount of food imported from outside the EU or food products produced in Europe which might be exported to be used somewhere else.

While food waste is generated at all stages of the food chain, according to numerous studies, the sector contributing the most to food waste concerns households (Buzby & Hyman 2012; Katajajuuri et al. 2014; Stenmarck et al. 2016). According to the Fusions project (Stenmarck et al. 2016), households produce 47 million tons of food waste ( $\pm$  4 million tons). Together with processing (17 million tons  $\pm$  13 million tons), these two sectors account for 72 per cent of food waste in the EU, although the estimate for the processing sector is highly uncertain compared to all the other sectors. Differences between countries were also substantial. Of the remaining 28 per cent of food waste, the wholesale and retail sectors have the smallest share, with 5 million tons and 5 per cent of total food

waste, whereas 11 million tons (12 per cent) come from the food service sector and 9 million tons (10 per cent) from primary production (Stenmarck et al. 2016).

In Finland, Silvennoinen et al. (2012) and Katajajuuri et al. (2014) have estimated the total amount of food waste to have reached 335-460 million kilograms a year, equating to 62 to 86 kilograms per person in a year, a significant part of which is still be suitable for human consumption. The largest portion of food waste, 120-160 million kilograms a year, is generated in households. The food industry generates the second-largest share of total food waste, i.e., 75-140 million kilograms/year, while the estimate for the food service sector is 75-85 million kilograms of waste, with the retail sector generating the smallest amount, i.e., 65-75 million kilograms of food waste a year (Katajajuuri et al. 2014).

The sectoral proportions of food waste reported from Finland are in line with research from other Western countries. For example, estimating food losses in the American food system, Kantor et al. (1997) reported retail losses of less than 2 per cent of edible food supplies in 1995, while food service and consumer losses accounted for 26 per cent.

However, Eriksson, Strid and Hansson (2012) and Cicatiello et al. (2017) found the actual amount of food waste in retailing to be +30 per cent and even +44 per cent over recorded food waste (respectively). Thus, the possibly unrecorded amount of food waste should also be taken into consideration when estimating the contribution of retailers to the generation of total food waste along the food chain, now estimated at 5 per cent in the EU (Stenmarck et al. 2016).

While measuring food waste is difficult, it involves only dealing with waste once it has occurred. While numbers provide information on waste amounts and raise awareness of this weighty issue, they do not offer an adequate understanding of the reasons behind wastage, nor provide insights into how food waste could be prevented. By black-boxing the process of food turning into waste, waste has become categorized as an evident, end-of-the-pipe phenomenon which is only taken care of once it happens (Gregson & Crang 2010). Studies that try to quantify food waste leave the question of how waste occurs open, instead providing analytically lazy answers about the reasons behind waste without scrutinized research, thus denying us insights into how waste could be prevented.

## 2.2 (Food) waste policy

The policy perspective on (food) waste includes historical developments, environmentalism and sustainability perspective. From the ecological and

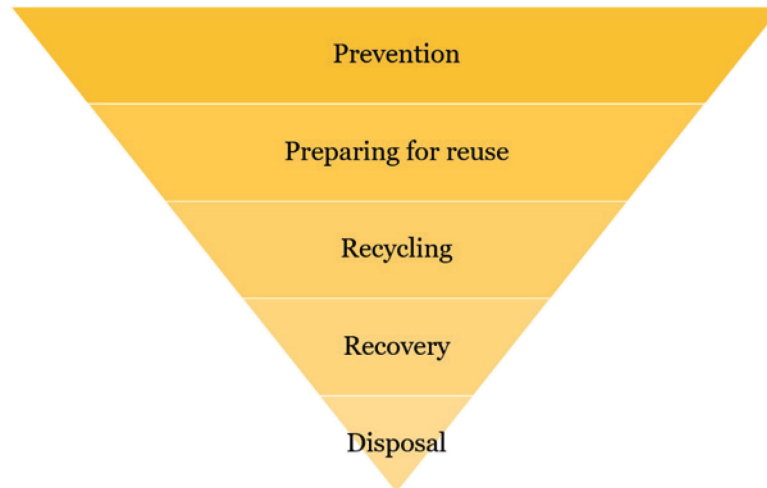
sustainability perspective, concern for the environment grew in the 1960s and early 1970s, as people became anxious of the impact of both consumption and growing production on the environment (Connolly & Prothero 2008: 118). However, Parfitt, Barthel and Macnaughton (2010) summarize how reducing food waste found its way on the agenda of the UN in 1945, long before the environmental awakening, when the FAO was established. Later, malnutrition and hunger provoked attempts to scrutinize the food chain in order to cut down food losses. However, although food waste was discussed in relation to policy and regulation, its part was largely ignored.

While the 1960s and early 1970s were marked with a growing concern for the environment, the focus was not so much on food waste as it was on pollution and other environmental aspects of growing production. While research on the environmental aspects of different diets, food products and food packaging has been carried out in numerous studies, the assessment of the environmental aspects and sustainability of the food chain has mostly ignored the role of food waste (Koivupuro et al. 2010).

Moving from food waste to considering waste on a more general level, in 1975, the EU issued the Waste Framework Directive (Council Directive 75/442/EEC) introducing a waste hierarchy, i.e., an order of preference for action to reduce and manage waste. The hierarchy was originally presented in the form of a pyramid, with disposal and recovery at the bottom, recycling and preparing for reuse in the middle, and prevention at the apex. While the aim was to protect the environment, conserve resources and minimize waste generation, its implementation was left optional for EU members; thus, initially, it had little impact on waste management practices (Williams 2015: 1).

The advanced policy and governance in relation to environment accelerated in 1987 to the recognition and presentation of the anew concept of sustainable development by the World Commission on Environment and Development (Brundtland Commission 1987). Sustainable development was defined as “development which meets the needs of current generations without compromising the ability of future generations to meet their own needs” (The World Commission on Environment and Development 1987).

In 1989, the waste hierarchy from 1975 was formalized as an ordered system of preferred management options in the European Commission’s Community Strategy for Waste Management Community and set as a priority approach for delivering the best overall environmental outcome (Papargyropoulou et al. 2014: 5; Williams 2015: 1).



**Figure 4.** Waste hierarchy (adopted from the European Commission’s Directive 2008/98/EC on waste)

It was only in 2008 that a new version of the waste hierarchy was introduced (Directive 2008/98/EC) (see Figure 3) and that integration of the hierarchy into national laws became obligatory. While food waste has traditionally been sent to landfill, now alternative destinations such as composting sites have become obligatory. The hierarchy is commonly presented in the shape of an inverted pyramid, including steps from the least favourable option of disposal, through recovery, recycling and preparing for reuse to the most favourable option of prevention at the bottom. Though the hierarchy lists waste treatment options in a preferred order, according to Williams (2015: 1), “most countries have regarded the hierarchy as a ‘ladder’ and have sought to climb it step-by-step from the bottom (landfill) to the top (waste prevention)”. Williams also points out that moving between various levels in the hierarchy calls for collaboration between different actors, industry, government, business, the charity and community sectors, and individuals.

Moving again from food waste to waste scholarship on a general level, I next refer to the synthezation of waste research by Evans et al. (2013), who write that, in accordance with policy work, studies on waste in the field of environmental policy and planning have emphasized the questions of governing, of evaluating waste policies and their consequences and, typically, of assessing the potential for recovering waste materials through recycling. This has led to conceptualizations of waste where “waste is uncomplicatedly the rejected and worthless stuff that needs



to be distanced from the societies that produced it or otherwise converted it into value via technological and organizational innovation”. Further, waste is taken as a fixed and self-evident category – an innate property or characteristic of certain things. The third assumption is that this unproblematic designation of certain things as waste is given by the imperatives of waste management (Evans et al. 2013: 6-7). The waste hierarchy has been applied in waste research in different fields, such as cultural research (Dobscha, Prothero & McDonagh 2012), and it can be seen to have influenced the evolution in reverse logistics and green supply chain management (Hazen et al. 2012).

The circular economy is a new and currently popular notion among policy and business advocacy groups seeking to promote sustainable development and reduce waste. The discussions have been primarily led by policymakers such as the European Commission and business advocacy bodies such as the Ellen MacArthur Foundation and Sitra in Finland. The EU issued, in 2014, the Communication known as “Towards a circular economy: a zero waste programme for Europe” and the Circular Economy Package, adopted in 2015, which seeks a transition towards a circular economy, including a sustainable development goal of a 50 per cent reduction in food waste by 2030 (European Commission 2014, 2015). There is no commonly accepted definition of a circular economy, but a common aim is to replace the take-make-dispose linear pattern of production and consumption with a circular system in which the value of products, materials and resources is maintained in the economy as long as possible (Merli, Preziosi & Acampora 2018). Korhonen et al. (2018) define a circular economy thus:

“[A] sustainable development initiative with the objective of reducing the societal production-consumption systems’ linear material and energy throughput flows by applying materials cycles, renewable and cascade-type energy flows to the linear system. [It] promotes high value material cycles alongside more traditional recycling and develops systems approaches to the cooperation of producers, consumers and other societal actors in sustainable development work.”

Like waste hierarchy, a circular economy makes a distinction with product reuse, remanufacturing and refurbishment which demand fewer resources and energy and are more economic than conventional recycling of materials as low-grade raw materials (Korhonen et al. 2018). According to Singh and Ordoñez (2016), the difference between a circular economy and a waste hierarchy lies mostly in the way discarded materials are perceived. In a circular economy, the aim is to phase out waste from industrial systems; therefore, the recovery routes focus mainly on recirculating post-consumer materials. It recognizes the important role of product



design in disassembly, inspection and reassembly and eliminating the use of toxic chemicals. The resource recovery routes prioritizes operationalizing replacement and reduction (that is, 'waste prevention' in the EU waste hierarchy), recovery (reuse by resale, repair, refurbish, reconditioning and remanufacturing) and reprocessing (upcycling, recycling and downcycling) over energy recovery and disposal (Singh & Ordoñez 2016: 343-344).

The waste hierarchy has been an important policy response to the waste challenge, being adapted to many fields of waste research in search of growing sustainability. Papargyropoulou et al. (2014) have applied the waste hierarchy to food waste research and proposed it acts as a framework for managing food surplus and food waste. The circular economy has been mainly linked to food waste in terms of waste management, e.g., turning food waste into energy (see Ingrao et al. 2018).

### 2.3 (Food) waste in retailing

While the environment became a topic of interest to marketers in the early 1970s, Bansal and Kilbourne (2001) suggest it never in fact established itself as a dominant influence in research or marketing practice, and there has been almost complete disregard concerning the environmental aspects of retailing in the 20th century (Bansal & Kilbourne 2001: 139). While there have been special issues of marketing journals related to environmental topics, Bansal and Kilbourne (2001) did not find a single article relating to the natural environment in the *Journal of Retailing* from 1972 to 1999 and only one article from business and business-related publications over a 15-year period.

While the environmental aspects of retailing have been neglected, this has also been the case for research on food waste in retailing, which has only recently started flourishing (Cicatiello et al. 2017; Filimonau & Gherbin 2017; Teller et al. 2018). Instead of concentrating on waste, the retail literature has focused on the traditional marketing perspective in terms of satisfying consumer demand: merchandising and replenishment that assure on-shelf availability and sales (Teller et al. 2018). Even though it has been widely acknowledged that profound changes in business practices are needed (Ropke 2009; Moisander, Markkula & Eräranta 2010; Spaargaren 2011), retail waste has been mainly explained by consumer wants driving the production (Mena, Adenso-Diaz & Yurte 2011: 655-656; Hanssen et al. 2011: 27; Silvennoinen et al. 2011: 36). Thus, waste has been treated more or less as a side effect of cost efficiency, while research on the reasons why products become unsaleable and how waste could be reduced and ultimately prevented has been neglected.

Until now, only a few studies on retail food waste have followed the same routes as mainstream research on waste, concentrating mainly on the quantification of waste. In these studies, the share of retail food waste has been reported to be the smallest in the food chain. According to one estimation, the EU grocery retail sector generated around 4.4 million tons of food waste in 2010, approximately 5 per cent of the total food wastage across the EU food supply chain (European Commission 2011). In a comprehensive study by Stenmarck et al. (2016), the amount of retail food waste in Europe was estimated to have been 4.6 million tons in 2012, i.e., around 5 per cent of the total food wasted along the supply chain. Similar shares of 3 per cent and 4 per cent have been reported for Germany (3 per cent) and Sweden (4 per cent), respectively (Eriksson et al. 2014). However, these numbers might not tell the whole story, since various researchers have reported huge amounts of unrecorded food waste that change remarkably, by +30 per cent and even +44 per cent, the total estimate for food waste (Eriksson, Strid & Hansson 2012; Cicatiello et al. 2017).

Stenmarck et al. (2011) have concentrated on food waste in the Nordic countries, contributing to knowledge on retail food waste. Based on interviews, the amount of food waste in retailing and wholesale in Finland has been estimated to reach 65,000-75,000 tons per year. In Norway, based on the measuring carried out in a few shops, the estimate is 43,000 tons per year in the retail sector. For Sweden, the estimate is 83,500 tons of food waste for the retail sector. The amounts are estimates, based on different research methods, and are not easily comparable. The estimate for Finland includes the wholesale sector, whereas the estimates for Norway and Sweden refer to retail food waste. However, in relation to population size (the population in Sweden is approximately double that of Norway), the estimates seem agreeable.

Although retailers are not the major cause of waste, when measured quantitatively (in kilograms), they are recognized as having the power to induce change among manufacturers and influence consumer preferences (Bansal & Kilbourne 2001: 143; Gruber, Holweg & Teller 2016). Situated at the intersection of different food chain actors, retail stores form a critical link between food producers and households. Further, the costs of food waste grow along the food chain, as costs from processing, packaging, logistics and retailing accumulate as the food product moves along it. More importantly, this is a question of not only costs and the value of food in terms of profits, but also environmental costs that accumulate with the level of processing and along the value chain. In terms of intervening in the food/waste process and seeking to reduce food waste, Gruber, Holweg & Teller (2016: 3) note that the absolute quantities of food waste generated at retail stores are highly significant in relation to the scattered food waste produced by

households or other parts of the food chain. Although retailers are not the major cause of waste in quantitative terms (amount of waste), the relative proportion of food waste caused by retailer outlets is bigger than the amount of waste created by households. Thus, the retail sector represents an interesting opportunity for food waste research and reductions. All in all, though research on food waste in retailing has been overshadowed by larger amounts of food waste in other parts of the food chain, retailing and food stores present an important site for food waste research (Cicatiello et al. 2017: 273; Filimonau & Gherbin 2017; Teller et al. 2018).

While research papers have concentrated on quantifying food waste, they have also produced information on the distribution of food waste among different product categories. Research papers have also listed causes of food waste (Stenmarck et al. 2011; Kantor et al. 1997; Mena, Adenso-Diaz & Yurtc 2011). However, these lists are mostly based on interviews with retail management.

One of the first articles to estimate the amount of and to analyse food waste in retailing was by Kantor et al. (1997). In more detail, relying on a review by USDA's Economic Research Service, the researchers were able to present tentative estimates as a starting point for more research. According to the report, nearly half of the retail losses came from fluid milk and other dairy products and fresh fruits and vegetables. The causes of food waste in retail include overstocking, overtrimming, improper stock rotation and post-holiday discarding of seasonal items, for example, Halloween cookies. Products that have reached their sell-by dates are mentioned as another reason behind food waste, mainly applying to fresh food items such as dairy and bakery products. Here, Kantor et al. (1997: 5) specifically mention the rise in the number of in-store bakeries along with freshly prepared speciality and deli items that have shorter shelf lives, though, for example, one-day-old bread would be safe to eat for a short time and potentially recoverable. This is in line with research from the Nordic countries, where fresh fruits, vegetables and bakery products are listed as the most important product groups present in waste flows (Stenmarck et al. 2011).

Kantor et al. (1997) reported that crushed, dented or otherwise damaged packaging, as well as expired shelf dates, were mentioned as reasons behind discarding canned fruits and vegetables, breakfast cereals, pasta and other non-perishable food products, with most of these losses occurring in inventory control, storage and handling. High failure rates for new food products are also speculated to have increased retail food losses in recent years as the number of new product introductions has risen. In the US, more than 16,000 new food products — including new sizes, packaging, flavours and brands of existing products — were placed on grocery store shelves in 1995, more than double the fewer-than-8,000

introduced in 1988. Industry experts have estimated that more than 90 per cent of new food products are quickly removed from the market (Kantor et al. 1997).

Looking not only at retailing but the whole food chain, Kantor et al. (1997: 4) continue:

“Some loss occurs in storage, due to insect infestations or mould, deterioration, or improper transportation and handling. Produce, dairy, meat, and other fresh items are subject to shrinkage (loss in weight or volume) due to inadequate packaging or simply the passage of time. Also, fresh foods stored or transported at improper temperatures can deteriorate, wilt, or suffer bacterial degradation or microbial growth. Frequent handling by food processors, brokers, and wholesalers can lead to additional losses. According to published studies, a typical food product is handled an average of 33 times before it is ever touched by a consumer in the supermarket.”

Mena, Adenso-Diaz and Yurtc (2011: 654) identify three root causes of food waste: industry megatrends, such as increasing demand for fresh products, and products out of season, as well as a move away from products with preservatives; natural constraints – factors that are associated with the nature of the products or process such as the short shelf-life of fresh products, the seasonality of supply and demand, and weather fluctuations; and management practices that have a direct impact on waste. Concentrating on management practices, they identify nine common causes of food waste: (1) lack of information sharing; (2) forecasting difficulties and poor ordering; (3) performance measurement and management; (4) cold chain management; (5) training; (6) quality management; (7) waste management responsibilities; (8) promotions management; and (9) packaging. The researchers also reported some good practices used to overcome the aforementioned challenges. All except for one of the good practices concentrated on management practices, while only one aimed to tackle natural causes and none of them megatrends (Mena, Adenso-Diaz & Yurtc 2011). However, it is important to note that the research data is based on interviews, hinder the capacity to reveal practice at work.

On the other hand, it is important to note that, though Mena, Adenso-Diaz and Yurtc (2011) stress management as a solution to minimize waste, at the same time, they confirm that many of the reasons behind food waste are out of reach in terms of management practices. Mena et al. (2011: 657) report:

“The results revealed that levels of waste are to a large extent dependent on the natural characteristics of the product, such as shelf-life, temperature

regime and demand variability, and on mega trends in the markets, such as the increasing demand for fresh products and products out of season. For instance, six out of seven products with very high levels of waste (more than 7%) were products with a shelf-life shorter than two weeks. Managers operating across the food supply chain need to operate within these constraints in order to minimize waste.”

While Mena, Adenso-Diaz and Yurtc (2011) stress the role of management, Teller et al. (2018) note that research has discarded the operational reality of retailers or frontline employees. Instead of a distant manager’s or expert’s perspective, Teller et al. (2018) call for research on food waste in a store environment.

Turning to the treatment of food waste in retailing, landfill has traditionally been a destination. According to Mena, Adenso-Diaz and Yurtc (2011), who conducted a study at the wholesale-retail interface in the UK and Spain, the main destination of food losses is landfill, followed by alternative destination such as biogas production and composting sites and donations to charity organizations and food banks. Garrone, Melacini and Perego (2012), based on a study in Italy, reveal that the destination of food losses mainly consists of: (a) donations to non-profit organizations and food banks; (b) deliveries to processing firms for the production of animal feeds (free or onerous supply); (c) employment as fertilizer on farms; (d) selling on alternative markets at discounted prices; (e) recycling for animal nutrition (free or onerous supply); and (f) disposal to landfill. Giuseppe, Enea and Muriana (2014) also suggest unsaleable products could be given to undernourished people by non-profit organizations, a process referred to as food recovery, while Garrone, Melacini and Perego (2014) report that delivering to non-profit organizations and food banks is a practice more common among suppliers, manufacturers and wholesalers (with 10.9 per cent, 35.3 per cent and 35 per cent of food recovered from their respective total food losses) rather than for the interviewed retailers (with only 4.6 per cent of their total food losses recovered).

More recently, research on food charities has revealed significant potential for redistribution strategies and for the human consumption of unsaleable food (Teller et al. 2018). At the same time, public interest and policy issues have pushed retailers to seek ways to avoid generating food waste. Food recovery in the form of food donations has accelerated in the UK after the French and Italian governments’ pioneering decision to discourage larger supermarkets from generating avoidable food waste by donating to charities and food banks instead. In Finland, Evira (the Finnish Food Safety Authority) changed, in 2013, the regulation on food donations in order to facilitate food redistribution. According to Filimonau and Gherbin (2017: 1188) the incentives are still insufficient for

grocery retailers to donate food. In Finland and the Vaasa region, in particular, however, the changes in regulation have accelerated food redistribution (interviews and news articles).

At the same time, recent research has pointed out that much of the food waste in retail can still be suitable for human consumption and could be donated for this purpose. In a study on an Italian hypermarket, at least 35 per cent of the total food waste produced at the store was considered as still edible (Cicatiello et al. 2017).

In the EU's waste hierarchy, food recovery is the second least-favourable option after disposal while prevention presents the best-possible solution. Garrone, Melacini and Perego (2014: 130), on the other hand, use concepts such as surplus food to describe "the edible food that is produced, manufactured, retailed or served but for various reasons is not sold to or consumed by the intended customer"; and, to make a distinction with food waste, "the surplus food that is not recovered to feed people, to feed animals, to produce new products (e.g., jams or juices), new materials (e.g., fertilizers) or energy". While the concept of surplus food states that edible food might not end up with consumers, it is presented as a static categorization (Evans et al. 2013), neglecting the possibility for prevention and unquestioning the ontological status of waste. Several researchers (Giuseppe, Enea & Muriana 2014; Kantor et al. 1997; Parfitt, Barthel & Macnaughton 2010; Garrone, Melacini & Perego 2014; Mena, Adenso-Diaz & Yurtc 2011) seem eager to suggest food recovery, in this case, giving food to charity, as doing so could ameliorate the diet of undernourished people. However, other possibilities should be considered, with a reflection on other stages of the waste hierarchy, not to mention having an ontological discussion.

But, why is it that landfill is still the main destination of food losses, while food recovery and other steps in the waste hierarchy are not common practice? According to Giuseppe, Enea and Muriana. (2014), food recovery is generally associated with organizational costs and lengthy procedures which need to be put into practice, while the economic benefits arising from such a practice are neglected and often unknown. Kantor et al. (1997) state that not all food that is lost is economically recoverable, claiming that food recovery efforts are often limited by financial and logistical constraints that make it difficult to match recovered food with potential recipients. Thus, the redistribution of unsaleable food to charities, or why this does not take place, is based on costs and the experience of difficulties in making arrangements.

Alexander and Smaje (2008: 1291) elaborate further:



“Retailers, for example, driven by shareholder value, seek both to extract as much profit as possible from commodities and to avert disposal costs through donation – aims that can work against each other when the moment of donation is delayed too long. At each point where items are transferred from one party to the next, ownership, whether of assets (fit-for-purpose food) or liabilities (waste), is similarly transferred, occasionally contested. In the case of perishable food, the temporal element separating assets from liabilities is particularly acute. Where items are branded, the conditions that accompany the donated item in its onward trajectory are particularly stringent since, if such items are misused, this could have a negative impact on the retailer’s brand value. Conceptually, this raises interesting questions about how and where waste diversion is accounted for, plus the nature both of the object being exchanged and the exchange itself.”

The above excerpt brings out different contradictions that retailers are fighting with. On the other hand, best-possible quality should be offered and best-possible profit should be received. Products should be sold and not given to charity; but, if they are not given to charity in sufficient time, they can become improper and even dangerous for consumption.

In addition to food recovery, Giuseppe, Enea & Muriana (2014) discuss recycling projects in order to conserve resources and reduce waste disposal costs, thus focusing on cost efficiency. Examples include finding new value in industrial raw materials or in other food products, or alternative uses for recycled food waste such as animal feed and compost.

Meanwhile, food waste in retailing has also been addressed as a question of corporate social responsibility. However, in practice, this has usually meant a shift in focus from retailers to consumers, with retailers pointing out the role of consumers in waste production. For example, the British Retail Consortium underlined that retailers and producers already see waste reduction as one of their corporate social responsibility objectives and that, in the UK, while only 6 per cent of food waste is produced in the supply chain, the vast majority (over 50 per cent) comes from households themselves (Giuseppe, Enea & Muriana 2014: 1309). Further, food retailers like Tesco have dedicated space in their corporate social responsibility reports on educating consumers and reporting on actions to reduce consumer food waste instead of focusing on retail food waste. Many retailers also claim that catering for customer needs yields (and means acceptance of) food waste (Mena, Adenso-Diaz & Yurtc 2011: 655-656; Hanssen, Silvennoinen & Katajajuuri 2011: 27; Silvennoinen et al. 2011: 36). However, it should be noted

that, while it is by no means unimportant to seek minimizations in consumer waste, it is appropriate to seek reductions on the part of all actors in the food chain.

To summarize, research on food waste in retailing has focused on the quantification and treatment of waste. Reasons behind food waste have also been outlined, but they are mainly based on managerial perceptions, interviews and statistics that have been shown to exclude information. Research on waste treatment highlights efficiency and costs as the main causes of food being wasted. However, while food waste has traditionally been sent to landfill, research on food charities has revealed a large potential for food recovery. Thus, there is need for research on retail sustainability and food waste, concentrating on what is done instead of what is said to be done. Product-wise, fresh food items such as dairy and bakery products are mentioned as a significant product group from the perspective of waste flows (Kantor et al. 1997: 5; Stenmarck et al. 2011).

## 2.4 (Food) waste in logistics

In the retail literature on green logistics and supply chain management, the notion of reverse logistics, meaning end-of-life product management, has emerged as one of the primary strategies for implementing sustainable activities in the supply chain. Green reverse logistics consists of remanufacturing, reusing and recycling (Hazen et al. 2012), comparable with the ideas of waste hierarchy, though not presenting a preferential structure of waste treatment. While supply chains have been built to be efficient, they have traditionally not been designed to do the reverse, take products back once without use (Dobscha, Prothero & McDonagh 2012: 462) and apply cradle-to-cradle thinking and processes. Greening of the supply chain means end-of-life product management rather than refusing the end of the pipe. While reusing, recycling and remanufacturing activities are recognized as being functions that serve to “green” the supply chain, these activities do not recognize the possibility of avoidance as a strategy to manage waste (Hazen et al. 2012). Taking care of waste does not fit with the goals of improved efficiency and lower costs and, according to Dobscha, Prothero and McDonagh (2012: 463), distribution channels are still very much managed by following these principles.

Looking at supply chain management, the philosophy of lean thinking is based on the concept of “muda” (the Japanese word for waste). The idea is to reduce any human activity which swallows resources without creating any value, such as mistakes that require rectification, the production of items no one wants so that inventories and remaindered goods pile up, processing steps which are not actually needed, the movement of employees and the transport of goods from one place to



another without any purpose, groups of people in a downstream activity standing around waiting because an upstream activity has not delivered on time, and goods and services which do not meet the needs of the customer (Womack & Jones 1996: 15). While the concept has been adopted widely, it has also faced criticism. Since lean thinking has its origin in the tactical product flows of Japanese car manufacturers, it has been condemned for ignoring the role of humans in waste processes and its limited applicability outside high-volume repetitive manufacturing environments (Hines, Holweg & Rich 2004). However, its focus on the elimination of waste and the search for “hidden wastes” makes the concept interesting from the perspective of food waste. The concept also acknowledges a more networked perspective on analysing the whole value chain, known as the lean enterprise (Womack & Jones 1996: 20-21).

In his research, Vlachos (2015) applies lean thinking to the food supply chain, within a tea company, suggesting lean practices for recovering the wasted value in food supply chains. From the perspective of lean thinking, waste in food supply chains can be anything other than the equipment, materials, parts, space and working time required to provide the service. Vlachos (2015) distinguishes seven types of waste: overproduction, waiting, transport, inappropriate processing, unnecessary inventory, unnecessary motion and defects. Defining waste is done in relation to the concept of value, and value in lean thinking can only be defined by the ultimate end customer (Vlachos 2015). Thus, conceptualization of waste is tied to the perception of the customer. Further, despite many successful lean implementations, companies often fail to apply lean tools and techniques (*ibid.*). From the perspective of the waste hierarchy, lean thinking operates at the highest-possible level, i.e., prevention, by seeking to address and eliminate waste. However, while aiming for elimination, conceptualization of waste is based on somewhat taken-for-granted ideas about the nature of waste and the need to get rid of it.

In recent studies, researchers have called for a more systemic framing of the food supply chain. Giuseppe, Enea and Muriana (2014) refer to the need to reduce food waste along supply chains as an emerging challenge for both researchers and practitioners. They (*ibid.*) adopt a supply chain perspective by especially addressing the need for developing and implementing new concepts for planning and controlling the supply chain. Further, they identify advanced technologies for food traceability, as well as innovative shelf life-based management policies as an example of the recent efforts aimed at increasing the sustainability of food supply chains.

Referring to a conference paper by Minnich and Maier (2006), Giuseppe, Enea and Muriana (2014) link the problem of food losses to the characteristics of the supply chain, making a distinction between responsive supply chains and efficient ones. Generally, the improvement of responsiveness leads to an excess of buffer capacity and inventories which face demand variability, while, in an efficient supply chain, the members manage their activities in order to meet predictable demand at the lowest cost (Minnich & Maier 2006). Traditionally, retailers have sought to improve operations in terms of better on-shelf availability and, thus, to reduce the number of out-of-stock situations for customers (Teller et al. 2018), whereas assessing food waste calls for a different approach.

Mollenkopf et al. (2010: 14) list three supply chain trends which, in particular, are converging in order to create an increasingly complex business environment: globalization, the utilization of lean processes and the shift towards green initiatives. While the complexity of distribution networks has grown in terms of the number of suppliers and subcontractors, operations have, at the same time, been dispersed around the globe. Meanwhile, lean management with a focus on waste elimination offers an alternative model to that of capital-intense mass production, but these practices are in many ways oppositional and difficult to implement and sustain, as supply chains increase in complexity and length. Further, a green supply chain focus requires close cooperation with suppliers and customers, together with the analysis of internal operations and processes, environmental considerations and products' life cycle assessment (Mollenkopf et al. 2010). Thus, a networked approach is needed.

Moving from supply chain management to networks, several authors have called for a network framing of the food chain (Amani & Gadde 2016). Following them, Amani and Gadde (2016) claim that the food chain should be understood as a complex network of different actors, from farmers to manufacturers, retailers and consumers, and from individual and small actors to large companies and multinationals. In their analyses, Amani and Gadde apply the ARA model (Håkansson & Snehota 1995; Håkansson et al. 2009), rooted in industrial network theory. Centred on analysing industrial reality, the model distinguishes between three central dimensions of the business landscape, deeply intertwined with each other: the activities undertaken, the resources used for these activities, and the actors undertaking the activities and controlling the resources. In the ARA model, the firm is the actor. However, it is also acknowledged that the coordination and a combination of resources may span the boundaries of firms, thus highlighting the role of relationships with business partners for effective coordination and combining of resources (Amani & Gadde 2016; Håkansson et al. 2009).

To conclude, the greening of supply chain management has been centred on end-of-life product management rather than refusing the end of the pipe. With a perspective on the whole value chain, lean thinking retains a networked view on logistics. However, at the same time, the conceptualization of waste is tied to the perception of the customer. Further, it has been mentioned that companies often fail to apply lean tools and techniques. The contradiction between better on-shelf availability and assessing food waste is reported, while the growing complexity of global logistics has been noted, with recent suggestions about the networked framing of food chains highlighted in order to better capture different actors and perspectives.

## 2.5 (Food) waste in consumption research

We live in a consumer society. The predominant way of framing what is happening is to construct environmental degradation and climate change as a problem of human behaviour, in particular, a problem of consumer behaviour (Shove 2010). However, food waste has not been among the primary topics of research on sustainable consumption. In the rest of the chapter, I concentrate on reviewing research on waste, and more specifically food waste, in consumption research.

While concern for the environment has grown, this has not necessarily been reflected in research on food waste. This is also true for research in the social sciences, where food waste has remained an underresearched area (Evans, Campbell & Murcott 2013). The authors (*ibid.*) briefly summarize how research on food waste gained a foothold in sociology. There first needed to be a more extensive recognition of the commonplace and ordinary aspects of life in the wider sociological community and the emergence of the ‘sociology of everyday life’ in the 1970s, which in turn initiated the ‘sociology of food’. However, as interest was directed at the more mundane aspects of everyday life, it was still typical to focus on new cultures, ideologies and discourses of daily life than on something so evident as waste. Thus, the ever-present phenomenon of waste was mostly dismissed. The same is true for research in consumption studies: though the full cycle of consumption (acquisition, consumption and disposition) had already been brought under the spotlight by Jacoby in 1978, interest in disposition practices has been scarce.

In line with policy work and research done in other fields, the initial studies on consumer waste explored it from the perspective of the immediate levels on the waste hierarchy, namely, disposal (e.g., throwing away) and recycling (de Coverly et al. 2008; Thøgersen & Grunert-Beckmann 1997). Research on disposal

behaviour has centred on and often been considered from a recreational perspective, highlighting disposition's involvement in consumers' negotiation of role and identity transitions (Arnould & Thompson 2005). Research on recycling, on the other hand, has concentrated on consumer behaviour and attitudes towards recycling, without an in-depth understanding of the related lifestyles and the sociocultural context, with the aim of general waste minimization (Thøgersen & Grunert-Beckmann 1997). Nevertheless, there are more inclusive approaches. Dobscha, Prothero and McDonagh (2012) present a preferred hierarchy of behaviours, the inverted pyramid of sustainability, as a cultural approach to sustainability. The model incorporates organizations that should, along with consumers, progress from recycling, redistributing, repairing, reusing and reducing to refusing, with the potential to interact and seek crossover between the levels. The model resembles the waste hierarchy (see 2.2 (Food) waste policy).

However, as De Coverly et al. (2008) argue, it is often the socially and culturally constructed criteria that construct our relationship with things, how we value things and thus what we choose to purchase or discard. Since Western waste collection processes are efficient at dealing with residues, refuse is quickly removed to rubbish bins and collected and taken away from us on a regular basis. As waste has always been out of sight and hidden away, it has also become culturally invisible, beyond the horizon of culturally oriented research.

Recently, there has been increasing interest in the amount of food waste generated, especially in households (Katajajuuri et al. 2014; Silvennoinen et al. 2014). Authors (ibid.) have measured Finnish consumers' food waste which could have been consumed, had it been stored or prepared differently. Thus, bio waste, such as vegetable peelings, coffee grounds or animal bones, is excluded from the study. The average annual food waste was 23 kilograms per capita, 63 kilograms per household and, in total, about 120 million kilograms/year. Thus, about 4-5 per cent of purchased food ends up wasted. The main discarded foodstuffs include vegetables, home-cooked food and milk products. The aforementioned authors have suggested extending knowledge about food waste will help in the development of new practices to decrease waste.

In the 21st century, it has become widely acknowledged that, in order to fight climate change and become more sustainable, we need to change our behaviour. In consumption studies, there have been frequent calls to consider the greening of consumption as a question of rational decision-making (Hargreaves 2011). Behavioural models such as the theory of reasoned action (Ajzen & Fishbein 1980) and the theory of planned behaviour (Ajzen 1991) have been widely used to explain sustainable consumption as a rational choice guided by attitudes, subjective norms

and perceived behavioural control. Though these models have been popular, research has shown that consumers rarely act as rational decision makers. Ethical and green consumer thoughts hardly translate into deeds, leading to an attitude-behaviour gap in terms of sustainable consumption. Despite this, the rational view on consumer behaviour has been widely used to explain how consumers act. Consequently, much effort has been dedicated to educating consumers (EC 2010: 31; Evans 2011; Papargyropoulou et al. 2014: 9), and attempts to promote pro-environmental behaviour and sustainable consumption have become important policy responses. However, this has also prompted a debate on the extent to which sustainable consumption or pro-environmental behaviour change is within the capacity of individual agents to bring about alone, or whether it requires a more fundamental structural change in society (Evans 2011; Maniates 2002).

Effects on the surroundings and the wider environment have remained out of focus, while research has concentrated very much on the consumer. Though individuals' criticism of corporate capitalism and marketing has been recognized, and research has been carried out on consumers' engagement in various acts of voluntary simple, sustainable and responsible consumption and anti-consumption, the socially and ecologically destructive aspects of consumption have not been taken that profoundly into consideration. For example, Shove (2010: 1274) criticizes relying on existing climate change policies to influence individualist perceptions and human behaviour.

While researchers have first and foremost focused on finding ways to change the above-mentioned attitude-behaviour gap, the growing interest in practice theory has directed attention at the different elements of practices and habitual consumption involved in responsible consumption.

Evans (2012) analyses food waste in relation to broader practices of household food consumption, from planning and shopping to preparing, eating and disposing of the uneaten. The research highlights the complex sociomaterial procedures of wastage. The author illustrates how food waste arises as a consequence of the ways in which domestic practices are organized, paying special attention to routines, social relations and the sociotemporal context. Further, Mattila et al. (2018) have discovered the potential of not only humans, but also non-human actors, such as things and apparatus, in organizing temporality, thus preventing and reducing food waste in the household context.

Gollnhofer (2017), on the other hand, analysed how alternative practices in the food sector, including the recovery, distribution and consumption of food waste, have become integrated into the market through normalization processes. In discussing the normalizing process, she paid attention not only to non-material,

but also to material culture, concluding that normalization occurs as a result of retracing the biography of an object, building community, rituals and sacrifices. In the context of retail food waste, Gollnhofer and Schouten (2017) investigated the efforts of activist consumers who had taken the initiative to organize an alternative market arrangement, known as food sharing. This enables stakeholders – consumers, retail firms and regulators – to work together for a common cause without compromising their own idiosyncratic objectives.

As described above, the lenses of practice research have brought into focus the dialectical character of consumption as a social phenomenon, where consumer behaviour and meaning making need to be considered in relation to structural conditions. Thus, practice theory and overcoming the structure-agency debate are considered as valuable perspectives for this research field, enabling a more systemic grounding.

Waste as a dynamic category needs to be understood in relation to the contexts (social, economic, historical) through which it has been put to work, the relationships in which it is embedded, and the complexity of meanings attributed to it (Evans et al. 2013: 8). Instead of a limited understanding of the actor level, more profound analysis and research on context and institutional issues are thus needed. As Shona Bettany (2015: 192) writes on consumption research, it “has an underpinning in neoliberal politics and ideology that reflects the political conditions from which it emerges. As a result, this politics resists accounts that challenge the model of the human (consumer) subject as anything other than free, choosing, agentic subject.” This interpretation has also dominated research on challenges related to food consumption where responsibility (and political agency) has (have) mainly been ascribed to consumers (D’Antone & Spencer 2014). The retailing sector has also argued that food waste in its case is an inevitable part of catering to consumer needs (Mena, Adenso-Diaz & Yurtc 2011: 655-656; Stenmarck et al. 2011: 27-28; Silvennoinen et al. 2012: 36). While the effect of neoliberal ideology on interpretation has been acknowledged, it is important to challenge and move beyond this one-sided understanding of the self-realizing individual. If the consumer is not free to choose, then exactly who or what has agency?

Consumption studies have offered conceptual and theoretical foundations for uncovering how waste is created. Through the lenses of practice theory, retail food waste is not seen as a problem associated with individuals, but rather a problem of the system, which needs a systemic approach in order to be understood.



## 2.6 Synthesizing the literature – a need for a systemic, holistic perspective

Although food waste has recently attracted interest among the researchers and the lay public, existing knowledge is limited and restricted by certain ontological and epistemological frames. Based on the above theoretical discussion, the following three pitfalls have been identified in the prior literature.

Firstly, research in retailing and consumption studies has focused on the measurement of waste (Eriksson, Strid & Hansson 2012, 2014; Gregson & Crang 2010: 1026). On the other hand, when reasons behind food waste have been sought out, they have mainly been based on managerial perceptions and interviews, if not on measurement statistics (Evans, Campbell & Murcott 2013; Gruber, Holweg & Teller 2016; Mena, Adenso-Diaz & Yurte 2011). Thus, the research is mainly quantitative and methodologically restricted.

Secondly, the management focus on waste in policy work and on the fields of retailing and logistics has conceptualized waste as something that is taken for granted. The process of food turning into waste has been black-boxed, and attention has primarily directed at the treatment of food waste instead of analysing the causes for waste and waste prevention. The waste hierarchy has been an important policy response to the waste challenge, being adapted to other fields of waste research in pursuit of enhancing sustainability. Papargyropoulou et al. (2014) have applied the waste hierarchy to food waste research and proposed that it functions as a framework for managing surplus food and food waste. Further, the circular economy has been mainly linked to food waste in terms of waste management, e.g., turning food waste into energy (see Ingrao et al. 2018).

Thirdly, research on logistics and consumers has been compartmentalized and revolved around only a few actors in the food chain. One key theme running through the literature is the extent to which research on sustainable practices related to waste and efforts to reduce food waste can be meaningful if it deals with actors separately or relies on the capacity of individual actors to bring about changes alone. The most recent research in different fields recognizes the need for a more holistic perspective, shifting attention from different phases or actors in the food chain to a systemic, all-inclusive understanding. In consumption research, the move from individualist perceptions to a situated, contextual understanding has been initiated.

In order to overcome the perceived pitfalls and to gain a better understanding of food waste, the following suggestions are made. Firstly, more research is needed on what is done instead of what is said to be done. Thus, there is a need for

methodological diversity and qualitative field studies. Secondly, there is a need to look at food waste in retailing and logistics outside of the prominent framework of (top-down) management. Thirdly, research on logistics and consumption calls for a network perspective on food waste.

Finally, as suggested by the theoretical synthesis, a more fundamental structural change in society is sought. Recent research developments demand a qualitative, more symmetrical and relational approach to food waste in order to improve on the results from managerially oriented studies. Instead of looking at management processes, concentrating on grassroots-level actors and things taking part in the course of how food turns into waste could help in the fight in this regard. Thus, in order to overcome the identified pitfalls and to follow the above suggestions, the research framework, as presented in the next chapter, is chosen.



### 3 GRASPING THE BUILDING BLOCKS FOR THE THEORETICAL-METHODOLOGICAL FRAMEWORK

In this chapter, the building blocks of the theoretical-methodological framework of the thesis are presented, based on the research gaps and pitfalls identified in the literature review. The framework is built on ANT and practice theory approaches. While previous research has mainly been quantitative or structured around management interviews, the ANT framework directs to build a symmetrical account. A network perspective on food waste is taken, and focus is shifted from certain predefined actors to a more holistic perception. The aim is to develop and advocate a sociomaterial, practice-network approach as a procedure for conducting research.

Theory and methodology always have an effect on each other; this is especially the case for ANT research, as ANT is regarded as both a theory and, more importantly, a methodology (Latour 1999). The chosen theoretical perspective of ANT can also be seen as a research philosophy, outlining the ontology and epistemology of the research and laying the ground for the whole study project.

The present chapter begins by introducing the ANT approach. First, the ontological and epistemological premises are presented. Then the historical developments and applications of ANT in marketing and consumption research are noted, and the methodology for practising ANT-based research is discussed. After this, the chapter moves onto practice theory and the historical developments behind this practice turn in social studies. A description of the applications of practice theory in marketing and consumption research is given and the concept of practice is examined in more detail. Finally, the ground is laid for bridging ANT and practice research.

#### 3.1 Actor-network theory approach

ANT has gained a strong presence in social science. But, what does ANT stand for? ANT is in no way self-explanatory or straightforward. Though named as a theory, it is in fact a constantly-evolving heterogeneous approach with ontological and epistemological assumptions, which has gone onto influence researchers (Law 2009). The aim of this section is to give a basic understanding of ANT and its history as well as the tenets of ANT approach.

### 3.1.1 What is (and what is not) actor-network theory?

ANT emerged in the 1980s through the work of sociologists Bruno Latour (1988), Michel Callon (1986) and John Law (1986), which was concerned with how STS could explain the production of scientific knowledge (Latour 2005). As already mentioned, the approach is known as the sociology of translation. While ANT is first and foremost associated with the founding researchers and STS, researchers within a variety of social science fields have since become fascinated by its possibilities and applied it in increasingly diverse ways, drawing on a range of theoretical resources. Thus, ANT has evolved and grown its network to become what it is today (Law 2009: 143). There is no single ANT, a coherent theory to be followed; rather, it is a heterogeneous assemblage of ideas, interpretations, concepts and representations.

What do the actor and network in ANT stand for (and do not stand for)? Latour (1999a: 15) speculated that “there are four things I do not like with actor-network theory: the word actor, the word network, the word theory and the hyphen!”. This is because of the common misunderstandings these terms produce. Thus, in order to provide a description of what is meant by ANT, it is necessary to define what ANT does not mean.

First of all, probably the most common misunderstanding is caused by the word *network* (Latour 1996, 1999a). ANT is not only concerned with technological usage; as Latour (*ibid.*) reminds us, it would be a misinterpretation to give it a generic technical meaning. *Network* in ANT has nothing to do with the Internet, a subway or a train: it is only a way to describe nodes and their possible paths of connections.

“With the new popularization of the word network, it now means transport without deformation, an instantaneous, unmediated access to every piece of information. That is exactly the opposite of what we meant.” (Latour 1999a: 15)

In addition to the technical interpretation of the network, Latour (1996) pointed out the difference between *network* in ANT and the geographically far/close notion of *network*. Instead of interpreting *network* in terms of geography, the aim is to analyse proximity through connectedness. In other words, elements which are close when disconnected may be infinitely remote if their connections are analysed; on the other hand, elements which would appear as infinitely distant may be close when their connections are brought back into the picture (*ibid.*: 4).

Further, the notion of *network* means getting rid of predefined scales, micro or macro, small or big, and replacing them by a metaphor of connections. The difference in size is only an effect of assembling bodies and material (Callon & Latour 1981: 284). Instead of *a priori* order relations, the type, number and topography of connections are specified between the actors. Furthermore, the concept of *network* shifts the focus away from an inside and an outside separated by a boundary. Instead of surfaces, internal and external, a network is all boundary without an inside and an outside. The only question is whether or not a connection is established between two elements. Thus, to pull it all together, the notion of *network* moves away from the social and allows us to reshuffle spatial metaphors which have rendered the study of societal nature such a challenge: far/close, micro/macro, and inside/outside.

Secondly, the word *actor* should not be confused with the traditional connotation of intentional human (male) individual behaviour (Latour 1996). This is how Latour (1996: 7) defines an actor:

“An ‘actor’ in ANT is a semiotic definition – an actant –, that is, something that acts or to which activity is granted by others. It implies no special motivation of human individual actors, nor of humans in general. An actant can literally be anything provided it is granted to be the source of an action.”

Thus, the actor in ANT can be human or non-human, nature or machine, social or technical, micro or macro: anything. This is an important distinction in relation to other network approaches. In marketing and consumption studies, network theories such as social network theory are usually based on social relations between humans. Thus, they only recognize humans as actors, while, in ANT, anything can act, both humans and non-humans. The IMP is based on a networked perspective and the ARA network model (Håkansson & Snehota 1995; Håkansson et al. 2009). The focus of the approach is on business-to-business relationships and, thus, firms as business actors. Thereby, the IMP cannot be said to be based on social interactions, with research centred more on activities and resources than on humans. However, only firms are named as actors, while the explicit elaboration of agency is not at the core of the theory.

Thirdly, the word *theory* in ANT is misleading. As already mentioned, though named as a theory, it is rather a heterogeneous approach with ontological and epistemological assumptions, which has also influenced the ANT method. For Latour (1999a: 19-20), ANT perhaps should have been called an “actant-rhizome ontology”, something like an ethnomethodology, describing it as “a very crude method to learn from the actors without imposing on them an *a priori* definition

of their world-building capacities”. However, while ANT can be called a method, it is a very crude one. Hardly any practical advice other than “follow the actor” is offered. It is rather an empty grid which gives perspective but does not pursue synthesis (Latour 2005: 221). In other words, “ANT is more like the name of a pencil or a brush than the name of an object to be drawn or painted” (Latour 2003: 63-64). This is why researchers do not always feel comfortable using it, or may even prefer to stay “at least within a stick’s reach of ANT”, as one professor pointed out to me in a discussion on ANT. This validity of this comment is reinforced in this imaginary excerpt between a professor and a student, based on several real conversations involving Latour (2004: 62):

Student: Well, yes. I am finding it difficult, I have to say, to apply Actor Network Theory to my case studies.

Professor: No wonder – it isn’t applicable to anything!

However, this excerpt is only a half-truth. In its simplest form, ANT follows in the footsteps of ethnographers and their use of ethnomethodology in the study of primitive cultures (Latour 1993: 7, 1999a: 19). Ethnographers have always been capable of following not only what actors do, but how and why they do it, weaving together a narration that is simultaneously real, social and narrated, creating mixtures of nature and culture. However, it is only that, as we have become modern and have assumed the need to separate the modern from the primitive, us from them, the purification of human beings and non-humans, social and natural, we have simply lost the pencil (or the method) that ethnographers who studied primitive cultures used. We have wanted to separate ourselves from savages, and the manner in which ethnographers have described primitive cultures has not suited us. We have become blind to looking at ourselves in the same way as we look at others. We have been unable to look at our self with our eyes wide open; not only ourselves, but everything that is acting. ANT means exactly this: to look at everything and follow that which is acting. It seeks to learn from all actors seeking to get rid of any persuasive predefinitions or categorizations (Latour 2005).

In terms of analysis, Latour (2004: 63) notes:

“The best it can do for you is to say something like: ‘When your informants mix up organization and hardware and psychology and politics in one sentence, don’t break it down first into neat little pots; try to follow the link they make among those elements that would have looked completely incommensurable if you had followed normal academic categories.’ That’s all. ANT can’t tell you positively what the link is.”

Considering the presentation of data, for traditional ANT authors, the only possible product of ANT research is a description. “Just describe”, Latour (2004: 64) recommends. Thus, while named a theory, ANT is better still a crude methodology or a research approach.

Fourthly, Latour (1999a: 16-18) reminds that us that *actor*, with its hyphenated connection with the word *network*, does not mean a focus either on the actor or the network. ANT is not meant as a response to the structure-agency debate. Instead, ANT proposes a flat ontology, where all actors are treated symmetrically. Social networks are not privileged, nor is the “dissolution of humanity”, a purely technological world. “‘Actor’ is not here to play the role of agency and ‘network’ to play the role of society”; rather, the actor and the network are a circulating entity. As pointed out in the discussion on the notion of *network*, instead of an inside and an outside, the only question is whether or not a connection is established between two elements.

In the above, we have presented what ANT is and what it is not, grounded on the notions of *actor*, *network*, *theory* and *hyphenation*. With its flat ontology, ANT pulls together and seeks to tackle the “the ‘out there’ nature, ‘in there’ psychology, ‘down there’ politics, ‘up there’ theology” (Latour 1999a: 22). Next, the premises of the ANT approach are presented.

### 3.1.2 Actor-network theory premises of relationality, symmetry and distributed agency

The ANT approach is based on a relational world view (ontology) and related concepts. Next, the ANT perceptions of relationality, symmetry and distributed agency are briefly discussed.

ANT is based on *relational* ontology, where a network emerges and reality is enacted in relations. Thus, agency is not a property of a single actor, but appears distributed among the actors of the network (Bajde 2013; Hill, Canniford & Mol2014; Latour 2005). This is to say, different actors are not interesting in themselves, but more so in relation to each other, e.g., a bread becomes waste in relation to different meanings and materials, and how they connect in sociomaterial practices. The relationality of ANT also appears in the way the networks are built. An actor is always part of a network, but always constitutes within itself a network. Thus, actors and networks can be endlessly followed. However, this means that agency is easily veiled or simplified or, in ANT terms, black-boxed (Law 2009: 147). If and when practices are built around the human

body, there is a risk of simplifying and losing the networks. This forms the basis of the need to bridge ANT and practice research.

*Symmetry* in ANT refers to seeking to get rid of preset categorizations and treating all actors in a similar manner (Latour 1993; Law 2004). As already noted, the meaning of *actor* should not be confused with the traditional connotation of intentional human behaviour (Latour 1996). Instead, all actors should be seen as capable of making a difference (Latour 2005), and humans and non-humans should be treated equally; e.g., when discovering and analysing the reasons behind food waste, heterogeneous actors should be treated as potentially taking part in the process of food becoming waste. This does not mean that objects will act intentionally. Rather, it takes into consideration their capacity-creating effects in the network, i.e., *distributed agency*. Action and intentionality thus emerge from the actor-network of multiple, heterogeneous actors.

### 3.1.3 Actor-network theory in marketing and consumption research

The ANT approach and the antecedents and elements of ANT research have recently gained more of a foothold within the marketing and consumption research framework (Bettany & Kerrane 2011; Canniford & Bajde 2015; Canniford & Shankar 2013; Epp & Price 2010; Giesler 2012; Martin & Schouten 2014). This relates to the growing interest in conceptual boundaries and the need to overcome them. Discussions include the boundary between production and consumption (Cova & Cova 2012; D'Antone & Spencer 2014; Martin & Schouten 2014; Thomas, Price & Schau 2013), objects and subjects (Bettany 2007; Bettany & Kerrane 2011; Borgerson 2013; Chitakunyea & Maclaranb 2014), nature and culture (Canniford & Shankar 2013), and consumers and technology (Lugosi & Quinton 2018). Further, ANT or ANT-based concepts have been utilized to discover market transformation (Giesler 2012; D'Antone & Spencer 2014; Martin & Schouten 2014).

While not all of the papers build on ANT per se, they lean on certain recognizable aspects or elements of this theory. For example, Bettany and Kerrane (2011) base their research on material-semiotic ontology. Following the object of a chicken coop, they show how practices and meanings co-emerge and reshuffle in relation to human and non-human entities. Consumers of chicken coops are embedded within diverse networks of heterogeneous elements and shaped in relation to them. While the authors (ibid.) refer to ANT, they also make a looser reference to material-semiotic approaches in plural. This somewhat vague relationship to ANT is present in part of the research. Some ontological characteristics or concepts from



ANT may have been chosen, but the research might not strictly follow this theoretical path.

Drawing on ANT, Thomas, Price and Schau (2013) provide new perspectives on consumption communities by conceptualizing the community as a network of heterogeneous actors, examining the interplay between actors in a mainstream activity-based consumption community of distance running. While highlighting the role of resources in the formation and maintenance of the community, the authors make a contribution by flattening the divide between consumers and producers, underlining the entwined role of these actors. In other words, producer and consumer can be seen as conceptual hybrids that change as they become embedded in different networks (Canniford & Bajde 2016: 5). However, Thomas, Price and Schau's (2013) research can be also criticized for treating consumers and producers as primary actors. While the researchers claim that an "additional benefit of adopting a networked view of communities is that it provides a richer understanding of communities as an assemblage of heterogeneous actors, as opposed to a dichotomized grouping of consumers and producers" (ibid.: 1027), instead of a wider analysis, the notion of heterogeneous actors seems to refer to human consumers and producers. As Bettany and Kerrane (2011) note, ANT should widen our perspective on materials and milieux.

Though ANT discards micro and macro concepts, some research papers in marketing, building on ANT, nonetheless choose to refer to these controversial concepts (e.g., Martin & Schouten 2014; Canniford, Riach & Hill 2018). Usually these references are made in order to reveal how ANT research is able to answer questions concerning both the micro and macro levels; e.g., Canniford, Riach & Hill (2018: 235) refer to "the macroscale of cultural systems and at the microscale of day-to-day interactions". This might be reasoned as a way to communicate ideas about ANT to someone who is not acquainted with it and is more used to view and examine the world according to this scale. However, a reference to a "cultural system" feels uncomfortable from the perspective of ANT, since it refers to a social system "out there", contrary to meanings and materiality co-emerging in a network that exists at the heart of ANT.

Recently, the concept of assemblage has gained more ground in consumption research (Canniford & Bajde 2015). According to Canniford and Bajde (2015), it unites with an actor-network in the conception of the world as "constituted from more or less temporary amalgamations of heterogeneous material and semiotic elements, amongst which capacities and actions emerge not as properties of individual elements, but through the relationships established between them". Thus, relations, symmetry and distributed agency are defined as central elements

of both. Despite this, the role of non-humans remains veiled. For example, Parmentier and Fischer (2015) conceptualize brands as assemblages of heterogeneous components, but still choose to examine how fans can contribute to the destabilization of a brand's identity and contribute to its co-destruction. As D'Antone and Spencer (2014) show in their research on the actor-network of the sustainable palm oil market, consumption is a multi-actor process where consideration of one actor without taking into account the others poses problems when pursuing a full understanding of the actors at work.

In order to resolve the problem of the missing masses, recent research in marketing and consumption studies has focused more on the methods for bringing in non-human actors. Drawing on ANT, Lugosi and Quinton (2018) developed a way to carry out more-than-human netnography. Canniford, Riach and Hill (2018), on the other hand, created a framework in order to understand how smell features in spatial assemblages of bodies, locations and experiences.

In sum, while ANT has received attention and been utilized in marketing and consumption research, there is still work to be done in order to flatten hierarchies and facilitate openness towards heterogeneous networks effectuating marketing and consumption.

#### 3.1.4 Principles of practising actor-network theory research

How should an ANT study be translated from theory to practice? The ANT procedure of "following the actor" is well documented, but what else can be done? In the following, based on ANT literature and the take-away from this research, five steps for carrying out ANT research are discussed. While relational ontology prohibits the existence of a single and ready-made procedure for undertaking ANT research, following these steps can help in performing symmetrical and ANT-wise research. ANT should be understood as a toolkit (Law 2009: 142), noting that tools can always be used in different ways.

##### 3.1.4.1 Multiple data

The sociology of science (and later ANT) was initially constructed in the late 1960s by sociologists, based on the ideas of Thomas S. Kuhn, as presented in his book, *The Structure of Scientific Revolutions* (Kuhn 1962). Kuhn argued that, while scientists use "paradigms", pragmatic sets of intellectual and practical tools for scientific puzzle solving, in the view of epistemology, scientific knowledge is a representation of reality produced by a special scientific method (Law 2009: 143).



According to Kuhn, knowing theory is not enough; you need to know what happens in practice, and that is why scientists work on cases as exemplars. The sociologists of science and the emerging actor-network writers built their research on such exemplary case studies, where knowledge lies in exemplars and words are never enough. Law (2009: 144) notes this as the basic methodological and philosophical principle in ANT, which should always be grounded in empirical case studies (Law & Singleton 2013).

What, then, makes an empirical case study? Is anything grounded in empirical work enough? Though a study leaning on data derived from interviews is empirical, the idea of ANT is to access directly what happens in the world and to examine what happens in real life, rather than asking people to comment upon it. That is why, instead of the predominant method of in-depth interviewing in marketing and consumer research (Askegaard & Linnet 2011; Moisander, Valtonen & Hirsto 2009), it might make sense to learn and benefit from other methods and, in particular, naturally occurring data. There is a difference between reality and knowledge of reality.

In order to flatten ontologies and to capture the heterogeneity of actor-networks, much of current research is based on multiple data and multiple contexts. However, though many studies in the context of ANT are built on multiple data (D'Antone & Spencer 2014; Thomas, Price & Schau 2013; Parmentier & Fischer 2015), there is still a lack of manifold analyses undertaken from variable perspectives. Indeed, reality can be evaluated by comparing what different actors have to say about themselves and each other (Latour 1993: 128).

While the researcher must avoid any *a priori* expectations, neither can she have a strict *a priori* plan on how the data is collected or what are used as data. This calls for reflexivity. When a researcher enters the field or becomes more acquainted with the subject of interest, it becomes easier to notice related actors that connect to networks of new actors, leading to numerous directions. "If you look for relations and materials and processes then they spread out everywhere", as Law and Singleton (2013: 493) explain. Binding the research to a single, predefined area is not possible, because the network is not already drawn. In predefined terms, the so-called "cultural island approach" is also becoming recognized as being limited with regard to organizational ethnography (Van Maanen 2011); instead, multisite fieldwork is becoming a more popular way to capture organizational practices in increasingly dispersed organizations (Hoholm & Araujo 2011). A specific site or case can work as an entry point to the phenomenon of interest, e.g., the bread and bakery products section of a hypermarket; but, after

that, the researcher should not limit herself too much to certain predefined areas, but look for and follow the actors instead.

In addition to multiple and multisite data, it is also important to capture different ontological relationalities, which demands multiple methodologies. Marketing and consumer research has been dominated by individual- and experience-based perspectives on consumer culture, in line with the status of in-depth interviews as a predominant method of data collection (Askegaard & Linnet 2011; Moisander, Valtonen & Hirsto 2009). This is also reflected in ANT research, though, instead of multiple relationalities, interviews tend to depict human-to-human relations. Thomas, Price and Schau (2013), investigating a distance-running community, a complex gathering of individuals (e.g., competitive and recreational runners, joggers, walkers, volunteers and race directors), organizations (e.g., race organizations, charity running programmes, specialist stores, and running shoe and apparel manufacturers) and associated resources (e.g., brands, products, races, and gathering places), which taken together form an actor-network of long-distance running, focused their analysis on “the experiences of individuals and organizations”. Though their data consisted not only of in-depth interviews but also online forum observation and prolonged participant observation, they focused on and were concerned with consumer and producer perspectives.

In ANT research, attention should not be paid to how humans see their actions and what humans do. Instead, the interest must be on the heterogeneous network of different actors, and this requires democratic, symmetrical data. Data that are produced only by human interviews and descriptions only represent a human enactment of reality. Acknowledging the ANT epistemology of variable ontologies (Latour 1993), it makes no sense to carry out research exclusively by listening to what humans have to say. This should not be taken as a request to start a conversation with things, but rather as encouragement to use numerous methods and data. While things cannot speak for themselves, they can be observed and followed. At-site observations give the researcher the possibility to focus on things and spaces.

Detaching one’s self from the ongoing discussions, as far as it is possible to do so, is also worth considering if the focus is not on the actor-network in the context of knowledge production. Otherwise, there is a risk of concentrating on literature debates rather than fieldwork (Cochoy 2008).

Using secondary data enables the researcher to capture the case from different perspectives: from inside organizations (memos, action plans and other documents) and from outside (media articles from local and national media); documents from different organizations (for example, in this research, documents

from supermarkets, different food assistance organizations and Evira are used); naturally occurring data (observations), real-time practice (e.g., observations, go-along interviewing) and produced data (e.g., interviews).

Meaningful instructions are needed for recording the data. Using multiple ways of recording helps to realize different aspects from them. Tapes, photos, notes, field memos and transcripts can highlight different perspectives and point out different actors. As the researcher follows the actors, so the volume of data expands. To be able to follow all the actors, a variety of different methods might be needed.

#### 3.1.4.2 Network view

The network in ANT is a tool to help describe something, not what is being described (Latour 2005: 131). In other words, “a network is not a thing but the recorded movement of a thing” (Latour 1996: 14). This means that a network cannot be understood in a technical sense, as a subway or a computer network, a preset, stabilized and strategically organized network. Instead, the network is formed in relations. Considering the example of a food waste network, food becomes waste in the bread and bakery section of a supermarket in a process involving different human and non-human actors. The actors and their trajectories are not preplanned and circulating, but need to be followed in order to be grasped. While the technical meaning of *network* is misleading, a reference to social networks is equally inappropriate. Actor-networks are not social networks connecting people, but heterogeneous networks formed by human and non-human actors. However, while networks are not social, a networked view can help to explicate the concept of the social. Since almost all interaction is mediated through objects, the social becomes nothing other than patterned networks of heterogeneous materials (Law 1992: 381).

Meanings and materiality co-emerge in a network. The agency-structure debate is overcome as the social is not seen to be made of agency and structure at all, but rather understood as a circulating entity (Latour 1999: 17), i.e., agency appears distributed in the network. Action is never the property of a single actor (especially not a human being), but the property of a network.

ANT is based on a flat ontology, where all objects that have the capacity to affect another object are treated as actors. Thus, while the networked view explains the social in a new way, it also allows us to overcome other divides, levels, layers, territories, categories, structures, systems and dualisms present in most of the research. One advantage of thinking in terms of networks is that it shifts the focus from distance or proximity to connections. As Latour (1996: 4-5) explains,

proximity in terms of distance is one type of connection, but elements which are close when disconnected may be infinitely remote if their connections are analysed. Instead of geography or space, the notion of *network* refers simply to associations. This calls for attentiveness and caution when looking at the world: instead of a hasty association between distance and relation, the focus should always be on connections.

Further, getting rid of scaling and *a priori* order relations is needed. Actor-network studies cannot be tied to any existing axiological models or systems, such as the myth of a top and of a bottom of society. Just as the social is nothing more than a circulating entity of heterogeneous materials, the scale of or the division between micro and macro is nothing more than connections between actors. The scale, the type, the number and topography of connections are left to the actors themselves (Latour 1996: 5). In other words, social structures are always grounded and built locally and can only be explored by applying a very local, very practical and very tiny locus. As Latour (1999: 17) suggests: “Big does not mean ‘really’ big or ‘overall’, or ‘overarching’, but connected, blind, local, mediated, related.” From an empirical perspective, this means keeping an eye on the local and practical, since what happens locally and practically also informs the larger scale. The macro context never simply exists somewhere; it is always grounded and comes together in local situations.

The actor-network cannot be readily defined, but calls for a willingness to work hard on multiple and complex sites. When it is not at all clear what constitutes action, there are risks in following traces that lead to nowhere; however, there are also possibilities of finding new and unrecognized, previously disregarded and underestimated actors that act in or translate the network. This is why research accounts need to be kept open (Hoholm & Araujo 2011: 936). This has been acknowledged in studies that are not precisely built on ANT. Recent organizational ethnography has evolved from single-site studies to multisite ethnography, followed by as recognition of distributed organizational practices (Van Maanen 2011: 224). This openness asks not only for multisitedness, but possibly multiple data in order to be able to follow the relations in the network.

Now that we have navigated our way through the meanings of *network*, it is appropriate at this point to highlight its connection with *actor*, and the function of the hyphen that binds them together. An actor is always in itself a network, a collection of different entities. Thus, *actor* and *network* designate two faces of the same phenomenon.

### 3.1.4.3 Focus on relations as opposed to objects and subjects

ANT is not interested on who does what, but what is done; and this comes together in relations. Though much space and numerous characters (of the alphabet) have been used in order to flatten the ontological distinction between humans and non-humans, meaning and materiality, big and small, macro and micro, social and technical, and nature and culture, the interest is rather on relations and networks than ontologically distinct entities (Law 2009: 147). However, in order to capture the relations, concentrating on actors and the premise of following actors can be fruitful.

“ANT’s realism is a realism of relations, as opposed to the realism of objects that can be grasped ‘out there’, independent of their relations and deployments”, states Bajde (2013: 230, based on Law 2004). These relations comprise a circulating entity, a network of relations, a hybrid of different entities that act together. Thus, there is no subject or object, only a circulating entity, a network that acts. Empirically, this means that humans are not granted agency, but neither are objects. Agency is a property of a collective or an assemblage that comes together in relations. Agency is distributed and relations must be followed.

In consumer studies, applying ANT has led to the discovery of objects of consumption: a coat raking grooming device (Bettany 2007), a dinner table (Epp & Price 2010) and chicken coops (Bettany & Kerrane 2011). Following an object at a boundary has enabled researchers to move across assemblages and to overcome the micro/macro divide (Bettany 2015). However, a focus on objects does not automatically produce an ANT view; rather, it risks losing the multiplicity of actors involved. Instead of concentrating on networks of things, or exploring the roles of ‘material culture’, ANT stands for a symmetrical treatment of the world. In practice, the researcher needs an entry point to a research site or phenomenon, for example, people; but following people always leads to a heterogeneous network: picking up a phone, sitting down and reading connect the person to a network of things and materials. Different actors that come along can then be followed and observed in their own right. All kinds of objects, subjects, human beings, machines, animals, nature, ideas, organizations, inequalities, scale and sizes and geographical arrangements are potential actors. The actor-network approach describes the enactment of materially and discursively heterogeneous relations that produce and reshuffle these actors (Law 2009: 141).

Though it is in ANT’s interest to “flatten ontologies”, that is to say, treat heterogeneous actors symmetrically, in research, it might be interesting to centre on “unforgotten” and marginal actors. This is exactly what Bettany (2007), Epp and Price (2010), and Bettany and Kerrane (2011) do, when they focus on such

mundane objects as a grooming device, a dinner table and a chicken coop. A networked view and much of the ANT literature can help us to distinguish histories or traces of the roles of the non-human and wave goodbye to old and established power relations; but, we cannot straightforwardly label this as ANT, due to an overdetermination of the object.

#### 3.1.4.4 Becoming sensitized to dualisms and reproduced categorizations

There is no research without a researcher. As a researcher, it becomes crucial to admit and become aware of one's role as a co-constructor of reality, an actor in the network of one's own research (Bajde 2013), performing and describing the reality that is under investigation in the form of a report, article or text.

Researchers not only produce; they can also renew or reproduce dualistic categorizations (Cochoy 2008) due to their own, previously built networks of knowledge. As Firat and Dholakia (2006) explain, representational thought tends to work with preordained categories. Refusing *a priori* ontological distinctions and categorizations of actors' should be taken into consideration in the research process: gathering of data, following actors and describing an actor-network. As Bettany (2007) reminds us, researchers' work is political. As long as this is not black-boxed and forgotten, the researcher has the possibility to contest her ideas and search for other options. Thus, it is important to seek to open boxes.

To reach the prerequisite of symmetry, actors cannot be predefined. The researcher must look for potential actors as practices unfold, keeping an eye on who or what is acting. Though it is impossible to get rid of all previous knowledge and assumptions, it is important to become aware of presumptions and directional constructs of thought. Becoming aware of dualisms is a key to contesting them. However, this is not easy. For example, in their research on heterogeneous, assembled communities, though relying on multiple data derived from in-depth interviews and participant observations, Thomas, Price and Schau (2013) ended up examining consumer and producer perspectives. Of course, vignettes can help us to look at human experiences, as in Parmentier and Fischer's (2015) article on how fans contribute to the dissipation of a brand's audience, where the researchers conceptualized brands as assemblages of heterogeneous components, but still chose to examine how fans can contribute to the destabilization of a brand's identity and contribute to its co-destruction. The question remains as to why we should concentrate on human fans instead of all elements at play in the dissipation of a brand's audience. As D'Antone and Spencer (2014) show in their research on the actor-network of the sustainable palm oil market, consumption is a multi-actor



process where consideration of one actor without taking into account the others poses problems for a full understanding of the network and possible participating actors.

Though non-individualistic methods of research can widen the focus to include non-humans, investigating non-humans is not straightforward. As Law and Singleton (2013: 495) suggest, ethnographic studies can centre too much on what people are saying and the problems that people can cause. To overcome this, it is important to plan data generation well beforehand, so that the researcher remembers to follow actors other than human ones. ANT's ontological relativism allows the world to be organized in many ways. The researcher is a co-actor in the research process, and *a priori* assumptions, knowledge and decisions are co-constructed in the networks of the researcher. Further, multiple data can be used to widen the perspective.

#### 3.1.4.5 If everything is networked, what is enough?

Follow the actor is the most basic (and only) piece of advice in ANT. However, an actor is always a network in itself, and a network is an assemblage of actors. The network grows and everything is related. This produces a dilemma for the researcher: what is the cutoff point? Obviously, the researcher has to make decisions on what to leave out and where to focus. However, there is no single answer to this in the ANT literature. It is not just a question of the content but rather aesthetics and space: sometimes, the style guidelines of a publication or the maximum number of words has the last word and dictates where scissors are needed. As Bettany (2015: 193) suggests, compared to research articles, only the format of a book is able to capture the complexity and scope of the network of actors.

One way of outlining the network is to build a case about certain actors. Examples include a two-year case study of a family's kitchen table as linked to a network of other objects, identity practices and spaces (Epp & Price 2010), and the paper by Bettany and Kerrane (2011) which follows the acting object of a chicken coop. What is enough relates both to methodology and "how long to follow" and to writing out the research paper and "where to end the description". In both phases, however, it is important to follow all the connections in the sense that a symmetrical account is produced. The case and the choices taken could threaten ANT principles, if the focus is more on a certain object rather than on its relations or connections.

#### 3.1.4.6 Writing the description

Theories usually try to explain why something happens, but ANT is descriptive rather than foundational in explanatory terms. This is disappointing for those who seek strong accounts, but instead stories can be told about “how” relations assemble, if at all (Law 2009: 141). However, multiple data can make writing the description difficult, in terms of where to start, how to proceed, and how to make sense of “the figure and the ground”.

Since a network is messy with many connections, not everything can be described, and focusing is probably needed. My instruction would be to simply start writing and, when focusing on certain relations or actor relations, remember to highlight the relational character of the network. While some actors act, the agency is always distributed. It is important to try to get rid of hierarchical thinking and expressions of hierarchy. Though the focus of the research might be on a certain object (e.g., food waste), the perspective should always be on the relations of the object and thus on the agency of the network. As Law and Singleton (2013: 490) suggest, what is spelled out should seek to reflect the world and the way in which it is unfolding and uncertain, i.e., the relational character of the network.

Being reflexive is an important part in describing the research. Implicit choices on what to consider as important and unimportant, if made without reflection, may lead to biased descriptions following researchers' own agendas, be they political, theoretical and/or personal. Following Latour (1999a: 20), researchers can pursue objectivity by using the vocabulary of the actors. Strictly adhering to ANT vocabulary might even end up restricting the actors' own world-building efforts and make it impossible for new actors to define the world on their own terms, using their own dimensions and touchstones (Latour 1999a: 20). As Latour (1996a: 11) has noted: “One does not jump outside a network to add an explanation – a cause, a factor, a set of factors, a series of co-occurrences; one simply extends the network further. Every network surround itself with its own frame of reference, its own definition of growth, of referring, of framing, of explaining.” Taking translation as an example of ANT vocabulary, a contract does not have to be known as translation in order to be understood, but translation can be used to depict a more general phenomenon, that of “all the negotiations, intrigues, calculations, acts of persuasion and violence, thanks to which an actor or force takes, or causes to be conferred on itself, authority to speak or act behalf of another actor or force” (Callon & Latour 1981: 279).

In its essence, ANT aims at description (Latour 2005). A weighty description produces and forms within itself an explanation. However, while Latour emphasizes description, many studies that build on ANT also produce an analytical



chapter or analysis on top of an empirical section. Yet, a well-written description can integrate knowledge in a way that produces analysis-like results.

#### 3.1.4.7 The most important rule is that there are no strict rules

ANT is created, recreated, explored and tinkered with as part of research practices (Law & Singleton 2013: 485). Within different streams of research, interpretations and emphasis vary. During my thesis project, I have encountered very different views on what can be and what should be done under the label of ANT research. The interpretation and demands are different, on the one hand, in the field of the sociology of science, from where the first ANT authors started their work, and, on the other, in the field of marketing and consumer research. Even inside marketing and consumer research, there are differences in preferred word choices (post-humanism, symmetry) and, for instance, in the role and appropriateness of references to cultural research methods, based on the stream of literature in use. Thus, it is important to choose/know about which discussion you are taking part in, and the outlet you are writing for, and stick to the lines to take.

## 3.2 Practice approach

Practice theory has gained a strong presence in social science. But what does the term “practice” really mean? It is by no means self-explanatory. In theory and research, it turns out to mean very different things in different fields and to different people. One reason for this is that researchers from different intellectual traditions have interpreted and focused on different aspects of practice in their research. Hence, in the following, a broad understanding of the different perceptions on practice is given. First, the (re)turn to practice theory is outlined, tracing the genealogy of practice research, concentrating on the developments on the field of marketing and highlighting some key aspects and fields of thought. Secondly, different approaches on practice research are outlined, making a difference between empirical, theoretical and philosophical approaches to practice. Thirdly, leaning on developments in other fields of research, the need for a more material, symmetrical and relational conception of practice research is recognized and put forward.

### 3.2.1 The practice turn in social studies

Introduced by Reckwitz (2002) as an interesting and alternative theory in relation to other social and cultural theorizations, practice theory has fuelled a ‘practice

turn' in contemporary social theory. Whereas practice theory is a social theory and can be placed under the subcategory of cultural theories (Reckwitz 2002), different disciplines from organizational studies (Nicolini 2009; Feldman & Orlikowski 2011) to market studies (Kjellberg & Helgesson 2006; Araujo, Kjellberg & Spencer 2008), and from environmental studies (Spaargaren 2011) to gender studies (Martin 2006) and to consumption studies (Schau, Muñiz & Arnould 2009; Shove & Pantzar 2005; Warde 2005), have applied the practice lens. Though widely adopted in consumption studies, practice research has not attracted much interest from other fields of marketing (Kjellberg & Helgesson 2006).

The roots of practice theory are in sociology, and the seminal theorizations include work from Pierre Bourdieu, Anthony Giddens, Michel de Certeau and Michel Foucault. However, traces of practice research can also be found in earlier works and philosophies. Reckwitz (2002: 250) even argues that everything that is original in practice theory were already available in the works of Wittgenstein and Heidegger. The origins of practice theory research can be further traced back to Aristotle. Therefore, instead of referring to a 'practice turn', a more correct expression would be a return to or a rediscovery of practice research.

Since the return to practice, copious new directions have also opened and influenced practice theory. Reckwitz (2012: 243) mentions, for example, empirical sociology, cultural studies and anthropology and the works in the wake of Garfinkel's ethnomethodology (1967), Butler's 'performative' gender studies (1990) and Latour's STS (1991).

As the roots of practice research are multiple, and the background of the researchers is manifold, so is the concept of practice ambiguous. While commonly referred to as practice theory, there exists no single practice theory, but rather a family of practice theories or a collection of practice lenses. These differ in terms of their background assumptions about what constitutes practice and what level of abstraction confronts practice. Sometimes, practice might simply refer to action and doing, to practicality (e.g., Holt 1995), while the practice theory approach refers to theoretical concepts and understanding (e.g., Warde 2005).

Concentrating on practice theory, although rich and vivid, there are some relatively common and shared features within the heteroglossia of practice research. One of the basic assumptions is the need to overcome the ancient dualism between individual agency and societal structure. In social theory, human behaviour has been explained either from an individual perspective, concentrating on single actions of a human actor, or from a macro perspective, focusing on the normative structures and social forces. Practice theorists acknowledge these two as related and in relation to each other. What an individual does is always in relation to

society at large, while social structures are built on the actions of individuals. Together, they are interrelated parts of the whole (Giddens 1984).

In the following sections, a brief history of practice research in consumption studies is offered, following by a short overview of practice theory and a depiction of the different approaches to practice research. Criticizing the current social understanding of practice, and reflecting on research on the role of things and artefacts as parts of practices, an intellectual move to a more materialized and epistemologically relational approach on practice research is pursued.

### 3.2.2 Practice theory in marketing and consumption studies

The marketing discipline can be divided into the subdisciplines of research on marketing management (the focal company's perspective) and consumption research. The practice approach in marketing has been driven by consumption researchers, such that practice theory has gained a strong presence, particularly in the culturist interpretative research tradition of CCT. In other fields of marketing, practice theory has largely remained on the margins, though it has gained some interest, for example, in the marketing strategy (Järventie-Thesleff, Moisander & Laine 2011) and service marketing (Korkman 2006) fields. There is also a stream of research on market practices (Kjellberg & Helgesson 2006; Araujo, Kjellberg & Spencer 2008; Kjellberg 2008). While practice theory has become a mainstream perspective in the most prestigious journals dealing with consumption, it has gained in popularity only recently. Next, a thorough overview of consumption studies and the turn to practice research is presented.

Traditional theories of consumer behaviour are psychologically oriented and focused on rational decision-making focused, on logical empiricist epistemological principles (see Table 2) (Askegaard & Linnet 2011; Thompson et al. 2013). Consumers were originally depicted as rational humans, processing information and choosing the best alternative in a vacuum, separate from the social world. This view was challenged in the 1980s<sup>4</sup> with a growing interest in meaning making and experiences. The previously narrow focus on consumer decision-making and purchasing, namely, consumer behaviour, begin to shift towards a more holistic interest in consumption, enhanced by a more encompassing conceptualization of consumption as acquisition, consumption and disposition (Arnould & Thompson 2005). The change in focus from positivistic research to hermeneutics and phenomenology can be conceptualized as a move from consumer behaviour to

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<sup>4</sup> The interpretative turn in cultural studies can be traced back to the 1970s (Reckwitz 2002), while the move towards experiential and phenomenological research in consumer studies came about in the 1980s.

consumer research. While the previous psychological streams had highlighted cognitive processing and rationality, the cultural perspective shifted interest from the symbolic aspects of consumer behaviour to the social construction of reality (Berger & Luckmann 1967).

Explaining and understanding actions by reconstructing the symbolic structures of knowledge presented a new way of cultural understanding, capable of coming across the divide between explaining actions by collective norms and values<sup>5</sup> and explaining actions by rational decision-making based on individual purposes, intentions and interests. Instead of individual decision-making or normative action, social order was embedded in collective cognitive and symbolic structures, in a shared knowledge, enabling a socially shared way of ascribing meaning to the world (Reckwitz 2002). People are buying things not only because of function, but also because of symbolic qualities and meaning, as Levy wrote already in 1959. In 1995, matters were taken a step further when Firat and Venkatesh conceptualized objects as symbols rather than in their concrete form.

**Table 2.** Perspectives on consumption research

	<b>Influential perspectives</b>	<b>Epistemology</b>	<b>Focus</b>
Consumer behaviour	Economics, psychology	Logical empiricism	Rational man
Consumer research	Cultural and social theory	Hermeneutics, phenomenology, interpretivism	Experiencing man
			Cultural man
			Practice
Consumption research	Post-humanist theories, e.g., ANT	Relational	Actor relation

Research on meanings lies at the heart of the versatile research, involving a cultural approach to consumer research, labelled in 2005 by Arnould and Thompson as CCT. Rather than a unified theory, this is an umbrella term for different theoretical conversations and frameworks addressing the dynamic relationships between consumer actions, the marketplace and cultural meanings. Central to this stream of research has been the representation of the consumer subject as a reflexive and empowered identity seeker (Askegaard & Linnet 2011),

<sup>5</sup> A predominant way of understanding action in social theory.

highlighting the contextual, symbolic and experiential aspects of consumption (Arnould & Thompson 2005).

To be more specific about what CCT research entails, Arnould and Thompson (2005: 876) divided CCT into four thematic domains of research on sociocultural processes and structures, namely, (1) consumer identity projects, (2) marketplace cultures (consumers are seen as culture producers), (3) the sociohistorical patterning of consumption (consumers seen as enactors of social roles and positions) and (4) mass-mediated marketplace ideologies and consumers' interpretive strategies.

Though contextualized as a collection of different research interests, the above-presented thematic domains of research capture the focus of the research: the consumer and her consumption from an interpretative perspective. Following this, it is no wonder that CCT has been criticized as individual-centred and experience-focused, as well as lacking criticism (Moisander, Penaloza & Valtonen 2009) and of forgetting to embrace the structural foundations and the possible cages and restrictions that structures can impose on the emancipated consumer (Askegaard & Linnet 2011). In support of the presented critique, the name of the research discipline, consumer research and the label of CCT all point to the consumer actor by outlining a world of individual consumer actors.

The practice turn in social and cultural studies offers an interesting and alternative way of interpreting and theorizing consumption. Responding to the critique of individualism, practice theory represents a new means to combine structure and agency. While previous cultural theories have understood the symbolic organization of reality from the perspective of mental structures, discourse or interaction (Reckwitz 2002), practice theory has been able to connect both bodily and mental activities to the notion of practice. Elevating the view on consumers to other elements in society, practice theory enlarges the unit of analysis from the individual to the practice level.

Instead of being interested in what consumers do or think, the practices that they participate in are at the centre of the study. Wants and emotions previously ascribed to humans do not belong to individuals but are a part of practices (Reckwitz 2002: 254). Rather than individual desires, it is practice that creates wants (Warde 2005: 138).

Even though practice theory is argued as being able to bring together the individual and the context, there is also evidence that this may not have happened, and that the embeddedness of an individual in her cultural surroundings has not been supposedly carried out. It is not rare to come across practice research where

practice and context are treated as separate. Concerning research on professional practice, Kemmis (2009) points out how referring to practice may simply refer to what it is that practitioners do, while the role of the context might be forgotten. This message is further enhanced by Askegaard and Linnet (2011: 383), who criticize mainstream consumption research for holding onto an individually focused paradigm. Further, what is done under the label of practice research can be criticized as a fad, not delivering what is theoretically stated. This has also been remarked by Warde (2014), who argues that many of the eager manifestoes for a practice-theoretical approach have done little more than rehearsed earlier established concepts. Thus, there is a need to define and specify in more detail practice research, with a focus on its ability to embed consumption in its context.

The practice turn should not be just about a change of vocabulary; it should also be about a change in the way research is carried out. In terms of consumer research, the practice turn should mean a move towards consumption research, embedding the individual in the context. This should be done at the level of labels as well as through practice when carrying out research. However, considering the vagueness of the concept of practice, it is not surprising that what is done in the name of practice research seems to be a mixture of multiple methods and conceptualizations. It is therefore important for the researcher to clarify what is meant by practice research and on which theoretical stream or interpretation the research is built on. For this purpose, different approaches to practice are elaborated in the following section. After that, the new waves and possibilities of practice research are discussed.

### 3.2.3 Conceptualizing practice

What does the word *practice* really mean? While the roots of practice theory are in cultural studies, different intellectual traditions tend to concentrate on different aspects of practice. In consumption studies, the focus has been on interpreting and looking at everyday routines, using a social-theoretical practice lens adopted from practice philosophers<sup>6</sup> and paying attention to the interconnected elements of practices. Next, some of the core principles of practice theory are presented.

One of the most quoted definitions of practice comes from the philosopher Andreas Reckwitz (2002: 249), who defined practice in his seminal paper as:

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<sup>6</sup> Most of the consumption research papers on practice refer to Reckwitz and Shatzki's conceptualization of practice. Alan Warde's seminal article, 'Consumption and theories of practice', is also largely based on the conceptions developed by these philosophers.

“a routinized type of behavior which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, ‘things’ and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge, interconnected to one another.”

To put in a simpler form, following Schatzki (1996), the mundane consumption routines of interest have often referred to doings and sayings.

The conceptualization by Schatzki (1996) applies two different notions of practice: practice as coordinated entity and practice as performance. Practice as an entity distinguishes doings and sayings as elements of practice, reconstructed through time and space, and coordinated through understandings, procedures and engagements. Practice as performance, on the other hand, refers to individual performance: actualization and carrying out the practice.

Later on, Shove and Pantzar (2005) and Shove et al. (2012) turned their attention to the material elements of practices in their conception of practice as interdependent relations between materials, competences and meanings. Highlighting the role of materials in their conceptualization, Shove and Pantzar (2005) distinguished between two streams of descriptions: one that draws on Bourdieu, Giddens and de Certeau, which emphasizes routines, habits and competences, and another that is based on Schatzki and Reckwitz, with roots in STS. The former stream of research can be conceptualized as social practice theory, while the latter is more ready to acknowledge the role of materials in practice research, though the potential has, for a long time, remained unrealized (Shove & Pantzar 2005). Thus, this material stream of practice research is elaborated further in this thesis within Article 3. The different conceptualizations of the elements of practice are synthesized in Table 3.

**Table 3.** Elements of practice as defined in consumption studies

Author	Elements of practice
Reckwitz (2002)	Bodily and mental activities, things and their use, understanding, know-how, states of emotion and motivational knowledge
Schatzki (1996); Warde (2005)	Doings and sayings
Shove & Pantzar (2005); Shove, Pantzar & Watson (2012)	Materials, competences and meanings



While the broad development of practice research in consumption studies can be depicted as above, at the same time, diverse routines and different ways of carrying out practice research are at work in different academic fields and disciplines. Looking at how practice research has been carried out in other disciplines can be of value and provide new vignettes for research in marketing and consumption studies.

In organizational studies, various authors (Kemmis 2009; Ghererdi 2000; Nicolini 2013) have sought to present an overview of practice research. Concentrating on theoretical development and genealogy, Nicolini (2013) outlined six different theorizations of practice: the social praxeology of Bourdieu and Giddens; practice as tradition and community; practice as activity; practice from an ethnomethodology standpoint; contemporary theory of practice (based on Heidegger, Wittgenstein and Schatzki); and language as discursive practice.

Compared to Nicolini's (2013) dedicated overview, a more straightforward but nevertheless equally applicable framework can be achieved by dividing practice research into three broad categories on the bases of the approach to practice research following Feldman and Orlikowski (2011). In their article "Theorizing practice and practicing theory in organization science" they distinguish between empirical, theoretical and philosophical approaches, all of which are present in the work of consumption researchers, though some are more prevalent, while others are more infrequent.

The first approach is empirical, focusing merely on human action, as opposed to theory. It can be used pragmatically when referring to what is done in practice, to activities such as work or consumption: for example, peeling an orange as a practice, as an emerging, ongoing activity, in contrast to the practice as theory, distinguishing the elements of the bodily routines, mental activities, the background knowledge and related artefacts. While this distinction between "praxis", action and "praktiken" theory is also pointed out by Reckwitz (2002) and Warde (2005), both of whom are commonly cited in practice-based consumption studies, it seems the difference between the concepts has remained somewhat unnoticed and not gained the attention and thinking it should have received.

Douglas Holt's (1995) typology of consumption practices is one of the rare exceptions where practices are approached as action. Holt defines practice as the "embodied skills that people bring to bear in their everyday activities". The research emphasizes human action without explicitly drawing on practice theory, comparable with the concept of practice as praxis. In the article, consumption practices are examined using a case study of baseball spectators. The interest in practices is phenomenological, and Holt is explicitly looking at how consumers

consume. The focus is simply put on everyday activities, routines and improvisation. While Holt's data are based on baseball spectators' practices, practical interest can be directed at almost anything, from linguistic and knowledge practices to management and consumption practices. While Feldman and Orlikowski (2011) call this approach "empirical", it could also be referred to in terms of practice as phenomenon or simply practice as activity.

The second approach is theoretical in nature. In contrast to the empirical approach, it explicitly refers to practice as theory and takes advantage of practice theorization to explain social life. Theorizers such as Bourdieu, Giddens and Reckwitz are referred to, and theory is used as a lens through which to look at people's recurrent actions. As Feldman and Orlikowski (2011: 1241) explain more explicitly:

"Working with the specific theoretical ideas of practice theorists requires researchers to engage with the core logic of how practices are produced, reinforced, and changed, and with what intended and unintended consequences."

To distinguish theoretical from empirical approaches, we can look back at Holt's article on consumption practices. While Holt (1995) makes reference to Bourdieu, Garfinkel and Giddens, he describes practice as a unit of consumers' actions. He barely uses practice as a theory, but instead concentrates on action, describing it by using practice as a word for categorization.

The third approach on practice is philosophical. In this approach, life and the whole world are seen as constituted in practices. This is the most comprehensive way of looking at practices, entailing ontological and epistemological questions on how the world is seen to be constituted. From the practice philosophical perspective, the world is seen to be composed of practices, which are the primary entities and building blocks on which everything else in society is built. Comparing philosophical and theoretical approaches to practice research, there are differences in how explicitly researchers adopt practice ontology. Interpreting the adopted standpoint can be difficult since it might not be explicitly stated in the research article. However, theory and philosophy are in many ways intertwined.

There are certain fields of research where the epistemological switch to practice has generated new perspectives on the phenomenon in question, particularly in the case of research on communities (Schau, Muniz & Arnould 2009; Arsel & Bean 2013), on sustainable consumption and ecological ways of living (Warde 2005; Ropke 2009; Shove & Walker 2009; Shove, Pantzar & Watson 2012) and on markets (Kjellberg & Helgesson 2006; Araujo, Kjellberg & Spencer 2008;

Kjellberg 2008). To illustrate this point, by examining nine different studies on brand communities, Schau et al. (2009) were able to show how practice and certain elements of practice can be used to categorize and understand collective value creation within brand communities on a general level. Practice becomes the main unit of analysis to understand communities. Similarly, a switch of perspective from the consuming individual to taking part in an ever-growing number of practices can be seen as constituting an increasing amount of consumption. Instead of individual decisions, people become part of consumption practices.

Though useful for categorization and making sense of practice research, the above-presented three approaches to practice are, by no means, intended as strict categories but merely ways to understand differences or matters of emphasis in treating the concept of practice and research on practice. Adopting a theoretical approach to practice does not strictly refer to a conceptual paper, but can include (and usually does!) empirical data, while the philosophical approach might also include practice thinking. In this research, the emphasis and the contribution are based on all of these perspectives. Practice is approached as an empirical phenomenon, on which empirical data are collected. The theoretical construction of practice is elaborated based on the material stream of practice research, together with a philosophical approach on how material practices come together and construct the world.

This section has presented the concept of practice. While doing so, it has surveyed the historical developments of consumer research and different approaches on consumption, from rational humans to experiences, culture, practice and actor relations. Concentrating on practice research, it has underlined different conceptualizations of practice, identifying a research gap on the missing masses in consumption research, the material stream of practice research. Further, a categorization of practice approaches, leaning on practice as action, theory and philosophy, has been offered, forming a framework for this research: the empirical approach understands waste as a dynamic phenomenon resulting from everyday actions, whereas theoretical and philosophical approaches concentrate on the material and networked character of practices. Following Nicolini (2009: 1392), in the case of theorizing practice, an appropriate methodological approach that makes us see the connection between the here and now of the situated practice and the elsewhere and then of other practices is needed. In order to develop this theoretical-philosophical standpoint, I lean on ANT which I will discuss in more detail in the next section.

### 3.3 Towards bridging actor-network theory and practice research

Following the above-presented ANT and practice approaches, this chapter paves the way for bridging ANT and practice-based research. While ANT departs from practice theory, at the same time, Bajde (2013: 234) recognizes it as theoretically competitive with regard to practice theory.

In this research, the ANT approach defines the research philosophy. The research ontology is based on ANT ontology, where a network emerges and reality is enacted in relations. Agency is not a property of a single actor, but appears distributed between the actors of the network. This is to say, different actors are not interesting in themselves, but more so in relation to each other, e.g., bread becomes waste in relation to different meanings and materials, and how they connect in sociomaterial practices. Thus, when relations come together in practice, this produces, disassembles and reproduces different actors including objects, subjects, human beings, machines, animals, nature, ideas, organizations, inequalities, scales and sizes, and geographical arrangements (Law 2009: 141). However, if agency is distributed, due to its circulating capacity, it is only partially gained or lost by following human bodies of practice.

Further, the actor and the network in ANT stand for the ever-growing bond between actors in networks. This means that an actor is always a part of a network, but always constituting a network in itself. It follows that networks bring together elements that actors do not fully recognize or know. Thus, agency is easily veiled and simplified or, in ANT terms, black-boxed (Law 2009: 147). If and when practices are built around the human body, there is a risk of simplifying and losing networks. These notions form the basis for bridging ANT and practice research.

Law and Singleton (2013: 489) write: "Perhaps then, ANT is better thought of as a sensibility to the materiality, relationality and uncertainty of practices, as a way of asking how it is that people and animals and objects get assembled in those practices, and as a way of mapping the relations of practice." This is, in many ways, an interesting idea, since it binds practices to the actor-network and points to the common ground that ANT and practices have.

This chapter has paved the way for bridging ANT and practice approaches. The work is continued in Article 3 that suggests combining ANT and practice research in a sociomaterial practice-network approach.

## 4 DATA GENERATION AND ANALYSIS

The following section takes the reader through the data generation process and analysis. The current ethnographic data are based on and built around findings from the bread and bakery section of a hypermarket. Apart from participant observations and discussions with employees in this bread and bakery section, other materials, such as news articles and organizational documents, were used. Thus, the data form a heterogeneous and abundant network for research. While presenting the data generation process, I will discuss how the analyses were developed. In the end, an evaluation of the research is offered, reflecting the quality of the study, the outline of the research process and the research ethics.

### 4.1 Multiple data

The research is based on various ethnographic materials as summarized in Table 4. The materials can be separated in terms of primary and secondary materials based on their function in the research articles. Data generation began in September 2014 with observations and interviews in the bread and bakery products section of a hypermarket belonging to a Finnish grocery store chain. The methodology was based on the ANT guideline about following the actor, with a focus on the ideas of relationality, symmetry and distributed agency. While many studies on food waste use interviews (with managers) as their main source of data, capturing the heterogeneous network of food waste through interviews would not produce an adequate account (Law 2009; Law & Singleton 2013). There is a difference between examining what happens in real life and asking people to comment upon it. Interviews would not be sufficient to give a symmetrical description of the role of different human and non-human actors participating in the food/waste process. Furthermore, work in grocery stores involves everyday routines and practices which employees do not actively think about, nor even talk about or know how to talk about them. Thus, the research could not be built on interviews. Instead, a multimethod focus at the interface of food/waste was applied.

In order to capture the relational character of retail food waste and distributed agency between different actors, elements, spaces and movements of bodies (Hill et al. 2014), the research was predicated on the “go-along method” (Kusenbach 2003). The method was also used by Evans (2012) in research on food disposal, providing a suitable framework, i.e., an ethnographic tool, to better understand the processes related to food turning into waste.

**Table 4.** Research data

<b>Locus</b>	<b>Type of data</b>	<b>Details</b>	<b>Time of collection</b>	<b>Article 1</b>	<b>Article 2</b>
Bakery	Interviews	At-site interview with a bakery owner	2016	x	
	Observations	At-site observations	2016	x	
Retail store	Field diary	3 days of observations and discussions in a hypermarket	2014	x	x
	Photos	45 photos to help capture the material networks	2014	x	x
	Documents	Annual reports from the Finnish Grocery Trade Association	2005-2017		
Consumers	Interviews	4 focus groups of 3-4 female consumers discussing their food consumption from shopping to disposal, 112 pages	2012	x	
Food charity	Interviews	Interviews with different food charity organizers and volunteers	2016		
	Photos	10 photos to help capture the material network	2016		
	Documents	Annual reports and convention documents on organizing charity work	2014-2016		
Co-operation	Participation	Meeting between different municipal and charity actors in the Vaasa region	2016		
Dumpsters	Interview	Interview with a dumpster diver	2016		
	Participation	Observant participation in a Facebook group for dumpster divers	2016		
Keeping animals	Discussion	Discussion with a stable owner	2016		
Food waste	News articles	Over 150 online news articles on food waste from YLE	2010-2017	x	x
		Printed articles on food waste from local media			x

The go-along method is a hybrid of observations and interviews, where the data collector follows or shadows the respondents as they carry out their everyday tasks. In this research, however, the go-along method was utilized following the ANT premises of relationality, symmetry and distributed agency, avoiding the production of a simply human enactment of reality. This means not only accompanying shop personnel as they carry out their work, but also following things and other non-human actors. Thus, while I watched the employees carry out things and tasks that they would be doing regardless of my presence and observation, simultaneously asking them questions on what they were doing, I also paid attention to and followed the non-human actors that took part in the network of food waste. Of course, the non-human actors could not be interviewed but, based on the networked connections, it was possible to ask for and encourage further descriptions from employees relating to other actors and what was happening around them. Hence, the methodological approach did not concentrate exclusively on following those who could speak for themselves; rather, I also "went along" with the non-human actors in order to capture the whole network of food waste.

Instead of plain interviewing (Stenmarck et al. 2011), the go-along method allows us to conduct at-site research and capture practices as they happen. It enabled me to ask questions about what I saw was happening at the field site. Since my own perspective is that of an etic observer, not representing a cultural insider concerning the work carried out in grocery stores, the method meant that I could familiarize myself with and become aware of the retail process and work tasks. The go-along interviewing approach concentrated on one of the individuals in charge of the bread and bakery products section, as she had the broadest and most multifaceted task list, while other employees carried out narrower task sets. However, I also followed and ask questions of other employees for shorter periods of time during the fieldwork.

I have now described the interview process for the go-along method and will now move onto the shadowing part. In more detail, the data generation required me to 'go along' with the employees, as they began their work days in the hypermarket, as they checked for old products and put them away, as they had their coffee and lunch breaks, and as they placed new orders and put new products on shelves. However, as already noted, the shadowing did not concentrate on employees alone; rather, I was attentive to the numerous actors that appeared in the waste network: customers, apparatus and technology, products and packaging, shelves and layout, and natural and temporal actors. As Law and Singleton (2013: 493) explain: "If you look for relations and materials and processes then they spread out everywhere." Thus, to produce a symmetrical account, inspired by Kopytoff's



(1986) cultural biography of things, I tracked and followed the focal object of bread and its packaging at the interface of food/waste and its network connections.

Compared to walking and talking humans, the challenge in following the non-human is on recognizing where to look and what to follow. Here, I felt that following and talking with employees were ways to connect to non-human elements; for example, when an employee used a portable device, referred to as Handytec, for ordering and checking the stock (or when it was not used), I started to realize the relations from the perspective of the non-human. Though I followed humans, I watched the relationships between actors from different actor points. Finally, it was easier to switch my attention from humans to the connections between non-human elements.

The observations and notes on the interviews, based on the go-along method, were recorded in a field diary. The field diary more or less includes emic descriptions of employees' talk, reflections on this talk based on observations, and singular observations on what was happening, e.g., descriptions of relations between various humans and non-humans. Writing a field diary was a new experience for me, and a learning process. During the fieldwork, I learned more and more about how to describe and write down my observations and perceptions. Thus, the first notes were more focused on what was said to me while I later moved onto describing more of what I saw, what had caught my eye and what was intriguing to me. In this sense, I found the photos that I took during the observations to be insightful and helpful in the analysis process. Further, while I wrote notes in the course of observing, I used employee coffee and lunch breaks, if not on which to base my discussions with them, to go through my notes, highlighting if there was something I needed to focus on or ask about. After the fieldwork, preferably on the same day, I sat down and wrote my notes in more detail onto a Word document.

The go-along observations and interviews lasted for a period of three days. However, I felt that, to obtain a more nuanced and multifaceted picture of the network, I should base my analysis on materials that are not informed exclusively by my own limited observations and discussions. The network could not be easily drawn, and I needed more materials to capture the perspectives of different actors. As Law notes in a discussion with Singleton (Law & Singleton 2013: 493): "If you look for relations and materials and processes then they spread out everywhere." The actors of food waste in the retail setting I observed extended the network to include charity organizations.

Following Callon and Latour (1981: 284), the actor-network cannot be readily defined. Thus, the hypermarket performed the role of an entry point to the phenomenon of food waste. Instead of binding the study to a single, predefined

area, in spring 2016, I started to follow actors away from the hypermarket, broadening my empirical research to other actors and parts of the food waste network of bread and bakery products in Vaasa and the nearby region. Following the food waste network led to multiple research materials, moving from the retail site to news articles, breadlines, participation in meetings and social media.

Here, I also followed the idea of flat ontology (Bajde 2013; Latour 1999a). In an ANT network, there are no boundaries, inside or outside. It is entirely flat. Put another way, a network is all boundary without an inside and an outside and entails overcoming contextual boundaries when following actors. Thus, in the data generation stage, I moved and followed the actors outside the hypermarket to multiple and complex sites, applying Latour's instruction: "The only question one may ask is whether or not a connection is established between two elements" (Latour 1996: 6). Further, recent organizational ethnography has evolved from single-site studies to multisite ethnography followed by the recognition of a distributedness of organizational practices (Van Maanen 2011: 224).

Discussing the challenges of ethnographic research on innovation processes, Hoholm and Araujo (2011: 936) point to the need to keep research accounts open. According to them, when it is not *a priori* clear what constitutes action, there are risks in following traces that lead to nowhere, but also possibilities of finding new and unrecognized, previously disregarded and underestimated actors that act or translate the network. The main challenge I felt in not knowing what is important beforehand related to documentation. I felt it was impossible to write all observations and ideas on paper; sometimes, I remembered later something I felt to be relevant or meaningful. What I did was to refer to earlier knowledge in the new diary notes or use a piece of information as backup knowledge for the analysis.

Data generation moved onto multiple sites, using multiple methodologies, and ending up with more and less useful data. The data generation process was built on growing knowledge on the food waste network and the possible actors within it, as well as following the network to find related and interesting actors. For example, as I learned of the charities that give out food which originates from grocery stores, I first conducted an initial interview with one of the organizers, which helped me to follow the network in order to find new actors and viewpoints or perspectives on the food waste network. To follow the food waste network in retailing, I read annual reports of the Finnish Grocery Trade Association. Further, growing the network included following traces to bakeries and waste bins, and further from waste bins to charity organizations.

The data generated in a bakery are mainly based on an interview with a bakery owner but includes field elements. The bakery owner had a mid-sized (over 20

employees) bakery, and he gave a guided tour through the bakery, while, at the same time, introducing and discussing the business (both production and marketing), as well as answering questions concerning selection and packaging from the interviewer. Thus, while walking in the bakery helped the interviewee to describe what really is done and to persist with his description of non-human elements such as the baking equipment, I was able to ask questions based on the non-human elements I saw, e.g., in the production process and the packaging of the products. This methodological choice helped me to generate a more nuanced and flat description than what would have been the case if we had sat in a back office or met in a place not related to the case, such as a café.

In order to understand consumers and their role in the food waste network, previously organized focus group discussions (Morgan 1997) were included to the research materials.<sup>7</sup> The data set included four focus group discussions with female consumers about their food consumption. The discussions lasted between 90 minutes and two hours. In order to stimulate and guide the discussions, ready-made collages of pictures of food waste consumption were used (Valtonen 2005: 224). While the data included discussions on the different phases of food consumption, the interest was now centred on descriptions of buying bread.

To enrich the understanding of food waste, online and offline materials concerning food waste were collected. Online news articles were searched using the keywords “food waste” (in Finnish: “ruokahävikki”) from the archive of the Finnish public broadcasting company, YLE. This produced a collection of over 150 online articles on food waste from the period 2010-2017. Other online materials included annual reports of the Finnish Grocery Trade Association from period 2005-2017 and food safety guideline documents for food charities produced by Evira.

The offline materials included news articles from local media such as the *Pohjalainen* newspaper and the *Ikkuna* freesheet, thus focusing more on the questions of food waste at the site of the research. Other offline materials included annual reports and convention documents of an association organizing charity work in the local area.

Further, various research materials were generated as I followed the food waste network from the retail to the charity sectors and dumpsters. The data set on food charity work in Vaasa was generated in the course of interviews with different food charity actors (founders, volunteers and clients), and via the go-along method on breadlines. I followed and observed the food waste network on those breadlines

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<sup>7</sup> This data set was collected for my master’s thesis on sustainable food consumption in rural Finland.

and interviewed the human participants. This led me to become a participant observer in a meeting with different municipal and charity actors in the Vaasa region, with a focus on food waste and helping those in need.

Based on the materials generated at the retail site, bakeries and charities, I became fully aware of the use of old bread as animal feed; I even briefly interviewed a stable owner. Further, I also interviewed a dumpster diver and participated as an observer in a Facebook group for dumpster divers.

The data collection involved a process of snowball sampling, where initial informants led to new and, in turn, newer informants, with the difference that, this time, the “informants” were not only humans, but actors and traces of actors leading to new documents and data outlets. While not all the different data sources directly referred to or were used as primary data in this thesis, the gathered rich data sources provided valuable background knowledge to the food waste network, from numerous actor perspectives. This enabled me to capture food waste from inside organizations (hypermarket, charities, bakeries) and from outside (media news articles), documents from different organizations (hypermarket, bakeries, charities, Evira, a stable owner), documenting things (observations), real-time practice (e.g., observations, go-along method) and discussions (e.g., interviews).

In addition to generating multiple data, I also used multiple ways of recording them. This was done in order to identify different perspectives and aspects from the data. The data generated via the go-along method was recorded in field notes and on photos. Further, field notes, photos, tapes and naturally accruing data (e.g., news articles, documents) highlighted different perspectives and different actors. As the researcher follows the actors, so grows the amount of data. At the same time, the researcher gains more and more of an insider’s point of view, i.e., an emic perspective to the phenomenon. Next, I will offer short descriptions of the specific research processes and data generated in order to discover the relations and non-human actors in food waste.

## 4.2 Building a networked view

As I began my methodological quest, I sought to pay attention to all actors that took part in the process of food turning into waste. Thus, while I followed different actors in the bread and bakery section of a hypermarket, I constantly searched for the points where food turned into waste and the actors related to this process. As already noted, shadowing did not concentrate exclusively on employees; rather, attention was paid to the numerous actors that appeared in the food waste

network: customers, apparatus and technology, products and packaging, shelves and layout, natural and temporal actors.

In order to observe and follow the different actors in the food waste network, I used several techniques or starting points. Compared to walking and talking humans, the challenge in following the non-human was in recognizing where to look and what to follow. Here, I believed that following and holding discussions with employees were means to connect to the non-human elements, such as when an employee used (or did not use) a portable device, known as a Handytec, for ordering and following up on stock. I then started to realize the relations from the perspective of the non-human. Thus, I observed the relationships between human and non-human actors from the viewpoint of the non-human. Finally, it was also easier to shift the focus from human/non-human relations to connections between non-human elements.

I was also inspired by Kopytoff's (1986) cultural biography of things; and, based on that, I tracked and followed the focal object of bread and its packaging: the item as it entered the store in a trolley, how the trolley was moved inside the bread and bakery section, how the bread was put in its place on a shelf, how the bread was grabbed by customers, how the expiry date became nearer (or no expiry date existed), how a red (reduced sale) sticker was placed on the package, how the bread was placed at top of the pile (or got buried underneath), and how the bread was picked up by a consumer to be bought or by an employee to be thrown into the waste trolley. Here, similar to following humans, I paid attention not only to the initial actor, in this case, bread and its packaging, but also to the related actors that became connected to the network, and then followed them again. This way, the network grew which turned my attention towards new actors, human and non-human, that could be followed. Further, I used clues and hints about what to note from prior research. The literature on food waste has pointed out, for example, the role of expiry dates, which were of interest to me when I entered the site. What I also did was that read and reread my data on food/waste, trying to focus on new elements and actors, and following the actors to new data, to news articles, to reports or to whatever data that seemed connected.

To overcome the far/close bias of 'the shorter the distance, the stronger the relation', I followed the actors outside the hypermarket. Further, instead of making a hasty association between distance and relation, I focused on connections. A case in point was when an employee, working with bread and bakery products, did not change an order since the Handytec portable ordering device was not within his reach. As I observed the situation, it became apparent that employees had copious shelving and other mandatory tasks to perform and thus hardly any time to even

think about adjusting orders. Further, in the observed bread and bakery section, there was only one Handytec in use that gave employees access to information on orders and sales. It was also commonplace for more than one employee to be working in the section at any given time. Thus, though a Handytec device might be near, proximity does not guarantee use. Without the careful observation of different actors, I might not have recognized that a nearby Handytec was not enough to assure a connection, thus contributing to food waste if excess orders are left unchanged.

### 4.3 Analysing relations (and actors)

It is impossible to separate the analysis from the data generation. Rather, the knowledge and analysis are co-created and co-constructed by different participating actors during the research process. As described above, the ANT approach involves a flat ontology, where symmetry and agency give structure and direction to data generation, while the focus of the analysis is on heterogeneous actors and relations. Keeping this in mind, I will next concentrate on describing how I arrived at a coherent and systemic analysis of food waste in a retail setting.

Since the first observations and go-along interviews were conducted in 2014 and the last in 2017, the data generation continued for a long time, while different analytical processes were carried out and research paper drafts written during the process. Though ANT guided the data generation, I was interested in both ANT and practice theory; and, in the initial analysis, I concentrated on food waste-producing practices. Thus, I was well familiarized with the research materials before starting the ANT analyses for the enclosed articles.

The data analysis included inductive organizing and sorting of the data, following the phases of categorization, comparison, dimensionalization, abstraction and iteration (Spiggle 1994). First, together with a close and repeated reading of the research materials, I started to identify and look for moments or passages in the text that were somehow related to food turning into waste. These moments were categorized as points where food becomes waste, as well as moments related to this process. Further, as the data generation proceeded and I followed the food waste network to a charity setting, the fuzzy boundary between food and waste became more apparent. It led me to ask not only how food turns into waste, but also how food waste turns back into food. Thus, in the analysis phase, I also concentrated on the points of food waste turning back to food again. Once the points of translation were conceived and the related excerpts listed, the categorization continued by tracing and identifying related, participating actors



(dimensionalization). While the analysis of interviews and field notes was carried out across numerous Word documents, the qualitative data analysis software NVivo was used for analysing the news articles. This allowed for a more nuanced categorization and organization of the data, while the process was otherwise similar.

In order to systemically analyse heterogeneous actors and their relations, I searched for different non-human elements from the data, exemplified by the following quote from the field notes, where an employee tried to use the Handytec portable device to ordering and follow up on stock:

“There are still too many brand A’s breads left to be sold, and the same was mentioned [by an employee] yesterday. Handytec [portable ordering device] indicates that there are still more to come, but John cannot use Handytec to reduce the order, not permanently or just for tomorrow. Instead, he would have to decrease the order from the desktop computer that is located in the office. Then the problem is, of course, that John is not the primary user of the office computer, but Cynthia is. So, he can’t change the order right after he sees the need to do so. Placing a new order via Handytec would be possible, [but since this is not what is wanted] John does nothing.” (Field notes)

In the above description, John is enabled to reduce the order via Handytec. The short excerpt reveals how the non-human also takes part in producing waste. Thus, while reading the field notes and other data, I tried to observe the relationships between human and non-human actors and focus on the viewpoint of the non-human. In turn, it was easier to shift the focus from human/non-human relations to connections between non-human elements. Further, to capture the multitude of actors, I focused on actors that were missing or not present. In the above excerpt, in order to decrease the order, John needs to use the desktop computer that is in the office, but this is not an option for John as he does not have the right to use it. Though not desperately remote (in terms of distance), the missing user rights mean that the computer is not connected to the network, leading to an arrangement of multiple actors that ends up producing food waste. Following this example, I paid attention to those actors that were missing or things that could have changed the trajectories or practices if they had been connected.

Articles 1 and 2 were premised on two different perspectives on food waste, i.e., considering the food waste network from the perspectives of different actors and actor sets. I will next describe the analysis process in these two articles.



In the first article, co-authored with Anu Norrgrann, we analyse retail food waste through the concept of retail gluttony. By retail gluttony, we refer to the role of grocery stores in not only shaping consumption by evoking desire, but also creating structural consumption problems by producing waste. Looking at food waste through the concept of gluttony therefore gave us a novel perspective on this phenomenon. In the analysis, we concentrated on the retail environment. Here, the photos we took were helpful in analysing the environment in more detail. Figures 6 and 7 show the environment under analysis and showcase the abundance of products in the bread and bakery section, as well as the resulting “waste”, i.e., bread that is thrown away by retailers and distributed by charity to those in need.



**Figure 5.** Abundance of bread in a retail store (researcher’s photo)



**Figure 6.** Abundance of bread in charity food bank (researcher’s photo)

Taken together, the pictures give a visual indication of how large amounts and a vast assortment of bread turn into the largest proportion of food that is handed out by food assistance charity workers. The large amounts of bread waste were also depicted elsewhere in the data, such as in the interviews and news articles. This

way, the analysis was premised on a constant dialogue with the rich and manifold research materials.

Further, an analysis of different actors, such as surroundings, displays, atmospheric tools and activities deployed to tempt customers, was needed in order to sort the actor-networks at play in retail gluttony. The analysis involved numerous iterations between networks and actors so as to identify the themes that construct retail gluttony in the messy relations among heterogeneous actors.

Stemming from this work, I wanted to discover more explicitly the phenomenon of food turning into waste and the actors taking part in that process. Thus, in the second article, co-authored with Hanna Leipämaa-Leskinen and Henna Syrjälä, we focused on the food waste network from the perspective of non-human actors. The analysis was based on tracing, identifying and categorizing the heterogeneous actors involved in the process of food turning to waste, and waste turning back to food again. Further, we searched the data for the moments where food waste was somehow prevented. In order to capture the heterogeneous actors and their relations, we zoomed in and out of the descriptions in the field diaries, such as in the form of employee talk and observations. While the analysis was informed by the work of the first author, the preliminary coding and interpretations were discussed jointly by all of us to reach a consensus about the findings. After this, I continued to analyse the identified actors in more detail, comparing them with one another, and ending up with three identified sets of non-human actors: the focal object, the natural-temporal actors and the techno-material actors.

During the process, we had to partly rewrite the article in order to clarify our focus on the retail food waste network from the perspective of non-human actors, thus demonstrating and analysing how non-human actors *participate* in the production and/or reduction of food waste in a network of actor relations. To underline distributed agency, we first showed how different human and non-human actors participate in retail food waste production/reduction, and then described the network from the chosen perspectives of identified non-human actors. The process was far from straightforward but, in the end, it produced meaningful results.

The research adopted the ANT approach, but as we focused on the food/waste boundary and the production and/or reduction of food waste, the research was more closely attached to practices. In fact, the peer reviewers suggested that we write the article from the perspective of practices, and discuss the human and non-human participants involved in them. Thus, this research article prompted greater interest in and provided new insights about the attempt to bridge ANT and practice research.

Hence, Article 2, compared to Article 1, offers another perspective on ANT research and how it comes close to practice research. The food waste network, which we describe from the perspective of the identified sets of non-human actors, could also be described as the practice of the network or the practice which comes about through the movements of the actors in the network. The food waste network in the retail setting is defined as an emerging and changing arrangement of heterogeneous actors that produce and/or reduce food waste, which unfolds within practices carried out in the retail context: put another way, actor-networks unfold within practices. This appropriately leads us to the original idea and starting point of the research, presented in the conceptual article written in 2014, which is attached here as the concluding article of the thesis.

#### 4.4 Becoming sensitized to dualisms and reproduced categorizations

*A priori* ontological distinctions and categorizations of actors were resisted in all phases of the research process: data generation, following actors, describing the actor-network and writing up the analysis. Further, it was important to be attentive to possible black boxes – building research on black-boxed, taken-for-granted actors or unravelled ideas (Latour 1999b; Bettany 2009). Thus, in order to get rid of black boxes, I zoomed in and out of actors during the data generation and analysis stages. For example, when identifying a possible actor involved in food waste, I sought to look at the food waste network from the perspective of not only that actor, but also related actors. On the other hand, I also decided to break down possible actors into pieces, following the logic of every actor that in itself constitutes an actor-network. For example, in this study on food waste, the focal actor is part of an actor-network of bread and its packaging; more precisely, the packaging includes (or does not include) the best-before date, or it can be torn or other ways damaged, have a sales sticker attached, and so on.

In order to focus my work symmetrically and not to concentrate too much on what people are saying and the problems that people bring about (Law & Singleton 2013: 495), I chose to use various methodologies that direct attention at non-humans. Prior to the fieldwork, I visualized the process of following non-humans and how data generation could be performed. At the site, focusing on others was an active exercise and involved me constantly reminding myself to focus on “things”, non-humans. This included techniques such as following employees as a way to connect with non-human elements, tracking and following the focal object of bread and its packaging, and finding clues about what to take into account from prior food waste research, as already described (see 4.2 Building a networked view). While the ANT

account should be symmetrical and flat, I was not afraid of trying to concentrate on the non-human, since, as a human researcher undertaking my first ANT-based research, I was more concerned that I would not be able to pay sufficient attention to non-human actors. In addition to a focus on non-humans, I used multiple forms data to widen the perspective.

During this research process, I read, reread and analysed, on numerous occasions, the initial data collected in the hypermarket. These data also formed the basis of Articles 1 and 2. Since I had written other drafts based partly on the same analysis process, but also on analytically other perspectives, I was forced to look at the same data from different perspectives and in relation to different ideas. This process, as well as discussions with the co-authors, helped to both open up new directions and become sensitized to different aspects of the data. I became more aware of preordained, reproduced or dualistic categorizations (Cochoy 2008; Firat & Dholakia 2006). Further, the comments received during the peer review process were helpful in achieving symmetry. Thus, looking for new perspectives and angles about the same things, while engaging others to read what we had written, was helpful in questioning and getting rid of pre-established assumptions.

#### 4.5 If everything is networked, what is enough?

In an actor-network, everything is related and the actors can be followed endlessly. However, the research has to stop somewhere. A highly pragmatic approach to this was to work within the word limit. In this thesis, the initial plan was to write a book that would offer more space for an elaborative analysis; however, the book turned out to be three articles that were written according to strict word limits. As my research materials gave me the opportunity to zoom in on the actors involved in food waste in the retail setting and to develop a rich understanding of different actors, I immediately directed my focus here. However, it would have also been possible to zoom out and focus on retail food waste from the point of view of other actors, such as food charities. In the end, I simply chose to limit myself to a restricted perspective of the network.

However, the rich and varied materials I generated were still valuable and mostly critical in pursuing a developed understanding and analysis. This also helped me to build a more encompassing understanding than what would have been possible if the description of the food/waste boundary was limited to the observations and interviews carried out in a hypermarket/supermarket unit. Thus, in order to carry out the research, good background knowledge, which facilitates the production of a more encompassing, symmetrical and supported analysis, making triangulation



possible, is needed. In other words, I have generated rich data on the network, while the articles and analysis focus on certain aspects of that network. However, I could not have focused on this perspective well enough if my picture of the network had been insufficient.

## 4.6 Writing the description

The multiple data made writing the description a challenging exercise, in terms of where to start, how to proceed, and how to make sense of “the figure and the ground”? Since a network is messy in terms of its connections, not everything can be described; thus, a strict focus was needed. In the research process, choosing the perspective of gluttony for Article 1 and by focusing on non-human actors in Article 2 helped to narrow down the research. These choices provided the perspective and focal point for the research description. However, this did not simply mean a blind description based solely on these entities, but a description of the food waste network starting out from these entities, while highlighting and building on the relational character of the network. As Law and Singleton (2013: 490) suggest, what is spelled out should aim to reflect the world and the way in which it is unfolding and uncertain. For example, as agency is always distributed, in Article 2, we were careful not to treat non-human actors as the sole enactors of food waste. Though the focus of the research was on a certain perspective on food waste, it offered only a window or a lens through which the relational agency of the network was revised.

While we wrote the first versions of the article, we received comments about being careful with our focus on the non-human actors of food waste. ANT’s flat ontology means that all actors should be treated equally, with symmetry, rather than the focus being on non-humans. The perspective should always be on the network, with agency being distributed in that network. Thus, we were careful to write our paper so that it highlighted the food waste network and distributed agency from the perspective of the non-human actors in that network. In other words, we looked at the food waste network from the perspective of non-human actors.

## 4.7 Evaluating the quality of the research

Any research paper that claims to be scientific needs to be exposed to critical questioning in order to be regarded as science. Yet, scrutinizing the quality of qualitative research and an ANT paper is not straightforward. The traditional measures of reliability, validity and generalizability are measures developed for a positivist paradigm. However, qualitative research also needs to be shown to be

credible. First, I will describe and elaborate the research process. Second, I will assess the quality of the analysis. In the end, I focus on research ethics.

#### 4.7.1 My journey – outline of the research process

In qualitative research, “the researcher is the instrument” (Patton 2002: 14). This also forms the basis for the STS discipline, from which ANT has derived. The aim in STS is to study through practice how science is made, and how the practices of scientists produce outcomes. Thus, knowing is embodied, situated and embedded in research practices (Law & Singleton 2013: 486). In ANT terms, the researcher becomes part of the network she studies. This calls for reflexivity. Next, I will elaborate the research process as it happened.

When I started this thesis, food waste quickly became the empirical phenomenon of interest and the topic to be explored and analysed. Moving onto theoretical considerations, it took more time to decide on how to approach food waste. From the beginning, I was interested in ANT research. It seemed to be an interesting yet challenging, as well as a theoretically new, approach in consumption research. Thus, I continued to read research papers and books based on ANT, trying to make up my mind. At the same time, I started to review more papers on practice research.

Moreover, I was confronted by the premises of ANT: instead of focusing on meanings and meaning making, I was fascinated about how ANT was able to capture physical material, and widen the perspective from a local- or micro-scale event to a system view and, in turn, to an understanding of an entity. However, as I read papers on practice research, I found more and more similarities with ANT and practice theory. I increasingly wondered about the differences between these two theories and, on the other hand, about how they could be combined. With this in mind, I proceeded with my work and, in 2014, I published an article on the possibilities of combining these two theories (Article 3 in this thesis).

In 2015, I participated in the Consumer Culture Theorizing Doctoral School Seminar at Bilkent University, Ankara. As numerous distinguished and productive professors in the field took part in the event, I had the opportunity to present my work and ideas to them. In particular, I raised the question about the need for more profound discussion on the philosophical premises of practice- and ANT-based research, especially in the CCT community. I highlighted my concern about some of the theoretical and methodological questions which have been left as veiled and unanswered in many research papers. I was told that these questions have been answered between the lines and that I should read many more research papers to

be able to understand this. I thought the answer was absurd. Research should always be transparent and explicit, with the theoretical positioning clear, not a matter of speculation or analytically lazy argumentation. During the seminar, another professor told me that his academic peers had discussed the same issue as I had raised, i.e., about the similarities and dissimilarities between ANT and practice research, during a round-table session at a previous conference. Thus, convinced of my case, I continued my efforts to open up the black box and build a framework based on these two theories. My interest in these theories pushed me to follow the thing, bread in this case, in order to construct a complete picture of the network.

The empirical research process began with a discussion with a local hypermarket chain manager on the topic of the research, food waste, resulting in an agreement about collecting data from a local hypermarket. This hypermarket and its bread and bakery products section worked as an entry point to the food/waste network for bread.

The initial data generation took place in September 2014, including observations and interviews in the bread and bakery products section of a hypermarket belonging to a Finnish grocery store chain. Though ANT guided the data generation in the hypermarket, as I was interested in both ANT and practice theory, in the initial analysis, I concentrated on food waste-producing practices. Thus, I focused on identifying the practice elements of materials, meanings and doings related to the translation of food into waste (Shove, Pantzar & Watson 2012; Warde 2005). As I continued to follow bread and its numerous network connections outside the hypermarket, I started to analyse the data from an ANT perspective.

Of course, my aim to capture the “whole network” was, from the start, more of an ideal than a realist outcome. Instead, some framing would have to be done, and the research would have to concentrate on a certain part of the network. First, the intention was to write articles, then a monograph, as this would allow for a more detailed and wider description and analysis of the network than an article of average length. However, during the process of writing the monograph, I also began to write articles. As these articles proceeded and were accepted, and as funding for the research project began to approach its limits, I decided to proceed with an article-based thesis. Research-wise, I would have considered it more interesting and meaningful to produce a weightier and more comprehensive description of the network than the now-offered perspective, as presented in separate articles. Following Bettany (2015: 193), only a book would have captured the entire scope of this work, but this would have required more time. Research



work is of a political nature (Bettany 2007), and presenting the research in an article of approximately 6,000 to 9,000 words would be the norm. Thus, I will continue to describe how I proceeded with the articles, or book chapters, to be exact.

In the first empirical article, with my co-author Norrgrann, we strictly apply ANT at the empirical sites of bread and bakery sections in Finnish grocery stores. Our interest is on the empirical phenomenon of grocery stores not only in shaping consumption by evoking desire, but also in creating structural consumption problems by producing waste. While doing this, I am at the same time able to explore food waste from the perspective of multi-actor retail systems, conceiving a networked view on food waste. Based on our multimethod data from Finnish grocery stores, we produce three themes of allurements, abundance, and apposition. Thus, we are interested in the role of the surroundings, displays, atmospheric tools and the activities deployed to tempt customers. We reveal how the relations between the experiential, material and social aspects of the retail milieu produce food waste. In conclusion, a product that does not entice or is not in apposition to others becomes a rotten apple in grocery store, leading to an abundance of food that is discarded.

The first empirical article enabled me to learn about ANT-based research, building on the tenets of relationality, symmetry and distributed agency. However, in this article, the perspective is on retail gluttony, and I wanted to discover more explicitly the phenomenon of food turning into waste, i.e., the emergence of food waste.

In the second empirical article, we analyse how food can – or otherwise – turn into waste in a retail setting. More specifically, the purpose of the article is to identify and analyse how non-human actors participate in the production and/or reduction of food waste in a network of actor relations. Thus, we adopt the ANT approach in this paper; but, as we focus on the food/waste boundary and the production and/or reduction of food waste, the research is closely attached to practices. Hence, the paper, compared to Article 1, gives another perspective on ANT research and how it comes close to practice research. The food waste network in a retail setting is defined as the emerging and changing arrangement of heterogeneous actors that produce and/or reduce food waste, which unfolds within practices carried out in this context. In other words, actor-networks unfold within practices. This appropriately leads us to the original idea and starting point of the research, presented in the conceptual article written in 2014, which is attached here as the concluding article of the thesis.

Though the concluding article was written first in 2014, it puts up a sufficient defence of its place and the ideas presented. Nevertheless, the outcome is cultivated in the conclusions and discussion chapter of the thesis. In the end, I am able to answer the question I put to myself at the beginning of the thesis process ('what is the difference between ANT and practice research?'), while also being able to realize an informed understanding of food waste. However, leaving this discussion to the end of the book, I will next look more closely at the methodological choices made in the first two articles, drawing on the ideas of ANT.

#### 4.7.2 Quality of the analysis

After going through the research process, it is time to elaborate and evaluate the quality of the research. Spiggle (1994) has established criteria for evaluating the quality of research (analysis) in consumer studies. The criteria include usefulness, innovation, integration, resonance and adequacy. To assess the usefulness of the research, questions such as 'does the work help in furthering the inquiry into X?' and 'can the research results be applied or transferred to other research settings, contexts and domains?' are asked (ibid.: 500). To be useful, the research results should be relevant to other researchers. Recently, there has been a growing interest in research on food waste (in retailing). By considering food waste from the perspective of heterogeneous agency, and by examining the relations of practice- and ANT-based research, this work takes part in a timely discussion and enhances our understanding of the phenomenon. As research on food waste continues, the usefulness of this thesis will increase.

Innovation in research means that the work offers a new perspective on something and transforms our conceptualizations (Spiggle 1994: 501). Thus, research has to offer creative and new ways to look at the world. The present study is innovative in terms of discovering food waste in a retail setting by applying theoretical methodological constructs previously used in consumer research. Instead of analysing food waste management, the research is interested in the heterogeneous actors of food waste. It acknowledges and describes the role of non-human agency in food waste processes, thus offering a fresh approach in addressing retail food waste. Further, instead of the predominant method of in-depth interviewing in marketing and consumer research (Askegaard & Linnet 2011; Moisander, Valtonen & Hirsto 2009), this work is based on multimethod ethnographic materials, including observations and naturally occurring data. Thus, rather than asking people to comment upon reality (e.g., knowledge of reality), the research seeks to directly access what happens in the world and to examine what happens

in real life. In the end, Article 3 elaborates on a conceptualization of ANT-based practice through an innovative combination of practice and ANT research.

Integration as a criterion means that the researcher is able to form a synthesis beyond the identification of common themes in the data (Spiggle 1994: 501). A unifying idea, concept or framework which integrates the research should be found. In this research, the core contributions are based on integration: identifying and describing the nature of food waste, and combining and integrating practice and ANT research. These contributions are also applicable to other similar (food waste in similar contexts) and even dissimilar ideas (the sociomaterial, practice-network approach in the case of dissimilar phenomena). Therefore, the research matches the criterion about the resonance of research, i.e., the research should be enlightening and evocative and enrich our understanding of identical, similar and even dissimilar phenomena (Spiggle 1994: 501).

The adequacy of research means that any interpretations are well grounded in the data and that the process must be made transparent so that the reader can trust in them (Spiggle 1994: 501). Thus, it is important to evaluate the research in the end, as well as constantly during the research process, i.e., while generating and analysing the data and writing the manuscript (Eriksson & Kovalainen 2016). To ensure this, I focused on spelling out and reporting the choices made during the research process. I have added an outline of the research process, describing it as it happened, i.e., the choices made and the sidetracks followed, to ensure transparency and knowledgeability of the process. This is especially important since, as stated above, there is no reified, separate, abstract and pre-existing ANT theory waiting to be applied. “ANT is created, recreated, explored and tinkered with in particular research practices” (Law & Singleton 2013: 485), and the researcher has to make her own decisions during the research process.

The interpretation of the data is grounded in multiple data sources, generated using multiple methods and various methods of analysis, thus contributing to the richness and depth of the description and analytical findings, e.g., triangulation. This enabled me to approach the food waste network from numerous perspectives and viewpoints, adding to the overall understanding of the phenomenon.

A multimethod approach (Arsel & Bean 2013) was used, since relying exclusively on interviews would have placed too much emphasis on how humans see their actions and what they do. At-site observations gave me the possibility of focusing on things and spaces. In addition, using multiple ways of data recording – tapes, photos, field notes and transcripts – helped to realize different aspects from the data. Different sources of data were used to complement each other and to verify or clarify what one source had stated in order to reach a valid description. In terms

of various methods of analysis, the pre-analysis based on practice theory and the differing perspectives on food waste in Articles 1 and 2 enriched the overall understanding of food waste.

Further, interpretation was offered following a long research process and engagement with the research data, together with numerous analysis rounds from different perspectives (practice, ANT, relations, actors). Data excerpts and pictures have been included in the thesis to illustrate the link between the research materials, description and analysis.

The research is not easily generalizable, though this was never the goal in the first place. However, while the data were generated at the research sites, developing an understanding of the related actors and practices in large retailers' business practices, such as stock management and marketing, are well standardized. Thus, it can be assumed that the description and evidence from this research will offer valuable insights to other retailers and more generally to those fighting to reduce food waste.

#### 4.7.3 Research ethics

All research involves questions on ethics, just as any form of human activity always involves questions about what is moral. This research, involving vulnerable groups and sensitive subjects, as well as applying the go-along method and undertaking participant observations of breadlines, necessitated the appropriate consideration of the ethical implications. However, research ethics are not only related to questions concerning access to ethnographic materials, but the whole research process, starting from the relationship between the researcher and the research objects and ending with writing up and publishing the research report (Eriksson & Kovalainen 2016).

At-site research and observation involve not only the researcher, but other people and spaces with a certain amount of privacy that need to be accessed. Firstly, permission to undertake research in the hypermarket was first asked for and negotiated with the retail chain management, then with the local store-level employees. Secondly, I strived to meet representatives/management of the relevant charities and agree beforehand about my participation on breadlines. If this was not possible, I went to the site in good time before food was handed out in order to introduce myself and my work and to ask for permission to participate as a researcher. The charity organizations were mostly approving; and, once I received initial permission, I was invited to participate whenever I wanted, including in other breadlines operated by the organizers. However, as these charity

organization typically ran several breadlines at different sites and had numerous volunteers on their lists, the volunteers at each site and at each time were always at least partially different. Thus, while I asked for permission to carry out data generation beforehand from these charities, at new sites and before new volunteers I always introduced myself.

Since taking part in a research was a new experience for many, I found it important to give people adequate information on their right to remain anonymous, but at the same time to explain how the research process works and how the data will be used. Further, in the meeting with different actors from the social sector, I made it clear that any potential or actual participants' names or upcoming cases would be treated with sensitivity and anonymously. In addition, in cases where participants wanted to discuss something that was too sensitive for consideration as research material, I asked for this to be brought to my attention. Extra caution was taken, since the multisectoral meeting was arranged not only to discuss food waste, but multifaceted social problems and solutions to the problems faced by the socially disadvantaged. The aim here was both to be sensitive and to build trust and encourage people to be open.

Related to interviewing and participating on breadlines, I had to consider my role as a researcher and knowledge producer and the possibilities that my research might cause harm to the participating individuals and organizations. While the breadlines I visited were open to all members of the public, the anonymity of participants was assured.

Research is always political (Moisander & Valtonen 2006: 151), and it was important for me as a researcher to reflect on my role in society and the possible implications of that for my research. In my case, the focus on food waste in retailing could be considered as sensitive and problematic in relation to the participating organizations, in the sense that admitting to and exposing food waste could have negative associations related to unsustainability. I found this concern to dominate my initial meetings with the retail manager. Acknowledging the sensitivity of the subject, I stressed my role as a researcher would be to enhance knowledge of the current situation concerning food waste, which in turn might be helpful for the company in relation to managing it. However, it must be pointed out that no kind of sponsorship arrangement was made between the researcher and the hypermarket. To protect the company, it was agreed that its name would not appear in the study.

Ethical considerations should also be taken into account in relation to the research process. The research process from beginning to the end should be founded on ethical research practices (Moisander & Valtonen 2006). The reader of the

research needs to be well connected to its research network, since truth is negotiated according to the amount and quality of nodes: detailed reporting makes the research process transparent and open to judgement. In the interests of greater transparency and professional integrity, two of the research articles have been co-authored, thus the work presented here has been opened up to the senior researchers who have participated in the process. Further, though Articles 1 and 2 are mostly based on my own work, I am thankful to the co-authors for their impact on the research. In addition, it must be noted that all the articles have been published and undergone a blind review process.

Contexts vary, and there are no absolute and specific rules for how to carry out ethical research, except for aiming to act reflexively and in an ethically acceptable manner, while taking into account the goals of the research, the context and the values and interests of the people involved (Hammersley & Atkinson 1995: 285). I have tried to work according to these standards throughout the process.

## 5 DISCUSSION AND CONCLUSIONS

This chapter begins by assessing the four RQs, followed by a discussion on the theoretical, methodological and contextual contributions. Further, societal implications are discussed. To conclude, suggestions for future research are offered.

### 5.1 Assessing the research question

The thesis set out to *develop a systemic perspective on the network of food turning into waste in a retail setting*. The research is built on four RQs:

1. What is the current understanding of food waste in the consumer society?
2. How does food turn into waste in a retail setting?
  - a) How food turns into waste in actor relations?
  - b) What is the role played by non-human actors in food waste formation?
3. What is the nature of food waste?
4. How to trace the network of relations in ANT research?
  - a) How to proceed in ANT research?
  - b) How to specify practices in ANT research?

The first RQ, on the *current understanding about food waste in consumer society*, was approached by carrying out a literature review. Based on this, three pitfalls in previous research on food waste were identified. Firstly, research on food waste has mostly concentrated on measuring the amount of food waste or on managerial perceptions or other interview-related data. Thus, this research builds on a qualitative understanding of food waste in a retail setting, based on various research methodologies and rich ethnographic materials. Secondly, research on food waste has been more focused on the treatment of food waste than on analysing how food becomes waste as well as solutions for waste prevention. Thus, the second RQ deals with *how food turns into waste in a retail setting*, revealing how food can – or otherwise – turn into waste. Thirdly, a need to shift the focus from separate phases or actors in the food chain to a holistic understanding of food waste in the food network is revealed. To achieve this, the research centres on the heterogeneous actors and actor relations in the network of food waste and suggests a practice-network approach to enable a more holistic perspective on food waste.

The second RQ, on *how food turns into waste in a retail setting*, is answered in Articles 1 and 2, using empirical research. Adopting the ANT perspective, the articles analyse how food turns into waste in retail stores. The data are based on



rich ethnographic materials, following the case of bread and bakery products. Stemming from these premises, the articles pursue different entry points to the food waste network. Article 1 analyses food waste via the concept of retail gluttony, a situated, multi-actor, and system-level form of overconsumption. In more detail, the three actor-networks of abundance, allurements and apposition, which play a role in food turning into waste, were identified and analysed. The research reveals how the retail setting as a material–sensory environment takes part in and perpetrates gluttony, creating a need to balance desirability and waste.

Article 2 analyses distributed agency in food waste by zooming in on and analysing the role of non-human actors in the food waste network. In more detail, three sets of non-human actors are identified – the focal object, the natural-temporal actors and the techno-material actors – whose interconnections with other human and non-human actors were analysed. The article shows how food waste in retailing is not merely a human-led process which can be solved at the aggregate level, but a dispersed and complex issue that needs an analysis of the operational reality in the store environment.

Together, Articles 1 and 2 extend the extant literature by depicting the distributed agency and relational character of food/waste and augmenting an understanding of the different human and non-human actors that take part in this context.

The third RQ asks: *what is the nature of food waste?* Based on the results from the two above-presented articles and the literature review in Chapter 2, a discussion on the concept of food waste is offered in the contributions section.

The fourth and last RQ is: *how to trace the network of relations in ANT research?* The RQ is divided into two subquestions. The first subquestion, *on how to proceed in ANT research*, is answered by developing a set of principles for carrying out ANT research, which is outlined in Chapter 3 and applied to the data generation and analysis in Chapter 4.

The second subquestion concerns *how to specify practices in ANT research*. While ANT research is able to uncover new aspects of food waste, Article 3 seeks to ask how theory could be developed in relation to practice research, to enable a more holistic perspective on food waste. Thus, in the third, theory-building article, an ANT approach to practice research is suggested. Firstly, the ANT conception of agency helps us to direct attention away from the human practitioner and onto the non-human actors that take part in practices. Secondly, conceptualizing practice through the concept of actor-networks enables us to shift the focus from local social practices to a wider network of relations. Thirdly, adopting the ANT guideline about “following the actor” can help to embed practices in surrounding

networks, i.e., the context of context. As a result, a sociomaterial practice-network approach, as a procedure for conducting research, is developed and advocated. Next, the theoretical contribution of the research is discussed and societal implications presented.

## 5.2 Theoretical and methodological contribution

Scientific research can contribute to three domains: theory, methodology and the empirical world, the context. Research at the intersection of these three interwoven domains is the most likely to produce a strong contribution; but, as Ladik and Stewart (2008) remind us, most research makes a significant contribution in one or two domains. In this study, the theoretical and methodological domains are the strongest, but without forgetting a contextual contribution.

According to MacInnis (2011), the research contribution can be related to the processes of discovery or to the process of justification. A contribution to discovery refers to the process of identifying something new, providing a new perspective and obtaining more detailed knowledge, in order to differentiate or to advocate by endorsing a way of seeing. Justification, on the other hand, entails revising, summarizing, integrating or refuting previous knowledge or a way of seeing. The contribution of this research relates more to the process of discovery than to the process of justification. In more detail, the above perspectives form the basis of the typology of contributions in marketing proposed by MacInnis (2011), which is used for assessing the conceptual contribution of the research. Based on the framework, this research produces four kinds of conceptual contribution.

Firstly, the research contributes by envisioning and, more specifically, by identifying the role of non-humans in retail food waste, thus offering new perspectives on the reasons behind retail food waste and making us aware of the role of those non-human actors we have overlooked. This was achieved in Articles 1 and 2.

Secondly, the research contributes by delineating, describing and depicting food waste as a relational entity which is formed within a network of heterogeneous human and non-human actors. In Articles 1 and 2, a firmer foundation for food waste in a retail setting is gained by mapping its relationship to heterogeneous actors, human and non-human. Based on the research, the thesis is able to describe and analyse the nature of food waste, thus fostering conceptual clarity.

Thirdly, the research debates and advocates a set of principles for carrying out ANT research, and a sociomaterial practice-network approach as a procedure for conducting research and opening up new avenues in practice research. This study thus works as a compass by suggesting an appropriate path for future research. This contribution can be distinguished on the basis of its strictly conceptual nature, i.e., the advancement of research in marketing. Next, the theoretical contribution of the study is discussed.

### 5.2.1 Concept of food waste

In order to undertake research on food waste, there must be some sort of understanding about the nature of food waste. This is of importance, since constructs are the building blocks of knowledge. Analysing and identifying the nature of food waste not only enhance our understanding on food waste, but also allow academics and practitioners to categorize situations based on that knowledge. The more that practitioners can understand what food waste is, the more effectively they can seek out ways to reduce it (MacInnis 2011). Based on the literature review presented in Chapter 2, as well as the rich ethnographic data and the results from the two empirical articles, the concept of food waste is now further elaborated, answering the last RQ about *the nature of food waste*.

The thesis began by outlining previous conceptualizations of food waste. The heterogeneity of concepts (e.g., food waste, food loss, surplus food) and the diversity of given meanings and categorizations (e.g., unavoidable and avoidable, planned and unplanned, post-harvest, not consumed or not recovered, relating to consumers' or retailers' behaviour, what is fit for consumption) highlight the numerous perspectives that have been applied to measure and analyse food waste. In order to start building on these definitions, the empirical quest in this research began by following food that is not sold or that is thrown away by retailers or manufacturers. However, following the ANT approach, the research quickly proceeded to an inductive stage by following the actors without strict, ready-made categorizations.

Based on the ethnographic materials, instead of a linear process of food turning into waste, we find that it is circular. Instead of being definite, the boundaries are blurry while food waste is conceptually fluid and dynamic.

The present study highlights how this fluidity is organized within heterogeneous actor relations, with food waste being a matter of its network, involving multiple and constantly moving relations of interconnected actors. Consequently, these constantly changing connections make it challenging to trace the exact points

where a particular food item turns into waste. Examples include when bread is considered as waste because of having damaged packaging, even though it could still be offered to employees to buy, or when bread reaches its best-before date and is thrown away by the retail store – only to be picked up by a charity organization which will then distribute the products to their clients. Distributed agency and changing actor relations can turn food waste back to food again. One illustration is offered in Article 2 (Alhonnoro, Leipämaa-Leskinen & Syrjälä 2020), where the initiative of an employee ends up saving a bread product with damaged packaging from being thrown away:

“One of the plastic bags has opened. John notices it and walks to the bakery area to close it with an adhesive tape.” (Field notes)

Most of the bread and bakery products that were thrown away in the retail setting were still suitable for consumption, and were also consumed or used for another purpose than simply being thrown away and ending up as waste. Thus, food turning into waste is not only a gradual, step-by-step process, but also an ambivalent, cyclical process, where the previously death-sentenced can re-enter the stage.

In order to clarify what is meant by food waste, Garrone et al. (2014) make a difference between food waste and surplus food, defining surplus food as safe food which, for one reason or another, is not sold to or consumed by the intended customer, while food waste is surplus food that is not used for feeding people. However, this kind of classification can only be used when the outcome (i.e., has the food been consumed or not?) is known. This is problematic, since it does not help us to act beforehand to reduce the amount food waste. Thus, in order to enable reductions in food waste, concepts that allow us to see different pathways and endpoints for food/waste are needed. The term “surplus food” in itself could be used, but it is necessary to describe food that is not used for its initial purpose rather than define its future. Besides surplus food, the term “potential food waste” could be used in bringing out the potential of the food (waste) (Alhonnoro, Leipämaa-Leskinen & Syrjälä 2020; Mattila et al. 2018).

The above discussion highlights the role of words – in this case, the role of the concepts used – in defining food (waste). At the heart of ANT, there are not only things and apparatus, but also all the actors involved, including semiotics. Though not materials in the most obvious sense, like a car or a piece of bread, letters, words, phrases, narratives and symbols and other types of verbal classifications, which are spelled on paper or pronounced by movements of the mouth, give meaning, produce verbal stigma and involve actor positions. They are the result of various kinds of actors in a circulating entity, an actor-network. Food or waste is

negotiated in relation to numerous heterogeneous actors in the food waste network. Here, semiotics, such as concepts used for food waste (e.g., potential food waste, surplus food, food waste), can become meaningful actors that can accelerate the process of food turning into waste, or even condemn food as waste, though other possibilities could be available. We recognize and categorize things on the basis of words. The value of things relies not only on material shapes and forms, but also on the words that give them value. Using concepts such as surplus or excess food is one way to translate food waste back to food. The definition of food waste is therefore, in itself, an actor in the network of food waste.

One of the aims set for the research was to discover the role of non-human actors in food waste formation in a retail setting. The reasons behind food waste have previously been linked to the definition of the concept. Parfitt et al. (2010) define retail food waste as something that applies and relates to behavioural issues at the retail and consumption stages. These authors (ibid.) do not explain what they mean by “behavioural issues”, but the proposition is close to Teller et al.’s (2018, p. 994) emphasis of the role of humans in the execution of food waste in in-store logistics, or Gruber et al.’s (2016) notion about studying “the human reality of food waste”. Defining food waste as a behavioural issue is in stark contrast to the research results of this thesis which underline distributed agency and the contributing role of heterogeneous non-human actors, such as things, technology, and natural-temporal actors, to the food waste problem. Our analysis highlights that food waste reduction is not only a question of human execution; rather, it is about considering and adjusting the roles of both the human and the non-human actors that take part in producing and/or reducing food waste.

While Parfitt et al. (2010) conclude that food waste in retailing generally relates to behavioural issues, at the same time, they acknowledge the role of infrastructure in post-harvest food waste. Based on the research results here, it can be claimed that the role of spatiality, the retail store environment, along with that of other non-human actors, is of importance in conceptualizing food waste. One perspective is offered in Article 1 (Alhonnoro & Norrgrann 2018) on retail gluttony, which shows how food becomes waste in apposition to other food products. In *Purity and Danger*, Mary Douglas (1984 [1966]) defines dirt, if not a matter of pathogenicity or hygiene, as a “matter out of place”. Here, food items that are not in apposition to others are a “matter out of place”. This is important, since it once again highlights how food waste is not necessarily something that is unfit for consumption; rather, it could still be sold or used in other ways, if appropriate action is taken in time. Thus, while all food is potential food waste, in order to reduce food waste, it might be useful to categorize and thus label food on the basis of its risk of becoming waste.

However, while non-humans participate in the food waste network, so do humans. One perspective is offered in Article 1 (Alhonnoro & Norrgrann 2018: 91), which demonstrates how food becomes waste in apposition to other food products: “My husband invariably teases me, because I always grab — and I know my friend does the same — my bread from underneath, from the undermost basket”; others agree: “Of course!” and “They always put the fresh breads behind and underneath” (focus group discussion).

In the excerpt, the best-possible bread product is selected while unpersuasive or unwanted products are left on the shelves and racks to become “food waste” if nothing is done. Imperfect products are seen as unacceptable in the retail food paradise. While consumers are eager to pick the best products, non-humans also have a role.

In the end, the research has highlighted the fluid nature of the food waste network. The distinction between food and waste is not straightforward and, in accordance with Mattila et al. (2018), the concept of food waste is negotiable. Not only does food turn into waste, but waste also turns into food. Instead of being a linear and gradual process of degradation, in the process of food/waste, boundaries are crossed and food/waste can be re-evaluated and redefined.

### 5.2.2 Flattening the network

The current research responds to the calls to flatten hierarchies and open up heterogeneous networks in marketing and consumption research (see Chapter 3.1.3). This is achieved by methodological decisions and in the analysis.

First, the study contributes to earlier ANT-based marketing and consumption research by suggesting and advocating principles for practising ANT research. Previous research built on ANT has been based on the simple guideline about following the actor. Further, ANT methodology has been compared to ethnomethodology (Latour 1999: 19-20), but hardly any other instructions about how to carry out ANT research have been given. This study has elaborated a synthesis of previous advice and a description of the methodological choices used for following heterogeneous actors, in order to arrive at a symmetrical description and overcome hierarchies. Though ANT is a highly crude method by definition (*ibid.*), it is of great importance to discuss how to carry out research and make the procedures transparent. The principles for practicing ANT research are a means to clarify and give direction to future ANT research.



Flattening hierarchies is a question of methodology and of analysis and writing up the description. Article 2 is able to demonstrate distributed agency from different actor perspectives. While the non-human actors involved in food waste are the focus of the article, at the same time, we are able to point out the networked relations and the participating humans. Thus, a description and an analysis of the food waste network are produced without excluding humans or establishing order relations.

### 5.2.3 Sociomaterial practice-network

By bridging ANT and practice approach, this research debates and advocates (MacInnis 2011) a sociomaterial practice-network approach as a procedure for conducting research. The early practice researchers developed social practices by focusing on symbolic and social aspects of practice. Since then, numerous researchers have emphasized the social and habitual aspects of practice. More recently, Halkier and Jensen (2011) extended the social approach by referring to social constructivist theory about practice, underlining the importance of conceptualizing more explicitly the role of social interaction in practice theory. These authors are analytically interested in the multiplicity of social categories and dynamics, and on the ways in which these are produced socially (*ibid.*). However, there also exists a more 'material' stream of practice research (Schatzki et al. 2005; Nicolini 2013; Warde 2014). These theories bring forward material artefacts and infrastructures. The current research has built on this stream of literature.

Though the role of material in practices has been acknowledged in marketing and consumption studies, the way that practice theory is mostly used is in terms of a social constructionist form, with an emphasis on social relations in constructing the world. The argument is based on the most commonly quoted practice literature by renowned practice theorists and conceptualizes practices by identifying individuals at the intersection of practice (Warde 2005: 143; Reckwitz 2002: 256). In a human-driven process, where artefacts and material products are present, their role is to be used, while practice is steered by humans' background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge. Thus, the underlying ontology and epistemology seem to favour human agency instead of a symmetrical one. Secondly, because of the human-centred descriptions of practice, research tends to focus on practitioners instead of practice, or on practice from practitioners' viewpoint. Thirdly, because published research articles are squeezed into a predefined format with a maximum word limit, the theory and methodology chapters have rather referred to other practice articles than made an effort to discuss theoretical postulations or theory



development. Thus, based on the recognized role of heterogeneous non-human actors in food waste, the aim of this thesis has also been to discuss the theoretical-methodological research framework and to make a contribution by bridging ANT and practice theory. As a result, a sociomaterial practice-network approach is offered (Alhonnoro 2014).

One of ANT's core propositions holds that action always necessitates the mobilization of multiple human and non-human entities (Callon & Muniesa 2005; Latour 2005). While material studies (Ilmonen 2004; Borgerson 2009) emphasize the role of materials, sometimes to the detriment of humans, ANT puts objects and humans at the same level, with no ontological distinctions. The actor-network is never predefined. As Epp and Price (2010: 821), referring to Miller (2005) and Preda (1999), note, "the objects and persons that constitute a particular network engage in joint processes of knowledge creation, responding to and affecting one another. Practice is an assemblage of multiple human and nonhuman actors becoming together and therefore we should not concentrate on tracking the movements 'performed' by human actors or object actors alone."

### 5.3 Contextual contribution

The research contributes to the sustainability of grocery retailing by extending our understanding of the emergence of food waste in a retail setting. Instead of being simply a behavioural issue and a question of human management (Teller et al. 2018), food waste is enacted within a network that connects both human and non-human actors. Thus, it is important to consider the role of food waste-related tools and other elements in the material-sensory environment (e.g., ordering devices, waste trolleys, products, brands, packaging, displays, layout and multisensory cues, such as labels and scents), and how they could be changed in order to reduce food waste. Hence, the efforts to reduce food waste must be communicated and put into practice at every level in the retail setting, not just in management speeches but also in ground-level practices, taking into consideration the various roles of non-human actors in producing and/or reducing food waste.

The previous chapter highlighted the fluid character of food waste. The research findings show that the label *food waste* is decisive, as food can become waste without the food item itself becoming inedible. Thus, in order to reduce food waste, it is important to understand and make a difference between food waste and potential food waste, unsold or unsaleable food. While inedible or spoiled food is not fit for human consumption, there is much more that could be done with edible food that is currently being treated as food waste. This means looking for new

possible pathways for foodstuffs now treated in this manner. However, in order to prevent food waste, this idea needs to be applied to practice. Besides food waste management, there is a need to *manage potential food waste*. While the research findings highlight how food waste could be prevented, there are also implications for managing unsaleable food waste.

Mould or any similar defects in food products were hardly found to be reasons why food was wasted. Rather, these reasons were often related to other actors in the food waste network: in the packaging, among the natural-temporal actors or techno-material actors, or in the actor-network of things and the abundance of food products. This is positive, since it gives more hope that food (waste) can be reclaimed. As food can become waste without it becoming inedible (as a result of a change in the actor network), similarly, a change in actor relations could enable food waste to be turned back into food. Therefore, compared to previous research that has emphasized the role of humans in food waste processes (Teller et al. 2018: 994), this study highlights that it is equally important to consider food waste-related tools and surroundings, including the marketing mix that could be adjusted in order to reduce food waste. Of course, this calls for the human management of food waste practices, as well as a careful analysis of the role of different actors (also non-human!), since changes in the retail setting can also help to reduce food waste, all of which can be more easily achieved than a change in what people do.

One case in point concerns bread, which despite being of good quality and saleable over a period of several days, consumers tend to look for fresh products. Products and their packaging are compared to each other on other grounds, and those that are not apposite – homogenous in relation to others – are often discarded. Two-day-old bread is considered less desirable than fresher bread. Instead of blaming consumers for making their selection in apposition, or seeking a change in consumer attitudes, increasing demand for products that are older and rejected more often could be achieved by changes in the surroundings and the marketing mix. For example, the pricing of products should be adjusted according to best-before dates. Prices could be adjusted on a daily basis and discounts made high enough to ensure everything is sold before the best-before date. However, this is not enough on its own, if discount prices are not visible enough and are left unnoticed. Pricing can be used in other situations where the food product is edible and saleable, but somehow defective. Rather than throwing it away, a bag of buns that is missing one item could be sold at a reduced price. As another example, the takeaway for retailers from Article 1 concerns balancing the range of alternatives, which, together with the pursuit of assuring good availability, can lead to a higher amount of food waste if not managed properly. Based on the research findings and experiences of the effects of augmented ranges, firms are encouraged and

instructed to downsize the collections of products. This might also lead to other gains, such as making the buying process more convenient for customers. At the same time, the retailer would profit by securing larger quantity discounts, which could in turn lead to reductions in sales prices (Paché 2007). Furthermore, as suggested in Article 2, the role(s) of seemingly mundane objects should be taken into account in the efforts to manage and reduce food waste in the retail setting. One example presented in Article 2 is the use of (large) waste trolleys that could normalize the emergence of (large amounts of) food waste in stores.

The matter of food waste should be tackled well in advance to minimize its potential occurrence, for example, when ordering. In Article 2 (Alhonnoro, Leipämaa-Leskinen & Syrjälä 2020), we suggest that weather forecasts, holidays, payday and statistical data on these actors should be integrated as background information when making bread-related orders, since these temporal-natural actors take part in the food waste network. Another possibility would be to reorganize the work schedule so that employees have more time to analyse the operating environment before making orders.

While it is important to develop technological solutions related to ordering, the role of techno-material actors in the retail setting, especially regarding food waste reduction, also needs to be critically assessed. Though technology has previously been linked primarily to reducing food waste (Giuseppe, Mario & Cinzia 2014; Silvennoinen et al. 2012), the current research suggests taking a more critical stance and evaluating the role of techno-material actors in this context. Based on the research findings, agency in the food waste network is distributed and relational. This means that food waste reduction cannot be based solely on technological improvements; rather, it necessitates incorporating technology in the food waste network. Technological solutions do not work on their own in a vacuum, but as part of the food waste network. Other actors such as employees and objects must be incorporated. This means educating users, in this case, employees, to spot problematic situations. Furthermore, users need to be provided with the means to act in alternative ways during their daily practices to encourage efforts to reduce food waste. One example presented in Article 2 involves offering a Handytec device to each and every employee in the bread and bakery section to enable appropriate ordering.

The efforts to tackle food waste must be communicated and put into practice at every level in the retail setting, not just in management speeches but also and especially in ground-level practices. This calls for acknowledging the multiple roles of the different actors mentioned above and the part played by the surroundings

and the marketing mix in causing and reducing food waste, and for adjusting or making changes to these actors.

Further, food waste management practices can be sought out from other food actors and in turn adjusted. In Article 2, we suggest that retailers could also engage in household revitalization practices to save food before it goes bad (Mattila et al., 2018). For example, if there are large amounts of unsold bread about to reach their best-before date, food waste could be avoided by freezing the bread before it expires.

In the end, though certain food items might be considered unsaleable in a retail outlet, they can still be edible and of value outside this setting. Thus, in order to avoid food waste, retail managers could investigate whether the food could still be used for consumption (e.g., charity) or for other purposes (e.g., energy production) following the waste hierarchy (European Commission's Directive 2008/98/EC on waste; Papargyropoulou et al. 2014).

## 5.4 Societal implications

Finding solutions to tackle food waste is an important and current discussion. Reducing food waste as a solution to fight climate change has been highlighted in recent years, with the specific role of the food system, including food waste, being addressed in the IPCC report on climate change and land, released in 2019. While most of the previous research on food waste has concentrated on measures and reasons behind food waste, this study has aimed to analyse the situation and find out how to reduce food waste in a retail setting.

In order to reduce food waste, it is necessary to understand what food waste is. Since the introduction of the waste hierarchy, interest in the circular economy has grown enormously in companies and administrations. This research clarifies the role of food waste in these discussions. Instead of treating food waste as an end-of-the-pipe phenomenon (Gregson & Crang 2010), understanding the fluid and circular character of food waste sheds light on possible different pathways for food, thus helping us to reduce food waste. The shift from managing food waste to managing potential food waste becomes possible. Further, recognizing the possibilities of food that is currently labelled as food waste could result in new business opportunities, not only for retail companies, but also for other firms, which could help in the process of reclaiming food.

Though the current research concentrates on retail food waste via the case of bread and bakery products, the solutions presented are, to some extent, transferable to

other food waste contexts. Thus, identifying the role of technological systems in other parts of the food network could yield new ways to reduce food waste.

In addition to the solutions for reducing food waste in food retailing, this research, inspired by ANT and practice perspectives, has paid attention to the inconspicuous actors involved in food waste: to mundane objects such as the waste trolley, to natural-temporal actors such as the weather and paydays, and to technology, such as ordering systems. Instead of being interested in what humans do, the research seeks to understand food waste from the perspective of numerous heterogeneous actors, seeking to find solutions for a systemic change. Instead of social change, the research highlights the means to reconstruct the structures and contexts of food waste.

Further, the introduced sociomaterial practice-network offers tools for investigating and analysing the move to a sustainable society and, more generally, societal change from a sociomaterial perspective. Thus, the research paves the way for a better understanding of and new solutions to achieve sustainable change.

## 5.5 Study limitations and future research suggestions

This thesis has contributed to the subject of food waste and to research theory and methodology. The suggestions for future research topics can be divided according to questions related to food waste and to research needs concerning ANT and practice-based research.

While the first two articles discuss and analyse how food turns into waste, they concentrate on the subject from certain viewpoints. In the current articles, the description is limited to the retail setting and the food waste network of bread and bakery products. Article 1 (Alhonnoro & Norrgrann 2018) has its focus on food waste from the perspective of gluttony, while Article 2 (Alhonnoro, Leipämaa-Leskinen & Syrjälä 2020) looks at this topic from the perspective of non-human actors. While the articles complement each other and shed light on new perspectives of food waste processes, they are at the same time limited to the chosen perspectives. Given the unfortunate limitation imposed by the word limit on research in the form of an article, the researcher must choose what is emphasized and what is left out. This is also constraining in terms of carrying ANT research, since the network and the description have had to be limited to certain actors in and perspectives on the network. To enable a more considered, all-encompassing discussion on the food waste network, a description and an analysis are needed on the parts of the network that have so far been left out or are not the main focus of the study. Firstly, this research has concentrated on bread and

bakery products in a retail setting. In order to gain a more holistic understanding of the food waste network in a store environment, research in this context should also be carried out on other food product groups. Secondly, a more encompassing analysis of the food waste networks calls for zooming out, in order to include: governmental and institutional actors such as legislation, municipal waste management and waste collection; community organizations such as charities; food networks such as agriculture, food producers and logistics; retail networks, such as store management; and customer networks, such as household food waste and customer logistics from homes to retailers and back. As this research has included various materials, from charity work to dumpster diving, a move away from the retail setting to a more inclusive appreciation of food waste is needed for a more profound analysis of the materials.

While food waste research would profit from zooming out, via a more encompassing discussion on the food waste network, research could also be continued by zooming in and looking more carefully at the role of the different human and non-human actors. While actor relations have been the focus of this study, our understanding of certain actors' roles in producing and/or reducing food waste could be enhanced by focusing on certain material things and boundary objects (Bettany 2016: 193), such as the waste trolley. Further, the methodological work on carrying out ANT research could be continued by a more focused analysis on how to define relations between actors, which actors to follow, and where the cutoff point should be.

The research findings include a conceptual discussion about the nature of food waste. Conceptualization of the construct is critical because it forms the basis on which measures are derived and on which theories are tested (MacInnis 2011: 141). Making a distinction between unsold and unconsumed food and surplus food and food waste is important in order to understand what really happens to wasted food. The outcome can be very different, in fact, significantly so, if unsold food that is given to food assistance charities is simply considered as food waste. Thus, an important aim for future research would be to study the amount of food that is unsold, left without being used and sent to a waste collection site. Equally important and interesting would be to follow the different pathways of food that is left unsold in retailing.

The current study's findings and suggestions should encourage the pursuit of action research to find out the best ways to reduce food waste. The first research article identifies a vast range of alternatives and the need to keep racks and shelves full as a reason behind food waste, as well as recommends a more careful management of product selection, ranges and assortments. Thus, research could

be undertaken to find out how changes in product selection contribute to the amount of food waste. In a similar manner, the role(s) of seemingly mundane objects, such as the size of a waste trolley in relation to the amount of food waste, as suggested in Article 2, could be tested in an experiment. In the end, the presented ideas for reducing food waste should be further analysed and tested in other food waste contexts, such as the possible effect of the size of the waste trolley on the amount of food waste.

Considering the theoretical contribution, the presented sociomaterial practice-network approach should be adopted in practice. Research should also be carried out in order to further develop and improve the ability of the framework at a practical level, so as to encompass different heterogeneous elements and overcome the limitations of scales, thus enabling a move towards the context of context.



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## 4. GLUTTONY

### No taste without the waste? Gluttony in bakery product retailing

**Lotta Alhonnoro and Anu Norrgrann**

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#### INTRODUCTION

The modern grocery store offers us everything we can dream of, and more. While retailers offer consumers a culinary cathedral with an abundance of variety, and employ a range of multisensoric atmospheric tools to maximize consumer enticement, at the same time some of the products on display are never picked up or sold. Attractive temptations become sinful waste, constituting not only a problem for the individual consumer, but also a structural one. Approximately one-third (Gustavsson et al. 2011) or even half (Parfitt et al. 2010) of the food produced for human consumption worldwide is lost or wasted each year. This amounts to at least 1.3 billion tons of food waste per year (Gustavsson et al. 2011).

Food waste emerges at all stages of the food value chain, from cultivation and farming to production, retailing, and consumption. Although research (Parfitt et al. 2010; Silvennoinen et al. 2012; WRAP 2009) indicates that consumers and households produce the largest share of food waste, the amount of waste caused by retailing also remains relatively high. Buzby and Hyman (2012, p. 568) have estimated that on average \$0.42 of food is lost at the retail level per American per day. In Finland, 12–14 kilograms of food per person are wasted each year in retail (Silvennoinen et al. 2012). Thus, according to Parfitt et al. (2010, p. 3079), the greatest potential for food waste reduction in the developed world lies in the areas of food services, retailing, and consumption. Hence, the challenges of over-

consumption and obesity extend to the systemic level of retail and distribution, raising the question of the role played in these processes by grocery stores and the desires they build, and whether they are in fact also guilty of gluttony.

Gluttony can be defined as excess in eating or drinking or greedy or excessive indulgence (Merriam-Webster 2017), as opposed to abstinence and control (Belk 1983). According to Cafaro (2005, p. 140):

The classic picture of the glutton is a man at table, stuffing in food with both hands, sauces dribbling down his chins, belly pushing back the table as he occasionally lurches into it. Unconcerned with quality, he is going for quantity. He does not talk to his dinner companions, even to comment on the food. He is all desire.

Another, now more unusual but previously more common, manifestation of gluttony is gourmandizing—fastidious attention paid to the preparation and dressing of food (Cafaro 2005). Public debates on gluttony and excess consumption embark from the primary image, assuming that obesity, overconsumption, and wasteful behavior are consumer-driven problems and a matter of individuals' responsibility: Consumers should control their lust and vanity with better planning and dietary changes. Likewise, a vast body of consumer research has concentrated on consumer decision making, using models such as the theory of planned behavior, in which decision making is seen as rational and well informed, leading from attitudes to buying behavior (Fishbein and Ajzen 1975; Ajzen 1985). Hence, policy interventions have sought to create change in behavior via information campaigns—by handing out knowledge and expecting this to lead to attitude change.

While gluttony has perhaps been more tolerated than some of the other deadly sins (Belk 1983), in a period when obesity is a norm rather than an exception (OECD 2017) and the optimal size of the human body is an issue of public debate (see for example discussions on bodyshaming and body positivity), gluttony can no longer be regarded as socially harmless or victimless.

Indeed, sins are not representative of only human nature. Caywood and Langrehr (1990), who were interested in utilizing the seven sins and seven virtues to analyze the values presented in advertising, define gluttony as *encouraging* excessive or lavish eating, thus moving away from purely individual appetite to questions of

outside influence. In a similar manner, Aydinoğlu and Krishna (2011) investigate the effect of the size labels used by food vendors on size judgments and consumption and conclude that mislabeling larger items as smaller can result in greater consumption without the consumer even being aware of it—what the researchers refer to as “guiltless gluttony.”

Gluttony has also been used as a metaphor. Wilk (2004) uses the metaphor of eating and the related pathology of gluttony to define the concept of consumption and discuss the moral aspects involved. While focusing his analysis on consumption, Wilk (2004, pp. 18–23) concludes that though there are no simple boundaries between consumption and production, the power of the “consumption as eating” metaphor has silenced other perceptions. While consumption may be considered in this sense, resources are similarly being eaten up in production. Thus it is important to detach from premade categorizations, extending the focus from consumption to take in production as well.

We depart from the traditional definition of gluttony as an individual experience and sin. Instead of asking “Are we consuming too much?” (Arrow et al. 2004), and extending our view past the impact of advertisements (Caywood and Langrehr 1990) and size labels (Aydinoğlu and Krishna 2011), we consider the role of retail in driving gluttony, and more profoundly the role of grocery stores in fueling (over)consumption. Positioning our research in the retail setting provides the opportunity to examine gluttony as a situated, multiactor, and system-level form of overconsumption. While gluttony as an individual experience means self-indulgence and can lead to obesity, a gluttonous grocery retailer contributes both to individual gluttony, by tempting customers into lavish eating, and to gluttony in itself, by building displays of enticing products in an amplitude that exceeds the amount consumed. The fact that nearly half of all food is wasted before consumption (Parfitt et al. 2010; Gustavsson et al. 2011) is an outcome of such retail gluttony.

Consistent with attempts to move away from individual consumer agency, and intrigued by the mislabeling of larger items as smaller in order to allow “guiltless gluttony”—unintended and uninformed overconsumption (Aydinoğlu and Krishna 2011, p. 1096)—we look at the multiple actors at play in gluttony, contributing to the understanding of distributed agency. Thus, through our interpretation of



gluttony, we continue the work of D'Antone and Spencer (2014) by reconsidering the concept of consumption itself.

The chapter is constructed as follows. We start by presenting our theoretical framework based on actor–network theory (ANT), which we apply to the experiential, material, and social aspects of the retail milieu. We then discuss our research context: the bakery and retail market in Finland. The subsequent section is devoted to presenting and analyzing our exemplar illustrations. We conclude with a discussion on our findings and their implications for food retailers.

## ACTOR–NETWORK THEORY: RELATIONAL UNDERSTANDING OF GLUTTONY IN THE RETAIL MILIEU

In order to explore the food retail environment, with all its elements, objects, and materials related to retail gluttony, we draw on ANT and its flat ontology (Bajde 2013). Fully aware of the numerous nuances and claims posited with regard to ANT, we utilize it as an enabling framework and tool (Law 2009, p.142) rather than a straitjacket. While mainstream consumer research follows an individual-focused paradigm, ANT implies a focus on relationality, symmetry, and distributed agency, which we discuss briefly in relation to the context of the retail milieu.<sup>1</sup>

Relationality as an ontological view enables exploration of the roles and effects of material culture within consumption spaces (Hill et al. 2014). The role, meaning, or value of an actor in a network is not fixed, but is negotiated and renegotiated in relation to other actors in the network. Hence, gluttony is a relational effect that emerges in the network of the retail milieu and the objects, humans, and other possible entities interacting in it.

Prior marketing research into the experiential, material, and social aspects of the retail milieu is largely rooted in Kotler's (1974) work on atmospherics. Atmospheric cues, which, through an ANT lens, can be seen as elements of the interacting actor network, include lighting and other visuals; sound, music, scent, taste, and tactile cues (Spence et al. 2014); space and layout; use of color; product display; and design features (Ballantine, Jack, and Parsons 2010). Merchandise (assortment, brand mix, price, and quality), store characteristics, service, and promotion have also been acknowledged as significant

components (Davies and Ward 2005; Turley and Chebat 2002), along with social dimensions of retail space. In particular, Bitner's (1992) idea of the servicescape highlights the relationships between the built environmental dimensions, signs, symbols, and human beings (customers and employees) within it.

Symmetricality refers to treating all actors in a similar manner (Latour 1993; Law 2004), meaning that preset categories and assumptions are forgotten, and humans and nonhumans are treated equally. Latour's (2005) idea that anything is capable of making differences that ultimately alter the dynamics in a network—that is, of being an *actant*—enables us to valorize the agentic roles of not only social but also material elements such as packages, displays, or sensory cues. By this we do not mean that objects act intentionally; rather, we acknowledge their capacity-creating effects, such as gluttonous behavior, in the network. The role of space itself (here understood as the retail milieu) can also be considered an actant, something which Vicdan and Hong (2017) claim is underrated in today's consumer research.

Consumption choices are always made in a specific milieu and with certain preconditions of production. As Kjellberg (2008) states, overconsumption, hyperconsumption (Kilbourne et al. 1997), and affluent consumption (Schaefer and Crane 2005) do not happen in a vacuum, but are relational effects of supply and production. While the concept of prosumption has questioned the detachment of consumption and production, it has concentrated entirely on capturing the role of an active consumer (Cova and Dalli 2009) rather than on problematization of the categories that are already well institutionalized. By challenging the ontological construction of gluttony, we are able to challenge the intertwined constitution of consumption and production.

Distributed agency postulates an understanding that agency is not the sole intention of any one sovereign actor, but is distributed across the network of heterogeneous actors (Bajde 2013; Hill et al. 2014; Latour 2005). While symmetry puts all actors in the same position, distributed agency proposes that action and intentionality emerge from the actor network, the network of multiple, heterogeneous actors. For example, Bettany and Kerrane (2011) illustrate how a consumer object, the Omlet Eglu, takes shape as an actor only within the actor network, that is, the heterogeneous relationalities within which it is embedded. In our empirical context, we approach gluttony

as embedded into and coproduced by the material–semiotic milieu of grocery retailing.

## CONTEXT AND DATA

To exemplify our discussion, we draw on illustrative multimethod and multisite data from the bread and bakery category. This offers an interesting context for gluttony, since bread is traditionally an important part of food culture, and in itself a metaphor for a meal. Bread and water are symbols for bare essentials for sustenance—living on only bread and water has traditionally been thought of as something done only in prison or a sign of asceticism. Bakery products, on the other hand, are more characteristic of an indulgence.

In the Finnish retail context most bread and bakery products are sold via supermarkets and hypermarkets, in contrast to the practice in many other European countries of purchasing these items at bakeries, separately from other groceries and daily goods. The Finnish retail market is highly concentrated. The almost 90 percent dominance of the two major supermarket chains and the extent of chain management within them has contributed to a certain conformity in the bread and bakery sections of Finnish retailers. The notion of gluttony, and the grocery distributors' role in it, is illustrated in quantitative terms by the fact that approximately 65–75 million kilograms of food are wasted each year by Finnish retail and wholesale businesses (Silvennoinen et al. 2012).

Our empirical data comprises field notes, interviews, focus group discussions, pictorial data, and online articles (see Table 4.1). In order to identify material elements, spaces, and movement of bodies (Hill et al. 2014), observation was used as a research technique. Author 2 gathered data from visits to two supermarkets/hypermarkets, making autoethnographic (Anderson 2006) observations, while author 1 observed and carried out go-along interviews (Kusenbach 2003) in another hypermarket over a period of three days in order to obtain a more detailed description and understand the daily routines of the employees. Author 1 also interviewed the owner of a midsized (more than 20 employees) bakery and was guided through the bakery; a presentation and discussion on production and marketing followed, including questions concerning selection and packaging. Further, we used a previously collected data set of four focus-group discussions

*Table 4.1 Research material*

Focus	Type of data	Description of the data	Generated by
Bakery	Interview and observations	35 pages, on-site observation and interview with a bakery owner, collected spring 2016	Author 1
Retail store	Field diaries	Three days of observations and discussions in hypermarket A, collected autumn 2014	Author 1
		Observation visits in hypermarket B and supermarket C, collected summer 2017	Author 2
	Photos	More than 50 photos from the stores to help capture the material networks, collected 2014 and 2017	Authors 1 + 2
Consumers	Focus-group interviews	112 pages, 4 focus groups of 3–4 female consumers discussing their food consumption from shopping to disposal, collected 2012	Author 1
Food waste	Online articles	Over 150 online news articles from 2010 to 2017 on food waste to build an understanding of the phenomenon of retail food waste	Author 1

(Morgan 1997) with female consumers on their food consumption, our interest being in descriptions of buying bread. More than 150 online articles on food waste helped us contextualize and understand the background of retail gluttony.

Our analysis process started at the site. During our prolonged observations we followed different actors, looking for cues of excess bread that remained unsold, eventually being discarded by the retailer. We also looked for atmospheric cues that were agentic in enticement to consume. Following ANT's tenants of symmetry and relationality, we focused on one element at a time to grasp the multifold actors

involved, but also followed material actors such as bread and its relations to packaging, display, people, other breads, and so on in order to grasp their relationalities.

## FINDINGS: BEYOND BREAD

We now provide insight into how gluttony exhibits itself and is embodied in the bread and bakery displays in grocery stores. In doing this, we look beyond the mundane practice of buying bread, and extend our perspective to encompass the actor network surrounding the simple product category, the activities deployed to maximize the temptations involved, and consumption experience with different atmospheric tools. We structure our illustrations along the lines of three themes that characterize gluttony in the empirical material: abundance, allurement, and apposition.

### **Abundance**

Gluttony as abundance arises from the material networks, the relations embedded in the retail milieu. While a meal of bread is used as a marker of asceticism, our data depicts bread sections as far from humble, offering an abundance of variety: Product items range from white wheat bread to dark rye, encompassing a number of different grains; from fresh to crisp bread; and from sliced breads to whole loaves, buns, and baguettes. An array of other products are also available, such as sweet and savory pastries and seasonal and regional specialties, as well as products for specific diets.

Since the mid-1990s, volume retailing has been based on the dogma that consumers want more assortment and stores that do not meet this expectation of variety are poorly perceived (Abdelmajid and Sandrine 2003, pp.487–8). The Finnish Grocery Trade Association also emphasizes catering to consumer needs and offering an extensive selection to meet consumer demand. The average grocery store product selection has tripled during the past 20 years, and in large hypermarkets the selection offered can include more than 25,000 products (FGT 2017).

Our data exhibits many ways in which abundance is present. While the amount and type of product items is broad, individual bread brands also offer multiple product varieties and brand extensions.

For example, the Reissumies brand, known for its wholegrain rye bread in four-packs, now contains numerous flavor variations in different package sizes, along with a line of buns and one of readymade sandwiches sold as quick snacks.

While products may be offered in different sizes, a notable number of packages offer “25 percent extra” or come in economy-pack sizes to create the allure to buy, possibly in excess. Such statements translate the matter of buying suitable bread into one of getting as much as possible at the lowest expense. Supersizing is particularly common in the United States (Chandon and Wansink 2012), but mundane products such as bread are marketed in larger sizes in Finland too.

Products come in various degrees and types of packaging, from brand-embellished plastic bags to bakery-like paper wrappings or cake boxes, some adhering more to a fast-moving consumer goods logic of enabling an easy sweep into the shopping cart and others more resembling a purchase from a bakery—picking and choosing from displays of unpackaged produce that may have been baked/heated at the point of purchase. The phenomenon appears in one of the supermarket observation transcripts concerning donut displays:

Several of the trays are, however, like they often tend to be here, very or completely empty. It feels like coming too late to a party or being stuck with the leftovers. The same donuts are also found in bakery packages like cardboard boxes, with a see-through “window.” If one was to buy donuts, which would one choose? The untouched, packaged ones in their neat arrangements, or hand-pick the poor last ones from the almost empty display? The ones on the display tray would feel fresher, served just for me, but the emptiness suggests that they have been on display already for a while. Maybe the packaged ones have stayed fresher and better protected? And their package would let me transport them home in a more protected way. They are probably the same stuff, from the same date, anyway? (Field notes)

The excerpt highlights the differing agentic roles of display fullness (untouched, packaged version) versus display scarcity (the almost empty trays) in a situation where the consumer reasons that the actual product content is constant. In our observations, we also found other examples of parallel and simultaneous displays of the same product. Thereby the already substantial assortment of bread is further broadened by offering the same products, for example, both on the regular palettes and on the instore bakery shelves. Retail



gluttony demonstrates itself not only in excess, but also in gourmandizing, in multitudinal displays, in different ways of presenting food (Cafaro 2005).

While the same products are sold in many ways and in different combinations, the visual display is based on abundance (see Figure 4.1), resembling the profusion of a market square. The art of piling is illustrated in the field diary: “Arranging large quantities of bread is a sport of its own. Mary knows how to pile up bread quickly so that nothing drops.”

Similar views on the importance of keeping displays full are found in the online news articles, as in this quote from a grocery store owner:

We want to cater for our consumers’ needs until night comes, and till the last consumer. We cannot play the game so carefully that there would be zero products left when doors are closed, because otherwise there is always someone who is left empty-handed. (25.1.2012)

Abundance thus not only means a variety of bread, packaging, and production methods used in order to encourage lavish eating, but also implies bread left unavoidably unconsumed as a spillover effect.

### **Allurement**

By *allurement* we mean the network and relations between consumer and milieu that induce gluttony. In the retail milieu, bread is not only made accessible, but is also highly present in a sensorial manner. The multisensory cues provided by retailers affect shopper emotions and behaviors (Helmefalk and Hultén 2017). Visual cues such as signage and displays help consumers orient themselves and frame the objects of consumption, as these observations illustrate:

Entering the bread section, what first catches my eye is the big text on the back wall saying “bakery.” As a part of boxy and efficient hypermarket, it does not yet feel like that, but the impression changes once I get closer to the products. (Field notes from hypermarket)

I also notice a big text saying “Baked here today.” I realized that there are also other, packaged breads at this shop, but they never grab my attention, as the “baked here” things are so alluring, but also cheap in comparison to many other places. No need to look any further. (Field notes from supermarket)





*Figure 4.1 Illustrations of the retail milieu*

In a similar way, visual keywords in the milieu grab the observer's eye. Terms such as “locally produced” or “ecological” can be seen as agentic, depending on the implications that such cues have for different customers as parts of the actor network. The shopping

event is not only in the hands of the consumer; agency is distributed throughout the network of different actors—the visual elements come strongly into play in signaling desirability, but physical objects, in terms of display facilities and the associations their colors, materials, and shapes propose, also stand out as agentic.

Another fancy display, that of the “baked here” stuff. Black-framed, tilted shelves behind glass doors. Tempting sweet and salty bakeries on baking paper, just as if they had come straight from the oven, yet hygienically behind the doors and to be touched and bagged only using the pliers. I continue beyond this premier row of produce, and encounter the runners-up, breads and rolls from local bakeries, packaged in rustling thin paper bags with see-through parts to let the appearance of the products do its job in alluring the consumer. (Field notes from hypermarket)

Here, the physical display shelves and showcases, and the ways in which they encourage consumers to perform activities such as self-service—as well as the materials involved—surround the products with symbolic associations and meanings, creating, as the observer ponders, relative positions between one type of product in contrast to others. In this milieu, the merchandise effects (Davies and Ward 2005) can imply tradeoffs between the allure of different types of bread, positioning them hierarchically in the mind of the consumer. The observer continues to the other end of the symbolic spectrum:

I encounter the big brands at the very end. For them, the brand does most of the talking. I recognize the names, logos, package sizes, flavors, and varieties. These I would pick just by instinct, then you don't have to dress up in additional desirabilities. They are just neatly stacked in their boring plastic bakery palettes. (Field notes from hypermarket)

Here, it is the agency of the recognizable, branded package that steps in as agentic, while the effect of the display containers withdraws to a purely functional role. A particular case in point regarding the alluring role of display objects is that of the doughnut displays (Figure 4.1). This pastel-colored and organically shaped assembly of plastic trays with dome-shaped tops replicates and reinforces the forms and colors of the soft, glazed, and sprinkled products themselves. They also hint at the display and the product acting together to create a temporal and spatial experience (Arnould 2005) “like in some kind of a fifties retro coffee shop or diner,” as described in the field notes from hypermarket.

However, not all displays are like the above. The big picture of the milieu is often warehouse-like, with huge palettes, racks, and messy displays. While delicacies provide allure for some, for other consumers in pursuit of thrift, a discount store-like atmosphere with special offers and bargain prices offers economic resources (Arnould 2005). Even this can have a gluttonous side, as one consumer, calling herself a bargain hunter, explains:

I am like a hamster that never ever anything runs out in my home. I have such an amount of hides in the basement, and we have a lot of space, so I usually never run out of anything, so that even if stores would be closed, I would easily survive for three weeks. (Focus group discussion)

In addition to this “cheap-looking” retail display of bread, one of the most characteristic ways in which products lure shoppers passing by is through olfactory cues, in this case the smell of freshly baked bread. The inhouse bakeries produce this effect at the point of display, awakening the senses of the consumer before one has even entered the bread section. In one supermarket, the manner in which the “freshly baked” (or heated from prebaked) bread was stored resulted in an even stronger sensory effect:

When I open the doors [of the bakery product showcase], the scents flood out and make me think that this stuff really is pretty fresh. The senses work in order; first the visual and then the smell. (Field notes from supermarket)

The quote above is in line with previous discussion of multisensory atmospherics (Helmefalk and Hultén 2017; Spence et al. 2014) and the importance of not isolating the study of specific sensory cues, but taking their interplay, the actor network, into consideration. Sensory cues are distributed between different products, display facilities, packages, and practices, thus providing allure in a multitude of ways—inviting and enticing customers to consume, even in gluttonous ways. In the plethora of sensory cues in the retail milieu, it can furthermore be asked whether the retailer produces a sensory overload (Spence et al. 2014), which also can be regarded as a type of gluttony.

## **Apposition**

We use apposition to describe the relationalities between products that are seemingly the same. From one product to the next, everything that is placed on shelves, pallets, and racks needs to be like the other—perfect. Employees in food stores work hard at not only unloading product deliveries, but also going through existing products in search of defects, picking up everything imperfect: a torn package; bags of bread that are on the verge of their use-by date yet remain perfectly edible and saleable; breads lacking a use-by date; bags of buns with the wrong amount of buns in them, and so on. In one hypermarket, a waste wagon, kept in the back storage area, is used every morning to collect imperfect products. Some bread is perceived as “good” in relation to other breads, and this becomes visible also in the way customers act:

“My husband invariably teases me, because I always grab—and I know my friend does the same—that she grabs her bread from underneath, from the undermost basket.” Others agree: “Of course!” and “They always put the fresh breads behind and underneath.” (Focus group discussion)

Grocery stores keep extra stock underneath the visibly displayed racks. Customers know this and search for the fresh stock by looking underneath. They seek the best possible option, not only among different brands—as commonly noted—but also among different iterations of the same product. Products that are not apposite—homogenous in relation to the network of others—are like rotten apples, often discarded. The following shopper observation illustrates how even minor imperfections in a product (display) may trigger the consumer to at least momentarily question their choice, especially when there is a flawless alternative in sight:

What strikes me as I look closer at the basket where the pastries are, is that there’s a lot of crumbs. I hesitate, and consider changing to the cocktail-size of the same product in the basket next to it, since they look more “clean,” but think that I shouldn’t maybe be put off just by some crumbs and pick a few of the “cleanest” pastries. (Field notes from supermarket)

While the general meaning of gluttony comes alive in the abundance of selection creating the allure of excessive eating, we also find



evidence for the other meaning of gluttony—namely gourmandizing and fastidious attention to preparation and dressing of food (Cafaro 2005)—in the attention given to product perfection. In previous research, retailers have argued that food waste in retailing as an inevitable part of catering for consumer needs (Mena et al. 2011, pp. 655–6; Stenmarck et al. 2011, pp. 27–8; Silvennoinen et al. 2012, p. 36). Based on the above exemplars, this seems to be true.

## DISCUSSION

In this chapter we have taken an actor–network perspective to make sense of gluttony in the retail milieu. We have approached gluttony not as a personal trait but as a relational effect, and revealed how the retail milieu as a material–sensory environment plays a role in and perpetrates gluttony. The above insights show that, in contrast to the human glutton, retail gluttony is a relational effect arising from abundance, allurements, and apposition constructed in heterogeneous networks. Products, brands, packaging, displays, layout, and multisensory cues, such as labels and scents, act in relation to human consumers in the retail milieu, with a capacity to act and create gluttony. Thus, instead of seeing gluttony enacted by the gluttonous consumer, it is an effect of the network, where agency is distributed also to retail elements and the retailer.

Abundance, allurements, and apposition are also relevant in the relational effect of bread becoming waste. Balancing desirability and waste raises interesting managerial implications for discussion. What is enough? Companies such as Apple have found a competitive advantage in offering minimal or moderate collections of alternatives. Could a more moderate but specialized variety ease consumer choice making while making it easier to adjust orders? Though an emphasis on convenience is claimed, are modern hypermarkets really convenient, and for whom? The French retailer Auchan has augmented choice and variety to make its customers' buying process easier while obtaining a better quantity discount and consequently reducing selling prices in stores (Paché 2007). Further, Broniarczyk et al. (1998, p. 174) demonstrate that moderate reductions in variety have no effect on consumers' perception of the product assortment when their favorite references remain available. This naturally requires identification of the favorite references of different customer

segments (Paché 2007). Thus, in order to reduce retail gluttony, research could investigate the effects of downsizing the abundance of bread on offer, but also more generally how changes in the marketing mix could be used to restrain retail gluttony.

## NOTE

1. Marketing scholars have dealt with the interplay between elements of the retail context and their effects on consumers and consumption through concepts such as the servicescape (Bitner 1992), store or retail environment (Arnould 2005; Kotler 1974; Turley and Chebat 2002), or supermarket as marketplace (Kniazeva and Belk 2010). While we position our standpoint within ANT, we choose to use the term “retail milieu.”

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Distributed Agency in Food Waste – A Focus on Non-Human Actors in Retail Setting

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The purpose of this chapter is to identify and analyse how non-human actors participate in production and/or reduction of food waste in a network of actor relations. Our empirical study focusses on a bread and bakery product section of a Finnish hypermarket where we follow how bread may – or may not – turn to waste in a network of various human and non-human actors. In so doing, we adopt the Actor-Network Theory (ANT) approach (Latour, 1999a, 1999b, 2005) as our analytic tool, which enables us to look beyond the dominant role of human actors, such as managers, employees and customers, in producing and/or reducing such waste. Thereby, we join the emerging stream of food waste studies recognising the distributed agency and re-emerging relations between humans and non-humans in the socio-material network (Evans, 2018; Mattila et al., 2018; Waitt & Phillips, 2016).

Until now, research on food waste in a grocery retailing setting has been largely neglected as a research topic (Cicatiello et al., 2017; Filimonau & Gherbin, 2017). The extant studies have concentrated on the quantification of food waste (Cicatiello et al., 2017; Food and Agriculture Organization of the United Nations [FAO], 2011; Katajajuuri et al. 2014; Teller et al., 2018) or adopted a managerial perspective to the issue (Evans, Campbell, & Murcott, 2013; Gruber, Holweg, & Teller, 2016; Mena, Adenso-Diaz, & Yurtc, 2011). This stream of food waste research takes a methodologically distant view of managers higher up in the organisation hierarchy and industry experts or gleans insight through secondary data (Teller et al., 2018). There is still a need for more in-depth understanding of the causes of food waste as well as ways to reduce it, including analysing the operational reality of retailers or frontline staff in the store environment rather than approaching the issue from a more aggregated level (Filimonau & Gherbin, 2017; Teller et al., 2018). Furthermore, we argue that studying “the human reality of food waste” (Gruber et al., 2016) is just one aspect of this wicked problem.

Therefore, in this chapter, we suggest that the food waste problem in the retail setting should be understood as a more dispersed and complex issue, rather than as a question of top-down management or as an issue to be solved through human-led processes. This requires investigating the issue in a store environment and adopting an analytical perspective that enables exploring the relations of heterogeneous human and non-human actors in the food waste network, each having different capacities to participate in waste production and/or reduction. In this manner, the current research sheds light on how it is not only human actors and their conscious decisions that may cause food to turn – or not – to waste. We also need to acknowledge the mobilisation of various related non-human actors in this process.

Although a few researchers have pointed out that food waste is a result of various factors in retailing, such as improperly functioning freezing and cooling equipment, and lack of adequate storage facilities (see Parfitt, Barthel, & Macnaughton, 2010), the non-human actors that participate in producing and/or reducing food waste in the food waste network remain largely unexplored. As an exception, Mattila et al. (2018) studied human and non-human actors in the household context to discover their potentials in organising temporality, thus preventing and reducing food waste. However, the ways in which food turns to waste in the interaction of human and non-human actors in the socio-material network in the retail setting have remained unresearched to date.

To fill these gaps, we adopt the methodological lens of ‘following the thing’ (Bettany & Kerrane, 2011; Latour, 1987) – the bread in this case – in a selected bread and bakery product section. The bread provides us with a particularly fruitful resource to investigate. Firstly, bread is categorised as one of the foodstuffs that most easily turns to waste (Mena et al., 2011, p. 653; Silvennoinen et al., 2012, p. 6). Secondly, bread appears as a multi-sensorial material object that evokes human and non-human interaction practiced through, for instance, touching, smelling, and tasting. It is thus capable of generating action in which multiple

variations of distributed agency may emerge. Therefore, bread and its (potential) transition into waste is considered here as our focal object of interest that is analysed in relation to other human and non-human actors.

We begin the chapter by outlining our theoretical framework. Actor-Network Theory provides us with theoretical lenses for understanding how distributed agency appears in interaction in a food waste network in the retail setting. Then, we move on to discuss our methodological choices, followed by the analysis and presentation of our findings. We describe how multiple heterogeneous (human and non-human) actors interact to produce and/or reduce food waste in the observed bread and bakery section. Then, we further zoom in on the interactions of the non-human actors – bread and its package, natural-temporal actors and techno-material actors – and other human and non-human actors involved in producing and/or reducing bread waste. We conclude our chapter by outlining practical implications and suggestions on how retail food waste could be reduced and even prevented. We highlight a need to focus on processes instead of (individual) human acts and consider different ways to confront food waste in relation to the heterogeneous actors of a food waste network in the retail setting.

### **Non-human Agency in the Food Waste Network**

Until now, only a few studies on retail food waste have sought to understand the root causes of food waste (Gruber et al., 2016; FAO, 2011; Teller et al., 2018). The identified reasons for food waste include undesirable customer behaviour and erratic demand, inefficient store operations and replenishment policies, and elevated product (quality) requirements (Teller et al., 2018). To shift the viewpoint from human-led processes to the socio-material network, in which human and non-human actors interact in ways that produce and/or reduce food waste, we rely on the theoretical premises stemming from ANT.

As the stream of research grounding on ANT and other post-humanist views is still in its infancy in food waste research (for notable exceptions, see Evans 2011; Mattila et al., 2018; Waitt & Phillips, 2016), we strengthen our theoretical bases with the emerging post-humanist studies from marketing and consumer research (e.g. Borgerson, 2013; Canniford & Bajde, 2016; Canniford, Riach, & Hill, 2018; Lugosi & Quinton, 2018; Otnes, Ruth, & Crosby, 2014; Syrjälä, Jaskari, & Leipämaa-Leskinen, 2016; Syrjälä & Norrgrann, 2019; Walther & Schouten, 2016) building on seminal thinkers such as Latour (1999a, 1999b), Miller (2010), and Haraway (2003). Thereby, we are able to adopt a relational perspective on food waste, in which producing/reducing food waste appears as a network of actors “acting within the confines of their material-semiotic milieu, the heterogeneous relationalities within which it is embedded” (Bettany & Kerrane, 2011, p. 1754).

Basing our research on relational ontology, we define a food waste network in the retail setting as the emerging and changing arrangements of heterogeneous actors. The arrangements include humans (e.g. customers, grocery store managers, and employees) and non-humans (e.g. bread and its package date labels, and displays) that produce and/or reduce food waste and unfold within practices carried out in the retail context. This perspective allows us to better understand how food turns to waste. It also yields a fruitful perspective on exploring the distributed agency emerging in the interaction of the different human and non-human actors at the point in which food turns to waste, and thus provides ideas for new solutions to cut down food waste. While we focus our description of the food waste network on the bread and bakery products section, we recognise its complex relations to other networked actors that are not scrutinised in our efforts. The food waste network in the bread and bakery section of a hypermarket is embedded in a network of various other actors, such as other retailers, policy makers, food charities and food banks (Gollnhofer & Schouten, 2017). Thereby, the food waste network is to be understood as being connected to other



networks, to more localised mundane interactions and coming up as a global arrangement (Askegaard & Linnet, 2011; Canniford, et al., 2018; Latour, 1996).

Within this food waste network, we trace agentic moments or “flickerings” (Borgerson, 2013; Syrjälä & Norrgrann, 2019) that take place in the interaction between different actors and contribute to those occasions in which food turns – or not – to waste. ANT acknowledges that agency is not a human property, but a property of a heterogeneous network consisting of human and non-human actors (Latour, 1999b). Thus, from the ANT perspective, no single action within the food waste network can be traced back to any sole actor, be it a human or non-human; instead, each action always needs the mobilisation of multiple actors (Bajde, 2013) and their interconnected relations (Canniford & Bajde, 2016). Therefore, agency is to be seen as *distributed* (Bajde, 2013; Brembeck, 2008) and the ontology of actors within consumption spaces, such as the retail site, as *relational* (Hill, Canniford, & Mol, 2014).

Furthermore, stemming from Borgerson’s (2013) categorisation of agentic capacities as effects (non-humans), and as effects and intentions (humans) of different actors, we rely on the idea that the expressions of the agency of material objects, such as bread, a waste trolley and a shelf in a hypermarket, may not appear to be purposefully intentional. Instead, these things are capable of producing agentic mobilisations through their interconnected relations with human and non-human actors in their socio-material network (ibid.). This refers to the idea that different actors are ontologically indeterminate, meaning that their boundaries and meanings are not fixed, but co-constituted and negotiated in a continuous state of mutual becoming (Haraway, 2003). Hence, food waste is a relational effect acted upon in everyday practices, rather than a fixed end of the pipe phenomenon (see also Mattila et al., 2018).

In conclusion, we respond to the call of Canniford and Bajde (2016), who have suggested that research should illuminate differences and interdependencies between human

and non-human actors to show how varied and multiple qualities of agency mobilise a network. Thereby, we are able to discover, as Evans (2011) proposes, the role of the non-human actors in food waste emergence, which has been overlooked and even excluded when concentrating mostly on the human-led process of managing waste. Further, the emerging and constantly changing relations in a network emphasise the dynamic nature of the food waste network, which is helpful in our efforts to move from food waste production to waste reduction and more sustainable practices.

### **Methodology**

Next, we briefly present our research design, followed by a description of the data generation and analysis. Then, we move on to elaborate our findings.

#### **Research site for ethnographically informed ANT research**

In this study, we combine an ethnographic research design (e.g. Arnould & Wallendorf, 1994) with that of ANT (Latour, 1999a, 1999b, 2005) to discover how bread may or may not turn to waste. As our purpose is to gain insights into the emergence of food waste before food ends up on consumers' plates, we chose a hypermarket as our field site. More specifically, we focused on its bread and bakery section, in which the multi-method data generation took place.

The food waste network in retailing is part of a systemic food waste problem; local and situated interactions are nested in and interconnected with a global arrangement (Canniford et al., 2018; Askegaard & Linnet, 2011). We firstly describe the Finnish retail market system to produce an understanding on how the focus of the current exploration – the food waste network in a retail store setting – relates and connects to other networks, constituting a global arrangement of food waste. The Finnish grocery market is highly concentrated, with two retail chains dominating almost 90% of it. Both of these retailers engage in robust supply chain management, due to which their bread and bakery selections

are very similar across their stores. In Western countries, grocery stores typically have a wide assortment range (Gruber et al., 2016) and retailers strive to avoid out-of-stock situations using volume and sales promotions to manage the supply (Theotokis, Pramataris, & Tsiros, 2012). The same applies in Finland. According to the Finnish Grocery Trade Association (FGT, 2017), the average grocery store product selection has grown threefold during the last 20 years, and in large hypermarkets the selection can include over 25,000 products. The bread selection in a Finnish hypermarket is typically very varied. It includes breads with a variety of grains, ranging from white wheat bread to dark rye, freshly baked products and crisp bread, sliced breads and whole loaves, buns and baguettes. The selection also includes other bakery products such as sweet and savoury pastries, and seasonal and regional specialities, as well as products geared towards special diets.

The bread and bakery section was chosen as the current field site, firstly, because bread is one of the main product categories causing food waste in the Finnish food retailing sector. According to Stenmarck et al. (2011, p. 62), bread and vegetables are the biggest food waste groups, with a waste level reaching 10 per cent of sales. This is in line with research carried out in the UK and Spain, which reported bread as one of the biggest contributors to food waste in retail, with waste levels in excess of 7 per cent (Mena et al., 2011, p. 653). Considering the environmental impact, Brancoli, Rousta, and Boltonbread (2017) estimated that bread waste, together with meat waste, contributes the most to the environmental footprint in a hypermarket. Secondly, bread, together with a variety of non-human actors connected to it, forms an abundance of variety and sensorial allurements (Alhonnoro & Norrgrann, 2018, p. 85–90). Breads come in many different types of packages, from colourfully branded plastic bags to more modest paper bags, and are presented in differently laid out product displays, some situated in big piles next to the aisles, and others placed without packaging in see-through stands at the in-store bakery for customers to pick and

choose from. An in-house bakery that does not actually bake but only heats up the products at the point of purchase adds to the multitude of atmospheric and sensory actors taking part in the network by bolstering the often forgotten sensual feature of consumption sites: smell (see also Canniford et al., 2018).

### **Data generation and analysis**

To identify and analyse how the different human and non-human actors are connected with each other in the chosen empirical setting, with a particular focus on how non-human agency appears in the food waste network, we utilised a variety of multi-method ethnographic materials. The first author represents the insider in this study. Most of the materials used in this study were generated as part of her dissertation thesis on bread waste.

Our primary data consists of participant observations. These data were generated in the bread and bakery section of a Finnish hypermarket in autumn 2014. During the three-day fieldwork, the first author observed the human and non-human actors and daily activities taking place in the bread and bakery section. She accompanied three employees in the grocery store, asking them to answer questions and describe what they were doing and why. Particular attention was paid to noticing when, how and through what types of interactions bread turned or did not turn to waste. The main focus was on identifying how the non-human and human actors interacted in the food waste network, and how distributed agency appeared in these interactions, (potentially) enacting the emergence of bread waste in the section. The managers and the employees of the hypermarket knew about the study. Before starting the fieldwork, the first author asked for their permission to observe and interview them. The resulting empirical materials include field diary notes and pictorial data. We protect the privacy of the informants and the hypermarket by guaranteeing their anonymity during the analysis.

We also generated supplementary data to enrich our understanding on retail food waste. These include online and offline materials concerning food waste in Finland during the years 2010–2017. The online articles were searched and collected using the keywords “food waste” from the archive of the Finnish public broadcasting company Yle. The offline articles consisted of collected local and national newspaper articles on food waste.

While our data is ethnographically informed in the sense that it involved a close and situated exploration of a bread and bakery product section and in-depth qualitative materials from various sources, the analytical focus and procedures differed from a traditional ethnographic study. Instead of following humans and seeking a culturally informed description, our ontological premises are based on the logic of ANT. Thus, in the analysis we concentrated on following the focal object (bread and its package) and how it is enacted in relation to other human and non-human actors in the food waste network. Consequently, the analysis was developed by tracing the hotspots where food may or may not turn to waste, and identifying the heterogeneous human and non-human actors involved in this transformation.

The iterative analysis process of the generated data started while observing in the bread and bakery section. At this stage, the researcher followed the relational ontology in terms of treating everything as a potential actor and avoiding a presupposed social order (Latour, 2005). To deepen and try out her interpretations, she asked the employees questions about the observed practices and actors. The same analysis process was followed systematically during iterative readings and inductive coding of the whole research material by the first author, thus zooming in and out from more or less emic descriptions like employee talk or singular observations to the recognition of the heterogeneous relationalities and network of various humans and non-humans. The preliminary codings and interpretations were discussed jointly by all the authors to reach a consensus on the findings. Eventually, this analysis identified three sets of non-human actors – the focal object, the natural-temporal

actors and the techno-material actors – whose interconnections to other human and non-human actors are elaborated next in the findings section.

### **Distributed Agency in the Food Waste Network**

We begin the findings section by describing how multiple heterogeneous human and non-human actors interact to produce and/or reduce food waste in the observed bread and bakery section. Then, we zoom in on three particular sets of non-human actors to analyse how agency appears distributed in the interaction between them and other human and non-human actors in the food waste network.

Let us begin by illustrating how multiple actors take part in producing and/or reducing bread waste. The following quote from the field notes pinpoints the occurrence of agentic (non)mobilisation:

There are still too many of brand A's breads left to be sold, and the same was mentioned [by an employee] yesterday. Handytec [portable ordering device] indicates that there are still more to come, but John cannot use Handytec to reduce the order, not permanently or just for tomorrow. Instead, he would have to decrease the order from the desktop computer that is located in the office. Then the problem is, of course, that John is not the primary user of the office computer, but Cynthia is. So he can't change the order right after he sees the need for it. Placing a new order via Handytec would be possible, [but since this is not what is wanted] John does nothing.  
(Field notes)

The above description demonstrates how a complex network of human and non-human actors comes together in the everyday practice of ordering (or reducing the order) bread and bakery products, and how the arrangement of multiple actors ends up producing waste. The starting point in the excerpt is the large amount of brand A bread. The employee, John, had already noticed on the previous day that there are many packages of this bread in



the rack considering the amount that is usually sold, and he uses “Handytec” to check the order and to try to reduce it. Handytec is a portable ordering device that the employees use for making new orders of bread and bakery products, tracking the orders and adjusting the orders when needed. The field note shows further how the actors, i.e. bread (in fact, a network of many breads that together constitute “too much bread”), the techno-material device Handytec, and John, the employee who notices the amount of bread and uses the ordering device, together form an inherently heterogeneous and sociomaterial practice (Mattila et al., 2018, p.3), where agency is distributed between the actors. Thus, John should change the order, but Handytec cannot be used for this purpose. John should ask Cynthia to change the order on the office computer, but Cynthia is not currently present. John has much work to do, so he proceeds with his work. Moreover, John is not the only one to act: agency appears distributed between human and non-human actors, in this case the Handytec, the office computer, Cynthia, the spatial arrangement and the distance between these actors, and John. Thus, coming together in the relational food waste network, heterogeneous actors take part in the ordering practice, which ends up producing food waste. Regarding this descriptive example as a starting point for our analysis, we next move on and focus more closely on how the food waste network in the bread and bakery section appears from the perspective of three sets of different non-human actors – the focal object, the natural-temporal actors and the techno-material actors.

### **Distributed agency from the perspective of the focal object**

We first zoom in on the food waste network in the bread and bakery section from the perspective of our focal object, i.e. bread and its package. Here we consider the package to also include signs (e.g. discount stickers and best-before-date markings) and symbols attached to the package.

Similar to typical bread and bakery sections in Finnish hypermarkets (FGT, 2017), the field site of our study included a high number and wide variety of bread products available for consumers. In addition, our analysis highlights the salience of “perfect” presentation of the products, that is, the products are shelved in a way that showcases them for optimal freshness and abundance (see also Alhonnoro & Norrgrann, 2018). This practice may eventually lead to an increase in the amount of food waste because employees more readily throw away bread packages that are not “perfect” (e.g. ruptured packages, too few pieces of bread in the package, and packages lacking best-before-date markings). In fact, aligned with the results presented by Cicatiello et al. (2017), our analysis showcases that nearly all the food waste emerging in the bread and bakery section would still have been fit for human consumption. The following field note illustrates this kind of situation:

One plastic bag has opened. One piece of bread drops out of the bag. The whole thing is put into the waste trolley. (Field notes)

In the field note, one of the employees put the package into the waste trolley after noticing that it was open. Thus, waste is created relationally, in the interaction of the focal object and the human actor. The focal object acts as a mobiliser and “invites” other actors to join the food waste network, in this case the employee, who uses her agentic capacity to decide whether a certain package is waste or not. Interestingly, the boundary between edible bread and bread waste changes according to what kind of agentic (human) actors they relate to. For example, a ragged bread package is not sold to customers, but employees can buy it at a 50 per cent discount. Cicatiello et al. (2017, p. 279) explained that the high amount of bread waste was due to the quality standards required by the customers and the low cost of these products for the store management. However, our analysis addresses also how agentic mobilisation can take an opposite direction due to the acts of an employee. The next quote exemplifies how one employee ends up saving the opened or ruptured package for resale:

One of the plastic bags has opened. John notices it and walks to the bakery area to close it with an adhesive tape. (Field notes)

The substantial difference between the aforementioned raw data illustrations is that the employee needs to notice the problem before bread slides out of the bag. If s/he does not, and slices drop out of the bag, then the whole bag of bread is in danger of ending up in the waste trolley. Thus, working practices may emerge as agentic in terms of exhibiting either as an opportunity or as an obstacle for reducing the amount of food waste. In any case, from the viewpoint of bread and its package, employees still exhibit strong agency in influencing the resulting food waste. They decide, for example, which products are visible to the customers and which are hidden, as exemplified in the following field note and Figure 1: John rearranges the display of rye bread packages. There is still much bread left, even without the large amount of new packages they have received. John does not place the discount products on the top of the pile, but instead lets them be buried in the pile. (Field notes)

[Insert Figure 1 here]

***Figure 1. Bread packages marked with discount sticker buried underneath new products.***

However, our analysis indicates that the human agency is not that straightforward. Instead, the focal object may induce agentic effects in relation to other human and non-human actors. This is especially notable in the case of discount products, as the discount stickers are important for certain customer groups. Their agentic mobilisation works in a two-way direction: they may appeal to some customers, but drive away other customers, who prefer to buy only fresh bakery products. Our research material includes plenty of remarks about how the customers move around in the section and use different methods to find the “best bread”, that is, the freshest and newest product by digging from the piles and moving racks, checking the best before dates, and touching the products, as described in the field note below:

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Customers dig out the products from the bottom of the pile, because they know that older products are located on top, and the newest are underneath. (Field notes)

This field note showcases how the bread can exhibit agency in relation to human actors by causing effects on their behaviours – customers may take or leave bread based on its softness or dryness. These agentic properties are also assigned to the best before dates (and to the missing best before dates) as well as to ruptured or deviant packages, all of which may become signallers of waste.

**Distributed agency from the perspective of natural-temporal actors** Next, we describe the distributed agency related to the second identified set of non-human actors in the bread and bakery section, namely the natural-temporal actors. These actors include animals, weather conditions, seasons, weekdays, and time of the day. They can manifest strong agentic capacities in relation to other human and non-human actors, mobilising food waste production and/or reduction in the network.

The analysis reveals that the demand for bread and bakery products is closely connected to changes in weather conditions and seasonal variations. One employee describes how the demand for white bread and baked goods increases in summertime: Cynthia says that the warm weather [June-July] could be seen in the demand. [The employee speculates.] People did not bother to bake buns at home, and demand for them increased in the stores. (Field notes)

Changes in demand may increase the amount of bread waste, and act as mobilisers in the network producing food waste. Even though there are national weather forecasts available on the changing weather conditions, these weather forecasts are not taken into account by the automated (and agentic) ordering system. If employees do not or cannot respond to changing weather forecasts and adjust orders, food waste can occur. In relation to changing weather,

other natural-temporal actors can also enter the food waste network. For instance, one field note describes a hot summer day situation in which flies, attracted by the sweet smell of fruits and jam, entered the pastry boxes. This lowered the demand for sweet pastries and eventually those pastries had to be thrown away:

Cynthia discards the pastries from the upper shelf. She has noticed that fruit pastries tempt small flies into the store. The same thing has happened before and she has rejected fruit pastry orders for a while. The best before date has not yet been reached, but who wants to buy flies? (Field notes)

Furthermore, weekdays and paydays are natural-temporal actors that may appear agentic in relation to other actors in the food waste network and, consequently, may influence the emergence of bread waste. These non-human actors are usually acted upon by the ordering system and the employees working in the bread and bakery section: “Bread sales change according to weekdays. The lowest amounts are sold on Wednesdays. (Field notes)” and “Paydays can be seen in the monthly statistics. People buy more fresh bread on the payday, while minus 30% products are sold before the payday. (Field notes)”. Thus, the amount of fresh bread should be adjusted according to the weekday and time of month in line with demand and to avoid food waste.

Moreover, seasonal holidays, such as Christmas and Easter, have two-way effects on the amount of food waste. First, they increase the amounts of food sold, and afterwards they increase the amount of food waste “generated when a food store is closed on many consecutive days” (excerpt from Yle news article). This kind of socio-temporal effect is also pointed out by Evans (2012) in relation to individual consumers’ rhythms of everyday life, like travelling and changes in plans. Also, Mattila et al. (2018) have noted that potential food waste can be revitalised, for example by using cooling equipment for freezing food as a way to store it for future use, thus pausing the process of food becoming waste beforehand. While

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we did not observe bread being saved in this way in the hypermarket, the employees reported that bread waste was often picked up by a pig farmer, which shows that some of the bread waste is turned into animal feed.

Some of the natural-temporal actors occur in a routinised way, and employees have become aware of these kinds of fluctuations in demand. However, there may still be disparity between the demand for certain bread products and the number of ordered products. This is due to the work practices and their organisation in the socio-material network. For instance, when only a few employees are at work and they have much shelving and other mandatory tasks to do, the employees concentrate on shelving, having hardly any time to even think about adjusting orders. Thus, the natural-temporal actors also have effects on how employees are capable of dividing their work tasks – in this case, usually in ways that increase food waste.

The distributed agency between the natural-temporal actors and employees is further reflected in how the orders are planned based on the previous year's sales figures. These figures do not contain information on issues such as typical weather conditions, special campaigns, or other timely events, which makes it difficult to forecast orders (see also Mena et al., 2011). A case in point is exemplified in the following field note, which shows that orders are difficult to adjust even though their inaccuracy is acknowledged:

A large amount of readymade sandwich cake sponges is thrown away, as we suspected would happen in the previous day (Cynthia suspected that last year the order was for some reason larger [maybe the order had been increased in response to a request by an individual customer]). (Field notes)

A very concrete example of agentic effects of natural-temporal actors on the amount of bread waste in our analysis relates to the in-store baking point's closing time. The baking

point sells some of the same products that are sold in the shelves of the ordinary bread section, as described below:

The baking point that is located inside the bread section is selling partly the same products that are also available in the bread section. For example, brand B's rye bread is available at the baking point and sold at a unit piece price, while the same bread is sold in two-piece bags in the bread section. (Field notes)

The observations revealed further that while the baking point throws away the remaining bread when it closes – regarded as out-of-date for the baking point at this moment – similar breads are sold in the ordinary section for several days. Thus, although the physical bread is exactly the same, the bread that is located in the baking point – instead of being delivered and pre-packaged by an outside bakery of the same brand – turns to waste at the moment when the baking point closes for the day. Correspondingly, when the same bread is delivered by an outside bakery and sold in the bread and bakery section, it is sellable and consumable for several days. In this example, the natural-temporal actor induces mobilisational agency which, however, is distributed in the interconnection between other human (employees) and non-human (bread, baking point) actors.

### **Distributed agency from the perspective of techno-material actors**

We also scrutinised the food waste network from the viewpoint of the identified techno-material actors. These actors include technological systems and devices that are in use in the field site, but also the spatial arrangements and very concrete materials, such as the location of the employee's office and the shelves in the section, and a waste trolley used for collecting the bread waste.

In the bread and bakery section, various technological apparatuses distribute agency with the employees in terms of making and adjusting orders, and keeping track of the stock. While these techno-material actors are used by the employees to manage and control bread



flows, a closer analysis of their agentic capacities and relations to other human and non-human actors reveals their central role in the food waste network. They not only facilitate daily practices and enable employees to work more efficiently, but they also exhibit agentic effects, which are distributed in the food waste network. To illustrate this in a more detailed manner, we return to the portable device Handytec. The employees use this device in the store for ordering and follow-up of the stock. The device is designed for easy and quick operation. As such, it provides only a limited amount of information about the made orders. It also neither registers nor is able to show all the orders made from other devices such as desktop computers. In addition, Handytec does not communicate very well with the other human and non-human actors of the network. At the same time, it may mislead and hinder the daily working practices of the employees. The following quotes illuminate how Handytec itself may change the orders made by the employees, which in turn may influence food waste emergence:

The system might state that there are no orders to be delivered, while in reality a newly delivered order of bread might be waiting to be shelved in the store. (Field notes)

John tells that Handytec does not always show the right stock status. Handytec may show that the amount in stock is lower than it actually is, and even if you correct it, it may change back during the night and make extra orders. Therefore, the warehouse includes a lot of unpacked platforms. It takes a lot of time to recalculate the stock and make changes to the orders. (Field notes)

Furthermore, our analysis demonstrates that the availability and number of technological devices have effects on the resulting food waste in the network. In the observed bread and bakery section, only one Handytec is in use to provide the employees with access

to information on orders and sales, even though one to three employees work in the section. This means that only one employee at a time can work with the Handytec and make adjustments to orders, for example. Although the orders can also be changed from the desktop computer located in the separate office, using a desktop computer requires the employees to go and work in the office. Thus, the employees cannot often use Handytec while doing their daily work in the bread and bakery section. Contrary to this, the desktop computer allows the employees to make changes to the orders for a longer period of time and utilising more relevant information. Our analysis shows that the employees often opt to shelve the products, rather than leaving their working place and going to the office to make the orders or change them.

Consequently, our analysis demonstrates that the techno-material actors alone are not able to cut down the amount of retail waste. Acting together with the employees, however, they demonstrate the capacity to affect food waste occurrence at the store (see also Silvennoinen et al., 2012, p. 36). In this regard, we partially agree with Cicatiello et al. (2017) who note and explain the significant amount of unrecorded food waste by routinised practices carried out by employees. Related to this, our analysis highlights that the disparity between the orders and the demand may also be closely connected with the techno-material actors that enable distributing agency in a way that has effects on both the employees' work practices and the food waste network:

Cynthia complains that "the computer system" [she is most likely talking about some program that utilises the Internet] was out of order yesterday morning. It happens every now and then, and this time the error impacted systems nationwide, because they received a separate email concerning it. Because of the error, Cynthia is not able to revise the orders. For example, they received a lot of donuts and she did want to cancel the order. (Field notes)

Our analysis also identified the (very large) waste trolley (Figure 2) as a critical techno-material actor enacting food waste emergence at the bread and bakery section. This trolley is used by the employees to collect bread waste in the store. It exhibits agency in terms of normalising large amounts of bread waste. The trolley is over one metre high and so wide and large that it blocks the aisle and requires two hands to push. Thus, it implicitly “invites” the employees working in the section to throw large quantities of bread away. Our interpretation is that the waste trolley not only acts as a collector of bread waste but also as a mobiliser of bread waste in the food waste network.

[Insert Figure 2 here]

***Figure 2. The waste trolley***

Here our findings align with Cochoy’s (2008) description of how consumption is shaped and negotiated not only by consumers, marketers and objects of consumption, but also by other material objects, such as merchandising technologies, shopping lists, and shopping carts. While Cochoy (ibid.) illustrates how a shopping cart may have effects on the amount of goods consumers buy at the hypermarket, the waste trolley in our case shows its influence on how much bread the employees end up throwing away as part of their daily practices in the bread and bakery section.

**Conclusions and Suggestions for Food Waste Reduction**

In this chapter, we have illustrated various occasional moments to show how distributed agency appears in the bread and bakery section and, consequently, the (many) relational effects of these becomings on food waste production and/or reduction. Zooming in on these moments, we were able to demonstrate that the emergence of bread waste in the retail setting is not only orchestrated and managed by the employees (human actors), but is enacted within the network that connects both human and non-human actors. For instance, the weather acts as a mobiliser of food waste when changes in demand increase the amount of

bread waste, and the waste trolley mobilises food waste by normalising throwing away large amounts of bread. Hence, our analysis delineates the distributed agencies of human and non-human actors in the food waste network and thereby extends the current understanding on food waste and provides novel insights into how food waste occurs in a retail setting.

To provide theory-based solutions for food waste reduction, we suggest that an ANT grounded analysis emphasising distributed agency (Latour, 1999a, 1999b, 2005), as opposed to one privileging human agency, helps shed light on the causes of food waste in a novel and a more comprehensive way. Our study complements earlier food waste discussions (Evans, 2011, 2018; Mattila et al., 2018; Waitt & Phillips, 2016) by focussing on the retail setting and emphasising the importance of identifying various human and non-human actors and their complex, interconnected relations in order to address the food waste problem. For instance, while Teller et al. (2018, p. 994) emphasised the role of humans in the execution of in-store logistics and related food waste occurrence, our analysis highlights that food waste reduction is not only a question of human execution. Instead, the focus should be on considering and adjusting the roles of both human and non-human actors that take part in producing and/or reducing food waste.

Further, the current study highlights and illuminates how the emergence of food waste is a matter of multiple and constantly moving relations of interconnected actors. Consequently, the fluid network of bread poses challenges when seeking to identify the exact points when a particular bread turns to waste. This can be seen for instance when the bread is considered as waste because of its ruptured package, but it can still be offered for employees to buy. Thus, we agree with Mattila et al. (2018) that the food waste concept is negotiable in nature. Using terms such as “surplus food” or “potential food waste” could be helpful in bringing out the potential of the food (waste).

Next, we move on to practical solutions for reducing food waste in the retail setting and discuss the role of non-humans in food waste occurrence. To start with the focal actor, the bread and its package, our findings address the critical role of the package and its signs, turning the bread to waste without any changes in the bread's physical properties. This was the case for example when the edible and sellable breads ended up in the waste trolley due to the lack of best before date markings or because discounted products were not visibly displayed for consumers. Thus, instead of blaming picky consumers and building consumer awareness on the food waste issue (Filimonau & Gherbin, 2017), we suggest that demand for older products and, consequently, transformations in consumer behaviour should be made in relation to changes in the non-human actors, for example by adjusting pricing according to best before dates and making sure that discounted products are visible for consumers.

Considering the natural-temporal actors, our findings indicate that weather forecasts, holidays, paydays, and the statistical data on these actors should be used as background information when making bread-related orders. Based on our analysis, employees might not have the time and possibility to consider these actors in their daily work, which is why we recommend that manufacturers and system designers should incorporate this data into the ordering systems. Further, following household practices for saving food before it goes bad (Mattila et al., 2018), bread and other food products could be revitalised also in stores. For example, if there are large amounts of unsold bread about to reach their best before date, food waste could be avoided by freezing the bread before it expires.

Finally, we urge to (re-)evaluate the role of techno-material actors in the retail setting, especially regarding food waste reduction. While previous studies have linked technology primarily to cutting down food waste (Giuseppe, Mario, & Cinzia, 2014; Silvennoinen et al., 2012), we suggest taking a more critical stance in evaluating the techno-material actors in relation to other actors in the food waste network. As illustrated in this

study, agency in the food waste network is distributed and relational. Therefore, food waste reduction cannot be based solely on technological improvements. Educating the users (employees) to spot problematic situations and providing means (e.g. Handytecs for all employees working in the bread and bakery section) for them to act in alternative ways during their daily practices would also facilitate efforts to reduce food waste.

Furthermore, we recommend taking into account the role(s) of seemingly mundane objects like the bread package, the weather, and technological devices in the efforts to manage and cut down food waste in the retail setting. While Teller et al. (2018, p. 994) emphasised the role of humans in the execution, this study highlights that it is important to consider the food waste-related tools and surroundings, and how they could be changed in order to reduce food waste. For example, we demonstrate in the study that the (large) waste trolley may normalise the emergence of food waste in stores. Thus, the efforts to fight against food waste must be communicated and put into practice at every level in the retail setting, not just in management speeches but also in ground-level practices, taking into consideration the various roles of non-human actors in producing and/or reducing food waste. Regarding the aforementioned example, this could mean using a smaller waste trolley or other changes in its design. A measuring tape could be included in it to show how much bread is thrown into the trolley. In addition, a target level of waste could be marked on the trolley in order to focus the employees' attention on the actual amount of food waste and to encourage them to reduce food waste.

In conclusion, based on the limitations of our explorative study, we suggest several future research opportunities. Firstly, our study has focussed on several non-human actors and their interconnected relations to other (human and non-human) actors in producing and/or reducing food waste. Therefore it cannot concentrate on exploring the role of specific actors such as technological devices in more detail. In this, we agree with Bettany's (2016, p. 193)

suggestion to analytically focus on a particular material thing (like Handytec) as a boundary object in order to discover the continually moving and messy network related to it. Secondly, shifting the perspective from actor relations to practices and focussing on the (underlying) power relations in the hotspots in which food turns to waste could be an interesting avenue for future research. Thirdly, while we have concentrated on bread and bakery products, investigating the food waste network within other food product groups in the retail setting might also yield innovative solutions in the fight against retail food waste. Finally, we encourage future research to focus on food waste prevention. It is not enough to study food waste only after it has been created. Instead, there is a constant need to better manage food handling processes so that food does not turn to waste in the first place.

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# **Practice as a patterned network of heterogeneous materials - an actor-network approach to practice theory**

**Lotta Alhonnoro**

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## **ABSTRACT**

The actor-network theory has received growing interest amongst consumer researchers. This article proposes that the material-semiotic approach of actor-network theory (ANT) can be used to widen and redirect the scope of practice research. While recognizing the two theories as intertwined, it is suggested that the ANT framework can open new avenues in practice research in three ways. Firstly, the ANT conception of agency recognizes the substantial role of material relations directing attention on material agency. Secondly, the conceptualization of actor-network moves the focus from micro-level social practices to a wider network of relations. Methodologically, adopting the ANT guideline of following the actor can help to answer recent calls for embedding consumption in to its wider cultural and institutional context. Presenting first a short introduction to the theories of ANT and practice, the paper presents an elaboration on the possibility of conceptualizing practice in an ANT way: as a patterned network of heterogeneous materials.

## **INTRODUCTION**

Conceptualizing consumption as practice has offered an alternative to interpretation and to the complex landscape of contemporary social theories (Reckwitz 2002: 243). It has accelerated a vast amount of practice-based research on consumption and also prompted interest in other fields of study such as organizational studies (Nicolini 2009), marketing (Giesler 2012; Martin & Schouten 2014), market studies (Kjellberg & Helgesson 2007) and environmental studies (Spaargaren 2011).

While the diversity of and multiple standpoints to practice have enriched practice theory, they have also made it difficult to grasp. Instead of addressing the philosophical background, much research concentrates on empirical insights. Focusing on the data is clearly important, but from a disciplinary standpoint there is also a need for theory development (Olson 1981).

The aim of this article is to suggest the possibility of building on ANT framework on ontological and epistemological questions confronted by practice theory. Firstly, the symmetrical tenant of ANT extends agency also for objects. Secondly, the network in ANT is a tool that enables practice to be viewed as a network of actors and to attain the network of practices. Thirdly, following the actor assembling the network offers a methodological tactic for embedding consumption into its wider cultural and institutional context.

While Bajde (2013) recognizes ANT can help to tackle challenges faced by the consumer culture theory, it is suggested here that practice theory in particular can benefit from the underpinnings of ANT, enabling to shed light on the materials of consumption (Watson 2008) and facilitating the move to the "context of context" (Askegaard & Linnet 2011). This is also proposed by D'Antone and Spencer (2014), who draw on actor-network theory to interpret consumption as a collection of human and non-human entities and a network of multiple actors. Instead of human agency, ANT suggests agency is an emergent effect, dependent on networks of heterogeneous interactions (Murdoch 1998: 369).

In relation to theory development, there is a growing need to consider how practice research is carried out. Difficulties in converting abstract theorizations to suit pragmatic needs have recently directed interest to the methodological challenges of practicing practice (Halkier & Jensen 2011; Nicolini 2009; Sahakian & Wilhite 2014). This was highlighted at Nordic Conference on Consumer Research NCCR 2014, where the topic received its own session. These questions are addressed by opposing an ANT-driven methodology in relation to practice theory.

The article proceeds with a brief outline of the literature on actor-network theory, concentrating on the seminal works of Law and Latour on ANT, followed by a review of the theories of practice. Then, there is a discussion of the actor-network approach to practice theory with an introduction to the ANT perception on agency and the network view of practice. The methodological standpoint of ANT and its implications for practice based perspective are also discussed. Finally, possibilities for using ANT-framework for practice research are presented.

## **A SHORT GUIDE TO ACTOR-NETWORK THEORY**

Actor Network Theory emerged in the 1980s in the work of French sociologists Bruno Latour, Michel Callon and John Law, in the field of science and technology studies (STS). While ANT has its background in STS, it has later interested and been utilized by researchers in a variety of social science fields and has been applied in increasingly varied ways drawing on a range of theoretical resources (Aspara 2007: 13; Law 2009: 142). Thus, there is no single ANT, no coherent theory to be followed, but rather a heterogeneous assembly of ideas and interpretations. The focus of this paper is on the theoretical perspective and the grounding ideas of Latour and Law, as well as the work of Callon, Murdoch and others.

The N in the acronym, standing for network, is a slippery stone. Firstly, though it contains the word network, ANT is built on different paradigms and has been used in different debates than the vast body of network research. Latour (2005: 132) has even stated that the theory should have been named differently, supplementing network with worknet or action net to avoid confusion. Network in ANT does not stand for a physical, concrete network, and it does not have a technical meaning such as a computer network or a subway (Latour 1996). Instead of trying to describe a network, as do most network theories, the network in ANT is used as a tool to describe something (Latour 2005: 131). However, there have also been discussions on the similarities between ANT and other network theories. For example, Brekke and Hoholm (2005) have highlighted how ANT thinking could assist Industrial Marketing and Purchasing group to make descriptions that better link business relationships with other phenomena in society.

Secondly, networks cannot be explained simply in terms of the social relations of human actors. Instead, social relations are always held together by durable and resistant materials (Latour 1996; 2005; Murdoch 1998: 360). This is where ANT departs from network theories and the social network theory. Whereas social network theory concentrates on social relations between human actors, according to ANT almost all interaction is mediated through and held together by objects, and social is nothing other than patterned networks of heterogeneous materials (Law 1992: 381; Murdoch 1998: 360). Actor-network is an assemblage of various elements, humans and nonhumans.

Instead of social and social networks being in the background of everything, emphasis is directed to the relations between the actors and actor networks (Latour 1996: 11). As Law (2004) observes: "ANT's realism is a realism of *relations*, as opposed to the realism of objects that can be grasped 'out there', independent of their relations and deployments" (emphasis added). Everything in the social and natural worlds is treated as a continuously generated effect of the webs of relations within which they are located (Law 2009: 141).

The ontology ANT proposes is flat. Compared to traditional studies, it makes no *a priori* assumption of order relations, whether something is human or nonhuman, machine or nature, macro or micro, far or close, big or small. All entities are treated equally, and number and topography of connections is left to the actors themselves (Latour 1996: 5). Consequently, all actors that affect and transform the state of affairs have agency (Latour 2005: 53).

The main unit of ANT is actor. Actor, sometimes also called actant<sup>1</sup>, is a part of a network, but also always constitutes a network in itself. The actor does not fully recognize or know all of the elements in its network. This simplification, or "black boxing" in ANT terms, is a necessary part of agency. (Callon 1991: 142; Law 2009: 147) According to the flat ontology, actor can be anything: material or text, anything which has power to act.

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<sup>1</sup> Actant or actor, Latour (1996) uses the words in place of each other.



This is where ANT has links to Foucauldian thinking and its conception of power.

Latour proposed ANT as a universal framework (Ylikoski 2000: 305). Instead of being categorized as a theory, a more viable categorization is to consider ANT as an ontology or as a methodology (Law 2009, 141), or as both, since they are deeply interwoven: ontology defining what there is, and leading the way for the method, explaining how to study, analyze and capture that what exists. The methodological starting point is to follow the actor (Murdoch 1998: 369), and make a careful description of it (Latour 2004). While this makes empirical work difficult, it also helps to produce a clear picture of the subject under scrutiny. ANT is a toolkit for the researcher, and the tools are also suitable for practice research. Before discussing this topic, a short overview of practice theory is presented.

### **A GLANCE AT PRACTICE THEORY**

Conceptualizing consumption as practice provides an alternative to interpretation and to the complex landscape of contemporary social theories (Reckwitz 2002: 243). While *homo economicus* represents a rational decision maker and *homo sociologicus* a norm follower, *homo practicus* places the human being as a carrier of practice (Nicolini 2013: 4). Social becomes situated in practice and the basic unit of analysis becomes practice. This premises work as a starting point for practice theoretical discussion.

However, like ANT, practice theory is not a unified and homogeneous theory. Instead, a better term would be "practice based perspective" or "family of practice research". While ANT has its roots in science and technology studies (STS), they have both, to some extent, had an effect on the reformulation of the practice theory (Reckwitz 2002, 243; Shove & Pantzar 2005).

Nicolini (2013) has outlined six different theorizations of practice: the social praxeology of Bourdieu and Giddens, practice as tradition and community, practice as activity, practice from an ethno-methodology standpoint, contemporary theory of practice (leaning on Heidegger, Wittgenstein and Schatzki) and language as discursive practice. A more simple division is offered by Shove and Pantzar (2005). The authors distinguish between practice research that draws on Bourdieu, Giddens and de Certeau emphasizing routines, habit and competence, and work that is based on Schatzki (2001) and Reckwitz (2002). The early descriptions of practice leaning on Bourdieu, Giddens and de Certeau are thoroughly social "in the sense that material artifacts, infrastructures and products feature barely at all" (Shove & Pantzar 2005: 44). The theorizations by Schatzki and Reckwitz, on the other hand, consider the role of material in practice.

More recently, Halkier and Jensen (2011), drawing on Reckwitz (2002), Schatzki (1996) and Warde (2005), have distinguished a social constructivist approach. This takes as its starting point an analysis of how

consumption practices are socially produced and reproduced (Halkier & Jensen, 2011: 105–107; Leipämaa-Leskinen et al. 2014).

In its conception of practice theory, this paper draws on the synthesizing attempts and contemporarily popular theorizations of Reckwitz (2002), Schatzki (1996) and Warde (2005), as well as on the more material understanding of Shove and Pantzar (2005). Reckwitz defines practice as “a routinized type of behavior which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, things and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge”. The interconnectedness of these elements forms a so called ‘block’ which cannot be reduced to any one of these single elements. (Reckwitz 2002: 249-250). The definition links symbolic meanings with doings and sayings.

Schatzki (1996) applies two different notions of practice: practice as coordinated entity and practice as performance. Practice as an entity refers to practice as a nexus of doings and sayings reconstructed through time and space. This entity is coordinated through understandings, procedures and engagements. Practice as performance refers to individual performance: actualization and carrying out the practice. Thus, practice is a coordinated entity, which also always requires performance for its existence (Warde 2005: 134).

In their definition, Shove et al. (2012: 24), aiming for simplicity, define practice by interdependent relations between materials, competences and meanings. The definition outlines the principal role of material in practice, distinguishing it from the much utilized ‘doings and sayings’ (Warde 2005), which neglects the materials in practice. In this respect, practice theory comes near ANT in its approach to material.

Next, practice meets ANT (again) as the possibilities ANT provides for practice ontology and methodology in consumption studies are discussed.

## **CONSTRUCTING PRACTICE FROM AN ACTOR-NETWORK PERSPECTIVE**

As noted in the previous sections, theory of practice and actor-network theory (ANT) are not too far apart. Both theories are better termed theoretical families with their roots in the STS, and they can also be characterized as process-depicting theories. The main constructs of practice and actor-network are both composed of several interconnected elements.

However, while ANT recognizes the role of material in human and non-human relationships, artifacts are included as elements - but lacking agency - in the constitution of practice. By adopting the ANT tenant of ontological symmetry to practice research, it is possible to achieve epistemological openness. Moreover, the network approach of ANT can be used to connect practices to the wider network of practices, while the simple rule of following the actor gives direction in applying practice theory to an empirical case.

### **Actor-Network Theory on agency**

In practice theory the emphasis is on practice, and the individual is seen as a carrier of practice (Reckwitz 2002, 250). However, the relation between materials and practices remains under-theorized (Shove & Pantzar 2005, 44) and the central ANT tenant of symmetry or flat ontology that grants agency to non-human objects such as artifacts and technologies has been only partly adopted.

Instead of facing practice open minded, practice theory postulates individual into the intersection of practice (Warde 2005, 143; Reckwitz 2002, 256). In Schatzki's (1996: 89) conceptualization of practice as coordinated entity and practice as performance, agency is given to the one who understands, for example, what to say or do, knows the procedures such as rules and instructions, and comprehends the engagements or teleoaffective structures embracing ends, projects, tasks, purposes, beliefs, emotions and moods. Practitioner becomes the integrator of the elements of practice when performing practices.

However, it should not be the researcher's job to decide in the actor's stead what groups make up the world and which agencies make them act (Latour 2005: 184). To study consumption in an open and balanced manner we cannot presuppose active consuming subjects and passive consumed objects (Bajde 2013: 235). Instead of placing the individual at the center of the practice, ANT shifts the focus to the interplay of actors and allows accepted subject-object relations to be seen in a new way. A television can be an active material object and a change agent that impacts on family life and the spatial aspects of the home (Chitakunye & Maclaran 1999: 53). Similarly, though we know it is not good for us to sit, and though we are constantly advised to stand or walk more, offices, desks and chairs seem to force us to take a seat. Likewise, in Bettany's account, a manual grooming device employed in the Afghan hound community becomes indeterminate, acting multiple roles while at the same time becoming an important actor in the formation of others (Bettany 2007: 54). This does not mean that objects would have an intention. Rather, it shows objects and things can be active, act and alter networks.

For most practice theorists practices are arrays of human activity (Schatzki, 2001: 2). Why could a television or something else non-human not be in the nexus of practice? Why is it necessary to predefine a center point, or by extension, why define a nexus at all? Latour (2005: 44) outlines practice as a node, a knot and a conglomerate of many types of material and human agencies. Social agents are never located in bodies and bodies alone, but rather that an actor is a patterned network of heterogeneous relations, or an effect produced by such a network (Law 1992: 384; Murdoch 1998: 360). Agency is attributed in terms of formations of meaning and materiality in which objects, bodies, and other heterogeneous entities are embedded (Bettany & Kerrane 2010: 1747). With his in mind, agency is next construct in relation to a network.

### **From an actor-network to a practice-network**

In ANT actor is a part of a network, but also always constitutes a network in itself. The patterned network of heterogeneous relations becomes and is the actor. This way agency is always a property of a network. Every action traditionally ascribed to human beings – thinking, writing, working and so on, are actually generated in networks that pass through and ramify both within and beyond the body (Aspara 2007: 41).

While practice theory places practice as a basic ontological unit for analysis, the hyphen in actor-network emphasizes the relation of the actor and the network, the network of translations behind every actor. A network or worknet or action net (Latour 2005: 132) view of practice draws together the network of practices, linking practices in space and time and revealing the power structures ordering practices (Callon 1991, Murdoch 1998).

Though practices are acknowledged as being interrelated, there has been little research into how different practices affect one another (Warde 2005: 149) and, more importantly, how practices interrelate (Shove & Walker 2010: 476; Hargreaves 2011). It is suggested here that ANT enables consumption practices to be interlinked in the wider material and societal context (Askegaard and Linnet 2011, 384).

In ANT terms, elements of practices can be *black boxed*: a household is comprised of heterogeneous actors, and similarly these actors, like a TV, are assembled by a network of actors, all being connected by different practices. For example, when seeking to enhance sustainable lifestyle, ANT allows us to see the futility of concentrating simply on giving instructions or setting regulations for consumers, since acting sustainably is the product of the whole network. The infrastructure, culture, and technology; the products sold in local supermarkets, the information in newspapers and all other heterogeneous materials are equally important. But how does this differ from what practice theory has to say? Though practice as entity resembles ANT's network of heterogeneous materials, in practice research practices are connected and assembled through the *individual*, "the unique crossing point of practices" (Reckwitz 2002: 256). In ANT "Society, organizations, agents and machines are all effects generated in patterned networks of diverse (not simply human) materials" (Law 1992, 380).

Methodologically, this means following the actions of network-builders instead of following the practitioner. It is akin to concepts like Kopytoff's (1986) cultural biography of things that tracks an object's origin, exchanges, uses, and transition points, with the distinction that the object, the actor, can be anything. Pragmatically this involves the use of methods like observation that make it possible to follow material as well.

Practices are engaged in the practice of everyday life and consumption is situated at the intersection of multiple practices that are connected to the network of institutional practices. Adopting the symmetrical tenant of ANT could help to follow the network of connections, incorporating the material and context. In studies of market, ANT has already been utilized to address the role of marketing in the construction and operation of markets (Araujo

2007: 211). It is now time for the possibilities of ANT to be utilized in practice research. In the next section, the methodological consequences of the network view are discussed.

### **The Actor-Network method**

After introducing the ANT perception on agency and the network view on practice, the methodological implications of ANT-based practice theory perspective are now discussed.

The methodological challenges in using practice theory have been acknowledged by many scholars (Halkier & Jensen 2011; Halkier, Katz-Gerro & Martens 2011; Nicolini 2013). ANT's starting point of following the actor addresses the methodological shortcomings of practice theory unresolved by Schatzki and other practice theorizers (Nicolini 2013: 180).

It is not suggested that ANT would make things simple; on the contrary, its methodological opacity offers no shortcuts. However, ANT does offer a novel framework to study practice as an entity as well as entangled practices, connected to one another. This is especially beneficial when a holistic, systemic approach on practices is sought, such as when looking at practices in relation to sustainability, where attention should be carefully directed at all elements of practice. In addition to doings and sayings, and objects, tools, devices and apparatus (Halkier et al. 2011, 6), we need to grasp the institutional surroundings like infrastructure, policy and technology, and also the bundle of interrelated practices, such as the practices of the policy makers. In order to achieve this, the following route map is suggested: Firstly, the researcher should adopt the symmetrical tenant of ANT and not decide in advance what is related and important, whether an interaction is micro or macro, big or small, social or technical. Scale is the actor's own achievement (Latour 2005: 184). ANT is all boundary without an inside and outside and so, instead of deciding on which layers to include, the sole question is whether or not a connection is established between two elements (Latour 1996, 6).

The task is then to carefully follow the actions of the heterogeneous network-builders (Murdoch 1998: 369), focusing on the network of connections. If an actor makes no difference, it is not an actor (Latour 2005: 130). Following Latour:

Actor-networks do connect and by connecting with one another provide an explanation of themselves, the only one there is for ANT. What is an explanation? The attachment of a set of practices that control or interfere on another. No explanation is stronger or more powerful than providing connections among unrelated elements, or showing how one element holds many others. (Latour 1996: 11)

ANT enables the interlinking of consumption practices to their wider material and societal context (Askegaard & Linnet 2011). "Society, organizations, agents and machines are all effects generated in patterned networks of diverse (not simply human) materials" (Law 1992, 380). On a

tactical level, using multiple methods might turn out to be most fruitful in capturing the network of practices and revealing the agencies at work.

Though ANT manages to remove layers and connect micro and macro, it comes at a price. The objective is giving a good description, not on interpretation. Tracing the network for a good description involves a lot of work. However, this way it is possible to obtain a better picture of a complex phenomenon.

## **CONCLUSION**

This article has attempted to enrich practice theoretical discussion and research by proposing (re)intertwining of ANT and practice-based research. This could enhance practice-based research in three ways. Firstly, while the practice-based perspective places the individual at the intersection of practices, the symmetrical tenant of ANT places all elements on the same line. Agency can be ascribed to an object but also to the assemblage of heterogeneous material, contributing to a better understanding of material in our lives. Methodologically, this might mean following an object instead of a human. Secondly, the network view of ANT could help to unveil the interconnectedness of practices and trace the micro and macro. Thirdly, this can be attained by following the actor in order to picture the network, incorporating the local and institutional context.

The ANT framework for practice research could be especially fruitful when looking at complex integrative practices and when the aim is an enriched, holistic understanding. A good example is research on sustainable practices, where ANT description could offer answers on local and global, micro and macro obstacles impeding sustainable practices. While following the actor is a somewhat vague guideline, and tracing the network involves hard work, it has the potential to capture a complex phenomenon. Though the ANT framework might not be adopted entirely, it offers good direction and inspiration for practice research.

ANT has already been utilized by certain consumption researchers for new perspectives and conceptualizations (Chitakunye & Maclaran 1999; Bettany 2007; Bettany & Kerrane 2010; Thomas, Price & Schau 2013). However, the full potential of ANT and the benefits described here remain to be unexplored.

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