EFFECT OF FOOD PRACTICES ON FOOD WASTE

Experience of food service kitchens in Oslo

Sandra Marcela Flores Barrera

Master's Thesis in Development, Environment and Cultural Change

Centre for Development and the Environment (SUM)

University of Oslo

June 2022

2022

Effect of Food Practices on Food Waste: Experience of food service kitchens in Oslo

http://www.duo.uio.no/

Print: Reprosentralen, Universitetet i Oslo

ABSTRACT

Based on semi-structured interviews with chefs of food service institutions kitchens (university canteens) in Oslo and a fieldwork in a professional kitchen, I studied the effect of food practices, mainly food preparation, on food waste. I analyzed food waste generation based on food practices in the kitchen. I identified that food preparation is a key stage that prevents the passage of food into waste, and that placements of food, throughout the kitchen, matter to prevent food waste. This thesis shows that what happens in the kitchen is related to other food handling practices such as planning and storing. Moreover, it draws on literature from food consumption, food practices and food waste research in out-of-home consumption venues. The framework that guides this thesis is social practice theory.

Key words: food practices, food service kitchens, practice theory, food waste, food consumption

ACKNOWLEDGMENTS

Esta tesis está dedicada a mis padres, Adriana y Juan, quiénes nutrieron desde siempre, y a pesar de la distancia, mis ganas de soñar.

Gracias…A mi esposo Max, quién ha sido mi constante en este tiempo de mucho cambio. Gracias por siempre estar ahí y empujarme a concretar este proyecto. Escribiéndome calaveritas que me hacían reír porque reflejaban tal cual la realidad de lo que fue este proceso para mí.

A mi familia, quiénes a la distancia, me echaban porras y me motivaban a seguir. Gracias por recordarme de dónde vengo y todo lo que ha conllevado esto. Gracias a mis amigas por estar al pendiente y compartirme sus mejores memes para hacerme reír mientras escribía. Las risas y las porras siempre sientan bien.

A mi supervisora Karen, por insistirme en construir mi texto de forma gradual y no repetitiva. Tu consejo sobre edición de textos me ayudó a dar mejor estructura y flujo a mis palabras e ideas. Gracias por compartirme también referencias de interés, por brindarme tu tiempo, retroalimentación y apoyo durante todo el proceso.

A los chefs, a los ayudantes de cocina y a otros empleados de las cafeterías que me dieron acceso a sus cocinas y a su entorno. Gracias por abrirme las puertas a sus espacios de trabajo y compartir conmigo su pasión, su tiempo e información.

A Arve y a los miembros del grupo de investigación de consumo. Gracias por compartir el interés por el marco teórico de este proyecto, por tener tiempo para resolver mis dudas, por compartir referencias relevantes y darme orientación durante mi tesis.

A mis colegas de SUM, quiénes en cada Text Lab me dieron retroalimentación a versiones anteriores a este texto.

A Gudrun, con quién siempre es bueno encontrarme. Gracias por estar ahí en un momento crítico para mí durante la pandemia. Gracias a Kristoffer por su apoyo técnico para que todo estuviera en orden. Por último, me gustaría agradecer también a las bibliotecarias de UiO, por facilitarme fuentes relevantes para esta tesis.

TABLE OF CONTENTS

LIST OF ACRONYMS

FSC	Food supply chain
FAO	The Food and Agricultural Organization of the United Nations
SDGs	Sustainable Development Goals
UN	The United Nations
UNEP	The United Nations Environment Programme
FLI	Food Loss Index
FWI	Food Waste Index
NGOs	Non-governmental organizations
SiO	*Studentsamskipnaden i Oslo* (In Norwegian) – Student welfare organization in Oslo
SPT	Social Practice Theory
NSD	*Norsk Senter for Forskningsdata* (In Norwegian) - Norwegian Centre for Research Data

LIST OF FIGURES

I. INTRODUCTION

Food is a complex constellation of issues (Lang and Barling 2012) p. 316

Several years ago, I was back home doing some social work at a food bank, where donated products from companies were stocked, reorganized, and shared with people in need. I remember how amazed I was by the amount of food stored in that warehouse and by the fact that some of it could have ended up in the trash. Pallets with piles and piles of boxes were covered with plastic foil and were arranged all around the place, while I spent my time there reorganizing food items from big boxes into smaller ones. Today, in a totally different context and circumstances, here I am, still amazed by the food that might go to waste.

Food is a basic human need. It can involve different meanings, practices, and policies. For some, food might seem mundane. However, in a hungry world and in a world affected by climate change, food waste became an issue of relevance, because it is happening at different latitudes and contexts. As stated by Parfitt, Barthel, and Macnaughton (2010), food waste happens at different points in the food supply chain (FSC), in both developing and developed countries and it poses different challenges on each stage of the FSC. As big as the problem might seem, this study is focused on the food practices in two food service institution kitchens in Oslo, Norway.

With this thesis, I aim to explore and respond the following research question: How food practices in the kitchen affect food waste? I argue that what happens in the kitchen matters in relation to food waste prevention or generation. My analysis will be supported by Social Practice Theory (SPT), mainly by the work done by Evans (2014) and Shove, Pantzar, and Watson (2012).

The food that is wasted

Food waste as an issue is part of the public debates in contemporary political agendas. As Szulecka et al. (2019) noted, this topic started to be on public debates just a decade ago, but it is now a specific matter of global concern. The 17 Sustainable Development Goals (SDGs) promoted in 2015 by the United Nations and adopted by all United Nation Member States, both developed and developing countries, are defined as a "universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere" (United Nations, n.d.). Particularly, food waste is targeted under Goal 12, that aims for ways to "ensure sustainable consumption and production patterns"[1]. More specifically, target 12.3 states that by 2030 the goal is to "halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses" (O'Connor, 2019). This goal is covering both sides of the FSC, considering the production (supply) and the consumption (demand) stages.

Food waste and food loss is a phenomenon that is present in different countries, with its differences nuances, magnitudes, and stages within the FSC (Pinto et al., 2018; Costello et al., 2016; (Parfitt, Barthel, and Macnaughton 2010). The difference between the concepts of food loss and food waste depends on where in the food supply chain the discarded food is taking place on. On the one hand, if the quantity or quality of food decreases along the FSC from harvest, slaughter, or catch and up to, but not including, the retail level, we can refer to it as food loss (FAO, 2019). On the other hand, if the decrease in quantity or quality occurs "at the retail and consumption level" (Ibid, xii) then we are talking about food waste (Ibid). Food loss tends to be associated with losses taking place mainly in developing countries, while food waste challenges are more present in developed countries. Despite where in the FSC the food is discarded, food losses and food waste pose challenges on different

[1] https://sdgs.un.org/goals retrieved on April 4th, 2022

dimensions: the former in terms of food security, and the latter when it comes to the environmental impacts of food production and consumption. Hence, the fact that we live in a world where 820 million people continue to suffer from hunger, and the fact that the environmental impact from food production accounts for 8% of the total estimated global greenhouse emissions (O'Connor, 2019), both put pressure to tackle the issue from different angles.

At the consumption stage, it is noted that in North America and Europe, the per capita food waste is between 95 to 115 kilograms per year, with a tendency to increase in the European Union (BIO Intelligence Service, 2010, cited in Pinto et al., 2018, 28). Whereas other regions such as the sub-Saharan Africa and South/Southeast Asia have a per capita food waste of 6-11 kilograms per year (Ibid). Moreover, the estimates done in 2011 by the Food and Agricultural Organization of the United Nations (FAO) are globally a common source to refer to the food loss or food waste issue. The estimates suggests that "around a third of the world's food is lost or wasted every year" (FAO, 2019).

Besides the interest that some countries have on reducing food waste, there are still methodological and conceptual challenges to approach the issue. Thereby, and in order to move forward to with the methodological challenges, and to achieve the specific targets under the SDGs, the United Nations (UN) has created two indexes and designated two of its agencies to be the custodians of them. The FAO will be responsible for the Food Loss Index (FLI), and the United Nations Environment Programme (UNEP) will monitor the demand side the Food Waste Index (FWI). Both indexes aim to contribute with solid estimates about food loss and food waste. The Food Loss Index was launched with the report *The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction* (FAO, 2019). The Food Waste Index, which has not been launched, is planned to estimate the waste considering three characteristics: the how, the where, and to what extent. First, to address the how, it should measure the food waste separated from the organic waste. Second, regarding the where, it should consider a specific level (e.g., the household). And the third, to know to

what extent, there should be national measurements for different food stages (O'Connor, 2019).

When it comes to the conceptual challenges, there is still no agreement on the definition for the food waste concept. For some, food waste covers all of the edible and non-edible components. Whereas for others, food waste covers only the edible parts of food, excluding bones, for example. Additionally, considering the definition provided by the UNEP, food waste is defined as: "the food and associated inedible parts removed from the human food supply chain at the following stages of the food chain: manufacturing of products, food retail and wholesale, out-of-home consumption, and in-home consumption" (O'Connor, 2019). However, in the recent FAO report, food waste is understood as the waste that "occurs at the retail and consumption level" (FAO 2019, xii). Under this report, inedible parts of food are not considered food loss neither food waste. This exclusion of the inedible parts of food is also reflected in the definition provided by the *Trade Agreement about the Reduction of Food waste* signed in 2017 (*Regjeringen*, 2017 cited in Szulecka et al., 2019, 257) and (Plasil 2020), where it is noted that food waste is understood as all of the edible parts of food produced for humans that are removed or disposed from the food chain.

The food waste issue creates a problem that touches upon ethical, social, and environmental concerns, where no single solution can be proposed to solve the problem. As pointed out by Szulecka et al. (2019), food waste cannot be tackled in a single way. There are political, economic, and cultural factors that influence the ways in which each country manages this issue. The Nordic region provides a good example on how food waste initiatives vary in origin, stakeholders, pathways, and outcomes. In Norway, food waste initiatives dated since 2010, with a clearer industry drive (Ibid*,* 261*)* compared to those that started in Denmark during 2008, where civil society had a more leading role (Ibid*,* 265). Norway is a good example on how the issue of food waste has been institutionalized, involving different actors and projects. As Szulecka et al. (2019) state: "food waste has recently been identified as a very significant and pressing problem in Norway" (p. 260).

In addition to the institutional initiatives that have been implemented in Norway, other technological paths for reducing food waste have also been launched and developed. These included, for instance, changes in food labels that aim to reduce food waste. However, as Plasil (2020) argues "changing words might remind people to use their senses but may not really change consumer attitudes and practices" (p. 24). These technological changes in Norway are coexisting with other strategies to redistribute surplus food (Baglioni et al. 2017). Even though the authors do not specify Norway as a case study, through my experience living in Oslo, I am aware that in Norway it is common to buy unsold food close to expiration by using mobile apps. These apps connect food items (raw or prepared) with customers at a reduced price. Supermarkets, restaurants, and bakeries are venues that participate in this surplus food management.

Motivation for the study

My motivation for realizing this project responds to several elements: first, the context where the research is taking place; second, a personal motivation to research a topic that I am really interested about; and third, because I want to continue exploring more ways in which kitchens are venues for sustainable solutions.

High-income countries, such as Norway, represent a good case for studying food waste because, as stated by Baglioni et al. (2017), "the amount of edible food wasted on a daily basis due to failures at the production, retail, and consumption stages, has reached an unbearable level". Particularly, food waste within developed countries occurs more within the consumption stages of the food supply chain (Parfitt, Barthel, and Macnaughton 2010). Szulecka et al. (2019) show that Norway has different actors involved within the food waste governance, where there is an industry lead, but with public involvement and civic participation. The food service industry is also on board, and environmental NGOs are also

tackling this problem. Hence, there are current conversations about a food waste law that will mainly impact food companies. So, Norway represents a context where work has been done, but the issue is still relevant for the research and political agendas.

My personal motivation for this study is that I grew among food, kitchens, and cooks (mainly family members) that were handling food. I was surrounded by recipes, ingredients and creations; a captivated by smells, textures and flavors. For me, the kitchen is a space of creation, a venue for expression, and also for change. During the design phase of this study, it was satisfying for me to realize that there is evidence that shows how kitchens, chefs, and cooks are contributing for a different, and hopefully much better, future.

An academic inspiration for this research is the idea presented in the peer-reviewed article *Chefs as Change-Makers from the Kitchen: Indigenous Knowledge and Traditional Food as Sustainability Innovations,* where Pereira et al. (2019) stressed that a specific venue for sustainable innovation is indeed the kitchen. Therefore, in the kitchen, where food is handled, food waste can occur. According to Lagorio, Pinto, and Golini (2018) food waste can occur during food preparation and storage. These stages are prior to the food waste generated by the consumer (generally known as plate waste) and do not cover an "end-of-pipe" scope (Hamilton et al. 2015). By positioning my study in the kitchen, I was able to immerse myself in the food preparation process and other food practices because, as pointed out by Hennchen (2019), "the stage of food preparation deserves special attention" (p. 675).

I situated my research in the broader anthropological spectrum that is needed to understand the complex food systems that we have (Belasco, 2008 cited in Pereira et al., 2019). Particularly, under food waste research, food preparation can be viewed as "an activity that involves the separation of food from non-food, and it follows that, stuff that does not enter the category of food is not going to follow the same trajectory as stuff that does" (Evans 2014, 54). Meaning that non-food will be placed in the bin and, more commonly, will end up in the waste stream.

Venue for the study: the kitchen

This study is located in the consumption stage of an industrialized country where evidence shows that food waste occurs (Costello, Birisci, and McGarvey 2016). The focus will be particularly on professional kitchens in the higher education sector of Oslo, Norway. University canteens are part of the "out-of-home eating", a phenomenon that has increased considerably in the last decennia (Ferreira, Liz Martins, and Rocha 2013) and which represents a good venue for food waste research. Out-of-home consumption covers consumption in restaurants, hotels, and canteens located in schools, offices, prisons, and hospitals (O'Connor, 2019).

In Oslo, items considered as food waste, usually and ideally, will be placed in a green bag. These green bags, found in households or in food service institutions and in other places such as public parks, represent one of the different waste sorting categories that the waste management services in Oslo have. This green bag usually includes peelings, bread, teabags, coffee grounds, seafood, leftovers meat/bones, eggshells, and small amounts of soiled kitchen paper (*Oslo Kommune*, 2022). Therefore, doing food waste research in Oslo is relevant from the environmental and consumption perspectives, and must definitely involve these green bags at some point.

This research is situated in an urban context, since the majority of the universities are located in cities. Moreover, cities face many sustainability challenges regarding waste and food. How to guarantee access to food? How is waste managed? How to prevent food waste from happening? These questions are among the most important ones, which could be present at city level's discussions. One way to understand food waste is through waste scholarship. On the one hand, waste scholarship has been mainly focused on exploring how and why material objects are discarded, where waste has been defined by Eriksen (2016), as a "result of affluence and surplus" (p. 107), and has captured researchers' interest. Furthermore, food waste has its own particularities and poses its own ethical challenges because food is matter

consumed by human beings and, as stated by Parfitt, Barthel, and Macnaughton (2010), "food is a biological material subject to degradation" (p. 3065).

Food waste research in educative dining areas is usually implemented in school canteens as the main venue for the study (Lagorio, Pinto, and Golini 2018). However, evidence shows that, in Norway, students rarely or never use the school canteen (Chortatos et al. 2018) because they bring their own *matpakke* (packed lunch). This fact makes it difficult to study food preparation in these educative venues. However, alternatively, other venues, such as kitchens in university canteens have more affluence of students and employees. Therefore, these last ones represent a good venue for food waste research (Pinto et al. 2018), (Costello, Birisci, and McGarvey 2016).

The University of Oslo is one of the leading public universities in Europe (University of Oslo, n.d.). It has a headcount of 28,000 students and 7,000 employees (University of Oslo a, n.d.), distributed among different campuses. The food supplier for the University is *SiO* (*Studentsamskipnaden*), a student association that offers different services that surround the student's life such as: housing, training, health, and food (Studentsamskipnaden SiO, n.d.). This association provides services to 28 public educative institutions in Oslo and Akershus, encompassing 71,800 students. *SiO Mat og Drikke* (SiO Food and Beverage) is the division that manages canteens and coffee shops from *SiO* (Ibid).

Oslo, as other major capitals in the world was affected by the COVID-19 pandemic. Lockdowns were implemented and people had to stay at home. Food service institutions in Oslo were closed since mid-March 2020. Slowly and following the prevention and safety guidelines, some of the canteens in universities started reopening during the Autumn 2020 semester. During the implementation of this research project, a second and more restrictive lockdown was implemented in Oslo during the Spring 2021 semester. And, again, food services institutions were shut down. During the Autumn 2021 semester, COVID-19 restrictions were changed, and students were allowed to be back on campus, therefore during

this semester there was a partial reopening of university canteens providing food service for students and employees.

Research context: Oslo, Norway

Measuring food waste within national borders is still an incipient field. There are only 15 countries[2], Norway being one of them, that have a food loss and food waste baseline at a national level (O'Connor, 2019). According to Szulecka et al. (2019), the issue of food waste has been part of Norway's national agenda since 2015. More importantly, it has not been an isolated issue of interest, but, instead, it has created a multi-level food waste governance in the country, comprised by different actors. This government setup, started and was led by the presence of companies within the industry. Then, it was combined with public ministries, who first acted as observers and then as full members. And, finally, the civil society when on board, mainly through the NGO, *Framtiden i våre hender* (The Future in Our Hands). Having this multi-level governance has helped to expand the work done by the industry led through the food waste initiative *ForMat* since 2010. First, it continued by signing *Agreement of Intent to reduce food waste* in 2015. Then, two years later, in 2017, it led to the signing of the *Industry Agreement on the reduction of food waste* by ministries and industry organizations. Thirdly, the *ForMat* network launched the *KuttMatsvinn2020* (Cut Food Waste 2020) intended to target the hospitality sector (Szulecka et al. 2019). Hence, even though some food waste governance exists in Norway, the hospitality sector has just recently been addressed. Therefore, it is relevant to look at the waste generated by hotels, employee cafeterias, and convenience stores even if they only represent 5% of the total food waste generated in the country. On the one hand, this sector comprises all the specialized, knowledgeable, and skilled professionals in the kitchen, who could have the best practices to prevent food waste that could be replicated in other sectors. On the other hand, this might

[2] Other countries include: Australia, Canada, Denmark, Estonia, Italy, Japan, Mexico, the Netherlands, New Zealand, Saudi Arabia, Slovenia, Spain, the United Kingdom, and the United States.

seem like a low percentage, however, from the total of 390,000 tons of food waste in Norway[3], it still represents a considerable amount of 17,000 tons of food waste generated that cannot be ignored.

Furthermore, at the individual level, there is also interest on mobilizing people in the Nordic countries, into what Niva et al. (2014) coined as sustainable culinary practices. These changes are all food-related changes that can take place in the way people produce, distribute, buy, or cook food in general. Therefore, these particularities of the context make food waste research relevant for different stakeholders in the country.

Thesis structure

This master thesis is structed in several chapters. First, the literature review chapter describes the food waste issue, discusses relevant food waste studies, and provides a brief presentation of social practice theory. Following, the theoretical chapter presents how the framework has evolved over time and what are its main premises. It also includes a table with conceptual definitions and a theoretical sketch that is employed in the analysis. This section concludes some reflections on the main discussion points within the theory.

Later, in the methodology chapter, I will present and describe my ethnographic approach, involving participant observations and interviews, drawn by the social practice theory framework. Here, subsections such as the data management, limitations, and challenges are also described.

Next, my results chapter is structured in three levels: 1) describing food saving practices, 2) the illustration of the passage of food into waste, and 3) the analysis where elements of social practice theory are employed to explain the practices of saving food.

[3] See Stendsgård et al., complete's report "Food Waste in Norway Report on Key Figures 2015-2018"

The final part of this thesis presents my conclusions and the bibliography used throughout the thesis. Additional documents such as the information letter, the consent form for this study, and the interview guide can be consulted in the Appendices section.

II. LITERATURE REVIEW

This Literature Review chapter includes a brief description of the food waste issue and how it has been addressed over time, followed by the main approaches to study food waste. This section will also cover the relevant studies in the field, highlighting the main findings and shortcomings. The final section of this chapter will describe the proposed approach to study food waste in this study, social practice theory, and a brief description of the methods used under this framework.

Food waste: the issue and more

> *The issue of food waste has become an increasing concern for governments and their populations* (Evans, 2014, 9)

For some authors food waste is a contemporary issue, meaning that the issue "started to appear on political agendas and on public debates only in the 2010s" (Szulecka et al. 2019, 254). However, food waste in the consumption sphere has been addressed for long. According to Evans (2013 in Southerton and Yates 2014 in Ekstrom), the UK's XVIII cookery books and household manuals included different ways in which people could reuse their food. Nowadays, food waste reduction is also the goal for different initiatives related to consumption and hunger prevention. It is estimated that "a third of the food produced globally every year for human consumption, approximately 1.3 billion tons, is lost or wasted" (FAO 2011b:4 in Alexander et al., in (Murcott et al. 2013). Because of its impact and its relation to a basic human need, food waste is included in one of the targets of the 17 United Nations Sustainable Development Goals (SDGs). Under the 12th goal of 'sustainable consumption

and production patterns', food waste is specifically addressed under the target 12.3 which aims to reduce by halve the per capita food waste by 2030 (Ibid). It is the first time that food waste is included as an issue in an international agenda.

Food waste: understood through different angles

According to Alexander et al., 2013 in (Murcott et al. 2013) there are three main approaches to food waste research. These approaches are interconnected and help us understand the way in which food waste is defined in the first place. First, and probably the most common, is the political economy of food waste. Under this approach, food waste is understood as "the failure to use potentially edible items to satisfy human hunger" p. 473. Here, the main assumption is that food is for humans and that it can be lost in all of the different stages of the supply chain. Second, the cultural approach defines food waste as a consequence of overconsumption. Under this approach, the prevalent solution to the problem is to provide knowledge to consumers in order for them to reduce their food waste. However, under the cultural approach, it is stated that sometimes the "food waste generating extravagances serve a purpose" p. 478. For example, to publicly show the difference on wealth, power or status between a donor and a giver. Finally, food waste can be studied under a post-humanist approach. Mainly in the developed world, food is seen as a lively matter, and not only something that can satisfy human needs. With or without human intervention, eventually, food will decompose. Under the post-humanist approach, the new technological scavengers gain relevance because they used food waste as an input to create other valuable output, such as energy.

Food waste, under the political economy approach, has also been studied in the field of sociology of consumption, mainly drawing from waste scholarship on studies of material culture (Evans 2014). Sociology of consumption focuses the attention on the context rather

than the individual, and the ways in which the former is relevant to understand the issue. The main applications of this approach were mainly implemented on energy studies. However, food research particularly addresses issues related to food consumption. Food consumption can be understood as different activities such as "purchasing a food item, using it or transform it (in cooking, baking, etc.), eating it, and wasting it" (Neuman 2018, 82). Food consumption studies within SPT have been drawn from a more analytical understanding of practices, such as eating (Warde 2016). In Warde's study, we can understand how come we eat, what do we eat, and why do we do it the way we do it. Sociology of consumption differs from other approaches to consumption, because of the way it defines consumption in the first place. Beyond seeing consumption as a simple transaction or an exchange that happens between a seller and a buyer, Warde (2005) defines consumption as:

> I understand consumption as a process whereby agents engage in appropriation and appreciation, whether for utilitarian, expressive or contemplative purposes, of goods, services, performances, information or ambience, whether purchased or not, over which the agent has some degree of discretion (Warde 2005, 137).

Evans (2019) draws on Warde's concepts of the "three As": acquisition, appropriation, and appreciation, and proposed three counterpart "Ds" consisting of: devaluation, divestment, and disposal. The later, considers the process of 'getting rid of things' (building from Gregson, 2007, p. 3.). These three additional moments of consumption make a total of six specific moments of consumption; where the disposal moment of consumption, which is the counterpart of the acquisition moment, opens a path to start understanding the different ways in which good, services, and experiences are disposed (p. 507). Even though these moments of consumption were not particularly developed for food studies, they can illustrate how food moves from the acquisition point to the disposal stage. However, compared to other

consumer goods that might have a longer life-span within the moments of consumption, food has a short life-span. Hence, it reaches the category of rubbish (Thompson 1979 cited in Evans 2014) very quickly. Thus, food is a material matter that is "particularly susceptible to rapid spoilage and decay, meaning that there are significant risks (whether real or perceived) associated with its consumption" Gregson et al.'s, 2007a, 2007b cited in (Evans 2014, 67). Other authors define the state of food as not fixed, but in constant flux and becoming (Bennet 2007 in Evans 2014). Through changes in texture, smell, color, or taste, food is sending us signals that can shape its "own passage to becoming waste" (Evans 2014, 67). This particularity of food is transversal and crosses over different sites of consumption, including households or food service institutions.

The location of the food that is disposed: loss or waste?

According to the (O'Connor, 2019) there are specific operational definitions for each of the two concepts, of food loss and food waste. The main difference between these two concepts relays on the stage in the human food supply chain in which the loss or waste occurs. On the one hand, food loss refers to "all the crop and livestock in human-edible commodity quantities, that directly or indirectly, completely exits the post-harvest/slaughter production/supply chain by being discarded, incinerated or otherwise, and does not re-enter in any other utilization (such as animal feed, industrial use, etc), up to, and excluding, the retail level" (p.9). On the other hand, food waste is "the food and associated inedible parts removed from the human food supply chain at the following stages of the food chain: manufacturing of food products, food retail and wholesale, out-of-home consumption and in-home consumption" (p. 10). In other words, food loss refers to the food lost in the production sphere, while food waste refers to the food that is wasted in the consumption sphere.

On the contrary, food waste is also defined as the "wholesome edible material intended for human consumption, arising at any point in the food supply chain that is instead

discarded, lost, decomposed or consumed by pests (SEE FAP, 1982, in Lagorio et al., 2018). Other food waste research identifies categories for classifying food waste: avoidable, possibly avoidable, and unavoidable (See Ventour, 2008 in Morone, 2018). Following this classification, Hamilton et al. (2015) categorize avoidable food waste as "food that should have been eaten, but for different reasons ended up as waste", where the term unavoidable food waste is used to categorize compounds of food waste that are not consider to be eaten by humans such as bones, shells, and peels. This research will consider Alexander et al., 2013 in (Murcott et al. 2013), where losses refer to the post-harvest, but pre-consumption waste. And food waste id broadly defined as that arising in the demand stage. Despite of the location where the loss or waste happens, some authors argue that in human societies, there will be always food waste, because of some reasons and at different degrees (Ibid, 478). So, it would never be completely eliminated.

These two views to the problem differ and contrast from each other. Political economy focuses on the different locations of the food supply chain where food loss or waste can occur, and, therefore, making allusion that it can be reduced. However, the cultural approaches, state that that it does not matter where it happens, food waste is an issue that is going to be present in any human society.

Food waste: the state of research

> *Research into food waste needs to go beyond the plate and even the bin* (Alexander et al., 2013, 482).

In this section, I will briefly describe relevant food waste studies. Some of them took place at the household level, while others were implemented in professional kitchens. This

reflects how food waste can take place at different sites of consumption (Sahakian and Wilhite 2014).

A relevant change in food waste research is the sphere of study within the food supply chain. According to FAO 2013 in (Costello, Birisci, and McGarvey 2016), the food supply chain is composed of 6 phases including: agricultural production, post-harvest handling and storage, processing, distribution, consumption, and end of life. Food waste can occur "at all phases in the food supply chain" (Costello, Birisci, and McGarvey 2016, 192). However, the food loss/waste research has been centered in the supply stage of the food production chain. However, as pointed by Belasco (2008) "until recently scholars were amazingly reluctant to study food, specially, the aspect closest to our hearts (and arteries): food consumption" (p.2). The field of food consumption is a complex system of subsystems, where consumers perform different food practices. These practices include: shopping, growing, foraging, cooking, and socializing (O'Neill et al. 2019). Previous food waste research on the consumption side has also explored different ways to organize meals, e.g. sharing to possibly reduce food waste. For example, in the study implemented by Morone et al. (2018), they study households to see if there was a causal relationship between food sharing and decreasing food waste. They conclude that there is no causal relation between these two variables. However, they noted three key enablers that could help food waste reduction, these include: environmentally friendly behavior, skills, and collaborative behaviors (p. 756).

Recent food waste research in the consumption stage pointed out that even though the food waste is generated in a specific venue, such as the household, it is caused by external practices (e.g. food packaging) that take place before the consumer acquires the food item. For example, the food waste research implemented by (Evans 2014) in UK households, shows that that packaging of certain food products can generate food waste at the household level, because people buy at the supermarket more food than what they need. Therefore, most of the time it ends up in the bin.

Another change in the food waste research is the venue selected for the study. As of now, households remain the main venue for implementing food waste research. However, food services institutions or professional kitchens are relevant sites for food waste research (Costello, Birisci, and McGarvey 2016), (Engström and Carlsson-Kanyama 2004), (Hennchen 2019) and (Pinto et al. 2018). As noted by Garrone, Melacini, and Perego (2014), the food service institutions can be described as having different segments. On the one hand, is the collective catering, which includes canteens at schools, companies, or hospitals. On the other hand, the commercial caterings refer to cafes and restaurants. These segments differ between each other in the cooking practices they implement, the service they provide, and the customer experience (Ibid, 136). It is also relevant to note that, even though the catering serves in a collective setting, the supplier could a private company. Particularly, in food service institutions, food waste research categorizes food waste as pre-consumer and post-consumer food waste (Costello, Birisci, and McGarvey 2016). Storage loss, preparation loss, serving loss, and overproduction are all considered as categories in the pre-consumer food waste. As its name specifies, post-consumer food waste covers all of the food that is purchased by a consumer, but does not get eaten (Ibid).

A third change in food waste research, particularly one done at food service institutions, is the shift in focus from plate-waste to other waste generated, mainly in the kitchen. Plate-waste refers to the leftovers generated after consumers buy food. Previous quantitative studies on plate-waste in education venues estimate that, from kindergarten to university, plate-waste is around 33 to 200 grams per person (See references in (Pinto et al. 2018). Other studies, such as the one implemented by Costello, Birisci, and McGarvey (2016) cover both, the pre and the post-consumer food waste of several dining facilities. This shift from the plate to the kitchen happens because in the catering service, food waste is also generated from spoilage, meal preparation, and unserved food. Consequently, other authors claim that the factors that might influence waste are inadequate planning, consumer food preferences, and inadequate training of food workers (Borges et al 2006 in (Ferreira, Liz Martins, and Rocha 2013).

However, as stated by Hennchen (2019), “most of the food waste research is based on cognitive-behavioral approaches”, p. 676. This means that the solution for the food waste problem is based on interventions, mainly focused on providing more information to students in the dining areas to reduce their plate-waste. An example of a study that tests the intervention messages to reduce food waste in canteens is the study implemented in one of the 18 canteens from the University of Lisbon (Pinto et al. 2018). Therefore, this dominant interest of researchers on plate-waste has left the waste generated in the kitchen functions unsearched (Goonan, Mirosa, and Spence 2015).

Furthermore, plate waste or post-consumer food waste has its own limitations in recovery, because evidence shows that leftovers on the plate are “more likely to end up in the bin” (Evans 2014, 54). Therefore, it is hard to recover food from that stage. Hence, research is also focusing in what happens before the plate waste, this is pre-consumer waste. According to Costello, Birisci, and McGarvey (2016), in their quantitative study of food waste done in four dinning services in the US, 13.9 metric tons (t) were wasted during the pre-consumer food waste, representing a 5.6% from all of the food that reached the dining facilities. This means that the waste was generated in the kitchen, or because of spoilage or excess of food.

It is in the kitchen where the preparation and other food handling activities (Hebrok and Heidenstrøm 2019) take place and where waste can also be generated. Engström and Carlsson-Kanyama (2004) noted in their food waste research done in food service institutions in Sweden, that some strategies can be implemented while handling food. By food handling we can understand that storage, preparation and serving losses can occur. For the storage, when goods are delivered to the food service institution try to keep them at a proper temperature, so that the frozen or chilled items are placed in the refrigerator and freezers as soon as possible. Particularly in the fridge, the new ones go in the back and the old items in the front. These authors also acknowledge that the integration of leftovers in the menu is

another way to reduce waste. However, if the amount of the leftovers is too small, or because of hygiene or quality aspects, sometimes the integration of leftovers is not possible.

A common activity that takes place in the kitchen is cooking or food preparation. As stated by Hennchen (2019) "the stage of food preparation deserves special attention" (p.675). The author defines preparation as the step that "consists of two activities: on the one hand, it refers to work routines that make serving food without major delays possible. Ingredients are cut, food is precooked, and products are organized in a fixed order ('mise en place') due to a usually restricted time window during opening hours. On the other hand, preparation also implies working in advance (e.g. for upcoming days) as soon as practitioners are finished with the preparation for the current day" (Ibid, 678). Food preparation in the kitchen is a key stage to understand food waste prevention, because it is where food is classified as food and non-food (Evans 2014), and these two food categories usually follow different placements. It is important to notice that whatever does not enter the food category will follow a different path from what does (Ibid*,* 54).

Besides to the stage in which waste is taking place in a food service facility, there is another common challenge faced by professional kitchens, and it is about how to define how much food to prepare per day (Sonnino and McWilliam 2011), (Garrone, Melacini, and Perego 2014).

To summarize, and as shown from previous food waste research, food waste research has shifted from the production side, to the consumption sphere in the food supply chain, and from the households to other sites of consumption, such as food service institutions. Particularly, in the food service institutions, food waste research is moving from the plate-waste to other locations, like the kitchen, where possible waste can be generated. Furthermore, and as some researchers pointed out, doing food waste research in a dining facility has its benefits because it is a more controlled environment compared to the dynamic household (Costello, Birisci, and McGarvey 2016).

Food waste and Social Practice Theory

The dominant approaches, mainly behavioristic focus approaches, to food waste tend to focus on different assumptions. First, they assume that food waste is generally caused because of the individual's lack of knowledge. The second assumption is that food waste is defined as an end-of-pipe problem (Hamilton et al. 2015). Hence, it is defined as a domestic issue that requires change mainly from the individual (Evans 2014). However, evidence shows that food waste cannot be seen as "simply the last point in the line of production, distribution, and consumption" p. 473 Crang et al., 2013 in (Sonnino and McWilliam 2011) and the problem cannot be solved only by providing more information to the individuals that are handling food and expect them to change their behavior.

Social Practice Theory approach differs from the individualistic approaches used to study food waste. First, its focus goes beyond the individual and it is centered on practices. Under this lens, food waste is not seen as a responsibility of the individual. Hence, food waste is seen as a product of the arrangement and organization of different processes and practices of contemporary life (Southerton, D., Yates, L. 2015 in Ekstrom). Social practice theory is a framework that can be applied to different research venues for studying the issue of food waste, in households (Evans 2014), (Hebrok and Heidenstrøm 2019), and in professional kitchens (Hennchen 2019). Secondly, this approach tries to identify the tensions and dynamics of practices, and the way in which they reproduce or adapt through performances. This approach is context sensitive, which means that there is a recognition of elements that include: working routines, practical knowledge, and the physical environment where the practice under study is taking place (Ibid). The sociological analysis on waste, and particularly on food waste is against the throwaway society thesis (Evans 2011). Because it sees waste as a result from the organization of everyday life practices, rather than just looking at the individual who disposes stuff. Moreover, instead of focusing on the amount of food that is in the bin, the sociological approach takes a step away from the bin and "explores how and why food that is purchased for consumption comes to be wasted" (Ibid, 42). A better

description of these elements and its connection to my study will be included in my theoretical framework.

Relevant findings: from beyond the plate and the bin

Previous food waste research under a social practice theory approach shows that inaccurate preparation accounts as the principal cause of food waste (See WRAP 2013b in (Hennchen 2019). Furthermore, in his food waste research at the household level in the UK, Evans (2014) argues that under a social practice theory approach, individuals cannot be blamed for food waste. Rather, he claims that food becomes stuff that is disposed because of the dynamics of everyday life, and that food waste is embedded in flows and practices. Evans (2014) claims that the practice, not the individual, should be the basic unit for waste research and policy. This position contrasts to other food waste research, where information through awareness campaigns is seen as the main intervention to reduce food waste (Pinto et al. 2018).

Food waste research brings Evans work which is drawn mainly from waste and material scholarship. He developed a theoretical sketch that points out how food passes through different flows or food categories (e.g. raw ingredients, cooked meals, leftovers, and waste) (Evans 2014), and highlighted the importance of looking beyond the bin. Under his social practice theory approach, research has to consider the ways in which the individuals plan and shop, how they prepared their food, and how might they get rid of what they do not use (Ibid). This shift from the individual to practice, and from the communicative aspects of food to the inconspicuous or mundane (Neuman 2018), involves focusing on the processes and practices involved in the handling of food. Moreover, the concepts of surplus and excess and other main contributions from Evan's work, who draws from waste and material scholarship. The former refers to the foodstuff that has already been acquired, but is not useful at the moment and can be placed somewhere else (p. 60). The latter refers to items that cannot be placed. In a way, surplus has the potential to become something or being used at

some point. Compared to excess, it is still useful in a way. (Evans 2014). In other words, surplus food is food that has not been cooked, opened, or prepared. It can be foodstuff that you already have, but it is being unused (Ibid). Finally, Evans draws from waste scholarship influenced by Lucas 2002 regarding his statement on how disposal is enacted "via a two-stage holding process". And, he is also influenced by what Hetherington 2004 suggests (and also cited in Evans 2014) about this process creating a gap in disposal through which households "deny the wastage of things whilst they attempt to obtain settlement with the value that remains" (p. 52). For Evans, when food enters the gap in disposal is where the empirical data is needed to make senses of the processes in which surplus might cross the line and become waste. Evans claims that food moves along different food categories (ingredients, cooked items, surplus, excess, and waste), and is through the movements in the kitchens that food can be saved.

In Oslo, Norway social practice theory has been used before to study food waste. In a recent study done by Hebrok and Heidenstrøm (2019) at 26 households in Oslo, they argue that, in order to prevent food waste, interventions have to be 'contextual measures'. This means that any proposed intervention should be linked to the time and place where food is handled, not only when it is disposed. And, if food is handled through different stages, any intervention should consider all of the food handling practices. The authors noted five food waste related practices that could be of relevance for future interventions, these include: acquiring food, storing food, assessing edibility of food, valuing food, and eating (p. 1435). They argue that knowledge on its own will not change what people do because what is making food going to the bin is not lack of knowledge, but the way in which everyday practices are organized. This is relevant for my study, because food preparation is a food handling practice that is connected to other four food handling practices. This will mean that any attempt to change food preparation, in order to reduce food waste, should also consider the way in which people are handling their food in the other four stages.

III. THEORETICAL FRAMEWORK

Social Practice Theory: Milestones, premises, and critics

Social Practice Theory (SPT) is a framework that understands the world through practices, and it considers the practice as the unit of study and analysis. It is a way to explain not only action, but the social world (Reckwitz 2002), where the actions could respond to rational choices or the norms in society. Rather, under this approach, the practices are what explains the action. Its main premise is the shift in the analytical focus. Meaning that the focus moves from (*homo*) individuals or products, "towards understanding of everyday practices, many of which include routinized activities" (Sahakian and Wilhite 2014, 26). SPT dates back to the mid-20th century, where much work was done by Bourdieu and Giddens. This first phase of SPT was focused in the social dimension of what now constitutes a practice. Concepts such as routines, reproduction, habitus, doxa were the main focus on both of these theorists' works. As stated by Shove, Pantzar, and Watson (2012), Bourdieu's and Giddens' approach was "entirely social" p. 2 (Chap. 2 online version). However, the theory continues to evolve and, from the social dimension, new elements were integrated into the SPT, mainly the material dimension. During this first stage of SPT, Ortner noted that a "theoretical orientation" towards terms such as: practices, praxis, action, interaction, activity, experience, and performance were permeating in to the research world (Warde 2016). This turn was a response to cultural theories that focus on the visible expressions. By turning into the everyday life, the personal life, that mainly occurred at home, became relevant. Here is where the small components of life help explain bigger issues (Ehn, Löfgren, and Wilk 2016).

Further on, new concepts were developed and the definition of the practice itself integrated a combination of different elements (Warde 2016), that moved from the social dimension. During the 2000's, theorists such as Schatzki and Reckwitz worked with

developing the theory at a conceptual level, and started to identify different elements that integrated a practice. For Schatzki, the practice is at the core of the social order and personal conduct. Likewise, Reckwitz's main contribution was to include the material aspects of life under the scope of the framework (Warde 2016). Furthermore, during this phase, other authors continued to interpret previous concepts and started to apply SPT in energy studies and environmental behaviour (Sahakian and Wilhite 2014, 26). The works done by Reckwitz 2002, Røpke 2009, Shove 2003, Spaargaren 2011 and Warde 2005 are well known for their application and marked the beginning of the application of theoretical or conceptual ideas in empirical studies. Particularly, Warde has explored the practice of eating through SPT, and has inspired recent work on SPT and food waste issues, mainly done by the work of David Evans which will be discussed in this chapter, section the analytical passage of food into waste.

Few studies have approached cooking under a social practice theory framework. However, Halkier (2009) points out that there are four analytical benefits for exploring cooking under this approach. First, it focuses on the execution of the cooking in everyday life, without focusing on intentionality and meaningfulness, which is the main focus in other everyday life studies of food. Secondly, "the production and performing of cooking practices is done as much by silent and tacit procedures with body, foodstuff and tools" (Murcott 1983; Short 2003) and, therefore, having a practice theoretical approach is a way to approach cooking practices and actions without privileging discourse. Thirdly, by having this approach to cooking, the focus centers on the "social flow of practically performed cooking, rather than the individual consumer choices" p. 62. Finally, through this approach, one is able to embrace with the normativity of everyday practices. This means that there are elements that can help identify, in the context of that study, what can be defined as good cooking.

There have been several critics of social practice, mainly in the way in which practices are transmitted. In the article *Practice then and Now,* Turner (2007) mentioned and built a case against the publishing of the social theory of practices book. On his book, he talks about

mirror-neurons. This concept refers to the fact that people only learn by looking at others. And, therefore, this can help us understand the ways in which practices are transmitted. However, practices are influenced by geographical contexts, resources, infrastructure, knowledge, etc. For example, if someone is interested on learning how to swim, they can watch videos on how it is done. However, nothing will replace the practice of being in the pool, sensing the environment and the water, holding your breath under water, etc. So, by looking at some videos you can get insights on how the performance is done, but nothing will replace the time spent practicing the skill and interacting with the water environment.

So, what is a practice?: Main concepts and types of practice

In Social Practice Theory, there are relevant concepts that describe what is considered as the main unit of analysis under this framework. A practice, according to Schatzki 2001 in Halkier (2009), "is a set of doings and sayings that are organized by a pool of understandings, a set of rules, and a teleoaffective structure" p. 360. Reckwitz 2002 in (Halkier 2009) also described a practice as something that involves more than two elements. For this author, the routinized attribute must be present, and the author expands on other elements that form a practice. These elements include the forms of bodily activities, forms of mental activities, things, knowledge, and states of emotion. In a way, practices are "ways of" doing, working, etc. Furthermore, Warde 2005 in Halkier (2009) defines a practice as "constituting a nexus of practical activity and its representations (doings and sayings), which become coordinated by understandings, procedures and engagements" (134).

In a way praxis and Practices are different from each other. Neuman (2018) draws from Reckwitz's distinction of praxis (Greek) and *Praktiken* (German). The former can be used to describe human action. Compared to practice theory, Praktiken involves a routinized behaviour and a combination of several elements such as where the body, the mental

activities, things, knowledge and emotions are part of that practice (Neuman 2018). Middlemiss (2018) describes a similar distinction between a practice and behaviour. The latter is defined as "what people do", p. 124. However, a practice involves doings, but also the way in which that doing is linked to the social and material world. In a way, a practice is an action, which includes the context where this action is taking place.

As the theoretical framework evolved, contemporary theorists within this perspective draw on the particularity of practice, which considers it as an integration of different elements. It started with the social elements of Bourdieu, such as the habitus, and over time new layers or dimensions had been added to the theory, mainly the material dimension (Sahakian and Wilhite 2014). For Schatzki, the elements that integrate a practice include: the body, the mind, things, knowledge, discourse, structure process, the agent or the individual (Reckwitz 2002). It is also Schatzki that identified the two main notions of practice, the coordinated entity and the performance (Warde 2005). On the one hand, the entity has to do with this nexus of doings and sayings, and the performance can be defined as the representation of an action, a practical activity. Schatzki's also contributed at a conceptual level, with his contribution of the classification of different type of practices. While disperse practices only require understanding for doing something, integrative practices, such as cooking are more complex (Ibid). Southerton and Yates (2015) noted that dispersed practices refer to "generic, usually tacit, practices that are dispersed across a range of activities" p. 138, while integrative practices are "the more complex practices found in and constitutive of particular domains of social like" (Schatzki, 1996: 98 cited in Southerton and Yates, 2015, p. 139). Furthermore, Southerthon and Yates (2015) define integrative practices as "those that have their own specific formalization in terms of rules, procedures and standards" (p. 139). Moreover, Warde (2016) describes that an integrative practice is one which is worth learning, and that has a knowledge base, and goals, and that is easy to identify it as good or bad performance. As stated before, integrative practices are complex, which allow them to be codified and disseminated (p. 85).

These elements of practice have been evolving not only at a theoretical level, but in their applicability or operationalization. Sahakian and Wilhite (2014) define three pillars of practice which include: the body, the material, and the social. Compared to the work done by other social practice theorists, the three dimensions are referred into elements of practice and the broad category might include different sub-elements. For Shove et al (2012) the elements of practice consist on material, competence, and meaning. As stated by Southerthon and Yates (2015), there is "no single agreed typology of elements" p. 138 within SPT. However, the main elements gravitate towards the material objects, and know-how and socially-sanctioned objectives (Ibid). The main premise of this theory is to understand the world in function of practices, that combine the social and the material world into one. The material element of a practice did not appear on the work of relevant practice theorists such as Giddens or Bourdieu, because their approach was "entirely 'social'" p. 2 The appearance of the dimension of "things" started more with Reckwitz and Schatzki works (Ibid), who noted that practice is linked with the objects. As defined by Shove, Pantzar, and Watson (2012), the materials encompass "objects, infrastructures, tools, hardware and the body itself" (Chap. 2. p.2. online version). It is important to mention that a practice is composed of different elements, but these elements on their own do not make a practice.

The mapping of the presence of these individual elements can be the first step for analyzing data under social practice theory approach. However, as shown by Shove, Pantzar, and Watson (2012), by an 'elemental' approach, within the social practice theory framework, the researcher can identify the elements of a practice, and the links or lack or links within the elements of a practice. In a way, and considering this goes out of my thesis scope, another level of analysis under social practice theory approach can be to understand the dynamic attributes of practice (Ibid). This means, that one's one has mapped the elements that constitute a practice, in a way you start thinking about possible avenues for change.

There are current discussions within SPT mainly discussion about: the way in which practices change or are persistent over time, the way in which individuals and groups engage

with the same practices, and the way in which the re-organization of practices is taking place (Warde 2005). In this section, I will discuss how is it that social practice theorists understand that social change and change within a practice can happen. Also, a critical discussion within the theory is the role of the individual. And, a last discussion covers on the way the theoretical framework is changing from only identifying practices to a framework that identifies relations between practices.

Social scientists are always questioning themselves on how social change happens. Warde (2005) argues that "the principal implication of a theory of practice is that the source of change in behaviour is already in the development of practices itself" (p.140), and that practices are not static, but "contain the seeds of constant change" (Ibid, 141). SPT promotes that, to understand how social change happens, one must look at the distributed agency that exists between the elements of practice Ortner 1989 in (Sahakian and Wilhite 2014). Distributed agency refers to the capability to be a source and originator of acts (Ortner 1989 cited in Sahakian and Wilhite 2014: 28). Here is where social practice theory differentiates from other frameworks that focus only in one the elements, such as the body/individual to make change happens (e.g. promoting reduction of food waste only with awareness information). However, recognizing the agency within the elements of practice is not sufficient to bring social change. One must look deeper and recognize also the power structures that operate within the elements of practice. As stated by Sahakian and Wilhite (2014), "agency may be distributed across dimensions of a practice but some contributors to a practice may have more power than others to stimulate change", 38. This distributed agency within elements of practice and the mapping of power within this agency can help in an implementation that can have better impact. Hence, one should be critical about the legitimization of power within these elements, in order not to reproduce power imbalances. Middlemiss (2018) noted that practice approaches do not attempt to predict what is going to happen in the future. What these approaches do, is to imagine different futures, and see in which way they could happen. This probably has to do with my analysis, while identifying the elements of a practice, then you can think about possible avenues for change, but of

course interventions have to consider the individual and realities of the people involved and not just propose an intervention from the outside. What happens if people don't want to do what has been proposed? In other words, change is not more isolated, and "we begin to imagine a world in which change must consist of multiple coordinated interventions, flexible and responsive through time according to how innovations develop" (Ibid, 134).

Compared to other behavioristic approaches, SPT, in a way, does not center its attention in the individual, but it is still a relevant component that makes a practice. Within the SPT, there a debate about the role that the individual should have. On the one hand, authors that see individuals as carriers of practice (Reckwitz 2002), and some others authors, such as Shove, go deeper into this proposition. Middlemiss (2018) noted that for Shove, practices are above the individual, since they have their own path and have the power to recruit practitioners. On the other hand, individuals can be seen as carriers of practices, but also as subjects that can bring change, because it is through performances that practices move forward or are transformed (Warde 2016).

One last discussion within SPT is that once a practice has been identified, it is important to determine the way in which it is related to other practices. Contemporary STP has changed its scope, from being a framework that helps map practices and the agency embedded in their elements, to being a framework that, while identifying agency within elements of practice, now is trying to identify the relationship between one practice and another one. As noted by Sahakian and Wilhite (2014) "practices are interrelated and must be viewed as a system and not as siloes", p. 37. So, in a way practices have been understood as a web of practices, where changes in one can bring changes to another. However, using social practice theory to understand how practice areas affect one another "is a rich area of both theoretical and empirical research, and one that remains understudied (Warde, 2005 in (Sahakian and Wilhite 2014). Furthermore, one of the main contributions of the framework is that it can identify a practice, but it also considers the way in which it is related to other practices. However, the framework cannot determine which practice has a higher hierarchy.

While implementing this framework that maps several practices, one has to avoid the generation of a rebound effect, which happens when a consumption area increases while trying to decrease another one (Sahakian and Wilhite 2014).

This relationship within practices can be understood by employing Warde's conceptual framework for eating (Southerthon and Yates, 2015). Warde draws from Schatzki's classification of disperse and integrative practices and operationalizes eating as a compound practice. Compound practices "result in the intersection of several integrative practices" (Southerthon and Yates, 2015, p. 139). This means that to understand eating, one should also consider the four main integrative practices that are bounded to eating, these include: supplying of food, cooking, organization of meal occasions, and aesthetic judgements of taste (Ibid). By understanding eating as a compound practice that is related to at least four integrative practices, then we can understand how the food waste generation is directly related to the moments where these integrative practices take place. In other words, to understand food disposal, one must understand the integrative practices of supplying of food and cooking (Southerthon and Yates, 2015) that influence or not the food waste generation in a specific space. Under a SPT is hard to isolate the focus on only one practice. As described in the Methodology Chapter, SPT falls into the 'sequencing of activities' (Ibid, 140).

The analytical passage of food into waste

Evans draws on SPT for his research particularly done of food waste in UK households. As far as I am concerned, this is one key study that integrates SPT particularly in the food waste qualitative research, which is cited in several peer-reviewed articles. Evans draws from material and waste scholarship to conclude in his book *Food Waste: Home Consumption, Material Culture and Everyday Life. Materializing Culture,* with a theoretical

sketch for sociological theory of household food waste, shown in Figure 1 (p. 92). Evans illustrates how food passes into different categories and evaluations (from raw ingredients, to a cooked meal, to leftovers, to waste) in which "food becomes surplus, and how it in turn becomes excess and then waste" (p. 91), passing through a gap in disposal. As stated by Evans: "By exploring the processes and practices that accompany the passage of food into waste, it transpires that there are a number of movements and steps that need to be understood" (p. 90). In the Figure, we can observe different rounded arrows that represent the diverse ways in which food can move from one category to another.

It is important to mention that Evans makes a distinction between food categories and placements. Surplus and excess are considered food categories, compared to the bin, that has to do with food placement. Furthermore, these food flows are complemented with elements of practice such as: material factors, the individual person, and the social factors. These elements influence how, when, what and why food is moved in a household context, but it would serve as a reference for my analysis section of food practices and food waste in professional kitchens. As it is identified in the figure, anxieties are transversal and present during the food trajectories.

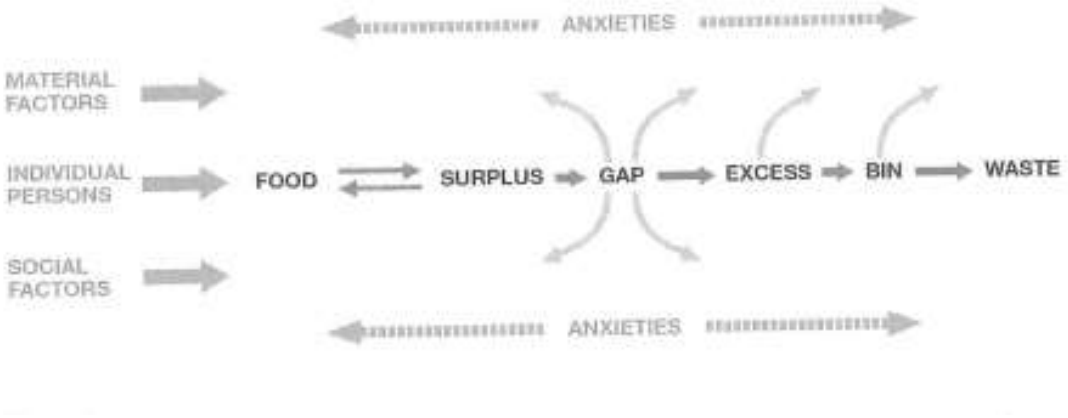


Figure 1. Evans' theoretical sketch for sociological theory of household food waste (p. 92)

The following concepts are described on what Evans (2014) refers to each of the components of his theoretical sketch, and will be useful with the categorization throughout the analysis.

MAIN CONCEPTS	DEFINITION
FOOD PREPARATION* NOT INCLUDED IN SKETCH	Is an activity that involves the separation of food from non-food. By consequence, whatever falls into the category of non-food will follow a different path from what is categorized as food (p. 54)
SURPLUS	Are acquired, but unused ingredients. By essence this category is quite ambiguous. Is not "immediately useful", but is not completely useless (p. 52), so usually items are place somewhere else (interim placing Lucas 2002 in Evans 2014, 52) instead of being disposed. Time can make surplus food exit the "gap in disposal" as excess (p. 57). It includes: uncooked and unopened ingredients (p. 53).
LEFTOVERS *NOT INCLUDED IN SKETCH	Are foodstuff that has been cooked, but not eaten. They follow a similar process of surplus food, but usually they are easier to identify, because they are covered with foil, cellophane, wraps (p.53) Edibility remains within the item
GAP IN DISPOSAL	Is a way to theorize the process of ridding (Lucas 2002 in Evans 2014), which is enacted gradually. The gap in disposal (Hetherington 2004 in Evans 2014) "can be viewed as something that extends the process of ridding" (p.54). It extends the process in two ways: one spatially (placement), and the other temporally (for a period of time). The gap can be extended with "movements, placings, and materials" (p. 58)

EXCESS	"Applies to objects that cannot be imagined in terms of this productive expenditure on the grounds that they are "disgusting", "worn out" and "shot through" (Gregson et al. 2007b: 198 cited in Evans 2014, 61). Usually, excess things are place in conduits that will "set them directly on course to being placed somewhere (typically the landfill) that configurates them as waste" (p. 61)
BIN	An item that plays a "significant role in finalizing the transformation of food into waste (p. 67). It can be as a connection between the private (the household, on Evans context) and the public waste management systems (Chappells and Shove 1999 cited in Evans 2014, 68).
WASTE	Refers to placement. It is a consequence on how something is disposed after they have been released from the gap in disposal (p. 90). Edibility cannot be recovered

Food flows and practices: relevant methods

The available literature on food waste in food services institutions (including canteens, restaurants or hotels) shows that the majority of these studies have a quantitative approach (Hennchen 2019), where the main research questions include why, where, and in what quantities food waste happens. There are some qualitative food waste studies in food services institutions that fall into "organizational processes" (Ibid*,* 676), this means that the focus shifts from the quantity, to the context where the phenomenon is taking place. This involves an ethnographic approach, where it is common to be in situ doing observations and implementing interviews with key stakeholders related to the kitchen operation and

management. Methodologically, the practice approach needs of a combined focus on doings and sayings (Schatzki 1996 in Evans 2014).

While studying practice, there are some methodologically challenges that had to be overcome; for example; the ways to define the limit of one practice or its relationship with other practices. These methodological challenges and more about how to operationalize practices and social practice theory will be included in the Methodology Chapter.

IV. METHODOLOGY

This study falls within the body of literature about food waste from food services institutions, campuses (Costello, Birisci, and McGarvey 2016) or professional kitchens (Hennchen 2019), particularly those found at universities. Guided by my research question about exploring and identifying the food practices that affect food waste during the meal preparation process, a qualitative design was considered to be the most suited to understand and answer this question.

Beuving and Vries (2014) defined the qualitative or naturalistic inquiry as an approach that looks for doing research into "everyday situations" (p. 19), and involved a "constant going back and forth, or iteration between problems, questions, evidence and theoretical ideas" (Ibid*,* 23). This study is part of the non-experimental studies, as Seale (2018) defines it where the "researcher does not directly influence the behaviour of the study participants, but rather collects information about what occurs" (p. 103).

In this chapter I will explain the methods I have used in the data collection process, and discuss some methodological considerations related to the project. First, I will describe the design of the study. Second, how the sample was defined and the selection of participants. Third, how the data was collected and stored. A section for validity and reliability is also included. Finally, I discussed some limitations and challenges while undergoing this research. At the end section of this chapter some closing remarks are discussed.

Design of the study

This study is designed to cover out-of-home food consumption. Where kitchen(s) from food service institutions are the venues of study trough a qualitative approach to food

waste. This study as pointed out by Hennchen (2019) “delves into organizational processes” (p. 676) to explore the main causes of food waste.

According to Reckwitz (2002) a practice can be approached as an entity or as a performance. This study is focused on food practices as performances (in situ) and as entities. For the study of food practices as performances, I implemented an ethnographic fieldwork (See Evans 2012a, 2012b in Neuman 2018), where I focused on what people do during the food preparation process. In ethnographic studies the researchers is personally present in the field under study (Ehn, Löfgren, and Wilk 2016). However, my fieldwork can be described as a familiar or closed by setting (Ibid). Nowadays, it is common to apply ethnographic approaches into different fields, mainly in consumption or education. The idea of doing fieldwork by getting lost in the jungle in a faraway land, now is replaced with studies implementing this method in closer settings, but were observing to what happens, listening to what people say, and asking questions are elements present under this scope.

Through the implementation of semi-structured interviews and informal conversations, I approached the practice as an entity, where participants could describe their cooking and food preparation practices. As stated in Evans (2014) “a theoretical orientation towards practice” requires these two elements to be combined (See Schatzki 1996 in Evans 2014).

I centered my study in the stage of food preparation and cooking in the kitchen. Because “cooking is the archetypal food issue for exemplifying a practice” (Neuman 2018). It is “done regularly and routinely, but with great different in skills and material circumstances” (Ibid*,* XXX*)*, at household or professional kitchen settings. Cooking and eating are practices that takes place everywhere, in different contexts and venues. However, as Hennchen (2019) points out, food preparation is a stage in the food supply chain that “deserves special attention” (p. 675) when regarding to food waste research particularly in professional kitchens. Drawing on Evans (2014) and his food waste research at household level, I was also interested in getting insights on how in professional kitchen participants

"prepare, store, and ultimately how they get rid of what they do not use" (p. 23). Hence, the research focus is what happens in the kitchen as, Costello, Birisci, and McGarvey (2016) defined it as pre-consumer waste.

Initial contact and sample prospection

Before gaining access to any of the potential participants of the canteens, I had an initial contact with an employee from the food service provider at one of the main universities in Oslo. This person, from the administration level, was open to talk about how canteens were organized and some operation insights. We arranged an online informal conversation to gain background information about the canteens. This meeting was held online during May 2020. Because canteens are private settings of a formal organization, I knew it was necessary to have a conversation with a key person in the organization, sometimes known as gatekeepers (Check reference in Seale p. 264).

I chose to study the food practices that affect food waste in a campus´s canteens at the University X in Oslo. The study participants could include chefs, kitchen leaders, cooks or kitchen helpers employed at one of these canteens. Independently of their role, the participant should be involved in the food production process. Therefore, I implemented a non-probability and purposive sampling, as Seale (2018) explains this type of sampling is adequate for exploratory studies, and the participants are invited because they cover certain criteria.

Because my fieldwork took place during the semester of Autumn 2020 (gradual reopening of canteens after the first COVID-19 lockdown in Oslo), it was hard to reach to potential participants via online. So, I decided to implemented a different strategy. First, I looked online which canteens were open during lockdown. Second, I personally visited the campus and knock-on doors (REF) to invite participants to the study. Finally, I also

implemented a snowball sampling (Seale 2018), where I asked participant(s) to refer to me to other colleagues that have a similar role, but in another canteen. All potential and current participants of this study were hand in a letter of information about the study and a consent form (See Appendix I) approved by *Norsk Senter for Forskningsdata* (NSD) guidelines. This was sent digitally (before meeting in person), and physically, after they agreed to participate in the study. Only confirmed participants in the study signed the physical consent form. Potential participants and current participants were aware that they were invited to participate in a voluntary basis and could withdraw at any time from the research. During this invitation process three potential participants stated that because of time and workload they did not have time to participate in the study.

The demographic information of the participants such as their age or race is not relevant for this study, because rather than focus on demographics, the main aim of this study is to focus on the food practices that happen in the kitchen. The participant's education can come along trough informal conversations between the researcher and the participant.

An initial contact stage with potential participants was implemented in October 2020 and because of COVID-19 and its challenges for contacting potential participants, a second stage was implemented during the Autumn semester of 2021. This study has a non-representative sample and will not argue for a generalization of results (Seale 2018).

Both of the participants in this qualitative study were chefs (leader) from their respective canteen at the university.

Data collection process and administration

In order to achieve the purpose of this study I choose the methods that were more likely to help me achieve this goal inspired by previous food waste research under a social practice theory approach. For this research, I implemented two main data collection methods,

participant observations in a professional kitchen over a period of 4 days and semi-structured interviews with two chefs of two different professional kitchens. Secondary sources such as online reports, webpages, online webinars, and other sources were consulted for background information that provided insights at two different levels. On the one hand, about food waste as a general issue, and on the other, as background information about the food waste context in Oslo.

Participant observation

The participant observation in the professional kitchen provided me with what Hennchen (2019) stated as a better understanding of the context where the food preparation practices take place. In a way I was able through this data collection technique to "look behind the curtain" (Ibid) and be immersed in the routines of a professional kitchen.

Before entering the kitchen for my participant observations, I discussed with the chef that, if possible, I would like to cover maximum one week of operations in the kitchen. We agreed that I could visit that kitchen between 2 or 3 hours per day. At the end, I managed to be in that kitchen during four days in October 2020, covering 14.10.2020, 15.10.2020, 19.10.2020 and 20.10.2020.

My observations in the kitchen were with an overt identity (Walsh and Seale, in Seale 2018), which means that it was obvious for the people there that I was an external person in the kitchen. I implemented it when there were fewer employees in the kitchen, and in a place where everybody knew each other it was easy to identify a new face or an outsider. I also followed hygiene guidelines and wore a white plastic lab coat during all of my observations in the kitchen.

All of the days were working week days, I tried as possible to cover at least 1 week of kitchen operations. The observations were done only during food preparation times, and not during a whole working shift in the kitchen. I took manual field notes in a notebook, where I include some drawings of the kitchen's outline, quotes, from the information conversations with the chef and the things that I saw. I also keep track of time in an irregular way.

Because my focus is on food preparation, I scheduled my visits somewhere between 7:00am and 11:00am. These observations took place during lockdown in Oslo, which means very few employees were at the kitchen, but this allowed me to have more time for informal conversation with the participant and go deeper within a specific topic or doubts.

The size of this professional kitchen can be described as a big kitchen. It has three stations, one cold, one warm, and a middle station for heating or cooling. It has 11 fridges, 3 freezers, steamer, and 7 ovens. All of the kitchen equipment is electric. The average of portions prepared in this kitchen was around 150 portions between 300-450 grs each. The type of menu served consists of two options: one with meat (where the protein change) and one vegetarian option (not vegan). The observations were done in the warm kitchen; where the chef that confirmed the participation in the study mainly worked. In this kitchen three bags for different types of waste were placed near a stainless-steel table. The green bag for food waste, the blue one (at that time, now is purple) for plastic food packaging's, and one white where cooking gloves, cooking napkins, and other items were placed.

After these 4 days of observing, I implemented around eleven hours of participant observation. Plus, eight hours of the transcribing my fieldnotes.

Description of the Venue: Canteen A

Production capacity: an average of 150 portions of food per day

Number of observation days: 4

Hours for observation per day: between 2 to 3 hours

Total of hours in the kitchen: around 11 hours

To avoid that my observations where without focus, I defined beforehand what I was going to observed. In this planning stage, I considered the first of the three textual levels within fieldnotes proposed by Beuving and Vries (2014), where the description level is centered in the observation of acts, behaviour, and cultural artifacts (p. 86). The interpretation and the explanation levels, whereas the former has to do with the meaning that an action has to a person and the latter refers to that "meaningful action through the eyes" of the researcher (Ibid) will come after. I also tried to stay focused and keep track of the food movements in the kitchen, or what Evans (2014) referred to as "a focus on the very literal movements of food" (p. 42). In my case, it involved movements of food within different points in the kitchen. By having access to the kitchen for several days, I was able to observe the operations in the kitchen (under COVID-19 circumstances, e.g. producing less meals, but still preparing more than 100 portions per day). Although my research is not focused in the volume of food waste per se that was generated, during my observations I regularly take a look to the green bag while the food preparation or cooking took place.

My observations were centered in the different things that happens while preparing food. So, I did not get involved in the food production process, but I undergo informal conversations with the chef while this process took place. All of these informal conversations were held in English. It was during this informal conversation that I could get insights about food related topics such as: how to assess the food quality, the role and some brief history about food labels in Norway, background information, and the relationship between the kitchen and its suppliers, among others. These informal and open-ended conversations

between me and the participant can be described as a type of interview that is merely exploratory. Merriam and Tisdell (2016) stated that the goal here is to learn as much as possible about a situation. This informal conversation provided me with insights for future questions in a more structured interview.

Because of the hectic environment that kitchens have, during some time I just observed how everything was done. In order to keep record of what I observed and avoid a problem of memory recall (Walsh & Seale, in (Seale 2018), I transcribed my fieldnotes immediately after I finished my visit in the kitchen using Nvivo12.

In each day while I was doing my observations, I started noticing that there where elements that where part of the kitchen's operations: a menu to follow, a specific amount of food that was prepared, the equipment used, the suppliers, among others. While doing my transcriptions some other elements where identified, such as the role that the current inventory or stock that the kitchen had in the menu, the skills and knowledge of the participant while handling the food, the type of food being prepared (menu), the way food is served, the "type" of consumer that attends the venue, and knowledge about handling different types of food items.

Interviews

Another data collection method for this study was the implementation of online or physical interviews with the chefs. On the first stage of the data collection process, and because of COVID-19 restrictions, an online interview was held in English with one chef, the same from the kitchen I did my observations in. The interview lasted around 20 minutes, but the participant was asked beforehand between 45-60 minutes of time in case it was needed. This interview took place on the 04.11.2020, one week after I finished my

observations in the kitchen. Because COVID-19 restrictions were ongoing, we decided to have the interview in Zoom. The participant was aware that and audio record of the interview will be implemented. For the second stage of my data collection process and because of the changes in the health and safety regulations in Oslo where changed (Autumn 2021), we agreed to have an interview at the canteen just before opening hours. By having this interview in the participant's workplace allowed me to understand more the context where food is prepared. During this interview the participant mentioned about the working place, the kitchen, and the relation with other kitchens/canteens of the building. By being there I could understand more about what the chef was referring to (Nygaard 2017).

In order to have some structure regarding the issues being discuss, but also facilitating a space where related thoughts or ideas, could be discussed or addressed, my interviews were semi-structured. With the reopening of the university's canteens during Autumn 2021 sometimes involved less personal and a high workload it was challenging for potential participants to agree to implement participant observation in their kitchens. Therefore, interviews were an appropriate method to collect data about their food practices. As Merriam and Tisdell (2016) noted, interviews are employed when we cannot observe "behavior, feelings, or how people interpret the world around them" (p. 108). Furthermore, Atkinson & Coffey (2012) suggested that by conducting interviews we obtain narratives that "are forms of social action on their own" (p.12), not only when as researchers do not have access to observable actions.

To have a better backup of what the chefs shared, both of the interviews were audio recorded. The audio record of an interview is the most common way to record and preserved what the participants said for future analysis (Merriam and Tisdell 2016). A guide for the semi-structured interview approved by *NSD* can be found in the Appendix II. After the conduction of each interview, I transcribed them manually. By transcribing the interview by myself, I got familiar with the data and started to identify some relations between this data and what I obtained from the participant observations during the kitchen visits. One of the

interviews was transcribed directly in Nvivo12 and the other one using f4transkript facilitated by the University of Oslo. The second one because of its duration (almost of about one hour), require a tool that help me pause and slow down the audio´s speed. For both interviews, the transcribing process was implemented in stages. First, where the focus was on the transcription of what the participant said, followed by the implementation of typo correction, text polishing, and proper interview identification (Merriam and Tisdell 2016).

Data management and storage

All participants in this research were aware that their names and their working places were anonymized. The files with private data such as the canteen names, or participant's contacts were encrypted and assigned a password to access the file.

Validity and reliability

One main source of validity of this research came from my data collection process, specifically on the order I did implement my methods. By doing first my participant observations in the professional kitchen, I could understand more on how the kitchen's set up and its operations. During the interviews, the chefs where mentioning topics such as the sharedness' principle what existed between the kitchens. Which was something I was able to observed in the kitchen and got it confirmed through the interviews. As stated, this study is limited in its sample, so it does not argue for any generalization.

Limitations, challenges, and further research

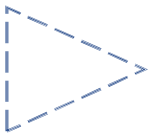
One of the main challenges that I faced during this research was getting access to potential research venues and potential participants within the lockdowns in Oslo. With COVID-19, many places were shut down, some employees were on a temporary leave (*permittert*), and the few participants available had sometimes a higher workload than before. During the gradually openings of canteens in 2021, I mapped the number of canteens that were open at one campus, and tried to cover at least 50% of these canteens (by that time only six where open). However, from those that where open and invited, some chefs or cooking employees argue that because of time issues they could not participate in this study. However, I really appreciate the chefs that even with extended workloads accepted to participate in this study. It was very enlightening to be in the kitchen and talk with the chefs. Through that I better understand the context where food was handled and prepared.

I also lose some motivation because the ongoing context with COVID, but I tried to keep it up during the process. Being part of the Text Lab promoted at SUM (some were digitally and other physically), provided me with some social meeting points where we could share withing colleagues our progress or challenges. Feedback from our drafts or chapter was shared and it was usefully for me to discussed with others about structure, content, flow of ideas, etc.

Further food waste research in higher education canteens can consider expanding research in two different ways. First, continue to focus in fewer kitchens, but covering more stages of consumption, moving forward the food production (in the kitchen) to what happens in the dining area. Another path of future research is how people prioritize the different food handling practices in the kitchen. Furthermore, food waste research can consider culturally differences between the categories of food and non-food and how these differences prevent or generate food waste. Kitchens are full with diverse people with different backgrounds, this understanding of food and non-food can enrich food waste research.

Closing remarks

I see this research project as a mini block in a larger chain. Through this process, I understand that research has a specific period for being design and implemented, and it is linked to specific resources, but it does not end with the master thesis. Knowledge is always being contested and evolving. As a practice, it cannot be kept forever the same, because there is always space for change. The future studies, the critics, the different (or complementary) approaches is what keep the ideas alive, the theories contested, and the knowledge moving forward.



V. RESULTS CHAPTER

Level of analysis I: Food saving practices

Based on previous evidence on food waste studies, it is assumed that during food preparation food waste can occur (Evans 2014), (Hennchen 2019). However, the data from this study shows that there are also ways that prevent food from being placed in the bin. Even though this research is not based on quantitative data, the experience from one professional kitchen shows that the amount of food waste generated is low compared to the amount of food prepare mainly for that service day. To understand these results, we need to understand the context and, elements of practice, that can help us understand why food is placed somewhere else, and not in the bin. My main thesis to be explored in this study is that food saving practices are and can take place in a professional kitchen that helps prevent food going to waste. As stated before, this study does not attempt to generalize results in any way.

To start, the issue of food waste is something that both chefs were aware off. Both chefs openly spoked about food waste and the tactics that they implement in their kitchens. Is a topic that is acknowledgeable and talked about with colleagues. Both of the chefs have specific understandings of what they understand by food waste. As noted by Participant 2, when ask about food waste:

> I know food waste is a big problem, but that is what we do, at our, when we get home, it is about the routines, in how we shop in the grocery's stores, how we store things (2021).

In a way I got surprised on getting this definition, because the understanding of this chef regarding food waste as a complex and multi-site issue not only happening in his/her professional kitchen (workplace), but also at home. Without specifying the grocery´s shopping and storing as other food handling practices (Hebrok and Heidenstrøm 2019), the chef do mention that acquiring food and the way are dimensions of the food waste issue.

The other chef also shared what he/she understood as food waste, in a more concise way the chef (Participant 1) described:

> Food waste is food that we throw away that was supposed to be eaten. That is the most basic description of food waste (2020).

This pragmatic definition englobes the edible attribute of food that somehow it was not consume. Despite the difference in the definitions provided by the chef, two elements can be highlight. On the one hand, that food waste is an issue that involves food being thrown away. On the other, that is a problem that arises at different consumption sites, such as the workplace of professional kitchens, and at home.

Compared to previous literature where food is just thrown away. I found out that before food is placed in the bin (or in the green bag in Oslo), several steps are implemented that allow the chefs to keep the food in the flow or in the loop. These steps are involved in food preparation, but also, they extend to other operations of the food service kitchens, mainly acquisition and storing. Similar to the food handling practices pointed out by Hebrok and Heidenstrøm (2019) that in a household can prevent food waste[4], Evans (2014) also categorize five categories that help follow the

[4] Acquiring, storing, assessing, valuing, and eating

food trajectories and explore why food items end up in the bin. These categories include:

a) Ways to plan and shop
b) Ways on how they prepared food
c) Ways on how they consumed
d) Ways on how they store
e) Ways on how they get rid of what they do not use

In the following section I will show how the experience from both professional kitchens can help us understand why food is placed somewhere else rather than the green bag.

a) Ways to plan and shop

One of the kitchens under study has fixed suppliers, which means that in that kitchen they have at least four different suppliers. One was for dairy products, other for dry ingredients or kitchen supplies, another one for vegetables, and one the specializes in surplus food from industry or companies (Participant 1, 2020). Previous to COVID, from one of the suppliers they receive 7 trays. During my observations in the kitchen, they only send one tray. This decrease reflects how during low production days, the input from suppliers also decreases considerably.

Building the menu from your stock, integrating ingredients that can cross over different dishes

As pointed out by both of the chefs: "At the moment, we use what we have in stock…we have a lot of basic ingredients in our stock that we can use for a number of things, just different sauces, different toppings, different add-ons to make different dishes of the same basic body (Participant 1, 2020). Likewise, Participant 2 mentioned the following: "We tried to use the same vegetables in many of the dishes (referring to lettuce, tomato, red onion, and

cucumber), just chopped in a different way" (referring that these ingredients can be used for burgers, kebabs, and falafel) (Participant 2, 2021). This idea of having ingredients that cross over different dishes at a time, is a way that prevents food waste because what is left out from one dish can be used as an input for another dish.

Knowing your numbers (in the new normal to decide how much to prepare)

Literature acknowledge that a common challenge faced by food service institutions kitchens it how to forecast the number of customers they will have during the day, therefore decide how much food to prepare (Sonnino and McWilliam 2011, Garrone, Melacini, and Perego 2014). During the COVID-19 pandemic, university canteens faced the challenge of not knowing when students will be on campus because of the change to online teaching and the safety restrictions during the pandemic. Under COVID-19 lockdowns food preparation planning was challenging, as noted by both participants: "Now with the COVID restrictions that change every week they make the planning very hard and unprecedent increase or decrease of the number of customers we have" (Participant 1, 2020). Participant 2 answer something in similar lines, "Some days are really high and some days are really quiet, so we haven't figure it out when the students are on campus. That is a tricky, tricky part" (Participant 2, 2021). During the gradual openings in Oslo, canteens continued to offer food service, but before there were fewer students on campus, both of the chefs apply a principle of the day before. Where instead of considering their regular numbers, the chefs used as reference the selling number from the day before, and define the number of meals around that number as pointed out by Participant 1 (2020):

> The sales number of the day before. Make and assessment of how much to produce every day at the start of the day, so we do not overproduce and have a lot of leftovers and minimize food waste.

Participant 2, follows a similar response on defining how much to produce per day.

> We have in the cash machine, we can write down our report, yesterday we sold X number of burgers, and we tried to see, to make a decision, around the numbers from yesterday, so we see how many burgers we have (Participant 2, 2021).

This example illustrates how food preparation is directly linked to the ways the chef plans the number of meals produced for that day. Planning the numbers of meals also influence food waste prevention or generation, because it can happen that food is prepared, but unsold for that day.

Considering the time gaps in your working days

Both of the kitchens under study only operate on weekdays, this means that on weekends service is closed. Both of the chefs were aware that the window between Friday and Monday can affect the generation of food waste. In order to prevent it, on Fridays chefs implemented different routines. As stated by Participant 2, when they have "quite Fridays" and they still have some vegetables left. For example, they cooked tomatoes and onions, and reuse these ingredients in a sauce or a in a stew. Furthermore, when the closing time is getting closer on the Friday, Participant 2, stated that they "freeze the tomatoes down and use it in stews" (Participant 2, 2021). Alike, before the closing hours, they have a buffet where they placed stuff that was overproduced.

b) Ways on how they prepared food

Knowing your ingredients, they are not the same!

I identified from both chefs the knowledge they have for different type of ingredients used as input for their dishes. It is not the same to prepare a salad, than to prepare a pasta, a burger, or another dish. What is prepared and how it is preserved varies because ingredients and food stuff have different life-spam, some of them decay rapidly. Chefs pointed out that time and temperature are variables that differ from the food item being handled.

This particular knowledge about the time and the temperature differences among ingredients is a way to prevent food waste. For every ingredient there is a specific path that one could follow. As pointed out from Participant 1 (2020):

> The cooked pasta is only good for certain number of minutes, hours, before is so bad that you cannot eat, if the quality is not good enough. If you cooled down quickly enough then you can put it in the fridge, and heated up again if you needed or can use it tomorrow. And the.... from the salad bar that is stuff that stays cold for the amount...the entirety of the day is just basically do not produce too much. If you cut out tomatoes, cucumbers, the salad it does not stays good for more than a couple of days.

Within the same food category such as bread, there are different ways to prevent it from going bad. The composition of each sub category varies from one item to another. Participant 2 (2021) illustrates this with the example of focaccia bread.

> Depends on if we have like, focaccia, because we served as a sandwich, mmmm, in the morning, we open one if we have three of four left from the day before, we just open one, and check if it is still edible, it is edible, but it can be dry, because

> of the bread, the bread get drier when it is in the fridge, so, mmm, and if it is, if we used focaccia, but contains about oil, and so, it is not that dry compared to other type of bread

This knowledge of the life-spam of different ingredients can also help when deciding how much days in advance you prepare your ingredients. As pointed out by Participant 2, for vegetables they implemented a two-day chopping in advance strategy, rather than a week.

Integrating surplus ingredients as your input for food preparation

One of the kitchen under study mentioned during the participant observations that they have roughly between 5 to 10% of their food ingredients coming from a supplier that sells surplus food from companies, this surplus food management tend to involve a company that produce a food item that was not sold (Baglioni et al. 2017). The kitchen under study bought from this supplier was not all of the ingredients, but basically frozen sausages. During food preparation in the kitchen a way to prevent food waste (and that connects foodstuff from outside the kitchen) is the integration of surplus food as regular ingredients to prepare new dishes. As far as I am not concerned, there is no an specific share from the total of suppliers that a professional kitchen must follow, but maybe the integration occurs in specific food categories and then to others.

Packing and labeling your food when prepared

Labeling meals with the date they were produce can be another way to prevent food from going to waste in a professional kitchen. Through this way, the chef can know how much time has passed since the production time. The food labels (Plasil 2020) as shown by literature are not going to prevent food from decaying, but it can provide with relevant

information to the person that is handling food, and to assess what should be eaten first and when. In one of the kitchens, the chef marked with the production date some of the dishes that where prepare, this was useful when using leftovers to know from what day they were.

c) Ways on how they consume

Integrating leftovers in your day menu

When a chef is planning for its daily menu, freshness can be the ultimate goal to achieve from the ingredients on hand. However, sometimes, food is just cooked, but not eaten. These leftovers (Evans 2014) if properly handled they can be used in the next day(s) after preparation. During my participant observations in the kitchen, a food item that I identify as an example of the reuse of leftovers from the day before was the rice. Rice, with no vegetables, or additional flavor, just plain white rice. The chef mention that with this food item, it is important to change the temperatures from warm to cold, to warm again without losing the quality of the product. Of course after a day passes, food quality must be reassured that the food item or dish is still safe to eat.

Keeping ingredients separately before serving (if possible)

As simple as it sounds, a good way to keep food good for longer time is to keep the different ingredients of the same dish in separate containers or trays.

d) Ways on how they store

Moving food around different placements in the kitchen as a way to save it from the bin

As we see from previous food waste research using a practice approach, a way to save food from the bag is to move it around through different trajectories mainly in the kitchen (Evans 2014). However, the movements itself will not save food by itself, but is a mixture of the individual, knowing when and what to move, mainly between the kitchen and its storage where and for how long. Here is where the performance of saving food is enacted. When these isolated elements of the body, the kitchen equipment and the food itself, and the knowledge behind the properties of the food item that is aimed to be preserved, that the act of disposal is disrupted.

As shown from my evidence, the food items can enter a gap in disposal (Evans 2014). However, this gap, that is just extending the process of ridding, can consist of several minutes, hours, days, weeks, and even months. These movements of food can involve changes in the food's materiality or applying a specific cooking method to it like boiling it. Afterwards the cold temperature was a variable that follows the majority of the food items that were aimed to be preserved for long.

Knowing what you have and where

Regular "check-ins" to your storage to see what is there, what can be reused, and what is just screaming that its bad (changes in consistency, appearance of smell, changes in color, pop out fungus). The performance of preserving or saving food involves regular visits to your storage to see what do you have and what has to be eaten soon or kept for long.

Extending the gap in disposal and returning food

The gap in disposal is not a black hole (Evans, 2014, 58)

As shown by data from my study, both chefs implemented strategies to expand the gap in disposal (See reference in Evans 2014) for the food that was in their kitchen. The most

tangible example was that one of the mashed potatoes, where the chef boiled them during the first lockdown in Oslo 2020, packed them in plastic bags (special food plastic bags) and froze the bags. After a couple of months, the chef was mixing with other ingredients for consumption in October of that year. However, it is important to mention how extending the gap in disposal won't save the food on itself. The individual most combine different elements such as the material aspect (for storing, at a proper temperature), the knowledge of the lifespan of different ingredients, and the time that that ingredient or item can be placed in the gap without exiting it as excess. Always keep in mind that handling food pose different challenges because if compared to other items or commodities, "food is biological matter subject to degradation" (Parfitt, Barthel, and Macnaughton 2010), 3065. However, and illustrated from my observations in the kitchen, it is possible to "hack" this degradation, through placements of the gap in disposal where temperature and time of storing varies from ingredient to ingredient.

e) Ways on how they get rid of what they do not use

Materializing your efforts about food waste

These two kitchens materialize their awareness of food waste by having a special sticker that represent that that meal was prepared from the day before, but it is still good (and offer it for halve price to students). During the interviews with the chefs and my observations in the kitchen, I could notice how what was a canteen concept in a first place, transformed and change into a sticker with meaning used in different canteens. It was the embeddedness of reducing food waste that start permeating other canteens. That sticker is a material element that is full with meaning, for the chefs or kitchen employees and to students and university's staff. Is not about hiding it, but knowing that your food is still good, but is just from a day or two days before.

Level of analysis II: Mapping the passage of food (into waste)

To identify the food flows, from the kitchen or from the experience of chefs, I did a manual categorization from my data considering two broad categories: ingredients and placements. For the ingredients category I used the color red, and for the placement category I used the color blue. By mapping with different colors, I could see in an isolated way what types of ingredients were used, and what items were placed in the green bag or somewhere else. For the ingredients category, different subcategories were identified such as: perishable and non-perishable food, pre-made food, frozen food, and food ready for service. For the placement category, subcategories identified in the data include: the freezer, the green bag, the fridge, coolers drawers, oven, food packaging, storage, trays, stainless-steel table, steamer, plastic bags for food packaging, or boxes. By doing this categorization, I could map two elements the food item and its placement.

Something that I noticed is that food passages in the kitchen do not follow a linear passage. Food comes and goes in different ways, depending on the type of ingredient it is being used during food preparation and where it is placed within the kitchen. This can be illustrated with Evan's sketch of food waste in household by the curved arrows. Which represent different ways in which food items can move along the kitchen. Foodstuff that entered the gap in disposal (Evans 2014) have not a specific time to be placed there, and they can either exit the gap as excess or continue as surplus or food. Food categories such as pasta, vegetables, perishable goods, proteins, or rice, each one has their particular path in the kitchen.

By observing food flows under a social practice theory is easy to identify the kitchen equipment (material element of a practice) that is helping keeping food out of the bin. Furthermore, food's materiality, combined with specific knowledge (another practice element) about foodstuff, is something that will influence the time something can be kept in the gap in disposal. Theses food flows in the kitchen were perform by a chef (individual) and

are illustrating how a practice is a combination of elements rather than just the elements on their own (Shove, Pantzar, and Watson 2012).

In the following section, I included the passages of food throughout different placements that I observed during my visits to a food service institution kitchen. This liner narrative is the best way to represent the passage of food into waste (Evans 2014)

Day 1

In order to get to the warm kitchen where my core observations took place, I entered the kitchen trough the cold kitchen section. Here, I observed that another kitchen´s employee was handling food from the day before. But I do not have the consent of this person, so all of the happenings in the cold kitchen are excluded from these findings. Also, I limited my observations to the warm kitchen, because it was hard to see the food preparation on different sites simultaneously.

For this study, I draw on Evans (2014) and followed food stuff (raw ingredients, or cooked stuff, frozen ingredients, etc) around the kitchen. Per day, several ingredients were used to prepare the dishes following a weekly menu. In a way the stainless-steel table was the main placement of ingredients during food preparation, where ingredients were placed and prepared. Moreover, from this central table they go to other places, including the fridge or other storage, serving trays, or the green bag.

This observation day started at 7:09am. The first prepared dish of the day was a salad with pig wings. For the salad, Participant 1 used chopped lettuce and carrots with vinegar. Participant 1 made the salad mix directly in one of the serving trays. The pig wings were brought from the freezer to the stainless-steel table and then were placed in the steamer. Participant 1 did not take out the pig wings from the bags, they were placed with all of the bag in the steamer.

While handling fruits and vegetables some elements were placed in the green bags during food preparation. For example, while handling mushrooms in the chopping board at the stainless-steal table, Participant 1 throw away part of the stem (ends) in the green bag. While Participant 1 was handling the mushrooms we briefly discussed about food life span. In that kitchen, salads were given an extra day from the day they were prepared, wraps two days and a baguette only day. While handling another ingredient: a cauliflower, Participant 1 took out the lefty part and placed it in the green bag. As stated by Evans (2014), non-food elements such as stems or seeds are immediately discarded during food preparation.

Rice was prepared to complemented the dish of the day. Rice only moved from the bag to the steamer tray, and then to the steamer. After cooked, the steamer trays serve also as serving trays of this food item during the opening service hours. Nothing was placed in the green bag during this preparation.

During this day, almost by 10:00am, I asked the participant what where the origins of food waste in this kitchen. Participant 1 mentioned that during preparation, it would be about un-eaten parts and bad cooking, which did not happen very often (Participant 1, 2020). By comparing what was in the green bag and what he was saying, in the green bag where only non-food elements from vegetables.

Being during the pandemic in a professional kitchen, allowed me to implement informal conversations on how the kitchen organizes its menus. Participant 1 (2020) mentioned that on Thursdays they plan for the menus (in COVID times), and that it depends on what they have in their storage (Participant Observation, day 1). Other food related topics come through the conversation mainly about what type of suppliers this kitchen have. Mainly they have Norwegian suppliers and one food supplier that specializes in surplus ingredients from the industry or companies (Participant Observation, day 1). Participant 1 described how in this kitchen they already incorporate surplus food into their food preparation processes, sourcing from this particular company between 5 to 10% of their ingredients. The integration of this supplier that sells surplus food items from companies is a way on how the gap in

disposal (Evans 2014), might mean the exit of food stuff from one actor, but an incorporation by another one.

Another topic that is related to food waste and that came during my observations through informal chat was about food labels and the difference among them. Participant 1 (2020) described how food labels were not the same. For example, "used by" is a food label that states that if the date passed the food item is not for consumption. However, the food label "best before" that is used in soft drinks (sodas), dairy products (milk), bread or sweets, states that food stuff can be good after that date. Hamilton et al. (2015) describe that the difference between both of these labels is the safety issue. The "use by date" refers to perishable goods that consume after a certain period, can represent a risk for human consumption. On the other hand, the "best before date" only indicates a food's loss in quality, but not in safety (See WRAP, 2012). Followed by the conversation with the chef, Participant 1 mentioned to me that in that kitchen they use a special sticker so customers know that the food item has pass its best before, but it is still suitable for consumption.

Through the preparation of the cauliflower, I asked how they know how much food to prepare. Participant 1 (2020) mentioned that they follow the school year and consider the different holidays in between (e.g. *høst ferie*, Autumn holiday) to calculate when students are on campus. However, because of COVID this strategy changed considerable.

During my observations and through the informal talk, I was wondering about any initiative that this professional kitchen was part of related to food waste. Participant 1 mentioned that this kitchen, where part of a food waste initiative called *KuttMatsvinn2020* (Cut Food Waste Serving 2020) and that they have to report they numbers every month. Participant 1 is aware that the goal of that initiative is to reduce by a specific percentage the food waste generated in the food service industry.

Another element that came out during my informal conversations was about the difference between working days, for example a Monday compared to a Friday. Because this kitchen is only open on weekdays, on Fridays they avoid to have many salads because there

will be several days before they open again a probably food goes bad in between. This example illustrates how time is a key variable in the gap of disposal for some food ingredients such as vegetables. In order to prevent those salads, exit the gap as excess and then into waste Evans (2014), this chef prefers to avoid overpreparation at least on Fridays where there are two consecutive days that the canteen remains closed. By this time, the trays with the plastic bags that contain the pig wings are taken off the steamer. The liquid that was generated in the bag is discarded through the strainers located in the kitchen's floor. During the preparation of this dish, no food was placed in the green bag, but the liquid part of the pig wings was immediately discarded. Following this action of discarding liquids from food preparation, I follow and asked the chef about the physical state of food waste. Participant 1 mentioned that in the kitchen they avoid to prepare soups, because is something that customers did not like as much. As shown from my observations, there are different physical states within the food waste that can be generated in the kitchen.

By almost 10:00am we also discussed particularly about food waste. I asked the understand for food waste and the answer was very straight forward: food waste is "food that you can eat, but goes to waste" (Participant 1, 2020). In this kitchen, they know how much food waste is thrown away for example from the prepared salads that have a bar code. They scan it and know the cost, and volume of that waste. In this kitchen, they try to reduce the cost of the waste and Participant 1 (2020) mentioned that they use leftovers or surplus food in their daily preparations.

Day 2

This day also started during the morning. Where I arrived at 8:30am at the kitchen and I took a first look at the green bag located in the kitchen. I continue to focus on the food preparation of that day having some check-ins in the green bag to see what was there during

the food preparation. Compared to the previous day of observations today there was no music on the background.

While I was entering the kitchen, I noticed a big door with a green stamp on it. I asked the participant, and the chef mentioned that is where all the green bags were stored. They keep it in a specific area with a specific temperature that prevents, that during summer the green bags started to stink. During the morning, we discussed about some background information about the canteen. Participant 1 mentioned to me that because of COVID, many employees where with *permittert*, which is a temporary leave from work, and where not working. I looked at the green bag and there are some cheeses slices and a baguette. From the day before, rice that was prepared, and they sold four trays. The one that was not sold, was going to be reuse for that day, and just re-heated before selling it. This example illustrates how a meal, if stored and properly cool down, can keep its quality for the day after. As stated by Evans (2014), this rice is an example of leftovers, which is a foodstuff that has been cooked but was not eaten. The rice was kept in the same tray where it was cooked, so it was just heated up. Because it was only one day the edibility of the rice remains.

Participant 1 takes out a big tray with pickled cabbage which has cellophane with a sticker with the date 14.10.20, it takes out the cellophane and distribute it into smaller trays. The chef mentioned to me that it was prepared the day before, and because it has vinegar, they let it rest the whole night. These pickles are going to be used for the hot dogs. Participant 1 mentioned to me that in order to prevent that the bread gets soggy during the serving time, they served everything separated, they plate it up until the item will be served; the bread from the sausages, the pickle vegetables because whatever is left, they can use it for another thing. This is a clear example of how leftovers in a kitchen are usually easy to identify because they are covered with cellophane, foil, or other material (Evans 2014).

During the morning Participant 1 takes out frozen milk and butter from the fridge. The chef mentioned to me that those ingredients where from a batch that was bought in March 2020 when they close for the first time because of lockdown due to COVID-19. My

observations were implemented in October of that year, so seven months from that. This finding shows that for some foot items the gap in disposal can last up to several months and when the food stuff is handled again, it does not exit the gap as excess, but as food. This example also illustrates how the individual uses different type of information that the chef had in hand. On the one hand, the milk product did have the food label that stated "*best for"* (best before) 14.06.2020, but it also included a second legend "*ofte god etter*" (often good after) (Matvett, n.d.). This means that because is a best before label the quality of the item is reduced, but not the safety. So, Participant 1 mentioned to me that if the food item is properly frozen, the chef will give around six months for products that contain the food label of often good after. Participant 1 mentioned that this food label is quite new in Norway, and that it has only around one and a half year since it started and now "everybody uses it" (Participant 1, 2020). At least for the milk, the chef will give a time frame of six months if the item was properly stored in the fridge. Following this way of assess food, Participant 1 adds up by stating that for him/her the use of the senses is another strategy to detect textures, smells, and taste.

I was curious about how in that kitchen the chef determined how much food they prepare per day. Considering that the observations were done during lockdown, so the influx of students, employees or clients was not as usual, but still, in this kitchen, they were preparing around 150 per day. Participant 1 mentioned "for us is better to make extra, not to have kilograms of extra" (Participant 1, 2020). The chef continues, and mentioned that they used the reference of what was sold the day before and how much they expect to sell in that day. Through my observations, I see that in this kitchen, food is prepared daily, and food is prepared in batches. If there is anything that was prepared, but not sold, they use if for the next day (for example of the rice tray).

Following the preparation of the mashed potatoes. Participant 1 take out from the freezer five plastic bags with boiled and crushed potatoes, no milk nor butter included. Participant 1 mentioned to me that these potatoes where boiled and packaged during March

2020. They did that because they were good, but did not know for how long the canteen will be closed. By freezing the bags, they avoid the potatoes to go to waste. Participant 1 expands on this and acknowledge that they have the kitchen capacity, of space and equipment, to make these food packagings, but know it is unused.

It is 10:32am and Participant 1 takes out the sausages from the oven, and plastic bags that contain a mix of beans, sweat potato, and paprika. As well Participant 1 mentioned to me that the bags with the mixture of beans and vegetables where prepared before lockdown and it is going to be served as a side of the mango salad.

I looked at the green bag of food waste and is just the coffee waste from the regular coffee preparation they have at that canteen. This day, I saw more employees in the kitchen, some were working in that kitchen, while others were from other canteens, that came up to pick up supplies or ice. What I notice during my observations is that the kitchens in this building are from the same food supplier, which means they are not franchise or private owners. The transit of employees, and exchange of tools or ingredients was a common action that happen in this kitchen.

Before I leave the kitchen on that day, I see on the main stainless-steel table a tool that is used to put the date to packaged food. Right now it is with the label of *Produksjon dato* (production date), and the stickers are added to trays with food that are covered with cellophane before serving. It was during these last moments of being in the kitchen that the chef mentioned to me that because of COVID "there is no big happening" in the kitchen. The chef shared that before COVID, they used to have an informal gathering with all of the employees from both, the cold and the warm kitchen, to share the plan for that day. Now, because fewer kitchen's employees where at the kitchen, the chef decided to skip this meeting.

Day 3

By 8:43am the milk supplier delivered the milk to this kitchen. I see that in the stainless-steel table there are several loose papers with the weekly menu. The green bag is place in a smaller plastic bucket; a little bit smaller than usual. Participant 1 brings from the outside fridge, frozen chicken that was stored in plastic bags and leaves it on the stainless-steel table. Every package is of two kilograms. Participant 1 also brings three milk liter shape containers with dried spices. The package is similar to those used for milk. In the steamer, Participant 1 adds oil and onions. In the stainless-steel table, Participant 1 puts cubes of frozen and chopped sweet potato (it has no peel and is pre-chopped). I asked how much of this is prepared and Participant 1 mentioned that is almost two and a halve kilograms of sweet potato. Participant 1 adds oil and some spices and puts the tray in the oven. After finishing this first part of the dishes, I took a look in the green bag and there is nothing placed there.

Participant 1 continues to handle the chicken. The chef has eight silver-ish trays where he/she placed two bags of around two kilograms each. The chef placed nine bags in five trays, and then placed them in the oven. In the area where the steamers are located, the smell of the oil with the onions starts to pop out. Participant 1 adds three cans of 2000 ml each one to the steamer. After placing the coconut milk, Participant 1 goes to another table and prepares the coffee for the day.

It is 9:13am, and Participant 1 takes out three bags, each one of 2 kilograms of rice. He/she opens them and places them under the running water to wash it. Today, because is Monday, I noticed more movement in the kitchens than the other weekdays. Participant 1 mentioned to me that on Mondays there is a lot to do “because you cannot prepare much on Fridays” (Participant 1, 2020). Participant 1 continues taking from below the stainless-steel two packages of pasta. Each one is of five kilograms, but at the end, only prepares one. In the stainless-steel table there are also some vegetables such as parsley and tomatoes. From one of the fridges, Participant 1 takes out a tray with different vegetables, such as lettuce and

sliced cucumbers. After placing the tray in the table, Participant 1 takes out the lettuce and place it in the green bag, but keep the cucumbers. This is an example on how the gap in disposal (Evans 2014) can result in different turnouts for different ingredients. Even though the two ingredients were placed in the same container, one exits the gap in disposal as excess (the lettuce because it was placed directly in the green bag) and the other one as surplus food (cucumbers). In a way the placement of the food does not determine if the item will leave the gap in disposal as excess or not, but the specific food item is what determines what happens to it.

In another tray, Participant 1 places some tomatoes and wash them. All of this happens in the stainless-steel table that covers the ovens and steams form one side. Participant 1 takes out a bag of peeled purple onions. They have no peel nor the ends parts. After washing the tomatoes, they are placed in the table again and with the help of a chopping board and knife, Participant 1 started to chop them. The tomatoes are used completely, nothing is thrown away. They do not include the green part that holds several of them together. I take a look to the green bag and while a lot of volume (of food) has been prepared only the lettuce from the tray is there. This shows how there is no causal relationship with the amount of food prepared and the amount of food waste generated. You can prepare a lot of food (in volume) and still do not generate a lot of waste. Participant 1 adds another rice tray (from last week, here the gap in disposal covered two weekends' days and the food item exit the gap as food, not excess), that was stored in a cool down machine. Participant 1 continues chopping the onions from the bag and the chef mixes then with the cucumber. Everything is going to be used for the salad. Participant 1 chops a bunch of coriander; everything is used, from end to end. Participant 1 continues washing the parsley, and takes out some damaged leaves starts to chop it, but only the leafy part, the stems remain there in the table. Participant 1 mentioned to me that on a regular day they used it all with oil and some spices.

It is 9:38am and from the fridge #2, Participant 1 takes out some black trays, there the chef places the salad and then placed the trays in a trolley with all of the food that is going

to be served. Participant 1 covers the trays with cellophane and place them in the trolley so the other kitchen's employees (with customer service and serving role) know that is ready. From the bag where the coriander was, Participant 1 takes out the other bunch and chop it and place it in a container. While participant 1 is preparing the service trolley, other kitchens employees come and use the oven.

The food preparation continues in this day. Now, Participant 1 takes out a tray with carrots of different colors (oranges and yellows) without the peel, but still with the end part. The carrots are raw and the tray is placed in the main preparation table. In another tray, Participant 1 puts the chopped onions with oil. In another tray, Participant 1 puts some carrots with oil. In the green bag there is the stem parts and seeds from red paprika (number of stems not identified). Participant 1 mixes the red paprika in the tray with the onions and oil, puts it into the oven. The same with the carrots tray. The four rice trays are ready, Participant 1 place them in the heater to keep them warm before serving.

Participant 1 handles frozen bread pieces into the oven. The chicken is defrosted by now, Participant 1 takes it out from the plastic bag and now, place it directly in the tray an again to the oven. First, they go with the bag to defrost them because "nobody took them out on Friday" (Participant 1, 2020). Participant 1 adds spices to the chicken, it won't be fried, only cooked in the oven. Per day in this kitchen, they prepare one batch of 10 litters of coffee, it last about 4 hours. It is almost 10:30am an Participant 1 leaves the pasta preparation until the last before serving hours. I noticed how the chef uses his/her hand to sense the heat, sometimes a special thermometer is used. After the food preparation is almost finished, I take a look to the green bag and I see ends of the red paprika, the ends from the carrots, and some lettuce and parsley's leaves.

I followed by asking Participant 1 about if they receive any type of training our courses from the food waste initiative, *Matvett*, Participant 1 mentioned to me that he/she does not, but "someone from the company does" (Participant 1, 2020). I notice that Participant 1 is very precise while preparing food. I noticed that the chicken that is ready is

not mixed with the masala sauce. Until they will serve it in the plate it would be combined, as for now, it was contained separately. This is another example on how another way to prevent food waste in the kitchen is to keep different ingredients or elements of dish separately, until it is time to serve.

The pasta continues to be in the oven. From the package of pasta, Participant 1 only prepare half of it, approximately 2 kilograms. Participant 1 mentioned to me that he/she prefers to prepare more batches, because warm pasta stays good for a short time. The pasta is combined with pesto and dried tomatoes. By this time, Participant 1 have the trolley with the food that is ready, for example the bread, and the coffee. Another kitchen employee takes it. In the green bag there is the coffee filter with the waste from coffee. The chef packed some legumes and place them in the fridge. It is 11:10am The chef takes out from the fridge, three trays with chicken, the chef adds some spices and puts the trays in the oven. I make an informal assessment to calculate how much stuff has been placed in the bags, the white one is ½ full, the green one is only ¼ full and the blue one is almost full because the volume of the food packages is bigger. I asked Participant 1 about the chicken that he/she brings from the fridge, Participant 1 mentioned that pre-cooked proteins, such as this chicken, can last between 2 or 3 days if something is not sold in that day.

When I am about to leave the kitchen, Participant 1 continues to prepare more carrots.

Day 4

My observations in the kitchen started at 8:45am. I could not see Participant 1 so I took the time to read some of the posters in the kitchen that were placed in a white board. Is a list with different categories of waste, what to include or not. It was stated the 3 main categories the green, the orange, and the red. Within these three main categories are 12 subcategories. The category of food waste "*Matavfall*" (food waste) is included in the green

category. The green category includes nine of the twelve subcategories. I meet Participant 1 around the stainless-steel table and I asked him/her about the chicken sales from yesterday. The chef mentioned to me that two more trays were sold than the day before, so that is good. The chef starts the day preparing three trays of rice, first he/she washes it. In the tray holders (the oven can hold vertically different trays at the same time), the chef adds the rice and four packages of frozen meat. Also, he/she adds three trays of frozen lasagna. This lasagna was prepared in advance in this kitchen. Is a tray with topp. The chef takes out the carrots from yesterday and starts to cut the stem and chopped them. The chef moves the green bag nears to him/her. Into the green bag the ends of the carrots are thrown away. The chef will add the carrots to the meat stew that is defrosting in the steamer. These carrots are called rainbow carrots, the colors range from red, to the common orange, to yellow. We both taste some yellow ones and the flavor is the same as the orange ones. The chef mentioned to me that on price, the red tends to be more expensive than the orange or yellow ones. Instead of cooking them, Participant 1 will add them to the stew. This is an example of how surplus food can be integrated in dishes. Because before the carrots where added to the stew, they were there, already in the kitchen but unused Evans (2014)

Participant 1 brings the trolley with some vegetables in bulk, and some tomatoes. The remaining carrots are placed again in the fridge. Participant 1 starts cutting some tomatoes and the chef uses all of it. A salad will be served as a side dish with the vegetarian lasagna. Two separate salads are served this day. During the salad preparation, the bottom part (the end) of the Chinese cabbage is thrown in the green bag. The rice is ready by 10:05am. I asked Participant 1 how he/she to know at what temperature and time different food items should be handled. The chef limit to answer with: “I would say experience. Just…certain number of times you know what to look for and you know what to expect” (2020). For one of the salads, Participant 1 uses pickle onions. After finishing the salad, the remaining onions go back to the fridge. Some of the salads are sold in a fixed package, and in the kitchen, they know approximately how much each portion is (50grs). The lasagna is still in the oven, and Participant 1 uses a thermometer to know the temperature from the center of the tray. On the

oven you can see the temperature of the oven, but it is different to the one in the food. Participant 1 prefers to use lower temperatures to avoid that product gests burn. Another kitchen assistant come and Participant 1 mentioned about the temperature and time for the lasagna (I understood partially some Norwegian). In the stainless-steel table there are some trays with the salads already prepared. It is 10:30am an in the green bag I saw only some lettuce ends, as well as ends from the carrots. The other salad is distributed in three smaller containers.

I noticed that in the stainless-steel table there are different trays, chopping boards, kitchen napkins, gloves, paper with the menu. As for now, the green bag is only ¼ full approximately. Participant 1 takes out from the fridge two more trays of frozen lasagna. At 10:50 am, Participant 1 takes out from the freezer another bag of meat and two additional bags of the stew (these bags of stew were already pre-made and packaged in this kitchen). Approximately every bag of stew is of 4 kilograms. The lasagna is still in the oven, at the end, five trays were heated up. I notice that compared to other days, Participant 1 is doing everything by himself/herself (washing, chopping, setting food in the oven, tasting, packing and preparing to serve). By 11:05am Participant 1, washes to parsley's bunches. The food preparation of today is ready, now is only time for the lasagna to be ready. By 11:07am I checked the green bag and on it I saw: the two stem parts of the parsley, coffee waste, lettuce leaves, the carrots' ends and stems.

To finish this preparation day, Participant 1 takes from the stainless-steel table to the fridge the leftover cucumber from one of the salads and the tomatoes. The trays are placed vertically in a trail container, with other trails that I could not see what was on it and everything is taken to the fridge. The lasagna stills in the oven. Participant 1 mentioned to me that other employee is responsible for product development mainly sandwiches and salads, those that are quite similar within other canteens.

Reflections from observations in a professional kitchen

During my observations in the kitchen, I started reflecting on different elements that influence the process of food preparation and therefore can prevent food waste. For example, while preparing a dish we can always keep in mind on how the ingredients can be used for something else. This is also related in how we served the food that we eat. Considering the example of the hotdogs where you have bread, the sausage, some dips, and toppings. It is a good idea to have everything separated so you avoid the bread to get soggy or moist. You can keep these loose ingredients for something else later on.

Another aspect that is connected to food preparation is how we interpret food labels (Plasil 2020) (Hamilton et al. 2015) and what we do with the information they are providing us. It is good the we know the difference between food labels to assess the quality and safety of the food item we are handling. In the case of the extension of the "best before" with the text "often good after", this means that the gap in disposal (Evans 2014) can be extended, but of course it depends if the food item was properly stored. As shown from the evidence, some food items can be still good after several months. However, these food labels, might be easy to read and to interpret on processed foods, but how we assess food safety on items that do not contain food label, for example raw ingredients, such as fruits and vegetables? What are the ways that a chef can identify and assess food safety and quality from different type of ingredients? In these assessments, when is exactly when food is categorized as non-food? These questions will be included further on in my conclusions chapter.

Plastic bags can be an example of an interim placing that extend the gap in disposal (Evans 2014). As shown from my observations from day 2, a specific food plastic bag with a capacity of one or two 1 to 2 kilograms were used in the kitchen. They were used to store pre-made food such as boiled and mashed potatoes (with no milk or butter) and a mixture of beans, paprika, and sweet potatoes. Before the lockdown this kitchen decided to premade base dishes that they could preserve and used them in the future. By that time, it was unknown

how long the lockdown of March will last, so they just decided to make these batches of what they already have in the kitchen, properly store them in the plastic bags and freeze them. They stored simple base ingredients what they could serve later on (this was a couple of months after) as final dishes. Mashed potatoes are a regular side dish that is served in this kitchen. Participant 1 mentioned to me that on a normal day they would prepare 200 kilograms of mashed potatoes as a side dish.

Reflections from the passage of food into waste

Based on my data, one result is that the passage of food into waste in these two kitchens is not unconscious or undeliberated, and prevent it by use of different elements such as competence from the chefs and material kitchen equipment. Both of the chefs interviewed and for what I saw in the kitchen illustrate that there are steps to avoid food waste mainly during their food preparation, and other food handling practices.

Keeping food on the loop is dependent to the temperature where the foodstuff is placed and the period of that placement. Time and temperature can be identified as transversal elements in all of the ways to save food from waste: As noted by Participant 1 (2020) these food movements involved different placings for different foodstuff:

> If you started as the ingredients, is keep them in the fridge or freezer as long as it is needed. In the kitchen (preparation), heat if needed, and the cool it down in the proper way and then store it in the fridge until you need it, to heat it to sell it. And then again if you do not sell everything you need to cool it down again and shore it in the fridge, in a perfect temperature. Is basically time and temperature, two things you need to control to make sure it does not go into food waste.

Level of analysis III: behind the food savings are elements of social practice theory

The first two levels of analysis in this study, included the mapping of different food saving practices from professional kitchens, and kitchen descriptions that illustrate the food flows during meal preparation to avoid food to become waste. Where I identify different ways in which food can be saved from the bin (or green bag). For this third part of the analysis, I analyze my findings under the elements of practices (Shove, Pantzar, and Watson 2012), which influence the food saving practices described before. It is important to mentioned that is hard to categorize doings, and particularly the different ways of handling of food into one specific category. What I want to illustrate is that the material, meaning, and competence all influence the food saving in the kitchen.

a) Material

As defined by Shove, Pantzar, and Watson (2012), the materials encompass "objects, infrastructures, tools, hardware and the body itself" (Chap. 2. p.2. online version). Being in a professional kitchen and having an interview with a chef in his/her working place allowed me better understand the setting where food preparation and other practices took place. By being in the kitchen and interviewing chefs it was easy to identify the different objects or kitchen equipment that where there as part of their workplace outline. The freezers, the ovens, steamers, chopping boards, knifes, kitchen gloves, napkins, among others are part of the objects and tools that were present in these kitchens. All of the kitchen equipment was easy to identify while being in the kitchen.

Furthermore, compared to other waste studies, food's materiality is at constant change, and a food item can change dramatically within several hours or days. Here is where the individual (body) interactions are key to prevent that food goes to waste. It is not only the individual, through his/her senses, that obtains information and asses the food, it is also the individual who perform the food saving practices.

In food saving practices, you have two materialities that are interconnected. On the one hand, you have the food's materiality that is in constant decay. On the other hand, through some kitchen equipment, an individual, can preserve food items, enlarging the gap in disposal as much as he/she can. An observation to Evans sketch on the food waste flow (Evans 2014) is that it does not explicit display the time variable. Time, when we are studying a material object, such as food, that is in constant decaying, it is relevant compare to other waste studies. As stated by the chefs, when regarding to food, time and temperature are key variables to keep an eye on in order to prevent food waste.

One particular material object that, in a Norwegian context, is key as a source of data is the green bag for food waste management. This green bag serves for a specific waste category in Norway and has its own meaning. Even if people are still confused on what to place where. This material element is present in both, at the private household level or food service institutions, and in the public open spaces throughout the Oslo. Because food waste is a specific category for the waste management in Oslo, it was easy to spot outside buildings, a green sticker with the tag of food waste. There are usually spaces in Oslo where green bags are stored before the waste management services come and pick them up. The green bag and the placement of food waste there is as example of how the elements of a practice are interconnected and allows the practice of disposal to happen. The green bag is an object (material), that is specially aiming to collect food waste. The color of the bag (green) determines a specific meaning of what should be place there compared to other waste categories. Finally, there is knowledge about what to do with those green bags and where to put them (competence, and material elements).

One particularity shown in my study is the sharedness principle among material objects that was both, observable trough my observations, and described in the interviews. In the kitchens under study, the chefs where open about the relationship that exists between the canteens nearby. It was easy for me to spot different employees from other canteens that were using ingredients or kitchen equipment to prepare meals that were going to be serve elsewhere. This material object sharedness expands on the notion that material objects are just there for somebody's use. This flow of ingredients, and of kitchen equipment, also influence how the food handling practices take place.

Professional kitchens could aim to reduce their food waste generation. But if it happens that there is food waste generation, that food wase (material matter) can be keep in the loop in the university campus. For example, during my previous semesters of my master, I volunteered at two student's initiatives. One was the UiO Rooftop Initiative and the other was student garden. Both of these student initiatives grow some vegetables for consumption, mainly for their student members. These student initiatives could benefit from what the kitchens on campus are already throwing away and use if for compost so the output from the kitchen can become an input and be use to grow food. Of course, this is something that the board of both initiatives might consider or implement. It is a way to continue or extend the use of food waste that has already reach the point to get to the green bag. This can illustrate a proto-practice, where the elements of a practice are there, but new links have not been made (Shove, Pantzar, and Watson 2012). In a way, the food waste separation in Norway is already implemented, there is a storage of the green bags in places near the university's canteens, and there are student initiatives that could benefit from this disposable matter, after all the prevention or saving practices are given a priority.

Another interaction between two tools that could help prevent food waste is the use of food labels and use of the senses. Both involve the material element of a practice, but one is commonly used to food items that are packed. I wouldn't argue that one replaces the other one, but, instead, that they can be used complementary. Let's recall that the food label often

good after is only included in items that after the best before date do not represent a harm for human consumption (Plasil 2020). In a way by using the food label and the senses is a way that you can triangulate and asses better the food's item safety. When the food item does not contain any food label, food assessment through the senses is vital to assess food.

b) Meaning

One of the elements of a practice is meaning. By meaning, Shove, Pantzar, and Watson (2012) refer to as "as a term we used to represent the social and symbolic significance of participation at any one moment" (Chapter 2, p. 3 from online version). This concept and definition are drawn from Schatziki's teleoaffective structures that include "embracing ends, projects, tasks, purposes, beliefs, emotions, and mood" (Ibid). The following subsections will include examples on how some of the elements that build for the meaning element were identified from the data.

By the data I collected, I could identify particular food waste projects that these canteens were part of. On the one hand, one is a business initiative involving actors from the food business. On the other, is an internal project aim to reduce food waste in the university's canteen context. As Participant 2 mentioned

> We were signing up for the food business and like goals, it was to reduce food waste within 20% during 2020, so we are in that program. So, we are working with that, is why started KUTT also, and that was even before they started the program, so it is being in this business for many years. That we have like…how do we called it? Yeah, like a plan on how to avoid food waste, so we

have internet lessons for the employees, and we have like e-learnings like some classes" (2021).

Another participant (1) expanded on this food business initiative called *KuttMatsvinn2020* (Cut Food Waste 2020) and mentioned that it has specific categories of food waste, from food production to service and they are "told to report". The food waste initiative, a specific food waste project among the food industry in Norway, promotes a specific knowledge regarding on how to prevent food waste by using the senses to assess food. As mentioned as Participant 1 there is interest that consumers know how to assess food by using their senses. This last example shows a relationship between the three elements of a practice: meaning, competence and material. Because through a project (meaning), knowledge about on how to assess food (competence) is shared by inviting professionals in the kitchen and consumers to use their senses (body/material) to assess food and prevent food waste.

Different believes were identified through the interviews with participants and observations in the kitchen. For example, one was very specific about the meaning of food waste. As stated by one of the participants "Food waste is money" (Participant 2, 2021). This shows the particular understating of this issue through the experience from someone from a food service institution. Another belief has to do with the eat ability of food from the day before. As a participant mentioned: "Is not daily made fresh, so we cut the price, and of course students are looking after a cheap meal option, and is totally like open about it that is from the day before" (Participant 2, 2021). This belief or idea of food from the day before is materialize through a specific sticker (a material object) with a particular meaning. The KUTT sticker is added to prepared meals from the day before that are offered to students at a half price as a tactic to prevent food waste.

Regarding the mood related to the food waste issue in this particular holding of kitchens, one participant mentioned: “We speak very well together, and we tried to find the best solutions together. And we keep it we find good solutions, we discussed with each other in the different restaurants, and how we, how we are going to handle it and how it can work in praxis” (Participant 2, 2021). This example reflects that the food waste issue, at least for this participant, is something that is talk at the workplace, among different colleagues, and at in some levels of the organization.

c) Competence

The next element of a practice is competence. The competence element integrates different forms of understanding and practical knowledgeability (Shove, Pantzar, and Watson 2012). These authors build from the ideas of deliberately cultivated skill describe by Giddens 1984 cited in (Ibid, 2).

As one of the chefs noted, food waste is something that: “is always in our minds” (Participant 2, 2021). This understanding about the issue, or the problem can be linked to another element of practice such as meaning, by implementing specific actions to prevent food waste in that kitchen. For example, Participant 2 mentioned that:

> We tried to, let say we tried to plan our days the best as we can, of course some food waste will happen which we tried to avoid as much as possible. And we tried to find good solutions how to minimize it, just like pricing down the day after, and on Fridays we have a buffet (Participant 2, 2021).

A particular understanding about food waste was pointed out by the participants. For example, Participant 2 mentioned that: “I know food waste is a big problem, but that is what we do, at our, when we get home, it is about the routines, in how we shop in the groceries stores, how we store things”. This definition provided by the participant was elaborated and show the different stages that interact on what goes to the bins at the kitchen. As reflected by the chef, it is not only what happens in the kitchen, but also what happens elsewhere in relation to the preparations at the kitchen. Compared to the definition provided by another Participant 1, that was more pragmatic: “Food waste is food that we throw away that was supposed to be eaten. That is the most basic description of food waste” (2020).

Through the interviews with the chefs and observations in the kitchen, practical knowledge is something that is used in a food service institution environment. One type of this practical knowledge that can help prevent food being thrown away is the knowledge about temperature applied to different food items, at different stages in the food preparation process. Another type of practical knowledge that helps food waste prevention, is the knowledge about the particularities of different types of food items and their life-spans. For example, as stated by one of the chefs:

> The cooked pasta is only good for certain number of minutes, hours, before is so bad that you cannot eat it if the quality is not good enough. If you cooled down quickly enough then you can put it in the fridge, and heated up again if you needed or can use it tomorrow (Participant 1, 2020).

> Likewise, the other chef also distinguished on how specific food items, such as salads, have a two-day life-span so in order to prevent that salads go bad: “we repack, and put cold water, in the salad so it stays crispy” (Participant 2, 2021).

Other food item identified was bakery, where Participant 2 mentioned that is best when it is fresh, but in order to prevent it from going to waste they tried to sell it at the end of the opening hours, if not, they freeze it down. Changes in temperatures are something commonly used in kitchens to preserve food quality. As stated by Participant 1, "A good example is to cool it down quickly enough to save the quality of the food, then the longer the food stays warm, the lower the quality it gets" (Participant 1, 2021). Regardless of the food item under use, these examples show how the competence element of a practice, such as specific knowledge about food and temperature, is linked to the material element of a practice, with the use of tools to increase or decrease the temperature of food and preserve it over time.

With COVID-19 food service institutions were challenge on how much food to prepare per day. Before COVID-19 one of my participants mentioned that they had a fixed amount of food prepared, considering school calendar, holidays etc. With the COVID19 and the reopenings, it was hard for kitchen leaders to determine how much food to prepare per day. As Participant 2 mentioned "So we haven't figured out like, how or when the students are in, on campus". Participant 1 also highlight that it was about finding a balance between how much food to prepare and what expectations you have for that day. This uncertainty during both of the reopening in Oslo have make, at least in these kitchens, hard to plan how much food to prepare. Changes in planning could affect how much food is produced, therefore is related to food waste.

The chefs that participated in this study were experienced in the kitchen. They have been involved in the industry for several years. Through the interviews, I identified practical knowledge related on how to save food or prevent food waste from happening. For example, Participant 1 mentioned: "If you start with the ingredients, keep them in the fridge or freezer as long as it is needed. In the kitchen, heated if needed, and then cool it down in the proper way and then store it in the fridge until you needed, heat it to sell it" (2020). This is another

example on how one element of a practice, competence, is linked to another practice element, in this case the material element, where the use of fridge or other kitchen equipment can help preserve food and just take it out when needed. This flow of foodstuff also reflects how there are previous steps that participants do before food goes to the bin. I categorize this particular knowledge as knowledge on how to prevent food waste. Involving steps that can be implemented before food goes to the bin. For example, "And then again if you do not sell everything you need to cool it down again and then store it in the fridge, in a perfect temperature, is basically time and temperature, two things that you need to control to make sure it does not go into food waste" (Participant 2, 2021).

Another type of practice knowledge identified in this analysis is the number of different types of ingredients used to prepare food. Fewer ingredients that can 'cross-over' through different dishes is also a way to prevent food waste. As stated by Participant 2: "Like they be, be for a burger, we have lettuce, some tomato, and red onion, cucumber, and for the kebab is the same, but it is chopped in a different way you know. We do not use so many different types of vegetables, and that will also avoid food waste" (2021).

Practical knowledge about the equipment's temperature in the kitchen is something that can prevent food waste. For example, "I do not know how many people that are not in our, like, are aware that the fridge has to at 4 degrees to, and how to cool down in the right way, so if you put the stew from your dinner in a box that is small and high it will take longer to cool down at the bottom of course" (Participant 2, 2021).

Another type of practical knowledge identified in one of the kitchens is what type of food customers like to eat in order to prevent food waste. As stated by Participant 1 (2020)

during my observations: People do not want soup (in that kitchen). We discussed that the majority of food waste from this kitchen has a solid state.

Through these examples I highlight those actions are done before food goes to the bin in these kitchens. As stated in an interview with one of the participants: “At the moment I do not think there is nothing we already, there are not anything that we are not already doing. I think we are doing all the steps that are possible to reduce food waste” (Participant 1, 2020).

VI. CONCLUSIONS

Through this study I explored the issue of food waste through the analysis of food practices in the kitchen, mainly of food preparation. I implemented an ethnographic study, and conducted a fieldwork in a professional kitchen and interviews with chefs from food service institutions in Oslo, Norway. Guided from social practice theory, I organize my findings in three different levels. First, that professional kitchens are sites of food saving practices, related to food preparation practices, and other food handling practices. Second, through a detailed descriptions of different food preparations process I could identify and illustrate the different placements that food can have instead of the bin. Third, practice elements are relevant to illustrate how different elements interact when the food saving practices are enacted.

One main finding is that in the two kitchens under study there is awareness about the food waste issue and specific actions during food preparation. This study also shows how food preparation is interlinked with other food handling practices in the kitchen such as planning, storing, and how the chefs managed to keep food out of the bin or green bag.

Another finding of this research is how the interpretation of food labels can affect food preparation, and therefore food waste. One of the chefs show how, if properly stored, an item could keep good after several months before consumption. This time extension is directly link to the gap in disposal, that can make food to exit as excess or continue to exit at surplus, which has potential to be used. However, this assessment of food labels is easy to do it when you have the food label that explicitly states the dates that one should follow. But future research regarding food waste could explore how chefs or cooks assess food's quality when there is no label that determines or guides about when to consume a food item.

By implementing a social practice approach to this study, I became aware on how hard can be to change a single practice, and how many interventions that are aiming at "reducing x or y" are lacking sometimes, the context in which that practice is taking place and its relationship with other practices. Sometimes in order to generate social change one should focus on different practices rather than looking at the practice as a silo. Food consumption is an entanglement of different practices. Therefore, solutions must consider a broader scope rather than aiming to change one single practice.

Another relevant finding of this research is that because of its exploratory scope, future research can continue to map food savings practices in other food serving institutions. After developed a set of practices, other methods could be implemented to explore from those practices which ones are present in different venues, which ones are new, and what are the ones that chefs prefer to implement. Maybe we are under food saving practices under construction.

Food, compared to other material goods that are part of consumption, is a critical issue. First, because its life-span is short and it is in constant decaying. Secondly, because is a basic human need. Moreover, food is in constant change, influence by changes in temperature that affects its texture, smell, or flavor. However, as shown from my evidence, it is possible to hack food's decaying. Involving movements, kitchen equipment, temperature, time, and an individual. Compared to other material object, the human body become of relevance for assessing food through our senses. Our body becomes a tool (material dimension) that can use sub tools (senses) to assess the quality of a food item. This is a particularity of food compared to other type of wastes. I definitely will encourage future waste research to consider the food waste category.

At a global level there is interest in reducing food waste. However, one thing is to redistribute or move around the food waste that is already generated and another thing are ways that prevent it in the first place. This research, makes a small contribution, in the prevention sphere rather than in the surplus food management sphere.

Particularly, I would encourage for future research to have a gender representation in the sample. In this study, only males chefs participated in the study. This does not mean that chefs, who are women, aren't out there leading kitchens. But this study is limited in its gender representation.

While doing this research, I started to notice my own food waste issues at home. I never quantify the exact volume, but I started to notice that a small relevant food part mainly from fruits and vegetables was going to the green bag. The seeds that I discarded mainly of apples, different types of chilis, watermelon, etc. I started to save them. I am not an expert in seeds, but I washed them and save them in small paper envelops. I reflect on how instead of having food items in our paintry as an extra, we have our stock of seeds for growing. Of course this add challenges on where to plan and grow those seeds. Is not that in a small apartment you can have a piece of land, but then is where the communal spaces come into part. I also saw in my small compost, seeds growing. I am amazed on how with very little maintenance, attention or care, seeds still grow.

This research had an impact on my personally. At home, I started to have my "Cómeme pronto" (in Spanish, eat me soon in English, *spis meg snart* in Norwegian) section in my fridge. This section was at the middle level in my fridge where I move food stuff that I know they go bad quite fast (e.g. leftovers from bought or homemade meals, some cheeses, chopped vegetables like onions, tomatoes, carrots). Some days I just out something from

there and eat. No cooking, no chopping, sometimes not even adding heat, just eat it as it is. This adjustment in my fridge was socialized with my husband. First, we both make fun about it, but then the section became a thing on itself, I even add a proper tag. To this shelf in the fridge food stuff comes from the upper shelfs, the lower vegetable shelf and from whatever is prepared. It is probably something simple, but it has become a very visual area of our fridge. And both of us know that if there something there, that has priority over making or buying something new.

VII. BIBLIOGRAPHY

Atkinson, Paul and Amanda Coffey. "Revisiting the Relationship Between Participant Observation and Interviewing." In *Postmodern Interviewing*, edited by Gubrium, Jaber F. (Editor), and James A. Holstein (Editor), 108-22. Thousand Oaks, CA: SAGE Publications, Inc., 2003. http://dx.doi.org.ezproxy.uio.no/10.4135/9781412985437.

Baglioni, Simone, Francesca Calò, Paola Garrone, and Mario Molteni. 2017. *Foodsaving in Europe: At the Crossroad of Social Innovation*. Cham: Cham: Springer International Publishing AG.

Belasco, Warren. 2008. *Food*, *The Key concepts*. Oxford: Berg.

Beuving, Joost, and Geert C. de Vries. 2014. *Doing qualitative research: the craft of naturalistic inquiry*. Vol. 56217. Amsterdam: Amsterdam: Amsterdam University Press.

Chortatos, Arthur, Laura Terragni, Sigrun Henjum, Marianne K. Gjertsen, Liv Elin Torheim, and Mekdes Kebede Gebremariam. 2018. "Consumption habits of school canteen and non-canteen users among Norwegian young adolescents: a mixed method analysis."

Costello, Christine, Esma Birisci, and Ronald G. McGarvey. 2016. "Food waste in campus dining operations: Inventory of pre- and post-consumer mass by food category, and estimation of embodied greenhouse gas emissions." *Renew. Agric. Food Syst* 31 (3):191-201. doi: 10.1017/S1742170515000071.

Ehn, Billy, Orvar Löfgren, and Richard R. Wilk. 2016. *Exploring everyday life : strategies for ethnography and cultural analysis*. Lanham: Rowman & Littlefield.

Engström, Rebecka, and Annika Carlsson-Kanyama. 2004. "Food losses in food service institutions Examples from Sweden." *Food policy* 29 (3):203-213. doi: 10.1016/j.foodpol.2004.03.004.

Eriksen, Thomas Hylland. 2016. *Overheating : an anthropology of accelerated change*, *Overheating*. London: Pluto Press.

Evans, David. 2011. "Beyond the Throwaway Society: Ordinary Domestic Practice and a Sociological Approach to Household Food Waste." *Sociology (Oxford)* 46 (1):41-56. doi: 10.1177/0038038511416150.

Evans, David. 2014. *Food waste : home consumption, material culture and everyday life*, *Materializing culture series*. London,New York: Bloomsbury Academic.

Evans, David M. 2019. "What is consumption, where has it been going, and does it still matter?" *The Sociological Review* 67 (3):499-517. doi: 10.1177/0038026118764028.

FAO. 2019. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome. Licence: CC BY-NC-SA 3.0 IGO. Consulted 29.04.22 https://www.fao.org/3/ca6030en/ca6030en.pdf

FAO. "The State of Food Security and Nutrition in the World 2021: The world is at a critical conjuncture". Not defined. https://www.fao.org/state-of-food-security-nutrition/en/

Ferreira, Manuela, Margarida Liz Martins, and Ada Rocha. 2013. "Food waste as an index of foodservice quality." *British food journal (1966)* 115 (11):1628-1637. doi: 10.1108/BFJ-03-2012-0051.

Garrone, Paola, Marco Melacini, and Alessandro Perego. 2014. "Opening the black box of food waste reduction." *Food policy* 46:129-139. doi: 10.1016/j.foodpol.2014.03.014.

Goonan, Sarah, Miranda Mirosa, and Heather Spence. 2015. "Systems-practice framework: An integrated approach for foodservice management: A systems-practice framework for foodservice management." *Nutrition & dietetics* 72 (1):81-90. doi: 10.1111/1747-0080.12114.

Halkier, Bente. 2009. "Suitable Cooking?: Performances andPositionings inCookingPractices amongDanishWomen." *Food, culture, & society* 12 (3):357-377. doi: 10.2752/175174409X432030.

Hamilton, Ha, M. S. Peverill, Db Muller, and H. Brattebo. 2015. "Assessment of Food Waste Prevention and Recycling Strategies Using a Multi layer Systems Approach." *Environ. Sci. Technol.* 49 (24):13937-13945. doi: 10.1021/acs.est.5b03781.

Hebrok, Marie, and Nina Heidenstrøm. 2019. "Contextualising food waste prevention - Decisive moments within everyday practices." *Journal of cleaner production* 210:1435-1448. doi: 10.1016/j.jclepro.2018.11.141.

Hennchen, Benjamin. 2019. "Knowing the kitchen: Applying practice theory to issues of food waste in the food service sector." *Journal of cleaner production* 225:675-683. doi: 10.1016/j.jclepro.2019.03.293.

Håland, Tord. 2021. "Halvparten av Blinderns spisesteder er forstsatt stengt." Universitas. October, 13th. https://universitas.no/nyheter/68588/halvparten-av-blinderns-spisesteder-er-fortsatt-st/

Lagorio, Alexandra, Roberto Pinto, and Ruggero Golini. 2018. "Food waste reduction in school canteens: Evidence from an Italian case." *Journal of Cleaner Production* 199:77-84. doi: 10.1016/j.jclepro.2018.07.077.

Lang, Tim, and David Barling. 2012. "Food security and food sustainability: reformulating the debate." *The Geographical Journal* 178 (4):313-326. doi: 10.1111/j.1475-4959.2012.00480.x.

Matvett. "Best before often means good after". Not defined. https://www.matvett.no/bransje/matvett-in-english/best-before-often-means-good-after

Matvett. "Kutt Matsvinn Servering". Not defined. https://www.matvett.no/bransje/kutt-matsvinn-2020

Merriam, Sharan B., and Elisabeth J. Tisdell. 2016. *Qualitative research : a guide to design and implementation*. 4th ed. ed, *Jossey-Bass higher and adult education series*. San Francisco, Calif: Jossey-Bass.

Middlemiss, Lucie. 2018. *Sustainable consumption : key issues*, *Key issues in environment and sustainability*. London: Routledge.

Morone, Piergiuseppe, Pasquale Marcello Falcone, Enrica Imbert, and Andrea Morone. 2018. "Does food sharing lead to food waste reduction? An experimental analysis to assess challenges and opportunities of a new consumption model." *Journal of Cleaner Production* 185:749-760. doi: 10.1016/j.jclepro.2018.01.208.

Murcott, Anne, Warren James Belasco, Peter Jackson, and Sidney W. Mintz. 2013. *The handbook of food research*. London: Bloomsbury.

Neuman, Nicklas. 2018. "On the engagement with social theory in food studies: cultural symbols and social practices." *Food, culture, & society* 22 (1):78-94. doi: 10.1080/15528014.2018.1547069.

Niva, Mari, Johanna Mäkelä, Nina Kahma, and Unni %J Journal of Consumer Policy Kjærnes. 2014. "Eating Sustainably? Practices and Background Factors of Ecological Food Consumption in Four Nordic Countries." 37 (4):465-484. doi: 10.1007/s10603-014-9270-4.

Nygaard, Lynn P. 2017. *Writing your master's thesis : from A to Zen*. Los Angeles, California: SAGE.

O'Connor, Clementine, 2019. "SDG 12.3 and the Food Waste Index". Accessed September 29, 2020. https://www.macs-g20.org/fileadmin/macs/Activities/S1_1_O_Connor_SDG_12.3_and_the_Food_Waste_Index.pdf

O'Neill, Kirstie J., Adrian K. Clear, Adrian Friday, Mike %J Agriculture Hazas, and Human Values. 2019. "'Fractures' in food practices: exploring transitions towards sustainable food." 36 (2):225-239. doi: 10.1007/s10460-019-09913-6.

Oslo Kommune. "Recycling in Oslo". Not defined. https://www.oslo.kommune.no/english/waste-and-recycling/recycling-in-oslo/#gref

Parfitt, J., M. Barthel, and S. Macnaughton. 2010. "Food waste within food supply chains: quantification and potential for change to 2050." *Philos Trans R Soc Lond B Biol Sci* 365 (1554):3065-81. doi: 10.1098/rstb.2010.0126.

Pereira, Laura, Rafael Calderón-Contreras, Albert Norström, Dulce Espinosa, Jenny Willis, Zayaan Khan, and Loubie Rusch. 2019. "Chefs as change-makers from the kitchen: indigenous knowledge and traditional food as sustainability innovations." *Global Sustainability* 2. doi: 10.1017/S2059479819000139.

Pinto, R. S., Rmds Pinto, F. F. S. Melo, S. S. Campos, and C. M. Cordovil. 2018. "A simple awareness campaign to promote food waste reduction in a University canteen." *Waste Manag* 76:28-38. doi: 10.1016/j.wasman.2018.02.044.

Plasil, Tanja. 2020. "“Best before, often good after”." *Nordic Journal of Science and Technology Studies* 8 (1):16-26. doi: 10.5324/njsts.v8i1.3396.

Reckwitz, Andreas. 2002. "Toward a Theory of Social Practices: A Development in Culturalist Theorizing." *European journal of social theory* 5 (2):243-263. doi: 10.1177/13684310222225432.

Riise Jenssen, Elisabeth. “Taste or Waste: An Analysis of Barriers to Reducing Household Food Waste among Young Adults in Fredrikstad, Norway”. Master thesis. University of Oslo, 2016.

Sahakian, Marlyne, and Harold Wilhite. 2014. "Making practice theory practicable: Towards more sustainable forms of consumption." *Journal of Consumer Culture* 14 (1):25-44. doi: 10.1177/1469540513505607.

Seale, Clive. 2018. *Researching society and culture*. 4th ed. ed. London: Sage.

Shove, Elizabeth, Mika Pantzar, and Matt Watson. 2012. *The Dynamics of Social Practice: Everyday Life and how it Changes*. London: London: SAGE Publications.

Sonnino, Roberta, and Susannah McWilliam. 2011. "Food waste, catering practices and public procurement: A case study of hospital food systems in Wales." *Food policy* 36 (6):823-829. doi: 10.1016/j.foodpol.2011.09.003.

Southerton, Dale and Yates, Luke. “Exploring food waste through the lens of social practice theories”. In *Waste Management and Sustainable Consumption: Reflections on Consumer Waste*, edited by Karin M. Ekström. 133-249. Oxford and New York: Routledge, 2015

Steel, Carolyn, 2009. “How food shape our cities.” Filmed July 2009 at TEDGlobal 2009. Video, 15:25. https://www.ted.com/talks/carolyn_steel_how_food_shapes_our_cities

Stendsgård et al., “Food Waste in Norway Report on Key Figures 2015-2018”, Matvett. 2019. https://www.matvett.no/uploads/documents/OR.32.19-Edible-food-waste-in-Norway-Report-on-key-figures-2015-2018.pdf

Studentsamskipnaden SiO. “Organisation: Key numbers”. Accessed August, 2020. https://www.sio.no/en/shortcuts/about-sio/organisation

Sundet, Øyvind. “Performing meat reduction: exploring how existing food practices enable and complicate meat reduced diets in Norwegian households”. Master thesis. University of Oslo, 2021.

Szulecka, Julia, Nhat Strøm-Andersen, Lisa Scordato, and Eili Skrivervik. 2019. Multi-level governance of food waste: Comparing Norway, Denmark and Sweden. Routledge.

Turner, Stephen. 2007. "Practice Then and Now." *Human affairs (Bratislava, Slovakia)* 17 (2):111-125. doi: 10.2478/v10023-007-0011-z.

United Nations. “The Sustainable Development Agenda”. Not defined. https://www.un.org/sustainabledevelopment/development-agenda/

University of Oslo. “About Uio”. Not defined. https://www.uio.no/english/about/

University of Oslo a. “Facts and Figures”. Not defined. https://www.uio.no/english/about/facts/

Warde, Alan. 2005. "Consumption and Theories of Practice." *Journal of consumer culture* 5 (2):131-153. doi: 10.1177/1469540505053090.

Warde, Alan. 2016. *The practice of eating*. Cambridge: Polity.

VIII. APPENDICES

I. Information Letter and Consent form

Are you interested in taking part in the research project *"University's Canteen in Oslo: a qualitative study of food practices and food waste"?*

This is an inquiry about participation in a research project where the main purpose is to identify and understand what are the food practices that occur in a university's canteen and how these practices are related, if so, to food waste. In this letter we will give you information about the purpose of the project and what your participation will involve.

Purpose of the project
This research project aims to use a qualitative approach to study food practices in a university's canteen in Oslo and identify how are these practices related to food waste. The research will cover three main objectives: 1) To observe and identify the current food practices that take place in a University's canteen. 2) To analyse how these practices contribute to food waste, identifying when and how food waste is generated. 3) To contribute in the knowledge generation and understanding of food waste from a university's canteen setting.
This research project is the master thesis for the program in Development, Environment, and Cultural Change from the University of Oslo.

Who is responsible for the research project?
University of Oslo is the institution responsible for the project.

Why are you being asked to participate?
Because the setting for the study is a university canteen, participants for the sample are either experts on the field or employees that are related to the management or operations of food in canteens.

What does participation involve for you?
There are two ways to participate in this study. One iso only through an online interview, and another one through participant observation (if applicable). The scope of the study will cover the different food practices (actions) that take place within the canteen during food

preparation process. The information collected will be recorded on paper, electronically or with sound recording.

- *If the participant choose to participate in this study trough and interview, this will involve and online interview with a duration approx. from 45 to 60 minutes. The topics covered will include daily operations in the kitchen during food preparation processes and food waste. The date and time of the online interview will be scheduled between the researcher and participant. The questions and answers from the interview will be audio recorded.*
- *If the participant gives consent to participant observation (if applicable), this will involve an agreement of the date(s) and time for visiting the kitchen during food preparation time (before serving time). Some informal conversation can take place during participant observations. Data will be recorded on paper.*

Participation is voluntary
Participation in the project is voluntary. If you chose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data
We will only use your personal data for the purpose(s) specified in this information letter. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act).

- *In connection with the institution responsible for the project, only the student and the supervisor will have access to the personal data.*
- *All personal data will be anonymized to ensure that no unauthorized persons are able to access to it.*

Participants of this research won't be recognizable in publications. All participants would be anonymized and provided with pseudonym.

What will happen to your personal data at the end of the research project?
The project is scheduled to end *December 2021. All the personal data, including any digital recordings will be deleted at the end of the project.*

Your rights
So long as you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified

- receive a copy of your personal data (data portability), and
- send a complaint to the Data Protection Officer or The Norwegian Data Protection Authority regarding the processing of your personal data

What gives us the right to process your personal data?
We will process your personal data based on your consent.

Based on an agreement with *University of Oslo,* NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?
If you have questions about the project, or want to exercise your rights, contact:

- *University of Oslo* via sandrmf@student.hf.uio.no (Student) or k.l.syse@sum.uio.no (Supervisor)
- *Our Data Protection Officer*, Roger Markgraf-Bye, via *personvernombud@uio.no*
- NSD – The Norwegian Centre for Research Data AS, by email: (personverntjenester@nsd.no) or by telephone: +47 55 58 21 17.

Yours sincerely,

Karen Victoria Lykke Syse	Sandra Marcela Flores Barrera
Supervisor	Student

Consent form

To participate in this research project, we will require your written consent. Please sign in this form and send it by email to sandrmf@student.hf.uio.no or hand it a printed copy to the student.

I have received and understood information about the project ***University's Canteen in Oslo: a qualitative study of food practices and food waste*** and have been given the opportunity to ask questions. I give consent:

- ☐ to participate in *an interview -Interviews will be held online, on a time and date agreed between the researcher and the participant.*
- ☐ to participate in *the method of participant observation– (if applicable).*

I give consent for my personal data to be processed until the end date of the project, December *2021.*

(Signed by participant, date)

II. Interview guide

Food practices and food waste research project

University's Canteen in Oslo: a qualitative study of food practices and food waste Approved by NSD*

Development, Environment and Cultural Change master program, University of Oslo

Semi-structured interview

Opening remarks

1. Thanks for your interest and time for participating in this research.
2. This is a reminder that the interview will be audio recorded.
3. Approximately the interview will last between 45-60 minutes maximum.
4. The topics covered in this interview will include food practices related mainly to food preparation.

Canteen/Kitchen operations/Food preparation

Kitchen/menu/serving

1. Can you describe the canteen/kitchen you work in? Approximately how much food is prepared there (number of portions or number of consumers served per day)?
2. How would you describe the type of food prepared in the kitchen you work in?
3. Can you tell me about how is the menu defined in this kitchen?
4. Can you describe how is defined how much food will be produced every day?
5. Can you describe the customers that come and eat in the canteen?
6. Can you tell me about how food is served in that canteen?

Participant

7. Can you describe your role in the kitchen? How is your role engaged in the food´s production line?

Handling of food and food preparation routines

8. Can you tell me about a typical day at work? What are the routines that you do throughout your day starting early in the morning?
9. While handling and preparing food, what are quality and safety considerations that you take into account?

10. While preparing food, can you describe some examples of the tools or equipment you use for cooking?
11. Can you describe some examples on how you store your ingredients or prepared food?
12. Can you describe how waste is handled here?
13. While preparing food for opening hours, what are the main causes that can make food end in the bin?
14. While in the kitchen, what do you do to prevent that food goes “bad”?

Leftovers

15. So when the serving hours are over. What are the routines after food is served? What happens in the kitchen?
16. Are there any kitchen routines for handling leftovers (food prepared, but unserved)? If so, can you provide some examples of these?

Food waste

17. What do you understand for food waste?
18. In your experience from this kitchen, what are the main reasons that make food end in the bin?
19. In your experience from this kitchen, what are the main kitchen routines that prevent food to go bad and up in the bin?
20. Can you describe if the kitchen you work in is involved in any food waste initiative or program? If so, can you tell which ones?

Closing remarks

21. Is there anything else you would like to add or comment?
22. I appreciate your time and answers for this interview and again, thank you for your participation in this research.

23. Referral