THE JOY OF FERMENTATION

The underlying motivations for home-fermentation in The Netherlands

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Abstract

Fermentation is a natural process provided by the microorganisms present on the food. They ferment the food through their metabolism. Fermentation of food contributes to the food security worldwide, as well as to social and cultural practices. A rise in interest in fermentation has been captured by multiple online media sources since 2016. Over the last two years, I personally have noticed that fermentation was mentioned more and more around me. With this thesis, I contributed to closing the knowledge gap that exists around modern-day home-fermentation motivations. Furthermore, I highlighted the social significance of the home-fermentation practice. To gain insight into the motivations behind home-fermenting, qualitative research strategies were applied. Different in-depth, semi-structured interviews were held, with five experts and ten (non-expert) home-fermenters. With the help of the social practice theory and Satter's hierarchy of food needs, the motivations for home-fermentation in the Netherlands were uncovered. This came down to four groups of home-fermenters based on their motivations: fermenting for flavour; fermenting for a healthy diet; fermenting to relieve health problems; and fermenting to be self-sufficient. Other factors that often played a role were curiosity and experimentation, but most of all joy. Following the social practice theory, each of these groups had similar "things" to exercise the practice, while their meanings differed, according to their motivations, as well as their competence. Furthermore, it was also uncovered that competence influenced their choice of "things", independently of the fermenter group(s) they were a part of. The hierarchy of food needs by Satter (2007) showed most home-fermentation were based around good tasting food, novel foods, and instrumental foods. By sharing the practice with friends and experimenting with their ferments, home-fermenters reproduced and changed the practice according to their meanings and available "things". Moreover, fermentation can (re-)connect people and was linked to conscious food choices. In addition, fermentation provided people with a tangible hobby during Covid-19, through which (virtual) contact with other people was possible. Lastly, home-fermenters and experts were of the opinion that, even though only in small steps, fermentation can change the world for the better. It can reduce food waste; conserve without the need of energy; adding to a healthy diet and gut; and lastly by being more conscious with regards to the global footprint of foods. To conclude, next to solutions to modern-day problems relating to health and sustainability, as well as evoking specific personal feelings and consumer behaviour, fermentation brings joy, above all else.

Keywords: home-fermentation, motivation, social practice theory, hierarchy of food needs, conscious consumerism

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1. Introduction

Fermentation has been around for a long time, as long as 10.000 years according to The Editors of Encyclopaedia Britannica (2020). Fermentation is a natural process provided by the microorganisms present on the food, they ferment the food through their metabolism (Katz, 2012). Fermentation of food contributed to the food security all over the world by enabling them to preserve food when abundant for when it was not, even now it is still a reason for fermentation in some places (Hesseltine & Wang, 1980; Quave & Pieroni, 2014). Fermented products have also been a part of many social and cultural systems for a long time (Tamang et al., 2020). On top of that, it is stated by Brumberg-Kraus & Dyer (2011) that these fermented foods and their organoleptic properties have had an a significant influence on the gastronomic culture of the society in which they are present.

However, more and more fermentations nowadays are used for their functionality, their health benefits (Soni & Dey, 2014). A rise in interest in fermentation has been captured by multiple online media sources since 2016 (Askew, 2018; Bimuno, 2019; Buech, 2018; Cronin, 2016; Epp, 2019; Howell, 2016; Saxe, 2019; Updates, 2020). Next to the health benefits and the perceived naturalness, there seems to be an increased interest in fermentation also because it can be a way to shape a personal or group identity (Askew, 2018; Click & Ridberg, 2010; Flachs & Orkin, 2019). This is happening in Korea, by making kimchi, Koreans feel connected to their nationality and community (Jang, Chung, Yang, Kim, & Kwon, 2015). Also, fermentation can be a way to divert yourself from the globalised food market and "vote with your fork" for a more sustainable practice (Click & Ridberg, 2010; Pollan, 2006b). This "voting with your fork" means by choosing what to eat, one supports the foods and food systems they prefer to see, which can inspire change within the global food system, according to Pollan (2006b). According to Soni & Dey (2014) the re-emergence of fermented foods is undoubted, more specifically the traditional and regional foods, along with new perspectives. Their article ended with the expected future wherein the emergence of traditional knowledge would play a role together with new technologies in the development of functional or novel fermented foods (Soni & Dey, 2014).

Fermentation might be more intertwined with modern day life than one would expect, since it draws attention to craft food-making, taste, identity, and to traditional ecological knowledge put into practice to sustain microbiological ecologies (Flachs & Orkin, 2019). As Tamang et al. (2020) note: "The nutritional and cultural importance of these ancient foods continue in the present era.". Lee & Kim (2013) state that fermented food is deeply rooted in the ways of life, the local environment, eating habits and deeply related to the produce, in different regions. So, when studying fermented foods, one is studying the close relationships between people, organisms and food, since the practice of fermentation involves both biological and cultural phenomena, which simultaneously progress (Steinkraus, 1996).

These previous paragraphs have demonstrated many different motivations for fermentation. Over the last two years, personally I have noticed that fermentation was mentioned more and more around me. People were starting to ferment foods at home or talked about a ferment that they have read about or tasted. This sparked curiosity about the tastes and process of the ferments and got me into home-fermentation. I enjoyed making my own food, it brought me joy and excitement, not only the taste but seeing the process up close. Besides that, consuming my fermented products daily makes me feel good. The home-fermentation adds to my identity as a foodie, while applying my gastronomic knowledge. It also connected me to the young entrepreneurial community and the fermentation community in Wageningen. Furthermore, it made me think about the food industry and got me to visit smaller, local shops more often, as well as the farmers market. My own

motivations as well as my observations seem to match different discussed articles. But then, which motivations are playing a role in the lives of other Dutch home-fermenters currently? This is not clear from academic literature, since few articles are written why people in modern day, western society are home-fermenting. So, with this thesis I hope to reveal what motivations drive home-fermenters nowadays and what role the practice plays in modern-day society.

Within this thesis, first previously recorded motivations for fermentation in literature are discussed in the background, chapter 2. Second, the theoretical framework is explained in chapter 3. Third, the research questions are depicted in chapter 4. Fourth, the used methods are discussed in chapter 5, as well as ethical issues relating to the methodology and how my personality could influence the study. Fifth, the results are depicted and shortly discussed in chapter 6, starting with the participant demographics and continuing with the results of motivations for fermentation and its influences on society and one's daily life. Sixth, a larger, more extensive discussion of the results in comparison to literature and the theoretical framework is provided in chapter 7. Last, a conclusion is provided.

2. Background

It is said that the origins of the fermented food began as unintentional accidents (Tamang et al., 2020). The earliest records of food fermentation go back to 13.000 BC, in Israel (Liu et al., 2018). Traditionally, fermentation processes relied on spontaneous fermentation, or by the use of back-slopping, which is where a part of a previous batch is used to jumpstart the fermentation (Campbell-Platt, 1987; Steinkraus, 1996; Tamang, 2010). Different factors have influenced the substrates used to produce alcoholic beverages and fermented foods (Hesseltine & Wang, 1980). These factors are social, cultural, religious and economic factors (Hesseltine & Wang, 1980). Tamang et al. (2020) note that alcohol-containing fermented beverages are one of the most important fermented products, culturally and economically speaking. This has to do with the fact that their consumption is associated with culture through its link to rituals, customs, religions and entertainment (Tamang et al., 2020). To illustrate, wine has an long standing significance in the diets of European and Mediterranean consumers (Tamang, 2010).

Click & Ridberg (2010) describe multiple reasons for home-preservation of food, such as the following:

- For consumption at a later date
- "To know and control what is in my food"
- Concerns about additives and preservatives in commercial products, as well as distrust
- Better taste
- Eating according to environmental beliefs
- According to tradition and memories, nostalgia
- Building relationships and strengthening existing bonds
- Sensory experiences, physical rewards, accomplishments, connection to earth and humanity
- Smells, sounds & sights as physical markers of a job well done
- Deep connection with others, human heritage, re-connect with the disconnected (history, earth, place, food)
- Deeper appreciation for growing seasons

So, reasons for fermentation exist, ranging from food security to organoleptic properties or a connection to a group identity. The loss of knowledge regarding traditional fermentation practices, their microbes, and plants involved in the practice is associated with the loss in biodiversity (Nabhan, 2010; Quave & Pieroni, 2014; Sõukand et al., 2015). Furthermore, this loss of knowledge is also associated with practices within communities that use fermentation for food security and culturally important tastes or the relations between food, health and identity (Nabhan, 2010; Quave & Pieroni, 2014; Sõukand et al., 2015). Different motivations will be discussed in further detail below.

2.1. Food security and sovereignty

Fermented foods provide and preserve nutritious foods, with a wide variety of flavour, aromas and textures they enrich the human diet (Steinkraus, 1994). Nutritional needs are daily met through the consumption on fermented foods and beverages. Some fermented foods can increase the protein content or enhance the essential amino acid balance and their availability. Furthermore, other fermentations increase the content or availability of different vitamins, providing different health benefits (Steinkraus, 1994). According to Steinkraus (1994), at least five roles are fulfilled by fermentation:

1. The enrichment of one's diet by the development of different flavours, aromas, and textures in foods.

2. The preservation of foods, also in larger quantities, through lactic acid, alcoholic, acetic acid, and alkaline fermentations.
3. The biological enrichments of food substrates with proteins, essential amino acids and fatty acids, and vitamins.
4. The detoxification of foods through fermentation.
5. The decrease of cooking times and energy requirements.

As an illustration for a nutritional reason for fermentation, in Korea, the lack of proteins in their meals gave a reason for Koreans to develop techniques (fermentation) for the processing of soybeans, providing a nutritional balance (Kim, Han, Jung, Ko, & Kim, 2011). Furthermore, food fermentation is an easy and cheap way to preserve foods, adding to food security of local communities for times when food was scarce (Chavan & Kadam, 1989; Hesseltine & Wang, 1980; Quave & Pieroni, 2014).

Yates-Doerr (2012) argues that there is a need for the inclusion of the values of taste, pleasure, relationships, and identity that arises from eating, for food policies to be successful. However, a simple access to food is not all. This is where food sovereignty arises, which can be defined and summarised as is done by the Declaration of Nyéléni (2007): "The right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations." Food fermentation can provide healthy, nutritious and appropriate food for one's culture, thereby adding to the food sovereignty (Click & Ridberg, 2010; Quave & Pieroni, 2015; Sõukand et al., 2015; Steinkraus, 1994). It can even be hypothesised to add to people's agency, by providing more control and knowledge over what they eat.

Yet, these practices are threatened by the loss of knowledge and place specific microorganisms (Nabhan, 2010; Quave & Pieroni, 2014). It is stated that a loss of either of these can result in a disruption of the practice and place-based food security for certain communities (Nabhan, 2010; Quave & Pieroni, 2014; Sõukand et al., 2015; Svanberg, 2015). These communities in question rely on fermentation for food security and food sovereignty; foster these culturally important tastes. Furthermore, this loss of knowledge and place specific microorganisms can create dis-embeddedness regarding their links between food, identity and health (Nabhan, 2010; Quave & Pieroni, 2014; Sõukand et al., 2015; Svanberg, 2015).

2.2. Social aspects

2.2.1. Trust

The food industry over the world has had scandals, such as the horsemeat scandal (Gray, 2013; Lawrence, 2013). This impedes on the trust that consumers have in the food industry (Gray, 2013). Also, ingredients that consumers are unfamiliar with, such as the E-numbers in Europe, are a cause for distrust in a product (Consumentenbond, 2010; Paans, 2013). This distrust can provide people the incentive to make their own food, e.g. fermenting foods at home (Click & Ridberg, 2010). This can be linked to the creation or following of alternative food networks, which will be discussed in chapter 2.4.1..

An example is the Bulgarian yoghurt case, where consumers distrust the food industry, including its starter cultures and raw milk (Yotova, 2018). They rather stick to the familiar farmer and the neighbourhood grandmother with her yoghurt starter. Yet, this practice of home fermentation of yoghurt is something that might be seen as part of the Bulgarian cultural identity and part of their

traditions (Yotova, 2018). These ideas of cultural identity and traditions will be further discussed in chapter 2.3..

2.2.2. Enjoyment

Making fermented foods can be a hobby for a consumer, as it is for me. This can provide joy and a feeling of accomplishment just like it can for preparing any other food (Click & Ridberg, 2010). Next to that, fermented foods can be a source of pride for communities, as it is with the Bulgarian yoghurt and Korean Kimchi (Jang et al., 2015; Yotova, 2018).

2.2.3. Relationships

As mentioned before, Click & Ridberg (2010) mentioned building relationships and strengthening existing bonds as one of the reasons for home-fermentation. This can be illustrated by the experience of Siragusa (2020), she noted that the making of sourdough bread and the keeping of the starter, provided her with a tool to reinforce old/existing relations she had, as well as making new ones even though the world was in lockdown due to the Covid-19 pandemic. This is something I personally experienced as well, mostly the creation of new friendships through the practice of fermentation, before and during the times when social distancing and quarantine were part of daily life.

The giving of (starter-)cultures is also an social aspect itself, as the giving of microorganisms are carrying well-wishes and recipes, they are classic anthropological gifts, saturated with social meaning (Jasarevic, 2015; Katz, 2016). As noted by Flachs & Orkin (2019), the gifts of starters and ferments also provide an invitation to the recipients to join in and to share the practice and culturally significant taste.

2.3. Culture, identity, and traditions

> *"Culture underlies all food choices and acts as a basis for the development of preferences." - Piqueras-Fiszman, Varela, & Fiszman (2013; 102)*

Fermentation is deeply rooted in local knowledge within a community, while shaping the local ecosystem and creating possibilities for cultural expression (Flachs & Orkin, 2019). Fermented products represent an important part of the foodscape worldwide and are even still deeply embedded into local environment and history, as a crucial part of the culture of local communities (Quave & Pieroni, 2014, 2015; Sõukand et al., 2015). It can be argued that fermented foods and their knowledge belong to local bio-cultural heritage, having evolved over centuries through interactions between local communities and their environment (Nabhan, 2010). This implies that the fermentation process and its products are part of the socio-ecological system made up of non-living and living components and their interactions (Scott & Sullivan, 2008). Which means that they contribute to the identities of the local communities, along with their "sense of place" in gastronomic sense (Evans, Flore, Astrup Pedersen, & Bom Frøst, 2015; Redzepi, 2010).

An illustration of how fermentation is intertwined with culture can be found in Northern Kenya, where the Samburu people see food and eating practices as central to their indigenous worldview and social relations (Holtzman, 2003). These practices are highly marked in relation to the preservation of tradition in the contexts of social change. Tea has been adopted by the community and included in social relations and rituals, fused with meanings, interpretations and reinterpretations(Holtzman, 2003). Another illustration is that of miang, a fermented tea leaf that

has a long sociocultural relationship with the locals in Northern Thailand (Khanongnuch, Unban, Kanpiengjai, & Saenjum, 2017). Next to it being popular, it is known as an essential food for traditional religious ceremonies and funerals in certain areas (Gypmantasiri, Sriboonchitta, & Wiboonpongse, 2001). Miang is consumed for pleasure and often served for chewing, as a part of ethnic social customs, similar to drinking alcohol or smoking cigarettes (Sasaki, 2008; Sasaki, Takeda, Kanzaki, Ohta, & Preechapanya, 2007). One can say that miang is integrated in the history, culture and tradition of Northern Thailand (Khanongnuch et al., 2017).

Sõukand et al. (2015) argue that ferments are "peculiar expressions of local gastronomies", along with the notion that these ferments often represent certain items on which these local communities "build their identity". The wild fermentations that are used can demonstrate the intimate traditional knowledge of the fermentation practices, as well as the interactions between the microorganisms present and the ingredients used in the ferment. Many of these recipes are not carefully or precisely documented, nor is their microbiology (Sõukand et al., 2015).

Yamin-Pasternak, Kliskey, Alessa, Pasternak, & Schweitzer (2014) notes that communities and ethnic groups stake claim to identities through the pungent and specifically local cultural ferments. This is also argued by Flachs & Orkin (2019), who state that fermented foods can be seen as expressions of local gastronomies, as well as the representation of a local group identity.

This formation of identity can be illustrated by the case of kimchi in Korea, where a national identity is formed through the practice of making kimchi (Jang et al., 2015).The article by Jang et al. (2015) shows the expression of national identity through kimchi, shaping their culture and identity, causing them to be passionate about the (Korean) origin of kimchi. Kimchi was even registered in 2013 as a world intangible heritage product (Chang, 2018). Based on this, one can say that the argument of it being embedded in the Korean culture and national identity is being strengthened and acknowledged.

A study performed by Ham (2017), showcases dawa-dawa, a fermented food which is used as flavourings for soups, while also enhancing the nutritional value. The dawa-dawa tells the story about membership and identity, practiced through food choices but socially mediated (Ham, 2017). The locals choose between inclusion in modern life by choosing bouillon blocks, or the health properties that dawa-dawa offers them (Ham, 2017).

There are multiple examples of how traditions are upheld by food fermentation. Laphet is one of those examples. It is a fermented and pickled tea leaf, a Myanmar tradition since ancient times, eaten by everyone at get-togethers in family homes, monasteries and during traditional celebrations, regardless of race or religion (Han & Aye, 2015). The tea leaves are cultivated in the mountains of Myanmar, where a proper climate is found for the tea to grow. Historically, laphet was used as a peace offering or symbol, while nowadays the laphet-tray is mainly an expression of hospitality to houseguests. This shows the embeddedness of the laphet, it's link to place and people (Han & Aye, 2015).

Another example of a persisting fermentation trend into the modern day is the making of vinegar from wild apple and cherries, which is still very much part of daily life in South Kosovo and North-East Albania, owing to the health properties associated with this ferment (Sõukand et al., 2015). However, along with the knowhow being mostly with the elderly and the increasing globalisation and homogenisation of the food industry, these traditional practices are slowly being forgotten and disappear (Sõukand et al., 2015).

An example of an old tradition revived, although by external influences, is the juniper beer in the Kurpie region in Poland (Madej, Piroznikow, Dumanowski, & Łuczaj, 2014). Even though, in other regions the tradition has faded into history, here it has been popularised since the 1990s as a regional specialty, aimed at tourists (Madej et al., 2014). Juniper beer is an example of the revival of a tradition, combined with emerging trends. These trends are amongst others the craft of foraging, the re-emergence of local recipes and home-fermentation (Madej et al., 2014). The juniper beer was mainly described as a drink for festivities, becoming popular as the local bishops opposed the drinking and production of vodka (Chętnik, 1936; Madej et al., 2014; Wołejsza, 2008). One could say that the use of juniper berries in Kurpie, was a necessity for food security, as famines were severe and poverty very much present, even so that into the 20th century the locals had to on rely wild greens to prevent starvation (Chętnik, 1936; Madej et al., 2014). This latter fact is contemplated to be the reason why the traditional knowledge has been so well passed on (Madej et al., 2014). However, only upon tourists' interest, was the tradition of making juniper beer revived. Though, it is only one of the few Eastern Europe regions where traditional knowledge and the tradition itself have been kept alive successfully, even throughout communistic times. The persistence, as argued by Madej et al. (2014), is a testament to the survival of Kurpie's people, their culinary independence and their fight against the homogenisation of traditions under communistic regimes.

2.4. Movements& Trends

2.4.1. Alternative food networks

The study of fermentation practices can conserve the various dispositions that fermentation brings along by celebrating taste, health, knowledge and place, opposing the globalisation and homogenisation of the food industry (Flachs & Orkin, 2019). Click & Ridberg (2010) conclude in their article that the act of "preservation upholds and extends the goals of alternative food networks". Alternative food networks (AFNs) are "the practice and an academic body of work surrounding the emergence of alternative food practices that emerged in the 1990s as a reaction against the standardization, globalization, and unethical nature of the industrial food system" (Edwards, 2016). Edwards (2016) denotes examples such as farmers markets, urban agriculture, community supported agriculture, and the slow food movement. AFNs are thus the reaction against dis-embeddedness, as Edwards (2016) describes. Reconnection to place, to nature is the exact opposite, and what could be argued to be strived for by AFNs.

Click & Ridberg (2010) argue that there is a clear renewed interest in sustainable agriculture, which is clear from the popularity of organic produce, gardening, farmers markets, slow food, local food and community-supported agriculture, all part of AFNs (Edwards, 2016). Advocates for alternative food are changing the food system by shopping for local and organic produce at farmers markets, by planting community gardens, and supporting community agriculture (Click & Ridberg, 2010). They "vote with their fork" for the food system they deem fit for the future (Pollan, 2006b). Parkins & Craig (2009) conclude that AFNs gain popularity through the public recognition of the importance of food culture, as well as the belief that the current global food system deprives consumers of their link to food culture.

These politics linked to AFNs are derived from cultural practices and values which are mobilized through "embeddedness" and a "turn to quality", both of which are part of the empowering of the local character that AFNs uphold (Parkins & Craig, 2009). Local food production also seems to have another benefit, the contribution to the local economy and food culture, as well as a shorter supply chain and its ecological benefits. Furthermore, it provides the possibility to re-establish the connections between producer and consumer, yielding trust, social regard, and pleasure. All in all, these aspects can be seen as a resistance against the disembedding forces that globalisation and the

dominant food culture in the agro-food industry are. The AFNs provide the tools to build an alternative food economy, grounding economic relations, in particular cultural and social contexts (Parkins & Craig, 2009). AFNs can stress the connections between everyday experiences, food cultures and political change (Kingsolver, 2007; Nabhan, 2002; Pollan, 2006a).

According to Click & Ridberg (2010), the practice of food preservation has the capacity to develop a relationship to food in line with environmental beliefs of AFNs. Click and Ridberg (2010) state to believe that the "enriched emotional life" (Parkins & Craig, 2009) as built through food preservation practices, extends the possibility to provide a deeper awareness of food and environment and to help change the food industry (Click & Ridberg, 2010). The microorganisms and their respective ferments give a tool to move against industrialisation and a homogenised and globalised food system, to connect to the goals of AFNs (Click & Ridberg, 2010; Flachs & Orkin, 2019).

So, with home-fermentation, these ideals of AFNs can be included in the foodscapes of home-fermenters, becoming more conscious around food and the environment, changing the global food system, voting with your fork, and re-embed the food practices into society and place (more on that in 2.5.).

2.4.2. Post-Pasteurian view

While Louis Pasteur deemed microbial life as potentially harmful, the so-called post-Pasteurians discriminate between microorganisms, good versus bad, healthy versus harmful (McGovern et al., 2005; Paxson, 2008). One can for instance think of a human being as a sustainable ecosystem (Benezra, DeStefano, & Gordon, 2012). Post-Pasteurians can be said to stand by the notion that not all bugs are bad and that microorganisms, next to being a part of life, also enhances human life (Paxson, 2008).

Paxson (2008) denotes that the most experienced artisans in cheese making, who have been making cheeses for local markets for years, are now finding themselves within a new "movement". The Food and Drug Administration (FDA) sees raw-milk cheese only as a potential biohazard, while fans see the exact opposite, they see the tradition and the workings of "good" microorganisms on the milk proteins. Marcellino is one of those post-Pasteurians. She states in the Public Broadcasting Service documentary of Thompson (2006): "Just as you want to save a certain kind of tree in the rain forest, you want to save the microbes that are part of a region, because they are the ones that have contributed to the flavour and special unique character of a cheese". This could be linked to terroir (further discussed in chapter 2.5.), where climate and soil create distinctive pastures, which in turn provide flavour components taken up in the milk, evidently turning up in the artisanal cheese (Paxson, 2008).

Another issue is the loss of microbial exposure through the industrialised processes, the traditional ferments might compensate for this loss by providing safe microbial exposure through home ferments (Sonnenburg & Sonnenburg, 2019). A higher risk of non-communicable and chronic diseases might be related to the gut microbiota that are changing, due to the loss of exposure to microorganisms, together with the spread of the industrial life style (Galimberti et al., 2021). It can be said that fermented food should be seen as more than just to feed the human body, but also to assist the gut microbiota in their functions. Environmental microorganisms, autochthonous to the human body are decreasing in numbers due to the growing standardization of industrial fermentative processes (Galimberti et al., 2021).

The practice of home fermentation takes on an ideological stance in North America (Jasarevic, 2015). "Culinary mutiny" is a term used by Katz (2003, 2006), a movement towards wild fermentation and

away from the industrialised foods. Katz can be seen as and oracle of "post-Pasteurian" trend, as named by Paxson (2008). Katz states: "Microbial cultures are essential to life's processes, such as digestion and immunity. We humans are in a symbiotic relationship with these single-cell life-forms. Microflora, as they are often called, digest food into nutrients our bodies can absorb, protect us from potentially dangerous organisms, and teach our immune systems how to function. (…) Microorganisms are our ancestors and our allies" (Katz, 2003;2). Paxson (2008;40) makes the concluding statement of her article about what she has observed: "Microbes' reputation is being dusted off.".

2.4.3. Eating healthy and natural

Current market trends have shown a recent rise in popularity of probiotic consumables, "natural" foods and health beverages (Bayer, 2019; Bedaf, 2021; Buech, 2018; Chan, 2021; Prado, Parada, Pandey, & Soccol, 2008). These foods are perceived as low in sugar while flavourful, minimally processed while having high nutritional value with added health-promoting properties (Altay, Karbancıoglu-Güler, Daskaya-Dikmen, & Heperkan, 2013). To illustrate this, in a study performed by Quave & Pieroni (2014), the purpose of non-alcoholic fermented beverages for the Gorani people is shown to be not only food preservation or enjoyment, but also its perceived health benefits. Yet, in current society, the majority of the consumers is still only familiar with the most common lacto-fermented foods (Quave & Pieroni, 2014). In 2018 however, an increase of 149% in consumption of fermented foods was seen on Upserve menus, as long as the consumer was previously unfamiliar with the ferment (Resendes, 2020; Saxe, 2019). In the next two sub-chapters, the health benefits that are previously mentioned, as well as where the flavours (organoleptic properties) that are mentioned arrive from, are explained.

2.4.3.1. Health benefits

Sõukand et al. (2015) argue that nowadays the role of ferments is seen as crucial in the shaping of the public health and nutrition, as probiotics are increasingly recognized as beneficial to one's health (Quigley, 2013; Sõukand et al., 2015). Fermented products represent an important part of the foodscape worldwide, but also the medicinal food domain and domestic strategies of health care (Sõukand et al., 2015). Fermented products often contain live bacteria or yeasts, when arriving in the gut, they enhance the gut microbiome (National Center for Complementary and Integrative Health, 2019). These microorganisms ferment the foods that our gastrointestinal tract cannot digest itself (Amara & Shibl, 2015). These processes provide nutrients for the microorganisms as well as for us.

Another reason for the health benefits of fermented products is the enhanced nutritional value, with an enhanced vitamin and organic acid content (Şanlier, Gökcen, & Sezgin, 2019). Some of these vitamins are vitamin B2, B9, B12 and vitamin K (Şanlier et al., 2019; Walther & Schmid, 2017). Furthermore, the nutritional value is also enhanced by the increased bioavailability, as is the case for vitamins and minerals, but also because of the digestibility of carbohydrates and proteins that is increased during fermentation (Hancioğlu & Karapinar, 1997; Reddy & Pierson, 1994). So, one could say that fermentation is a sort of pre-digestion process. Next to vitamins, multiple other bioactive compounds can be produced during fermentation, one of them being bioactive peptides (Hebert, Saavedra, & Ferranti, 2010; Martinez-Villaluenga, Peñas, & Frias, 2017; Otağ & Hayta, 2013; Walther & Sieber, 2011). These bioactive peptides are often the attribute to which some health benefits from fermented foods are linked, amongst other these are: reducing the blood cholesterol levels, reducing allergic reactions, fighting obesity, fighting carcinogenesis, and fighting osteoporosis (Tamang & Kailasapathy, 2010). Many other different health benefits are described in academic literature, however not all are fully researched or understood.

2.4.3.2. Organoleptic properties

Fermentation can bring about a new set of flavours and textures to be enjoyed by consumers (Galimberti et al., 2021; Katz, 2012; Licandro et al., 2020; Şanlier et al., 2019). As an example, fermenting milk gives a viscous or even almost solid yoghurt, but fermenting milk can also create a soft and runny or a hard cheese. Fermenting chili peppers causes them to get less spicy over time while fermenting tea will provide bubbles and acidity (Katz, 2012; Redzepi & Zilber, 2018). These are just a few examples of organoleptic changes that happen during the fermentation process, bringing about characteristic flavours linked to that product. These provide reasons why consumers enjoy fermented products, or for example could prefer Bulgarian yoghurt over Kefir, or a Camembert over a Roquefort.

2.4.4. Sustainability

The sustainable side to fermentation is acknowledged by Quave & Pieroni (2014), stating that the tradition of fermentation reduces food waste and spoilage. This also links back to an increased food security and food sovereignty (Quave & Pieroni, 2014). This sustainability factor is also recognized beyond food consumption, for instance by providing the possibility of the biovalorisation of food waste to create a product or ingredient with added value (Chua & Liu, 2019; Vong & Liu, 2016). On a final note, it can also be imagined that by fermentation, a product is conserved without the need of energy, in contrast to refrigeration.

2.5. Sense of place, terroir and (re-)embeddedness

One can wonder how microorganisms define particular tastes, which influences how and why local knowledge and tastes define distinctive foodways (Flachs & Orkin, 2019). “Terroir”, the place-specific quality of food, can be reimagined as the distinct microbiological landscape, which results from the combination of agricultural and culinary practices (Belda, Zarraonaindia, Perisin, Palacios, & Acedo, 2017; Nabhan, 2010; Paxson, 2013). Fermentation sheds a light on the biological and socio-political mechanisms that become entangled when they shape and get shaped by larger environments (Flachs & Orkin, 2019). Moreover, the fermented food of a certain ethnic group is intimately linked to different place-specific factors (Lee & Kim, 2013). These are the produce of the region, but also the weather, soil and the people’s way of life and eating habits. Together, this enhances the unique traditional fermented food of certain places. Nielsen (2019) concluded that the progression of fermentation practices was influenced by the raw materials and the climate conditions, as well as the social, cultural, religious, and economic aspects of the area of production. All in all, fermented products can be said to be strongly connected to their territory of origin and their people’s traditions, and therefore embedded in its surrounding society and place (Hugenholtz, 2013; Tamang et al., 2020).

Redzepi (2010) describes that the sense of place, in sensory terms, in the cuisine is based on many different factors. One of these is the culinary processes, where invisible microbiota play a crucial role. Other factors are the local agro-biodiversity, soil and environment management, pastoral and agricultural techniques, and ways of cooking (heating up the foods) (Redzepi, 2010). Therefore, the local knowledge regarding these factors is a valuable factor in food preservation and food security, according to Quave & Pieroni (2014).

An illustration is given by Scott & Sullivan (2008). According to them, fermentation of grapes into wine is closely linked to place through its registered appellations, with its local yeasts, soils, cave conditions. Each of these factors influence and produce the distinct regional wines. Differences can be noted for the same grape grown in different regions and the exact same can be said for cheeses. Scott & Sullivan (2008) concluded that the deliberate use of fermented foods has shown how all life

processes are intimately connected with ecological processes. They end with the note saying “the patterns of culture which last the longest may be those that mimic the dynamics of ecosystems” (Scott & Sullivan, 2008;6). This could be hinting towards a notion of sustainability, which provides a possibility for perseverance into the future.

Returning to the topic of cheese, Marcellino states that “The diversity of the local trains of microorganisms in a region contributed to the diversity of cheeses in France. . . . So you may not think that microorganisms are important, but . . . for the French, they consider this, these microorganisms, part of their patrimony.” (Thompson, 2006). Marcellino also sees possibilities in terroirs of cheese: “In one faithfully follows a traditional technique based on a natural microbial succession, one is enabled to create a new product characteristic of one’s own land” (Marcellino, Beuvier, Grappin, Guéguen, & Benson, 2001). Paxson (2008) is of the opinion that another possibility is that terroir taste can also be resulting from bacteria digesting enzymes present in the milk, thereby releasing chemical flavours upon death, which link back to the local grasses. This “terroir effect” would be enforced through making cheese with raw milk, instead of pasteurised milk. Raw milk might therefore be forwarded as a biotechnology, according to Paxson (2008), for “localism”, defined as “the expression of a people’s connection to a piece of land”. This all is in line with the note by Sõukand et al. (2015) who state that place can be expressed through the bio-cultural aspect by the microorganisms present in a ferment. These are very place specific and significantly induce and shape the gastronomic and sensory properties of the ferment (Sõukand et al., 2015).

All these different illustrative examples show how food and place, as well as microorganisms involved in fermentation practices are related. This topic also links back to AFNs as they search out these alternative food systems, to reconnect with nature. So, AFNs can be a way for consumers to create re-embeddedness and a sense of place, and reconnect to nature, all through the practice of home-fermentation.

2.6. Summary

To summarize, there are many different motivations for home-fermentation, ranging from necessity for food security, to a healthy and nutritious diet, to pure enjoyment of flavours, as well as providing the means to re-connect to nature, reproduce the food network you would like to be a part of, and voting with your fork. It could be said that food, and therefore also fermented foods are deeply rooted in daily life and social practices, not only in specific cultures and traditions, but worldwide and intertwined with each and everyone’s identity.

3. Theoretical framework

To make sense of all the data that was be collected, a theoretical framework was set up. In this case, this was comprised of Maslow's hierarchy of needs as a basis for Satter's hierarchy of food needs, to characterize and order one's motivations; and the social practice theory, to connect the fermentation practices to social entities. Each of these components will be discussed in the coming sub-chapters 3.1. and 3.2..

3.1. Hierarchy of needs

3.1.1. Maslow's hierarchy of needs

Maslow's hierarchy of needs states that the physiological needs are the largest motivator for a certain action (Maslow, 1943). When these are met, only then, new desires emerge and causing a person's desire to shift the next level, this also means that when the previous level is not met anymore, their desires shift to that level. To illustrate how the different motivations for fermentation are linked to the hierarchy, the health benefits of fermentation can qualify as safety needs, while identity can qualify as esteem (Maslow, 1943). For illustrative purposes, the visualised Hierarchy of Needs is depicted in figure 1, below.

Figure 1. Maslow's hierarchy of needs (McLeod, 2020).

This hierarchy of needs can provide a lens through which all motivations can be ordered according to the needs of the participant. This also makes comparing motivations less complicated. Yet, the motivations in this research are most likely largely, if not all, based around food choices. For that reason, another hierarchy of needs is introduced.

3.1.2. Satter's hierarchy of food needs

An adaptation of Maslow's hierarchy of needs is the Hierarchy of Food Needs, designed by Satter (2007). Similar to Maslow's hierarchy, one works his/her way to the top of the pyramid when a level of needs is satisfied. Below in figure 2, the Satter's hierarchy is illustrated.

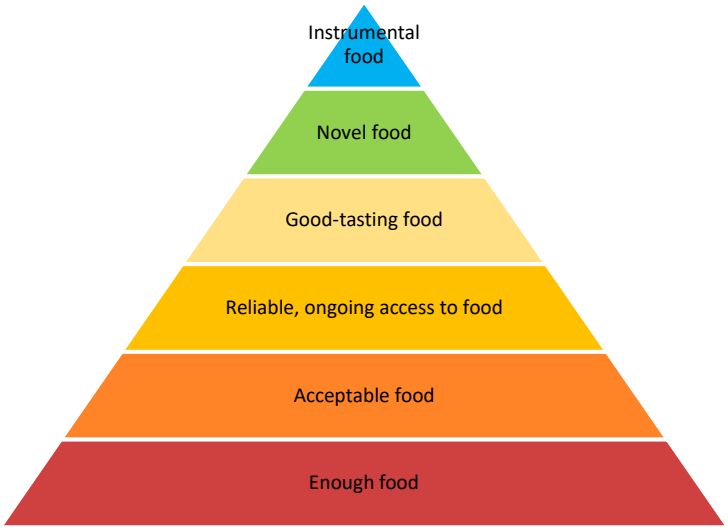

Figure 2. Satter's hierarchy of food needs, adapted from (Satter, 2007).

Within Satter's hierarchy, the first level is driven by food insecurity, by actual hunger (Satter, 2007). This would encompass the fermentation practice when recreated out of need for, for instance, reducing toxicity. The second level encompasses the acceptability of the food, which can entail the nutritional quality of food, as well as possible social norms regarding food selection and acquisition manner, linking to food sovereignty. Here, home-fermentation can be used to enhance the nutritional value, or to create the wished food system by being self-sufficient. In the third level, the need for assurance of acceptable food on the table the next day or week arises. In this level, fermentation can enhance the possibility to conserve foods, to ensure acceptable foods in the near future. When people can be assured that they will not experience hunger any time soon, a longing for good tasting food emerges, influenced by aesthetics and flavours, this is the fourth level. Here, fermentation can add to the flavours and textures of foods, fulfilling this longing for good tasting foods. The second to last level describes novel foods, meaning opening up to experimentation and not fearing for having to throw away food out of dislike and having to go hungry because of that. Fermented foods, I argue, can be seen as a novel food, because of the "forgottenness" of the practice, in other words the practice not being reproduced in society, in the Netherlands between approximately 1950 and 2010, based on the experiences and knowledge of the experts spoken with. Satter describes that eating a novelty food can be an experiment for consumers, fermented products in this thesis only seen as a novelty food when home-fermenters themselves call it experimental. This experimental behaviour encompasses fermentation practices without the use of recipes but purely embodied knowledge and experience with the practice to be able to do so. Lastly, instrumental foods are mentioned. These foods entail a broader possibility of satiation, namely to achieve a physical, cognitive or spiritual outcome linked to a specific food, in line with the top level of Maslow's hierarchy of needs (Satter, 2007). Here, the main theme is "I consider what is good for me when I eat" (Satter, n.d.). This is thus reliant on the view of the consumer and can therefore differ in definition between home-fermenters. To tackle this, personal views from the home-fermenter on their food choices are taken into consideration when placing them in Satter's hierarchy of food needs.

With Satter's adaptation of Maslow's hierarchy of needs, reasoning food certain food choices may become clearer, as well as motivations for specific fermentation processes or even the general home-fermentation practice. Here, the meaning of the social practice can be compared between home-fermenters.

3.2. The social practice theory

While the hierarchy of food needs can give meaning to motivations for fermentation, the social practice theory can address how people give meaning to their home-fermentation practices, as well as connect the practices to their social relationships and show change in practices. This is because the social structures are produced and reproduced in practices, through interaction between structures and actors (Bourdieu, 1977; Delormier, Frohlich, & Potvin, 2009; Giddens, 1984). Practices, as according to Reckwitz (2002) are "social practices", only coming into being in the process of activities carried out with others. Here, agency makes the emergence and reproduction of practices possible, it is collective, while the individual actor is the "carrier" of the practice (Reckwitz, 2002). Practices are a routinized type of behaviour, consisting of three different, interlinking elements of social practices (Hargreaves, 2011; Reckwitz, 2002; Shove, Pantzar, & Watson, 2012; Vermeer, 2018):

1. "Things" that compose social practices, in this particular research these are ferments and the needed materials for fermentation as well as ingredients and (a possible) starter culture.
2. Meanings that provide the practice with direction, which includes the embodied knowledge on the social significance and experience with the practice.
3. Competence to carry out the practices, this encapsulates understanding and knowhow of the practice itself. This can include knowledge on the safety of ferments, the health benefits of fermented foods, as well as the precise steps that need to be undertaken to carry out the practice and how to keep the microorganisms alive, happy, and fermenting well.

Shove et al. (2012) has even shown the possibility of the social practice theory to uncover changes and dynamics in everyday life and over time, which in this case could show the changes in practices of fermentations over time (Halkier, Katz-Gerro, & Martens, 2011). In the view of Gram-Hanssen (2010), as we continually practice our daily tasks, we reproduce the social structures of society. Yet, we can also change these social structures through our practices (Shove et al., 2012). Thus, in this study, social practice theory can create the bigger picture around home-fermentation and the accompanying motivations, by understanding how the practice "home-fermentation" is carried and reproduced within society.

In this research, the three elements of the social practice in relation to the home-fermentation practice will be explored. Thereby also, when looking at the history of fermentation in the Netherlands, it will be discussed what kind of impact each of these three elements has had on the practice. Each of the three elements namely has an impact on the practice, but the question then is, how does it relate and how do they, together, recreate the practice?

4. Research question

Food security seems to be the foremost reason for fermentation, followed by food sovereignty, according to literature and taking Satter's hierarchy of food needs into consideration. This was because after having access to food, one desires tasty and healthy foods that is appropriate for their culture, food sovereignty, as would be in line with Satter's hierarchy of food needs (2007). Only after that, it was hypothesised, people would seek out novelty foods that are aligned with their political and ecological believes, that fit into movements and seen as trends. The reasons for fermentations in the Netherlands might also come down to easier motivations, including the (still) exclusiveness of fermented products (not all being commercialised yet); the low difficulty and time consumption; the joy of eating your self-made food as well as knowing what you eat. These latter motivations were what was hypothesised to be observed in The Netherlands, since food insecurity was generally of no concern in the Netherlands and the current trends lean towards clean, natural and healthy foods (Backx, 2012; Bayer, 2019; Bedaf, 2021; Voedingscentrum, 2020). The following of food movements, the expressing ecological and political believes and identity might be secondary to the direct consequences of fermentation which are experienced as beneficial, causing them to be the main motivations (joy, health, etc.). This would be in line with the previously mentioned hierarchy of needs by Maslow (1943).

All these different motivations are expected to be exposed through the main research question: What motivates people in the Netherlands to pick up the practice of home-fermentation and continue to home-ferment? The sub-research questions will help providing these answers:

1. What motivations do home-fermenters have that link to personal feelings, identity, and cultural background?
2. How are the motivations of home-fermenters linked to their personal political and ecological beliefs?
3. How do home-fermenters socially reproduce the practice of home-fermentation?
4. How is the practice of home-fermentation integrated into the daily life of home-fermenters, with and without Covid-19?

4.1. Reason to study this topic

Personal interest has been the main reason for setting up this specific research topic. With this thesis, I hope to provide a bridge to close the knowledge gap that exists around modern-day home-fermentation motivations and to highlight the social significance of the home-fermentation practice. The reasons why more and more people have started fermenting (again) will be brought to light. This might show new interests of the consumer and their political views towards the local and global food systems.

This study only included home-fermentation practices (no industrial practices), this could include fermenting with a starter (bought or given) or a wild-fermentation with the microorganisms present on the foods.

5. Methods

5.1. Research design

To gain insight into the motivations behind home-fermenting, qualitative research strategies were applied. Different interviews were held, with experts and (non-expert) home-fermenters.

5.1.1. Expert interviews

By semi-structured interviews with experts their experiences with the enthusiasm for fermentation was documented along with their professional views on the practice. The interviews covered the topics of rise in the practice of home-fermentation, how to be introduced to home-fermentation and motivations for home-fermentation, as well as their personal view on the practice and the possible community around it. Their personal observations could provide a wider view on the Dutch home-fermentation trend and society, as they are in daily contact with fermentation and fermentation-enthusiasts. This could provide a new and perhaps broader and more inclusive view on the home-fermentation motivations according to Satter's hierarchy of food needs. Next to that, experts could be able to show differences over time as the social practice that home-fermentation is, how these practices have changed over time and re-structured society or were structured by it. This was because these experts have been fermenting longer and have been in contact with the fermentation society longer than I personally have. More specifically, they perhaps could indicate changes in the ferments that are popular in society ("things"), the meanings that people attach to ferments, as well as the gaining of knowledge (competence) to carry out the fermentations.

5.1.2. Home-fermenter interviews

In-depth, semi-structured interviews were held with adult home-fermenters living in the Netherlands, to gain more insight into the motivations to ferment foods at home. These interviews covered the topics of how they got introduced to home-fermentation, what it brought them and why they kept fermenting foods at home. Within these interviews, the ferments covered were only those which they make at home themselves or those they might want to make in the nearer future. Also, their personal food preferences and cultural heritage was discussed, so to see if and how they influence their home-fermentation practices. Furthermore, questions on how home-fermentation influences their daily life, with and without Covid-19 were included, since the lockdown may have been of influence on the practice and to see how so.

Both expert and home-fermenter interview guides can be found in appendix A.

5.2. Participants

5.2.1. Participant criteria

To specify the research group more in-depth, the expert was defined as someone who works professionally with fermentation on a (relatively) regular basis and was thereby knowledgeable about fermentation practices and its place in modern day society. By adult, Dutch home-fermenters, only home-fermenters living in the Netherlands were meant, at least 18 years old. This also meant that if people had an allochthonous background, but live in the Netherlands, they could be included in the study. This is because the Netherlands is seen as a multicultural society, as 24.7% of all inhabitants has a non-Dutch background (Centraal Bureau voor de Statistiek, 2021). The criterium for at least 18 years of age was set since for this study, to be able to give consent, but also to have created personal food preferences.

5.2.2. Participant recruitment

The goal was to perform the study with at least ten home-fermenters and four experts. The home-fermenters participating in the study were sourced though my personal network and through

snowball sampling. I reached the experts through their contact information that is given online, through my personal network and snowball sampling. I included experts differencing in their specific field of practice, background, and expertise, so that a wider view of the fermentation practice was gained.

5.2.3. Platform for conducting interviews

Due to the presence of COVID-19, the likeliness of being able to hold these interviews face to face was small. Therefore, Skype, Zoom or MS teams was often used to conduct these meetings, depending on the participants' access to the platforms. If meeting face to face were possible, a place where the interviewee was most comfortable was be used.

5.3. Ethics

Before the interviews, the purpose of the study was made clear to the participants as well as who I was. All participants were asked to consent to the use of their answers in this study and to the interviews being recorded. This raw data was not shared with anyone. Throughout the transcription, the participants were not mentioned by name. This goes as well for the final report, which also omitted identifiers, to preserve confidentiality. Regarding the anonymity of experts, they remained anonymous, as no account occurred where it was crucial to be identifiable in one way or another for the validity of their answer.

If participants requested a certain answer to be removed from the transcript and not to be mentioned in the report, this would have been done, yet this did not occur. All data that was collected from these interviews and focus groups will be stored on a safe and secure computer environment for five years after completion of the study. Hereafter, all data will be destroyed.

Before the interviews started, all participants were asked to sign a form to indicate that they were aware of and consented to how the collected data was used and stored. These forms are provided in appendix B. They were also given the option to receive their personal interview recording and transcript afterwards, as well as the final report.

5.4. Data analysis

The data analysis was performed by transcribing the interviews with the help of Otter.ai and Amberscript. Following, the written interviews were coded using a code book, as found in appendix C. For the coding, the method of content analysis was used. This process was done by hand, digitally in a PDF on an iPad, with the help of the app GoodNotes. This app provided the possibility to write and highlight texts with the help of a digitally connected pencil.

5.5. Writer positionality

As I am a home-fermenter myself, as well as a Food Technologist, I used my own knowledge to seek out more knowledge in participants. Yet, refrained from sharing my own opinion or knowledge directly, so not to influence the participants answers. The fact that I recruited participant partially through my personal network might have influenced the outcome of the study due to a poor representation of the Dutch home-fermenters. Therefore, I limited the participant recruiting through my personal network to at most half of the participants. Furthermore, I was cautious and critical towards each and every participant, home-fermenter, or expert, to prevent my own personal relationship with them to be of influence on how I saw and used their answers in my research.

6. Results and short discussions

6.1. Participant demographics

For this research, 5 experts and 10 home-fermenters were interviewed. The group of experts was made up of a university professor of food microbiology; a culinary ethnologist; an educator on sustainable foodways and preservation, who is also knowledgeable on fermentation history; a food writer; and a fermentation specialist, chef, and educator. These experts were contacted because of their specific field of expertise and their contact with home-fermenters.

The home-fermenters group was for 40% percent made up of males and 60% female, with an average age of 34 (±17.7). The age distribution can be found in figure 3 below. The 50+ age group included a participant of 53 years old, as well as a participant of 80 years old. Five of all home-fermenters were directly recruited through my personal network, three fermenters through a fermentation workshop and two home-fermenters were recruited through snowball sampling.

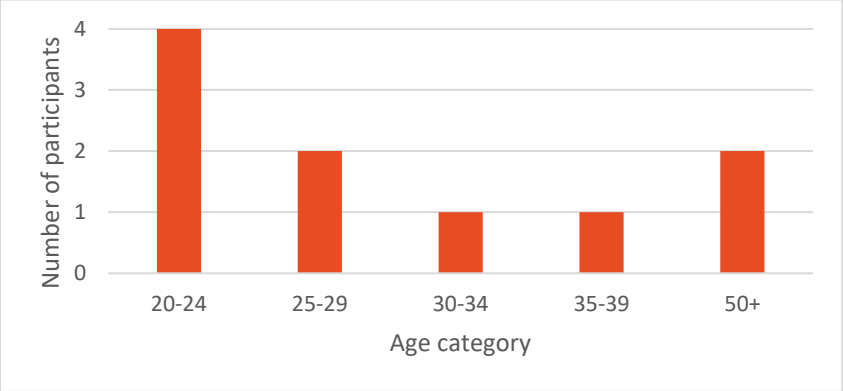

Figure 3. Age distribution amongst the home-fermenters.

Furthermore, some home-fermenters also brought with them different cultural heritages and places of upbringing, including:

- Someone with an upbringing in Curacao
- Someone with an upbringing in the United States of America
- Someone with an upbringing in the province of Zeeland
- Someone with a Chinese heritage
- Someone with a Chinese/Dutch upbringing in the Netherlands
- A home-fermenter who identified as a farmer's daughter, growing up in the north of the Netherlands

On a more critical note, these demographics show a younger group of home-fermenters with perhaps a strong influence of their place of studying, Wageningen, as a sustainably oriented municipality. Furthermore, most home-fermenters have enjoyed an education at a university, often in the field of biology, food technology or biotechnology. This might have caused a distorted view of the Dutch home-fermenters as a whole.

6.2. Fermentation fading away from everyday life

As described in the background, fermentation used to be, and in some places of the world, still is a necessary practice to preserve foods and provide food security. But why did the practice fade away from everyday life in the Netherlands in the past century? This section will answer the question, with the explanations of experts and an interpretation with use of the social practice theory.

The culinary ethnologist explained that fermentation was used and is still used during times of hardship and crisis. She explained, during the first world war, a fat shortage was the biggest problem of the famine that was present in the Netherlands. Drying became a more well-known process, as well as fermentation. The latter ensured that sailors had a proper food storage for their long journey at sea. Hence, due to this hardship during the first world war, people knew how to deal with food shortages when the second world war came around.

Different fermented products, such as wild chicory roots that were processed and fermented into "surrogaatkoffie", a coffee substitute, were used once again out of necessity. However, that was seen as food for the poor, so after the war, these food ways were discarded, and focus shifted to new, industrialised foods. Yet, with all these industries popping up, they needed workers. The young men on the farmlands were now employed at these industrial plants, leaving no one to work the fields. That is where new migrant workers came to work, who brought their food ways with them, which still included fermented foods. While they were still fermenting their foods, for the Dutch it was not trendy. Yet they still ate fermented foods, but those were all made industrially. At home, it would be in trend and considered fancy to have tiny crackers and cheeses on the table for your party guests. One could say that the meaning linked to the practice of fermentation changed to a meaning which made the practice no longer desirable.

Furthermore, home-fermentation was not even needed anymore with the rise of refrigeration, added another expert. He explained that going to the supermarket was in style and that the culture was shaped in such a way that it was trendy to have practices shaped to save the housewife some time. Next to that, the European governments, in its efforts to produce enough foods to prevent a future famine, started to enlarge the farmers' fields. These were to be mono cropped with only one variety of each vegetable, he explained. This is a now heavily debated topic, as this is not a sustainable way of agriculture. Sustainability has become a reason for consumers to change their food ways and explain the rise of AFNs (Edwards, 2016; Forssell & Lankoski, 2015). Sustainability is also something that is present on the minds of most home-fermenters during the interviews, how this is impacting their fermentation practices is debated later. The expert providing workshops in preservation of foods noticed that most of his participants are motivated to home-ferment to be more self-sufficient and to make the most out of the produce from their gardens. For his participants, sustainability plays a large role in their food ways and use fermentation to support those sustainable food ways that they envision.

Next to the meanings that are attached to the practice of fermentation, also "things" play a role. Since one needs to have access to them in order to exercise the practice. This is also something that the previously mentioned expert noted. He named the example of milk kefir, a fermented milk with the help of kefir grains which encompasses different microorganisms, reminiscent of yoghurt (Rosa et al., 2017). This was a common ferment for most Dutch households, yet it had disappeared. The cause was the industrialisation of milk around the 1900s. Less and less people could afford to keep a cow or goat at home, meaning they no longer had access to fresh milk every day. Instead, a bottle of milk was delivered every morning to the doorsteps of the Dutch households. But making milk kefir with this milk was not possible. The "thing", being fresh, unpasteurised milk, was no longer available to the consumer, so nor was the practice of making milk kefir or "hangop" possible. "Hangop" is currently known as yoghurt that has been drained from most liquids, yet it used to be a fermented milk that had gotten thicker at room temperature with the help of microorganisms naturally present in the milk.

So, with the culture and food chains changing, the meanings of fermentation as well as "things" changed or disappeared. It can be imagined that with the fading of the actual doing of the practice,

socially reproducing the practice, also the knowledge faded. This was similar to an illustration given in chapter 2, the practice of making juniper beer in Poland, where the knowhow of the practice only continued in the region of Kurpie, in contrast to other regions in Poland where it used to be a vivid tradition as well.

Then, the question remains, 'Why is it back now?'. As discussed previously, multiple motivations could be part of the reasons why it is back. Multiple experts gave their visions on these motivations and how fermentation is recreated in society, as well as other aspects it brings along. Taken together with the views from home-fermenters, this is formulated into a larger view on the practice and discussed in detail in the next five subchapters.

6.3. Four types of fermenters

> *"The reason why I want to ferment things is to support for one health, for two just curiosity and for three flavour." – Home-fermenter*

Throughout the interviews, it became clear that the home-fermenters in the Netherlands can be differentiated into four different groups; 1. those who ferment for the taste and experimentation, 2. to create a healthy diet, 3. to relieve health problems and 4. to be self-sufficient. With all these groups, different motivations arise, which can be categorized accordingly into the following four categories:

1. Experimentation, curiosity, and organoleptic properties
2. Creating a healthy diet and enjoying the health benefits
3. Relieving health problems
4. Being self-sufficient

Next to these four motivation categories, there is one other motivation that has been mentioned by 7 out of 10 home-fermenters, which is joy. This joy can be related to making something yourself, or the changes that fermentation creates in the products, so its process. Or it can give joy like it is experienced with another hobby, but also the joy of sharing your experiences and ferments with friends and family.

All ten home-fermenters included the flavours that arise from fermentation as a motivation to be fermenting, but only five home-fermenters noted that they liked to experiment with their ferments. The other motivations for home-fermentation were noted less than the organoleptic properties. Health benefits were only mentioned as a motivation for fermentation by five home-fermenters, health problems by three home-fermenters, and self-sufficiency as a direct motivator for fermentation was only mentioned by one home-fermenter.

> *"It's yeah, that's the kind of the beauty of it, it's super simple, but it's super tasty. And it's healthy and makes me feel good. And there's just not many reasons not to do it." – Home-fermenter*

All afore mentioned fermenter-groups will be discussed further, including their different motivations. Furthermore, how these groups are each linked to Satter's hierarchy of food needs will

be discussed. Next to that, how the social practice theory applies will also be looked at for each group, this encompasses their general competence (knowhow of the practice), the meanings they attach to the practice, as well as the "things" needed for carrying out the practice. More in-depth discussions, including notes on the competences involved in home-fermentation practices, can be found in chapter 7.

However, it must be noted that not every home-fermenter fits into only one category, often, people have multiple reasons for home-fermenting, thereby fitting into multiple fermenter-categories. Also, some motivations weigh heavier than others for some home-fermenters. There is also a difference in ferments that home-fermenters are making, which can differ in its perceived healthiness. To illustrate, one participant makes beer, while another makes milk kefir. The beer will be less likely part of a health-related motivation, while it could be true for milk kefir. This was indeed reflected by the participants' motivations.

6.3.1. Taste and experimentation

The first group to be discussed is the group fermenting for the organoleptic properties and experimentation. All ten home-fermenters stated to be motivated to ferment by the flavours that arise from the fermentation process. Five of them also noted, without asking for it, to be motivated to ferment by the experimentation possibilities and variety that could be implemented, trying other things, and not following recipes. Nine out of ten home-fermenters enjoyed and did experiment with their fermentations. However, these were not all related to motivations for fermentation.

The motivation to ferment for its flavours, fits into the fourth level of Satter's hierarchy of food needs, good-tasting foods. This would suggest that all ten home-fermenters were not experiencing any food insecurity, but rather liked to enjoy their foods and were able to be critical towards their food choices. One of the experts noted about why he always likes to try ferments of others, illustrating the flavourful experience that home-fermenters can have with their fermented products:

> *"Well, they always have different flavours, and always different flavours than you know. And that is the nice thing about fermentation, of course that it is always, in contrast to products like Coca Cola, which is always the same, this is always exciting, noticing what you taste. And that you are aware of that."*

As noted earlier, nine of these home-fermenters, were also experimenting with their ferments, which indicated that their motivations were at the fifth level of Satter's hierarchy of needs, novel foods. They even rarely used recipes but regarded them often as vague guidelines and relied on their own knowledge (competence). For this group, good-tasting food was not enough anymore, the experience of trying new things has driven them to experiment with their fermentations, according the Satter's hierarchy. This was in line with the data, where home-fermenters stated to experiment to enjoy other, not yet experienced flavours. Only one home-fermenter was not experimenting but is building up to it. This participant brewed beer and followed recipes strictly, to prevent a bad or different tasting beer than the one she had been working and waiting for, for a long time.

"And yes, recently I thought of one [flavour], well, I thought-, it popped in my head and I immediately laughed! I often have so much fun with it that I come up with the craziest flavours and such." – Home-fermenter

By experimenting, one could change the practice while they socially reproduced it by changing their personal practices. To illustrate, one expert changed the whole process of sourdough bread baking, making it more accessible. By sharing this specific practice in his workshops, more fermenters will reproduce the practice the same way. This results in multiple ways of recreating the practice of baking sourdough bread throughout society.

Furthermore, throughout the interviews, indications were given that that home-fermenters who experimented also had more experience with, and knowledge of the practice than the home-fermenters that did not experiment with their fermentations and follow recipes. An illustration can be given by a home-fermenter who explained that she had tried different kinds of milk and brands from the supermarket, but that that does not turn out so delicious as fresh milk that is not pasteurised. She described her favourite way of making milk kefir, with fresh milk from a farmer:

"If I want to make delicious kefir, then I let such a bottle stand a little longer. Then a layer of fat will be formed on top, I take that off and that ends up in my kefir. Then I have real, real whipped cream-kefir."

This shows her competence, in this case regarding the process and ingredients, and experience with the practice. Moreover, she explained that when she shared her milk kefir grains (the symbiotic culture that ferments the milk), often people got the shelf-stable milk and made milk kefir with that, experiencing a disgusting flavour and sourness that they immediately stopped making milk-kefir. Here you see that because of the lacking competence with regards to the ingredients they, the "things", were chosen differently, causing a different outcome. So, it could be said that the competence influences the chosen "things", which in turn influences whether a person would recreate the practice.

So, a greater competence with regards to processes and ingredients for the experimenting home-fermenters in comparison to the non-experimenting home-fermenters was indicated. It could also entail a different meaning that these home-fermenters gave to their practice, based on more experience with the practice, however this is still ambiguous. However, it can be stated that this meaning that home-fermenters linked to their home-fermentation practice, was clearly linked to their motivations to ferment, as their motivations were their driving factor and therefore provided direction to their fermentation practices. Based on this, each and every different motivation for fermentation entailed a different meaning of the socially reproduced practice.

6.3.2. Healthy diet

The second group of home-fermenters that was encountered during this study was the group that is motivated to home-ferment due to health benefits and healthy image of fermented foods. This fitted into the top level of Satter's hierarchy of food needs, instrumental foods, since this level encompasses considerations for what is good for you as a consumer, the health-related motivations

fit here perfectly. Not all home-fermenters included in this study were consciously home-fermenting for its perceived health benefits, this was true for six out of ten home-fermenters.

> *"But I do feel that it really complements my, like a healthy diet and that it makes my gut feel nice." – Home-fermenter*

Although not all health benefits may be backed by scientific research, these home-fermenters experienced a beneficial effect regarding their health when eating their home-fermented products. Which, in turn, made them feel good. Part of this may be explained by gut health. As one of the experts explained, with the arrival of Pasteur's techniques, our food has seen less microorganisms, which could be seen as depletion of part of its benefits. The expert continued explaining that every animal ingests many different microorganisms every day, from the water it drinks to the food they eat. However, not us humans. This is also what Prof.dr. Remco Kort argues in his book, De Microbe Mens. Katz (2012) and Kort (2017) both explain that we have evolved together, human and microbe, into a fruitful symbiotic organism, yet no longer. The university professor, one of the experts, explained that the composition of our microbiome has a large impact on our health, in the short term and long term as they also impact our immune responses. Peyer's patches, as they are called, can be alerted by some specific microorganisms, which makes them alert for other, harmful passers-by. This is hypothesised to be strengthening one's natural resistance against pathogenic microorganisms. Yet, he nuances, this is all new and not all clearly sought out yet.

Back to this group of home-fermenters, the meaning attached to the practice encompasses feeling healthy and good, through eating the fermented products, next to other meanings attached to the practice through other motivations. Furthermore, the knowhow of the practice (competence) might have also encapsulated scientific knowledge about how these fermented foods impact their health, next to the competence (with regards to the process) to carry out the practice. Regarding "things", these are similar to those linked to the practice for other groups of home-fermenters.

6.3.3. Relieving health problems

A third group of home-fermenters was motivated to home-ferment by some less happy circumstances. Within this study, three home-fermenters encountered health problems, which were relieved, each to a different extend, by their home-fermented foods and drinks. Further explained by Honor Nutrition & Counseling (2019), the top level, instrumental food, of Satter's hierarchy of food needs, encompasses the food that will do something for you, beyond the satisfaction of basic needs. This was where the motivation for home-fermentation to relieve health problems would fit in. By relieving certain health problems, these home-fermenters were able enjoy their life to a fuller extent. For one home-fermenter making milk kefir may have prevented her from a returning case of diverticulitis and it was a more pleasant option than taking medicines. Another home-fermenter already enjoyed fermented foods for how it made him feel, as well as the flavours. But when he encountered digestive problems, he noticed that fermented foods relieved him from those problems. The third home-fermenter fitting into this group, had a hard time living with Lyme's disease. She had started with making kombucha because of a range of problems with medications and the disease itself:

"And I thought, I must do something and yes, fermented foods are very good for stomach and intestinal complaints and such. So, I thought, if only I could do that with a delicious drink, then it might be going a lot better. And indeed, it really has helped me."

By consuming their home-fermented products, these home-fermenters had encountered less health problems, while enjoying a range of flavourful products and the experimentation that could come with it. One could say that the motivation, and therefore meaning attached to the home-fermentation practice, as well as their competence with the practice, was similar to the previously explained home-fermenter group that home-ferment for a healthier diet. However, I would argue that the meaning linked to the practice was more pronounced for this group than the previously explained group, since this group experienced a larger benefit from it and had a larger need for the practice in their daily life. Thereby, their meaning that they attached to the practice may have been shifted more towards a need, while their competence and experience also encapsulates knowledge on the influence of fermented foods on their health. However, this was not clearly seen. Yet, the three home-fermenters that relieved health-problems through the practice, also said to experience a lot of joy, as is similar to the other home-fermenters in this study.

6.3.4. Self-sufficiency

The fourth group of home-fermenters in this study was motivated to home-ferment by the possibility of being self-sufficient. This was only mentioned by one home-fermenter in this study, while being the largest group amongst the participants of workshops of one of the experts. This home-fermenter noted that fermentation was a gateway to being self-sufficient, through wanting the best produce for your ferments, meaning growing them yourself. This was also a goal for himself. This motivation for home-fermentation could fit into three levels:

1. Instrumental foods, the sixth level. In this case, one might want to be self-sufficient to rely on a more sustainable food system, in the process of self-actualisation. Another reasoning could be the prevention of food waste, by conserving your surpluses.
2. Reliable, ongoing access to food, the third. This used to be the main reason for fermentation in the past, creating food security all year round, throughout the winter. But also, for when money was tight, as once was the case for one of the experts.
3. Acceptable foods, the second level. This would be fitting through its link with food sovereignty, while being of opinion that the current food system does not provide acceptable foods, quality, production and acquisition-wise.

For the home-fermenter included in this group, the ecological beliefs inspired the home-fermenters motivations, finding the ways of the current global food system not acceptable or adequate and therefore the foods not of proper quality. Hence, his motivations would be most in line with the second level of Satter's hierarchy of foods, acceptable foods. For the expert whose workshop participants mostly share this motivation, often wanted to conserve the surpluses from their gardens. This would place them on the sixth level, instrumental foods.

In this group, one of the meanings attached to this practice were linked to norms, values, and perceptions of the current global food system (list number 1 and 3), while it could also be linked to necessity to ensure food on the table (list number 2). So, these two different meanings for this group can be stated to be dependent on whether or not people had a choice to home-ferment. This might also entail a deeper understanding of the practice (competence with regards to the process and

ingredients) for the home-fermentation practice out of need for it, as is the case for home-fermenters in the third level.

6.4. Fermentation as a social practice

Next to the four main motivations (and meanings) previously denoted for fermentation (taste and experimentation, health benefits, health problems and self-sufficiency), other motivations and aspects are also linked to the practice which are not fitting in the four motivations above. Yet, these play a significant role in the home-fermentation practices in the Netherlands. In the next sub-chapter, the noticed conscious consumerism and wishes to reconnect to nature as a result of distrust and/or ecological beliefs and their links to the home-fermentation practice are discussed. Furthermore, sub-chapter 6.4.2 focusses on the recreation of the practice within society and how this leads to (re-)connection with other home-fermenters and the formation of a community. Lastly, in sub-chapter 6.4.3, the integration of the practice into the daily life of home-fermenters is described.

6.4.1. Conscious consumerism, back to nature and distrust

> *"… they all have an above average interest in food, at least, and in conscious eating, that connects them at least. Whatever reason, whether it is purely taste or health. . . . They value their food, they value making it themselves, they value quality." - Expert*

Conscious eating, conscious consumerism, often came up during the interviews with home-fermenters, but was also noted by all experts. One expert noted that people are asking more often "But what happens to it [food]? What do you put into your mouth?" and "what global-step did it have?". In this case, conscious consumerism was meant considering the environment and the impact your food choices have on it and thinking critically about what and how you eat. For instance, locally grown vegetables and less meat consumption came up, as well as purchasing goods from local farmers and in season, or preventing food waste by buying foods from the Too Good To Go app. This app provides a platform for supermarkets and other food distributors to sell their foods that are almost past expiration date for a reduced price. In some cases, even thinking critically about flavour and what you like were included in the definition of conscious consumerism, as for this home-fermenter:

> *"Once I also fermented tomatoes . . . then people may start to think . . . what do I actually like?"*

This presence of "conscious consumerism" could have multiple explanations. Firstly, globally there has been more attention for the environment and global warming. Secondly, as explained in the background, and confirmed by multiple experts, consumers are looking for different, healthier food, moving away from convenience food, in which fermentation can "fit nicely". Thirdly, Wageningen is a place where the environment is often considered, and multiple home-fermenters have studied or are studying here. Lastly, as one of the home-fermenters noted: "If you start fermenting, you'll end up looking for the best.", meaning the best ingredients. For this home-fermenter this meant local, in season, and most optimally home-grown. However, the question remains whether the conscious

behaviour was a result of, or the cause of reproducing the home-fermentation practice. If we follow the remarks of Click & Ridberg (2010), it is suggested that conscious consumerism can be a result of the home-fermentation practice, as described in chapter 2.4.1.. What was established from these results, was that most of the home-fermenters, when making choices around their food practices, and therefore also their home-fermentation practices, took the environment into account. In this case this was visible in the choosing of their ingredients, the “things” for their ferments. It could also be imagined that this environmental concern was also expressed through the meaning attached to the practice by home-fermenters wanting to be self-sufficient. However, this was not completely clear from the results.

On another note, with three home-fermenters I discussed the topic of whether they believed in Michael Pollan's "voting with your fork" (2006b), as this can be done when picking the “things” for one’s ferments. One of the home-fermenters thought it was a nice idea, a way to have an influence as a group of consumers, but she noted that it might only be for those who are able to do so with regards to their financial status. A second home-fermenter believes it takes the focus away from regenerative agriculture, which he noted to be better than eating vegan. A third home-fermenter mostly shops local and plant-based because he agrees with the term “100%”. However, to provide any conclusions on if and how “voting with your fork” is incorporated within the home-fermentation practice (the ecological-political influences on the practice), more research must be done. Yet this could have been better researched in this study, asking more home-fermenters about their opinion on this matter.

Furthermore, this “conscious consumerism” was often also linked to consciously choosing what you eat and knowing what you eat, also aside from home-fermentation practices. This was linked to the next topic that also came up, the distrust in the food industry and wanting another food system, reconnecting to nature. With food scandals being brought to light, distrust in the global food system arises and together with environmental concerns, a wish for a different global food system emerges, as seen in the background. While clear influences of AFNs and voting with your fork were absent, this wanting of knowing what is in your food, knowing what you eat and the reconnection to nature was seen amongst these home-fermenters. Yet, few home-fermenters noted to be distrusting of the global food system. Most home-fermenters liked to be in closer contact with nature, enjoying a vegetable garden or seeking out farmers shops. This desired reconnection to nature was more frequently noted by one of the experts. Most of his workshop’s participants were into fermentation for the main motivation of being self-sufficient. For them, the wish for the connection with nature is more pronounced:

> *"That is also an important point that they say: everything in the supermarket, you don't know what happened to it, you don't know how it has been grown and whether and how the earth suffers by it. Or if for instance pesticides are used. You don't know what kind of additives are added. So, there are people who say: yes, I want that contact with the earth again. I want that contact with food again. I want to know what I eat again."*

In addition, this wish was also seen by another expert, describing wanting to go back to “real flavours” and “Back to real food”, not only by consumers. Chefs are seeing how fermentation can lead to better flavours and food producers are interested in fermentation to make their food more natural. One of the home-fermenters noticed this loss of connection with nature and food. He stated:

"And then . . . other people that are also trying to create foods locally and sort of start as a subculture, not necessarily subculture but yeah, just getting more connected to food. I think for many people, food is sort of this thing that is just there and it gets made. And it doesn't matter how it gets made. It's there, and it's for fuel. But if you produce food in a more industrialised manner . . . I think that . . . the connection that you have to it gets lost."

By practicing home-fermentation, the home-fermenters were consciously choosing what they eat and knew what they were eating. As discussed before, these home-fermenters were conscious of the global footprint some foods might have and often chose food products that were locally and/or ecologically friendly produced, also for their ingredients in ferments ("things"). In addition, making the foods yourself provided an opportunity to reflect on the amount of work and time is needed to grow and prepare foods, as was noted by one of the experts. Furthermore, he noted, that this consciousness of time and effort needed for making and growing foods, makes people think twice about throwing foods away. So, it could be said that home-fermentation can inspire conscious consumerism, as is in line with the study by Click & Ridberg (2010).

6.4.2. Fermentation as a start of a community

Sharing, relationships and a community all have strong connection to fermentation. This connection could be starting with sharing ferments. Seven out of ten home-fermenters specifically stated to like sharing their ferments with others.

"But I must say that it is fun to be able to offer people a cooled drink that you made yourself and that is tasty and something else than water, coffee or tea." – Home-fermenter

This liking of sharing ferments, and how that can positively influence relationships and the recreation of the practice, was also noticed by one of the experts. It is not uncommon, as sharing food with others has been observed not only to be enjoyed, but also a way to express creativity and care (Clair, Hocking, Bunrayong, Vittayakorn, & Rattakorn, 2005). This caring for was also seen by one of the home-fermenters, who would prepare a certain ferment when they knew they would have people over later that week. Others shared their starters, recipes and tips & tricks, or taught others the practice and made a fun activity out of it. Starters are often needed to make ferments. These are basically microorganisms, most often a symbiotic culture comprising of different microorganisms living together in your starter (Meneer Wateetons, 2019). These can be bought, but are often shared amongst friends, family and others that like to learn the practice. Throughout the practice they are nourished and propagated and shared once again.

Eight out of ten home-fermenters also learned their practices from other home-fermenters and/or friends. Other resources of teachings included the internet, including social media (mentioned by nine home-fermenters), books (mentioned by three home-fermenters) and workshops (mentioned by two home-fermenters). So, it could be said that next to sharing the actual product of their practices, home-fermenters also shared some of the "things" and knowledge, thereby gaining competence, online and offline. Even inspiration and creativity were gained through these means by some home-fermenters. A study by Yarbrough (2017) found sharing of "things" such as starters and

perhaps even materials such as fermentation vessels, as well as competence to be significantly present under the kombucha brewers in San Marcos, Texas.

Next to the exchange of "things" and knowledge, it could even be said that by conversing on the topic, one shares the meaning that they attach to the practice (through their motivations) and it might even inspire others to start home-fermenting. In this case, it could be hypothesised that this meaning is also passed on to the newly inspired home-fermenter. Five home-fermenters in this study got into home-fermentation through a friend or partner. Four other home-fermenters got into home-fermentation after thinking whether they could make a product from the supermarket themselves and the tenth home-fermenter was looking for an alternative for alcoholic drinks. This practice of inspiring friends and family to start home-fermenting were also found by two different studies. Yarbrough (2017) found similar inspiring practices taking place for the of making kombucha in San Marcos. Gelling (2020) found similar results for the practice of conserving in the Netherlands, his study pointed out that 44.2% of his participants learned the practice via friends and family. While conserving encompasses much more than just fermentation, it must be noted that fermentation was the second most popular technique to be practiced.

A little anecdote to illustrate this practice of sharing is Herman, a sourdough shared continuously. In the Netherlands around the 80's, there used to be a sourdough called Herman (Vreugdenhil, 2020). You would feed him (provide the microorganisms with nutrients so that they can grow and propagate) for ten days and afterwards you would bake a bread and give the rest of the sourdough to friends. With this piece of sourdough, a combination of flour, sugar, milk, yeasts and bacteria, your friends would do the same. This Herman, filled with microorganisms were shared, and propagated and shared in a continuing cycle (Vreugdenhil, 2020).

Through the sharing of the practice, including its "things", its knowhow (competence) and its meanings, one can imagine it can impact relationships positively. An article by Siragusa (2020) showed this impact. She reconnected with old friends and made new ones in a foreign country, during lockdown (Siragusa, 2020). These reconnections she encountered was for me an eye opener and the reason to look at this aspect of the home-fermentation practice as well. Some home-fermenters first showed some confusion about the question whether they thought fermentation had influenced any relationships they had. As it had for me, this opened some of their eyes too.

> *"I never really thought about it very specifically, but then I think, yes, it did help. For example with a colleague, with my mother. I would not say that it is a big change in an instant, but it comes in small steps and yes, I definitely feel like that is a positive contribution, because my mother in turn wants to share that [SCOBY[1] and how to make kombucha] with a friend of hers. So, then you connect with each other, do you know what I mean? Just like the Wageningen Fermenters Facebook group, that everyone helps each other with questions or that you share things with each other. I do believe that beautiful friendships come from that."*

The interviewed home-fermenters made some new friends, reconnected with older friendships, or strengthened their current relationships with friends or acquaintances. It was something extra to

[1] A SCOBY is a Symbiotic Culture Of Bacteria and Yeasts, cultures of microorganisms, often found in different forms and used to make different ferments with.

have in common, another topic to converse on and explore, together. Also, some negative effects were noted, though. One of the home-fermenters noted that he would not feel at ease if someone got too enthusiastic and more or less would preach the practice as if it was a religion. An expert shared a view based on his own experience, that through fermenting every few days, one could have less time for his or her loved one, which could be a cause of irritation. Another result of fermentation is the creation of alcohol, which could brighten or bedim the ambience, he noted. Nonetheless, besides these three notes, only positive effects on relationships were gained through the practice of home-fermentation. However, not only fermentation can have this positive effect on relationships. It must be noted that a common interest or hobby could have the same effect.

> *"And food is always a connecting factor, so yes. And especially making things together. Absolutely."- Expert*

This connection with others through food, and preparing food, was also mentioned a few times. So, while cultural influences on the home-fermentation practice were not found, nostalgia and bonding over food and cooking was apparent for some home-fermenters. A few times home-fermenters told me about their memories, about their time with food and with their mom. One of them told me about how she was either helping or just looking and seeing what her mom was doing while she was cooking. For her that were "fond childhood memories", bonding over food and cooking together. Another home-fermenter explained that he was, already at a young age, curiosity for flavours. As his mom would give him food, he would try to guess the ingredients. So, while in this case the fermentation practice plays no role, it illustrates relationships can be strengthened over foods.

Not only new relationships with humans were established. Seeing a starter for one's fermentation as a pet, having such an emotional bond with it, was described by Sofo, Galluzzi, & Zito (2021). This was also noted by two of the home-fermenters. One home-fermenter stated:

> *"It's like there is a, like you have some kind of pet, or something, you know?"*

Here, we touch upon another sub-topic, the Post-Pasteurian view, the view that not all microorganisms are bad. One of the home-fermenters stated the following, which I personally think is a nice way of illustrating a Post-Pasteurian view:

> *"Why it gives me joy? The flavour, the sharing aspect. And just the fact that I'm sort of working together with these microbes, to create something, yeah, that's mutually beneficial to them and to me, in a way. Many people, they sort of see microbes more as things. And they, it's maybe weird to personify them. But like for your [kombucha] SCOBY, for example, it feels almost like your kid in a way. So, you, you grow a, ehm, connected to them."*

One of the key "things" for the home-fermentation practice are the actual microorganisms that ferment your foods. So, not surprisingly, reluctant, and hesitant behaviour towards microorganisms

by home-fermenters has not been observed in this study. Multiple experts noted that the Post-Pasteurian view was getting more common amongst their students and workshop participants. This observation would be coherent with the view of Paxson (2008;40), stating that "Microbes' reputation is being dusted off.". Explanations for this change of view on microorganisms is that their positive contribution to foods and gut health is getting more well known, though food advertisement, social media, television shows, and magazines. An expert noted that all throughout society there has been positive attention towards microorganisms and fermentation.

"People are beginning to see that they are not only scary and dangerous." - Expert

As noted before, sharing of ferments, starters and knowledge all happens within groups of friends, sometimes family, but also in a bigger fermentation community. This can be explained by the sharing that creates a bigger, intertwined web of home-fermenters that are in contact with each other, as was noted by Yarbrough (2017). Another analogy for this ever-growing group of home-fermenters was that the practice and its reproducers could be seen as a snowball. Pascal Gelling (2020;30) notes for the practice of conserving that: "Because while the snowball rolls and rolls, it will get bigger and bigger. That is already noticeable. The expertise and enthusiasm within the [cultural] heritage community is growing. Occasionally the snowball just needs a little push, and we all can deliver that. Whatever your motivation is." I believe this to be true for the home-fermentation practice, since part of the home-fermenters in this study learned it from friends, and inspired others to do recreate the practice themselves.

That the group of home-fermenters is growing, was also noticed by Murray & O'Neill (2015), in the context of beer brewing. They showed a significant part of their participants, although sourced through an established community, was likely to recommend the practice to others. However, within this study, the feeling of being an active part of a community was not established for all. While nine home-fermenters believed there is a community around fermentation, only four of them were actively taking part in that said community. Furthermore, one of those four home-fermenters noted that he was part of a more ferment-specific community, namely the beer-brewing community. He described it as a very small and transparent community, made up out of Dutch breweries, all sharing knowledge and tasting each other's beer, all interested in making better beers. He also noted that connections are easily made within that community because it is so small. This sense of community was also seen by Murray & O'Neill (2015) and is perhaps to be seen in the Netherlands later, maybe for fermentation as a whole, maybe a different one for different ferments. However, at the moment of conducting this study, this community had not been established. Yet, it is hypothesised to be established in the near future. In this study, most home-fermenters shared their ferments and practices predominantly with friends and family. The community that they have been a part of, was mostly mentioned to be online, as the Netherlands was in lockdown. One of the experts explained that, except for the "Rotzooi festival" (a fermentation festival by Meneer Wateetons and Christian Weij), there is no central place for the fermentation community to come together. Still, there are multiple Facebook groups for instance. Yet, these communities, all fermenters that are in connection with each other, are often described by experts as creative and eager to learn. This is a promising view, because it implies that the fermentation community may grow ever more and ever more knowledge may be gained and shared.

Furthermore, an expert noted that each home-fermenter group can form their own community but are all connected through their interest in quality food. This again, is very much in line with the

placement of all home-fermenters in the hierarchy of food needs on level 3, good tasting food, and nine out of ten home-fermenters on level 4, novel food. So communities might still form like the Kombucha Culture in San Marcos and the beer community that is the American Home Brewers Association (Murray & O'Neill, 2015; Yarbrough, 2017). However, on what basis is still unknown, as the expert suggested, it might be based on their main motivation for fermentation (the four groups) or based on the ferments that they are making. The latter seems to me personally the most logical, since this study showed that home-fermenters could have multiple reasons for recreating the practice within their daily lives and therefore fit into multiple groups, making communities based on motivations difficult.

6.4.3. About time, daily life and "Corona hobbies"

Time is of the essence in fermentation. A poetic description of its relation is that time could be considered an ingredient (a "thing") of the practice. This is not uncommon, as it is often called a resource and spent or used in relation to a certain practice (Southerton, 2013). The home-fermentation practice itself takes time and practice to understand, to experience it, and create competence. Time is even needed to make a starter (a "thing") for your ferment. For some of these home-fermenters the fact that you needed time and patience, waiting for your ferment to be ready, was considered a charm of the practice, living in a society where everything is almost directly available. It can even be hypothesised that the need for waiting makes the result and practice feel more rewarding. Consumption of time, frequent and stretched over longer periods of time, are often linked to self-actualisation, according to Southerton (2013). Following that view, home-fermentation can be linked to self-actualisation as well, which is encompassed in Satter's top level "instrumental foods". This is because fermentations often need longer periods of time to ferment or because fermentations often consist of multiple steps over time. Thus, it can be linked to self-actualisation according to Southerton's view. Six home-fermenters can therefore be linked to self-actualisation, as they are placed in the top level of Satter's hierarchy of food needs. However, time that is spent engaging with the practice is differing according to the ferments that are made. Further research can investigate the link between Southerton's conceptual framework, what routines and habits are involved and Satter's hierarchy of food needs.

More about time, during the months in lockdown due to Covid-19, three home-fermenters started their fermentation journey, and two added a new ferment, some home-fermenters were even calling it a "Corona hobby". For a handful of others, this practice got more time and attention. This was possible since working from home left people with more time on their hands, which was also visible through the sourdough craze that was present all over social media (Cereceda, 2020; Gammon, 2020). Similarly, Gelling's research showed that 50% of his participants, already familiar with conserving, used their extra time to learn other conservation techniques (Gelling, 2020). In this study, a few home-fermenters noted that kneading sourdough bread was a nice break from studying. Yet, the practice endured after the lockdown, integrated into their daily life to some extent. Some take a day every few weeks to prepare a big batch of their favourite ferments, in this case kimchi was mentioned a few times. This only took one day and then some time to let it ferment. They would "burp" it every so often, this means letting air out, to prevent a too high pressure and exploding jars. Other than that, no routines were present for these practices. Others checked their ferments every (few) day(s). One home-fermenter would feed her starters daily or once a week, depending on whether the starters were residing at room temperature or in the fridge, respectively. One of her starters in the fridge was her sourdough, around which she created a routine: every weekend she would feed it and bake a bread. Another home-fermenter described her routine of checking up on her kombucha's. She stated that every morning she would look at her bottles filled with kombucha to see how far along they were in their fermentation process. When

she had no time or energy to make kombucha, she missed taking all the steps in the process. This shows how much this practice is part of her daily life.

It could be said that when to reproduce the practice, whether and to which extent it is a routine, is up to your lifestyle and ferments that you are making. To illustrate, kimchi takes a day and perhaps a few check-up moments, while sourdough encompasses multiple steps in only a few days, which needs feeding, kneading and multiple waiting steps, whereas kombucha needs multiple steps over multiple days (Meneer Wateetons, 2019; Weij, 2020). The extend of integration of different ferments into a daily routine could be interesting to investigate in further research. In that case I would recommend looking at a few specific ferments, ranging in needed time for the practice. This way, the integration into daily life can be compared between a few ferments while still leaving time for in-depth research about the topic. Such research was difficult for this study, because it encompassed so many different ferments. However, as noted by one of the home-fermenters, for her fermentation was her "Corona hobby", but as she and the name "hobby" suggested, other hobbies could have provided just the same joy in spare hours.

> *"Anyway, yes, look, fermenting does not feel any different to me than if I were to bake a delicious cake or something. I don't see it as something different." – Home-fermenter*

Whether the four home-fermenters started their fermentation journey during the Covid-19 lockdown had influenced the perceived social significance of the practice, their meaning attached to the practice, could be speculated. While for some home-fermenters the practice relieved a bit of boredom, for most home-fermenters it was just a nice activity. Yet, it was also mentioned by four home-fermenters to provide a satisfying break from their work. One home-fermenter noticed, however, that even though closed off from the outside world physically, online platforms still provided interaction with others. For her this was the Facebook group Wageningen Fermenters. Another home-fermenter also believed it could be beneficial to one's mental health, as is also described by Sofo, Galluzzi, & Zito (2021), linking to stress relief.

> *"It's sort of fun and challenging in a way. And it's, it's something that can give satisfaction that doesn't require anything from the outside world." – Home-fermenter*

It could be said that for some home-fermenters the meaning of the practice remained unchanged during the Covid-19 lockdown, while for others the lockdown constructed the possibility to see the practice as a break and a possibility to work into one's daily life, as also described by Clemence Gossett in Gammon's article on sourdough baking during the Covid-19 lockdown (2020). I would even argue that the lockdown period provided the practice with a popularity and familiarity boost, based on the home-fermenters that started and/or expanded their fermentation endeavours, as well as the 50% of participants in Gelling's research that learned new techniques during the lockdown (2020). Another hypothesised reason for picking up the fermentation practice during lockdown are the health benefits associated with fermented foods. This is because being in good health was linked to having a lower chance of getting a severe case of Covid-19 (Sevil & Van Kempen, 2020). Furthermore, one of the experts also noted a reason to start fermenting during the lockdown:

"Also now, with Corona, my website shows that I don't provide workshops currently . . . and still, I get a lot of emails from people who are thinking, hey, they are shaken up, by the bustle in the supermarkets, empty shelves and thinking, hey, but how can I actually preserve foods myself, and they realise that they don't know how anymore. They say, at my parents', there used to be weck jars in the kitchen and there used to be a big jar with sauerkraut. But I don't know how to make that. So, that they because of that, also think like, hey, it is not that crazy to have some knowledge about how to process foods, to give it a conserving function, well yes, fermentation is also a very suitable way to so do."

This quote illustrates a self-sufficient reason to ferment and a lack of competence to do so, as well as a nostalgia to lost practices of their parents, triggered by the Covid-19 lockdown. Reasons described by the home-fermenters in this study came down to having more time towards the practice, often pared with curiosity. Only time seems to be of influence on the reasons for fermentation during lockdown in this study. As the lockdown could provide one ingredient, namely time, which perhaps was for some missing. If and how meanings attached to the home-fermentation practice could differ between home-fermenters who started during and outside of the lockdown. This could perhaps be attached to the idea of having time for the practice, which was of lesser concern during the lockdown. Yet all fermenters continued also after the lockdown, either having seen that the time-constraints were diminishable or not even a real barrier, or having found a way to incorporate it into their daily life. This latter is true for some home-fermenters that noted that they made a routine around their ferments. It should be noted though, that during the concluding of this study, the Netherlands is still not fully out of lockdown. This means that people might still have more time on their hands to home-ferment than they would have before Covid-19. However, this idea about if and how meanings attached to the home-fermentation practice could differ between home-fermenters started during and outside of the lockdown, is something to be looked into in further detail in another research.

7. Extensive discussions

As described in previous chapters, the motivations for home-fermentation differ amongst the different home-fermenter groups and influence the meaning to be attached to the practice. It could therefore even be said that the four groups of fermenters are based on the meanings attached to home-fermentation. In contrast, “things” do not necessarily differ amongst the groups, only if influenced by competence. Recipes, starter cultures or microorganisms present on foods, as well as foods and jars, bottles and water locks could be needed. Yet, the recipes were often disregarded during the practices of experimental home-fermenters.

In previous chapters, the competence needed for the practices was often discussed, such as how competence can influence the specific choices within “things”, as illustrated with the example of choosing milk for making milk kefir. However, these “things” must be available. If not, people might not be enabled to recreate the practice and stop with recreating the practice. As seen with the fresh milk for the milk kefir. On the other hand, one might consider recreating the practice adapted to their available “things”, so swap out the napa cabbage in kimchi for a white cabbage for instance. This availability of “things” can be influenced by economic means, but also by geographical means. To illustrate, fresh juniper berries are hard to come by in the Netherlands, so if someone wanted to make juniper beer, they would need to go to Kurpie. Another aspect of fermentation is also the climate; Tempeh is made under relatively warm conditions, 27-32°C, which can make it more

difficult to make and therefore recreate the practice in cooler climates (Weij, 2020). So, it could be said that competence, geographical and economical means influence "things", which in turn influences the recreation of the practice. These geographical means can translate into differences in microbial composition of the starter cultures or the use of ingredients, hence, relating to embeddedness within places and cultures. It is hypothesised that competence, *i.e.*, knowhow of the practice, might be more needed in some groups than others, as they may rely on their competence to carry out the practice for their physical health or even to put food on the table. Therefore, the competence with regards to the process within those groups might be more pronounced, but this is subject to further research.

Previously discussed competences were often regarding the general competence of the practice or linked to the process or the ingredients. However, within the process, the competences can for instance be divided into different categories: judging of safety, judging when the ferment is ready, or specific handling of the ferments. These categories are all encompassed by competence. Yet, due to the broad range of ferments and their requirements, no clear results can be given on these different forms of competence. This would be interesting to investigate in later research, with a smaller range of, if not just one, ferments included.

When looking once again to Satter's hierarchy of food needs, in comparison to the motivations for home-fermentation, in figure 4, the motivations for home-fermentation were linked to the optimalisation of foods, rather than food security. Even though the self-sufficient motivation was linked to the third level of reliable, ongoing access to food, it has not been mentioned as a motivator by any home-fermenter in this study. Why this was the case was hypothesised to be linked to the urban living situation of the home-fermenters, where one can rely on modern means of acquiring food, *i.e.,* supermarkets and restaurants. In addition, being fully self-sufficient might not even a possibility in these areas. Illustrated in this same figure is the different levels that people can perform the practice, also at the same time.

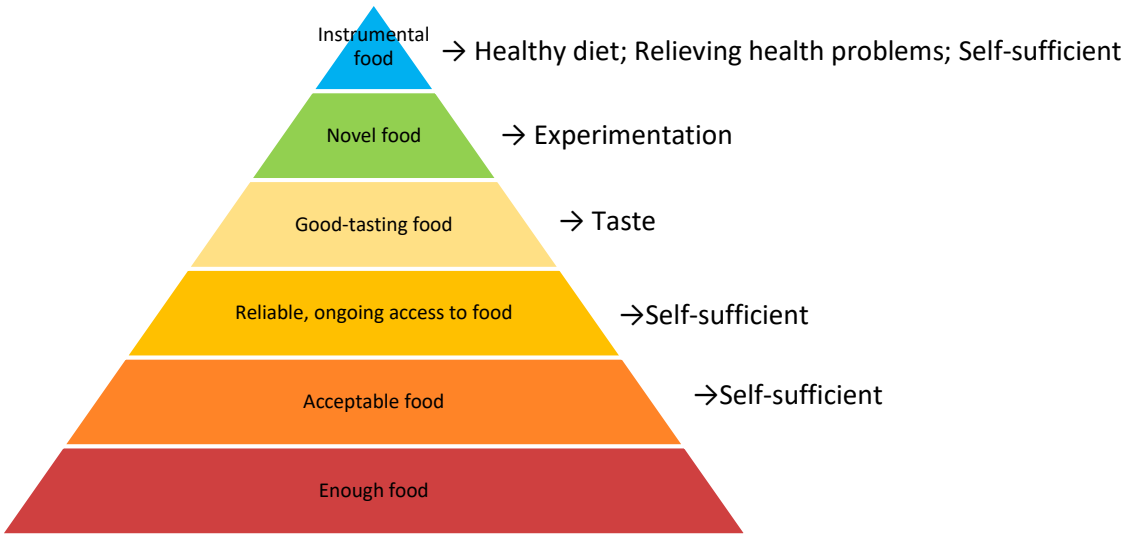

Figure 4. Satter's hierarchy of food needs, adapted from (Satter, 2007), including the different home-fermentation motivations.

Now that the main motivations for home-fermentations have been established, how is this practice recreated in society? I propose the idea that by making ferments, sharing them, sharing knowledge (competence), starters ("things") and ideas (meanings) one socially reproduces the practice of

home-fermentation, sometimes changes it, and increases the size of the snowball, that is the home-fermentation practice and its home-fermenters. By doing so, fermenters not only have some enjoyable foods, but also encounter a lot of joy. Seven home-fermenters specifically stated to enjoy the practice. This notion was also encountered by one of the experts, saying:

> *"a lot of people who have said all those other things, so the health aspect, the preservation, the self-sufficiency, but a lot of times it was also added that it is a fun hobby, above all else."*

Other statements from home-fermenters in this study included enjoying working with foods and sharing the outcomes, as well as the practice. The feeling of accomplishment and being proud of making something yourself was true for home-fermentation, as with other hobbies such as baking. This follows from the accounts of these ten home-fermenters, along with other studies (Click & Ridberg, 2010; Murray & O'Neill, 2015; Sofo et al., 2021; Yarbrough, 2017). Home-fermenters were proud of their ferments and proudly share them too, which could also bring joy to those that they share it with, as acknowledged by an expert. Moreover, the possibility of variety within the ferments was often mentioned as well, just like the implementation of knowledge gained through studies. One home-fermenter even noted that she could implement her competence of the home-fermentation practice in her studies. Another home-fermenter also noted that if one is not so familiar with how fermentation works, they might learn even more about the practice. This could be, for instance, the process and microbiology of the ferments. It was even mentioned that when interested in the practice, you could get interested in the process and find out which other common products are even fermented. This gained knowledge and competence of the practice may prove to be useful for her future career, she stated.

Lastly, an interesting notion was that two home-fermenters noted to use kombucha, a fermented tea, as a substitute for alcoholic drinks. One could say that the home-fermentation practice can be used to change and adapt the social practice of drinking together. These two home-fermenters introduced their fermentation practices within their social circles during the social practice of drinking together. But what this brings along to each of these social practices and how they might influence each other is subject to further research.

7.1. Academic literature versus found motivations

Throughout the literature review in chapter 2, multiple possible motivations for fermentation were described. However, a few motivations described within this research were not part of the practice of these home-fermenters. Firstly, cultural influences and influences of traditions were not present as motivations. The only noticeable cultural influence was a slightly more open attitude towards fermentation and novel foods, but this was also found for people with a background that included food technology or biology or the home-fermenter that grew up on a farm. It could thus be said that an openness to novel foods was a common feature amongst these home-fermenters, which is also in line with the encountered experimental tendencies. The lack of this cultural influence could be explained by a non-reflective group of home-fermenters on the one hand, or by the lack presence of the home-fermentation in the Dutch culture over the past (approximately) 70 years on the other hand. For another study, a group of home-fermenter with fermentation influenced by tradition and culture could be sought out and compared to a group of home-fermenters where this would have had no influence. This could for instance be based on their cultural heritage and selection based on

whether they have been brought up with the practice in their daily lives. From this, a clearer idea could perhaps be gained how culture and tradition may influence one's practice.

Secondly, the identity that the home-fermenters took on as conscious consumers and the aim of being self-sufficient, was clearly seen. Here, home-fermenters engaged with their practices through their personal identity of a conscious consumer. However, expression of their identities was no motivation to home-ferment. Yet, it was logical to presume that this would be present, as seen in the background, as well as a group identity, seen in the background and in the case of kombucha brewers in San Marcos (Yarbrough, 2017). Why these expressions of personal and group identities through fermentation practices were absent, could perhaps be explained by the broad range of ferments included in this study or by the absence of cultural influences. Yet, not asking the right or best-formulated questions might also be an explanation. So, this could be subject to further research.

Thirdly, the reproduction and following of AFNs was not present within the motivations to home-ferment in this study. Some of the appurtenant ideas were present amongst home-fermenters, such as eating locally grown vegetables and fruits, as well as voting with their fork for one home-fermenter, but not as a motivating factor for their practices. A motivating factor to home-ferment described by home-fermenters and experts, however, was the wanting to know what to eat, as well reconnecting to nature. However, even though these were present, the fermenters did not carry out the home-fermentation practice to be a part of AFNs, even though they unconsciously are.

Fourthly, the (still) exclusiveness of fermented products, as not all were commercialised yet, was hypothesised to be part of the motivations for home-fermentation. However, this was not found. Home-fermenters thought their own ferments to be cheaper and tasting better, rather than be unavailable in commercial supermarkets.

Lastly, while there is a clear connection between fermentation and sense of place, terroir and (re-)embeddedness, as was described in chapter 2.5., this played no role within the fermentation practices of these home-fermenters or clear from conversations with experts. This might be because of the small scale of, and the social relations within the home-fermentation practice. To show this, one would need to search out (home-)fermenters that have encountered many products in many places, to see and understand how ferments are linked to place and terroir, how they can create (re-)embeddedness.

These different links that were hypothesised to be there but were not, are perhaps visible in another larger, study. For that I recommend a narrowed down research to one ferment or one motivation, as this thesis encompassed a broad range of topics. This latter notion, as well as some other still present knowledge gaps that were mentioned, might be the reason for these missing links.

7.2. Fermentation can change the world for the better

There is one last thing that has been talked about during the interviews with fourteen of the participants and that is the question whether fermentation can change the world for the better, according to home-fermenter and expert. While the extent of it may be debated, all agreed it would better the world to some extent. Often gut health, with relation to an enhanced microbiome, as well as easier digestibility were mentioned, as well as optimizing nutrition and help with food intolerances. Furthermore, becoming more conscious about foods and flavours, what you eat and how it affects your body might improve was voiced. Also, environmental impacts were noted, namely reducing and upcycling waste, preserving foods without needing energy, lesser use of plastic and self-sufficiency. The fun it brings as a hobby, as well as the more flavourful foods and relations

with others has also been mentioned. Lastly, the link between the fermentation community and the community to support locals has been voiced, as well as by fermentation and making soda's yourself, taking away part of the monopolies of some bigger companies. Overall, fermentation could change the world for the better, through the levels of good-tasting food and instrumental food in Satter's hierarchy of needs (2007) and by reproducing the practice within one's daily life. To accomplish this, one only needs to be invested in the practice through the meaning you provide it and I believe the competence will follow. Since being invested encourages gaining more knowledge which will lead you to your most optimised practice. This provides flavour, optimises nutrition, and creates or enhances relationships, which in turn do the same. Meaning will follow the practice and be recreated with newly gained knowledge. "Things" will be there just the same, only competence will influence the choice for specific ingredients and materials needed for the practice.

7.3. Critical reflections

Previously, some remaining knowledge gaps were addressed. A few explanations for these remaining gaps, could be the broad scope of included fermentations, which can each be seen as a practice on its own; the non-reflective nature of the group of home-fermenters, as a lot are studying or have studied in Wageningen; or the lack of fermentation culture in the Netherlands in the last 70 years (approximately).

This study was carried out using in-depth semi-structured interviews, which worked well for these research questions. It provided the home-fermenters the possibility to share their experiences, while I could easily ask for further explanations where needed. This provided some clearer insights and nuances, as well as illustrations for the social practices at play in this study. Moreover, my personal knowledge on and experience with the practice, made it easy for me to understand ferments, methods, and competences that participants were talking about. In addition, it helped with asking further questions, seeking out more in-depth answers. The interviews with experts were, as expected, helpful in providing a broader view on the home-fermentation practices and provided this thesis with some helpful nuances, background information, illustrations, and further explanations.

The Satter's hierarchy of food needs has provided a clear lens to understand the motivations for carrying out the practice, while the social practice theory helped to show how this practice can change, evolve, be recreated, as well as show the relations it has within society. However, both made clear distinctions, which might have easily overshadowed the nuances within the study and put home-fermenters in categories and boxes more than is necessary. Since home-fermenters often carried out the practice according to multiple motivations, a hierarchy might not have been the best way for categorisation. For this, perhaps a web-like structure could be developed which can show that home-fermenters can have multiple motivations for carrying out the practice, as well as how these motivations relate to each other.

I learned a lot from writing this study. Not only do I understand underlying motivations and social practices at play, as well as how personal feelings are involved in the practice, but I also learned how food needs can be linked to the home-fermentation practice beyond conservation. Furthermore, being a Food Technology student, I was new to anthropological research and studies, except for two courses. Working with this different way of researching broadened my skillset with qualitative research methods and the workings of a theoretical framework. It also provided me with these previously mentioned eye-openers, which I would not have gained through an experimental design-based thesis. I am thankful for this broadened view that I have gained.

My recommendation for further research would be to focus on these different knowledge gaps indicated throughout this research. Furthermore, I advise to focus on one or only a few ferments,

depending on the research question, since it was hard to go into detail on every part of this thesis as much as I would have liked. With this, one could find out more about the competence, things and meanings attached to the practice and how this differs amongst home-fermenters with different motivations. Another possibility might be to focus on only one motivation and find out how this motivation influences the practice, its social relations, and its recreation within society.

8. Conclusion

With the help of the social practice theory and Satter's hierarchy of food needs, the motivations for home-fermentation in the Netherlands were uncovered. This came down to four groups of home-fermenters based on their motivations: fermenting for flavour; fermenting for a healthy diet; fermenting to relieve health problems; and fermenting to be self-sufficient. Other factors that often played a role were curiosity and experimentation, but most of all joy. However, no clear link between culture, (group-) identity and the motivations for home-fermentation practice was found.

Each of these groups had similar "things" to exercise the practice, while their meanings differed, according to their motivations. Competence differences were linked to the need for the practice as well as experimental behaviour linked to the home-fermentation methods. Furthermore, it was also uncovered that competence influenced their choice of "things", independently of the fermenter group(s) they were a part of. In addition, to reproduce the practice, all needed "things" must be available, which may be hindered according to geographical influences and financial situation. It was apparent that ecological believes were intertwined with the practice, through the picking of ingredients, "things" for ferments. Furthermore, conscious consumerism was apparent in the daily lives of home-fermenters, yet they did not have any links to motivations for home-fermentation, nor did any political or other ecological believes, except for the wanting to be self-sufficient. However, to which extend was not clear. The hierarchy of food needs by Satter (2007), showed most home-fermentation were based around good tasting food, novel foods, and instrumental foods. The motivation of self-sufficiency could be linked to two levels of the hierarchy, reliable, ongoing access to foods and instrumental food. However, only the latter was true for these home-fermenters.

By sharing the practice with friends and experimenting with their ferments, home-fermenters reproduce and change the practice according to their meanings and available "things". Moreover, fermentation, like other hobbies and foods, can (re-)connect people. By the sharing of ferments and teaching others, the practice continues to grow in society, as a snowball. In addition, fermentation provided people with a nice break and a tangible hobby during Covid-19, through which (virtual) contact with other people was possible, possibly even adding to mental health, though not shown in this study. The time-related aspect of waiting for your food was for some home-fermenters a charm of the practice, in a world where everything will go so fast, or so slow during a lockdown. Even after the lockdown, the practice continued in the daily lives of home-fermenters. Differing according to the ferments, home-fermenters are checking up and working with their ferments every few days or weeks even. Lastly, home-fermenters and experts were of the opinion that, even though only in small steps, fermentation can change the world for the better, as it can reduce food waste, conserve without the need of energy, adding to a healthy diet and mental health (joy), and lastly by being more conscious around the global footprint of foods.

To conclude, next to solutions to modern-day problems relating to health and sustainability, as well as evoking specific personal feelings and consumer behaviour, fermentation brings joy, above all else. Finally, I would like to note down two more quotes from experts, which I found to be wonderful.

"I think that the thoughts that I still have daily, is that it is a sort of conjuring. That it is a kind of magic, that you as a sort of wizard are leading invisible groups of armies of microorganisms. And that they are doing stuff for you, and that that can give such incredible change in taste and texture." In addition, he also described it as a party to see it all happening.

About why to start fermenting: *"That it was so delicious, that I was amazed, that it was so simple, that you could make such a simple thing what would be even more delicious than that what I could buy. And that was actually true for everything I encountered."*

9. Thanks

This thesis would not have been such a wonderful journey without the home-fermenters and experts that were willing to spend some time with me and my questions. So, I wanted to say thank all of them, one last time, for sharing your knowledge and experiences with me, I have learned a lot. Furthermore, I wanted to thank my boyfriend for proofreading many pages in the last months, as well as pulling me through the stressful times that also accompanied this journey for me. Also, I wanted to thank my friends that helped me with proofreading parts of this thesis and making wonderful suggestions. Thanks as well to my thesis-buddy to help me find my way in this, previously not as familiar, way of research. I also would like to thank Lucie for guiding me on my endeavours and having so much patience with my food-tech-ways which were not so appropriate for this field of study. Lastly, a thanks to my friends and family to whom I could vent my frustrations but also with whom I could share my findings with and celebrate successes (as I will do after handing in this wonderful work of art).

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Appendix A – Interview guides

1. Expert interview guide

Numbers mark questions, dots mark prompts or further/deeper questions

Demographics

Age:
Gender:
Education:
Current occupation:

Introducing questions

1. What was your first encounter with home-fermenting?
    - Where, with whom, what ferment, what culture
2. When did you start fermenting?
    - Why then?
3. What got you into fermentation?
    - Flavour, texture, health benefits, joyous hobby, recommendations, what ferments did you start with, culture, tradition, curiosity
4. By whom or wat did you get introduced to the practice of fermenting?
    - A friend, family, workshop, internet, social media
5. How do you think others are introduced to fermentation?
    - Workshops, friends, family, Facebook, internet, social media
6. Do you teach others?
    - In what way? Personal, social media, internet, workshops, books…

Main questions

7. What were your reasons to make fermentation into a business?
    - Enjoyment, knowledge sharing, sharing of an amazing product, making the world a healthier and better place
8. Why do people come to your workshops?
9. How would you describe the people that come to your workshop?
    - why do they come there?
10. Which ferments are popular?
11. How do people think or feel about fermentation practices in your view?
12. Have you observed any change in these attitudes over the years?
13. What do you think caused this change in attitude?
    - Trends, health benefits, new tastes, gastronomy, social media, climate change, knowing what you eat, food industry, distrust
14. Do you have any speculations as to what motivates people to pick up the practice of home-fermentation?
    - Trends, health benefits, new tastes, more eco-friendly food choices, knowing what you eat, food industry, distrust
15. Do you believe/think there is a fermentation community in the Netherlands?
    - Where would it be, would there be different ones, how could it have been formed
16. How would you describe that community?
    - Eager to learn and teach, making new friends, sharing culture
17. What are your experiences with that same community?

Concluding questions

18. Do you think fermentation can help change the world for the better?
    - How so? Food waste, healthier food, shorter supply chains
19. How do you know your ferment is ready?
    - Smell, taste, acidity, colour, consistency, texture…
20. How do you judge the food safety of your ferments?
    - Acidity, salt content, by careful observation
21. What do you think people appreciate most about ferments?
22. Do you have any other home-fermentation-related thoughts or remarks you would like to share?
23. Do you have any questions for me?

2. Home-fermenter interview guide

Numbers mark questions, dots mark prompts or further/deeper questions

Demographics

Age:
Gender:
Education:
Current occupation:

Introducing questions

1. What was your first encounter with home-fermenting?
    - When, by who, where, what were your first thoughts
2. When did you start home-fermenting?
    - What prompted this?
3. What got you into home-fermenting?
    - Who inspired you, what inspired you, taste, health, knowing what you eat?
4. How did you learn to ferment?
    - From whom, where, internet or books or a person or social media, what did you start with
5. Are there any home-fermenters in your family?
    - What do they make, is it linked to a certain history, tradition or part of your culture?
6. Do you know other home-fermenters? Are you in contact with them often?
    - Via internet, or in person, social media
7. Do you learn from other home-fermenters?
    - What do they teach you, do you teach them, how do they teach you/you them, in person or via internet or social media?
8. With whom do you discuss home-fermentation?
    - What do you talk about, taste, recipes, health, tips and tricks?
9. Do you think there is a fermentation community?
    - Where would this be, everywhere, in real life or just online (incl. social media), is it big or small, are there multiple or just one
10. Are you a part of such a community?
    - Where do you converse with them, what do you share with them?
11. Would you say that home-fermentation has influenced relationships you have?
    - How so, with friends, family, created new ones or strengthened old ones

Main questions

12. What culture do you relate to most?
    - Chinese, Japanese, Western, Dutch, American, French, Italian….
13. How would you describe yourself in a food related context?
    - Would you say you're a Foodie, fitgirl/fitboy, punk, against the grain, vegan, vegetarian, flexitarian, food habits
14. What kind of food did you grew up with?
15. How did you get to the foods that you are preparing nowadays?
16. What are your food choices based on?
    - How do you feel about climate change, the food industry, local food, food waste, eating meat or other animal-products? What do you believe is important?
17. How does home-fermentation make you feel?

- Healthy, joyous, feel good in your skin, good about your food choices, connected to a community or family or friends or rather place or culture

18. How has home-fermentation influenced your daily life?
    - Health, food choices, habits
19. Do you have a routine created around your fermentations?
    - Burping, checking up, feeding
20. Would you recommend home-fermentation to others?
    - Why?
21. Do you think fermentation can help change the world for the better?
    - How so?
    - Do you feel you can change the food system by changing your eating habits? (voting with your fork)
22. If you started fermenting during Covid, did this help you in any way getting through the days?
    - Lockdown, mental health, physical health

Concluding questions

23. What ferments are you making at home?
    - Lactoferments, wild ferments, ferments with moulds, soda's
24. Why are you making these ferments?
    - Culture, habit, tradition, what do they provide you, why aren't you making ….?.
25. How does your background influence your ferment choices?
26. Do you use a starter or backslopping? Or do you only do wild fermentations?
27. Do you use recipes and if so, where do you get your recipes from?
    - Online, friends, books, workshops, fermentation community, social media
28. How do you know your ferment is ready?
    - Smell, taste, acidity, colour, consistency, texture…
29. How do you judge the food safety of your ferments?
    - Acidity, salt content, by careful observation
30. Do you have other benefits from fermentation you would like to share? *(you mentioned…)*
    - Why are these important to you?
31. Do you have any other home-fermentation-related thoughts or remarks you would like to share?
32. Do you have any questions for me?

Appendix B – Consent form

1. Expert consent form

Dear expert,

First of all, thank you for taking your time for my study and the willingness to participate. Over the past years I have personally notices a trend of home-fermentation, which seems to be expanding and growing. So, I am looking into different motivations for home-fermentation, what drives/inspires a person to start and continue home-fermenting foods and drinks. Therefore, no answer is wrong. I would like to know your experiences and observation regarding consumer behaviour with regards to fermentation. I would like to conduct a personal interview with you, which will take no longer than 1.5 hours. If possible and preferred, and in line with the Dutch Covid-measures, these personal interviews can be held face to face. If not, skype will be used.

I would like to record the interview and transcribe what is said, to be used in my report. However, I will keep your answers anonymous throughout the study. This means your name and other words that can uncover your identity will be removed from the transcript. However, if a part that includes these specifics and which are crucial to the study, I would like to include it. Yet, if you like to remain anonymous throughout, this will be respected. Besides me, only my supervisor might know your personal details when seeing the raw data. All data that is collected from the interview will be stored on a safe and secure computer environment for five years after completion of the study. Hereafter, all data will be destroyed.

If you like to take something that you said back or want something not to be mentioned in the report, this will of course be respected. This means that this specific part will be deleted from the transcript and not be mentioned anywhere anymore, this includes the report. At any point in time, you are able to withdraw from the study, if preferred, until the end of the study. At the end of the study, this will be around the beginning of July, I can send you a copy of the full report of the study. This is also true for your interview recording and transcript, which I can send to you.

Hereby I hope to have informed you properly on what this study is about and how I will store and use your data.

I would like you to sign below, to show that you have read this document and comply with all of the above.

Wish to stay anonymous:

- ❑ as much as possible
  OR
- ❑ wish to stay anonymous completely.

Name

Date:

Signature:

2. Home-fermenter consent form

Dear participant,

First of all, thank you for taking your time for my study and the willingness to participate. Over the past years I have personally notices a trend of home-fermentation, which seems to be expanding and growing. So, I am looking into different motivations for home-fermentation, what drives/inspires a person to start and continue home-fermenting foods and drinks. Therefore, no answer is wrong. To conduct this study, I would like to conduct a personal interview with you, and a focus group together with four other participants. Each activity will take no longer than 1.5 hours. If possible and preferred, and in line with the Dutch Covid-measures, these personal interviews can be held face to face. If not, skype will be used, as will be done with the focus group. During the focus groups you and four others will discuss different fermented products.

I would like to record the interview and focus group and transcribe what is said, to be used in my report. However, I will keep your answers anonymous throughout the study. This means your name and items which potentially can uncover your identity, will be removed from the transcript. Besides me, only my supervisor might know your personal details when seeing the raw data. All data that is collected from the interview and focus group will be stored on a safe and secure computer environment for five years after completion of the study. Hereafter, all data will be destroyed.

If you like to take something that you said back or want something not to be mentioned in the report, this will of course be respected. This means that this specific part will be deleted from the transcript and not be mentioned anywhere anymore, this includes the report. At any point in time, you are able to withdraw from the study, if preferred, until the end of the study. At the end of the study, this will be around the beginning of July, I can send you a copy of the full report of the study. This is also true for your interview recording and transcript, which I can send to you.

Hereby I hope to have informed you properly on what this study is about and how I will store and use your data.

I would like you to sign below, to show that you have read this document and comply with all of the above.

Name:

Date:

Signature:

Appendix C – Codebook

Overarching code	Colour code	Specific code	Description	Strategy used
Motivations		Joy	Positive, happy feelings experienced by the home-fermenter as a result of the home-fermentation practices. Can arise from and along with other motivations.	Deductive
		Accomplishment	The sense of accomplishment a participant gets from their practice of home-fermentation.	Inductive
		Curiosity	Curiosity towards a certain practices or process.	Inductive
		Organoleptic properties	The different organoleptic properties that arise in a product through fermentation.	Deductive
		Experimentation	Experiment with foods (in this specific case), with taste and flavour, as well as (in this case) fermentation practices	Inductive
		Healthy diet	A diet that is in the eye of the participant healthy, meaning good for their body and health.	Inductive
		Health problems	Problems that occur related to health, such as indigestion, low energy…	Inductive
		Health benefits	Positive effects on health as experienced by the home-fermenter, as a result of consuming (home-) fermented products. As well as "feeling good" because of eating fermented products. And the benefits of micro-organisms.	Deductive
		Self-sufficient	Not needing to rely on others or other companies for, in this case, nutrition, food.	Inductive
		Dietary substitute	A specific ferment made to substitute a part of a diet	Inductive
		Preservation	Preserving food by fermentation	Inductive
		First motivation	The first input why the participant started with fermentation	Inductive

Overarching code	Colour code	Specific code	Description	Strategy used
Personal		Culture	The social behaviour, ideas, values and customs of a group of people or society, which the home-fermenter identifies with/feels included in.	Deductive
		Distrust	Distrust in food industry due to food scandals and other concerns, wanting to know what you eat and what has gone into it, also in terms of effort and energy, as well as ingredients, pesticides and additives.	Deductive
		Identity	Expressing oneself through the practice of home-fermentation, for instance, identifying oneself as a foodie or fitgirl or fermentation enthusiast.	Deductive
		Sense of belonging	Achieving a sense of belonging in a place, culture and/or community, basically where you are, through the practice of fermentation	Deductive
		Relationships	The changing of relationships the home-fermenter has experienced through the practice of fermentation, e.g., reconnecting with old friends or making new ones.	Deductive
		Nostalgia	The sentiment or affection of something from the past, that the home-fermenter used to know/do/experience/see….	Deductive
		Sense of place	Creating a sense of place, where you (the home-fermenter) are in the world and how you are connected to it specifically, through home-fermentation.	Deductive
		Integration into lifestyle	About the extent of integration of fermentation into one's lifestyle, daily life.	Deductive
		Attitude	The specific attitude of a home-fermenter/consumer towards fermentation, other than described under other motivations or codes	Deductive
		Reconnect	Feeling more connected to nature, to your roots, to agriculture, to food, instead of the disembedded and disconnected globalised food industry.	Deductive
		Food choices	What are the participants food choices based upon? Including conscious consumer behaviour, however the participant describes it.	Inductive
		Food sharing	Sharing foods, ferments in this case, as well as starters.	Inductive

Overarching code	Colour code	Specific code	Description	Strategy used
Ecological and political views		Food waste	The wasting of good food, also connected to sustainability.	Deductive
		Local	Choosing food from a nearby farmland, buying from the farmers, eating local; thus, shortening the supply chain in comparison to commercial foods.	Deductive
		Post-Pasteurian view	Having a view that sees microbes not as inherently bad, but as some good and some bad and wanting to restore biodiversity amongst microorganisms. (View is in contrast with the one from Louis Pasteur, viewing all microbes as bad and opting for pasteurisation, sterilisation and sanitation)	Deductive
		AFN	The following/adhering to the thoughts belonging to alternative food networks, which mostly go against the globalised food industry and industrialisation.	Deductive
		Environment	Doing something specifically, changing his/her foodscape to benefit the environment or decrease the global footprint of foods	Inductive
Practices		"Things"	Things composing the fermentation practice, so the recipe, starter, the sort of ferment.	Deductive
		Meanings	Meanings that provide the practice with direction, which includes the embodied knowledge on the social significance and experience with the practice.	Inductive
		Competence	Competence to carry out the practices, this encapsulates understanding and knowhow of the practice itself.	Inductive
		Methods	Certain methods, practices that are used for fermentations. Ways of fermenting.	Inductive
		Ferments	The choice of ferments that were made by the participants and including reasons that are not mentioned under "motivation codes".	Deductive
		Source of information	Any source of information which the home-fermenters use, this can include social media platforms, but also friends, family, workshops, books. & How and where experts share their knowledge and teach.	Deductive
		Food safety	Fermentation as a means to detoxify foods, providing safe nourishment.	Deductive

Overarching code	Colour code	Specific code	Description	Strategy used
Other		Introduction	How the home-fermenters got introduced to fermentation, this include any means to be introduced. Their first encounter.	Deductive
		Community	Fermentation community, a group of people that converse on the topic of and come together around (home-)fermentation.	Deductive
		Covid-19	The Covid-19 pandemic. This code includes all the different influences covid had on the home-fermentation practices of the home-fermenters.	Deductive
		Change the world	Possible influence of fermentation to change the world for the better, according to participants	Inductive
		History	History about fermentation in the Netherlands	Inductive
		Other	Not yet defined codes, that seem important not to forget	Inductive
Quotes		Quotes	Quotes, sayings that are worth working into the report	Inductive