

Barriers, facilitators and strategies to increasing milk, yoghurt and soft cheese intakes: A cross cultural perspective

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Author's Declaration

I hereby declare that the work presented in this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

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I would like to use this space to send a message. PhDs, like other jobs, are made of hard work, intense moments, and, sometimes, worst scenarios happening. You are asked to manage your professional and personal life, and it is not easy when you have several studies ongoing, deadlines, want to meet others' expectations, etc. You may work with people who approach life differently and not be able to see this as a strength (notably, two brains think better than one). During this PhD, I had to face deep grief, and at some point, things were running so fast around me that I felt it was just too much; I seemed to have a short circuit between the ears, and the whole situation was painful to me. But, in those challenges, I learnt that sometimes is good to step back, take it slowly, rest; question yourself and look for answers; take time to find your way and when necessary, ask for help. Stress should be a stimulus; we should not let it take us too far. I worked hard behind the scenes, much harder than on stage. Even sometimes it is harsh, and we tend to forget that progression is not linear, hard work always pays off (*il tempo è galantuomo*). Please, if you see yourself in my words, do not be afraid to reach out, or seek help. There is no shame in needing a talk, or a break. You will be able to keep going, to grow, to achieve; and you will not regret the small talks – they are indeed one of the best parts of this.

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Abstract

Dairy is a wide category of products that differ from one another in their raw ingredients, process of production, sensory characteristics, and modes (manner) of consumption. Soft dairy, i.e., milk, yoghurt, and other fermented products, and soft cheese, have been associated with health, as they provide macro- and micronutrients that are fundamental to maintaining a healthy diet. Along with their health benefits, these products are more environmentally friendly and more affordable than other animal-based products, especially meat. Moreover, compared to other dairy, soft dairy products are also associated with less use of natural resources and less expensive diets. However, its consumption around the world is lower than recommended, especially among young adults.

The main aim of this PhD was to identify and explore reasons for (non)consumption of soft dairy among young adults aged between 18 and 30 years old in the UK and France. These two countries have been chosen because they both are in the top 15 milk-producing countries in the world, have a long dairy farm tradition and a homogeneous food culture, but different products are most consumed, i.e., hard cheese in the UK and yoghurt and soft cheese in France, and this may impact consumption in terms of quantities, energy content and manners of consumption. Secondly, this research project aimed to test strategies for change in the consumption of soft dairy among the target population.

Four studies were developed to achieve these aims. The first two aimed to identify and explore reasons for consumption and non-consumption of soft dairy, the third explored intakes and patterns of consumption, and the fourth was expected to be developed from the results of the three other studies. Due to time limitations, Studies 3 and 4 were conducted only in France. However, their protocols were developed to enable replication in the UK too. Since Study 2 was still ongoing, Study 4 was developed from the results of Studies 1 and 3 only.

A qualitative study (Study 1) was conducted in both countries, aiming to identify reasons for (non)consumption of soft dairy, followed by a quantitative study (Study 2) exploring these reasons in larger samples. Study 1 and Study 2 did not collect any data about intakes as the main aim was to explore reasons for (non)consumption, regardless of the actual quantity. Both studies were based on recent literature showing that soft dairy intakes are lower than recommended. While the quantitative study was ongoing, an exploratory study (Study 3) using a national public database was performed to

investigate actual soft dairy consumption among French adults. The least consumed product category, i.e., fresh fermented dairy, was chosen as the target for a pilot study (Study 4), aiming to boost its consumption by teaching recipes including these products.

The qualitative study (Study 1) found four themes and sixteen sub-themes influencing dairy consumption and non-consumption among the target population in both countries; a seventeenth sub-theme seemed to impact dairy consumption only among participants based in France. These may suggest that reasons for consumption and non-consumption are similar in both countries; however, since these results are from a qualitative study, they cannot be generalised, all sub-themes were used to develop statements that a bigger sample of young adults were asked to evaluate while filling in an online questionnaire (Study 2) to explore their attitudes toward the least consumed soft dairy products. Results show that among young adults in the UK and France, soft dairy can be perceived as too processed, or expiring too quickly, but also that it can be consumed out of enjoyment or to treat themselves. Study 3 aimed to identify not only the least consumed product category but also potential eating patterns: French adults consume most of their soft dairy, e.g., soft cheese, yoghurt, around mealtimes (lunch or dinner), combined with other food products, e.g., bread, and rarely by itself, preferring eating dairy to drinking dairy. Study 4 has been developed from results of the previous studies and aimed at increasing opportunities to eat soft dairy, particularly fresh fermented products, e.g., cultured milks, throughout the day, so that the developed recipes included savoury and sweet dishes, eatable and drinkable alternatives, to be consumed alone or in a proper meal. Participants completed a questionnaire about their attitudes towards soft dairy consumption three times, i.e., before the interventions, after two weeks, and after four weeks. This questionnaire was the questionnaire used in Study 2. Results show that engaging in cooking activities can have a positive effect in boosting certain attitudes, increasing opportunities and modes of consumption, and considering soft dairy products as alternatives to other dairy products and other foods.

This project fits into the wider framework of sustainable development goals, with a particular focus on goals 3, 12, and 13, respectively, good health and well-being, responsible consumption and production, and climate action. Findings from studies 1-2 demonstrate the importance of country-specific studies. In addition to identifying determinants of consumption, in terms of common facilitators, e.g., preferences, and specific barriers, e.g., size of sold products in the UK, they also identified different consumption frequencies and contexts of several soft dairy products, e.g., whole milk, skimmed milk, goat's milk. The characterisation of food patterns (Study 3) combined with findings from other studies also reveal that, despite the lower increase in intakes

than was expected in Study 4, culinary activities can be considered for real-life, but for more important results, other factors must also be considered. This research project also reveals that new outreaching activities on the role of dairy products on health are needed. Food awareness and literacy may indeed aid in boosting soft dairy consumption among young adults.

Resumé

Les produits laitiers sont une vaste catégorie de produits qui diffèrent les uns des autres par leurs matières premières, leur processus de fabrication, leurs caractéristiques sensorielles et leurs modes de consommation. Les produits laitiers frais, comme le lait, les yaourts et les autres produits fermentés, ainsi que les fromages à pâte molle, ont été associés à la santé, puisqu'ils fournissent des micro- et macronutriments essentiels pour maintenir une alimentation saine. Avec leurs avantages pour la santé, ces produits sont plus durables et moins chers que d'autres produits d'origine animale, en particulier la viande. De plus, par rapport aux autres produits laitiers, les produits laitiers frais sont également associés à une utilisation réduite des ressources naturelles et à des régimes alimentaires moins coûteux. Cependant, leur consommation dans le monde est inférieure aux recommandations, en particulier chez les jeunes adultes.

Le principal objectif de ce doctorat était d'identifier et d'explorer les raisons de la (non) consommation de produits laitiers frais chez les jeunes adultes âgés de 18 à 30 ans au Royaume-Uni et en France. Les deux pays figurent parmi les 15 plus grands producteurs de lait au monde, ont une longue tradition de ferme laitière et une culture alimentaire homogène, mais se distinguent par les types de produits laitiers les plus consommés : le fromage à pâte dure au Royaume-Uni et le yaourt et le fromage à pâte molle en France, et cela peut avoir un impact sur la consommation en termes de quantités, de contenu énergétique et de modes de consommation. En plus, ce projet de recherche visait à tester des stratégies pour modifier la consommation de produits laitiers frais au sein de la population cible.

Quatre études ont été développées pour atteindre ces objectifs. Les premières deux se sont concentrées sur les déterminants de la consommation et de la non-consommation de produits laitiers, le troisième explorait les apports et les modes de consommation, et le quatrième devait être développé à partir des résultats des trois autres études. En raison des contraintes de temps, les études 3 et 4 ont été menées uniquement en France. Cependant, leurs protocoles ont été développés pour permettre de les répliquer au Royaume-Uni également. Comme l'étude 2 était toujours en cours, l'étude 4 a été développée à partir des résultats des études 1 et 3 uniquement.

Une étude qualitative (étude 1) a été menée dans les deux pays afin d'identifier les raisons de la (non-)consommation de produits laitiers frais, suivie d'une étude quantitative (étude 2) explorant ces raisons dans des échantillons plus nombreux. L'étude 1 et l'étude 2 n'ont pas recueilli de données sur les apports car le principal objectif

était d'explorer les raisons de la (non)consommation, quelle que soit la quantité réelle. Les deux études étaient basées sur la littérature récente montrant que les apports en produits laitiers frais sont inférieurs aux recommandations. Au cours de l'étude quantitative, une étude exploratoire (étude 3) utilisant une base de données publique nationale a été menée pour étudier la consommation réelle de produits laitiers frais chez les adultes français. La catégorie de produits la moins consommée, c'est-à-dire les produits laitiers frais fermentés, a été choisie comme cible pour une étude pilote (étude 4), visant à stimuler leur consommation en proposant des recettes incluant ces produits.

L'étude qualitative (étude 1) a révélé quatre thèmes et seize sous-thèmes influençant la consommation et la non-consommation de produits laitiers parmi la population cible dans les deux pays ; un dix-septième sous-thème semblait avoir une incidence sur la consommation de produits laitiers uniquement chez les participants vivant en France. Cela peut suggérer que les raisons de la consommation et de la non-consommation sont similaires dans les deux pays ; cependant, puisque ces résultats proviennent d'une étude qualitative, ils ne peuvent pas être généralisés. Tous les sous-thèmes ont été utilisés pour élaborer des énoncés qu'un plus grand échantillon de jeunes adultes a été invité à évaluer en remplissant un questionnaire en ligne (étude 2) afin d'explorer leurs attitudes envers les produits laitiers frais les moins consommés. Les résultats montrent que chez les jeunes adultes au Royaume-Uni et en France, les produits laitiers sont consommés pour se faire plaisir, mais ils peuvent être perçus comme étant trop transformés ou périssables trop rapidement. L'étude 3 visait à identifier non seulement la catégorie de produit la moins consommée, mais aussi les habitudes alimentaires potentielles : les adultes français consomment la plupart de leurs produits laitiers frais, par exemple du fromage à pâte molle et du yaourt, aux heures des repas (déjeuner ou dîner), en combinaison avec d'autres produits alimentaires, p.ex., avec du pain, rarement seuls, et préfèrent en manger plutôt qu'en boire. L'étude 4 a été élaborée dans le but d'augmenter les possibilités de consommation des produits laitiers frais, en particulier des produits fermentés frais, p.ex., *lait ribot*, tout au long de la journée, de sorte que les recettes élaborées comprennent des plats salés et sucrés, des alternatives comestibles et buvables, à consommer seules ou dans un repas structuré. Les participants ont répondu à un questionnaire sur leurs attitudes envers la consommation de produits laitiers frais à trois reprises : avant les interventions, après deux semaines et après quatre semaines. Ce questionnaire a été élaboré à partir des résultats de l'étude 1. Les résultats montrent que le fait de participer à des activités culinaires peut avoir un effet positif sur certaines attitudes, augmentant les possibilités et les modes de consommation, et permettant de

considérer les produits laitiers frais comme des alternatives aux autres produits laitiers et à d'autres aliments.

Ce projet s'inscrit dans le cadre plus large d'objectifs de développement durable, avec un focus particulier sur les objectifs 3, 12 et 13, respectivement bonne santé et bien-être, consommation et production responsables, et action climatique. Les résultats des études 1 et 2 démontrent l'importance des études par pays (« country-specific »). En plus d'identifier déterminants de la consommation, en termes de facilitateurs communs, p. ex., les préférences, ils ont identifié des obstacles spécifiques de chaque pays, p.ex., la taille des produits vendus au Royaume-Uni. Ces études ont identifié des barrières spécifiques ainsi que différentes fréquences et contextes de consommation de plusieurs produits laitiers frais, p. ex., lait entier, lait écrémé, lait de chèvre. La caractérisation des habitudes alimentaires (étude 3) combinée aux résultats d'autres études révèle également que, malgré les augmentations des apports plus faible que prévu au cours de l'étude 4, les activités culinaires peuvent être prises en compte pour une étude en "real-life", mais pour des résultats plus impactants, d'autres facteurs doivent de même être pris en compte, tels que les mêmes prédicteurs spécifiques au pays. Ce projet de recherche met également en évidence la nécessité d'accroître la sensibilisation au rôle des produits laitiers dans la santé. Les connaissances alimentaires peuvent aider à stimuler la consommation de produits laitiers frais chez les jeunes adultes.

List of publications, attended conferences and proceedings

Chapter 2 has been published as:

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Franzon C, Dougkas A, Memery J, Prigent J, Appleton KM

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2023/2024 Member of the organising committee for ECR BFDG, taking place in Cambridge, 4-5 of April 2024.

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List of abbreviations (alphabetic order)

EDA European Dairy Association

ESEE Standard Error of Estimate

FAO Food and Agriculture
Organization of the United Nations

FR France

GHGE GreenHouse Gas Emissions

INCA French Individual and National
Survey Consumption (études
Individuelles Nationales des
Consommations Alimentaires)

KMO Kaiser-Meyen-Olkin test

MCAR Missing Completely At Random
[data]

PBDA Plant Based Dairy Alternative

PCA Principal Component Analysis

PNNS French National Nutrition and
Health Program (Programme National
Nutrition Santé)

UK United Kingdom

WHO World Health Organization

Chapter One: What is dairy?

1.1. Introduction

This PhD project focused on reasons for consumption and non-consumption of dairy, particularly soft dairy products, among a population of young adults aged between 18 and 30 years old living in the UK and France. In the last two decades, the consumption of milk and other fresh dairy products has decreased and stalled among individuals of different countries (European Commission. Directorate General for Agriculture and Rural Development., 2024; Gerosa & Skoet, 2012; Our World in Data, 2025), despite their positive impact on human health and being associated with sustainable diets (Mozaffarian, 2019; Mulet-Cabero et al., 2024; Prentice, 2014; Rozenberg et al., 2016; Sinclair et al., 2025; Wallace et al., 2021).

But what is dairy? And how do these foods place themselves in the food system, knowing that food is not considered only based on its nutritional benefits or role in health (Mozaffarian, 2019; Mulet-Cabero et al., 2024; Prentice, 2014; Rozenberg et al., 2016; Timon et al., 2020), but also by its societal, cultural and environmental role (Askegaard & Linnet, 2011; Berners-Lee et al., 2012; Douglas, 1972; Firat & Kutucuo, 2013; Fischler, 1980; Guy et al., 2024; Harris, 1998; Hobbs et al., 2020; Holm et al., 2019; Naspetti et al., 2021; Rappoport, 2003; Rozin, 2005; Rozin et al., 2002; Timon et al., 2020; Trichopoulou et al., 2007) in past and future diets and lifestyles?

This chapter will give an overview of dairy. Its benefits and impact on human health and the environment, its consumption around the world, and across different life stages will be explored. It will eventually give insight into the research context in which this research project and its studies have been developed. The main aims and thesis structure are reported at the end of this chapter.

1.1.1. What is dairy?

Dairy is a wide food group including products that differ from each other in raw ingredients, e.g., cow's milk; production processes, e.g., fermentation; curing time, i.e., fresh or aged; sensory characteristics, e.g., taste; and mode (manner) of consumption (Almena-Aliste & Mietton, 2017; Bylund, 1995; Corvera-Paredes et al., 2022; Duncan, 1998; Gavrilova et al., 2020; Johnson, 2017). The Oxford Learner's Dictionary defines dairy as an uncountable noun for "milk, cheese, and other milk products" (Oxford Learner's Dictionary of Academic English,

2024), while the Merriam-Webster, also specifies that dairy refers to all milk products, including milk itself, that are derived from domestic animals, e.g., cow or goat (Merriam-Webster, 2025). The Food and Agriculture Organization of the United Nations (FAO) gives details on dairy in the Codex Alimentarius (CXS 206, 1999; Weltgesundheitsorganisation & FAO, 2011), defining when this term can be used and about what, i.e., all products made from milk of milking animals or milk products, thus excluding plant-based dairy alternatives (PBDA).

Dairy products have been around for centuries, as their discovery, per milk fermentation, is thought to have taken place more than 8000 years ago (Prentice, 2014). Geographical differences due to animal differences, e.g., camels in the desert (Faye & Konuspayeva, 2012), or animal scarcity, e.g., fewer cattle in Asia (Hodgson, 1979), led to differences in production and consumption. Around the world, dairy products are most often made from cow's milk (Bylund, 1995; Faye & Konuspayeva, 2012; Hodgson, 1979). Among them, milk is the most common and well-known dairy product (Gerosa & Skoet, 2012; Huth et al., 2006; Smith et al., 2022). More than 80% of it is yielded from cows (Gerosa & Skoet, 2012), then buffalo, goats, sheep, and camels (Gerosa & Skoet, 2012). Milk is a protein-rich watery solution (Bylund, 1995; Weltgesundheitsorganisation & FAO, 2011) that contains other macro- and micronutrients in different quantities depending on its animal origin. For instance, buffalo's and sheep's milk are fattier (Bylund, 1995), and goat's and sheep's contain less lactose, making these more suitable for people experiencing lactose intolerance or sensitivity (Lad et al., 2017, p. 201; Raynal-Ljutovac et al., 2008). Milk also has the lowest greenhouse gas emissions (GHGE) among dairy products (Agence de la transition écologique, 2021; Berners-Lee et al., 2012; Gerosa & Skoet, 2012), and it has notably been associated with health benefits, e.g., good source of micro- and macronutrients (Duncan, 1998; Farag et al., 2020; Kok & Hutkins, 2018; Pei et al., 2017; Prentice, 2014; Rozenberg et al., 2016; Sluijs et al., 2012; Thorning et al., 2016; Timon et al., 2020; Trichia et al., 2020; Yuzbashian et al., 2021). Furthermore, compared to other animal-based foods, all dairy products are considered more environmentally friendly (Agence de la transition écologique, 2021; Berners-Lee et al., 2012; Guy et al., 2024; Hobbs et al., 2020).

After being yielded, milk undergoes technological processes including thermic treatments to ensure safety and reduce risky contaminations (Bylund, 1995). Different types of bacteria may then be added to milk in the form of culture starters, triggering fermentation (Bylund, 1995). The type of bacteria and other fermentation specifications, e.g., pH level, lead to different products, differing in sensory characteristics and composition, e.g., yoghurt vs cheese (Almena-Aliste & Miettton, 2017; Bylund, 1995; Corvera-Paredes et al., 2022; Johnson, 2017). Yoghurt and fermented dairy products are the results of lactic-acidic fermentation, occasionally paired with yeast fermentation (Almena-Aliste & Miettton, 2017; Bylund, 1995), while cheeses

are more complex products. In fact, after fermentation, cheeses also undergo a coagulation phase and, occasionally, a curing or mould-curing stage, which may require the product to age for months or years before being consumed (Almena-Aliste & Miettton, 2017; Bylund, 1995; Weltgesundheitsorganisation & FAO, 2011). All the processes impact the final product, giving it not only different sensory characteristics but also differentiating its nutritional profile, thus its impact on human health (Lucas et al., 2006; Rashidinejad et al., 2017). Moreover, these aspects are directly related to resource usage, e.g., water needs, and this affects each product's GHGE and usage of resources, thus their environmental impact (Canellada et al., 2018; Finnegan et al., 2018).

1.1.1.1. Classification of dairy products

Classification of food products has always been challenging (Ireland et al., 2002; Moubarac et al., 2014; Sadler et al., 2021). Besides the fact that all dairy is made and contains milk (Bylund, 1995; CXS 206, 1999; Merriam-Webster, 2025; Oxford Learner's Dictionary of Academic English, 2024; Weltgesundheitsorganisation & FAO, 2011), dairy may be classified according to its ingredients, production methods, and final products (Almena-Aliste & Miettton, 2017; Bylund, 1995; Ireland et al., 2002; Johnson, 2017; Moubarac et al., 2014; Raynal-Ljutovac et al., 2008; Sadler et al., 2021). It can also be classified based on its origin, context of consumption, and other consumption-related aspects, e.g., nutritional profile, environmental impact (Agence de la transition écologique, 2021; Berners-Lee et al., 2012; Cesbron-Lavau et al., 2017; Chollet et al., 2022; Clegg et al., 2021; Gerber & Food and Agriculture Organization of the United Nations, 2013; Ministère des solidarités et de la santé, 2019; Naspetti et al., 2021). Based on the main focus and research areas touched by this project, dairy products have been here classified using a traditional approach based on production processes (Bylund, 1995; Weltgesundheitsorganisation & FAO, 2011), considering also environmental, i.e., GHGE, nutritional and health impacts (Agence de la transition écologique, 2021; Almena-Aliste & Miettton, 2017; Berners-Lee et al., 2012; Bourlioux, 2007; Bylund, 1995; Gerber & Food and Agriculture Organization of the United Nations, 2013; Guy et al., 2024; Hobbs et al., 2020; Johnson, 2017; Kok & Hutkins, 2018; Mozaffarian, 2019; Prentice, 2014; Rozenberg et al., 2016). Table 1.1 summarises dairy categories included in the dairy group, and their respective GHGE, nutritional impact, and health impact. GHGE was based on data from Berners-Lee *et al.*, 2012 and the *Agribalyse database*, a French public dataset including food and agriculture impacts on the environment. In Berners-Lee, greenhouse gas emissions are expressed on a scale from 0 to 18. The dairy products score, between 2 and 7, can therefore be considered as medium-low. For some soft dairy products, the score is even lower.

Table 1. 1.

Sub-groups for dairy characterisation. Each sub-group reports definitions and examples of the included products. GHGE was based on the Agribalyse database by the Agence de la transition écologique, 2021 and by Berners-Lee et al., 2012 and is expressed in kg CO₂ kg⁻¹.

Sub-groups and products	GHGE	Nutritional impact	Health impact
Milk: all types of milk, animal-based, lactose-free included.	<2	Higher water content (82-87% depending on the animal), 4-7 % of fat. It naturally contains lactose but may be processed to be lactose-free. Fat content may be reduced (semi-skimmed/skimmed) (Bylund, 1995). Good source of vitamins, calcium, and minerals (Rozenberg et al., 2016). Source of protein (Clegg et al., 2021; Hoffman & Falvo, 2005; Rozenberg et al., 2016)	Promotes bone density and reduces the risk of chronic diseases (Das et al., 2023; European Dairy Association, 2021; Prentice, 2014; Yackobovitch-Gavan et al., 2017).
Yoghurt: all types of yoghurt, animal-based, to drink/to eat.	~2	Lower water content compared to milk, naturally does not contain lactose, which is digested during fermentation by lactic acid bacteria (Bylund, 1995; Weltgesundheitsorganisation & FAO, 2011). Good source of vitamins, calcium, and minerals (Rozenberg et al., 2016). Source of protein (Clegg et al., 2021; Rozenberg et al., 2016). It must contain <15% of fats, may be sweetened and contain stabilisers to increase viscosity and avoid colloidal separations; It must contain a minimum of 10 ⁶ microorganisms (Bylund, 1995; Weltgesundheitsorganisation & FAO, 2011)	Promotes gut health (Kok & Hutkins, 2018; Szczepańska et al., 2021).
Fermented dairy, other than yoghurt: Fresh, fermented dairy, animal-based, e.g., kefir, crème fraîche.	~2	Generally, more fluid than yoghurt, it does not contain lactose, as it undergoes a fermentation process (Bylund, 1995; Weltgesundheitsorganisation & FAO, 2011). Source of micro-nutrients and vitamins (Frag et al., 2020; Szczepańska et al., 2021). It must contain <10% of fats and 10 ⁴ in yeasts (Weltgesundheitsorganisation & FAO, 2011)	Improves digestion and gut health, decreases cholesterol, and may aid in recovery in sports (Savaiano & Hutkins, 2021; Szczepańska et al., 2021)

Soft cheese: fresh, not ripened cheese.	2-5	Good source of protein (Rozenberg et al., 2016). Low sugar, may be high in fat (ANSES, 2016). It has low pH scores, but water content is about 70%, thus their shelf-life is shorter than cured cheeses (Almena-Aliste & Mietton, 2017; Bylund, 1995)	Full-fat natural cheese is associated with low LDL, and low inflammation and may help tackle obesity (Tunick & Van Hekken, 2015).
Hard cheese: hard, semi-hard cheese, i.e., ripened cheese.	5-7	Lower content in water (45-60%) and low pH scores, good source of protein (Almena-Aliste & Mietton, 2017; Bylund, 1995; Rozenberg et al., 2016). Longer shelf-life compared to fresh dairy products, due to the curing or mould-curing stage (Bylund, 1995). Low sugar, may be high in fat and salt (from 1.7 to 7%) (ANSES, 2016; Bylund, 1995). May contain additives to reduce the risk of organism growth, e.g., Clostridia.	Full-fat natural cheese is associated with low LDL, and low inflammation and may help tackle obesity (de Goede et al., 2015; Tunick & Van Hekken, 2015).
Desserts: all types of dairy-based desserts, spoonable or not, e.g. cheesecake.	~3	Source of sugar, fat (ANSES, 2016; Santé publique France, 2019b).	The consumption of high-sugar products should be reduced (Santé publique France, 2019b), as associated with inflammatory and metabolic diseases (Freeman et al., 2018).
PBDA: all plant-based alternatives to dairy products, e.g., soy milk.	<2	Good source of calcium and vitamins (Clegg et al., 2021). Micro-nutrients may be less available than those contained in animal-based dairy foods (Witard et al., 2025).	Plant-based diets are associated with a lower risk of chronic diseases, such as obesity and some cancers (Hemler & Hu, 2019).

An exception in classification was made for fermented dairy products, as, despite being a fermented product, yoghurt was classified on its own. Other fermented dairy products, such as kefir, crème fraîche, and cultured milks, were, at the time of this PhD project, less known and less consumed than yoghurts (Baschali et al., 2017; Cesbron-Lavau et al., 2017). They

may or may not be consumed in the same way, and when classified with yoghurts, details may be lost due to the popularity of yoghurt among young adults.

A plant-based dairy alternatives [PBDA] category was added to the list, as in some contexts these products are considered dairy (Dietary Guidelines for Americans, 2020-2025, 2020; Public Health England, 2016; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020), and because many consumers categorise them as such since they are consumed in the same manner (Chollet et al., 2022). However, in this manuscript, PBDA will be treated as a separate category, while being considered in studies and discussions, as this food group is rising in popularity (Adamczyk et al., 2022; Schiano et al., 2020).

Conversely, due to its nutritional composition and use in the kitchen, butter is usually excluded from the dairy group and included in the oils and fats one (Public Health England, 2016; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020). Thus, no consideration will be made about butter nor butter consumption.

1.1.1.2. Soft dairy products

Within the dairy category, fresh, not ripened products, whether they have undergone a fermentation process or not, are also known as “soft dairy”. This group notably includes milk, yoghurt, other fresh fermented products, and soft cheeses (Almena-Aliste & Mietton, 2017; Bylund, 1995). These products, as reported in Table 1.1, have a low GHGE, and studies associate them with health benefits, besides the role they may also play in cheaper, more sustainable, protein-rich diets (Appleton, 2023; Clegg et al., 2021; European Dairy Association, 2021; Farag et al., 2020; Guy et al., 2024; Hobbs et al., 2020; Kok & Hutkins, 2018; Rozenberg et al., 2016; Szczepańska et al., 2021; Timon et al., 2020; Tunick & Van Hekken, 2015). Consumption of these products may help people to engage in diets and lifestyles that are less impacting on the environment and resources (Brennan et al., 2023; Brščić, 2020; Hobbs et al., 2020; Sinclair et al., 2025), a change that is required to achieve the globally sustainable objectives widely represented by the goals set by FAO in the Agenda 2030 (FAO, 2022).

1.1.1.2.1. Evidence of health and sustainability benefits of soft dairy consumption

Consumption of soft dairy products has been associated with positive health outcomes and may play a role in achieving more sustainable lifestyles.

Firstly, these products are rich in micro- and macro-nutrients and have a complex food matrix that has been shown to support the maintenance of healthy diets while providing support to the body, boosting bone and gut health, enhancing physical recovery after intense activities, and improving sleep quality (Farag et al., 2020; Ireland et al., 2002; Kok & Hutkins, 2018; Komada et al., 2020; Pei et al., 2017; A. S. Rouf et al., 2018; Roy, 2008; Rozenberg et al., 2016; Savaiano & Hutkins, 2021; Thorning et al., 2016). Many studies associate its consumption with a lower risk of cardiovascular and other non-communicable diseases (Sluijs et al., 2012; Trichopoulou et al., 2007; Yuzbashian et al., 2021), while also demonstrating the positive link between soft dairy consumption and body weight (Kouvelioti et al., 2017; Thorning et al., 2016). For all these reasons and benefits, soft dairy consumption is promoted from the early stages of life to ensure the right intake of calcium, vitamins, proteins, and healthy fats (Huth et al., 2006; Mozaffarian, 2019). Concerning fats, in the past decade, dairy consumption has been re-evaluated thanks to studies carried out specifically on the behaviour of its complex food matrix, and nowadays, many dietary guidelines around the world recommend daily consumption of soft dairy products (Comerford et al., 2021; Prentice, 2014; Weaver, 2014). Generally speaking, except for some populations, e.g., allergic individuals, the daily recommended intake of dairy is between two and three portions on average (Comerford et al., 2021; European Dairy Association, 2021; Weaver, 2014). Its consumption previously was doubtful and often contested by those who claimed that the fat contained in these products, being saturated, could adversely affect the consumer's state of health (Lovegrove & Givens, 2016; Lovegrove & Hobbs, 2016). More recent studies have shown that the food matrix of these products once ingested allows the product not to be fully digested, and, for instance, the presence of calcium or the fat membrane reduces fat absorption, lowering among others also the risk of increasing LDL cholesterol (Lovegrove & Givens, 2016; Mozaffarian, 2019; Timon et al., 2020). These studies exculpate the consumption of these products and confirm their role in maintaining metabolic, cardiovascular, and bowel health and reducing the risk of developing inflammatory conditions that could lead to obesity or other metabolic diseases (Kouvelioti et al., 2017; Sluijs et al., 2012; Yuzbashian et al., 2021). That said, it is important to note that although the guidelines often include hard cheese among dairy products, the recommended products for daily consumption common across all different countries are milk, yoghurt, fresh fermented dairy products, and soft cheese (European Dairy Association, 2021; Ministère des solidarités et de la santé, 2018). Hard cheese can, in fact, be included in other food groups, or its consumption can be suggested every two to three days instead of daily (European Dairy Association, 2021; Ministère des solidarités et de la santé, 2018).

Secondly, soft dairy consumption also fits the need to migrate to more sustainable lifestyles, not only having less impact on the environment, but also contemplating more responsible use

of resources and prioritising societal and economic equalities alongside natural resource preservation (Drewnowski, 2018; FAO, 2022; Gaillac & Marbach, 2021; Gerber & Food and Agriculture Organization of the United Nations, 2013; Vieux et al., 2025). These products are less impacting on the environment, particularly when compared to other animal-based products, e.g., meat (Agence de la transition écologique, 2021; Berners-Lee et al., 2012; Gerber & Food and Agriculture Organization of the United Nations, 2013; Hobbs et al., 2020; Vieux et al., 2025), and depending on the milk's origin, its impact might be even lower. In fact, soft dairy from non-cattle milk is notably less demanding in terms of environmental resources (Haenlein, 2007; Peacock & Sherman, 2010; Pirisi et al., 2011). Milk yield is lower from goats and sheep, thus production too (Faye & Konuspayeva, 2012; Pirisi et al., 2011; Pulina et al., 2018); however, these products bring diversity to the market, with products that may differ from cows not only in sensory characteristics but also nutritional aspects (Bylund, 1995; Pirisi et al., 2011). For instance, goat milk is notably fattier (Bylund, 1995; Weltgesundheitsorganisation & FAO, 2011) but also more tolerated among individuals with lactose intolerance (Lad et al., 2017; Raynal-Ljutovac et al., 2008), making these products suitable for a wider population. Recent studies have also shown that diets rich in dairy, particularly soft dairy, might reduce household expenses while sustaining local producers, responsible for keeping alive local traditions (Askegaard & Linnet, 2011; Fusté-Forné, 2021).

1.1.2. Dairy intakes

Dairy products are indeed a very common food group around the world. The dairy sector has grown and changed through the years (Bouamra-Mechemache et al., 2008; Clay et al., 2020), and so has its availability from local to global (Askegaard & Linnet, 2011; Bojnec & Fertő, 2014), but its consumption remains common in many diets (Comerford et al., 2021; Prentice, 2014). In the past, milk was considered the “perfect food”, the “wholesome”, a “complete” food (Hodgson, 1979; Paul et al., 2020; Yackobovitch-Gavan et al., 2017). It contains many micro- and macro-nutrients that are considered necessary in maintaining a healthy diet (Hirahatake et al., 2020; Hodgson, 1979; Mozaffarian, 2019; Paul et al., 2020; Prentice, 2014; Rozenberg et al., 2016; Timon et al., 2020; Tunick & Van Hekken, 2015). Based on this, its consumption has been considered a real boost for health (Lad et al., 2017; Savaiano & Hutkins, 2021; Thorning et al., 2016) and has been advised in many food guidelines around the world (Comerford et al., 2021; Prentice, 2014; Weaver, 2009, 2014), promoting it to achieve nutrient adequacy at any life stage through dietary choices (Clegg et al., 2021; A. Rouf et al., 2019). Milk is not the only dairy food to appear in dietary recommendations, but it is the most common one (Comerford et al., 2021; European Dairy Association, 2021). Other products are

mentioned, both positively and negatively (Ministère des solidarités et de la santé, 2019). Notably, other soft dairy products, such as yoghurts and soft cheeses, are often recommended (Dietary Guidelines for Americans, 2020-2025, 2020; European Dairy Association, 2021; Prentice, 2014; Public Health England, 2016; Santé publique France, 2019b). Yoghurt consumption has already been considered a health marker (Weaver, 2014), and along with milk, its consumption is strongly recommended across any life stage as a product rich in B vitamins (Kok & Hutkins, 2018; Laird et al., 2017; Savaiano & Hutkins, 2021). Cheese, as well, is often recommended (European Dairy Association, 2021), preferably unripe, or in small portions in the case of aged products (European Dairy Association, 2021). Other products, i.e., sugary dairy-based desserts, are relegated to occasional consumption (Ministère des solidarités et de la santé, 2016, 2019; Santé publique France, 2019b).

Different countries have different dietary guidelines (Comerford et al., 2021; European Dairy Association, 2021; Weaver, 2014). These recommendations are indeed aimed at a country-specific audience, and it is sometimes difficult to compare them as they refer to different reference products, e.g., some dietary guidelines refer to daily dairy intakes as quantities of specific products, others in terms of milk equivalent (European Dairy Association, 2021). Some also include PBDA in the dairy category (Comerford et al., 2021; Public Health England, 2016), but leave out fermented dairy products, despite their positive impact on health (Savaiano & Hutkins, 2021). In principle, most recommendations suggest a specific number of servings of dairy products per day depending on life stage (Weaver, 2014) and often also offer suggestions on products to consume daily (European Dairy Association, 2021; Ministère des solidarités et de la santé, 2016; Santé publique France, 2019b; Weaver, 2014). Different products provide different caloric intakes, and this aspect also needs to be considered in the overall diet. For instance, 100g of whole (full-fat) cow's milk has 65 kcal, 100g of cow's skimmed milk has 33kcal, while the average cheese has 330 kcal for 100g of product (ANSES, 2016). The products also provide different micro- and macronutrients (ANSES, 2016), thus it is impossible to treat all dairy products the same. In some dietary guidelines, dairy is grouped in bigger animal-based foods sections, while in others it is discussed as a stand-alone food group (Comerford et al., 2021; European Dairy Association, 2021).

Dietary recommendations can indeed look different in different countries. For instance, the UK Eat Well guide recommends a general consumption of "some" dairy, including PBDA, and suggests preferring low-fat items (Comerford et al., 2021; Public Health England, 2016), sometimes specifying to not exceed the 8% of the daily caloric intake (European Dairy Association, 2021) but also suggesting having milk to achieve the daily intake of liquids for good hydration (Public Health England, 2016). Similarly, the American dietary guidelines include PBDA and suggest low fat dairy products (Dietary Guidelines for Americans, 2020-

2025, 2020; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020). Other countries give a suggested number of daily servings, and more specific advice, e.g., portion sizes, type of product (Comerford et al., 2021; European Dairy Association, 2021; Weaver, 2014). Dairy daily recommended servings, when specified, are generally between two and three and focus on milk, yoghurt, soft cheese, or cheese (Comerford et al., 2021; Weaver, 2014), with some specific instances between one and five servings (Comerford et al., 2021; Weaver, 2014). These recommendations change depending on the target population (Weaver, 2014). Different life stages have different needs, thus nutritional intakes need to be adjusted accordingly to achieve adequacy (Wallace et al., 2021). Suggested intakes are usually higher among the younger population (Weaver, 2014), and this is due to the higher need for calcium and other micronutrients for linear growth, bone, and dental health (Dror & Allen, 2014; Tanaka et al., 2010). Moreover, a right intake of calcium and other nutrients during childhood, adolescence, and young adulthood is required to maximise bone mineral content and reach peak bone mass and reduce the risk of developing osteoporosis and sarcopenia at later stages, especially in women (Das et al., 2023; Hereford et al., 2024; Yackobovitch-Gavan et al., 2017). Recommended intakes are then lowered for healthy adults (Weaver, 2014) and increased for pregnant, breastfeeding women, and the elderly (Weaver, 2014).

Despite all benefits and dietary advice, suggested dairy intakes are often only partially met among different populations. In 2021, the EDA reported that only five countries out of twenty-three met their recommended dairy intake (European Dairy Association, 2021). For instance, in France, the average daily intake was at the time 75 ml vs the recommended intake of 300 ml (European Dairy Association, 2021). A recent report from FAO underlined how consumption per capita has reduced all around Western countries. In France, the consumption per capita went from 286kg in 1991 to 267kg in 2021, while in the UK it reduced from 227kg in 1991 to 202kg in 2021 (Our World in Data, 2025).

Recent studies investigated this negative trend in consumption (Dubuisson et al., 2010; Gerosa & Skoet, 2012, 2012; Kapaj, 2018; Stewart et al., 2012; Zingone et al., 2017), often referring to it as a generational change (Casini et al., 2015; Stewart et al., 2012), and alongside challenges due to a shift in consumption, many saw it as an opportunity to launch new functional dairy products in the market (Duncan, 1998; Guyomarc'h et al., 2021; A. Y. Tamime & Robinson, 1988). Along with new technologies, many public campaigns focus on providing access to dairy products, particularly milk and yoghurt, in schools, to boost their consumption among children and adolescents, to reduce negative long-term health outcomes (Baker et al., 1980; Sipple et al., 2020). Even though higher consumption of dairy has been found among individuals living with children (Zingone et al., 2017), dairy intake drastically decreases in

adulthood, particularly after leaving school (European Dairy Association, 2021; Hohoff et al., 2021; Louie et al., 2014), and remains low during adulthood (Cifelli et al., 2023; Laird et al., 2017). However, while individuals in older adulthood are more prone to change their diet to improve their health (Chollet et al., 2014; Laird et al., 2017), young adulthood is a life stage associated with less healthy choices, e.g., higher consumption of sugary or fatty snacks (Poobalan et al., 2014), alongside life changes, e.g., leaving the family household, and new challenges to face (Poobalan et al., 2014; Winpenny et al., 2018; Winpenny, Winkler, et al., 2020). Young individuals aged between 18 and 30 years old have poorer dietary habits, limited awareness, and food literacy (Deliens et al., 2014, 2015, 2016; Pendergast et al., 2016) and often perceive access to healthy food as limited by its cost (Betts et al., 1997; Hebden et al., 2015; Howse et al., 2018). Moreover, they often underestimate the importance of habits developed in this life stage concerning diet and lifestyle, as they will have an impact on their long-term health (Das et al., 2023; Yackobovitch-Gavan et al., 2017; Yeung et al., 2021).

1.1.3. Facilitators and barriers to dairy (non)consumption

Identifying and exploring reasons for consumption and non-consumption of certain foods is fundamental to understanding their role as facilitators and barriers to intake and developing effective strategies for change (Dogherty & Estabrooks, 2015; Michie et al., 2011). Many studies have already tried to understand which factors may influence healthy dietary choices, including dairy consumption among different target populations (Adamczyk et al., 2022; S. Allen et al., 2018; Betts et al., 1997; Cardello et al., 2024; Chollet et al., 2014; Clay et al., 2020; Kearney, 2010; Laila et al., 2021; Laird et al., 2017; Louie et al., 2014; McCarthy et al., 2017; Ojeda et al., 2021; Rabiei et al., 2021; A. Rouf et al., 2019; Schiano et al., 2020).

The most common reasons for consumption and non-consumption of dairy products are individual-related, such as liking, disliking, and personal experiences (Cardello et al., 2024; Danby, 2005; Juhl et al., 2018; Markovic et al., 2019; Morelli & Vitale, 2020; Ojeda et al., 2021; Palacios et al., 2009; Recio-Román et al., 2020). Negative experiences and the association of these with dairy consumption, for instance, acne, may lead individuals to reduce dairy consumption (Danby, 2005; Juhl et al., 2018; Markovic et al., 2019). Similarly, limiting dairy may be due to experiencing lactose intolerance and its troublesome symptoms such as diarrhoea and bloating (Morelli & Vitale, 2020; Palacios et al., 2009; Pei et al., 2017; A. Rouf et al., 2019). The great tendency for self-diagnosis leads people to limit the consumption of these products, although it is not recommended to avoid them all in the presence of lactose intolerance (Morelli & Vitale, 2020; Pei et al., 2017; Rozenberg et al., 2016). There are still some products, e.g., yoghurt, which have only traces of lactose and are therefore also suitable

for a population with lactose intolerance (Kok & Hutkins, 2018; Marco et al., 2017; Pei et al., 2017; Savaiano & Hutkins, 2021). Other myths or misbeliefs are popular among barriers to consumption: individuals reported reducing consumption of dairy products because they perceived them to be a threat to their health, e.g., bone health, or believed they could lead to an increase in body weight (S. Allen et al., 2018; Racey et al., 2017; Rozenberg et al., 2016). However, many studies report health benefits as an actual facilitator to consumption (Jung et al., 2015; Laila et al., 2021; Laird et al., 2017; Nolan-Clark et al., 2011). Knowledge, beliefs, and food literacy can be barriers or facilitators based on an individuals' dietary awareness (Albano, 2022; S. Allen et al., 2018; Buttriss, 1997; Kuźniar et al., 2021; Lake et al., 2004; Y. Lee et al., 2022; Rabiei et al., 2021; A. Rouf et al., 2019), confirming the fact that the same reasons may change role, i.e., facilitators vs barriers, depending on the individual and context (Rabiei et al., 2021).

Alongside reasons that differ from one individual to another, also socio-cultural factors can play a role in higher or lower dairy consumption. Family, friends, and colleagues' food choices can lead to consuming or not a particular category of foods (Cardel et al., 2020; Cruwys et al., 2015; Deliens et al., 2014; Lacroix et al., 2016). Contexts of consumption, e.g., in a meal vs by itself, can also be influenced by social interferences (Cruwys et al., 2015; Douglas, 1972; Rauber et al., 2022), as well as household patterns (Laila et al., 2021; Pettinger et al., 2006). Food also can serve as a medium to amplify the sense of belonging to a group, whether social, cultural, or religious (D'Haene et al., 2019; Firat & Kutucuo, 2013; Rappoport, 2003; Scarpi, 2005). Some social groups have food practices, sometimes taboos, sometimes simple traditional occasions of eating a specific food on holidays, which reinforce the sense of belonging to a certain community and its identity (Douglas, 1972; Frez-Muñoz et al., 2021; Harris, 1998; Mahi, 2013; Pieniak et al., 2009; Reddy & van Dam, 2020; Rozin, 2005; Rozin et al., 2002; Trichopoulou et al., 2007).

Consumers are nowadays facing new challenges, e.g., sustainability, and their dietary choices may change accordingly (Cardello et al., 2022; Clay et al., 2020; Drewnowski, 2018; Merlino et al., 2022; Schiano et al., 2020). While dairy consumption fits vegetarian diets (Weaver, 2009), consumers are also increasingly developing an interest in PBDA (Adamczyk et al., 2022; Cardello et al., 2022; Clegg et al., 2021; Paul et al., 2020; Schiano et al., 2020). The market for these products is expanding, and other phenomena are emerging. On the one hand, the proposal of local or organic products, and on the other hand, commercial desertification outside of urban areas (Furey et al., 2001; Fusté-Forné, 2021; Merlino et al., 2022). These factors may indeed have an impact on reshaping purchasing behaviours, along with a higher availability of products from other regions and countries that may lead to trying new products too (Ohlan, 2014).

It is good to remember that people do not eat only for reasons of physical hunger and nutritional needs. Some of them may change their food choices out of convenience, for instance, the presence of a specific food at home (Cruwys et al., 2015). Studies suggest that food insecurity strongly impacts food choices (Mintz & Du Bois, 2002), and may lead to also experiencing emotional hunger and eating out of stress, for comfort, or as a reward (Finch & Tomiyama, 2015; Hu & Min, 2022; Jiang et al., 2021; Locher et al., 2005, 2005; Tomiyama et al., 2015; Varela et al., 2022; Weltens et al., 2014). The concepts of comfort food, pleasure, and hedonic eating, most commonly associated with the consumption of sweets or palatable snacks, have also been linked to the consumption of dairy products (Comer, 2015; De Cock, 2017; Hu & Min, 2022).

1.1.4. Research gaps

Despite all the benefits, healthy dairy consumption has been decreasing (Casini et al., 2015; Dubuisson et al., 2010; European Dairy Association, 2021; Kapaj, 2018; Stewart et al., 2012; Zingone et al., 2017). For instance, in France, in 2016, less than 50% of adults consumed milk every day (Charby et al., 2017). Alongside the decrease in healthy dairy intakes, the consumption of dairy fat increases (IDF Communications, 2018; OECD/FAO, 2024).

Low intakes of soft dairy impact all adults, but particularly young adults, who are also notably impacted by other poor dietary choices (Betts et al., 1997; Casini et al., 2015; Deliens et al., 2014; Hebden et al., 2015; Howse et al., 2018; Pendergast et al., 2016; Poobalan et al., 2014; Winpenny et al., 2018). Many reasons for consumption and non-consumption have been already found and investigated to explore dairy intakes (Cardel et al., 2020; Cardello et al., 2022, 2024; Lacroix et al., 2016; Merlino et al., 2022; Naspetti et al., 2021; Palacios et al., 2009; Racey et al., 2017; A. S. Rouf et al., 2018; Schiano et al., 2020), however, these are often investigated by focusing on a single dairy category, e.g., milk, without considering other counterparts in the same studies, e.g., milk vs yoghurt, while the same factor may change role not only based on different individuals but also the different food items. As individuals have their preferences and experiences (Cardello et al., 2024), each dairy product has as well its own properties and can be consumed in different manners and meals according to its sensory profile, and these all impact eating patterns (Chinea et al., 2020; Holm et al., 2019; Kant, 2018). Investigating all dairy together can aid in defining to what extent a particular dairy item can substitute or be substituted by another dairy product, and why.

Studies have also explored these in different target populations and countries. However, young adults are not a popular target (Moffitt et al., 2017). More studies tend to focus on children and adolescents still in schools or the elderly (Laila et al., 2021; Laird et al., 2017;

Moffitt et al., 2017; Racey et al., 2017; Sipple et al., 2020). Young adults are a difficult population because they face new challenges, however, it is becoming more and more necessary to invert the consumption trend, considering that dairy consumption can have not only a positive impact on their actual health (Hirahatake et al., 2020; Lovegrove & Hobbs, 2016; Timon et al., 2020) but also decreasing their risk of developing metabolic disorders, osteoporosis, sarcopenia, and other diseases that notably affect the health system (Das et al., 2023; Stroud et al., 2015; Yackobovitch-Gavan et al., 2017; Yeung et al., 2021).

It is remarkable to note that even countries with a strong national food identity (Frez-Muñoz et al., 2021; Trichopoulou et al., 2007) and with milk production among the highest in the world (European Commission, 2023; Ueberoi, 2021) suffer from this drop in consumption. While in some countries, e.g., developing countries, dairy consumption may still be limited simply because of the scarcity of milking animals, low genetic tolerance to lactose, or other socio-cultural related aspects (Faye & Konuspayeva, 2012; Frez-Muñoz et al., 2021; Hodgson, 1979; Lad et al., 2017; Prentice, 2014; Raynal-Ljutovac et al., 2008; Weltgesundheitsorganisation & FAO, 2011), countries such as France or the UK have always boasted of dairy consumption in their food culture (Delfosse, 2012a; Fumey, 2012; Mintz & Du Bois, 2002), and at the moment they are suffering a decrease in consumption (European Dairy Association, 2021; Our World in Data, 2025). Cross-cultural research may aid in identifying both common and country-specific features that impact food consumption, leading to a better understanding of consumers' behaviours and patterns, while enabling the development of tailored strategies that could maximise results (Brislin, 1983).

1.1.5. Aims

Considering the research background and identified gaps, this PhD project aimed to:

- Identify and explore reasons for consumption and non-consumption of soft dairy products among a target population of young adults aged between 18 and 30 years old and living in the UK and France, to also identify and explore similarities and differences between these two countries.
- Develop and test strategies to boost healthy soft dairy consumption among the target population in the target countries, directly addressing barriers to consumption and/or promoting facilitators found to play a role in facilitating intakes.

The recruitment process in this project focused on having a balanced sample of students and non-students. Many past studies have focused on university students while investigating barriers and facilitators to consumption (Aceijas et al., 2017; Betts et al., 1997; Deliens et al.,

2016; Hebden et al., 2015; Howse et al., 2018; Sprake et al., 2018), however, both students and non-students should be taken into account to shape more effective strategies to improve lifestyles among this target population. No additional segmentation, i.e., by gender, was considered, and the sample was considered in its totality. When the project was developed and the target population was chosen, this decision was made, expecting the whole target population to provide interesting considerations without additional segmentation.

1.1.6. Studies

This research project was based on a bottom-up approach (Trichopoulos et al., 2000). Four studies were planned. The first three studies aimed to explore dairy consumption, particularly soft dairy consumption, to allow a comprehensive identification of the reasons for the consumption and non-consumption of soft dairy products, and give a deep and accurate insight into the consumption of these and the other products included in the broad group of dairy products. Other common categories of dairy, e.g., hard cheese, dairy-based desserts, were included to consider when, why, and how soft dairy could replace or be replaced by other dairy products. The results of these first three studies were intended to allow the development of a strategy to be tested in the fourth study, with the specific aim of promoting the consumption of healthy soft dairy products. The development of a real-life intervention study based on the results of the previous studies allows the consideration of the factors in their actual role as barriers or facilitators to consumption, and to interface them with a strategy created accordingly to reduce their effects or, on the contrary, to maximize them (Dogherty & Estabrooks, 2015; Michie et al., 2011). Each study, integrated into this research perspective, had specific aims:

- Study one:
 - Identify and explore reasons for consumption and non-consumption of a wide range of dairy products, including soft dairy products, among the target population of young adults living in the UK and France
 - Identify and explore relationships between different dairy products, including soft dairy, and how these are perceived among consumers and non-consumers, e.g., alternatives.
- Study two:
 - Investigate in a wider sample of young adults living in the UK and France reasons for consumption and non-consumption of soft dairy products.
 - Investigate the frequency and contexts of consumption of soft dairy products.
- Study three:

- Investigate dairy intakes in terms of quantity and potential eating patterns, i.e., how and when soft dairy was consumed, in a population sample.
- Study four:
 - Develop and test a strategy aimed at changing soft dairy consumption among the target population.

The order of these studies was also considered and structured, as the results of the first are necessary to develop the second; and the results and considerations arising from the first three studies were intended to allow the development of a strategy to be tested in the last one. Specifically, themes and sub-themes from study one were used to develop an online questionnaire investigating attitudes towards consumption and non-consumption of soft dairy in a bigger sample (Study two). Study two also included a set of questions on frequency and contexts of consumption, which were also investigated in Study three. No data were collected about intakes in the first two studies, as their main aim was exploring reasons for (non)consumption, regardless of intakes. Intakes and eating patterns were explored in Study three. Study four was expected to be developed by combining the results of these three studies. However, for reasons that will be discussed further in Chapter 5, not only were the results of study two not yet analysed at the time of study four's development, but data collection was still ongoing, thus no preliminary results were ready. Other results were used as planned.

Due to time and resource limitations, studies three and four were conducted considering only French samples. Despite these limitations, their protocols have been developed to be replicated in one or the other country, i.e., the UK. However, all studies were intended to stand-alone, offering unique insights into dairy consumption in the UK and in France.

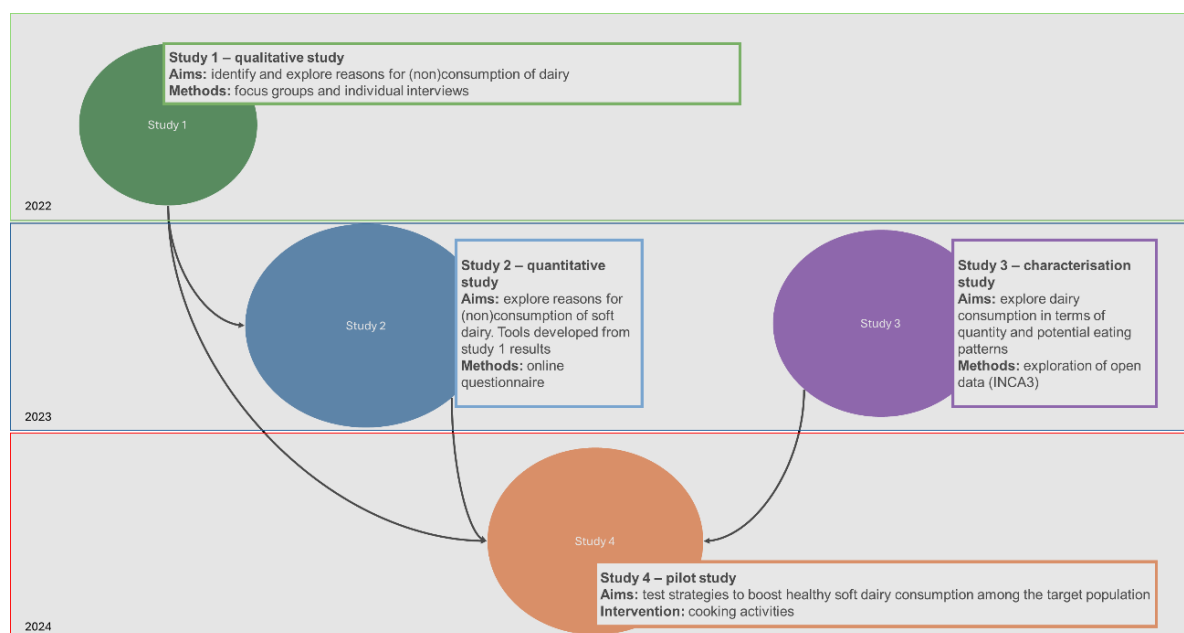
Figure 1.1 shows the original structure of this PhD, while Figure 1.2 shows the final structure that was put in place for this project.

1.1.7. A collaborative project

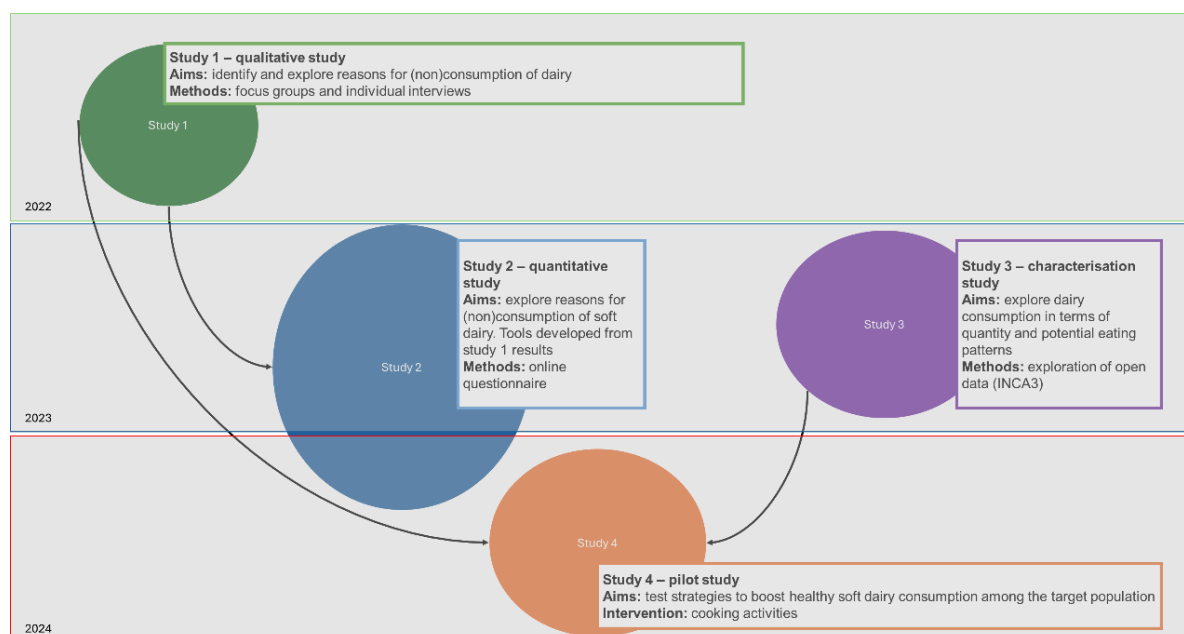
This PhD project was partly funded by Bournemouth University, UK, the Research and Innovation Center of the Institut LYFE, located in Ecully, France, and Danone S.A., a company with a product portfolio that includes dairy products. Danone S.A. had no role in the design of the study, or the collection, analysis, or interpretation of data.

Figure 1. 1.

Original structure of this PhD. Studies 1-3 were planned to be conducted before study 4 and help in developing a strategy aiming at increasing soft dairy consumption.

**Figure 1. 2.**

Final plan. Studies 1 and 3 were used to develop study 4, whereas study 2 was still ongoing.



Collaborative research may indeed have a role in developing and conducting more effective studies (Dooley & Kirk, 2007; Lind et al., 2013; Perkmann & Walsh, 2007), allowing people of different expertise to enhance strengths and reduce gaps (Dooley & Kirk, 2007; Lind et al., 2013; Perkmann & Walsh, 2007). In cross-cultural research, having research partners in the country or topic of interest is indeed favourable (Ember & Ember, 2002; Ho, 2009; Nelson & Baumgarte, 2004), while reducing misunderstanding due to different languages, perspectives, or contexts (Ember & Ember, 2002; Ho, 2009; Kandiko & Kinchin, 2012; Nelson & Baumgarte, 2004).

Studies one and two were conducted in both the UK, in English, and France, in French. Study one, focus groups and individual interviews, took place at Bournemouth University, and the Research and Innovation Center of the Institut LYFE; study two was held online. Study four was developed with the help of two expert chefs working in the innovation hub of the Research and Innovation Center of the Institut LYFE, where it also took place.

1.2. Thesis structure

This chapter has contextualised the present research project, giving an insight into the research gaps and aims. The planned studies and their specific objectives have been defined and justified. Four chapters will follow, each focusing on one study, and a further chapter focusing on integration and discussion of the main findings.

Chapters 2-5 will describe in detail all the four studies conducted during this PhD. All of them will be described one by one in aims, methods, and results. A short introduction will open each chapter to contextualise the study in the overall research project. A specific discussion of findings will close each chapter, also giving insight into limitations, challenges, and future research. The discussion at the end of these chapters is intended to discuss each study's results only. Short references and links to other studies are expected, but only to contextualise them in the research project.

Chapter 6 will summarize the studies and findings of this PhD before integrating and discussing all results together, in the wider context of the entire research project. All findings will be discussed together to have a better understanding of the actual research context, disclose novelties, and strengths, address limitations and challenges, and give insight into future perspectives.

2. Chapter Two: A qualitative study to explore reasons for consumption and non-consumption of dairy products and PBDA

2.1. Introduction

The previous chapter describes the structure of this PhD and the context in which this project was developed and conducted. Studies already conducted proved the importance of consuming soft dairy products to maintain a healthy and environmentally friendly diet (Berners-Lee et al., 2012; Hobbs et al., 2020; Thorning et al., 2016; van de Kamp et al., 2018), and some highlighted that the intake of these foods is lower than recommended in several countries and populations, but particularly among individuals aged between 18- and 30 years old (Comerford et al., 2021; European Dairy Association, 2021; Louie et al., 2014). Recent studies investigating eating behaviours found many facilitators and barriers impacting diets, including dairy consumption. These factors may be personal, socio-economic, related to culture, or even to market availability (Appleton, 2016; Cardel et al., 2020; Laila et al., 2021; Rabiei et al., 2021; Racey et al., 2017; Snuggs et al., 2022). However, studies assessing attitudes towards dairy consumption often focused on one category of dairy, e.g., yoghurt, or product, e.g., cow's milk (Juhl et al., 2018; Kouvelioti et al., 2017; Savaiano & Hutkins, 2021), limiting findings to that specific food, reducing possibilities of generalising specific features common to more than one product in the same dairy category or failing to consider potential differences between them. Dairy is indeed a big food group, including products that differ in raw ingredients, process of production, sensory characteristics, e.g., taste, and manners of consumption (Almena-Aliste & Mietton, 2017; Bylund, 1995; Ojeda et al., 2021). Although the project's main aim was to increase consumption of healthy soft dairy, these considerations led to the need to identify and explore reasons for consumption and non-consumption of a wide range of dairy products belonging to different dairy categories, e.g., milk, yoghurt, fermented dairy, cheeses, dairy-based desserts. Exploring these together also helps to develop other considerations that may be valuable in planning a real-life study. For instance, how do consumers swap dairy products and substitute one for another? This, and other practical considerations may aid the development of effective strategies that promote the consumption of specific products or categories.

Qualitative assessments are common methods in behavioural and social sciences (Yilmaz, 2013), as they allow participants to articulate their opinions (Kruger et al., 2019; Taherdoost, 2022), and to collect details about their experiences (Kruger et al., 2019; Taherdoost, 2022) as fast, easy to organise, informal discussions (Acocella, 2012).

During focus groups, the interaction between participants may play a role in helping initiate conversations and exploring topics from different points of view (Acocella, 2012), and individual interviews may help participants open up about more sensitive topics (Kruger et al., 2019; Tong et al., 2007). Conducting a study including both focus groups and individual interviews has many strengths. First, topics may be discussed differently depending on the presence or absence of other people in the debate (Acocella, 2012; Kruger et al., 2019; Tong et al., 2007; Yilmaz, 2013). In both settings, the researcher can ask for more details and explore further all topics (Taherdoost, 2022). Homogeneity in discussed topics can be ensured using the same moderator guide as a guideline (Acocella, 2012; Taherdoost, 2022). While focus groups are indeed a fast method to collect many different data, they tend to last longer than individual interviews and require multiple participants at the same time (Lambert & Loiselle, 2008). Considering these aspects, both focus groups and individual interviews were conducted with the aim of exploiting the potential of these two qualitative research tools.

2.2. Aims of the study

This study aimed to identify and explore reasons for consumption and non-consumption of a wide range of dairy products and explore potential similarities and differences between the UK and France. This study does not focus on actual intakes of dairy products, however, as the concept of consumption is closely linked to intakes, reasons for higher, lower, or modified intakes have been discussed, with no formal reference to quantities. Intakes were not considered determinant in the exploration of reasons for consumption and non-consumption. Reasons for consumption and non-consumption were explored and discussed among participants, regardless of whether they were discussing consumed or non-consumed dairy categories. Furthermore, the aim was not only to identify facilitators to consumption, but also barriers that may lead to not consuming dairy products.

2.3. Methods

Focus groups and individual interviews were conducted in the UK and France, according to the guidelines laid down in the Declaration of Helsinki, and all procedures involving human subjects were approved by the Research Ethics Committee of Bournemouth

University, UK (ID: 43726, Appendix 2.1). Written informed consent was obtained from all participants (Appendix 2.2).

All focus groups and individual interviews were audio-recorded and conducted by the same person (C.F.), in the language spoken in the country. They took place in the UK at Bournemouth University, and in France at the Research & Innovation Center of the Institut Lyfe in Ecully. All focus groups and individual interviews were conducted in quiet rooms used for the study only, to avoid any interferences or noisy spaces where the participants might not feel able to focus or comfortable to express their own opinion. At the beginning of each session, the principal investigator explained to participants that the purpose of the focus group or individual interview was to hear and discuss their experiences and opinions and assure them that there were no good or wrong answers. During each focus group and individual interview, the participants had the opportunity to taste local English and French cow's and goat's cheeses, with bread, crackers, and fruits, and they had access to water, tea, and coffee during all the sessions. This tasting session was not mandatory and had no impact on the study per se; it was intended to help generate a debate on the products. All participants were able to withdraw before or during the focus groups and individual interviews, but not after the end of these. No personal information, such as name, and/or surname were asked or registered, making recognition impossible, given the need to keep participants anonymous in the various steps of data collection and analyses. Moreover, removing participants from a discussion group could be problematic, especially if their intervention has generated a debate in which other voices have joined.

If participants were not available for focus groups, they were rescheduled for an individual interview to limit the risk of loss in recruited participants, especially in France, where recruitment appeared more challenging. They could select the day and the time of the session, and for focus groups, they could decide to take part in same-sex focus groups or mixed ones. It has already been proven that different degrees of disclosure may be achieved depending on how much participants feel comfortable during the discussion (Kruger et al., 2019; Lambert & Loiselle, 2008), and that being in a same-sex group may help in reducing discomfort and led participants opening up while discussing personal experiences.

2.3.1. Topics

All focus groups and individual interviews were conducted following the same moderator guide (Appendix 2.3). The moderator guide was structured to ensure participants were

given the widest opportunity to explain their opinions about a topic or a product. The structure and the types of questions were adjusted after a pilot session with English speakers. The piloted session took place in the UK before the start of the recruitment to ensure all topics would be discussed and to have a general idea of timing. The role of the moderator guide was to ensure all topics were discussed; however, the order of the topics was not fixed, and it changed as dictated by the conversation. Participants were asked about their daily consumption and reasons for consumption and non-consumption of a wide range of dairy foods, including cow's and non-cattle products, i.e., milk, yoghurt, yoghurt to drink, cultured milks and other fermented dairy, dairy-based desserts, soft cheese, cream cheese, hard cheese. Due to the increasing interest in plant-based dairy alternatives (Adamczyk et al., 2022), participants debated also about plant-based milks, yoghurts, cheeses, and desserts. Other topics were discussed to explore the (non)consumption of local and organic dairy products, and eventually, participants were asked to think about reasons that could impact their consumption in the future, that may lead them to an increase or decrease of their dairy intake.

2.3.2. Participants

Participants were admitted to the study if they were aged between 18 and 30 years old, living in the country in which the focus group or individual interview would have taken place, and spoke the country's language fluently. People following a vegan diet were not considered eligible to take part in the study. No other dietary or lifestyle factors were assessed. All participants had to express their written consent before starting the focus group or the individual interview. Each participant took part in one focus group or one individual interview only.

2.3.3. Recruitment

Participants taking part in the focus groups and individual interviews were recruited using the same recruitment scheme, through the Bournemouth University SciTech and Psychology newsletters, Lyfe's internal newsletters, social media, flyers, or snowball sampling. Students enrolled in Psychology at Bournemouth University were recruited via SONA, an online platform managing participants pool for universities, and received SONA credits as reimbursement for their participation. No similar scheme was in use in France at the time of the study. Due to recruitment limitations, participants recruited in

later months received a £10 (15€) gift voucher to be compensated for their time. No information about the reimbursement was provided during the recruitment process.

2.3.4. Data analyses

All focus groups and individual interviews were conducted, audio-recorded, and transcribed by the principal investigator. They were coded following the thematic analysis process described in Braun & Clarke, using a data-driven approach (Braun & Clarke, 2006). This process includes six steps: (1) familiarization with the data collected; (2) coding; (3) creation of themes from the codes; (4) creation of a thematic map, links between themes and codes and between themes and all data; (5) creation of names and definitions to clarify each theme; and (6) writing a report (Braun & Clarke, 2006).

Focus groups' scripts were coded by two researchers: the principal investigator, who also collected all data, a researcher native in English for the focus groups that took place in the UK, and a researcher native in French for the focus groups that took place in France. Researchers coded all the scripts individually on Microsoft Word. They read the scripts to familiarise themselves with the data and then labelled each reason for (non)consumption with a code of one or two words. All codes were generated from the data. All codes were discussed between the two researchers involved in coding, upon agreement. After the end of the coding process for focus groups, the same procedure was used to code all individual interviews. These were coded only by the principal investigator. However, the same codes arose from the data.

Once all the scripts were coded, the principal investigator grouped the codes into themes and sub-themes. Each code was included in one theme and sub-theme only. A visual map (Figure 2.1) was generated, showing themes, sub-themes, and links between them. To avoid overlapping between themes and sub-themes, the principal investigator created definitions for each theme and sub-theme and discussed these with another researcher. Eventually, a report describing all these was written and discussed among all researchers engaged in the project.

2.3.5. Reflexivity

Three female researchers were directly involved in this study. The principal investigator conducted all the focus groups and individual interviews, transcribed them, and coded them all. Two other researchers were involved in coding focus groups in their native

languages, to reduce misunderstanding and misinterpretation since the principal investigator is not a native speaker of English or French. One of the two researchers was also involved in discussing themes, sub-themes, and their definitions.

Two of the three researchers have a background in psychology and all three work on nutrition-related topics. All of them include dairy foods in their diet; one of them is lactose intolerant. All these elements might have impacted the analysis process. However, double coding was performed to avoid or limit the risk of personal interpretation of the data (Belotto, 2018; He & Schonlau, 2020; Raskind et al., 2019).

2.4. Results and Discussion

In each country, four focus groups lasting between 60 and 90 minutes were conducted between May and September 2022. Each focus group was organised as follows: one was mixed-gender and mixed employment status; one was mixed-gender only students; one for females only, and one for only male participants. In both the UK and France, seven individual interviews lasting between 20 and 30 minutes were conducted between May and September 2022.

2.4.1. Sample

A total of forty-five young adults took part in the study (UK=22). Thirty-one took part in focus groups, while the remaining participated in individual interviews. Table 2.1 shows the demographic details of the two samples, as an entire population that took part in the study and per method.

Table 2. 1.

Sample's main demographic characteristics for the entire sample, and per focus groups and individual interviews. Percentages are computed based on the total number of participants of each method and country.

		UK	France
ENTIRE SAMPLE	Total number of participants	22	23
	Average age [years old]	25.4	23.05
	Females (N, %)	14 (62%)	14 (60.8%)
	Students (N, %)	11 (50%)	12 (52%)
	Employed (N, %)	11 (50%)	8 (34.7%)
	Unemployed and looking for a job	0	3 (13%)
FOCUS GROUPS	Total number of participants	15	16
	Average age [years old]	22.7	24.1
	Females (N, %)	8 (53.3%)	8 (50%)
	Students (N, %)	11 (73.3%)	7 (43.75%)
	Employed (N, %)	4 (26%)	7 (43.75%)
INDIVIDUAL INTERVIEWS	Total number of participants	7	7
	Average age [years old]	28.1	22
	Females (N, %)	6 (85.7%)	6 (85.7%)
	Students (N, %)	0	5 (71.4%)
	Employed (N, %)	7 (100%)	1 (14.2%)

2.4.2. Reasons for consumption and non-consumption

The thematic analysis found four themes and sixteen sub-themes impacting dairy consumption and non-consumption in both the UK and France. A seventeenth sub-theme seemed to impact dairy consumption in France only. The themes and the sub-themes are shown in Figure 2.1 and defined in Table 2.2.

All themes and sub-themes are intended with the same degree of influence, as they all seemed to have an impact on participants' dairy (non)consumption. They were defined with an independent neutral valence, and they may assume a positive or negative valence depending on the single participant, food, and topic. Even if independent, themes and sub-themes may be related to each other.

Figure 2. 1.

Thematic visual map showing reasons for dairy consumption, themes, and sub-themes found to impact dairy consumption.

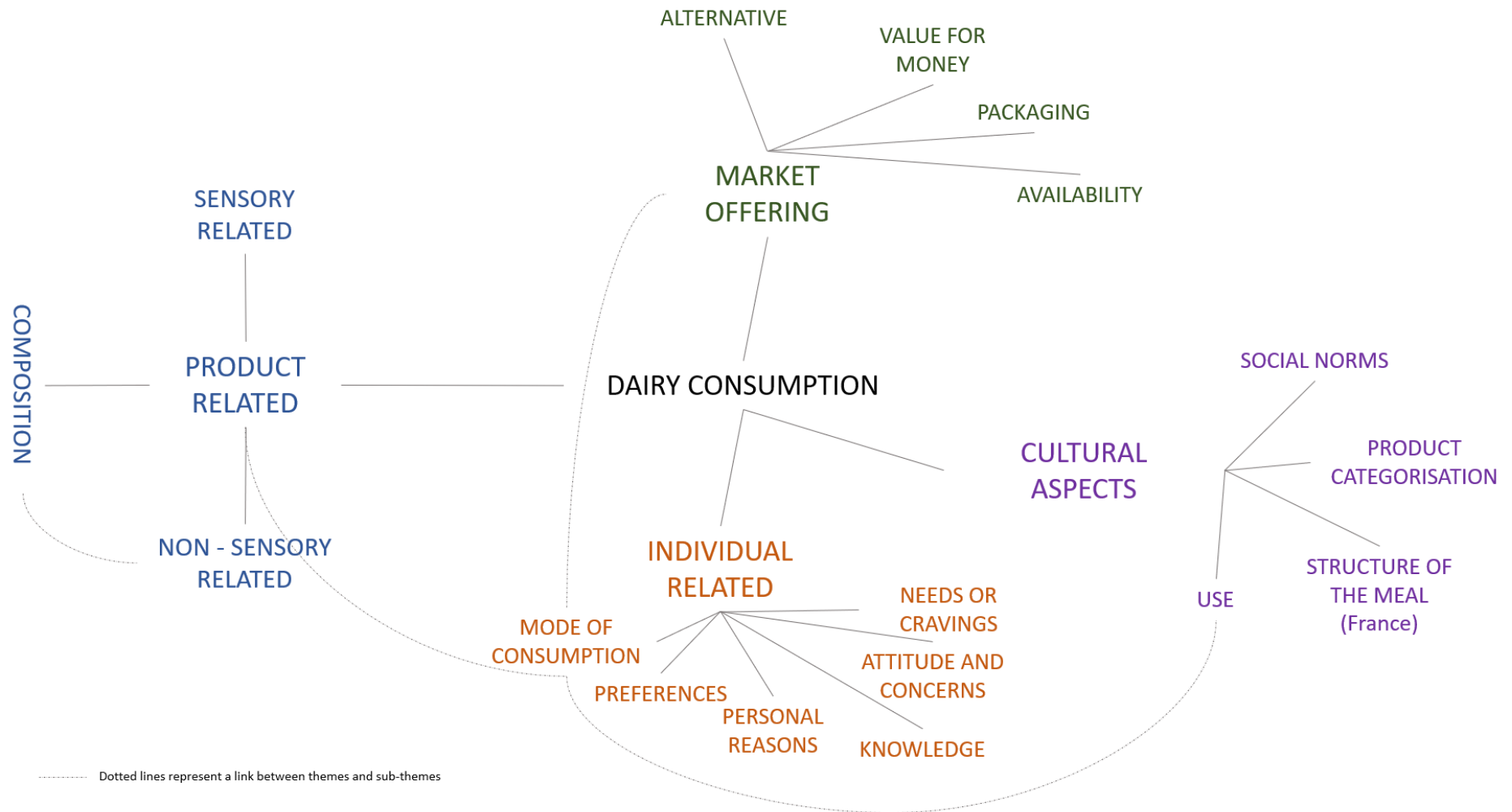


Table 2. 2.

Themes (in bold and capital letters) and sub-themes (in italics) and their definition, with an example quote. The order is not meant to be considered as ranking or level of importance. Each participant was given an identification code based on the country in which they were taking part in the study, the method of assessment, i.e., focus group or individual interview, and a number, e.g., UKFG1P1.

Themes and sub-themes	Definitions
PRODUCT RELATED	This theme includes all codes that refer to attributes of a product per se.
Sensory	<i>Sensory qualities of a product: taste, texture, smell.</i> “‘Well, let's say... the texture is a bit thicker, and a small aroma, a bit of taste...” (FRFG3P3, about yoghurt to drink)
Composition	<i>Ingredients and nutritional compounds.</i> <i>Nutritional composition, while not necessarily influencing sensory-related aspects, does influence claims and other non-sensory qualities of the product.</i> “‘It is a good source of calcium, isn't it?” (UKFG2P4, about yoghurt)
Non-sensory	<i>Nutritional claims, origin, process of production, degree of versatility, and all non-sensory related characteristics.</i> “‘It's like obviously, milk is like not processed (...) whereas like cheese I'd imagine to be like more processed.” (UKFG1P6, about cheese)
INDIVIDUAL RELATED	This theme includes six sub-themes. It includes all codes that refer to attributes related to each participant that differ from one individual to another, are personal, and may be unique for each participant.
Mode of consumption	<i>All possible ways to consume a dairy product, e.g., on its own, in a recipe, as a snack, or during a meal.</i> “‘It is good in pasta dishes, and everything else, you can use it with whatever the food (...) or alone with a piece of bread or without” (FR1I3, about semi-hard cheese)
Preferences	<i>Personal preferences (i.e., liking, disliking).</i> “‘I don't like cottage cheese. It's too lumpy. (...) I'm just 'No, I do not want to put that in my mouth” (UK1I1, about cottage cheese)
Personal reasons	<i>Personal experiences, habits, health (e.g., allergies, lactose intolerance, acne).</i> “‘I do not drink it anymore because it makes me sick.” (FRFG2P3, about milk)
Knowledge	<i>All kinds of knowledge and assumptions a person has about dairy products that may influence their intake.</i>

	“Well, I do not know if this is true, but what I know is that everyone keeps telling me that milk fortifies bones... it fortifies the body, and I consume it every day, since I do sports, and it helps.” (FRFG3P2, about milk)
Attitudes and concerns	<i>Attitudes towards consumption and health, ethics, animal, or environmental concerns (e.g., exploitation, sustainability).</i> “So, although it says plant-based, it’s not necessarily more environmentally friendly.” (UKFG4P5, about plant-based dairy alternatives)
Needs or cravings	<i>Consumption for health (needs) vs. consumption for pleasure.</i> “I started drinking milk again, I cannot say I drink it every day, but when I feel as I miss it, I drink a glass of it” (FRFGP3, about cow’s milk)
CULTURAL ASPECTS	This theme includes all codes that refer to attributes related to the cultural or social background, including traditional customs. The fourth sub-theme, structure of the meal, has been found to impact intakes only among French participants.
Product categorization	<i>How dairy products are classified or grouped based on their use or nutritional aspects (e.g., protein content).</i> “Generally speaking, I categorize “cheese” and “meat”, so I cannot substitute them. It is not logical to swap a piece of meat with a piece of cheese for me” (FRFG3P3, about cheese)
Social norms	<i>Peers and family influence.</i> “I do it just to be fancy, like... I do just to be fancy in front of my friends.” (UKFG3P3, about soft cheese)
Use	<i>Dairy is consumed because of traditions or cultural customs.</i> “Yes, yes, yes. We have it and it is traditional to consume it with some specific dishes” (FRFG2P5, about fermented dairy)
Structure of the meal (Found only in France)	<i>The course of the meal during which dairy products, and particularly cheese, should be eaten. French participants refer to cheese as part of the meal, when consumed as part of a dish, and as dessert when consumed with bread, with fruits, with jam, or alone at the end of the meal.</i> “The cheese, in a dish of pasta or as dessert.” (FRFG3P4, about cheese)
MARKET OFFERING	This theme includes all codes that refer to attributes related to dairy market supply.
Availability	<i>Presence of dairy products in the shops.</i>

	“Still, if I can find it in a supermarket, I can have it. But it’s not very common, I think. And I haven’t seen in any supermarket.” (UKII4, about goat’s milk)
Alternatives	<i>Possibility of substituting other products with dairy or dairy with similar dairy products.</i> “You can’t taste difference really? Can you, between adding yoghurt and adding like cream, blindly do, or can you? I don’t know. I think it does the same job” (UKFG3P3, about cream)
Value for money	<i>All aspects related to price, including the concept of cost-efficiency, as a relationship between the price, the value of the product in terms of quality, quantity, or utility, and the potential for waste.</i> “I buy them as like this is great saving money” (UKFG2P3, about yoghurt)
Packaging	<i>Packaging, portion size, shelf-life.</i> <i>Participants justified their (non)purchasing behaviours with packaging-related reasons. Often, they seemed reluctant to buy big packages of yoghurt or new cheeses, to avoid food waste.</i> “Also don’t like how it says consumed in three days because I’m not going to eat the whole yoghurt in like three days you know (...) So saying that you have to keep consuming it for three days, it kind of stops me from buying it. (...) Because it’s just you. You’d be like, you can’t finish all that food, you can’t!” (UKFG2P4, about yoghurt)

2.4.3. Reasons for general dairy consumption

Product-related aspects were found to impact dairy consumption among participants in both countries. As already discussed, dairy is a wide food group and includes products that may undergo different production processes, may differ in taste, appearance, smell, and texture, and may be consumed differently, in manners and contexts (Almena-Aliste & Miettton, 2017; Bylund, 1995; Ojeda et al., 2021), and the influence of product-related aspects was expected in both countries. For instance, *sensory-related* factors, i.e., intrinsic attributes of each single product, seemed to impact dairy consumption among the participants of this study in both countries. Each dairy food has its sensory attributes, that make it different not only from products belonging to another category of dairy, e.g., milk vs cheese (“*There is something about the milk, the fact that is liquid, more than juice, but creamier than water...*”, *FRII3* vs “*Blue cheese is strong*”, *UKFG4P4*), but also from products within the same category, e.g., goat’s cheese vs cow’s cheese (“*You can really taste the goat, it is stronger*

than cow's cheese", FRII5). All organoleptic characteristics, i.e., taste, colour and other visual characteristics, smell, texture, tactile experiences, and sounds, have already been found to influence dairy consumption among the target population and across all life (Cardello et al., 2024; Palacios et al., 2009; Paul et al., 2020). Alongside sensorial aspects, participants discussed dairy's *composition*, i.e., ingredients. In fact, for some of them consuming dairy is good for humans because of its composition (*"I don't think if it was not for the protein, I would really consume it [yoghurt] that much, to be honest"*, UKFG3P2), and this was related also to nutritional claims and health benefits (Bimbo, 2017; Oostenbach et al., 2019). This was also already debated in recent studies, alongside the concepts of naturalness and processed foods (Jung et al., 2015; Lacroix et al., 2016; Sari Agricultural Sciences and Natural Resources University, Iran et al., 2019; Varela et al., 2022). *Non-sensory* related aspects were also discussed, including the degree of versatility. This factor, already explored in other similar studies (Laila et al., 2021; Racey et al., 2017), seems to be linked to product composition, and has an impact on dairy intakes, as a product with a higher degree of versatility may be consumed in different manners and contexts (Duncan, 1998; Pulina et al., 2018), thus increasing opportunities for consumption.

Individual-related factors that may impact dairy consumption were debated. This theme not only discerns further similarities and differences between the two countries but also highlights what may be individual experiences or personal factors that impact consumption differently. The sub-theme *mode of consumption* refers to the manner and context of dairy intake and appears to be linked to the degree of versatility of the products. Dairy products could be consumed warm, or cold (*"I like goat cheese because I can eat it cold in salad or warm on bread"*, FRII3), at different time of the day (*"In the main meal, in the afternoon, in the evening I can take some yoghurt"*, UKII2), or with different foods (*"Sometimes I'll have home mixed Greek yoghurt [...] that is like an alternative to like mayonnaise. When I want something a bit creamy with the meal, sometimes I have like spicy chicken and rice, and then I add Greek yoghurt to make it a bit cooler."*, UKFG3P3). *Personal preferences*, i.e., liking vs disliking, and *personal reasons*, e.g., negative vs positive childhood memories, lactose sensitivity, body symptoms as nausea or acne, also had a role in dairy consumption among the participants of this study. Studies suggest that personal preferences, personal experiences, and product-related aspects may not only impact food acceptability but also perceived quality (King et al., 2007; Ojeda et al., 2021; Vargas-Bello-Pérez et al., 2022). *Knowledge, attitudes, and concerns* were also discussed. Particularly, participants in both countries debated whether adults should consume or not consume dairy (*"You hear things, don't you?, about dairy being not good for you, and you shouldn't have too many things that come from cows. It's not... too great to have them, and I thought, you know what? Let me*

just switch and try.", UKFG3P2; *"I feel like, at least in France, it is not recommended to consume dairy. This makes me feel guilty, as I believe I must take responsibility over my food choices, but I feel as I should restrain myself, but I eat more dairy than what is probably good"*, FRFG1P6). Not all of them agreed; some argued that dairy consumption could be harmful, as dairy foods are notably fattier than other products, and this would negatively impact health (*"I would like to add something about this [...] it is not like kids, we do not need to consume dairy as adults. in fact, it can cause calcifications in the bones in the joints, so it's not necessarily good indeed, but you always need to get some calcium right? That's... it's inevitable, but it's also because it brought saturated fatty acids and among the saturated fatty acids, trans fatty acids."*, FRFG1P4). Other studies recently explored these aspects too (Adamczyk et al., 2022; Chollet et al., 2014; Lacroix et al., 2016; Racey et al., 2017; Rouf et al., 2018). This misconception may be related to beliefs that blame whole-fat foods, including dairy, for cardiovascular and other metabolic diseases, since they are high in saturated fat (Givens, 2010). However, recent cohort studies have emphasised a beneficial relationship between dairy intake, body weight, and overall health (Dougkas et al., 2011; Hobbs et al., 2020; Lovegrove & Givens, 2016; Lovegrove & Hobbs, 2016). Moreover, others highlighted the necessity of reconsidering the way we look at food, suggesting we consider it as a complex matrix, in which every single component interacts with the other components, impacting above all the digestion and the absorption of micro- and macro-nutrients, e.g., saturated fats, vitamins, minerals (Givens, 2010; King et al., 2007; Lovegrove & Givens, 2016; Mozaffarian, 2019). While some participants suggested that dairy consumption is not optimal for human health, others, particularly in France, disagreed and expressed doubts about intake or being compliant with recommendations (*"I try to not abuse, I already consume two to three dairy products per day [...] and dietary recommendations suggest consuming two dairy per day, at least in France, it was three and now it seems to me that it is about two."*, FGFR2P3), confirming the fact that guidelines may be misinterpreted and not perceived clearly (Leme et al., 2021).

Knowledge, attitudes, and concerns also included discussions about the impact of dairy consumption on the environment and animals (*"And I've seen documentaries about dairy farming as well. And it sort of put me off a bit about how the cows are treated"*, UKFG3P2). In both the UK and France, participants seemed to be aware that a lifestyle change is needed, but most of them were unsure about dairy intake, wondering whether the intake should be limited or avoided to achieve more sustainable diets. Some participants, especially in France, argued that buying local products could, in addition to being a support for small and medium-sized enterprises, ease the consequences of unrestrained mass production, preferring more environmentally friendly products. In this regard, in both

countries, some suggest that local products have a more natural taste and a higher quality. This seems to reflect other research on this topic (Askegaard & Madsen, 1998; Merlino et al., 2022). While an increasing number of consumers are redirecting their attention from animal-based to plant-based products (Adamczyk et al., 2022), increasing studies have investigated this transition in terms of new products, sensory perception, and attitudes toward sustainability (Adamczyk et al., 2022; Drigon et al., 2023; Guyomarc'h et al., 2021). Sometimes consumers justify their change in diets as due to environmental concerns (Brščić, 2020), and they did this as well in this study. However, some participants in the UK reported that they could avoid milk for sustainability reasons but continue to consume yoghurt despite everything (*"So I have milk but oat milk. I consume quite a lot of yoghurt, [...], Greek [animal-based] yoghurt.... contradictory, right?"*, UKFG3P2). This seems in line with some studies reporting that the main reasons for reducing dairy and substituting them with PBDA are more related to sensory aspects and pleasure, rather than to engage in more sustainable lifestyles (Adamczyk et al., 2022; Racey et al., 2017; Varela et al., 2022). Moreover, it is possible to engage in more environmentally friendly diets without completely removing dairy, as its production is notably more sustainable than meat, and has a lower impact on GHGE than other animal-based products (Berners-Lee et al., 2012; Fresán & Sabaté, 2019; Gaillac & Marbach, 2021; Gerber & Food and Agriculture Organization of the United Nations, 2013; Hobbs et al., 2020; C. Reynolds, 2018; Sandström et al., 2018; van de Kamp et al., 2018). Rising awareness among consumers and boosting health literacy seem to be fundamental to addressing these barriers to consumption, allowing individuals to engage in more sustainable and healthier lifestyles while improving the use of resources in the food system (Brščić, 2020; Gerber & Food and Agriculture Organization of the United Nations, 2013; Leme et al., 2021; Santé publique France, 2019b). As mentioned just above, consumers are notably driven by pleasure-oriented eating experiences (Adamczyk et al., 2022; Hu & Min, 2022; Racey et al., 2017; Varela et al., 2022). Participants in this study also discussed the fact that people do not eat only for living, but also out of enjoyment, and this is what the sub-theme *needs or cravings* refers to - the duality of eating for need vs eating for pleasure. In this scenario, dairy consumption is experienced as an occasion of indulgence and hedonic eating; and some participants admitted that they are eating dairy almost until experiencing negative body symptoms (*"I just feel really bad after like, even now [after tasting cheeses] I'm like... sick, like you said, I still eat it because I say 'Okay, it still tastes nice'"*, UKFG2P5). This appears to be in line with the findings of another study exploring dairy consumption among adolescents, in which participants discussed their control over consumption (Racey et al., 2017). In fact, like many other products, dairy may be consumed as comfort food: as a treat or a reward or coping mechanism (Finch & Tomiyama, 2015; Locher et al., 2005; Tomiyama et al., 2015).

The third theme, cultural aspects, includes all codes related to cultural or social backgrounds, and all are external to the individual *per se*. France and the UK have a long and homogenous culture of dairy production and consumption (European Commission, 2023; Germov & Williams, 1999), but the aspects considered in this topic can also vary based on aspects such as belonging to a community or religion (Almerico, 2014; Mintz & Du Bois, 2002). *Product categorisation* was discussed and refers predominantly to two arguments: the categorisation of dairy products within and without the dairy category. In both the UK and France, some participants do not consider all dairy products to be the same and refer to some of them as “fake dairy”, e.g., vegan cheese, *Laughing Cow*® (Groupe Bel, Leitchfield, USA). Alongside this, particularly in France, dairy foods tended to be considered as different from other protein-rich foods, e.g., eggs, and tofu, and this makes them unsuitable for substitution within a meal. Categorisation has already been investigated, and studies suggest that people categorise food based on its origin and production (Chollet et al., 2022; Varela et al., 2022) and their cultural backgrounds (Larson & Story, 2009; Rozin et al., 2002), which may justify some differences between the two countries. The sub-theme *social norms* refers to the social interactions with family members, peers, and colleagues that seemed to impact the sample’s dairy intake. Social norms seemed to have the power to both encourage and discourage consumption among the participants, depending on the interactions (*“My partner’s parents always put on like a cheese board when we go over there [...] sometimes the people will bring their own cheeses and it’s like, then you get to try some new.”*, UKI11; *“I consume PBDA vanilla flavoured milk, as my mom does not like milk... but I personally love the taste of fresh [animal-based] milk but, whatever.”*, FRII4; *“Because that’s what my parents consume, I got used to it. [...] So perhaps it’s going to be the same for the vegan products.”*, UKI13). *Use* refers to the context of consumption that is due to food customs (*“Yes, yes, yes. We do consume [cultured milks] with specific dishes. Let’s say, two or three times per month. I love to consume it but only in these circumstances”*, FRFG2P5) and, notably, may differ from one country to another, and from one group to another (Larson & Story, 2009). Customs, religion, and social norms have been shown to impact food choices, context, and mode of consumption of foods, as much as individual factors (Cruwys et al., 2015; Ojeda et al., 2021). The sub-theme *structure of the meal* is the only sub-theme that seemed to only impact participants living in France, particularly in relation to cheese intake (*“We are really attached to our meals, I think we are the only country... or maybe not. However, we can have it [cheese] alone, or with wine, at the end of the meal, it is still part of the main meal”*, FRFG1P6; *“Oh, I love it [brie] at the end of my meals. With a piece of bread.”*, FRII3). For instance, in France, cheese is often consumed at the end of a meal (Poulain, 2002), whereas in other countries it may be more frequent at other times of the day, e.g., breakfast (Fagt et al., 2018; Holm et al., 2019; Visser,

2017). The moment of the day in which food is or is not consumed and meal rituals are strongly related to food cultures (Douglas, 1972; Visser, 2017), which is the case for dairy and particularly cheese (Delfosse, 2012a; Poulain, 2002). Eating cheese at the end of the meal may be a legacy of past customs and traditions, for instance, the *service à la française*, popular in France and Europe in the eighteenth century, when diners would end their meals eating cheeses (Gray, 2010; Harding, 2021; Visser, 2017). Moreover, when and how these foods are eaten seemed to be formerly recognised and shared by all participants, and this may confirm that French food traditions are socially recognised in the country (Germov & Williams, 1999).

Participants discussed also aspects related to the market offering and their purchasing behaviours. This theme refers to aspects that may not only differ from country to country, but also to purchase-related behaviours that are defined by a series of dynamics that are also affected by the marketing strategies of each brand (Baca & Reshidi, 2025; De Hooge, 2025; Sardar & Vijay, 2025). *Availability* and *alternative* have already been reported as determinants impacting food choices (Larson & Story, 2009; Merlino et al., 2022). While some participants admitted purchasing foods always from the same store, so that if they did not find a product, they would simply not consume it, others explained that the presence of similar dairy in the store led them to still consume dairy products, even when they did not find exactly what they were looking for. Moreover, most of the participants justified their purchasing behaviours based on the concept of *value for money* (*"It is all about cost-convenience"*, UKII1). This sub-theme refers to the fact that participants in both countries admitted buying dairy products based on the ratio between price and quality or convenience. Market prices seemed to be an important factor as these were often associated with a potential reason to increase or decrease dairy consumption, respectively if prices fall or rise. However, a recent study seems to suggest that diets rich in dairy intakes are tendentially cheaper than diets low in dairy, not to mention the benefits that dairy intake has on the health of the consumer (Hobbs et al., 2020). *Packaging* also was found to impact dairy consumption in the sample, particularly pack size. In the UK particularly, participants debated and admitted they try to reduce or avoid purchasing big portions of dairy if they are not sure they will consume it all before the expiration date, and this is to avoid food waste (*"I'd like to try but I don't want to buy because it is a little bit... big amounts are... I don't want to waste."*, UKII2). Household waste has indeed a role in food waste and GHG emissions (Brennan et al., 2023; C. Reynolds, 2018). Moreover, participants began to pay attention also to the material of the containers, e.g., plastic, and prefer more sustainable containers, e.g., paper. Market offerings should reconsider selling smaller containers made

of biodegradable materials (Galić et al., 2019; C. Reynolds, 2018), with the double aim of reducing food waste and plastic waste.

2.4.4. Considerations on reasons for soft dairy consumption specifically

As already mentioned, the focus of this PhD is to identify, investigate, and address barriers and facilitators for soft dairy consumption. Soft dairy consumption has been shown to be beneficial for human health at a lower cost and to have a lower impact on the environment and GHGE (Drewnowski, 2018; Fresán & Sabaté, 2019; Givens, 2010; Hobbs et al., 2020; Lovegrove & Givens, 2016; van de Kamp et al., 2018). A recent study shows people may reduce food impacts on the environment and engage in sustainable actions by taking small steps, for instance reducing meat consumption and increasing soft dairy consumption (Guy et al., 2024).

Milk seems to be the most consumed dairy product in Europe, and it is not uncommon to hear people refer to it as the “wholesome complete food”, due to its composition (Jung et al., 2015; Paul et al., 2020). It is also the dairy product with the highest number of plant-based and mixed alternatives on the market (Drigon et al., 2023; Guyomarc’h et al., 2021; Paul et al., 2020). In this sample, participants consuming milk admitted being driven by its taste and habits, but some of them, particularly in France, reported not knowing how much they should consume based on the national recommendations and Nutri-Score, a nutritional label based on an algorithm grouping foods based on their nutritional contents. Its 5-point scale goes from “A” (dark green), meaning the food item has the best nutritional value, to “E” (red), meaning the food item has the worst nutritional value (Hercberg et al., 2022). Recently, this nutritional label underwent an updating process while data were collected for this study, and milk was downgraded from A to B or C depending on its fat content (Lejeune, 2023; Merz et al., 2024). This will possibly lead to a further decrease in milk consumption in the next few years. Milk non-consumption was mostly associated with lactose sensitivity and intolerance, which led some participants to limit or avoid its intake. The fear of experiencing digestive complications and abdominal pain due to milk ingestion may lead people to not consume it at all, even though not all adults develop intolerance and, for the majority of people experiencing lactose sensitivity, the consumption of small quantities is to be considered as safe (Silanikove et al., 2015). Moreover, a general decline in the quantity of consumption has been observed and explored (Chollet et al., 2014; Stewart et al., 2012), and one of the most important drivers of this has been identified as health-related concerns (Chollet et al., 2014), as was also reported in this study.

Alongside milk, yoghurt and soft cheese were products consumed by the majority of participants in both countries. They are versatile, as they can be consumed in savoury, neutral, and sweet dishes, and yoghurt may be purchased in spoonable or drinkable formats, and be consumed in different contexts or moments of the day, e.g., at home vs at work, meal vs snack; while soft cheese is available in products that meet different preferences and contextual needs, and was reportedly consumed as comfort food, based on its sensory and non-sensory characteristics, e.g., cream cheese, blue cheese (Almena-Aliste & Mietton, 2017; Ojeda et al., 2021). Yoghurt seemed to be the most appreciated product among participants of this study, even more than milk. In the soft dairy category, it is the most protein-rich product, and it is suitable for people with lactose intolerance (Rizzoli, 2014; Savaiano & Hutkins, 2021). Some kinds of fresh yoghurt have even been shown to improve lactose intolerance, depending on the bacteria used in the production (Savaiano & Hutkins, 2021).

It is interesting to note that while yoghurt appeared to be appreciated by the sample and one of the most consumed soft dairy products, other fermented dairy, e.g., cultured milks, quark, and cottage cheese, were described as “lumpy” and “disgusting”, even if their production processes and raw materials are often the same as yoghurts, at least industrial ones (Savaiano & Hutkins, 2021; Yuzbashian et al., 2021). It seemed also that participants in both countries were less likely to try this category of soft dairy, and this may be because they had never been exposed to them before (Harris, 1998; Siegrist et al., 2013). Fermented dairy products, particularly cultured milks, have been linked to positive health outputs and, above all enhanced sports recovery and glucose metabolism (Farag et al., 2020; Kok & Hutkins, 2018; Marco et al., 2017), but in the UK and France, they are not traditionally consumed and uncommon in shops.

2.4.5. Implications and imitations

This study aimed to identify and explore reasons for consumption and non-consumption of dairy products, alongside exploring potential similarities and differences between the two target countries. Four themes were found to impact consumption in both countries, suggesting that similar determinants may have an influence on dairy consumption. The results of this study could not be generalised as the sample size was small, but still, they could aid in developing more consumer-centred strategies or studies. For instance, producers should consider selling different portion sizes of products or working on more informative labels. A better labelling system or clearer advice on serving sizes seems required to avoid misunderstanding of the current dietary guidelines, particularly in France.

Studies aiming at recruiting a bigger sample of participants in one or both countries may be developed from this study too, to test how specific determinants impact consumption and use results to maximise tailored strategies aiming at either boosting consumption of healthy dairy products or decreasing consumption of dairy products rich in fats or sugars.

To explain their point of view and experiences, participants reported their frequency of consumption and portion sizes, however, these were not explored in detail, and no information was asked about the actual quantity consumed. This is indeed a strong limitation as, first, what may be considered a small intake for someone could be a normal or big portion for someone else; secondly, frequency and quantity are not directly related dimensions, for instance, someone could consume dairy more frequently than someone else and still consume very little dairy compared to the daily recommended intake. Finally, collecting quantity in intakes would have made it possible to make more appropriate comments on the reduction of consumption and compliance or non-compliance with food recommendations of the two countries considered.

2.5. Conclusions

Four themes and sixteen sub-themes were found to impact dairy consumption among young adults in the UK and France, and a seventeenth sub-theme seemed to influence only participants in France. The comparison of the two countries provided interesting observations. Firstly, participants in both countries seemed to be driven by liking and personal experiences while consuming dairy, and they also appeared not particularly enthusiastic about consuming fermented dairy products. While the discussion on recommendations is common among French participants, it seems that although these recommendations represent a well-known guideline, participants are not sure how to behave to comply with them. In the UK sample the reference to them is made in a less structured way. In both countries, environmental and animal sustainability issues were discussed and articulated according to their background; with differences on some focal points, for example considerations about local dairy and plant-based products, portion sizes, or food waste. An immediate difference could be found in the presence of the sub-theme *structure of the meal*, which seems to only affect the sample of participants in France. However, the sample size was limited, and a deeper investigation was needed. For this reason, once identified, reasons for (non)consumption were used to develop an online questionnaire aiming to explore these in a larger sample in the UK and France, focusing on soft dairy foods and trying to assess facilitators and barriers to the consumption of less frequently consumed soft dairy products.

Take home message

Aim of the study	Identify and explore reasons for consumption and non-consumption of cow's and non-cattle's dairy products, i.e., milk, yoghurt, yoghurt to drink, cultured milks and other fermented dairy, dairy-based desserts, soft cheese, cream cheese, hard cheese, and PBDA.
Methodology	Qualitative
Methods	Focus groups and individual interviews
Eligibility criteria	Being aged 18-30 years old; living in the UK or France; speaking the country's language fluently; not being vegan. Written consent was required before the start of the focus group/interview.
Data collection	All focus groups and interviews have been audio-recorded. All of them were conducted following the same moderator guide to cover the same topics.
Data analyses	Thematic analysis, data-driven approach, following Braun & Clarke (2006). Focus groups were all double-coded. Individual interviews were single-coded by the principal investigator after all focus groups were coded.
Participants	Forty-five (UK=22) participants took part in the study. Twenty-nine of them were in the UK (individual interviews, n=7), and twenty-three in France (individual interviews, n=7).
Results	Four themes and sixteen sub-themes were found to impact dairy consumption in both countries (theme product-related: sub-themes sensory, non-sensory, composition; theme individual-related: sub-themes mode of consumption, preferences, personal reasons, knowledge, attitudes and concerns, needs or cravings; theme cultural aspects: sub-themes product categorization, social norms, use; theme market offering: sub-themes alternative, packaging, value for money, availability). A seventeenth sub-theme (theme cultural aspects: sub-theme structure of the meal) seems to impact dairy consumption, especially cheese consumption, only among French participants.
Next steps	Once identified reasons for (non)consumption of soft dairy and other dairy products, a quantitative study (study 2, Chapter 3) has been developed to explore these in a larger sample of young adults in the two countries. These factors have also been used and considered while developing a real-life interventional study (study 4, Chapter 5).

3. Chapter Three: A quantitative study. An online questionnaire to explore soft dairy consumption and attitudes towards least consumed products.

3.1. Introduction

The previous study (Chapter 2) aimed to identify reasons for consumption and non-consumption of a wide range of dairy products among young adults living in the UK and France and explore similarities and differences between the two countries. Qualitative methods are commonly used in behavioural and social sciences (Yilmaz, 2013). They do not require special settings, they are easy to plan, and they are inexpensive (Acocella, 2012), and while needing some arrangements, such as an impartial investigator, the entire discussion is flexible and the moderator guide can be used to ensure all topics are discussed (Acocella, 2012; Taherdoost, 2022). In focus groups, interactions between participants may be an opportunity to stimulate debate and discussion (Acocella, 2012), helping the researchers to explore data in depth and ask for more details directly during data collection (Kruger et al., 2019; Taherdoost, 2022). However, both focus groups and individual interviews have some limitations. Firstly, the design of the study may have an impact on the results; secondly, data collected in groups may differ from data collected during individual interviews, due to interactions between participants (Acocella, 2012; Kruger et al., 2019; Yilmaz, 2013), and feel less free to talk (Kruger et al., 2019). Qualitative studies may be criticised as they are developed on non-standardised procedures and strongly linked to contexts that always need to be considered when looking at results (Yilmaz, 2013). The sample size is based on the concept of saturation (Fugard & Potts, 2015; Hennink et al., 2019; Vasileiou et al., 2018), but in general due to the time-consuming data collection and analysis, qualitative studies tend to have smaller sample sizes than quantitative ones, leading to difficulties in generalising findings in the general population (Taherdoost, 2022). Even when double-coded, personal interpretation of involved researchers may impact results, increasing risks of misinterpretation (Taherdoost, 2022).

For these reasons, the findings from the previous study have been used to develop an online questionnaire aiming at exploring all sub-themes in a general population of the target age and countries. Quantitative studies are, in fact, more likely to be developed starting from validated tools, categories, or scales, in which participants' personal experiences need to fit (Yilmaz, 2013). A questionnaire study, while limiting the expression of individual opinions, will eventually allow us to generalise the results to a whole population (Taherdoost, 2022), particularly as the sample size is usually bigger than qualitative studies (Taherdoost, 2022), and analysed through statistical (and objective) methods (Taherdoost, 2022; Yilmaz, 2013). Furthermore, online questionnaires can be run at the same time in the UK and France, but compared to a

qualitative study, the data collection is less time-consuming and respondents can fill it in independently from the time or the place, reaching potential participants living across a wider geographic range (Van Selm & Jankowski, 2006). These studies are also available to participants who could not take part in real-life studies, for whatever reason (Van Selm & Jankowski, 2006), including those who live in rural or remote areas or live in lower socio-economic conditions.

While the previous study focused on attitudes towards consumption and non-consumption of a range of dairy and PBDA products, this study tried to assess attitudes towards soft dairy products, particularly least consumed soft dairy products, alongside frequency and contexts of consumption. This study was intended to help in developing an intervention that targets items that were not already consumed daily and to consider targeting the potential contexts and barriers that seemed to be determinants for low consumption. This design seems to be rare in the literature, in which online surveys, as it happened for qualitative studies as well, are more likely to focus on one product or one category of products, usually the most common one (Juhl et al., 2018; Kouvelioti et al., 2017; Savaiano & Hutkins, 2021).

The structure and the content of this study were directly developed based on the results of the previous study, while also addressing the focus on soft dairy, as these products were the main target of this PhD project. Along with the least consumed soft dairy foods, PBDA were also explored. While PBDA could not be considered as dairy products because of their different raw ingredients and process of production (Weltgesundheitsorganisation & FAO, 2011), they are consumed in the same contexts and modes (Chollet et al., 2022), that some participants may indeed consider them as such. To avoid misleading, and still have a comprehensive idea of consumption, this category was included too.

3.2. Aims of the study

This study aimed to explore in a bigger sample of young adults aged 18-30 years old living in the UK and France dairy consumption:

- i. reasons for consumption and non-consumption of least consumed soft dairy products, i.e., milk, yoghurt and fermented dairy, soft cheese, hard cheese
- ii. contexts of consumption of least consumed soft dairy and hard cheese
- iii. frequency of consumption of soft dairy, hard cheese, other dairy-based products, e.g., dairy-based desserts
- iv. reasons for consumption of local and organic dairy products
- v. reasons for voluntary changes in dairy consumption (past and next six months)

- vi. reasons for consumption and non-consumption of most consumed PBDA categories
- vii. contexts of consumption of most consumed PBDA categories
- viii. frequency of consumption of PBDA
- ix. common reasons for non-consumption of non-consumed dairy and/or PBDA categories
- x. possible relationship between frequency of consumption and demographic factors, e.g., gender, and other factors, e.g., seasonality.

3.3. Methods

3.3.1. Study design

3.3.1.1. General details

This study was approved by the Research Ethics Committee of Bournemouth University, UK (ID: 46697, Appendix 3.1), and collected data in the UK and France. Before collecting any data participants read the information sheet and gave consent (Appendix 3.2) This questionnaire was divided into three main sections: a. dairy consumption; b. PBDA; c. demographics. Section a. dairy consumption includes six sub-sections: 1. milk, 2. yoghurt and fermented dairy, 3. cheese (both hard and soft), 4. frequency of other dairy consumption, 5. reasons for local and organic consumption, 6. reasons for voluntary changes in consumption. All sub-sections in section a. were structured so that all questions and answers were displayed in the same order. Sections a. and b. were organised similarly: all the questions about a specific category of foods were the same and asked in the same order; all statements that participants could choose or had to evaluate were also presented to them in the same order. Questions are summarised in Table 3.1, the study flow is shown in Figure 3.1, and the complete questionnaire is available in Appendix 3.3.

Question sections were developed to focus on the consumption of least consumed products. The first question (A) was added to separate actual consumers from non-consumers. Participants who did not consume dairy were still asked to select the three main reasons why (B) before being redirected to the following section. Participants reporting consumption of dairy products and PBDA were answering questions about frequency (C) and contexts (D) of consumption, which were developed from the results of the previous study, utilising established methods. However, the main section of questions (E) focused on attitudes towards consumption and non-consumption. This section was developed using themes and sub-

themes found to impact consumption in Study one, and discussed in Chapter 2.5, such that each theme and sub-theme was represented in the questionnaire below.

The only difference between sections a., dairy consumption, and b., PBDA, was in the question related to the reasons for consumption. While for dairy products participants were asked to choose among a list of products the one that they consumed the least, for PBDA they were asked to choose the most consumed one. PBDA products are indeed a different category of foods, and not a main focus of this PhD. However, studies recently focused on this category and similarities were seen with dairy consumption, e.g., contexts of consumption (Adamczyk et al., 2022; Chollet et al., 2022). The general idea was to investigate attitudes towards the category, without the second aim of addressing barriers to increase its consumption.

Table 3. 1.*Questionnaire's sections and sub-sections.*

Section	Sub-section	Questions
Dairy consumption (a)	1. Milk 2. yoghurt and fermented dairy 3. cheese	A. Do you consume "category"? Yes/No B. If no: select the main three reasons why / If yes: frequency of consumption of a list of products in the "category" C. Select the least consumed product in the category. D. Frequency of consumption of the chosen product in different sets and contexts E. Evaluate statements about attitudes toward consumption of the chosen product.
	4. other dairy	Frequency of consumption
	5. local, organic consumption	A. Do you consume "local"/"organic"? Yes/No B. Select the main reasons why
	6. voluntary changes in consumption	A. Did/Will your consumption change in the past/next 6 months? Yes/No B. If yes: select the main reasons why
PBDA (b)	1. PBDA	A. Do you consume "category"? Yes/No B. If no: select the main three reasons why / If yes: frequency of consumption of a list of products in the "category" C. Select the most consumed product in the category. D. Frequency of consumption of the chosen product in different sets and contexts E. Evaluate statements about attitudes toward consumption
Demographics (c)		Gender, age, ethnicity, dimension of the city they lived in, weight and height (to calculate BMI), highest education, employment, living alone, eating alone, weekly budget, weekly food budget, holidays per year

All dairy categories reported a small description of the products to be considered, e.g., for soft cheese: not ripened, fresh. For all animal-based dairy, participants were asked to not consider PBDA when answering. Some products in the list reported examples to permit participants to identify the right type of products they should think about. These examples included branded items commercialised in the UK, France, or both countries. As fermented dairy appeared to be uncommon in the UK and France when this questionnaire was launched in early 2023, this category of dairy products was included in the yoghurt category, i.e., kefir, crème fraîche, *lait ribot*, and in the soft cheese, i.e., quark, *fromage blanc*, Petit Suisse. This would also be justified by the fact that the majority of commercialised products have similar production processes, using the same bacteria used in yoghurt lacto-fermentation (Savaiano & Hutkins, 2021), or the same texture and context of consumption (Bourlioux, 2007; Cesbron-Lavau et al., 2017; Charby et al., 2017). An “Other (please specify)” choice was added to all questions. Participants were able to type in and add a choice that in their opinion was missing from the lists of products, contexts of consumption, reasons for non-consumption, reasons for local and organic consumption and non-consumption, reasons for voluntary changes in consumption. No possibility of adding additional answers was given in the questionnaire exploring attitudes toward consumption.

The main aim of this questionnaire was to explore attitudes towards consumption of least consumed soft dairy products participants would consider consuming more, among the target age in the target countries. However, before being asked about soft cheese, participants were asked about hard cheese and other cheeses, i.e., smoked, with herbs and flowers. This question was added to avoid confusion in the soft cheese category and reduce the risk of participants including these cheeses in that category.

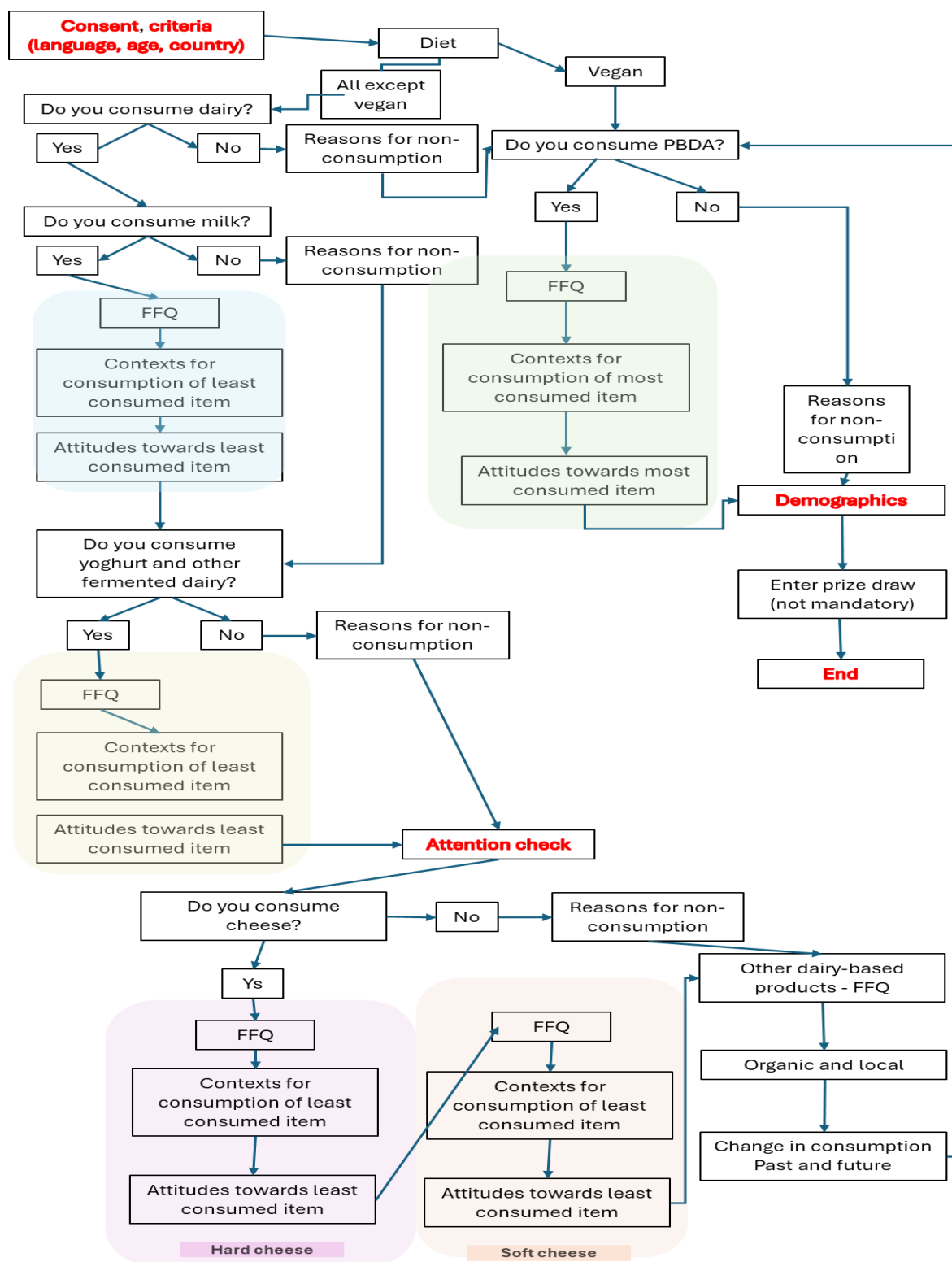
Participants answered all questions only for product categories they admitted to consuming. When they did not consume a certain category, they were redirected to a question exploring reasons for non-consumption, and then to the next product category as per Figure 3.1.

This questionnaire was scheduled to be accessible online for six months. A monthly number of participants, $n=100$, was set. Date of completion was considered as a variable to assess if seasonality was a predictor of consumption.

Before being launched, both English and French versions of this questionnaire underwent a piloting session. Two small samples of $n=10$ completed the questionnaire to check questions, answers, and flow and assess the average duration for completion.

Figure 3. 1.

Questionnaire's path and categories of dairy products that were investigated. Red questions were used to check eligibility and validity (attention check and internal consistency).



3.3.1.2. Food frequency questionnaires for frequency of consumption

Participants selecting 'yes' to consuming a certain category of dairy were asked about their frequency of consumption in the last three months of a list of products belonging to that category. The frequency of consumption questionnaire was developed from Food Frequency Questionnaire (FFQ), a type of questionnaire that is commonly used to explore how often products are consumed in a set time, e.g., day (Cade et al., 2002). The question and the scale have been reported in Table 3.2, and the list of products for each category is reported in Table 3.3. Participants had to answer for all products before proceeding to the next questionnaire.

Table 3. 2.

Food frequency questionnaire was used to explore the frequency of consumption of different dairy products. An “Other (please specify)” row was always left as a free text box at the end of each product category, and participants could type in a single product if they considered it missing from the list.

How often do you consume the following products?

Please consider your consumption in the last 3 months.

[illegible]

Table 3. 3.

List of products participants were asked about in the food frequency questionnaire.

Product category	List of products
<i>Milk</i>	Whole, full fat cow's milk, Semi-skimmed cow's milk, Skimmed cow's milk, Lactose-free milk, Goat's milk, Sheep's milk
<i>Yoghurt and fermented dairy</i>	Whole, full fat cow's yoghurt – flavoured, Whole, full fat cow's yoghurt – unflavoured, Low fat cow's yoghurt – flavoured, Low fat cow's yoghurt – unflavoured, 0% fat cow's yoghurt – flavoured, 0% fat cow's yoghurt – unflavoured, Goat's/sheep's yoghurt – flavoured, Goat's/sheep's yoghurt – unflavoured, Yoghurt to drink (e.g., Yop, Michel et Augustin) – flavoured, Yoghurt to drink with probiotics (e.g., Actimel, Yakult) – flavoured, Yoghurt to drink with probiotics (e.g., Actimel, Yakult) – unflavoured, Kefir – flavoured, Kefir – unflavoured, Crème fraîche, Buttermilk, Lait ribot
<i>Hard cheese and other cheeses</i>	Cow's semi-hard or hard cheese (e.g., Cheddar, Comte, Gouda, Gruyere, Parmigiano), Goat's semi-hard or hard cheese, Sheep's semi-hard or hard cheese, Blue cheese (e.g., Stilton, Fourme d'Ambert), Smoked cheese, Cheese with herbs, flowers or fruits (e.g., Gouda with cumin seeds, Wensleydale with apricots, Cheddar with mango, Alp blossom)
<i>Soft cheese</i>	Cottage cheese, Quark, Fromage blanc, Faisselle, Petit Suisse, Fresh cheese (e.g., Mozzarella, Feta, Paneer), Goat's fresh cheese, Sheep's fresh cheese, Moulded cheese (e.g., Brie, Camembert), Blue cheese (e.g., Roquefort, Gorgonzola, Bleu d'Auvergne), Cream cheese (e.g. Philadelphia, Boursin), Cheese spread, (e.g. Laughing cow, DairyLea, Kiri)
<i>Other dairy products</i>	Flavoured milk, Milkshakes, Frappé with milk, Lattes, Milk with syrups, Ice-cream, Frozen yoghurt, Pudding, Custard, Cheesecake, Other dairy desserts (e.g., dulce de leche, tiramisu), Whipped cream, Clotted cream, Sour cream, Condensed milk, Evaporated milk, Single and/or double cream, Milk powder, Whey

3.3.1.3. FFQ for contexts of consumption

Participants were then asked to select one of the products in the dairy category that they were not consuming daily but would be willing to consume more, before completing a FFQ for contexts of consumption (Table 3.4). They were not completing this for the “other dairy products” sub-sections. They had to answer for all products before proceeding to the next question.

Table 3. 4.

Question investigating contexts of consumption.

Considering the selected product, answer the next question ticking the appropriate box.

I consume this product:

	NEVER	RARELY	SOMETIMES	OFTEN	ALWAYS	N/A
On its own	☐	☐	☐	☐	☐	☐
With coffee, cocoa, or tea	☐	☐	☐	☐	☐	☐
With something else	☐	☐	☐	☐	☐	☐
During a main meal (breakfast, lunch, dinner)	☐	☐	☐	☐	☐	☐
Grated in a dish	☐	☐	☐	☐	☐	☐
As a snack	☐	☐	☐	☐	☐	☐
Before going to sleep	☐	☐	☐	☐	☐	☐
In cooking	☐	☐	☐	☐	☐	☐
On special occasions	☐	☐	☐	☐	☐	☐
When I am alone	☐	☐	☐	☐	☐	☐
When I am with someone else	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐

3.3.1.4. Attitudes towards consumption of least consumed dairy products

The last question of each product category aimed to investigate attitudes towards consumption of the selected product. Participants had a small reminder at the beginning of the questionnaire reporting which product they chose as least consumed. They were asked to evaluate 40 statements from strongly disagree (-2) to strongly agree (2), as reported in Table 3.5. These statements were developed from the themes and sub-themes previously found to impact dairy

and PBDA consumption and described in Chapter 2 in detail. Each sub-theme was used to develop at least two statements in two valances, positive and negative, so that participants had to express how much they agreed with one and its opposite, which are all reported in Table 3.6. To ensure statements covered all possible attitudes of interest, four sub-themes required more than two statements, i.e., personal reasons, knowledge, attitudes and concerns, and value for money. Participants have been asked to evaluate all statements before being redirected to the next product category. The statements were worded to fit whatever the product was previously chosen by participants and did not change in order or syntax.

Table 3. 5.

Structure for attitudes questionnaire. The scale went from strongly disagree (-2) to strongly agree (2).

	Strongly disagree	Moderately disagree	Neither agree nor disagree	Moderately agree	Strongly agree
(statement)	☐	☐	☐	☐	☐

Table 3. 6.

The forty statements evaluating attitudes towards consumption, and the corresponding theme and sub-theme, with the number of total statements in brackets. Participants answered a questionnaire structured as per Table 3.5.

Theme	Sub-theme	Positive statement	Negative statement
PRODUCT-RELATED	<i>Sensory</i> (1-2)	I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
	<i>Composition</i> (3-4)	It is natural	It is too processed
	<i>Non-sensory</i> (5-6)	Consuming it boosts my health	It is unhealthy
INDIVIDUAL-RELATED	<i>Mode of consumption</i> (7-8)	I can consume it on its own, in recipes or in combination with some foods	I cannot use this product in many ways
	<i>Preferences</i> (9-10)	I like this product	I do not enjoy consuming it

	<i>Personal reasons</i> (11-14)	I never experience body symptoms when consuming it I have always consumed this product	Body symptoms occur when I consume this product I did not consume it while growing up
	<i>Knowledge</i> (15-17)	It contributes to a balanced diet	As an adult, I do not need to consume it to be healthy Reducing its consumption will benefit my health
	<i>Attitudes and concerns</i> (18-21)	It is environmentally friendly It is animal friendly	It is not sustainable Reducing its consumption will benefit the environment
	<i>Needs or cravings</i> (22-23)	I consume it when I want to treat or reward myself	I would not consume it on special occasions
CULTURAL ASPECTS	<i>Structure of the meal</i> (24-25)	I would finish a meal with this product	This product is not suitable as the final course of a meal
	<i>Social norms</i> (26-27)	I consume it because of my family/friends	No one I know consumes this as I do
	<i>Use</i> (28-29)	It is common to consume it in my culture	It is unusual to consume this product in my culture
	<i>Categorisation</i> (30-31)	I consume it because it is a good source of protein	It is a totally different category of food from meat/eggs/tofu
MARKET OFFERING	<i>Availability</i> (32-33)	I can find it in the shops	It is not always available where I shop
	<i>Alternative</i> (34-35)	It is a good replacement for other foods	This cannot be used to replace other products
	<i>Value for money</i> (36-37)	It is worth the price	It is too expensive
	<i>Packaging</i> (38-40)	I can consume what I buy within the expiration date	It expires too quickly I often waste it

3.3.1.5. Reasons for consumption of organic and local dairy products

Alongside reasons for consumption of dairy products in general, a small set of questions has been asked to explore consumption of organic and local dairy products. Both these dimensions were explored in Study 1. All participants completing section a. were asked to answer these questions. Whether consuming or not organic or local products, they were asked to select why from a list of common reasons, i.e., taste, health, availability, cost, and no difference between the two. More than one answer was possible. They could add further details.

3.3.1.6. Reasons for voluntary changes in dairy consumption

Reasons for voluntary changes in consumption were investigated in Study 1, and participants completing the dairy section were also asked if they had changed their consumption in the past six months or would consider doing so in the next six months. Participants selecting yes were asked to select the main reasons why from a list of common reasons, i.e., diet-related reasons, health-related reasons, external reasons, cost, and sustainability. More than one answer was possible. They could add further details.

3.3.1.7. PBDA category

PBDA consumption was also explored. Participants were asked to answer questions about PBDA categories after they completed all the dairy sections or if they reported following a vegan diet. Firstly, they were asked to answer a FFQ, that differed from the dairy one because they were asked about PBDA categories instead of products for each category. PBDA was not the main focus of this research, but its exploration was considered still valuable when considering it as an alternative to dairy categories. The questionnaire structure is the same as dairy, as reported in Table 3.2. PBDA categories are reported in Table 3.7.

Table 3. 7.

List of PBDA categories that participants were asked to answer.

Product category	List of products
PBDA	Plant-based unflavoured milk, Plant-based flavoured milk, Plant-based unflavoured yoghurt, Plant-based flavoured yoghurt, Plant-based dairy dessert, Plant-based soft cheese, Plant-based hard or semi-hard cheese

After the FFQ, each of them was asked to select the most consumed PBDA category and to answer the same contexts of consumption questionnaire reported in Table 3.4. Lastly, they were asked to complete the questionnaire exploring attitudes towards consumption of the most consumed PBDA. This questionnaire was developed and structured as the dairy ones. Participants had a note at the beginning of each page reminding them which product category they selected as the most consumed PBDA category. The scale, from “Strongly disagree” (-2) to “Strongly agree” (+2), is the same as reported in Table 3.5, as well as the statements reported in Table 3.6.

3.3.1.8. Reasons for non-consumption of non-consumed categories

All participants had the opportunity to complete the questionnaire for the products they consumed. For products they reported to not consume, they were asked why, and to select the main three reasons why they did not consume that category of foods, i.e., milk, yoghurt and fermented dairy, cheese, PBDA. They were choosing among statements with negative direction developed from Study 1 and reported in Table 3.8 by sub-theme. A general statement about never tasting the product was also added, as participants could have different backgrounds, and in some of them, it might not be common to consume these products. Although identifying reasons for non-consumption of non-consumed products was not an aim of this study, participants were asked about three main reasons instead of one to have a better general idea of the dimension.

Table 3. 8.

Reasons for non-consumption. Participants were asked to select the three main reasons for non-consumption among them. The statement “I’ve never tested it” was added. Participants had a free text box at the end to add possible reasons that were not included in the list.

Why? Select the three main reasons and order them from 1 = most important, 2 = second most important, 3 = less important.

Theme	Sub-theme	Negative statement
PRODUCT-RELATED	Sensory	One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
	Composition	It is too processed
	Non-sensory	It is unhealthy
INDIVIDUAL-RELATED	Mode of consumption	I cannot use this product in many ways
	Preferences	I do not enjoy consuming it

	<i>Personal reasons</i>	Body symptoms occur when I consume this product I did not consume it while growing up I've never tasted it
	<i>Knowledge</i>	As an adult, I do not need to consume it to be healthy Reducing its consumption will benefit my health
	<i>Attitudes and concerns</i>	It is not sustainable Reducing its consumption will benefit the environment
	<i>Needs or cravings</i>	I would not consume it on special occasions
CULTURAL ASPECTS	<i>Structure of the meal</i>	This product is not suitable as the final course of a meal
	<i>Social norms</i>	No one I know consumes this as I do
	<i>Use</i>	It is unusual to consume this product in my culture
	<i>Categorisation</i>	It is a totally different category of food from meat/eggs/tofu
MARKET OFFERING	<i>Availability</i>	It is not always available where I shop
	<i>Alternative</i>	This cannot be used to replace other products
	<i>Value for money</i>	It is too expensive
	<i>Packaging</i>	It expires too quickly I often waste it

3.3.1.9. Demographics

Demographic factors, i.e., gender, age, ethnicity, dimension of the city they lived in, weight, height, highest education level completed, employment status, living alone or with children, eating alone, weekly budget, weekly food budget, holidays per year, were explored. Weight and height to compute BMI were asked of each participant in the last section of the questionnaire to ensure good strata and better describe the sample. Moreover, all demographic factors were used in the data analyses and tested as potential predictors. Demographics placement in a questionnaire is a debated topic (Green et al., 2000; Teclaw et al., 2012). In this questionnaire, demographics were asked at the end to maximise data collection of the main outcomes, i.e., dairy consumption and related attitudes, PBDA consumption, and related attitudes. Questionnaires completed voluntarily tend to encounter more drop out, particularly when longer than 100 items of content (Hoerger, 2010).

3.3.1.10. Eligibility criteria and diets

Before collecting any data, participants were required to read the information sheet and give consent to data collection and storage. They were able to withdraw at any time before and during the study, but not at its end, as each answer was collected anonymously. After giving

consent, they were redirected to the first three questions, investigating their eligibility to take part in the study. They were required to speak the questionnaire's language fluently (English or French), be aged between 18 and 30 years old, and live in the UK or France. The eligibility was assessed by the first three questions, i.e., "Are you fluent in English/French?" (depending on the country), "Are you aged between 18 and 30 years old included?", "Do you live in the UK/France?". No participant was admitted to the study when answering 'no' to one of these questions; they were automatically sent to the end of the study. The last question, i.e., "Do you live in the UK/France?", was also used as a consistency check. After eligibility questions, all participants were asked if following a specific diet; when selecting 'vegan', they were automatically redirected to the PBDA section. The study was entirely online, and no setting was required, except for asking participants to fill it in in one session.

3.3.1.11. Attention check

All participants completing section a. dairy consumption, went through an attention check, i.e., "Which one is a fruit?" with possible answers: "Caterpillar"; "Scissors"; "Melon"; "Armchair"; "Potato". Only one answer, i.e., "Melon", was correct. Attention checks are used to detect respondents who may answer automatically or in a rush, without reading attentively or spending adequate time on a question (Abbey & Meloy, 2017).

3.3.1.12. Languages

The questionnaire was developed in English and underwent a retro-translation process. It was translated into French by a researcher speaking both languages and retro-translated to English by a French native speaker. A final check was run by a native English speaker to ensure that the two versions (the original and the retro-translated version) were identical. English and French versions of the questionnaire were uploaded and available online on Qualtrics, an online platform hosting online questionnaires and studies. They were uploaded as two different questionnaires and had two different URLs. Participants were not able to change language and move from one to another.

3.3.1.13. Recruitment

Participants were recruited from February to July 2023 through social media, flyers, online posts, online recruitment platforms, and snowball sampling. The aim was to recruit 100 participants per month per country. To thank them for their time, at the end of the survey, participants could enter a prize draw to win gift vouchers, but entering the draw was not

mandatory. Participants entering the draw were asked to accept Bournemouth University rules for prize draws, otherwise, they could not enter it. Participants entering the draw knew that they would not have any other kind of reimbursement and that the prize could not be exchanged for money. Participants recruited via online recruitment platform providing some sort of payment, i.e., SONA and Prolific, were excluded from entering the prize draw. Students at Bournemouth University were recruited through SONA and paid in course credits and thus excluded from entering the prize draw. Due to recruitment limitations, 31% (n=188) of French participants were recruited through Prolific, an online platform that gives access to a wide number of potentially eligible participants. Respondents recruited via Prolific were excluded from entering the prize draw since they received a paid reimbursement for their participation in the study, following the website's rules, and after validation of the answers (prior check of attention or consistency checks and time of completion). The number of participants recruited on Prolific never exceeded 50% of the total monthly number of participants. To reach the number of recruited participants 100 each month, the questionnaire was re-opened in France in February and June 2024.

3.3.2. Analyses

3.3.2.1. Answers validation for data consistency

All questionnaires in both countries were checked for data consistency through different methods to ensure data quality (Abbey & Meloy, 2017). Answers were not considered for analyses when at least one of the following was true: failed attention check; failed consistency in country/city, i.e., reporting they lived in a country but then selecting a city that is in the other one; answering always the same or more than 50% the same two choices; questionnaires were completed too quickly (< 3 min/category) or too slowly (> 20 min/category). An average time of 7 minutes for each category was estimated before the launch of the study during the piloting phase, and all participants through the information sheet were required to complete the questionnaire in one sitting (no more than 2 hours).

3.3.2.2. Sample size and missing data

Both datasets were checked for missing data. Missing data were treated as missing completely at random when participants started the survey but dropped out and removed following a pairwise method, i.e., removing only missing data (blank cells), leading to a sample size that differs across variables. For analyses such as correlation and regression, analyses were conducted on full answers (no missing data) only.

3.3.2.3. Descriptive analyses

Descriptive analyses were run on Excel to explore the dataset. All answers were considered for each complete product section, even answers with uncompleted demographic characteristics. All variables were explored as absolute values (number of responses) and percentages. A frequency monthly score was calculated for the frequency of consumption per single product and dairy category. The score was mathematically computed as described in Table 3.9 by calculating how many days the products were consumed in a 30-day month. This score was calculated for each product and each category adding up all single products scores belonging to that category for all respondents reporting consumption of the category. A “times in a month” score was computed multiplying the scores by 30. Demographic variables were also explored to better describe the samples.

Table 3. 9.

Calculation for monthly score for frequencies of consumption.

Answers	Average days per month	Mathematic computation	Monthly score
Every day	30	30/30	1
3-5 times a week	4 days * 4 weeks	4*4/30	.533
1-2 times a week	1.5 days * 4 weeks	1.5*4/30	.2
1-2 times a fortnight	1.5 days * 2 weeks	1.5*2/30	.1
1-2 times a month	1.5 days	1.5/30	.05
Less than once a month	0.5 days	0.5/30	.0167
Never	0	0/30	0

3.3.2.4. Inferential analyses

Inferential analyses were run on IBM SPSS Statistics software, Version 28 for Windows (IBM Corp., Armonk, NY, USA) to test for differences between countries. All statistical analyses were performed with an accepted confidence level of $p < .05$.

Chi-square tested differences in consumption of each dairy and PBDA category, consumption of organic and local dairy products, and any changes in dairy consumption in the past and next six months. Only a Chi-square test has been run for cheese consumption, inclusive of hard and soft cheeses, as participants were asked about cheese consumption in general

before being asked for products of each of the two categories separately. A Welch ANOVA tested differences between countries in the average consumption of each dairy food category.

Three linear regression analyses were run for each product category on complete answers, i.e., answers with completed demographic section, testing predictors as summed up in Table 3.10. Firstly, a general linear regression was run for each product category, for a total of five general linear regressions, testing all potential predictors among collected and computed scores. It tested all attitudes, and demographic factors, including countries and diets, and all computed scores, i.e., number of total dairy categories completed and average frequency of consumption, as predictors of consumption. Secondly, two other regressions were run for each category and each country testing all attitudes and demographic factors, excluding countries as predictors, for a total of ten linear regressions, i.e., each of the five categories per each of the two countries separately.

Before running all models, scores for negative statements were reversed to test statements with the same direction, and an average score was computed for each sub-theme assessed by the statements. Multiple dummy variables were created for categorical variables with more than two levels, i.e., gender, education, employment status, and diet. All predictors were tested for correlation before being added to the regression models. Three dummy variables for demographics have been excluded from all models, due to multicollinearity: the variable “male”, in gender; the variable “no diet”, in diets, referred to participants not following a diet at the time of the study; the variable “job”, in employment status, referred to participants who were workers when completing the questionnaire. These were respectively collinear with the variables “female”, “student”, and “diet”, which referred to participants following a diet at the time of the study. A fourth demographic variable has been excluded from all French models run exploring attitudes towards each single product category. The weekly food budget was collinear with the weekly budget, thus removed from the models.

Table 3. 10.*Predictors tested in regression analyses.*

Models	Predictors
<i>General model per each product category</i>	Attitudes towards consumption: sensory, ingredients, composition, mode of consumption, preferences, personal reasons, knowledge, attitudes and concerns, needs or cravings, structure of the meal, use, categorisation, social norms, alternative, availability, value for money, packaging Demographics: gender, age, country, diets, dimension of the city they lived in, BMI, education (above/below A level), employment, living alone, eating alone, weekly budget, weekly food budget, holidays per year Other: seasonality Computed scores: total number of product categories completed in the questionnaire, average frequency of consumption of the product category
<i>Model product per country</i>	Attitudes towards consumption: sensory, ingredients, composition, mode of consumption, preferences, personal reasons, knowledge, attitudes and concerns, needs or cravings, structure of the meal, use, categorisation, social norms, alternative, availability, value for money, packaging Demographics: gender, age, country, diets, dimension of the city they lived in, BMI, education (above/below A level), employment, living alone, eating alone, weekly budget, weekly food budget (except for French models), holidays per year Other: seasonality Computed scores: total number of product categories completed in the questionnaire, average frequency of consumption of the product category

A Principal Component Analysis (PCA) was performed, exploring all attitudes together for each product category, on a sample including both UK and French participants, aiming to identify potential patterns in attitudes of consumption among the sample. A Kaiser-Meyen-Olkin (KMO) and Bartlett's test was run before each one to assess data adequacy. The number of components was based on the total variance explained, components with an Eigenvalue > 1, and the scree plot. A Mann-Whitney U test for non-parametrical data was performed on the resulting variables for the main components of each product category to test differences between the two countries.

3.4. Results

3.4.1. Sample and demographics

A total of 1350 (UK n=750) participants were recruited and completed the questionnaire in the UK and France. In the UK, n=470 (62%) completed the entire questionnaire with no failed checks. In France, n=513 (85%) completed the entire questionnaire with no failed checks. Table 3.11 summarises the main demographic characteristics for both complete samples.

Table 3. 11.

Main demographic characteristics of the two samples. Except for the first line, other details refer to participants who completed the questionnaire with no failed checks.

	UK	France
Recruited, and completed before trimming data for invalid answers	750	600
Completed with no failed checks	470 (94% from England)	513
Females	288 (38.4%)	302 (50%)
Students	168 (22.4%)	231 (38.5%)
Average age	23.6 years old	24.4 years old
Average BMI (computed)	24.8	25.3
Average number of people living with	2.3 adults & 0.6 child	1.2 adults and 0.3 child
Average number of people eating with	2 people	1.4 people
Weekly budget	£271, £135 (49%) for food	150.5 euros, 90 (59,8%) for food
Average number of holidays per year	1	1

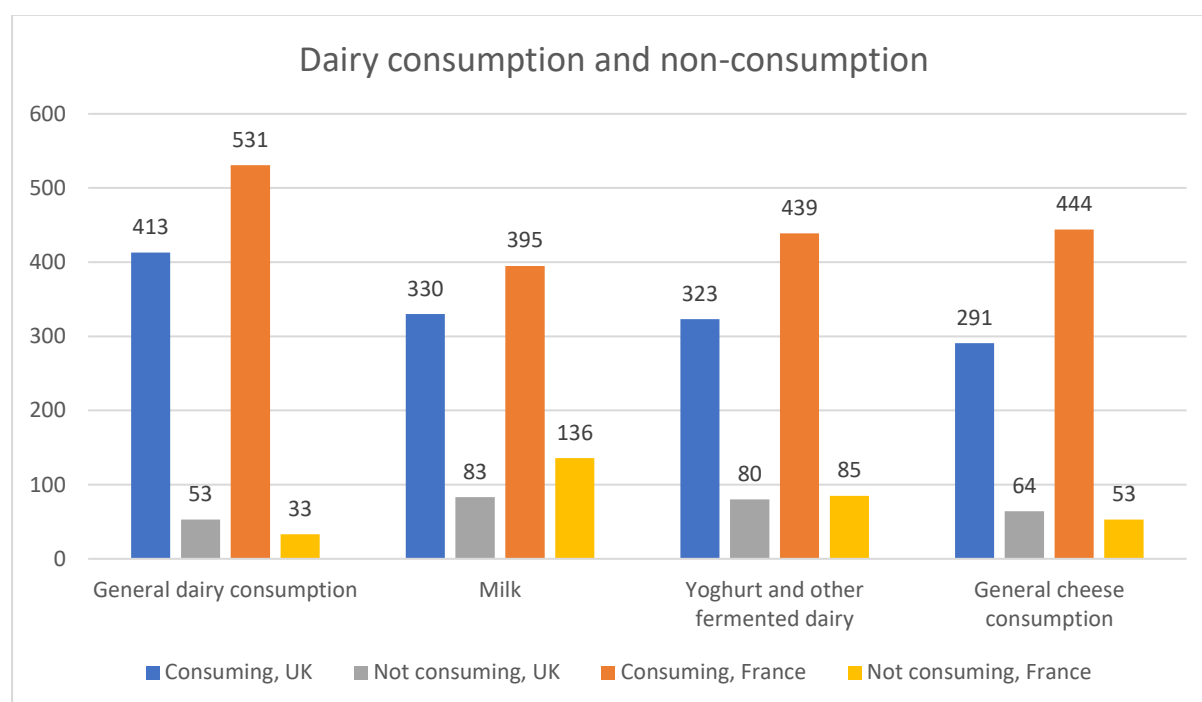
3.4.2. Dairy consumption

Figure 3.2 shows the total respondents for each sample and dairy category, divided into participants who reported consuming each dairy category, or non-consuming it. While the majority of respondents (88% in the UK and 94% in France) reported consuming dairy products, some dairy categories were more consumed than others. For instance, cheese, which included both hard and soft cheeses, was consumed by 81% of respondents living in

the UK and 89% of respondents living in France, being the most consumed dairy category. The least consumed dairy category was milk. While 79% of UK respondents reported consumption of milk, 74% of respondents living in France reported consuming it. Milk was the only dairy category that was reported to be consumed by less than 80% of respondents in both countries, and also the only dairy category being consumed less in France than in the UK.

Figure 3. 2.

Number of respondents consuming and non-consuming dairy products in the two samples.



Two-sample Chi-Square tests were performed for general dairy consumption and each dairy category. Three Chi-Square tests found significant differences between the samples for dairy consumption in general, milk, and cheese consumption. Detailed information about all statistical results is reported in Table 3.12.

Table 3. 12.

Two-sample Chi-Square tests were performed to test association between consumption and countries. Statistics details for Two-sample Chi-Square tests for significant and non-significant results. Significant results are reported in bold. Sample sizes are reported in total and for each country as n= (no);(yes).

Category	Pearson Chi-Square	DF	N of valid cases	Asymptotic significance
<i>General dairy consumption</i>	10.16	1	1030 UK 53;413 FR 33;531	.00
<i>Milk</i>	3.96	1	944 UK 83;330 FR 136;395	.04
<i>Yoghurt and other fermented dairy</i>	2.05	1	927 UK 80;323 FR 85;439	.15
<i>General cheese consumption</i>	9.48	1	852 UK 64;291 FR 53;444	.00

3.4.2.1. Frequency of consumption

Cross-country differences were found in the frequency of consumption of common dairy products. Figures 3.3-3.6 show the frequency of consumption of milks, yoghurts and fermented dairy products, cheeses, other dairy products in the UK and France. French participants reported not consuming all products in the lists, and they tended to consume the same similar products more often, while in the UK sample, all products were consumed more often than in France.

Figure 3. 4. Frequency [percentages] of yoghurt and other fermented dairy consumption in the UK (n=314, on the left) and France (n=432, on the right).

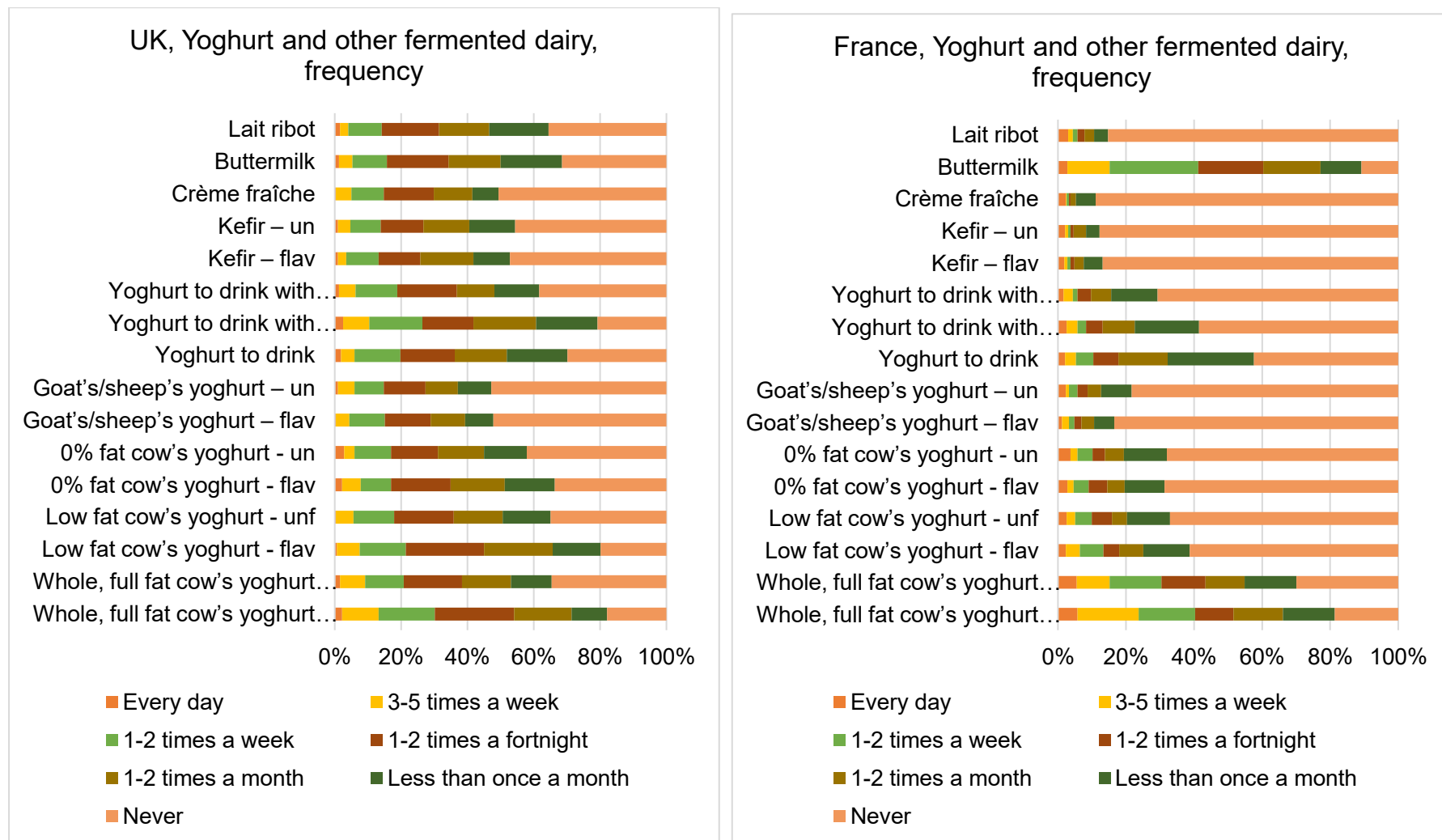


Figure 3. 5. Frequency [percentages] of hard and soft cheese consumption, in the UK (hard cheese n=288, soft cheese n=276, on the left) and France (hard cheese n=442, soft cheese n=422, on the right).

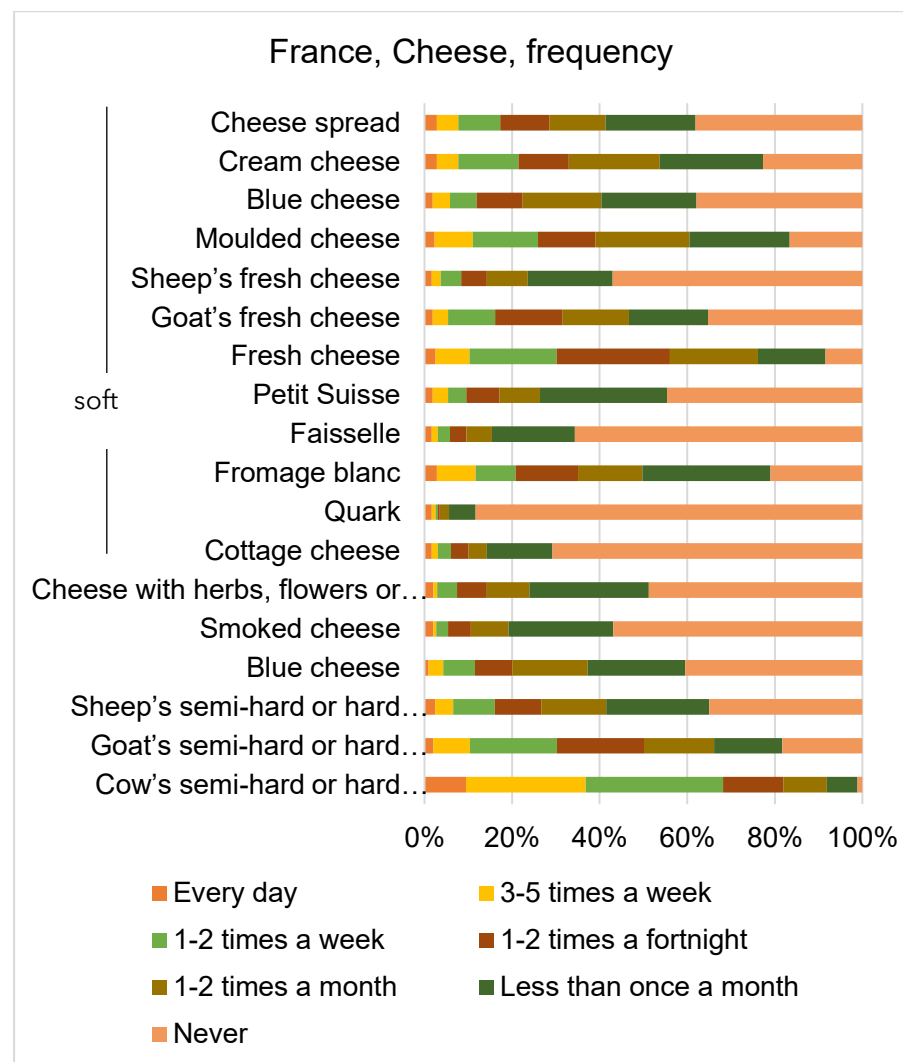
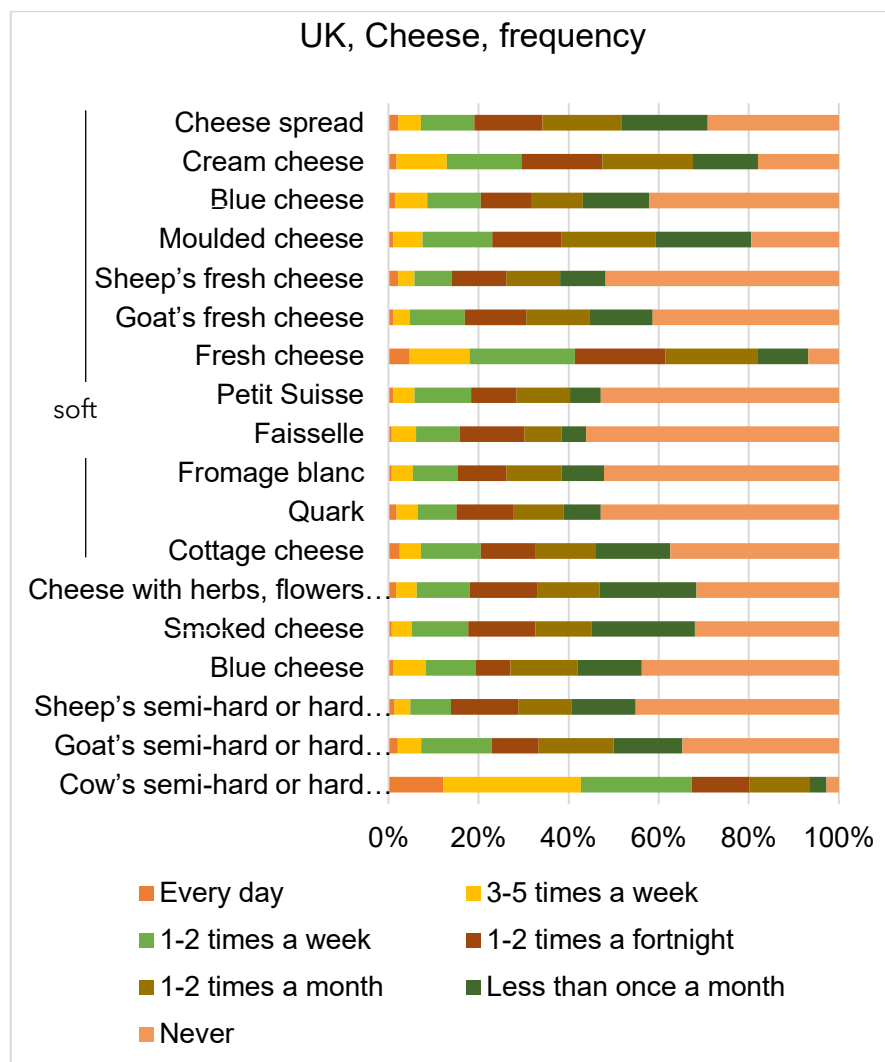
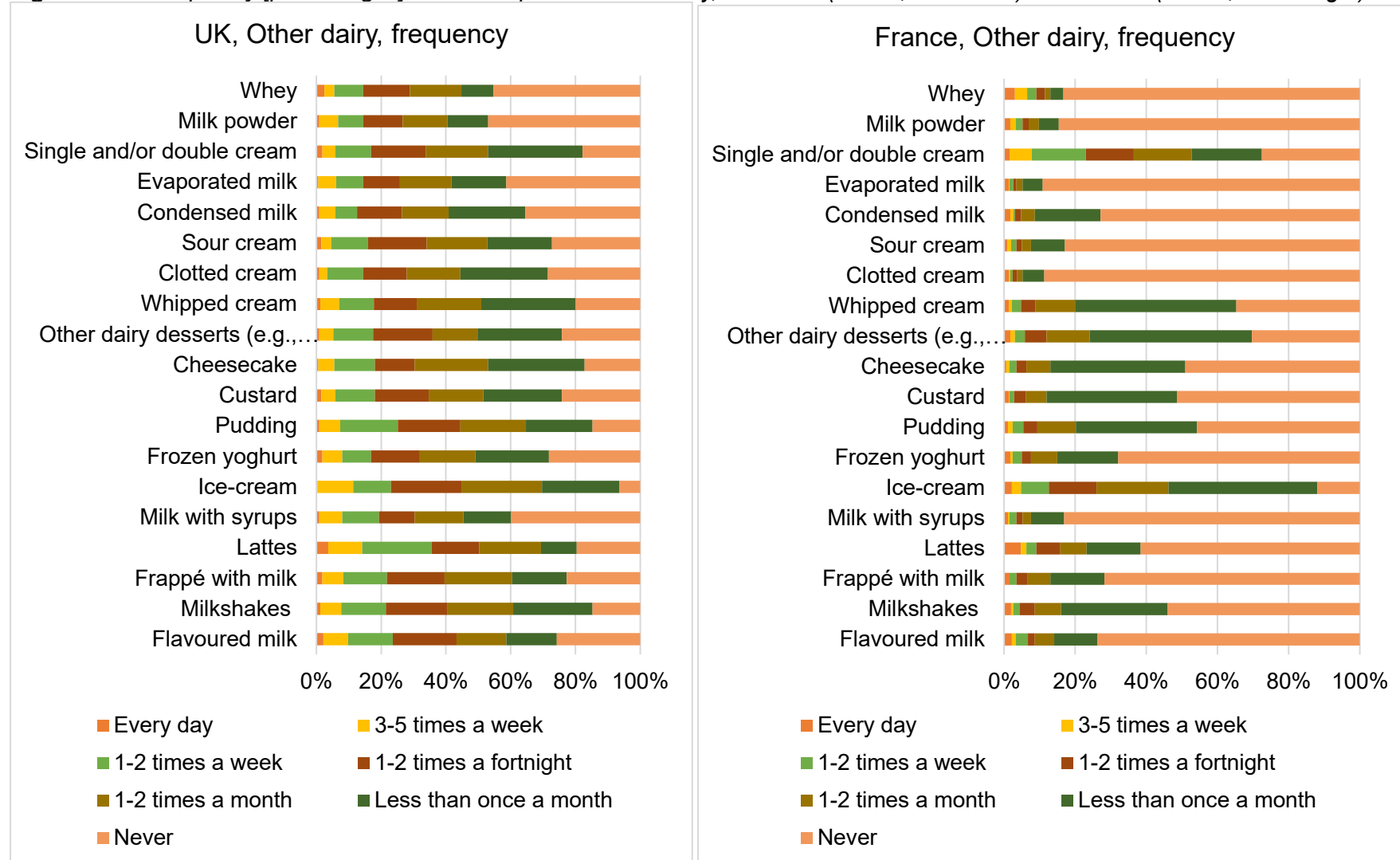


Figure 3. 6. Frequency [percentages] of consumption of other dairy, in the UK (n=326, on the left) and France (n=461, on the right).



These results are confirmed by the frequency monthly score that has been computed for each dairy product category. Table 3.13 shows the scores for each dairy products in each country, and statistics details for Welch ANOVA. Score show that while in the UK all products are consumed with more or less the same total frequency in the month, except for hard cheese, in France each dairy category has one or two products more consumed than others.

Table 3. 13.

Frequency consumption on a monthly scale (30-day month), and statistics details for Welch ANOVA. Welch ANOVA tests were performed to test if differences in means were statistically significant. Results, in bold, are significant per $p < .05$.

		UK score	times in a month UK	FR score	times in a month FR	Statistic	df1	df2	sig.
MILK	Whole, full fat cow's milk	0.177	5.30	0.119	3.56	8.802	1	679.616	.00
	Semi-skimmed cow's milk	0.292	8.77	0.351	10.54	5.098	1	717.174	.02
	Skimmed cow's milk	0.114	3.41	0.082	2.46	3.774	1	719.178	.05
	Lactose-free milk	0.099	2.98	0.076	2.27	2.320	1	714.833	.12
	Goat's milk	0.066	1.97	0.041	1.22	4.436	1	720.272	.03
	Sheep's milk	0.064	1.91	0.035	1.04	6.264	1	722.944	.01
YOGHURT AND FERMENTED DAIRY	Whole, full fat cow's yoghurt – flav	0.149	4.46	0.208	6.23	11.808	1	750.913	<.001
	Whole, full fat cow's yoghurt – un	0.106	3.18	0.159	4.76	10.982	1	749.834	<.001
	Low fat cow's yoghurt – flav	0.107	3.21	0.070	2.09	9.454	1	741.136	.00
	Low fat cow's yoghurt – unf	0.084	2.52	0.059	1.78	4.715	1	750.299	.03
	0% fat cow's yoghurt – flav	0.099	2.97	0.057	1.70	9.984	1	674.695	.00
	0% fat cow's yoghurt – un	0.090	2.71	0.066	1.97	2.999	1	711.562	.08
	Goat's/sheep's yoghurt – flav	0.067	2.00	0.031	0.93	14.187	1	699.481	<.001
	Goat's/sheep's yoghurt – un	0.073	2.19	0.040	1.19	8.356	1	702.284	.00

Table 3.13. (Continued)

Frequency consumption on a monthly scale (30-day month), and statistics details for Welch ANOVA. Welch ANOVA tests were performed to test if differences in means were statistically significant. Results, in bold, are significant per $p < .05$.

		UK score	times in a month UK	FR score	times in a month FR	Statistic	df1	df2	sig.
YOGHURT AND FERMENTED DAIRY	Yoghurt to drink	0.096	2.87	0.068	2.03	5.062	1	683.52	.02
	Yoghurt to drink with probiotics – flav	0.127	3.81	0.061	1.83	22.015	1	645.855	<.001
	Yoghurt to drink with probiotics – un	0.090	2.71	0.043	1.30	16.643	1	665.499	<.001
	Kefir – flav	0.065	1.95	0.029	0.86	12.498	1	712.1	<.001
	Kefir – un	0.070	2.10	0.031	0.92	13.329	1	705.91	<.001
	Crème fraîche	0.070	2.10	0.028	0.84	16.244	1	732.946	<.001
	Buttermilk	0.085	2.55	0.176	5.27	46.785	1	750.793	<.001
	Lait ribot	0.077	2.32	0.044	1.33	7.392	1	738.329	.00
HARD CHEESE	Cow's semi-hard or hard cheese	0.354	10.61	0.324	9.71	1.761	1	587.029	.18
	Goat's semi-hard or hard cheese	0.101	3.04	0.135	4.06	5.921	1	634.484	.01
	Sheep's semi-hard or hard cheese	0.074	2.22	0.088	2.64	1.263	1	687.138	.26

Table 3.13. (Continued)

Frequency consumption on a monthly scale (30-day month), and statistics details for Welch ANOVA. Welch ANOVA tests were performed to test if differences in means were statistically significant. Results, in bold, are significant per $p < .05$.

		UK score	times in a month UK	FR score	times in a month FR	Statistic	df1	df2	sig.
HARD CHEESE	Blue cheese	0.089	2.67	0.063	1.89	4.758	1	525.913	.03
	Smoked cheese	0.081	2.44	0.044	1.31	12.02	1	640.236	<.001
	Cheese with herbs, flowers or fruits	0.091	2.73	0.051	1.54	10.484	1	570.284	.00
	Cottage cheese	0.099	2.96	0.039	1.17	20.318	1	480.196	<.001
	Quark	0.080	2.40	0.025	0.75	19.921	1	495.057	<.001
	Fromage blanc	0.071	2.13	0.121	3.62	13.985	1	701.723	<.001
SOFT CHEESE	Faisselle	0.075	2.24	0.040	1.20	9.535	1	572.716	.00
	Petit Suisse	0.078	2.34	0.064	1.91	1.392	1	616.411	.23
	Fresh cheese	0.197	5.90	0.145	4.36	8.947	1	502.128	.00
	Goat's fresh cheese	0.078	2.33	0.085	2.56	0.403	1	641.275	.52
	Sheep's fresh cheese	0.077	2.32	0.051	1.54	4.195	1	525.861	.04
	Moulded cheese	0.106	3.19	0.128	3.83	2.441	1	668.964	.12
	Blue cheese	0.096	2.88	0.076	2.27	2.307	1	566.903	.13

Table 3. 13. (Continued)

Frequency consumption on a monthly scale (30-day month), and statistics details for Welch ANOVA. Welch ANOVA tests were performed to test if differences in means were statistically significant. Results, in bold, are significant per $p < .05$.

		UK score	times in a month h UK	FR score	times in a month h FR	Statistic	df1	df2	sig.
SOFT	Cream cheese	0.141	4.23	0.108	3.25	4.798	1	585.974	.03
	Cheese spread	0.100	2.99	0.095	2.85	0.111	1	624.271	.74
OTHER DAIRY	Flavoured milk	0.120	3.60	0.041	1.24	37.243	1	612.07	<.001
	Milkshakes	0.108	3.24	0.040	1.21	35.668	1	647.165	<.001
	Frappé with milk	0.111	3.33	0.028	0.85	51.719	1	543.574	<.001
	Lattes	0.161	4.84	0.075	2.25	28.741	1	690.116	<.001
	Milk with syrups	0.091	2.72	0.022	0.66	43.182	1	535.254	<.001
	Ice-cream	0.124	3.72	0.083	2.49	11.924	1	707.291	<.001
	Frozen yoghurt	0.097	2.91	0.036	1.07	26.655	1	588.746	<.001
	Pudding	0.112	3.37	0.040	1.20	49.096	1	589.856	<.001
	Custard	0.092	2.77	0.030	0.91	35.211	1	560.157	<.001
	Cheesecake	0.087	2.61	0.029	0.86	42.125	1	543.673	<.001
	Other dairy desserts (e.g., dulce de leche, tiramisu)	0.087	2.61	0.051	1.53	11.797	1	696.84	<.001
	Whipped cream	0.094	2.81	0.042	1.25	23.725	1	584.364	<.001
	Clotted cream	0.071	2.14	0.020	0.60	31.589	1	657.274	<.001
	Sour cream	0.086	2.57	0.022	0.67	40.954	1	552.671	<.001
	Condensed milk	0.074	2.23	0.030	0.91	17.835	1	672.03	<.001
	Evaporated milk	0.075	2.24	0.019	0.58	32.499	1	605.597	<.001
	Single and/or double cream	0.094	2.82	0.104	3.13	0.729	1	716.984	.39
	Milk powder	0.077	2.31	0.034	1.01	15.582	1	672.873	<.001
	Whey	0.083	2.49	0.058	1.74	3.49	1	736.163	.06

Tables 3.13-3.14 show that different dairy products are consumed differently in the two countries, giving detailed insights. While monthly scores are similar for milks and hard cheese, participants in the UK reported consuming yoghurt, soft cheese and other dairy more frequently than the French sample.

Table 3. 14.

Overall frequency consumption on a monthly scale (30-day month), and statistics details for Welch ANOVA. Welch ANOVA tests were performed to test if differences in means were statistically significant. Results, in bold, are significant per $p < .05$.

	UK score	times in a month UK	FR score	times in a month FR	Statistics	d1	df2	sig.
Milk	0.814	24.41	0.701	21.03	1.613	1	1053.725	.20
Yoghurt and fermented dairy	1.478	44.35	1.172	35.17	0.302	1	1037.608	.58
Hard cheese	0.793	23.79	0.723	21.68	3.552	1	1065.116	.06
Soft cheese	1.206	36.19	0.873	26.20	0.487	1	1057.948	.49
Other dairy	1.845	55.36	0.859	25.77	28.171	1	1071.004	<.001

3.4.2.2. Least consumed dairy products

Results of least consumed dairy products confirmed the results described in the frequency of consumption section (3.4.2.1). The results from the previous sections showed that French participants are more likely to consume always the same products, less frequently, and with less variance than the UK sample. This happens as well for the least consumed products. The French sample chose in general the same type of products, which are not necessarily uncommon, e.g., whole milk; compared to the British, whose choice appears more varied. More than 50% of the French sample, is represented by a maximum of three choices (Figures 3.7-3.10). This does not happen in the UK sample, which confirms itself more variable in its choices compared to its French counterpart.

Figure 3. 7.

Least consumed [percentages] milks in the UK (N=329, on the left) and France (N=396, on the right).

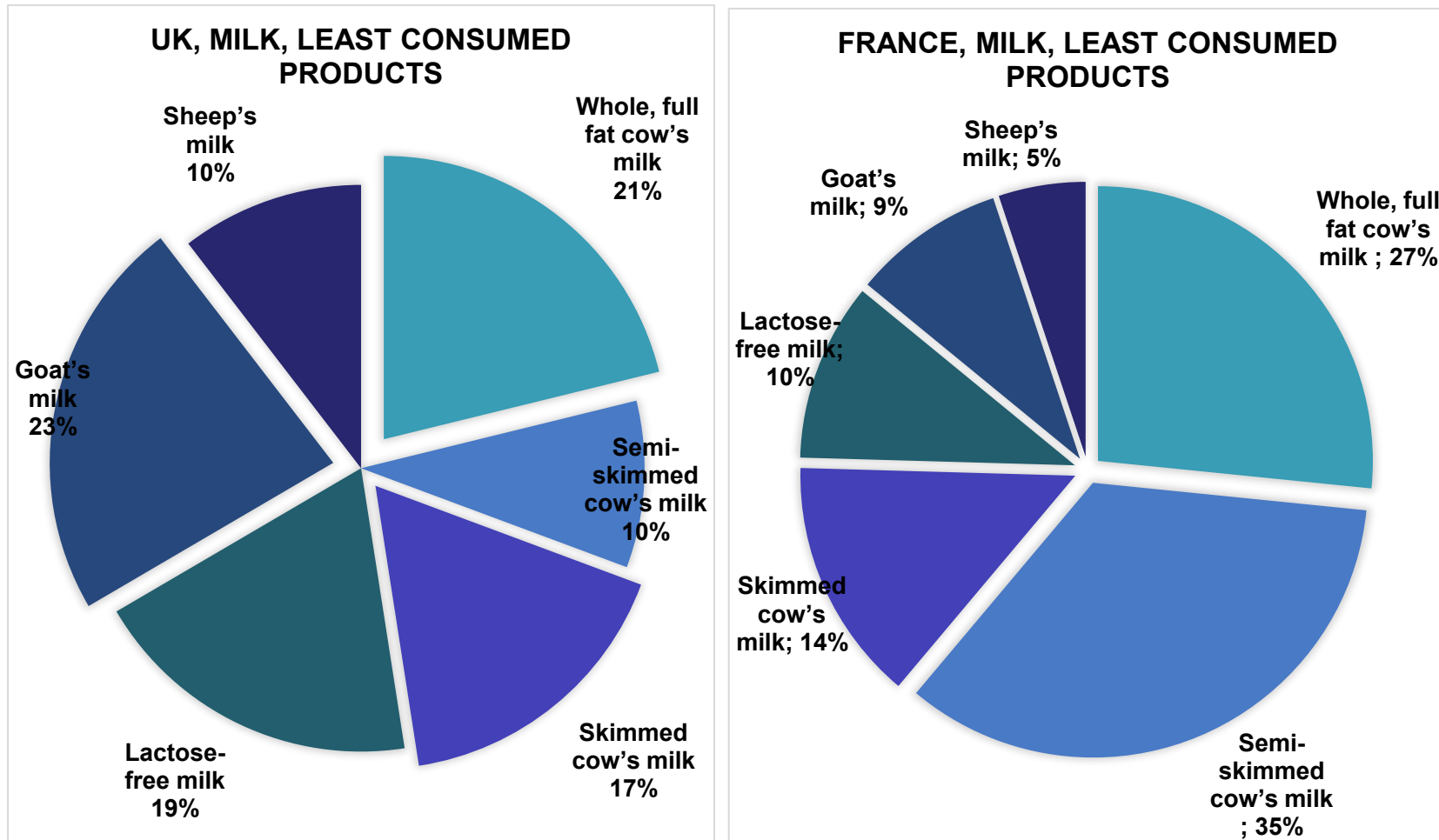


Figure 3. 8. Least consumed [percentages] yoghurts and fermented dairy in the UK (n=314, above) and France (n=432, below).

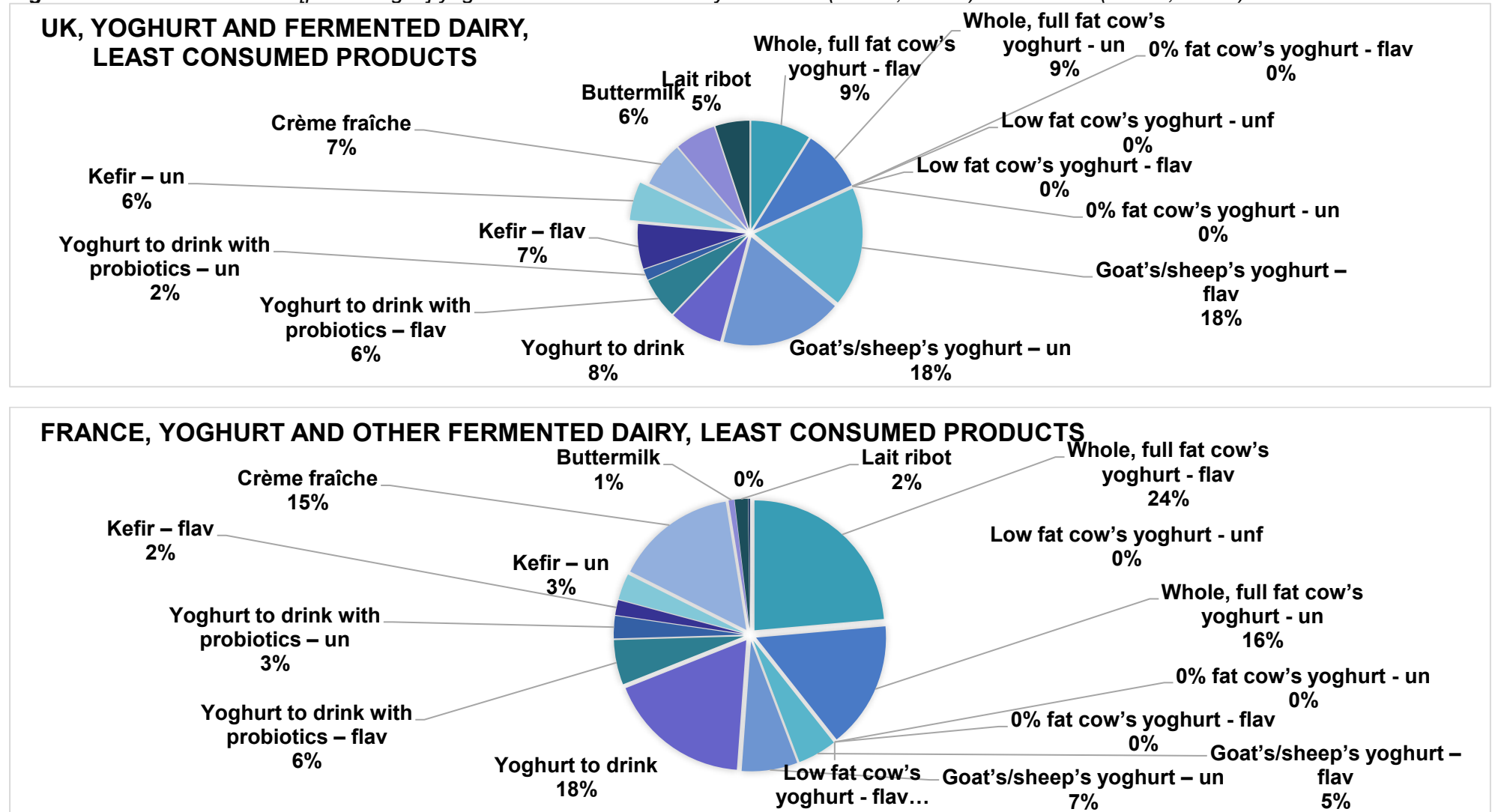


Figure 3. 9.

Least consumed[percentages] hard cheeses in the UK (n=288, on the left) and France (n=442, on the right).

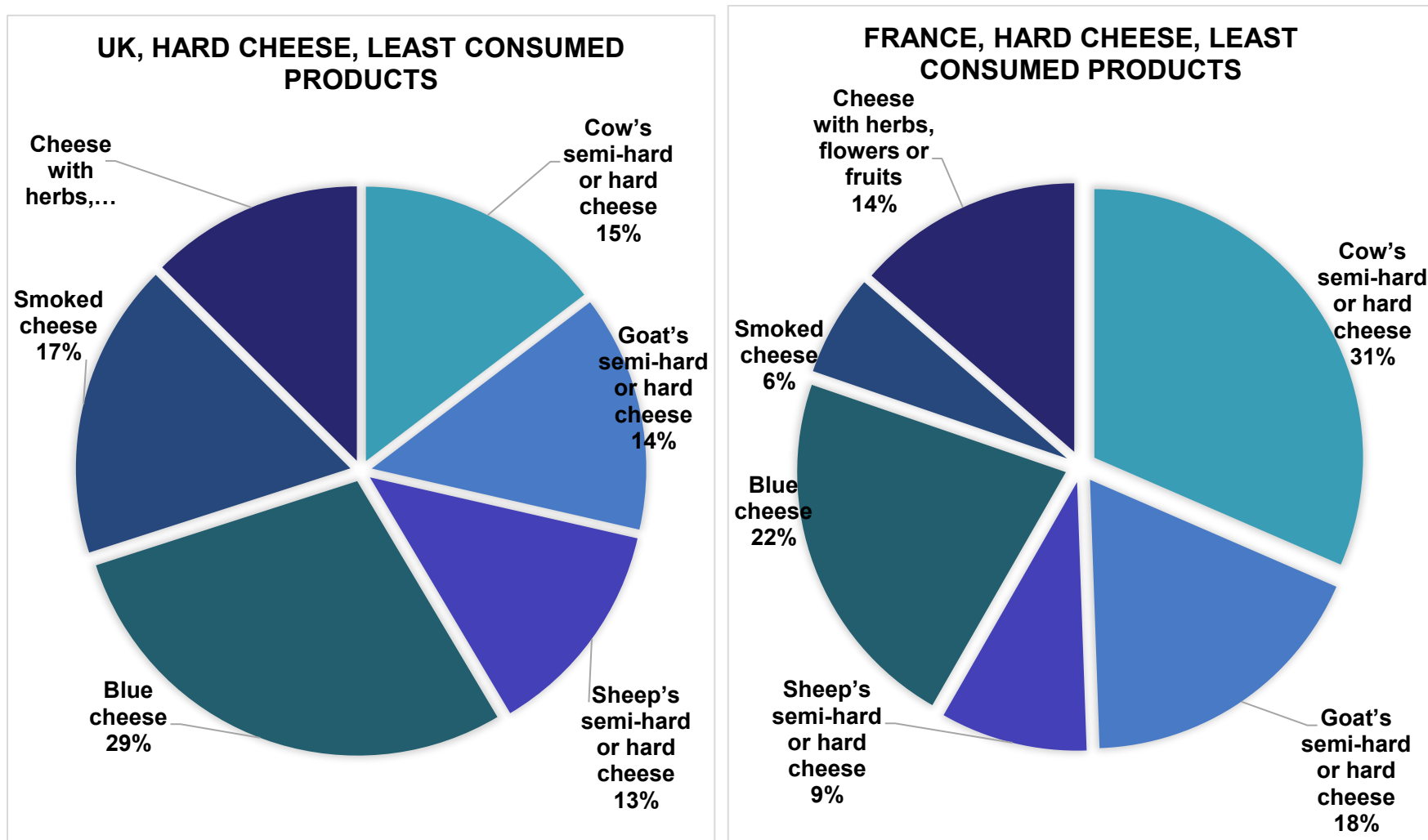
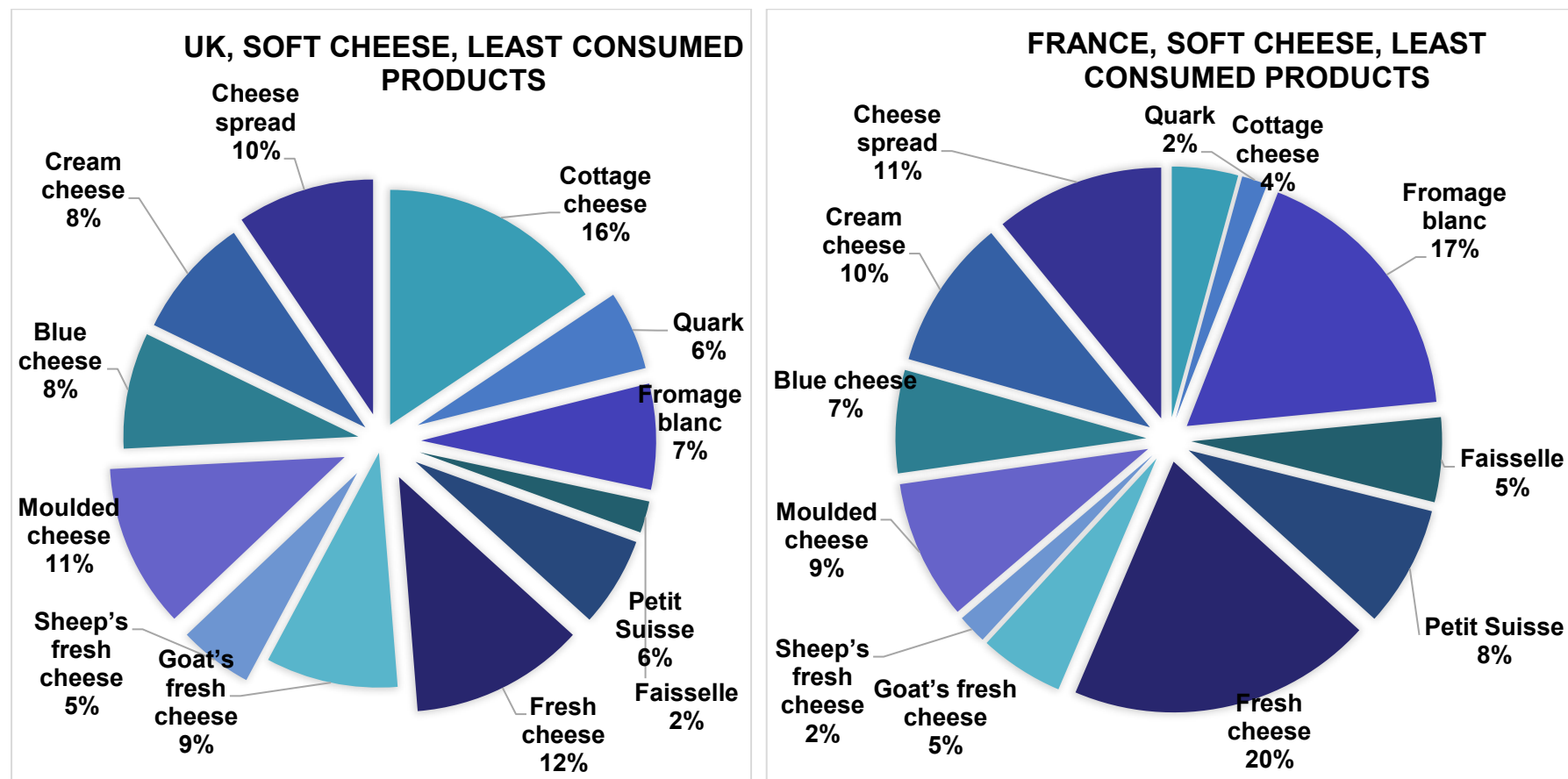


Figure 3. 10.

Least consumed [percentages] soft cheeses in the UK (n=276, on the left) and France (n=422, on the right).



3.4.2.3. Contexts of consumption

Contexts of consumption have been investigated in Excel only for soft dairy and hard cheese. Similarities and differences may be seen in Figures 3.11-3.14. Contexts of consumption are more defined in France, particularly for yoghurts and both types of cheese. This may suggest that these products do have a specific role or use in certain meals in France.

Some contexts are rarely selected in both countries, e.g., before going to sleep, and others change based on the product, e.g., milk vs hard cheese.

Figure 3. 11. Different contexts [absolute numbers] of least consumed milk consumption in the UK and France.

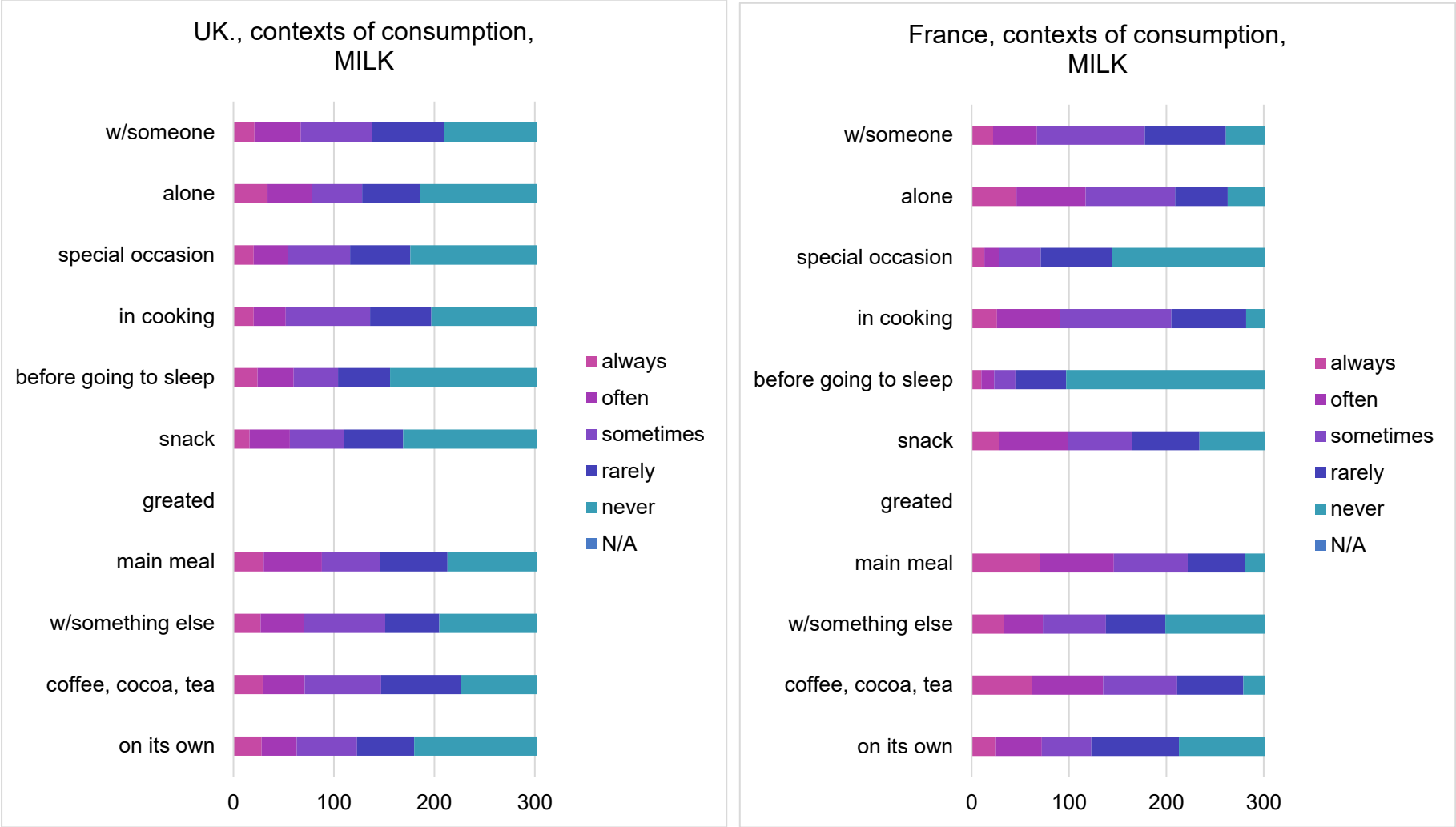


Figure 3. 12. Different contexts [absolute numbers] of least consumed yoghurt and other fermented dairy consumption in the UK and France.

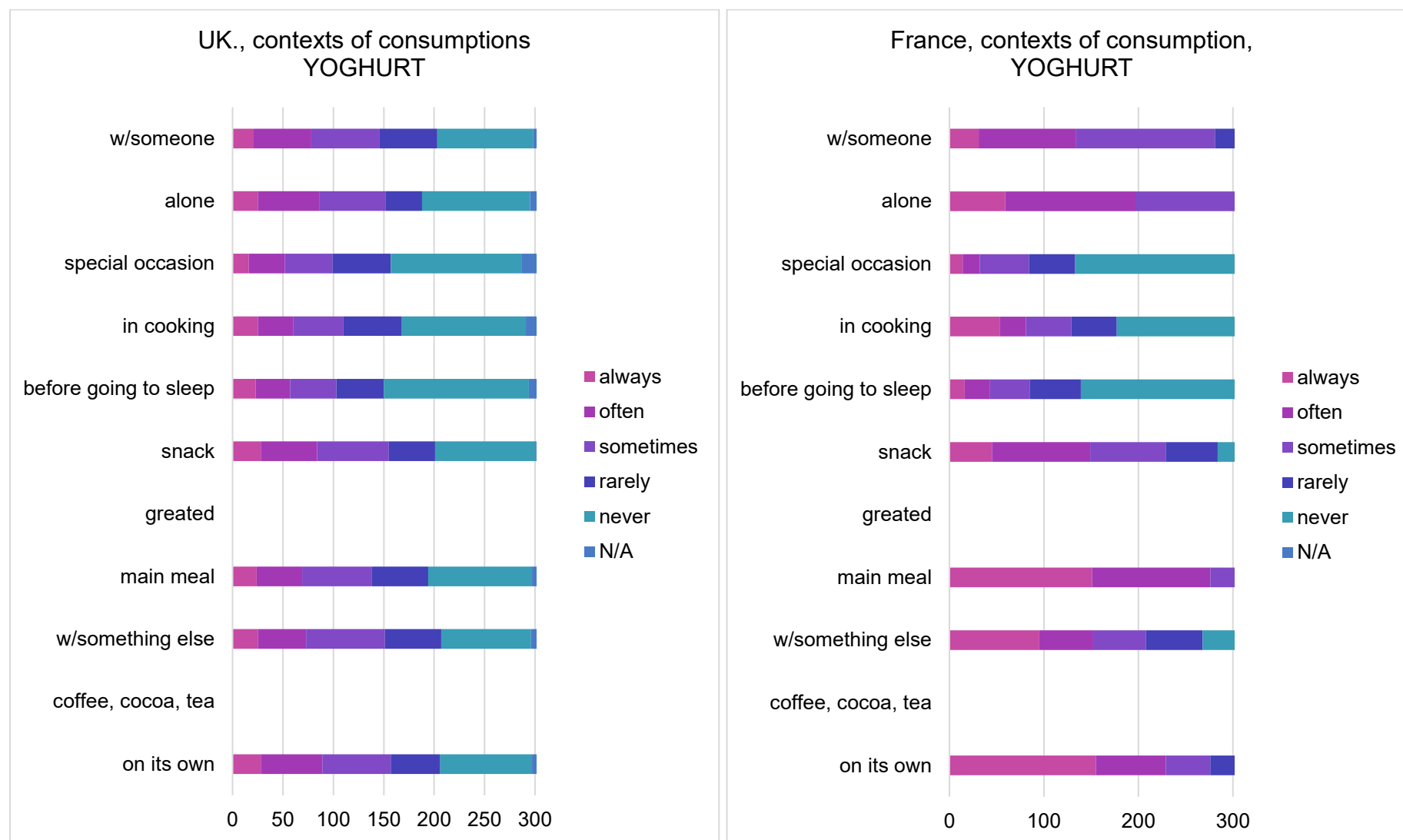


Figure 3. 13. Different contexts [absolute numbers] of least consumed soft cheese consumption in the UK and France.

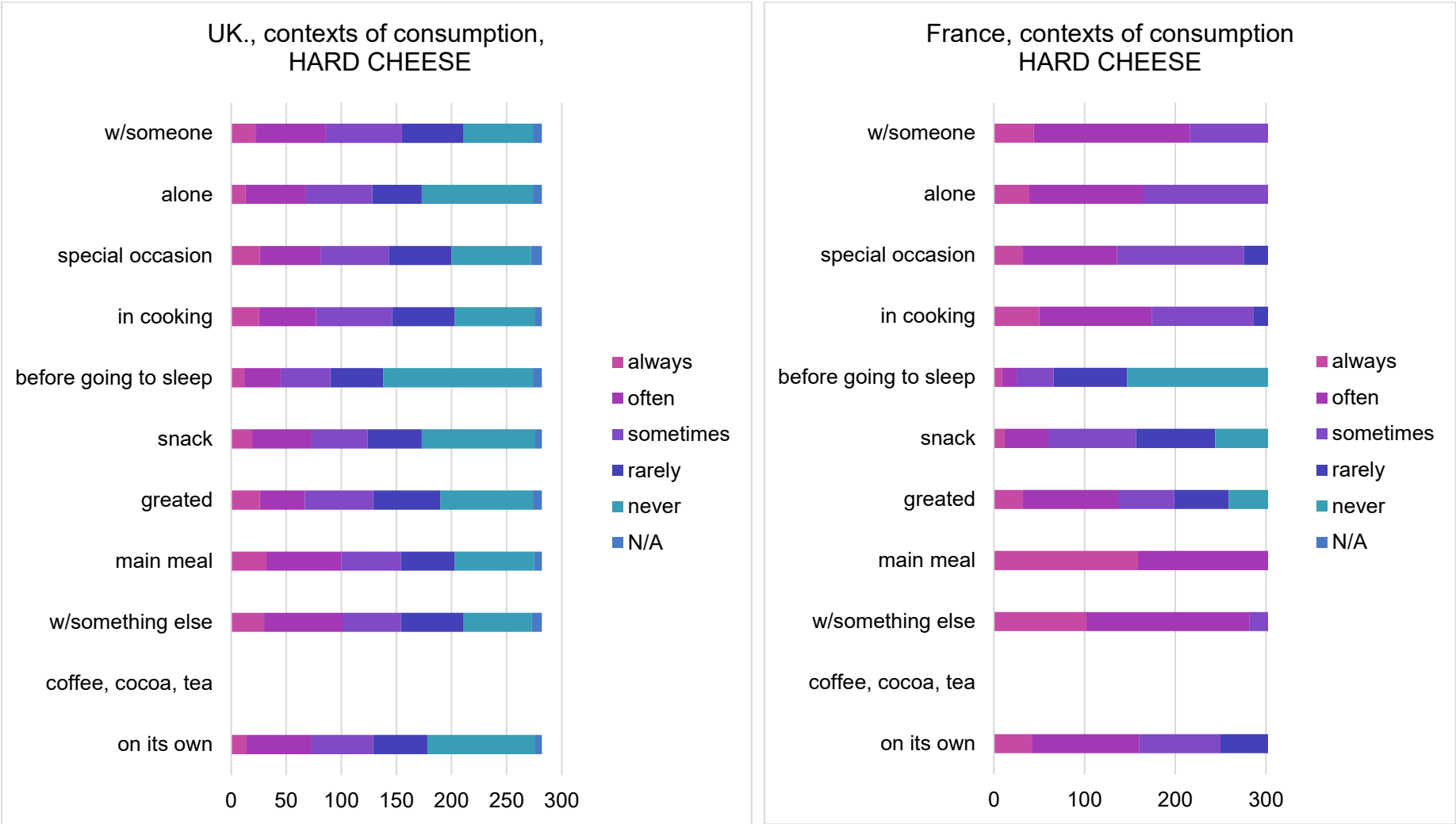
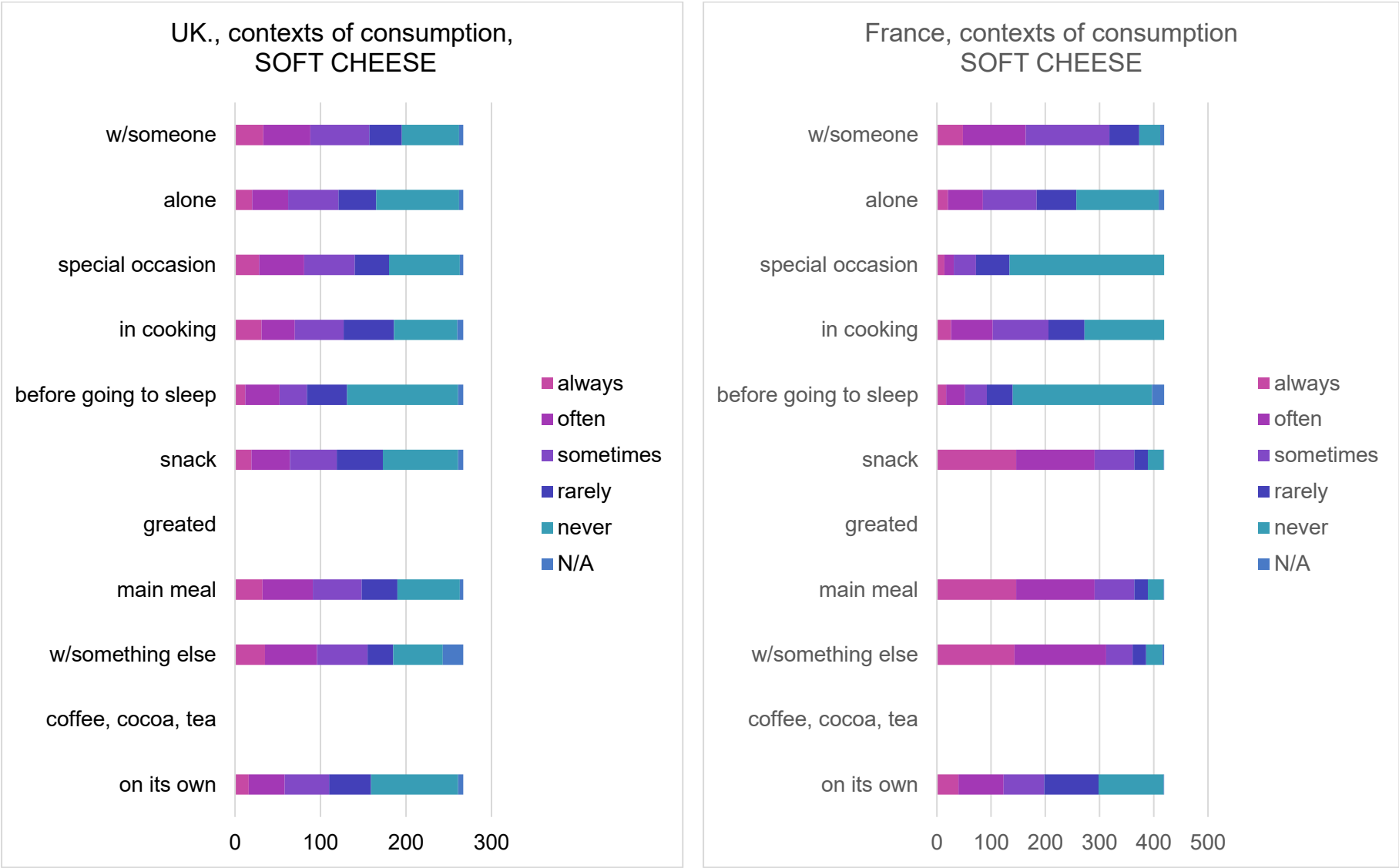


Figure 3. 14. Different contexts [absolute numbers] of least consumed hard cheese consumption in the UK and France.



3.4.2.4. Attitudes towards consumption

3.4.2.4.1. Predictors in consumption including country as variable

All general regression analyses were significant, respectively: for milk, $R^2=.498$, $F(37,452)=12.141$, $p<.001$; for yoghurt and other fermented dairy, $R^2=.521$, $F(37,484)=14.254$, $p<.001$; for soft cheese, $R^2=.514$, $F(37,503)=14.373$, $p<.001$; hard cheese, $R^2=.452$, $F(36,533)=12.226$, $p<.001$. Different factors were found to significantly predict consumption depending on the product. Tables 3.15-3.16 show all variables that were tested as predictors for least consumed dairy products and reported standardised β - and p -values. Higher β -values have a stronger impact on consumption. While the expected change in the dependent variable is always expected to be one-unit change, the sign of β gives information about the direction of the change: if β -value is negative, at the increase of the predictor, consumption is expected to decrease. Thus, if β is negative, predictor is considered a barrier to consumption. When it is positive, predictor is considered as a facilitator to consumption. While some factors, i.e., preferences, needs or cravings, following a diet, impact the consumption of all dairy categories, some others are product-specific, e.g., use, categorisation, city. Table 3.17 reports statements for each sub-theme.

Table 3. 15.

Outcomes of the linear regression analyses exploring the impact of attitudes on dairy consumption. The table reports all attitudes tested as potential predictors and their standardised β values and p -values in brackets. Results for predictors significantly impacting consumption are in bold.

Sub-theme	Milk	Yoghurt and other fermented dairy	Hard cheese	Soft cheese
<i>Sensory</i>	β -.00 (.86)	β .04 (.40)	β .07 (.19)	β -.00 (.94)
<i>Composition</i>	β -.06 (.21)	β -.09 (.05)	β .02 (.58)	β .00 (.93)
<i>Non-sensory</i>	β -.08 (.01)	β -.09 (.01)	β -.04 (.30)	β -.07 (.06)
<i>Mode of consumption</i>	β .04 (.25)	β .12 (.00)	β .07 (.05)	β .06 (.07)
<i>Preferences</i>	β .34 (<.001)	β .22 (<.001)	β .29 (<.001)	β .43 (<.001)
<i>Personal reasons</i>	β .02 (.58)	β .13 (.00)	β .14 (.00)	β .05 (.24)
<i>Knowledge</i>	β .06 (.17)	β .03 (.43)	β .07 (.09)	β .01 (.78)
<i>Attitudes and concerns</i>	β .01 (.66)	β .03 (.40)	β -.01 (.68)	β .02 (.53)

<i>Needs or cravings</i>	β .11 (.01)	β .12 (<.001)	β .17 (<.001)	β .19 (<.001)
<i>Structure of the meal</i>	β .05 (.15)	β .04 (.32)	β .17 (.62)	β .02 (.60)
<i>Social norms</i>	β -.05 (.13)	β .03 (.31)	β .02 (.66)	β .04 (.23)
<i>Use</i>	β .09 (.03)	β .02 (.60)	β -.04 (.34)	β -.02 (.64)
<i>Categorisation</i>	β .06 (.09)	β .06 (.09)	β .05 (.11)	β .09 (.01)
<i>Availability</i>	β .01 (.78)	β -.05 (.19)	β -.00 (.85)	β -.04 (.31)
<i>Alternative</i>	β .00 (.97)	β .01 (.70)	β .00 (.90)	β -.01 (.72)
<i>Value for money</i>	β -.04 (.26)	β -.00 (.93)	β .01 (.76)	β .04 (.22)
<i>Packaging</i>	β -.04 (.28)	β -.03 (.37)	β -.08 (.05)	β -.05 (.21)

Table 3. 16.

Outcomes of the linear regression analyses exploring the impact of demographic factors on dairy consumption. The table reports all demographics variables tested as potential predictors and their standardised β values and p-values (in brackets). Factors found to significantly impact consumption are reported in bold.

Demographics	Milk	Yoghurt and other fermented dairy	Hard cheese	Soft cheese
<i>Seasonality</i>	β -.00 (.83)	β .00 (.98)	β .02 (.58)	β .01 (.75)
<i>Following a diet limiting animal-based products, i.e., vegetarian, ovo-vegetarian, lactose-vegetarian, flexitarian / Not following a diet</i>	β .22 (<.001)	β .14 (<.001)	β .08 (.02)	β .14 (<.001)
<i>Following a lactose-free</i>	β .05 (.14)	β .09 (.00)	β -.01 (.61)	β -.02 (.40)
<i>Total number of product categories completed in the questionnaire (1 to 5, including PBDA)</i>	β -.07 (.03)	β .01 (.71)	β .03 (.27)	β .05 (.07)
<i>Average frequency of consumption of the product category</i>	β .06 (.18)	β .14 (.00)	β .06 (.14)	β .20 (<.001)
<i>Country</i>	β -.08 (.10)	β .10 (.03)	β -.04 (.33)	β -.13 (.00)

<i>Male/female</i>	β -.01 (.70)	β -.07 (.02)	β -.06 (.06)	β -.07 (.03)
<i>Binary/other</i>	β -.05 (.14)	β .00 (.81)	β -.01 (.60)	β .00 (.92)
<i>Age</i>	β .07 (.13)	β .09 (.03)	β .11 (.01)	β .13 (.00)
<i>BMI</i>	β -.00 (.83)	β -.04 (.22)	β -.02 (.56)	β -.02 (.40)
<i>City</i>	β -.14 (<.001)	β .01 (.73)	β .02 (.45)	β -.00 (.90)
<i>Higher education</i>	β -.04 (.25)	β -.07 (.03)	β -.09 (.00)	β -.09 (.00)
<i>Student</i>	β -.08 (.07)	β -.02 (.56)	β -.03 (.49)	β .07 (.08)
<i>Non-employed</i>	β .01 (.63)	β .02 (.51)	β -.04 (.35)	β -.02 (.49)
<i>Living with adults</i>	β -.04 (.35)	β -.05 (.16)	β -.01 (.77)	β -.02 (.51)
<i>Living with children</i>	β .17 (<.001)	β .13 (.01)	β .03 (.46)	β .07 (.12)
<i>Eating alone or with someone else</i>	β .03 (.37)	β .04 (.03)	β .03 (.38)	β .01 (.82)
<i>Weekly budget</i>	β .03 (.66)	β .14 (.00)	β .10 (.10)	.01 (β .14)
<i>Weekly food budget</i>	β -.06 (.34)	β .02 (.64)	β -.01 (.77)	β .08 (.14)
<i>Holidays abroad</i>	β .03 (.34)	β .04 (.19)	β .06 (.34)	β .04 (.20)

Table 3. 17.

Positive and negative statements per sub-theme. Each sub-theme was entered in the regression analysis models and tested as a predictor in consumption.

Sub-theme	Positive statement	Negative statement
Sensory	I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
Composition	It is natural	It is too processed
Non-sensory	Consuming it boosts my health	It is unhealthy
Mode of consumption	I can consume it on its own, in recipes or in combination with some foods	I cannot use this product in many ways
Preferences	I like this product	I do not enjoy consuming it
Personal reasons	I never experience body symptoms when consuming it I have always consumed this product	Body symptoms occur when I consume this product I did not consume it while growing up
Knowledge	It contributes to a balanced diet	As an adult, I do not need to consume it to be healthy Reducing its consumption will benefit my health
Attitudes and concerns	It is environmentally friendly It is animal friendly	It is not sustainable Reducing its consumption will benefit the environment
Needs or cravings	I consume it when I want to treat or reward myself	I would not consume it on special occasions
Structure of the meal	I would finish a meal with this product	This product is not suitable as the final course of a meal
Social norms	I consume it because of my family/friends	No one I know consumes this as I do
Use	It is common to consume it in my culture	It is unusual to consume this product in my culture
Categorisation	I consume it because it is a good source of protein	It is a totally different category of food from meat/eggs/tofu
Availability	I can find it in the shops	It is not always available where I shop
Alternative	It is a good replacement for other foods	This cannot be used to replace other products
Value for money	It is worth the price	It is too expensive
Packaging	I can consume what I buy within the expiration date	It expires too quickly I often waste it

3.4.2.4.2. Predictors of consumption in the UK and France

Separated linear regressions per country were significant, respectively for milk, in the UK, $R^2=.641$, standard error of estimate ESEE=.65933, $F(35,159)=7.876$, $p<.001$, in France $R^2=.494$, ESEE=.57701, $F(36,257)=6.972$, $p<.001$; for yoghurt and other fermented, in the UK $R^2=.619$, ESEE=.66098, $F(36,165)=7.433$, $p<.001$, in France $R^2=.471$, ESEE=.51204, $F(36,283)=7.008$, $p<.001$; for soft cheese, in the UK $R^2=.685$, ESEE=.61530, $F(6,177)=10.690$, $p<.001$, in France $R^2=.383$, ESEE=.51683, $F(32,291)=5.136$, $p<.001$; for hard cheese, in the UK, $R^2=.638$, ESEE=.64730, $F(35,181)=9.129$, $p<.001$, in France, $R^2=.282$, ESEE=.53795, $F(35,317)=3.565$, $p<.001$. Models run on the UK sample report higher R-squared scores compared to French ones. This score is usually used as a tool to explore the goodness of fit of the model (Hagquist & Stenbeck, 1998), and lower R-squared may estimate lower predictive capability (Hagquist & Stenbeck, 1998). However, as it may be argued, this is not a valuable measure if reported by itself (Krueger & Lewis-Beck, 2007), the ESEE has also been reported. Several different variables have been found to significantly predict consumption depending on the product and the country. For instance, preferences, and needs or cravings, were found to impact both countries positively. Other predictors impacted only one country, e.g., following a diet was found to impact consumption only in the UK, while others, e.g., packaging, not only were country-specific, but also product-specific. Tables 3.18 and 3.19 report all variables that have been tested, and standardised β values for significant predictors for $p<.05$. Reference statements are reported again in Table 3.20.

Table 3. 18.

Outcomes of the linear regression analyses exploring the impact of attitudes on dairy consumption. The table reports all attitudes tested as potential predictors among respondents in the UK (UK) and France (FR), and their standardised β values and p-values in brackets. Predictors found to significantly impact consumption are reported in bold.

Sub-theme	Milk	Yoghurt and other fermented dairy	Hard cheese	Soft cheese
<i>Sensory</i>	UK β .00 (.95) FR β -.03 (.59)	UK β .05 (.38) FR β -.01 (.84)	UK β .14 (.08) FR β .05 (.46)	UK β .09 (.18) FR β -.02 (.74)
<i>Composition</i>	UK β -.09 (.14) FR β -.05 (.22)	UK β -.04 (.50) FR β -.07 (.30)	UK β -.01 (.88) FR β .05 (.47)	UK β -.03 (.52) FR β .10 (.16)
<i>Non-sensory</i>	UK β .06 (.22) FR β -.06 (.42)	UK β -.09 (.11) FR β -.09 (.12)	UK β .03 (.52) FR β .00 (.91)	UK β .00 (.89) FR β -.10 (.10)
<i>Mode of consumption</i>	UK β -.02 (.65) FR β .08 (.09)	UK β .01 (.74) FR β .17 (<.001)	UK β -.00 (.87) FR β .15 (.00)	UK β .04 (.37) FR β .12 (.01)
<i>Preferences</i>	UK β .27 (<.001)	UK β .18 (.02)	UK β .36 (<.001)	UK β .30 (<.001)

	FR β .36 (<.001)	FR β .18 (.00)	FR β .09 (.21)	FR β .27 (<.001)
<i>Personal reasons</i>	UK β .06 (.31) FR β .03 (.54)	UK β .06 (.33) FR β .17 (.00)	UK β .08 (.20) FR β .16 (.00)	UK β .15 (.00) FR β -.06 (.32)
<i>Knowledge</i>	UK β .09 (.18) FR β .06 (.36)	UK β .05 (.38) FR β -.01 (.83)	UK β .02 (.70) FR β .08 (.23)	UK β .04 (.45) FR β -.04 (.59)
<i>Attitudes and concerns</i>	UK β -.04 (.49) FR β .01 (.81)	UK β .06 (.28) FR β .02 (.69)	UK β .01 (.83) FR β -.09 (.11)	UK β .06 (.23) FR β -.02 (.71)
<i>Needs or cravings</i>	UK β .14 (.03) FR β .08 (.13)	UK β .15 (.01) FR β .07 (.12)	UK β .17 (.01) FR β .13 (.03)	UK β .20 (.00) FR β .15 (.00)
<i>Structure of the meal</i>	UK β .07(.26) FR β .03 (.55)	UK β .09 (.14) FR β .01 (.83)	UK β -.07 (.26) FR β .04 (.46)	UK β .10 (.05) FR β -.04 (.37)
<i>Social norms</i>	UK β -.05 (.34) FR β -.04 (.41)	UK β .08 (.17) FR β -.05 (.29)	UK β .00 (.99) FR β -.02 (.68)	UK β .00 (.89) FR β .02 (.65)
<i>Use</i>	UK β .03 (.59) FR β .09 (.09)	UK β -.04 (.43) FR β .10 (.07)	UK β -.02 (.73) FR β -.02 (.70)	UK β -.02 (.63) FR β .04 (.45)
<i>Categorisation</i>	UK β .08 (.15) FR β .01 (.86)	UK β .09 (.11) FR β .06 (.25)	UK β .07 (.19) FR β .05 (.29)	UK β .06 (.25) FR β .04 (.37)
<i>Availability</i>	UK β .06 (.36) FR β .06 (.19)	UK β -.00 (.95) FR β -.06 (.21)	UK β -.00 (.99) FR β .04 (.40)	UK β -.05 (.40) FR β -.03 (.55)
<i>Alternative</i>	UK β -.02 (.70) FR β .05 (.24)	UK β -.04 (.40) FR β .02 (.69)	UK β .01 (.79) FR β -.02 (.68)	UK β .01 (.83) FR β -.02 (.71)
<i>Value for money</i>	UK β -.11 (.05) FR β -.03 (.50)	UK β -.04 (.43) FR β .03 (.55)	UK β .00 (.99) FR β -.03 (.51)	UK β .05 (.31) FR β .07 (.17)
<i>Packaging</i>	UK β .03 (.62) FR β -.07 (.12)	UK β -.00 (.96) FR β -.04 (.36)	UK β -.00 (.99) FR β -.09 (.10)	UK β -.11 (.03) FR β -.01 (.80)

Table 3. 19.

Outcomes of the linear regression analyses exploring the impact of demographics on dairy consumption. The table reports all demographic factors tested as potential predictors among respondents in the UK (UK) and France (FR), and their standardised β values and p-values in brackets. Predictors found to significantly impact consumption are reported in bold.

Demographics	Milk	Yoghurt and other fermented dairy	Hard cheese	Soft cheese
<i>Seasonality</i>	UK β -.10 (.07) FR β -.01 (.75)	UK β -.07 (.21) FR β -.01 (.82)	UK β .07 (.18) FR β -.09 (.08)	UK β -.01 (.76) FR β -.02 (.64)
<i>Following a diet limiting animal-based products, i.e., vegetarian, ovo- vegetarian, lactose- vegetarian, flexitarian / Not following a diet</i>	UK β .30 (<.001) FR β .10 (.06)	UK β .21 (.00) FR β .03 (.49)	UK β .17 (.00) FR β -.05 (.37)	UK β .22 (<.001) FR β .00 (.90)
<i>Following a lactose- free</i>	UK β .05 (.30) FR β .08 (.06)	UK β .13 (.01) FR β -.04 (.36)	UK β -.02 (.62) FR β -.00 (.87)	UK β -.01 (.71) FR β -.03 (.59)
<i>Total number of product categories completed in the questionnaire (1 to 5, including PBDA)</i>	UK β -.04 (.30) FR β -.09 (.05)	UK β -.07 (.16) FR β .10 (.03)	UK β -.00 (.98) FR β .08 (.13)	UK β .05 (.28) FR β .08 (.10)
<i>Average frequency of consumption of product category</i>	UK β -.16 (.00) FR β .30 (<.001)	UK β .00 (.99) FR β .32 (<.001)	UK β -.03 (.54) FR β .17 (.01)	UK β .04 (.44) FR β .28 (.00)
<i>Male/female</i>	UK β -.02 (.69) FR β .04 (.37)	UK β -.05 (.33) FR β -.08 (.09)	UK β -.03 (.54) FR β -.04 (.46)	UK β -.05 (.27) FR β -.05 (.30)
<i>Binary/other</i>	UK β -.09 (.10) FR β .00 (.89)	UK β -.00 (.93) FR β .02 (.58)	UK β -.04 (.36) FR β -.03 (.53)	UK β -.03 (.54) FR β .05 (.31)
<i>Age</i>	UK β .06 (.42) FR β .01 (.81)	UK β .09 (.19) FR β .01 (.79)	UK β .08 (.22) FR β .01 (.84)	UK β .08 (.21) FR β .09 (.13)
<i>BMI</i>	UK β -.01 (.76) FR β .00 (.95)	UK β -.01 (.72) FR β -.02 (.56)	UK β .00 (.87) FR β -.00 (.94)	UK β .04 (.32) FR β -.05 (.31)

<i>City</i>	UK β -.11 (.04) FR β -.13 (.00)	UK β -.00 (.97) FR β .08 (.09)	UK β .04 (.36) FR β .05 (.34)	UK β -.03 (.49) FR β .04 (.36)
<i>Higher education</i>	UK β -.11 (.05) FR β .03 (.50)	UK β -.12 (.01) FR β -.05 (.31)	UK β -.08 (.08) FR β -.07 (.18)	UK β -.05 (.29) FR β -.09 (.06)
<i>Student</i>	UK β -.11 (.14) FR β -.02 (.65)	UK β .00 (.94) FR β .06 (.29)	UK β -.08 (.21) FR β .00 (.98)	UK β .06 (.33) FR β .11 (.05)
<i>Non-employed</i>	UK β .04 (.38) FR β .00 (.86)	UK β .09 (.08) FR β -.03 (.46)	UK β .01 (.78) FR β -.09 (.07)	UK β .00 (.96) FR β -.02 (.65)
<i>Living with adults</i>	UK β -.04(.42) FR β .01 (.85)	UK β -.10 (.07) FR β .05 (.39)	UK β .02 (.68) FR β .01 (.84)	UK β -.03 (.52) FR β -.02 (.67)
<i>Living with children</i>	UK β .08 (.11) FR β .17 (.02)	UK β .07 (.24) FR β .21 (.02)	UK β .08 (.18) FR β .05 (.47)	UK β -.02 (.72) FR β .20 (.03)
<i>Eating alone or with someone else</i>	UK β .02 (.72) FR β -.01 (.77)	UK β -.05 (.43) FR β -.03 (.55)	UK β .01 (.80) FR β -.06 (.35)	UK β -.03 (.51) FR β .01 (.84)
<i>Weekly budget</i>	UK β .00 (.97) FR β .04 (.75)	UK β .13 (.12) FR β .06 (.31)	UK β .01 (.88) FR β -.12 (.37)	UK β .05 (.46) FR β .13 (.33)
<i>Weekly food budget</i> France was tested due to collinearity with weekly budget	UK β .07 (.44)	UK β .13 (.13)	UK β .12 (.18)	UK β .06 (.39)
<i>Holidays abroad</i>	UK β -.05 (.28) FR β .01 (.32)	UK β .00 (.95) FR β .05 (.29)	UK β .07 (.16) FR β -.00 (.31)	UK β .06 (.19) FR β -.00 (.95)

Table 3. 20.

Positive and negative statements per sub-theme (Table 3.8). Each sub-theme was entered into the regression analysis models and tested as a predictor of consumption.

Sub-theme	Positive statement	Negative statement
Sensory	I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
Composition	It is natural	It is too processed
Non-sensory	Consuming it boosts my health	It is unhealthy
Mode of consumption	I can consume it on its own, in recipes or in combination with some foods	I cannot use this product in many ways
Preferences	I like this product	I do not enjoy consuming it
Personal reasons	I never experience body symptoms when consuming it I have always consumed this product	Body symptoms occur when I consume this product I did not consume it while growing up
Knowledge	It contributes to a balanced diet	As an adult, I do not need to consume it to be healthy Reducing its consumption will benefit my health
Attitudes and concerns	It is environmentally friendly It is animal friendly	It is not sustainable Reducing its consumption will benefit the environment
Needs or cravings	I consume it when I want to treat or reward myself	I would not consume it on special occasions
Structure of the meal	I would finish a meal with this product	This product is not suitable as the final course of a meal
Social norms	I consume it because of my family/friends	No one I know consumes this as I do
Use	It is common to consume it in my culture	It is unusual to consume this product in my culture
Categorisation	I consume it because it is a good source of protein	It is a totally different category of food from meat/eggs/tofu
Availability	I can find it in the shops	It is not always available where I shop
Alternative	It is a good replacement for other foods	This cannot be used to replace other products
Value for money	It is worth the price	It is too expensive
Packaging	I can consume what I buy within the expiration date	It expires too quickly I often waste it

3.4.2.4.3. Principal Component Analyses

A Principal Component Analysis (PCA) was run on the complete dataset of both samples, for each product category. Overall all PCA reported significant Bartlett's tests ($p=.000$ for all dairy products and $p<.001$ for PBDA) and KMO scores between .795 and .857, a high data adequacy for running PCA (Shrestha, 2021). For milk, results show a KMO score of .802, and five components explaining 57% of variance. Results for yoghurt and other fermented dairy products show a KMO score of .795, and five components explaining 61% of the variance. Results for soft cheese show a KMO score of .856, and four components explain 57.5% of variance, while for hard cheese KMO score is .857, and four components explain 56.6% of variance. Table 3.21 reports how the different attitudes are divided into components, and Table 3.22 reports labels for each component, covered variance, and the attitudes included.

Table 3. 21.

Outcomes of the PCA. The table shows each attitude was divided into components among dairy categories and their scores. In brackets, the number of the components they were included in.

Sub-theme	Yoghurt and other fermented Hard cheese			
	Milk	dairy	cheese	Soft cheese
<i>Sensory</i>	(1) .653	(1) .726	(1) .779	(1) .760
<i>Composition</i>	(3) .501	(2) .772	(2) .782	(2) .782
<i>Non-sensory</i>	(1) .426	(2) .671	(3) .503	(2) .538
<i>Mode of consumption</i>	(1) .575	(3) .636	(4) .511	(1) .573
<i>Preferences</i>	(1) .802	(1) .815	(1) .842	(1) .816
<i>Personal reasons</i>	(1) .687	(1) .721	(1) .732	(1) .730
<i>Knowledge</i>	(2) .521	(2) .794	(2) .781	(2) .772
<i>Attitudes and concerns</i>				(2) .648
	(2) .602	(2) .650	(2) .602	(4) -.445
<i>Needs or cravings</i>				(1) .585
	(3) -.604	(5) .546	(1) .720	(3) -.397

<i>Structure of the meal</i>	(2) .499	(1) .571	(1) .671	(1) .574 (3) -.390
<i>Social norms</i>	(4) .855	(5) -.391	(1) .376	(1) .384
<i>Use</i>	(1) .615	(1) .695	(1) .636	(1) .659
<i>Categorisation</i>	(5) .732	(2) .561	(3) -.495	(2) .519 (3) -.415
<i>Availability</i>	(2) -.556	(1) .623	(4) .490	(1) .557
<i>Alternative</i>	(2) .410	(4) .550	(3) -.512	(2) .557
<i>Value for money</i>	(1) .523	(4) -.452	(4) -.384	(1) .422
<i>Packaging</i>	(1) .529	(1) .659	(1) .636	(1) .631

Table 3. 22.

Labels for each PCA component and included attitudes. In brackets, covered variance.

Product category	Component	Label, (% covered variance)	Attitudes
<i>Milk</i>	Component 1	Individual practices of consumption (24%)	sensory, non-sensory, mode of consumption, preferences, personal reasons, use, value for money, packaging
	Component 2	Beliefs (11.9%)	availability, alternative, structure of the meal, knowledge, attitudes and concerns
	Component 3	Suitability (9%)	composition, needs or cravings
	Component 4	Social norms (6%)	social norms
	Component 5	Categorisation (6%)	Categorisation
<i>Yoghurt and other fermented dairy</i>	Component 1	Individual practices of consumption (22%)	sensory, preferences, personal reasons, structure of the meal, use, availability, packaging
	Component 2	Beliefs (17%)	categorisation, composition, non-

Hard cheese			sensory, knowledge, attitudes and concerns
	Component 3	Mode of consumption (7.6%)	mode of consumption
	Component 4	Supply (7.3%)	alternative, value for money
	Component 5	Occasion (6.6%)	social norms, needs or cravings
	Component 1	Individual practices of consumption (27%)	sensory, preferences, personal reasons, needs or cravings, structure of the meal, social norms, use, packaging
	Component 2	Beliefs (14%)	knowledge, attitudes and concerns, composition
	Component 3	Suitability (7.9%)	alternative, categorisation, non-sensory
	Component 4	Supply (6.7%)	value for money, availability, mode of consumption
	Component 1	Individual practices of consumption (27%)	sensory, mode of consumption, preferences, personal reasons, needs or cravings, structure of the meal, social norms, use, availability, value for money, packaging
	Component 2	Beliefs (16.9%)	alternative, categorisation, composition, non-sensory, knowledge, attitudes and concerns
Soft cheese	Component 3 (all negative scores)	Occasion (7.11%)	categorisation, needs or cravings, structure of the meal
	Component 4 (all negative scores)	Concerns (6.2%)	attitudes and concerns

Table 3.23 reports details of the Mann-Whitney U test, performed to test potential differences between the UK and France. Results are to be considered significant for p-values <0.5. Mean Ranks are reported to have a measure of which country is more represented by the factor.

Table 3. 23.

Outcomes of the Mann-Whitney U tests performed to test whether PCA factors differed by country. Statistics details for the Mann-Whitney U test performed between the two countries, the UK and France (FR). Significant results are reported in bold. Mean ranks are reported to have a measure of which country is more represented by each factor.

Product	Factor	Mann-Whitney-U	Wilcoxon W	Z	p-value	Mean Rank UK	Mean Rank FR
Milk	1	1408	34184	-10.20	<.001	170.92	306.17
Milk	2	19468	655828	-6.83	<.001	307.16	216.54
Milk	3	29146	49246	-.78	.43	246.23	256.63
Milk	4	25667	72027	-2.95	.00	276.17	236.93
Milk	5	28719	48819	-1.05	.29	244.10	258.03
Yoghurt	1	10367.500	31895.500	-13.96	<.001	154.08	349.95
Yoghurt	2	32394.500	92079.500	-1.82	.06	292.50	266.90
Yoghurt	3	32418.500	92103.500	-1.81	.07	292.39	266.97
Yoghurt	4	31106.500	90791.500	-2.53	.01	298.73	263.16
Yoghurt	5	33421.500	54949.500	-1.26	.20	265.46	283.13
Soft cheese	1	11729.500	35819.500	-13.78	<.001	163.56	357.40
Soft cheese	2	30494.500	89834.50	-3.81	<.001	314.76	261.15
Soft cheese	3	36640.500	95980.50	-.54	.58	286.69	279.01
Soft cheese	4	33507.500	57597.50	-2.21	.02	263.00	294.09
Hard cheese	1	11693	36224	-14.20	<.001	163.91	366.65
Hard cheese	2	31171	94717	-4.19	<.001	325.95	266.06
Hard cheese	3	38130	62661	-.62	.53	283.53	292.39
Hard cheese	4	36927	61458	-1.23	.21	278.09	295.77

Results of the Mann-Whitney U test show that, despite the dairy category, mean ranks were higher in France for each PC1, but higher in the UK for each PC2. For other factors, i.e., PC3, PC4, and PC5 (when present), the country with higher mean ranks changed based on the product.

3.4.2.5. Reasons for organic, local, and changes in dairy consumption

3.4.2.5.1. Organic dairy consumption

Among respondents (n=325 in the UK, n=460 in France), 55% of participants in the UK and 50% in France reported consuming organic dairy products. When asked about reasons for consumption and non-consumption, as shown in Figure 3.15, the majority of participants consuming it, reported considering it healthier and tasting better, while participants who did not consume it at the time of the study, reported as main reasons the cost, i.e., finding it more expensive, but also finding no difference between organic and non-organic products. A third reason for non-consumption was due to lower availability. The main reasons for consumption and non-consumption were the same in both countries.

3.4.2.5.2. Local dairy consumption

Among respondents (n=325 in the UK, n=460 in France), 57% of UK participants and 43% of French respondents reported consuming local dairy products. Results (Figure 3.16) reflect results in the organic section above. Most participants consuming local dairy reported considering it healthier and tasting better. Participants who did not consume it justified it as expensive, and they did not find differences between local and non-local. As well as organic products, local dairy was perceived as less available.

3.4.2.5.3. Differences in organic and local consumption

Figure 3.17 shows the total respondents for each sample, consuming or not organic and local dairy products. Chi-Square tests were performed to test differences between the two samples, details about statistics are reported in Table 3.24.

Figure 3. 15. Reasons [percentages] for consumption (on the left) and non-consumption (on the right) of organic dairy products in the UK (above) and France (below).

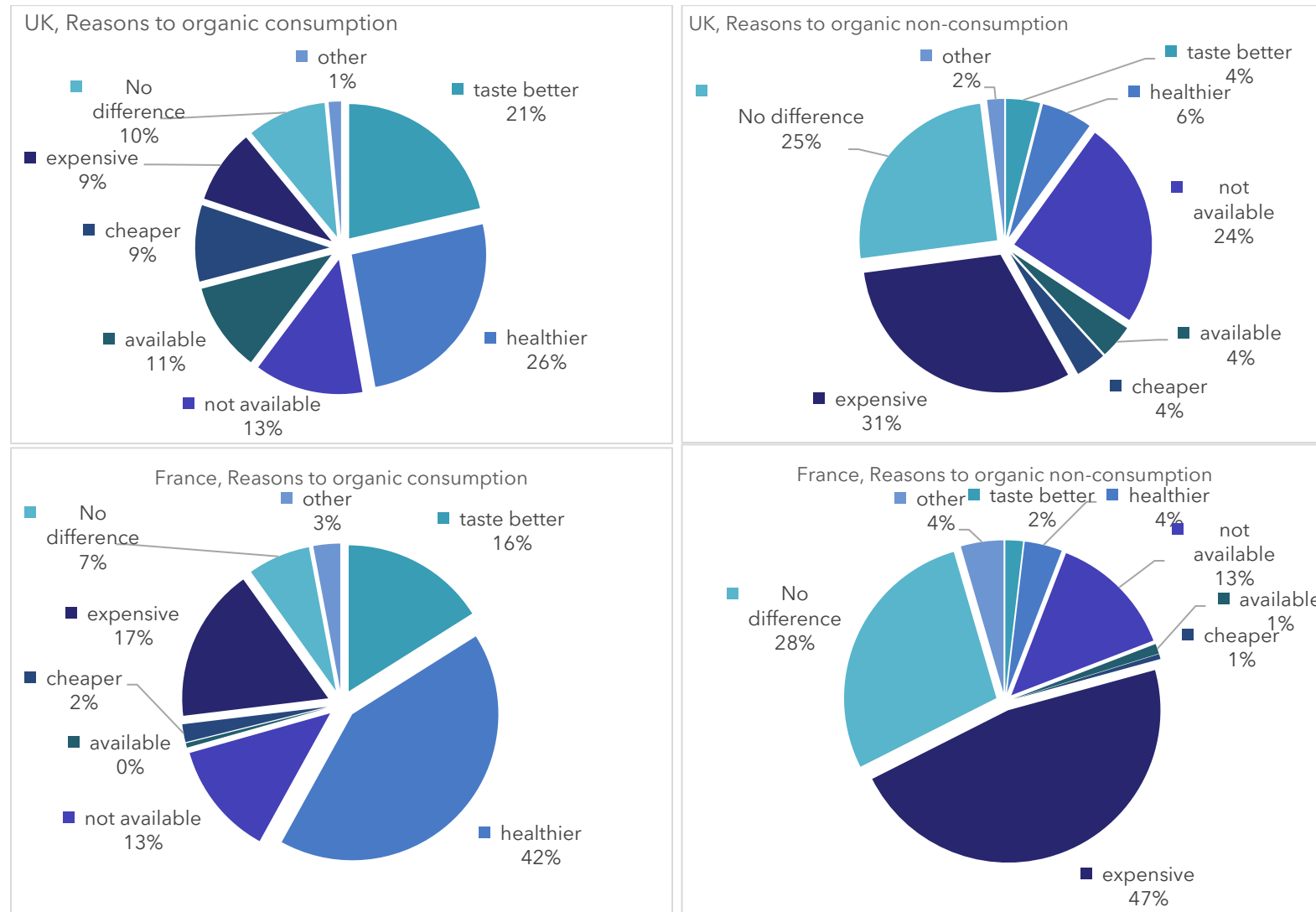


Figure 3. 16. Reasons [percentages] for consumption (on the left) and non-consumption (on the right) of local dairy products in the UK (above) and France (below).

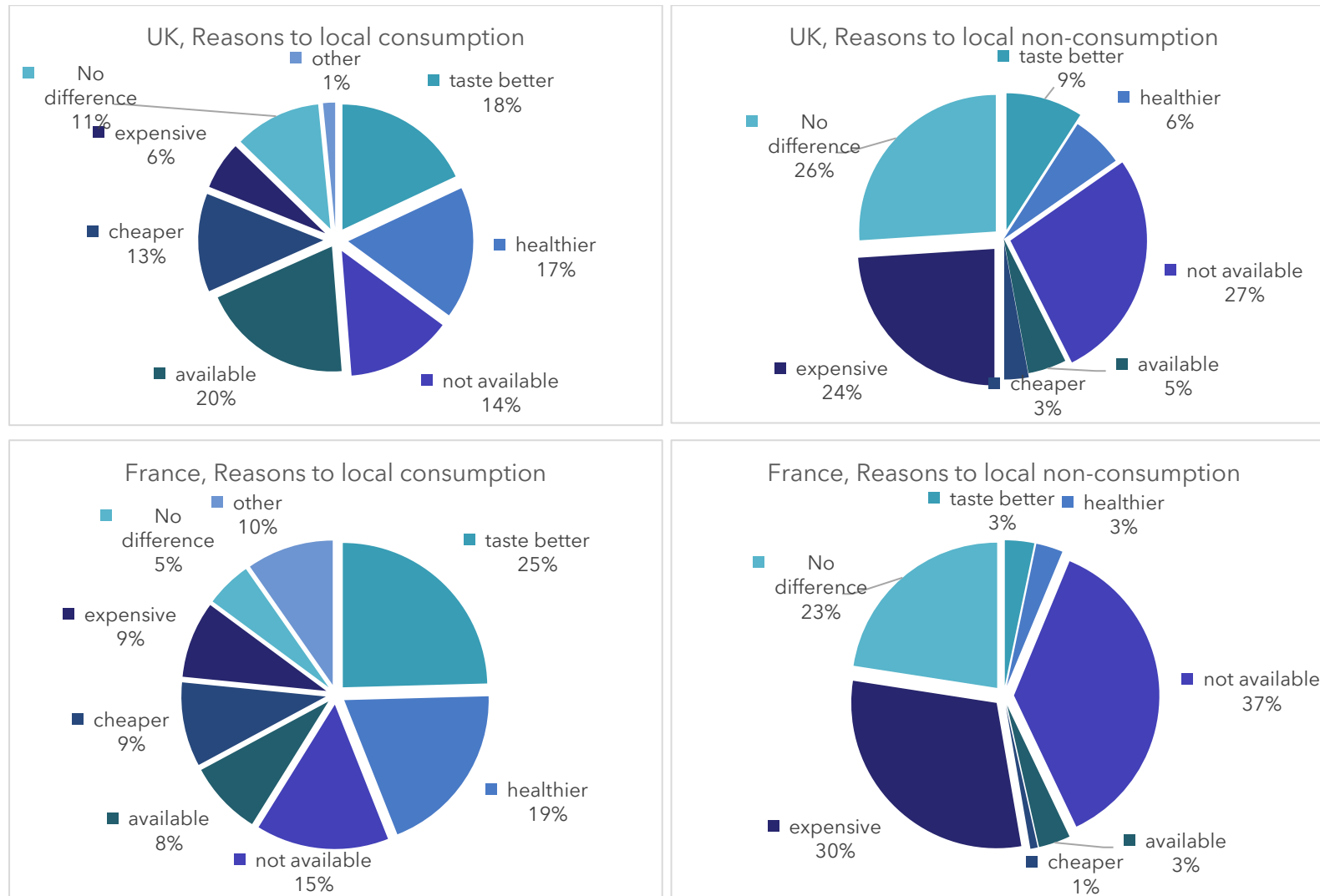
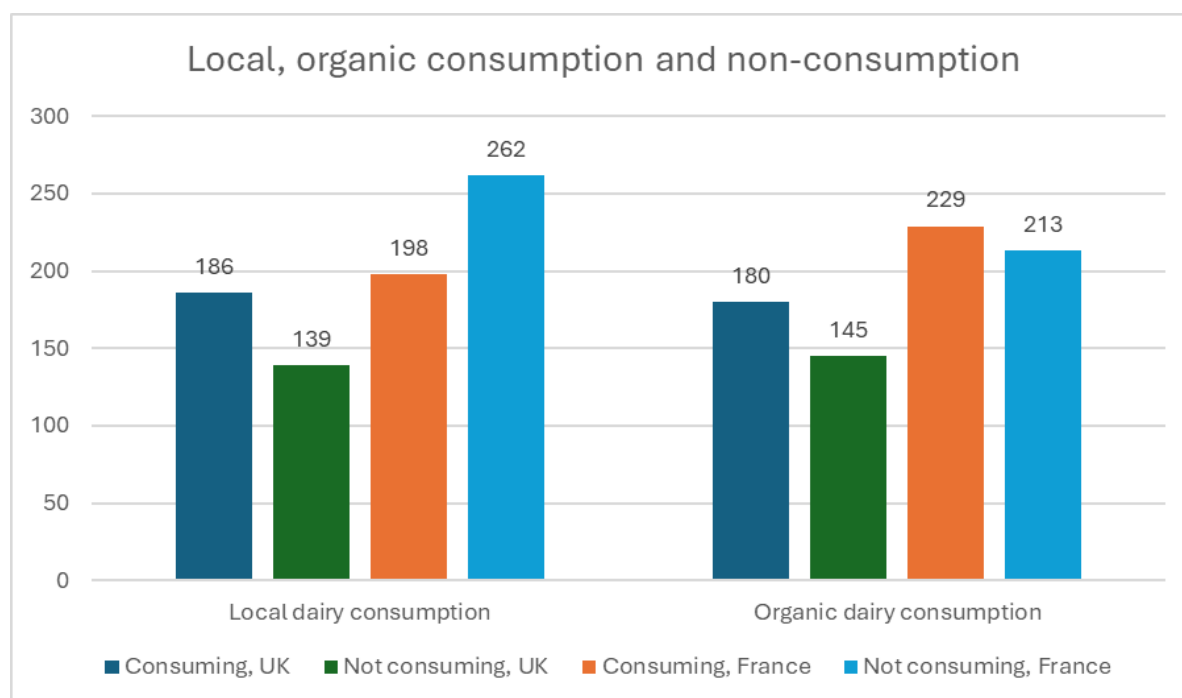


Figure 3. 17.

Number of respondents in each sample, reporting consumption and non-consumption of organic and local dairy products.

**Table 3. 24.**

Outcomes of the Two-sample Chi-Square tests performed to test association between local and organic consumption (separately) and countries. Statistics details for Chi-Square tests for significant and non-significant results. Sample sizes are reported in total and for each country as n= (no);(yes).

Category	Pearson Chi-Square	DF	N of valid cases	Asymptotic significance
Local dairy consumption	15.340	1	785 UK 139;186 FR 262;198	<.001
Organic dairy consumption	2.395	1	785 UK 145;180 FR 213;229	.122

3.4.2.5.4. Voluntary changes in the previous 6 months

Among the 785 participants (UK n=325) answering about voluntary changes in consumption during the previous 6 months, 43% in the UK and 67% in France reported no changes. However, among respondents reporting a change, the majority (36% in the UK, and 23% in France) reported consuming fewer dairy products. Figure 3.18 shows the main reasons for changes. Again, the main reasons are health and diet-related in both countries, with an exception in France with reasons for consuming more dairy mostly related to external factors, e.g. reasons related to the living situation or household, availability. Even if it was not one of the first three reasons, cost was again one of the major reasons for decreasing consumption.

3.4.2.5.5. Voluntary changes in the future 6 months

Figure 3.19 reports reasons for voluntary future changes. A total of 783 respondents (UK n=323) answered about their willingness to change dairy consumption in the next 6 months. In the UK, 50% of them answered that they were not thinking about modifying their intake, while 30% wanted to consume fewer dairy products and 20% wanted to consume more. In France, while 74% of them reported not wanting to change intake, 19% of them would like to reduce their consumption and only 7% to increase it. Figure 20 shows the main reasons for these voluntary changes. Among the reasons for consuming less, particularly in France, sustainability covers an important role, along with health- and diet-related reasons.

Figure 3. 18.

Reasons [percentages] for changes increasing (above) and decreasing (below) consumption of dairy products in the UK (on the left) and France (on the right).

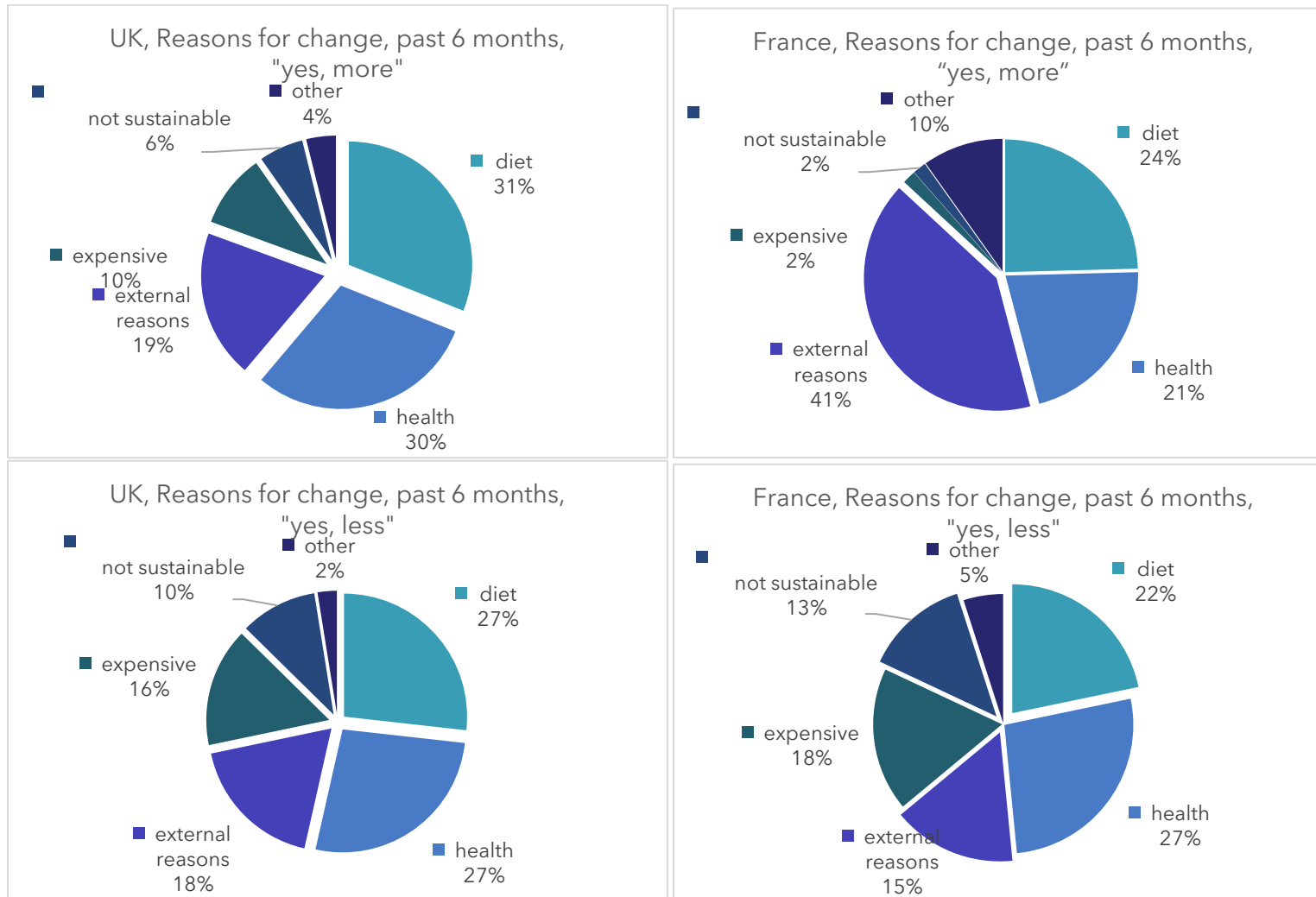
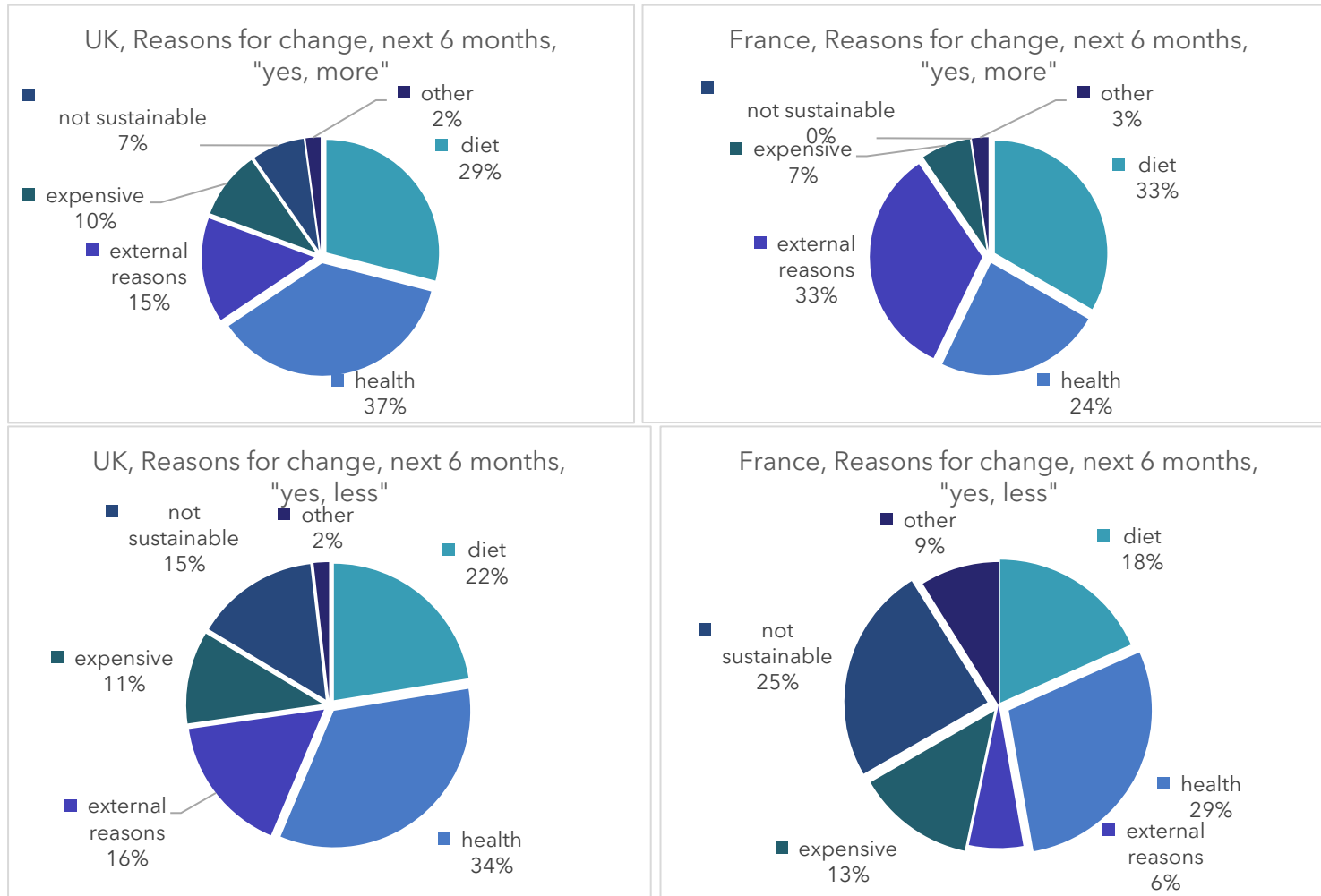


Figure 3. 19.

Reasons [percentages] for changes increasing (above) and decreasing (below) consumption of dairy products in the UK (on the left) and France (on the right).

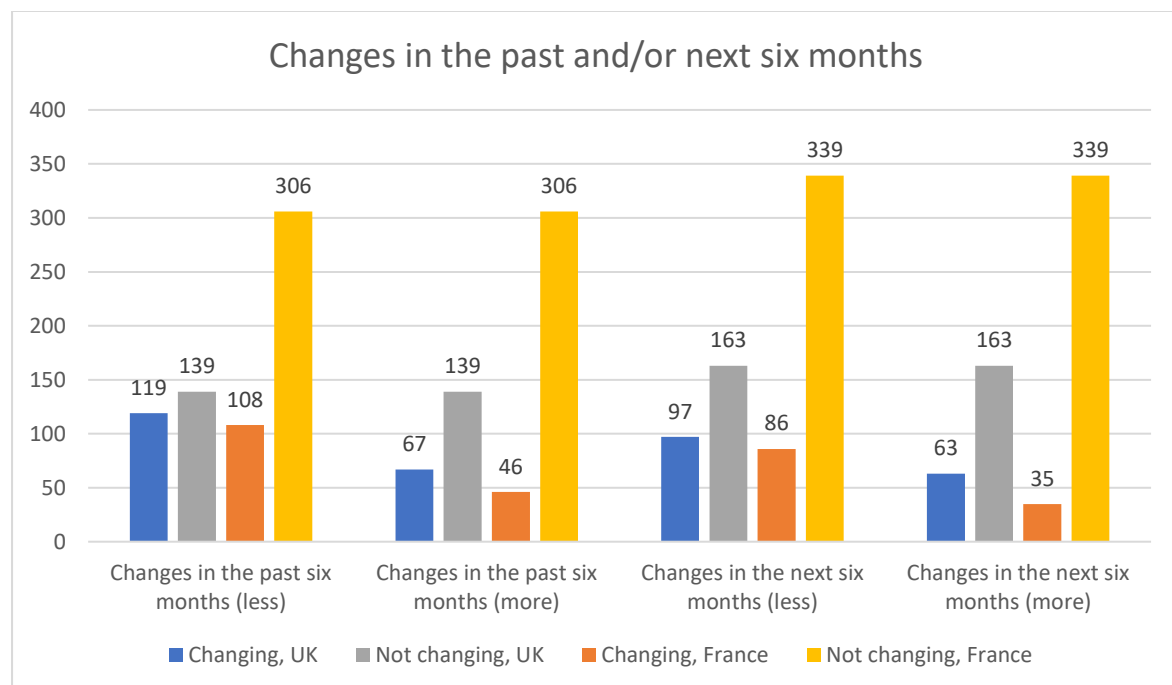


3.4.2.5.6. Differences in changes in dairy consumption

Figure 3.20 shows the total respondents for each sample reporting changing or not their dairy consumption in the six months before completing the questionnaire, or their (non-) willingness to change their dairy consumption in the future. The majority of participants in France reported no change, and no willingness to change in the recent future. Participants in the UK reported more variable answers in both questions.

Figure 3. 20.

Number of respondents in each sample, reporting changing or willingness to change dairy consumption, or not.



Chi-Square tests were performed to test differences between the two samples, details about statistics are reported in Table 3.25. Changes in consumption were tested twice, for negative answers and increasing in consumption, and another time for negative answers and decreasing in consumption.

Table 3. 25.

Outcomes of the Two-sample Chi-Square tests performed to test association between potential changes in consumption and countries. Statistics details for Chi-Square test for significant and non-significant results. Sample sizes are reported in total and for each country as n= (no);(yes).

Category	Pearson Chi- Square	Df	N of valid cases	Asymptotic significance
<i>Changes in the past six months (less)</i>	28.528	1	672 UK 139;119 FR 306;108	<.001
<i>Changes in the past six months (more)</i>	708.682	4	672 UK 139;67 FR 306;46	<.001
<i>Changes in the next six months (less)</i>	24.015	1	685 UK 163;97 FR 339;86	<.001
<i>Changes in the next six months (more)</i>	725.357	4	685 UK 163;63 FR 339;35	<.001

3.4.2.6. Reasons for non-consumption of non-consumed dairy categories

Figures 3.21-3.25 report the main reasons for non-consumption of non-consumed product categories. Although participants were asked to select the three main reasons, answers have been grouped with no reference to ranking. Only participants reporting not consuming dairy were completing this section. Along with sensory characteristics, individual-related aspects, e.g., body symptoms, were classified as the main reasons for non-consumption.

Figure 3. 21.

Reasons [total percentages] for dairy non-consumption in the UK (n=53, on the left) and France (FR, n=31, on the right). UK “other” included: lactose intolerance (1).

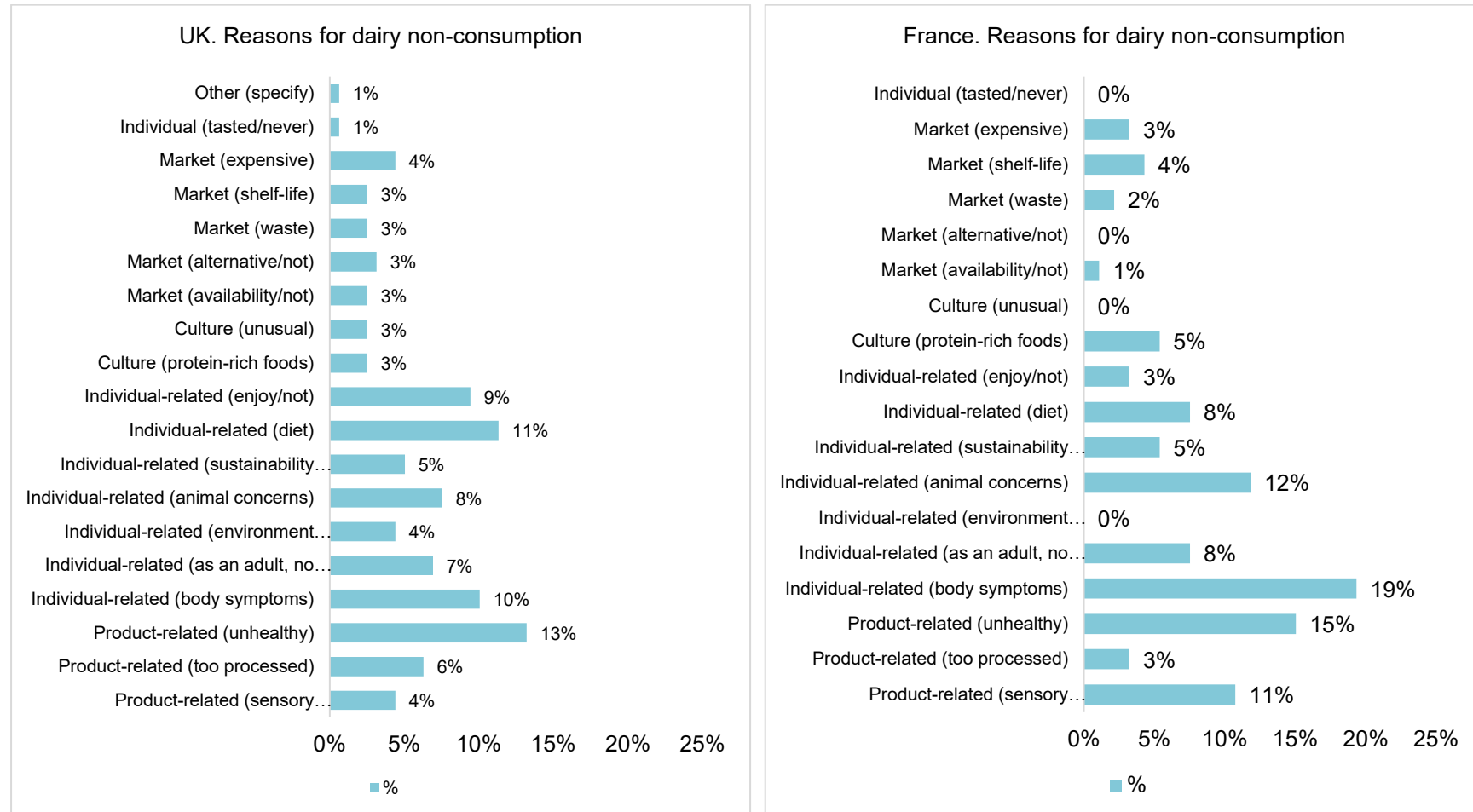


Figure 3. 22.

Reasons [total percentages] for milk non-consumption in the UK (n=83, on the left) and France (FR, n=136, on the right). "Other" in France included: digestive issues (5), actively preferring other dairy (1), no occasion to eat (1), no desire (1), too caloric dense (1).

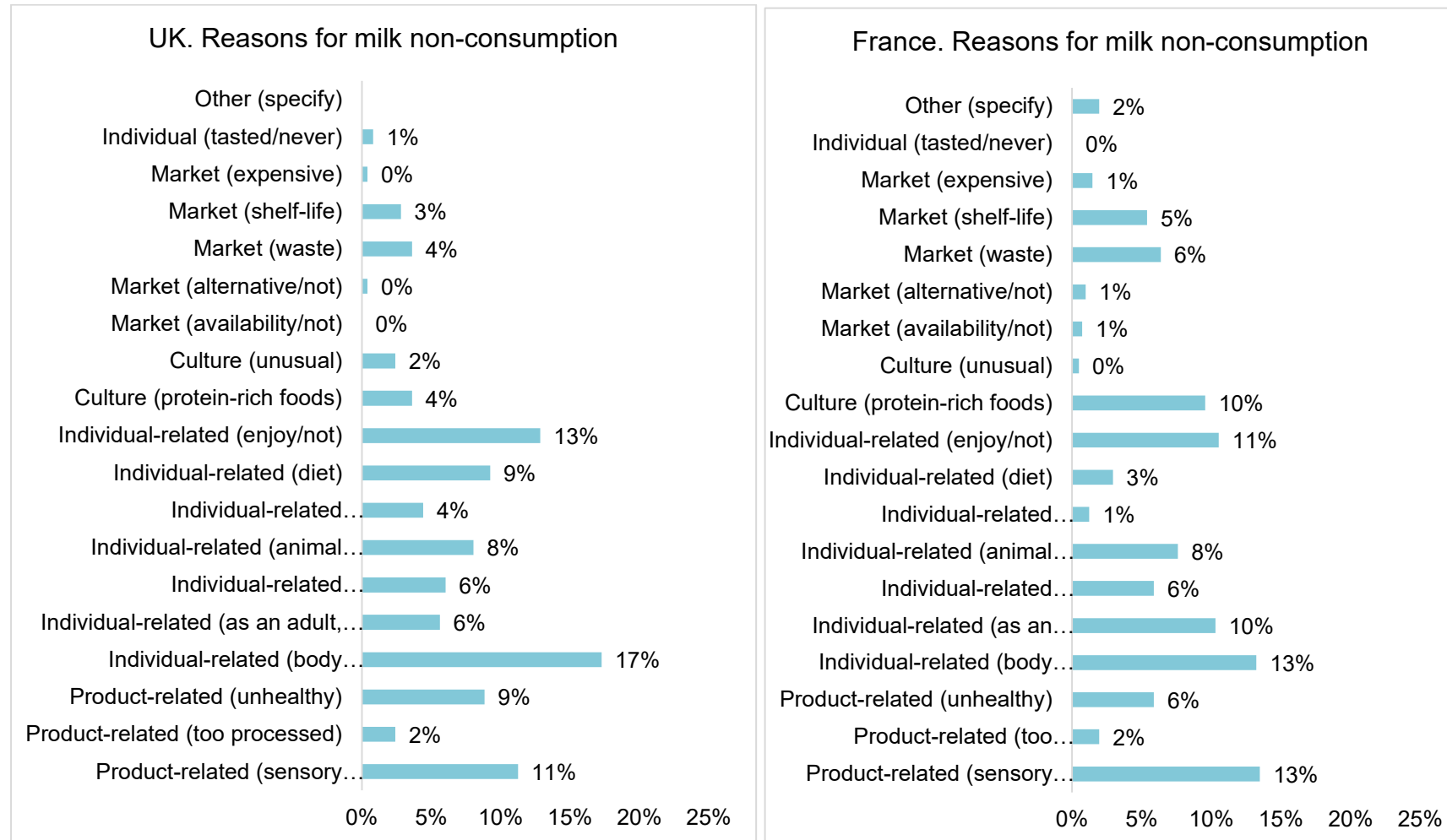


Figure 3. 23.

Reasons [total percentages] for yoghurt and fermented dairy non-consumption in the UK (n=78, on the left) and France (FR, n=78, on the right).
 “Other” in France included: no particular liking (1), no desire to eat it (1).

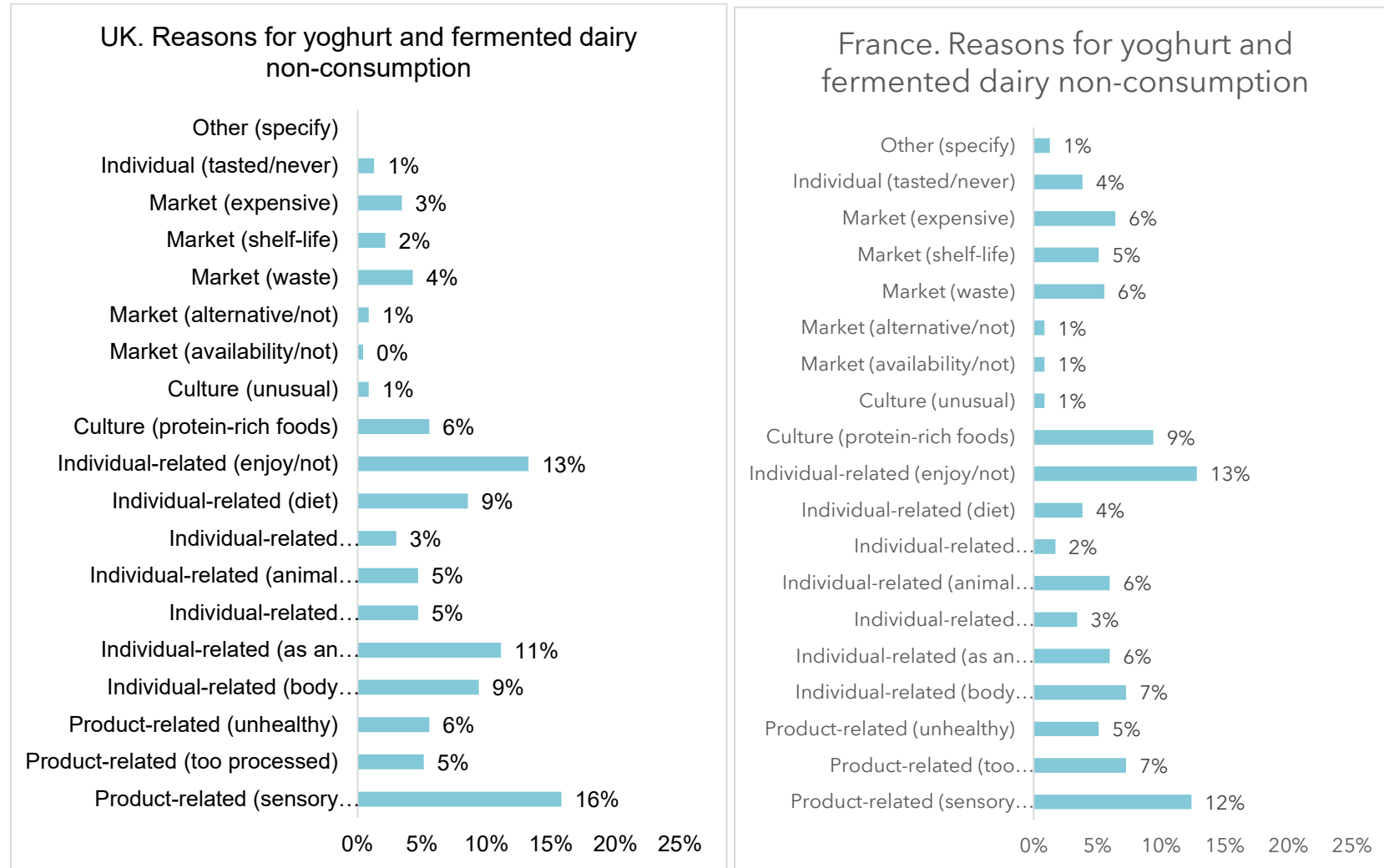
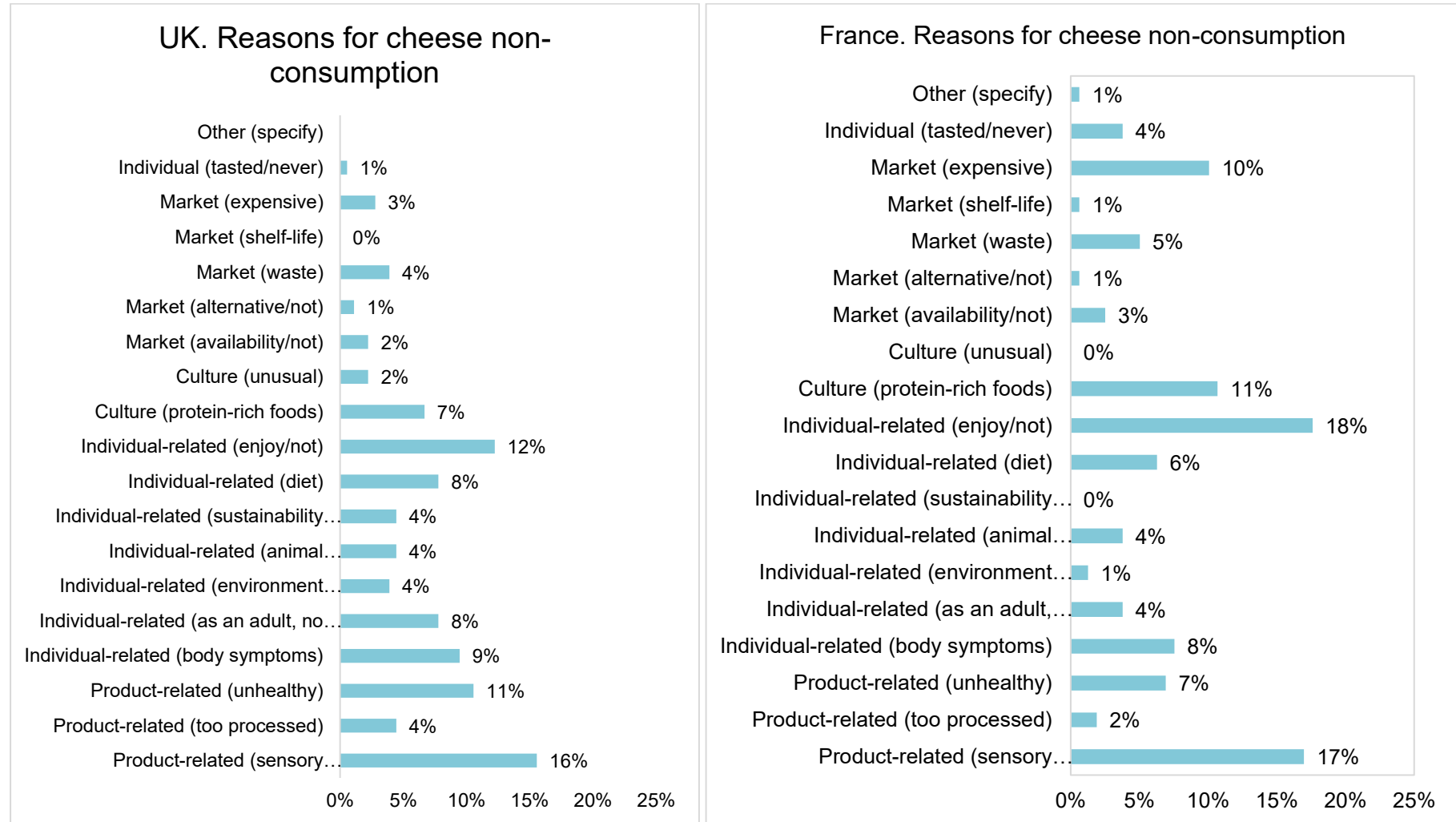


Figure 3. 24.

Reasons [total percentages] for cheese (hard and soft) non-consumption in the UK (n=60, on the left) and France (FR, n=53, on the right).
 “Other” in France included: no desire to consume it (1).

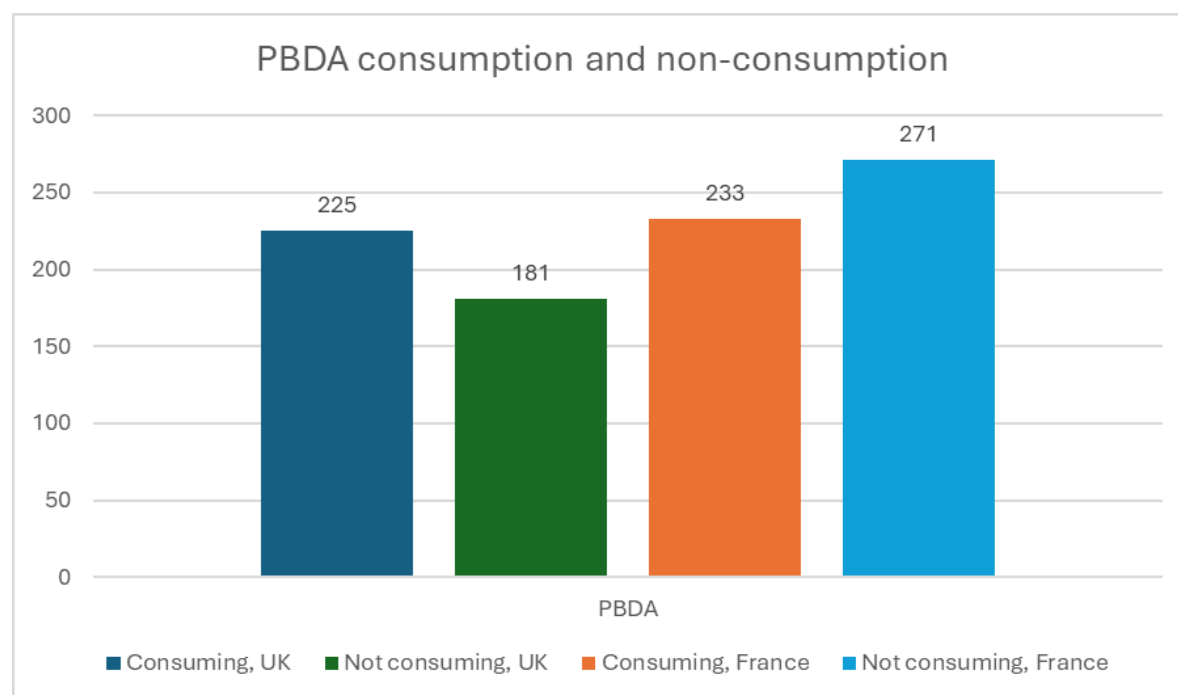


3.4.3. PBDA consumption

In the UK, 225 (55%) participants reported consuming PBDA products and 181 not consuming them, while in France 233 (46%) respondents were consuming them at the time of the study and 271 were reporting to not consuming them (Figure 3.25). This was the least consumed category explored in the survey. Non-consumption was particularly higher in France, with more than 50% of respondents reporting not consuming PBDA.

Figure 3. 25.

Number of respondents reporting consuming and non-consuming PBDA.



A Chi-Square was performed to test differences between the samples. Main statistics are reported in Table 3.26.

Table 3. 26.

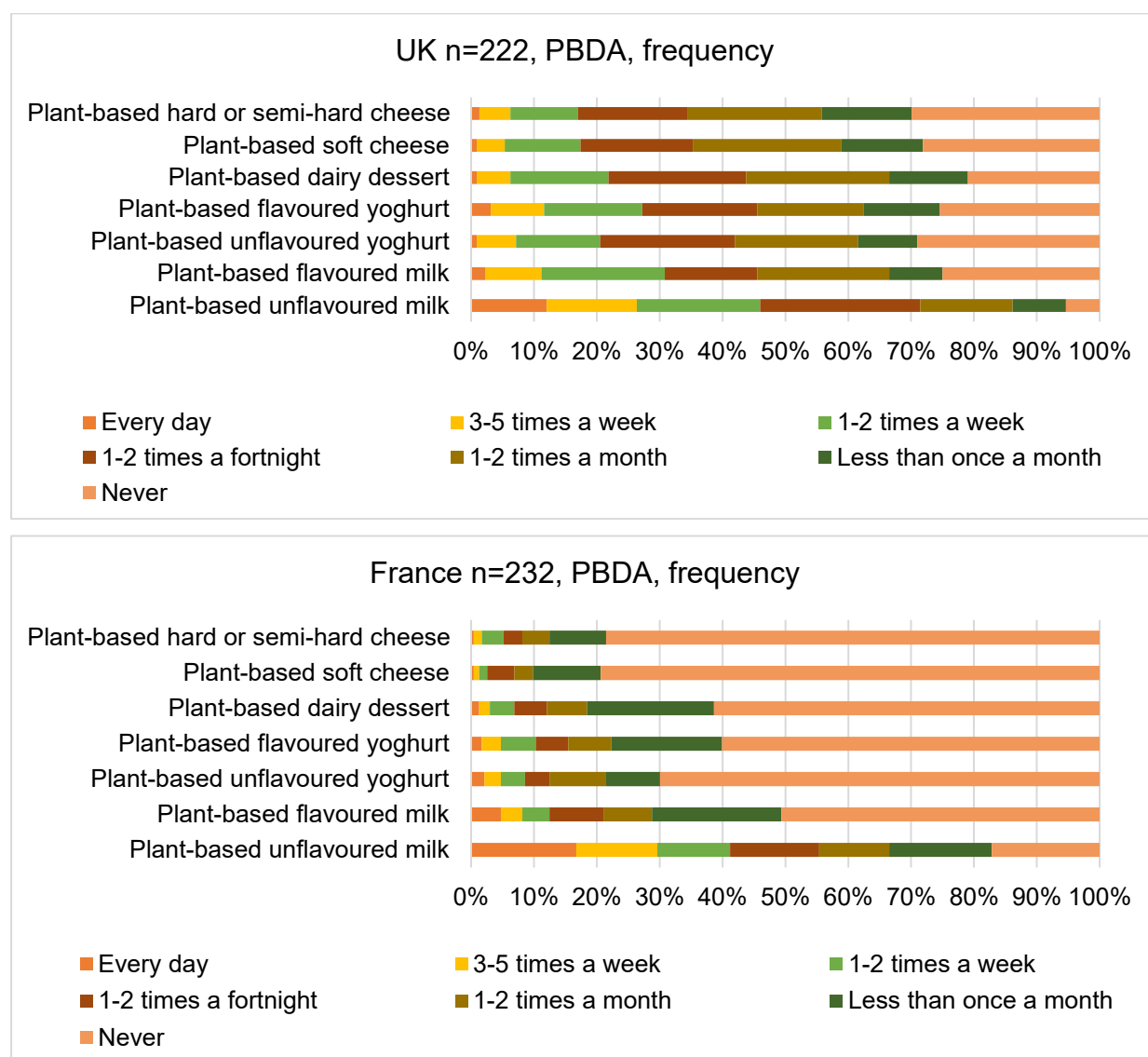
Outcomes of the Two-sample Chi-Square tests were performed to test association between PBDA consumption and countries. Statistics of Chi-Square test performed to test differences between the UK and French samples. Sample sizes are reported in total and for each country as n= (no);(yes).

Category	Pearson Chi-Square	DF	N of valid cases	Asymptotic significance
PBDA	7.594	1	910 UK 181;225 FR 271;233	.00

The same considerations made for dairy are valid as well for the frequency of PBDA. English sample reported more variable consumption of different PBDA products (Figure 3.26), while more than 50% of the French sample selected the same product as frequently consumed and the others occasionally consumed in the month.

Figure 3. 26.

Most consumed [percentages] PBDA products in the UK (n=222, above) and France (n=232, below).



Tables 3.27 shows the scores for each PBDA type in each country, and statistics details for Welch ANOVA, while Table 3.28 reports scores and statistics for the entire PBDA section.

Table 3. 27.

Frequency consumption in a monthly scale (30-day month) of each PBDA type, and statistics details for Welch ANOVA. Welch ANOVA tests were performed to test if differences in means were statistically significant. Results, in bold, are significant per $p < .05$.

		UK score	times in a month UK	FR score	times in a month FR	Statistic	df1	df2	sig.
PBDA	Plant-based unflavoured milk	0.270	8.10	0.282	8.45	0.138	1	450.457	.71
	Plant-based flavoured milk	0.136	4.08	0.091	2.72	5.178	1	450.403	.02
	Plant-based unflavoured yoghurt	0.102	3.06	0.053	1.59	10.495	1	454.394	.00
	Plant-based flavoured yoghurt	0.137	4.10	0.056	1.69	20.723	1	413.788	<.001
	Plant-based dairy dessert	0.104	3.13	0.042	1.26	21.768	1	446.678	<.001
	Plant-based soft cheese	0.089	2.67	0.019	0.58	38.728	1	360.858	<.001
	Plant-based hard or semi-hard cheese	0.092	2.75	0.025	0.75	29.243	1	361.957	<.001

Table 3. 28.

Overall frequency consumption in a monthly scale (30-day month), and statistics details for Welch ANOVA. Welch ANOVA tests were performed to test if differences in means were statistically significant. Results, in bold, are significant per $p < .05$.

	UK score	times in a month UK	FR score	times in a month FR	statistics	d1	df2	sig.
PBDA	0.938	28.14	0.306	9.19	21.942	1	913.819	<.001

Most consumed PBDA types are shown in Figure 3.27, and their contexts of consumption in Figure 3.28. As respondents were selecting the most consumed PBDA product type, it is not possible to directly compare these results to dairy categories. Both countries selected plant-based milks as most consumed PBDA. Compared to the UK, the French sample shows more variance in the contexts of consumption but less in the most consumed products selected.

Figure 3. 27.

Most consumed PBDA in the UK (n=222, on the left) and in France (n=232, on the right).

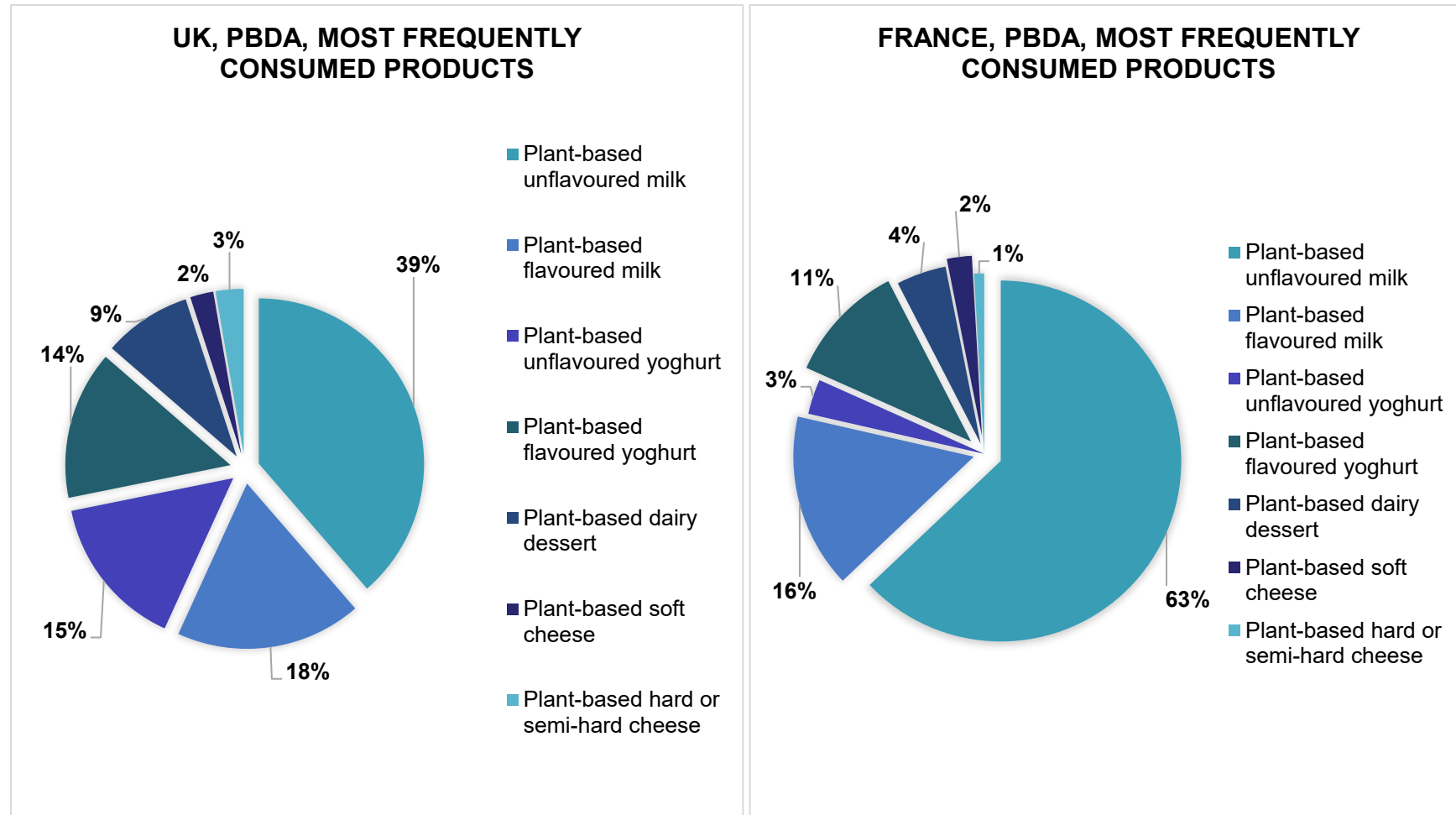
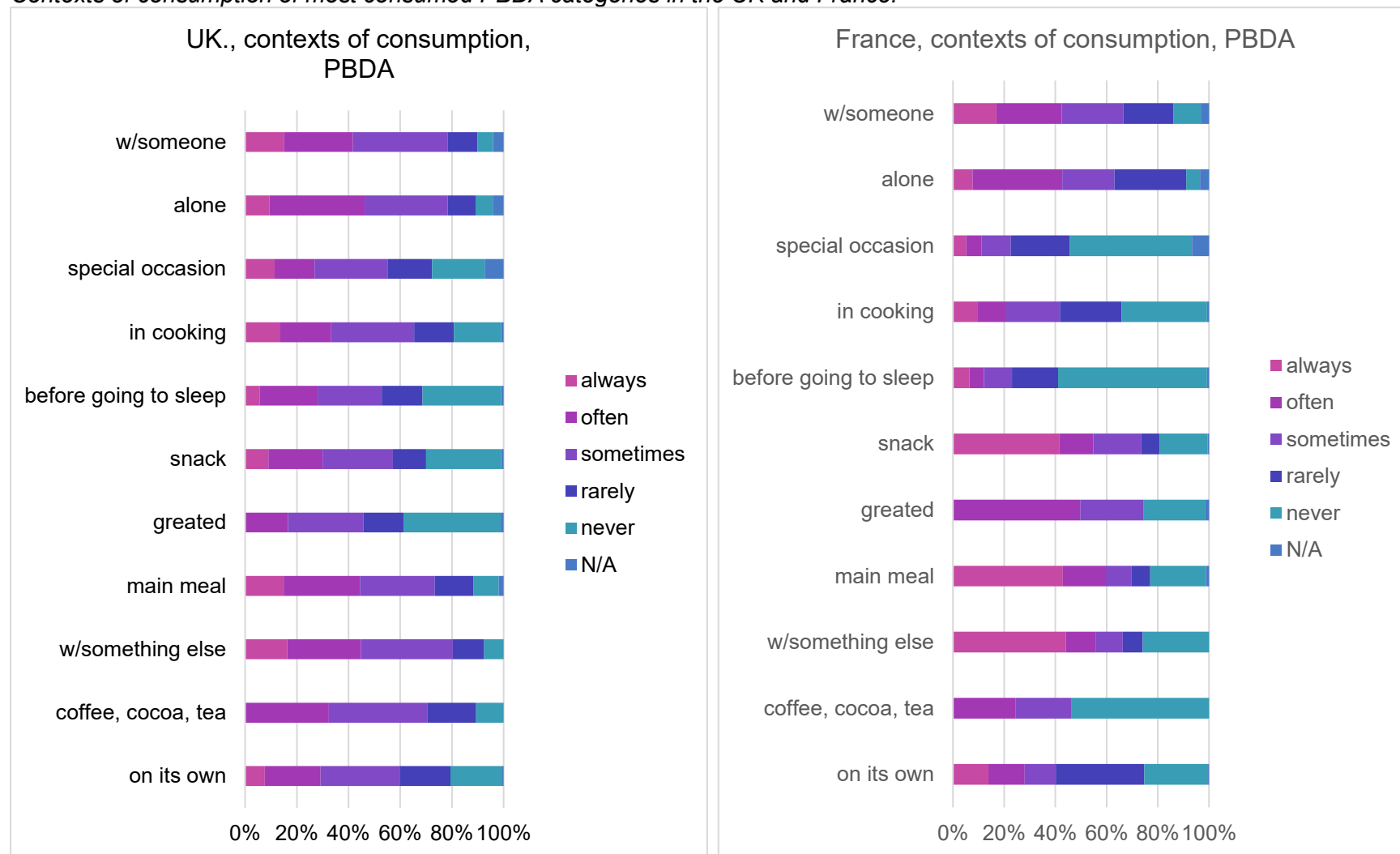


Figure 3. 28.

Contexts of consumption of most consumed PBDA categories in the UK and France.



Two regression analysis models were run for PBDA too. The general regression analyses were significant, $R^2=.474$, $F(38,308)=7.298$, $p<.001$. Different factors were found to significantly predict consumption, and standardised β values for the ones that were found to significantly impact consumption at $p<.05$ can be observed in Table 3.29 (attitudes) and 3.30 (demographics). Table 3.31 reports the statements for each attitude.

Table 3. 29.

Outcomes of the linear regression analyses exploring the impact of attitudes on PBDA consumption. The table reports all attitudes tested as potential predictors, and their standardised β values and p-values in brackets. Predictors found to significantly impact consumption are reported in bold.

Sub-theme	Standardised β values	p-values
Sensory	β .01	.87
Composition	β -.07	.19
Non-sensory	β .07	.16
Mode of consumption	β .04	.32
Preferences	β -.07	.26
Personal reasons	β .03	.55
Knowledge	β .08	.11
Attitudes and concerns	β -.12	.03
Needs or cravings	β .15	<.001
Structure of the meal	β .14	.00
Social norms	β -.02	.66
Use	β -.04	.35
Categorisation	β .09	.06
Availability	β -.09	.06
Alternative	β -.06	.20
Value for money	β .06	.15
Packaging	β .06	.26

Table 3. 30.

Outcomes of the linear regression analyses exploring the impact of demographics on PBDA consumption. The table reports alldemographics factor tested as potential predictors, and their standardised β values and p-values in brackets. Predictors found to significantly impact consumption are reported in bold.

Demographics	Standardised β values	p-values
Seasonality	β .06	.15
Following a diet limiting animal-based products, i.e., vegetarian, ovo-vegetarian, lactose- vegetarian, flexitarian / Not following a diet	β .16	.00
Following a lactose-free	β .06	.20
Vegan	β .01	.91
Total number of product categories completed in the questionnaire (1 to 5, including PBDA)	β -.02	.69
Average frequency of consumption of the product category	β .13	.01
Country	β -.24	<.001
Male/female	β -.08	.09
Binary/other	β -.07	.11
Age	β .03	.56
BMI	β .04	.30
City	β -.06	.15
Higher education	β -.03	.47
Student	β .01	.80
Non-employed	β -.00	.94
Living with adults	β -.01	.06
Living with children	β .01	.71
Eating alone or with someone else	β .12	.02
Weekly budget	β .18	.01
Weekly food budget	β -.01	.85
Holidays abroad	β -.05	.27

Table 3. 31.

Positive and negative statements per sub-theme (Table 3.8). Each sub-theme was entered into the regression analysis models and tested as a predictor of consumption.

Sub-theme	Positive statement	Negative statement
Sensory	I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
Composition	It is natural	It is too processed
Non-sensory	Consuming it boosts my health	It is unhealthy
Mode of consumption	I can consume it on its own, in recipes or in combination with some foods	I cannot use this product in many ways
Preferences	I like this product	I do not enjoy consuming it
Personal reasons	I never experience body symptoms when consuming it	Body symptoms occur when I consume this product
	I have always consumed this product	I did not consume it while growing up
Knowledge	It contributes to a balanced diet	As an adult, I do not need to consume it to be healthy
		Reducing its consumption will benefit my health
Attitudes and concerns	It is environmentally friendly	It is not sustainable
	It is animal friendly	Reducing its consumption will benefit the environment
Needs or cravings	I consume it when I want to treat or reward myself	I would not consume it on special occasions
Structure of the meal	I would finish a meal with this product	This product is not suitable as the final course of a meal
Social norms	I consume it because of my family/friends	No one I know consumes this as I do
Use	It is common to consume it in my culture	It is unusual to consume this product in my culture
Categorisation	I consume it because it is a good source of protein	It is a totally different category of food from meat/eggs/tofu
Availability	I can find it in the shops	It is not always available where I shop
Alternative	It is a good replacement for other foods	This cannot be used to replace other products
Value for money	It is worth the price	It is too expensive
Packaging	I can consume what I buy within the expiration date	It expires too quickly
		I often waste it

Separated linear regressions per country were significant, for PBDA, in the UK $R^2=.545$, $ESEE=.54318$, $F(37,140)=4.529$, $p<.001$, in France, $R^2=.397$, $ESEE=.41588$, $F(37,168)=2.329$, $p<.001$. The same considerations made for dairy are valid for the R^2 and the

ESEE. Tables 3.32-3.34 report predictors in consumption for both samples. Differently from the dairy categories, results found country-specific predictors.

Table 3. 32.

Outcomes of the linear regression analyses exploring the impact of attitudes on dairy consumption. The table reports all attitudes tested as potential predictors of most consumed PBDA consumption among respondents in the UK (UK) and France (FR), and their standardised β values and p-values in brackets. Predictors found to significantly impact consumption are reported in bold.

Sub-theme	PBDA
Sensory	UK β -.03 (.71) FR β .05 (.57)
Composition	UK β .01 (.22) FR β -.01 (.86)
Non-sensory	UK β -.09 (.82) FR β .01 (.26)
Mode of consumption	UK β .12 (.11) FR β .05 (.53)
Preferences	UK β .01(.93) FR β -.16 (.14)
Personal reasons	UK β .08 (.34) FR β .03 (.68)
Knowledge	UK β .09 (.26) FR β .05 (.57)
Attitudes and concerns	UK β -.16 (.06) FR β .00 (.98)
Needs or cravings	UK β .14 (.02) FR β .15 (.07)
Structure of the meal	UK β .09 (.14) FR β .19 (.03)
Social norms	UK β .02 (.71) FR β -.08 (.29)
Use	UK β -.15 (.05) FR β .14 (.07)
Categorisation	UK β .15 (.03) FR β .06 (.42)
Availability	UK β -.09 (.34) FR β -.17 (.02)
Alternative	UK β -.18 (.01) FR β .02 (.78)
Value for money	UK β .09(.21) FR β .08 (.31)
Packaging	UK β .04 (.62) FR β -.01 (.87)

Table 3. 33.

Outcomes of the linear regression analyses exploring the impact of attitudes on PBDA consumption. The table reports all demographic factors tested as potential predictors among respondents in the UK (UK) and France (FR), their standardised β values, p -values in brackets. Predictors found to significantly impact consumption are reported in bold.

Demographics	PBDA
Seasonality	UK β .09 (.19) FR β .05 (.45)
Following a diet limiting animal-based products, i.e., vegetarian, ovo-vegetarian, lactose-vegetarian, flexitarian / Not following a diet	UK β .17 (.05) FR β .013 (.11)
Following a lactose-free	UK β .09 (.19) FR β -.03 (.67)
Vegan	UK β -.00 (.96) FR β -.04 (.69)
Total number of product categories completed in the questionnaire	UK β -.09 (.22) FR β .11 (.26)
Average frequency of consumption of the product category	UK β .03 (.63) FR β .33 (<.001)
Male/female	UK β -.14 (.04) FR β .05 (.54)
Binary/other	UK β -.07 (.21) FR β -.01 (.90)
Age	UK β .06 (.49) FR β -.00 (.97)
BMI	UK β .07 (.26) FR β -.03 (.65)
City	UK β -.07 (.29) FR β -.08 (.28)
Higher education	UK β .03 (.60) FR β -.14 (.08)
Student	UK β .11 (.25) FR β -.08 (.37)
Non-employed	UK β .01 (.87) FR β .03 (.66)
Living with adults	UK β -.05 (.48) FR β -.02 (.83)
Living with children	UK β .03 (.65) FR β -.13 (.15)
Eating alone or with someone else	UK β .06 (.43) FR β .15 (.18)
Weekly budget	UK β .17 (.19) FR β .13 (.21)
Weekly food budget UK only / FR multicollinearity with weekly budget	UK β .08 (.530)
Holidays abroad	UK β -.05 (.44) FR β -.07 (.37)

A principal component analysis has been run, results have a KMO score of .798, and five components explaining 57% of variance. Tables 3.34 and 3.35 report details of each component including attitudes, labels, and covered variances. Table 3.36 reports statistics for the Mann-Whitney-U test performed to test potential differences between countries.

Table 3. 34.

Outcomes of the PCA and how each attitude was divided into components for PBDA consumption, and their scores. In brackets, the number of the components they were included in.

Sub-theme	PBDA
<i>Sensory</i>	(1) .591
<i>Composition</i>	(1) .671
<i>Non-sensory</i>	(1) .535
<i>Mode of consumption</i>	(1) .447
<i>Preferences</i>	(1) .772
<i>Personal reasons</i>	(1) .419
<i>Knowledge</i>	(1) .612
<i>Attitudes and concerns</i>	(1) .699
<i>Needs or cravings</i>	(4) .408
<i>Structure of the meal</i>	(3) .667
<i>Social norms</i>	(2) .611
<i>Use</i>	(2) .593
<i>Categorisation</i>	(5) .502
<i>Availability</i>	(3) -.565
<i>Alternative</i>	(1) .560
<i>Value for money</i>	(2) .456
<i>Packaging</i>	(1) .592

Table 3. 35.

Labels for each PCA components and included attitudes. In brackets, covered variance.

Product category	Component	Label, (% covered variance)	Attitudes
PBDA	Component 1	Sustainability, health, and diets (24%)	sensory, composition, non-sensory, mode of consumption, preferences, personal reasons, knowledge, attitudes and concerns, alternative, packaging
	Component 2	External factors (10%)	value for money, use, social norms
	Component 3	Supply (8.7%)	availability, structure of the meal
	Component 4	Reward (8%)	needs or cravings
	Component 5	Categorisation (6%)	Categorisation

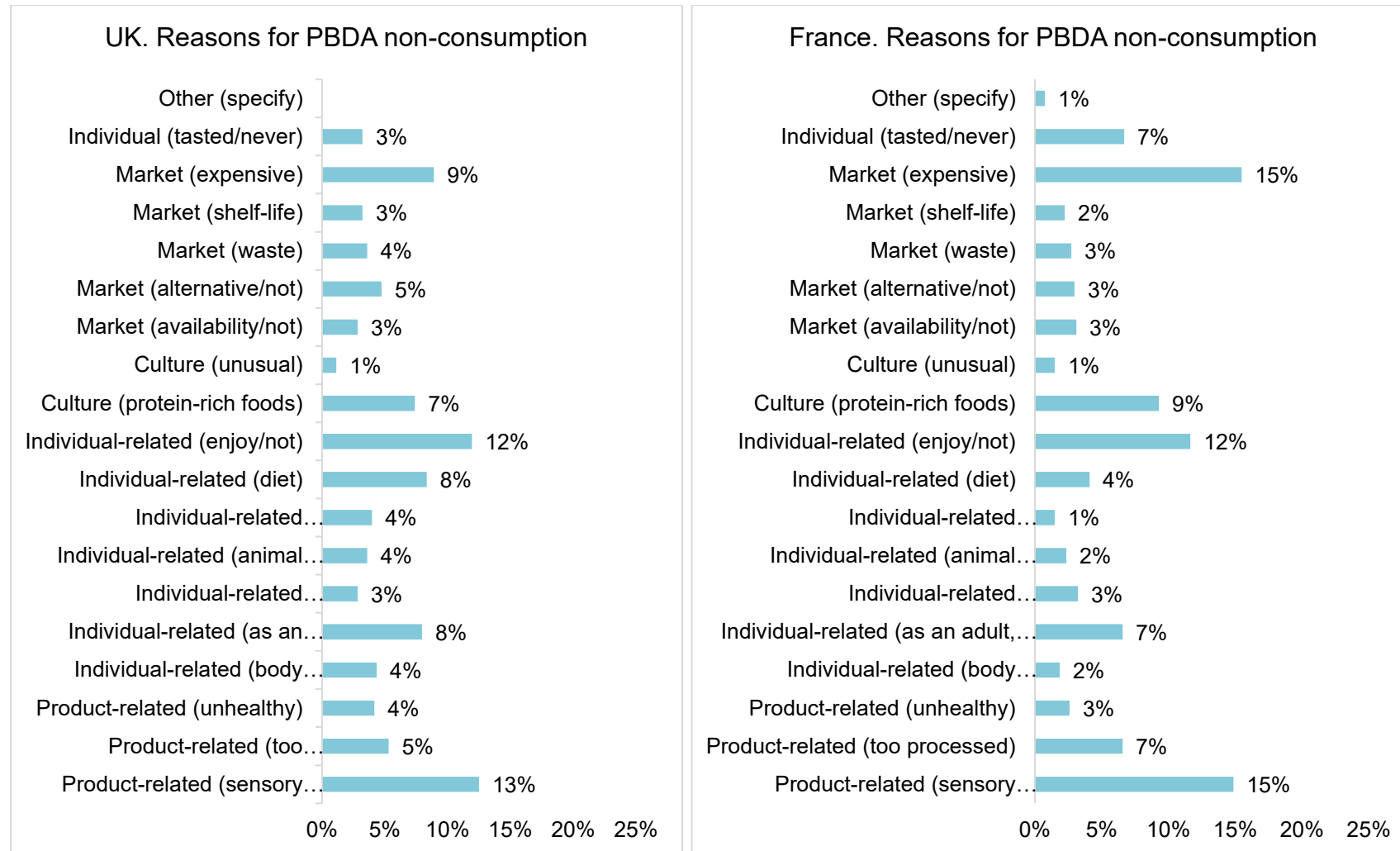
Table 3. 36.

Outcome of the Mann-Whitney U tests performed to test whether PCA factors differed by country. Statistics details for the Mann-Whitney U test performed between the two countries, UK and France (FR). Significant results are reported in bold. Significant results are reported in bold. Mean ranks are reported to have a measure of which country is more represented by each factor.

Product	Factor	Mann-Whitney- U	Wilcoxon W	Z	p- value	Mean Rank UK	Mean Rank FR
PBDA	1	9976.50	26629.50	-5.82	<.001	146.32	209.66
PBDA	2	6731.50	21437.50	-9.21	<.001	225.51	125.37
PBDA	3	14877.50	31530.50	-.71	.47	173.24	181.00
PBDA	4	12951.50	27657.50	-2.72	.001	191.34	161.74
PBDA	5	13818.50	30471.50	-1.81	.06	167.43	187.19

Reasons for non-consumption have been asked of participants reporting non-consuming PBDA too. While these foods as well as product-related and individual-related aspects remain among the main reasons for non-consumption, differences can be seen between countries too (Figure 3.29). The main three reasons selected are the same, but the order (percentage %) is different. While in France the main three reasons for non-consumption are due to PBDA perceived as expensive, reasons related to its sensory characteristics, and lastly disliking, in the UK participants selected disliking as first reason, followed by sensory characteristics, then cost.

Figure 3. 29. Reasons [total percentages] for PBDA non-consumption in the UK (n=176, on the left) and France (FR, n=269, on the right). In France, “other” included: allergies (1), habits (2), no desire to eat this category (1), already consuming other animal-based dairy (1), no valid reason to consume (1).



3.5. Discussion

The main aim of this study was to investigate reasons for consumption and non-consumption of least consumed dairy products. Alongside these, frequency and contexts of consumption were investigated for soft dairy, hard cheese, and PBDA; as well as the reasons for consumption of organic and local dairy products, and voluntary changes in consumption. Results not only show the differences between the two countries but also across the dairy category, among different products. These findings could be particularly valuable when developing a real-life study or new products, as it has been demonstrated that knowing facilitators alongside barriers is necessary to achieve successful tailored real-life strategies in food and health sectors as well as many others (Altintzoglou et al., 2010; Dogherty & Estabrooks, 2015; Léegaré & Zhang, 2013).

3.5.1. Attitudes towards consumption

Two linear regression models were run per product category: the first one tested all potential predictors in consumption, including countries and other computed scores, and then the second was run twice, i.e., one per country, to test potential predictors specifically in the UK and France. No statistical analyses have been run to directly compare the results of these regression analyses; however, results reveal similarities and differences between the two countries and across different dairy products.

In the product-related theme, the sub-theme *non-sensory*, was found to impact dairy consumption negatively. Naturalness and processing have been explored in other studies as factors that may influence consumers' perception of dairy (Bimbo, 2017; Hersleth et al., 2005; Salomé et al., 2021; Varela et al., 2022). However, it is unusual to find in the literature people considering milk as too processed, even among young adults (Desbouys et al., 2020; Rauber et al., 2022). In other studies, young adults and adolescents reported reducing their cheese intake due to its non-sensory. This product is usually referred to as higher in fat (Perkovic et al., 2022; Rouf et al., 2019).

Among the individual-related theme, *preferences*, and *experiences* were found to positively impact consumption, and these confirm current literature (Ojeda et al., 2021; Palacios et al., 2009; Recio-Román et al., 2020; Vargas-Bello-Pérez et al., 2022). These findings are particularly interesting in this study, as participants evaluated statements referring to their least consumed dairy products, meaning that even though the products are not consumed daily, it may not be because of less enjoyment in consuming them. The literature already confirmed that many eating behaviours are due to habits (Ji & Wood, 2007; Sanchez-Villegas et al., 2003) and purchasing schemes (Brščić, 2020; Ji & Wood, 2007; Kurajdova & Táborecka-

Petrovicova, 2015). Higher dairy consumption was associated in both countries with rewarding behaviours, consumption out of enjoyment or to treat themselves (sub-theme *needs or cravings*). Even though these may represent positive attitudes as treating themselves to a celebratory meal, indulging in food cravings or comfort foods should be better investigated as it might lead to overeating or be caused by emotional eating (Finch & Tomiyama, 2015; Locher et al., 2005; Macht, 1999; Tomiyama et al., 2015).

Another individual-related factor that has been found to influence dairy intake positively among participants of this study is *mode of consumption*, which refers, as already seen, to the possibility of consuming the same product in different recipes or contexts of consumption, an aspect strongly associated with the type of product and modifiable in several contexts and settings (Charby et al., 2017; Michaud et al., 2004).

Cultural aspects related to dairy intake, and in general to all food systems, are extremely intrinsic to consumption, and it may be difficult to separate them from the rest, and sometimes to distinctly recognise them (Askegaard & Linnet, 2011; Desbouys et al., 2020). In this sample, the sub-theme *use* was found to influence consumption. It has been previously discussed the importance of customs and how in some countries as France, dairy plays a central role in the meals (Herpin, 1988; Michaud et al., 2004); however, it is challenging to find a direct reference to milk intake, as research focuses on trends of its consumption or intakes among specific populations, e.g., toddlers (Šedík et al., 2023; Stewart et al., 2012). The general focus on children, with the promotion of several policies and strategies to ensure milk intake among this population, might have impacted young adults too, even if the consumption trend is negative (Chollet et al., 2014; Stewart et al., 2012). In fact, in this sample, participants living with children were found to consume more milk than others.

Knowing how participants think about a product (sub-theme: *categorization*) may also help in developing new strategies or creating new contexts of consumption. Results showed that intakes of soft cheese are higher when perceived as protein-rich foods. A recent study found that this categorization is more likely to be done by grouping foods based on their type or eating contexts than their ingredients or nutrients (Chollet et al., 2022). This may also explain why PBDA in the UK sample was associated with protein-rich products, even though these foods are usually poorer in proteins than their dairy-respective alternatives (Clegg et al., 2021). When discussing the market-related aspects that may influence food intake, someone could point out that all food choices are based on and depend on retailers' and brand's strategies (Martinho, 2020). However, results in this study suggest that they are not always perceived as determinants when it comes to dairy consumption, or not as expected. For instance, low availability was found to have a role in lower consumption of PBDA in France. Recent studies have found more French people interested and inclined to try PBDA foods (Adamczyk et al.,

2022; Brščić, 2020; Varela et al., 2022), it is still necessary to investigate the role of marketing strategies in the trend of consumption.

The market offering has indeed a role in shaping food choices, as well as food culture, styles of consumption, personal preferences, and brand preferences (Askegaard & Linnet, 2011; Firat & Kutucuo, 2013; Kurajdova & Táborecka-Petrovicova, 2015), however, the fact that perceived low availability is associated with lower intakes, may be related to the purchasing patterns more than availability per se. The repetitiveness of purchases may lead to habits in consumption (Ji & Wood, 2007), preferring non-consumption over purchasing a similar food item. This also may justify why the risk of waste was found to have a role in decreasing soft cheese consumption in the UK. Soft dairy is often sold in packs that are perceived to be too big, and not-ripened fresh products expire sooner than other dairy products (Brennan et al., 2023; Brščić, 2020; Galić et al., 2019; Milani et al., 2011); moreover, young adults are keener to engage in more sustainable purchasing behaviours aiming to reduce waste (Brennan et al., 2023; Kymäläinen et al., 2021).

These results not only give an insight into the attitudes of two samples from different countries towards dairy consumption, but also an overview of a generational trend in consumption. For instance, while developing an interventional study, it may be valuable to consider exploring the *needs or cravings* aspects or enhancing *modes of consumption*. As it would be difficult and complex to focus on individual experiences and preferences, it would also be valuable to consider the perception of products' *categorisation* or *alternative* in the development of new products. Moreover, these aspects, as well as *packaging*, may particularly help in shaping new purchasing and eating behaviours.

Alongside attitudes towards consumption, when developing strategies, it would be necessary to investigate further the demographic factors to be able to structure a tailored intervention for the right target population. Demographic factors cannot be changed directly but should be considered when planning to test strategies for change.

For instance, it is well known that people with *higher education* and *higher socioeconomic status* are more likely to engage in healthier food behaviours (Desbouys et al., 2020; Guiné et al., 2020; Sanchez-Villegas et al., 2003; Winpenny et al., 2018). People in the sample with a higher weekly budget are likely to consume dairy more frequently, but higher education is associated with lower soft dairy intakes. Higher-educated people have already shown a willingness to be compliant with dietary recommendations (Sanchez-Villegas et al., 2003; Schrauwen & Westerterp, 2000). In France, a further reduction in dairy consumption may happen among consumers, as national recommendations have been recently updated decreasing from three to two soft dairy daily portions for adults (Santé publique France, 2019a).

It has also been demonstrated that among young adults, people are less likely to engage with doctors and health professionals, but auto-diagnose themselves with lactose intolerance, justifying a reduction in dairy consumption for health reasons (Morelli & Vitale, 2020). However, following a lactose-free diet was found to positively impact the consumption of yoghurt and other fermented dairy in the general regression model. These products are safe for the majority of consumers reporting experiencing negative body symptoms after dairy consumption, as they contain a low level of lactose (Silanikove et al., 2015).

Another interesting aspect is related to *age*: many others have already investigated the generational trend in dairy consumption in Europe and worldwide (Chollet et al., 2014; Cifelli et al., 2023; Hohoff et al., 2021; Ivanova et al., 2024; Kapaj, 2018; Stewart et al., 2012), finding that among young adults, the youngest are low consumers of fermented products, i.e., yoghurt and other fermented dairy, particularly when compared to mature adults (Charby et al., 2017; Cifelli et al., 2023; Hohoff et al., 2021).

Lastly, the factor *city* refers to the place in which participants live, based on the city's size: metropolis, big city, village, or countryside. Scarce availability outside urban areas or lost habits of buying products directly from farmers are common in the countryside (Furey et al., 2001; Jarosz, 2008; Jensen & Orfila, 2021; Léegaré & Zhang, 2013), while the exact opposite is true for countries that have a long farming tradition, where people are still used to purchasing fresh products at community markets or farms (Jarosz, 2008; Jensen & Orfila, 2021).

Alongside linear regressions, PCA was also run to have a better insight into what attitudes impact consumption and how they are grouped. PCA has already been used to explore and investigate dietary and eating patterns (Bailey et al., 2006; Ghosh & Chattopadhyay, 2012; Schwedhelm et al., 2018) and in this study similarities among components were found across all dairy categories, particularly in components 1 and 2 where the same attitudes can be found, alongside few specific differences. More differences were found when comparing the PCAs for dairy and PBDA, as the first component in the PBDA PCA diverges from the others for the grouped attitudes, while maintaining *personal preferences* and *experiences* among them. Alongside individual-related aspects, *sensory* factors were also always included in PCA1.

These three characteristics have already been found to impact dietary patterns, dairy consumption, and at different life stages (Corrêa Leite et al., 2003; Ghosh & Chattopadhyay, 2012). Among dairy categories *knowledge* was always found in PCA2, while the factor *attitudes and concerns* could be alternatively found in PC2 or PC3; the two composing component 1 of PBDA. Nutritional knowledge and concerns about health already have been found to impact dairy (non)consumption, particularly PBDA intakes (S. Allen et al., 2018; Buttriss, 1997; Faber, 2023; Faber et al., 2020). Moreover, in this sample, many reported consuming, or not consuming, dairy products driven by health-related reasons. The PCA

results also highlight the importance of suitability, *mode of consumption*, or occasion of consumption. These three characteristics are all aspects related to the sense of versatility that has already been explored as a facilitator of the consumption of dairy foods.

3.5.2. Frequency and contexts of consumption

This questionnaire also explored the frequency and contexts of consumption. Frequencies were explored for each product and general category, while contexts were explored only for the least consumed dairy products and the most consumed type of PBDA. Results found some interesting differences in frequency between the two countries.

The UK sample reported consuming different products commonly, whilst the French one reported consuming the same one or two products more often, and rarely the rest. This difference is found across all dairy categories, and PBDA products too, even if PBDA are explored by type, i.e., milks, yoghurts, cheeses, instead of one single category at a time. Nowadays, PBDAs are commonly associated with the dairy category and treated as such, instead of being considered a different food category (CXS 206, 1999; Weltgesundheitsorganisation & FAO, 2011). PBDAs are not, in fact, dairy products (CXS 206, 1999). However, even if they have different raw ingredients and production process, since they are consumed in the same contexts, they are treated and categorised as dairy, and this confirms current literature (Chollet et al., 2022; Clegg et al., 2021).

Recommendations around the world suggest an average daily consumption of 2 portions of dairy products, and suggest preferring soft dairy (Comerford et al., 2021; European Dairy Association, 2021; Ministère des solidarités et de la santé, 2018; Prentice, 2014). While no consideration can be made about quantities, frequency scores suggest that young adults do consume dairy on a daily basis. Frequency scores were lower among French respondents, but more similar across different categories. Milk was the least consumed among dairy products, i.e., 21 times/month in France vs 24 times/month in the UK, followed by hard cheese, i.e., 21 times in a month in France vs 23 times/month in the UK, which means that on average these products were not consumed on a daily basis. Young adults taking part in the study in the UK reported to consume yoghurt more often, i.e., 44 times in a month vs 35 times/month in France, and frequency scores of other dairy products was the highest, i.e., 55 times in a month vs 25 times/month in France. This category included dairy high in sugars and fats, e.g., dairy-based desserts, high in protein content, e.g., whey, and other less common dairy, e.g., evaporated milk. Because of their high content of sugar/fat, some of them should be consumed less often (Lewis & Dale, 1994; Ministère des solidarités et de la santé, 2018; Santé publique France, 2019b).

Contexts of consumption were explored too. Findings show that these differ based not only on the country but particularly depending on the product. While the UK sample reported more variance in products, differences in contexts of consumption have been particularly reported in France. In the UK, except for milk, all dairy products were reported more likely to be consumed in combination with other foods, alone, or for special occasions. Milk was reported to be consumed with cocoa, coffee, and tea before going to sleep. In the French sample, all dairy categories were reported to be more consumed in the main meals and with other foods, except for yoghurt, which was more likely to be consumed on its own. This may confirm what was already discussed in the previous chapter, that these products have a role and an order of service in the meal or are preferred when served in combination with something else. Contexts of consumption are highly related to the concept of mode (manners) of consumption and the degree of versatility of a product, and the literature already confirmed that settings and contexts of consumption do impact intake (Deliens et al., 2015; Jaeger & Porcherot, 2017; Larson & Story, 2009; Mahi, 2013; Ojeda et al., 2021; Verain et al., 2022). Eating patterns are strongly associated with eating environments (Deliens et al., 2015; Jaeger & Porcherot, 2017; Verain et al., 2022).

Considering these, findings for frequency and contexts of consumption may be valuable when developing studies to test practical strategies aiming to not only increase consumption of healthy dairy but also to promote new occasions of consumption.

3.5.3. Organic and local dairy consumption and willingness to change dairy consumption

Health-related aspects were reported as the main reason to consume local and organic dairy in both countries, alongside better sensory characteristics. However, the perception of them as a non-available and expensive dairy category leads others to not consume these at all.

More than 20% of participants in both countries reported to perceive no differences between organic and non-organic products and between local and non-local products; however, the type of no difference was not explored. It is for this reason impossible to determine if they considered these the same as non-organic/non-local products in terms of sensory characteristics, health claims, or other aspects.

Organic and local products are associated with concerns related to sustainable and environmentally friendly diets (Christoph-Schulz et al., 2015; Merlino et al., 2022; Naspetti et al., 2021), concepts that were not found to significantly impact the sample of this questionnaire. A recent study explained that organic dairy consumption is more likely among

consumers of organic foods in general (Naspetti et al., 2021), and that environmental concerns are not always reflected in purchasing behaviours (Naspetti et al., 2021).

Interestingly, most French participants did not contemplate and would not consider the idea of voluntarily changing dairy intake. Less than 30% of them changed it in the 6 months before taking part in the study, and most of them (23%) reported consuming less dairy, for health, diet, and external factors, and 19% of people considering reducing dairy intakes in the future would do it for the same reasons and to reduce costs, as dairy is again perceived as expensive. In the UK sample, the findings differ from the French ones. While 43% did not change their intakes in the previous 6 months, 51% reported a change in the past, and 50% are likely to consider changing it in the future. Most of these changes also reflect the willingness to consume less dairy (36% changing in the previous 6 months, 30% willing to change in the recent future). Since the average frequency of consumption is already lower than recommended and expected, knowing that respondents would like to reduce further consumption makes even clearer the need for intervention to reduce the risks of a real drop in consumption. Moreover, the reasons selected for increasing and lowering consumption are the same: health-related and diet-related cover more than 50% of the main reasons.

Further investigations are more than necessary to determine more specifically the reasons. In fact, even though participants could add details in a free-text box, this section was not exploring reasons in depth, but general reasons for changes, e.g., health-related, external factors. Both qualitative and quantitative studies should be conducted to explore these dimensions further, before developing tailored strategies to address them accordingly.

3.5.4. Reasons for non-consumption of non-consumed categories

This study did not aim to investigate reasons for non-consumption of non-consumed categories. However, whenever participants reported not consuming a category of products among dairy or the PBDA, they were asked to select from a list the three main reasons why. It is interesting to note that reasons for non-consumption of non-consumed products are justified by the same six attitudes in both countries, along with a few country-specific reasons. In fact, in both countries, *preferences*, i.e., liking, and *personal reasons*, i.e., experiencing body symptoms, and *sensory* characteristics, e.g., taste, smell, or texture, are the barriers that scored higher and are common to all types of products. This confirms what is already found in the literature, as food non-enjoyment and negative experiences are known to impact food intake (Cardello et al., 2022, 2024; Ojeda et al., 2021; Siegrist et al., 2013).

Non-consumption can be justified by other aspects that change depending on the product category and country. For instance, cultural and market-related aspects are not chosen similarly in the two samples, cost and categorisation. This also confirms previous studies (Almena-Aliste & Mietton, 2017; Chollet et al., 2022; Clegg et al., 2021; Paul et al., 2020). Different market strategies take place not only in different countries but also between big cities and small towns, which differs also for the presence of big supermarkets or local markets (Furey et al., 2001; Jarosz, 2008; Léegaré & Zhang, 2013) so that a difference in perception is expected. Different products categories in the two countries were reported as unhealthy and not fitting the diet. Different reasons were selected to explain these, for instance, in the UK sample participants reported not consuming yoghurt because it is not necessary in adult life, and cheese as they perceived it as unhealthy, while in the French sample both yoghurt and cheese were considered different from other protein-rich foods. These findings may help in developing more non-consumption-focused studies since further investigations are needed to address these questions properly.

3.5.5. Implications and limitations

This study was developed from the results of the previous study to explore attitudes towards consumption and non-consumption of the least consumed soft dairy and hard cheese, alongside exploring also frequencies and contexts of consumption of the most common soft dairy products, hard cheeses, and PBDA. Its results would help design country-specific interventions aiming at boosting the consumption of healthy dairy products. For instance, interventions may be developed taking into account the soft dairy category that was found to be less consumed, while targeting the least consumed products that participants stated they would consider consuming more. Interventions can consider boosting one or more facilitators while also addressing barriers to consumption.

Results could also help promote healthier choices among the dairy group. A clearer communication in dietary guidelines could help consumers prefer healthier alternatives over sugary and/or fatty dairy products, and advice on how to use healthier dairy options may be helpful to create more consumption occasions.

This study focused on the frequency of consumption of dairy and PBDA products and did not ask for any details about intakes, such as quantity or portions. For this reason, it is impossible to estimate the actual intake of these products. This study aimed to identify reasons for consumption more than assess the actual intake of dairy products, but information about the frequency of consumption gives no certainty about the portion size. However, since the

frequency of consumption, particularly in France, is lower than expected, it could be hypothesized that recommended intakes are not achieved by most of the sample.

Due to its structure, the PBDA category cannot be directly compared to dairy sections. First of all, participants, when consuming it, were asked to select the most consumed PBDA, the exact opposite of what they were asked to choose for dairy. Moreover, the list of PBDA products included the entire offer of PBDA: milks, yoghurts, cheeses, together, so participants had to choose the most consumed category instead of the most consumed product. This structure was preferred to explore consumption of dairy alternatives but limits the possibility of direct comparison.

3.6. Conclusions

Results of this study revealed that different reasons impact the consumption of least consumed dairy products both in the UK and France, e.g., *preferences, needs or cravings*, while others were found to influence only one country and/or been product-specific, e.g., *packaging* impacting only the UK sample only for soft cheese consumption, or *mode of consumption* significantly impacting only the French sample. These results could be particularly valuable in the developing of strategies aiming to boost consumption of healthy soft dairy as they refer to least consumed products that consumers are willing to consider consuming more. Moreover, results of this questionnaire gave a better insight of contexts and frequencies of consumption, that could help in selecting low consumed categories and, while addressing barriers or enhancing facilitators, eventually lead to an increase in consumption of these products.

This study was indeed developed and conducted with the specific aim of investigating attitudes towards consumption and potential uncommon eating contexts, as this PhD project aimed to test a strategy for changes in consumption of soft dairy products in real life, developing a pilot study from the results of all previous studies. While this questionnaire focused on attitudes, contexts, and frequency, the following study explored quantities and potential eating patterns. Results of both these studies were supposed to be used later in this research project, however, due to recruitment limitations in France, the questionnaire was online longer than expected, thus, its findings were not used for the development of Study 4.

Take home message

Aim of the study	Primary aim: investigate reasons for consumption and non-consumption of cow's and non-cattle soft dairy products, i.e., milk, yoghurt and other fermented dairy, soft cheese. Secondary aims: investigate reasons for consumption and non-consumption of hard cheese, and PBDA. Investigate frequencies and contexts of consumption of milk, yoghurt and other fermented dairy, hard cheese, other dairy, e.g., buttermilk, and PBDA. Investigate reasons for non-consumption of non-consumed products. Investigate reasons for (non)consumption of organic and local dairy. Investigate reasons for voluntary changes in the consumption of dairy.
Methodology	Quantitative
Methods	Online questionnaire
Eligibility criteria	Being aged 18-30 years old; living in the UK or France; speaking the country's language fluently. Consent was required before the start of the questionnaire.
Data collection	Frequency and contexts of consumption via food frequency questionnaires. Attitudes towards consumption questionnaire developed from qualitative study's results (Study 1, Chapter 2); multiples choices questionnaire for organic, local, voluntary changes in consumption; demographic questionnaires. Participants were filling in only sections for dairy and PBDA they reported to consume at the time of the study.
Data analyses	Descriptive and inferential analyses have been performed in Excel and SPSS to investigate the sample and identify potential similarities and differences between the two countries. Linear regression analyses and PCA have been run on SPSS to identify and group potential predictors in consumption.
Participants	A total of 1350 participants (UK n=750) took part in the study,
Results	Several predictors have been found to impact soft dairy consumption, some of them are similar in the two countries, while others reveal differences between the UK and France. Reported frequencies revealed a lower-than-expected consumption in both countries, where the highest intakes are reported far from the daily recommended ones. Moreover, in the voluntary changes, participants reported considering lowering their dairy intake even further.
Next steps	This study was planned to aid in the development of the interventional study, but due to time constraints study 4 (Chapter 5) was developed before the end of this questionnaire. However, results may be valuable to plan new effective strategies to promote the consumption of healthy soft dairy and boost its intake.

4. Chapter Four: A characterisation study

4.1. Introduction

The two previous studies aimed to identify and explore reasons for consumption and non-consumption of dairy products, particularly soft dairy. While they both focused on attitudes toward consumption, the questionnaire study investigated frequencies and contexts of consumption too. None of these studies considered quantities, but some complementary data about intakes might have accidentally been collected during the focus groups and individual interviews. While it is known and has already been discussed that dairy consumption may have a positive impact on health (Adesogan & Dahl, 2020; Comerford et al., 2021; Farag et al., 2020; Kok & Hutkins, 2018; A. S. Rouf et al., 2018; Savaiano & Hutkins, 2021; Tunick & Van Hekken, 2015), different products may not have the same impact on diet. For instance, while the consumption of yoghurt and fermented products is recommended because they are beneficial to gut health (Farag et al., 2020; Kok & Hutkins, 2018; Savaiano & Hutkins, 2021) or daily milk consumption may tackle obesity and other non-communicable diseases (Tunick & Van Hekken, 2015), cream and dairy-based desserts are considered fatty, sugary, high in kilocalories and thus their consumption needs to be occasional (Santé publique France, 2019b). Moreover, different products come from different production processes, and these may have different impacts on the environment (Berners-Lee et al., 2012; Gerber & Food and Agriculture Organization of the United Nations, 2013; Schiano et al., 2020; Weaver, 2009). This should be considered a relevant aspect to have in mind while promoting lower environmental impact diets (Alae-Carew et al., 2022; Berners-Lee et al., 2012; Eating Better, 2020; Gaillac & Marbach, 2021; Gerber & Food and Agriculture Organization of the United Nations, 2013; Guy et al., 2024; Reynolds et al., 2019; Schiano et al., 2020; Weaver, 2009).

As already discussed in the previous chapters, the fact that dairy is a wide group of foods makes it suitable for countless recipes and contexts of consumption, dictated by both individual practices and external factors, e.g., customs, and supply (Almena-Aliste & Mietton, 2017; Corvera-Paredes et al., 2022; Cruwys et al., 2015; Ojeda et al., 2021; Rauber et al., 2022; Schiano et al., 2020; Verain et al., 2022). For instance, French adults tend to consume cheese daily (Adamczyk et al., 2022), a product whose consumption in the recommendations is discouraged or limited because of its high kcal content (Santé publique France, 2019b). Moreover, the most recent French guidelines suggest consuming two portions of dairy products per day, preferably yoghurt and fromage frais (Santé publique France, 2019b). However, as seen previously, consumption can also be impacted by the meal, the moment of the day, contexts, and other eating patterns that may depend on the individuals as much as

on the culture of the country they live in (Douglas, 1972; Harris, 1998; Jaeger & Porcherot, 2017; Leech et al., 2015; Poulain, 2002; Trichopoulou et al., 2007; Verain et al., 2022; Visser, 2017). Eating patterns may be defined according to three constructs: i) patterning, e.g., frequency, meal event, timing; ii) format, e.g., food combinations, nutrient content; iii) context, e.g., eating with others or with the family, eating in front of the television or outside, i.e., not at home (Leech et al., 2015). Alongside frequency and contexts of consumption, it was at this point of this research project indeed necessary to identify potential eating patterns based on the type of dairy products, food combinations, and moment of the day, to characterise properly other aspects of consumption, before developing a strategy to boost consumption of healthy soft dairy products.

To conduct this type of investigation, this study was based on a public dataset, i.e., the French Individual and National Survey Consumption INCA (*études Individuelles Nationales des Consommations Alimentaires*), which took place between 2014 and 2015 in France. Conducting studies on open data is becoming increasingly common, as it allows getting different insights from the same data (Gomes et al., 2022; Kostkova et al., 2016), particularly when navigating large datasets (Gomes et al., 2022). For the INCA study, data is collected every seven years, i.e., INCA1 in 1998-1999, INCA2 in 2006-2007, and INCA3 in 2014-2015, so that INCA3 was the most recent dataset (Ministère des solidarités et de la santé, 2019). It is still considered representative of French population as it has recently been used by the Ministry of Health and Social Services (Ministère du travail, de la santé, des solidarités et de famille) to enact the fourth French National Nutrition and Health Program PNNS (*Programme National Nutrition Santé*), in force from 2019 to 2024 (Ministère du travail, de la santé, des solidarités et de famille, France, 2025), and it is representative of the French population living in France, i.e., excluding French overseas departments and territories and Corsica, in terms of diets, physical activity and other health-related aspects (Agence nationale de sécurité sanitaire (ANSES), 2017a, 2017b; Ministère des solidarités et de la santé, 2019).

This study was designed to explore the quantities of dairy consumption and characterise soft dairy consumption in terms of potential eating patterns in a wide sample of adults. Knowing how much these foods are consumed, i.e., in terms of quantity and energy, how, e.g., in food combination, and when during the day, e.g., mealtime, could aid in the development of an effective strategy to promote healthy dairy consumption. In fact, alongside addressing barriers, focusing on creating new occasions for consumption or, instead, reinforcing already existing eating habits would increase possibilities for positive outcomes in interventional studies. As already seen in the previous studies' results, dairy products may be used as alternative products to each other. This is also the reason why, alongside soft dairy products, other dairy

categories have also been explored, as in developing new habits focusing on soft dairy, it may be necessary to know consumers' behaviours around other dairy products too.

Results of this study aided in designing the next study (Study 4), that took place in France. Since Study 4 was planned to be entirely conducted in France and not replicated in the UK, Study 3 only explored quantities of consumption and potential eating patterns among a French sample. No UK public database was explored. Thus, no direct comparison between the two countries will follow.

4.2. Aims of the study

This study aimed to explore dairy intakes, i.e., consumed quantities, and potential eating patterns among a population of French adults. The explored dimensions considered two out of the three constructs of characterisation: i) patterning, and ii) format (Leech et al., 2015). No details were explored about iii) context (Leech et al., 2015).

The study aimed specifically to:

1. Characterise dairy consumption by type of dairy products consumed
2. Estimate dairy consumption, in quantity [grams] and energy [kcal]
3. Identify and characterise potential eating patterns of soft dairy consumption, and specifically understand if:
 - a. Is it more likely to be eaten or drunk? (ii)
 - b. Is it more likely to be consumed in savoury or sweet dishes? (ii)
 - c. Is it more likely to be consumed in combination with other foods or by itself?
(i), (ii)
 - d. Is it more likely to be consumed at a particular moment throughout the day?
(i)

4.3. Methods

Data from the INCA3 database was used and is entirely available online as .csv files, and could be downloaded for free at <https://www.data.gouv.fr/fr/datasets/donnees-de-consommations-et-habitudes-alimentaires-de-letude-inca-3/#/resources>, the French website for data collected by public agencies. Each .csv file gives information about different dimensions, e.g., demographics, food journals, and a thesaurus was available on the website. Participants were grouped based on their age, i.e., for adults, 18-44 years old, 45-64 years old, and 65-79 years old. No other information was disclosed about their age. Consequently,

it was impossible to explore data only across the target population of young adults aged 18-30 years old, and the reference age has been extended to 44.

This study was approved by the Research Ethics Committee of Bournemouth University, UK (ID: 45760, Appendix 4.1). The INCA3 database is public, already anonymised, and has obtained appropriate ethical approval before its data collection. Only data necessary for this study has been used. Dairy consumption has been explored through the file named “conso-compo-alim-vf-mad-datagouv2021”, reporting three non-consecutive 24h-food journals per participant, and “description-indiv”, reporting demographic details. Dietary data were collected along with many additional data, including the time of the day the foods were consumed, location, and event. Among them, the time of the meal was used in this study to identify potential eating habits among the sample. Other dimensions were explored directly from the food journals, reporting besides simple dietary intakes, i.e., name of the product and consumed quantity, information about foods eaten together, e.g., each entry would have extra information if eaten with something else. The degree of detail depends on the individual.

4.3.1. Sub-groups

To explore types of dairy foods, each dairy item has been allocated to only one out of ten categories. Five sub-groups of dairy, i.e., milk, yoghurt, soft cheese, hard cheese, desserts, have been sorted considering both the environmental and health impacts of products and their production process, inspired by Ottogalli's and American Cheese Society models (Almena-Aliste & Mietton, 2017), their processes of production and GHG emissions [$\text{kg CO}_2 \text{ kg}^{-1}$] (Agence de la transition écologique, 2021; Berners-Lee et al., 2012). A sixth sub-group, i.e., fermented dairy, was also included for all fermented dairy, excluding yoghurt. This sub-group, was included in “Yogurt and other fermented dairy” category in the questionnaire, but it was separated here to allow a more accurate characterisation of these products, considering that some of them, e.g., cultured milks, have sensory profiles and therefore use that substantially differ from the most consumed product among fermented dairy products, i.e., yoghurt (A. Tamime, 2002). Three other categories, i.e., cream, sauce, other, were created to permit all dairy entries to be classified. The tenth category, i.e., PBDA, included only plant-based dairy products, all products categories together. The choice of classifying PBDA as such, and not by type of product, e.g., PBDA milk, is due to a scarce presence of these products to justify a more detailed classification.

4.3.2. Intakes

Dietary data, i.e., dairy daily intake, was derived from self-reported food journals. Intakes have been considered in terms of quantity and energy, overall, as “dairy”, and per dairy type. Dairy entries included in four categories, i.e., milk, yoghurt, fermented dairy, and soft cheese, have been used to compute the overall “soft dairy” consumption. Hard cheese was used as a reference category, as already mentioned in the questionnaire study. Desserts as well were considered as a reference category, as other categories such as yoghurt happened to be eaten as a ‘dessert’ alternative.

4.3.3. Eating patterns

Eating patterns have been characterised in qualitative terms. The idea behind this characterisation was understanding *how* and *when* dairy products are or are not consumed, independently from their quantity, thus, all indices were computed based on the total number of entries, including dairy items, and not intakes. Different dimensions have been explored for each dairy entry individually and classified based on ways of consumption. Four different dimensions were explored:

- i. First dimension: “eaten” vs “drunk”. All fluid products, whose texture is liquid, that can be consumed alone or with other liquid products, e.g., coffee, were classified as “drunk”. Products whose texture does not allow them to be consumed as a beverage, but instead of being “spoonable”, or whose consistency is solid, were classified as “eaten”.
- ii. Second dimension: “savoury” vs “sweet”. All entries were checked one by one and classified according to the foods they were consumed with. They were classified as “savoury” if consumed with other savoury foods, e.g., pasta; they were classified as “sweet” if the other foods were sugary, e.g., jam. A third label was added to classify dairy entries when not paired with any food or paired with food, either ‘savoury’ or ‘sweet’, i.e., coffee, cocoa, tea. In these cases, they have been classified as “neither”.
- iii. Third dimension: ‘combined with other foods’ or ‘by itself’. Each dairy entry was classified based on the foods it was paired with, based on the details entered by each participant reporting their food intake. When the dairy was consumed by itself in a standalone meal, it was classified as “by itself”; when the dairy was consumed in a meal and details about the combination were stated, it was classified as the food they were consumed with, e.g., with fruit was classified as “fruit”; when the dairy was consumed in a meal, but no details were stated on food combinations, it was classified as “in a meal”.

- iv. Fourth dimension: moment of the day of the consumption (in hours, from 0 to 23). The moment of the day has been explored in terms of frequency of consumption per total dairy, soft dairy, and each soft dairy product individually, hard cheese, and desserts. A hypothetical distinction between meals and snacks has also been made concerning the time of consumption, considering those that are the traditional meal times as France is a country still linked to a daily structure that includes three main meals (i.e., breakfast, lunch, and dinner) at hours of the day shared by most of the population (Poulain, 2002).

4.3.4. Sample and demographics

A total of 5855 people took part in the INCA3, $n=3157$ adults. Among them, $n=783$ adults were aged between 18 and 44 years old. Average values for demographics were computed in Excel and are summarised in Table 4.1. No other information about the sample was considered. Data were not trimmed based on implausible energy intake, under-reporting, or over-reporting daily energy. The overall diet was not a parameter that was considered, and whereas other foods were taken into account for dairy characterisation, i.e., food combination, no other consideration was made about their quantity or energy intake; thus, no consideration could be made about participants' overall diet.

As already mentioned in Chapter 1.1.5, no further segmentation was planned for the target population. For this reason, no analysis was performed to determine or explore potential differences in dairy consumption between females and males, and hereby considered the sample as a whole of females and males together.

Table 4. 1.

Main demographic factors of the sample including participants aged 18-44 years old.

Totals	N=783
Gender	324 males (41.3%) 459 females (58.6%)
BMI, average	24.7 (s=4.77) Max = 45, Min = 15.7
Education	373 high school or below (47.6%)
Total energy, average per day	2190 cal

4.3.5. Analyses

Descriptive analyses have been run to explore and to quantify intakes. Each dairy entry has been classified manually. Each food journal has been checked, and then a research per product has been run to ensure all entries have been associated with one dairy type only. Eating patterns have been explored one by one.

4.4. Results

4.4.1. Total dairy and soft dairy intakes

Average intakes have been calculated in grams and kilocalories per sub-group of dairy products per day. An overall average per day has also been computed for total dairy, which includes all sub-groups, and soft dairy, i.e., milk, yoghurt, fermented dairy, and soft cheese. These scores are shown in Table 4.2. The 'Other' category is missing due to a lack of details, i.e., quantity, which led to the impossibility of computing the average for grams and energy consumed, and consequently its impact on the overall intake. Figures 4.1-4.2 show the impact of each sub-group individually, as average daily quantity consumed [grams] and energy in kJ.. This type of graph highlights the nutritional difference between products, considering that the same amount of consumed product often does not correspond to the same energy impact. Particularly, the graphs visually represent the difference in energy between certain types of products, e.g., milk vs hard cheese. The two most consumed dairy products are both soft dairy products, i.e., milk, yoghurt, but they do not impact the overall diet in terms of energy as other less consumed foods, e.g., cheeses.

Table 4. 2.

Average quantity and energy intakes per total dairy, soft dairy, and each sub-group of dairy products per day. Energy content has been reported in Kcal and kJoules. 1 kcal = 4.186 kJ.

N=783	Average consumed quantity [g/day]	Average energy intake [kcal/day]	Average energy intake [kJ/day]
All dairy	246	269	1,126
Soft dairy	214.5	187	782.7
Milk	117.5	60.3	252
Yoghurt	63	54	227
Fermented dairy	15	18	75.3
Soft cheese	19	54	227
Hard cheese	12	44.7	187
Dessert	19	36	150.6
Cream	0.2	0.6	2.5
Sauce	0.5	0.6	2.5
PBDA	3	1.7	7

French dietary guidelines recommend 2 servings per day of dairy products, as 150ml of milk, 125g of yoghurt, or 30g of cheese, or a total of 310ml as milk equivalents (European Dairy Association, 2021). Quantities showed in Table 4.2. are smaller than the recommended ones; however, the fact that soft dairy is the most consumed category of dairy is promising, as French dietary recommendations also suggest preferring soft dairy over other dairy types (Ministère des solidarités et de la santé, 2018).

Figure 4. 1.
Average daily consumption in grams per day, n=783.

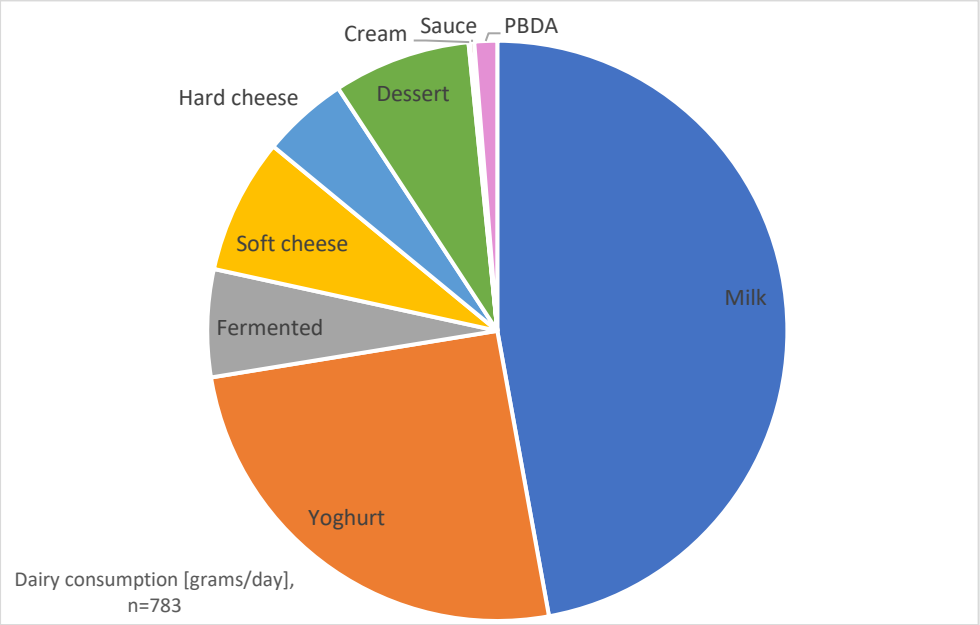
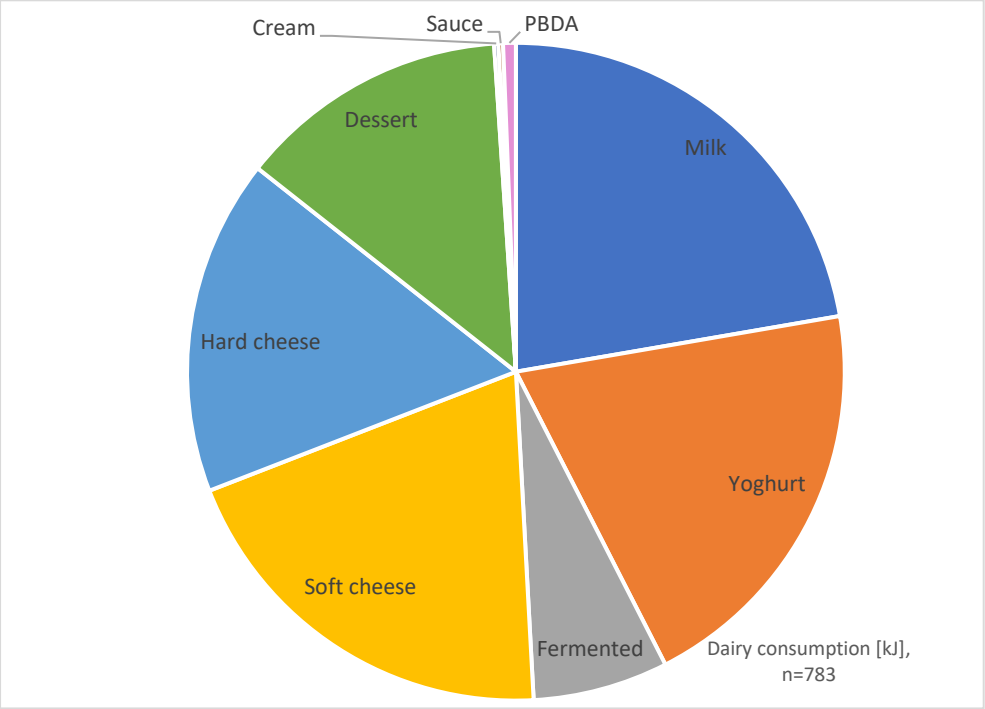


Figure 4. 2.
Average daily consumption in kJ per day, n=783.



4.4.2. Eating patterns

Dimension n. 1: are dairy products more likely to be eaten or drunk?

Figure 4.3 shows that among this sample, dairy products are more likely to be eaten, except for milks and PBDA milks. The eaten fraction in milk refers to the eating occasion, when milk is consumed with cereals.

Dimension n. 2: are dairy products more likely to be consumed in savoury or sweet dishes?

This dimension is more diversified when compared to dimension 1. As shown in Figure 4.4, some products are consumed by the sample only in savoury dishes, while others only in sweet versions, as indeed it would be expected given their sensory characteristics, e.g., desserts vs hard cheese. However, in other categories, this distinction is less neat. Fermented products, for instance, are the most versatile as they are consumed in both savoury and sweet recipes. PBDA category as well includes savoury and sweet dishes, however, it is important to keep in mind that this category includes different categories of products, from milks to cheeses.

Dimension n. 3: are dairy products more likely to be consumed in combination with other foods or by itself?

Not only can dairy be consumed in different states (dimension 1) and recipes (dimension 2), but these products are also suitable for consumption alone or with other foods. Figure 4.5 shows that dairy products have been recorded to be consumed in different kinds of combinations, with different food types, either in direct combinations, e.g., with bread, or with no specific details but still not by itself, i.e., in a meal. Food combinations are an important aspect to consider while characterising eating patterns as the manner of consumption, plus the food combinations, may impact other sensory, e.g., taste, and non-sensory, e.g., nutritional aspects.

Dimension n. 4: are dairy products more likely to be consumed at a particular moment throughout the day?

Figure 4.6 shows moments of the day of dairy consumption among the sample. A sort of trend could be noticed during the day, with a peak around the traditional mealtimes. Figure 4.7 shows moments of the day for soft dairy products, hard cheese, and desserts. This graph makes it easier to notice daily patterns: milk is consumed more in the morning than other

products, and is rarely consumed later in the day. Yoghurts and cheeses are more likely to be consumed around lunch or dinner time, as well as desserts.

Figure 4. 3.

Eatable or drinkable ratio per dairy product [%].

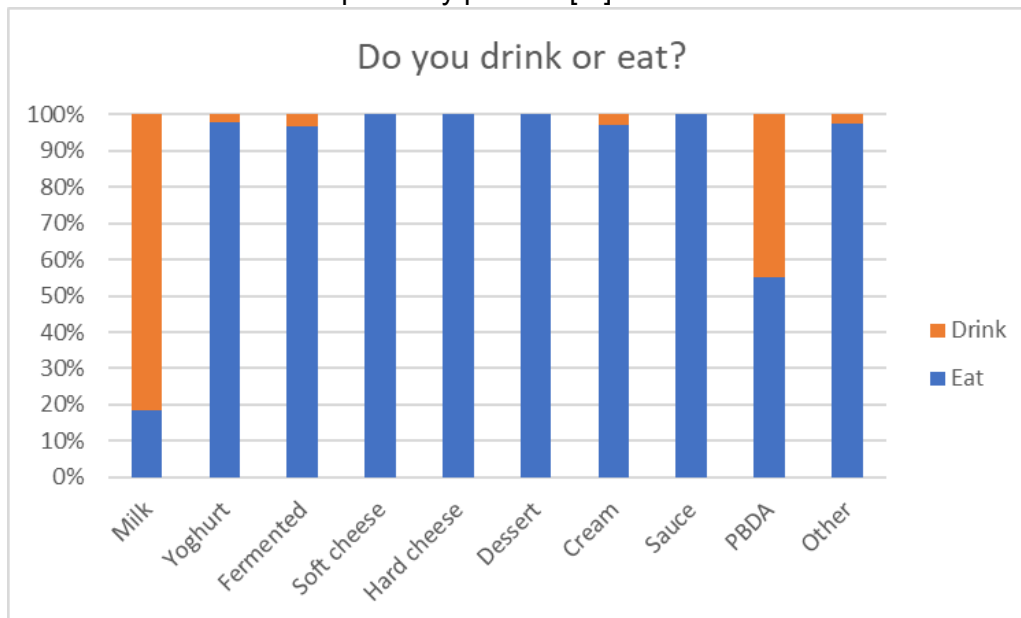


Figure 4. 4.

Savoury, sweet, neither taste ratio per dairy product [%]. "Neither" refers to the consumption of dairy in dishes that are neither sweet nor savoury, i.e., no combination with other products; milk added to coffee, tea, cocoa but without added sugars.

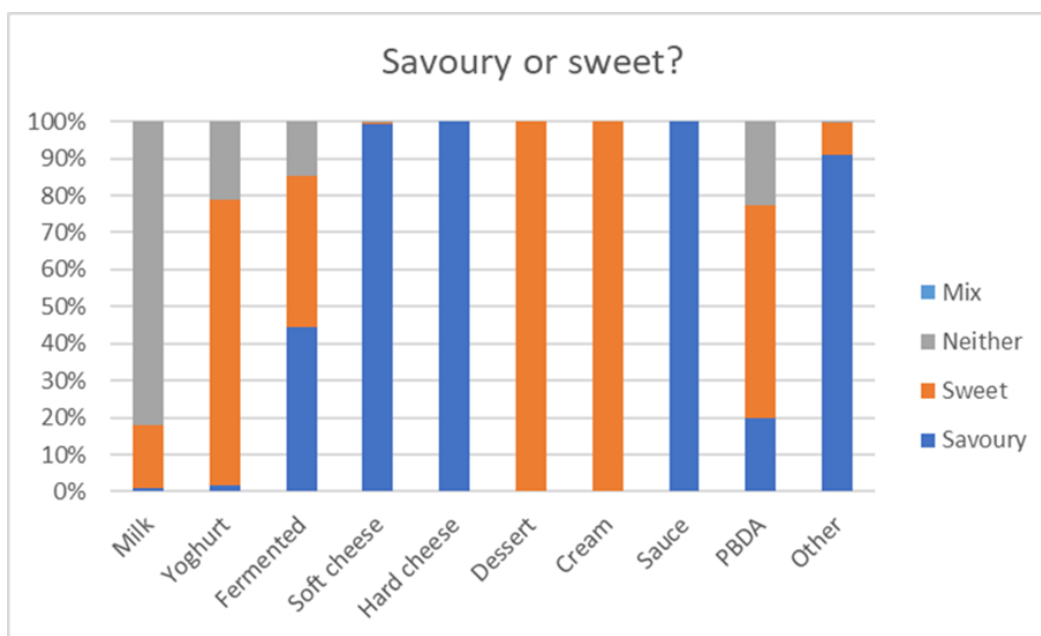


Figure 4. 6. Frequency per day. Axis y [times the dairy product has been added to the database]; axis x [hours]. The “all dairy” also includes the soft dairy. Soft dairy has been highlighted to see its ratio to the total.

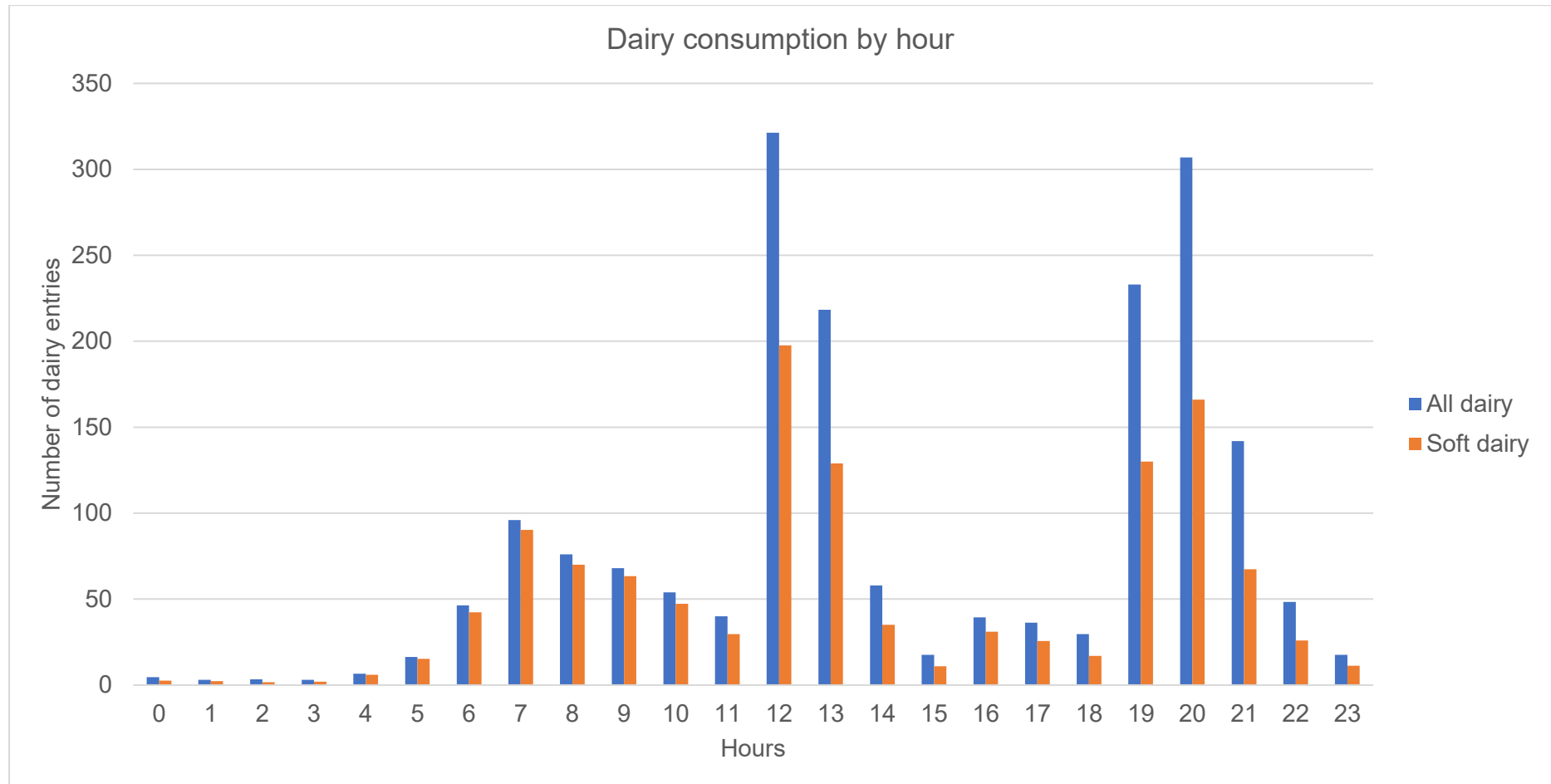
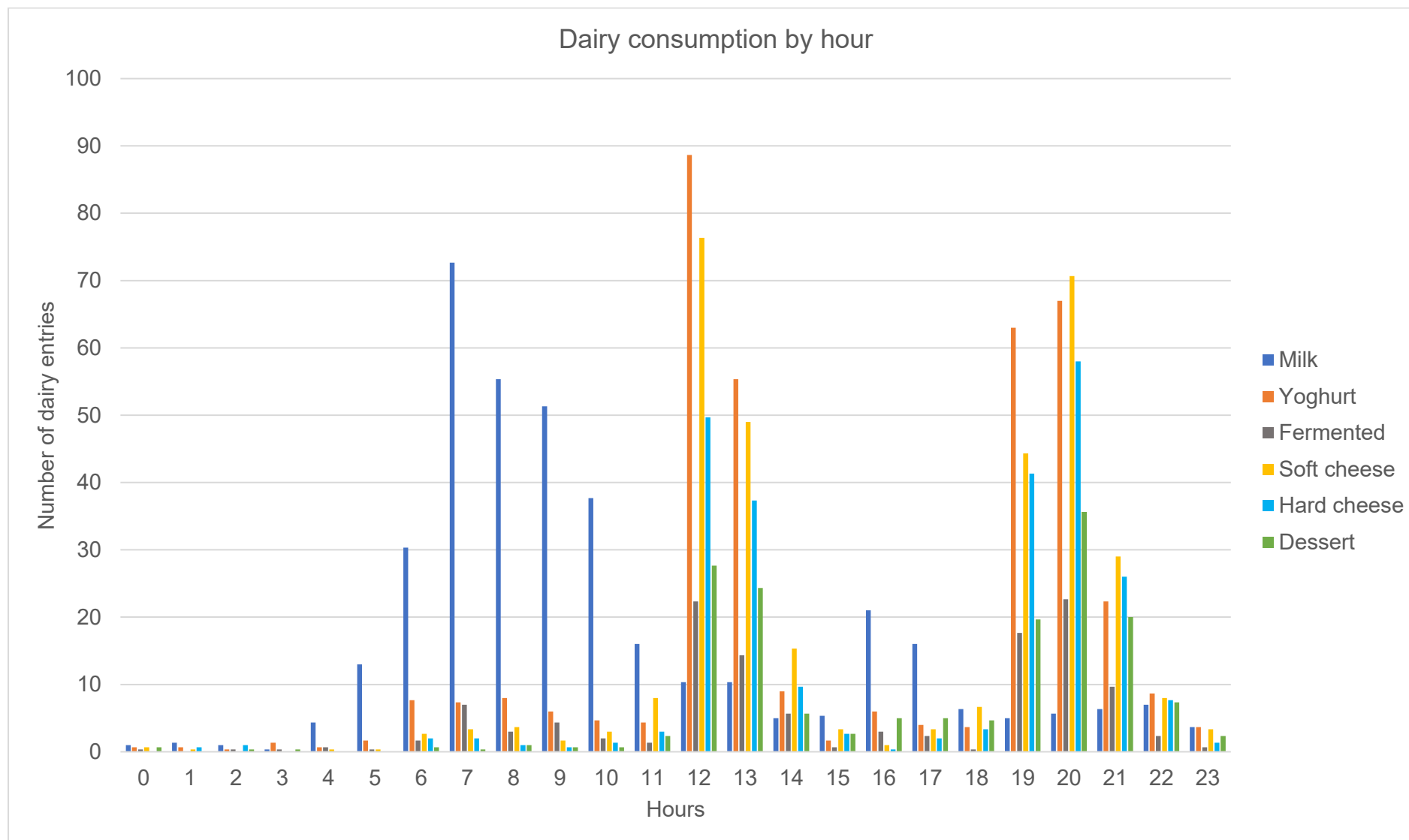


Figure 4. 7. Frequency per day. Axis y [times the dairy product has been added to the database]; axis x [hours]. Focus on soft dairy products.



4.5. Discussion

This study aimed to define dairy consumption, in types and quantity, and explore potential eating patterns, i.e., manners and moments of each soft dairy product consumption, and to identify possible similarities and differences among them. Results showed that intake, kcal impact, and eating patterns change according to the soft dairy type.

4.5.1. Milk

It is interesting to note that the consumption of soft dairy highly impacts the overall dairy intake. The most consumed types of dairy products, considering quantities, are milk and yoghurt, followed by soft cheeses and desserts. This reflects consumption in different countries around the world, as milk is the most well-known dairy product (Paul et al., 2020), and it is also used as a dairy reference (European Dairy Association, 2021), so that dairy consumption is evaluated in milk equivalents (European Dairy Association, 2021). However, in terms of energy, milk has a weaker impact than other products. For instance, cheese may have a stronger influence on overall diet, as for smaller quantities, it still provides a caloric intake similar to other products consumed in larger quantities. These products, both soft and hard, are typically richer in fat and, thus, are higher in energy content compared to milk, i.e., cheeses have an average of 344 kcal for 100g vs milk has an average of 65 kcal for 100g (ANSES, 2016).

Milk, as well as plant-based milks, is the only dairy product that is more likely to be drunk than eaten, except for the occasional consumption with cereals. It can also be found in recipes, but as other sources confirmed, it is mostly consumed as a beverage (Herpin, 1988; McCarthy et al., 2017, 2017; Ng et al., 2012; Roy, 2008), by itself, or with something else, e.g., coffee, cocoa or tea (Ng et al., 2012; Roy, 2008), as suggested here too by the food combination's results. Moreover, results suggest that milk is the most consumed product among dairy at breakfast, and this also reflects the current situation in other countries, and across different life stages, including young adulthood (Blondin et al., 2018; Fagt et al., 2018; Michaud et al., 2004; Michels et al., 2016; Ozdogan et al., 2017; Rubio-Martín et al., 2017). Strategies to boost milk consumption for health-related reasons are more common among children (Blondin et al., 2018; D Souza, 2023), particularly in school canteens (Blondin et al., 2018; D Souza, 2023; Laila et al., 2021). Adults reported reducing their milk consumption after leaving school (Winpenny, Smith, et al., 2020); they possibly keep consuming it at breakfast because of habits (Herpin, 1988; Ozdogan et al., 2017), or for individual preferences, for instance in coffee or tea, with or without sugar (Herpin, 1988; Ng et al., 2012; Ozdogan et al., 2017).

4.5.2. Yoghurt

The presence of yoghurt as the second most consumed dairy product among French adults should not be a surprise. As discussed in the previous chapter, this dairy food is indeed the most popular in France, and the market offers many and various types of it (European Commission, 2023; European Dairy Association, 2021; Les marchés des produits laitiers, carnés et avicoles. Bilan 2022/Perspectives 2023, 2023). In terms of energy, yoghurt, similarly to milk, does not impact the overall diet as much as other dairy products. For instance, the same number of calories is added to the diet by consuming a smaller portion of dairy-based desserts. However, the impact on the diet quality is different: yoghurt consumption has been associated with several health benefits, starting with gut health (Kok & Hutkins, 2018, 2018; Savaiano & Hutkins, 2021; Szczepańska et al., 2021; Valli & Traill, 2005).

Yoghurt is indeed an interesting and versatile product: it is mostly eaten during meals, but not always in direct combination with other foods, and could also substitute other products, such as desserts (Kemp et al., 2017). It is a common French custom to add sugar, honey, or jam to natural yoghurt and eat it at the end of the meal (Saint-Eve et al., 2016), either at home or at the work or school canteen instead of other dairy-based desserts (Herpin, 1988; Saint-Eve et al., 2016).

4.5.3. Fermented dairy

While yoghurt is indeed the most common fermented dairy product, many other foods should be considered while characterising the consumption of soft fermented dairy. France, particularly, is a country that has different local fermented dairy products that belong to regional and local traditions, e.g., *lait ribot* (Bourlioux, 2007). Other fermented dairy products are quite popular in France, such as the *fromage blanc*, *Petit Suisse* or the *crème fraîche* (Cesbron-Lavau et al., 2017). Although they are very little consumed in this sample, the consumption of these products is different from yoghurt. For instance, in this dataset, they were more eaten than drunk, and they seemed suitable for all kinds of dishes, both sweet and savoury, and for different kinds of food combinations. However, their consumption throughout the day is incredibly small compared to other soft dairy and dairy products in general.

This product category is difficult to characterise for several reasons. The first is because products such as *fromage blanc* and *Petit Suisse* are often considered as proper yoghurts, and not as distinctive products that are also the result of a dairy fermentation (Bylund, 1995; Charby et al., 2017). Indeed, yoghurts are the most popular fermented products, but not the only ones (A. Tamime, 2002). Another reason is the popularity of the product. As mentioned

above, fermented products such as *lait ribot*, are products belonging to traditional local cuisines, therefore more popular in some regions than others (Bourlioux, 2007). Other cultured milks, such as kefir, are little known in the French market and, although present in supermarkets, maybe less consumed because they do not belong to the culture of this country (Bourlioux, 2007; Savaiano & Hutkins, 2021; A. Tamime, 2002). These considerations may justify why fermented dairy products, except yoghurt, are not much consumed, besides their high degree of versatility, an aspect that notably seemed to be a facilitator to consumption in previous studies' results.

4.5.4. Soft cheese

Soft cheese is the third most consumed dairy product among this sample of French adults, alongside desserts, and it is also the dairy with the highest energy impact, followed by hard cheese. Its consumption reflects traditional habits: it is eaten in savoury dishes and mostly consumed in a meal with bread, rarely by itself. Alongside yoghurt, soft cheese has been recorded in traditional mealtimes.

France has a strong cheese culture (Delfosse, 2012a, 2012b; Fumey, 2012), including cattle's and non-cattle's products (Flamant, 1983). This dairy category is wide and includes many products, differing in the process of production (Almena-Aliste & Mietton, 2017; Kupiec & Revell, 1998) and consequently in their sensory profiles, e.g., taste, thus the type of soft cheese that is consumed may differ based on individual preferences more than the occasion for consumption (Almena-Aliste & Mietton, 2017; Kupiec & Revell, 1998; Murphy et al., 2004; Ojeda et al., 2021). For instance, both moulded blue cheese and not-ripened cheese are included in the soft cheese category and have different taste, smell, visual appearance, and texture (Almena-Aliste & Mietton, 2017; Kupiec & Revell, 1998). These aspects have already been shown to impact the acceptability of dairy products and individual preferences (Kupiec & Revell, 1998; Ojeda et al., 2021), however, the same products may be suitable to be used in the same kind of recipes or dishes (Batty et al., 2019; Borghini, 2015), so that they may also fit in the same food combination (Borghini, 2015).

4.6. Conclusions

. Results of this study show that the most consumed products in terms of quantity are milk and yoghurt, but the most impacting in terms of energy [Kcal] is soft cheese. Eating patterns exploration revealed that they can be consumed differently: notably, milk is more drunk than eaten, particularly around breakfast time, in no combination with other foods other than cereal

or coffee, cocoa, tea, and occasionally with sugar; the others, i.e., yoghurt, fermented dairy, soft cheese, are more likely to be eaten than drunk and consumed during the day, particularly at lunch or dinner. Yoghurt was more often consumed in sweet dishes, and soft cheese in savoury options; fermented dairy products, although their consumption is limited, were reported in both savoury and sweet recipes. These results were used to select fermented dairy products as target for Study 4, that will be discussed in Chapter 5, developed based on the current eating patterns and gaps in daily consumption of this low consumed category.

Take home message

Aim of the study	Characterise soft dairy and dairy consumption in terms of quantities and eating patterns in France
Methodology	Exploratory through public national database
Methods	The French public INCA3 database has been explored in terms of dairy consumption in Excel
Eligibility criteria	No participant has been recruited to take part to this study
Data collection	No data were collected in this study
Data analyses	Descriptive analyses have been performed in Excel to explore and characterise dairy intakes and potential eating patterns among the target population
Participants	Adults aged between 18 and 44 years old were considered for this study (n=783).
Results	Milk is the most consumed dairy in terms of quantities, but the most impacting in terms of calories are cheeses, both hard and soft. Except for dairy and PBDA milks, dairy is more likely to be eaten than drunk, during traditional mealtimes. Different categories can be consumed in different food combinations, but generally speaking dairy products are more likely to be consumed in a meal than by itself.
Next steps	This study helped in identifying patterns in dairy consumption and explore quantities. Results have been used to choose the least consumed healthy soft dairy, i.e., fermented products, as target for the interventional study (Chapter 5). Moreover, they aid in the development of the intervention as it aimed to increase occasions of consumption in moments of the day usually lacking in dairy intakes.

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5. Chapter Five: A pilot study testing strategies to boost healthy soft dairy consumption in France

5.1. Introduction

The qualitative and quantitative studies aimed to identify and investigate reasons for consumption and non-consumption of dairy, particularly soft dairy, among a target population of young adults living in the UK and France. In the questionnaire, data were also collected about frequencies and contexts of consumption of least consumed soft dairy products. A third study was conducted to explore quantities and eating patterns in consumption of these products among a sample of French adults aged 18-44 years old, a population inclusive of young adults. All these studies have been designed with the double aims of characterising soft dairy consumption and aiding in the development of an interventional study aiming to boost the consumption of healthy soft dairy. This research project has been conceptualised and conducted with a secondary aim of testing strategies for changes, both addressing barriers to consumption and promoting changes in intakes, for health and environmental benefits. Consuming more soft dairy could aid in reducing the risk of cardiovascular diseases, but also achieving and maintaining an overall healthy diet rich in micronutrients, vitamins, and proteins (Adesogan & Dahl, 2020; Bourlioux, 2007; Bramston et al., 2020; Cesbron-Lavau et al., 2017; Comerford et al., 2021; Farag et al., 2020; Kok & Hutkins, 2018; Marco et al., 2017; Savaiano & Hutkins, 2021), with a low environmental impact (Berners-Lee et al., 2012; Gerber & Food and Agriculture Organization of the United Nations, 2013; Guy et al., 2024; Hobbs et al., 2020; Schiano et al., 2020; Weaver, 2009).

Due to challenges in the recruitment of French young adults willing to take part in the quantitative study, no results were available to be used in the development of this study. However, facilitators and barriers to dairy consumption were explored during focus groups and individual interviews and those were considered when developing the interventions that will be discussed in this chapter. Interventions based on facilitators and barriers to consumption have already been shown to increase the possibilities of long-lasting outcomes and lifestyle changes, while also permitting implementation processes of already existing policies (Dogherty & Estabrooks, 2015; Kulmala et al., 2021; Rogers et al., 2021). This is a relevant aspect when speaking about health choices in young adulthood, as research has already shown that these may have an impact on later life (Winpenny, Winkler, et al., 2020), from general health to life expectancy (Caprara, 2018; Dickerson & Quas, 2021; Rizzoli, 2014; Rozenberg et al., 2016; Veit, 2011; Williams et al., 2017; Winpenny, Winkler, et al., 2020). For instance, results of this study showed that sensory-related aspects, e.g., taste, and individual

factors were found to have an important influence on dairy (non)consumption, and this confirmed literature (Appleton, 2023; Cardello et al., 2022; Deliens et al., 2014; Lacroix et al., 2016; Laila et al., 2021). As the degree of versatility and suitability in different dishes was also found to be an important facilitator for people already consuming dairy, cooking activities were selected as an intervention as learning new recipes might aid in increasing intakes among low consumers. Cooking and culinary activities were already used to promote dietary and behavioural changes (Bramston et al., 2020; Hasan et al., 2019; Reicks et al., 2018). Improving cooking skills and learning new recipes could lead participants to improve their overall diets (N. I. Larson et al., 2006). Moreover, collecting positive experiences could encourage later consumption (Addis & Holdbrook, 2019), alongside considering healthy soft dairy over sugary or fattier alternatives (Ares et al., 2009).

Fermented dairy products were selected as the main target of this study. Based on the characterisation study's results, these foods were the least consumed among healthy soft dairy. This category was consumed in sweet and savoury dishes, making it suitable for different recipes, regardless of meal or moment of the day. In the qualitative study, participants described some of them, e.g., cultured milks, as "disgusting". This sort of reluctance was indeed playing a role as a barrier to consumption, considering also that many of them reported to have never tried the category before, and were not willing to. Some fermented dairy products are common in France, e.g., *fromage blanc*, and commonly grouped with yoghurts (Charby et al., 2017), while others are more likely to be consumed only locally, e.g., *lait ribot* in Brittany (Bourlioux, 2007; Cesbron-Lavau et al., 2017) but, besides being similar, they seem not to be considered as alternatives (Cesbron-Lavau et al., 2017). Considering that the main barrier to fermented dairy consumption is its sensory characteristics, learning new recipes might reduce aversion to these products. Moreover, even if engaging at home or alone in activities aiming to change a habit or an attitude may be perceived as challenging (Knakiewicz, 2015), these actions may lead to a change in perspective, particularly when learning skills from a trained person or in group (Dyen & Sirieix, 2016; Gordillo & Prescott, 2023; Hardin-Fanning & Ricks, 2017; Knakiewicz, 2015; Verplanken & Orbell, 2022).

Conducting this study first in France made it possible to take full advantage of the opportunities given by collaborative research. The principal investigator (C.F.) was, in fact, able to collaborate with expert chefs and members of the innovation team of the Research and Innovation Center of the Institut Lyfe to fully develop this research protocol. Even though, due to resource constraints and time limitations, this study was conducted only in France, its protocol was indeed developed to enable replication in the second target country, i.e., the UK.

5.2. Aims of the study

This study aimed to:

- i. test the effectiveness of cooking activities for changing fermented dairy consumption
- ii. test the effectiveness of cooking activities for changing soft dairy consumption
- iii. test the effectiveness of cooking activities in changing attitudes towards fermented dairy products and soft dairy products in general

5.3. Methods

This study was approved by the Research Ethics Committee of Bournemouth University, UK (ID: 52913, Appendix 5.1), structured following the CONSORT statement (Cuschieri, 2019), and registered on OSF in December 2023 (<https://osf.io/wgmdk/>).

5.3.1. Study design

This study was designed as a randomised trial. Participants were recruited in France to take part in a 6-week study. They knew they were participating in a dietary study and could be asked to take part in activities, but they were not aware of the real aim of the study, as knowing the real aim could lead participants to adjust their behaviours (Karanicolas et al., 2009) After completing screening measurements, they were randomly allocated to one of three groups:

- intervention group “W, workshops”: participants were invited to participate in two cooking classes at the Institut Lyfe, Ecully, to learn fermented dairy-based recipes directly from a trained chef. At the end of the second session, they received a leaflet with the recipes they learnt in the workshops. They were asked to replicate these at home in the following two weeks and provide feedback for each replicated recipe.
- intervention group “L, leaflets”: participants received a leaflet with the same recipes as the group “W”. They were asked to replicate the recipes at home in the following two weeks and fill in the feedback questionnaire for each replicated recipe.
- control group “C”: participants did not receive the workshops nor the leaflets nor dietary advice.

Besides differences in engagement in cooking activities, all groups were required to complete dietary questionnaires at *week -1*, *week 2*, and *week 6* (follow-up). At the end of data collection

(week 7), all participants, regardless of their allocation group, received a debriefing disclosing the real aim of the study and were invited to complete a debriefing questionnaire.

5.3.2. Participants

To participate participants were required to be in the target age, living in France, available to come to the Institut Lyfe in Ecully, and not following a vegan diet. All activities and questionnaires were in French, thus a medium proficiency in the language was suggested. All participants had the opportunity to read an information sheet that, even though it did not disclose enough details to make them aware of the real aim of the study, informed them about the types of activities they could be required to do, and about the presence of recipes containing milk derivatives, then asked to not take part in the study if they thought something might cause them health risks, e.g., milk allergy.

Before collecting any data, all participants had to give their consent to data collection (Appendix 5.2). No data were collected before this, and no data could be collected without consent. Participants giving a negative answer to consent were redirected to the last page of the screening survey and were not allowed into the study. At the time of allocation, each participant received an invitation letter (Appendix 5.3) reporting detailed information about the activities they were invited to do, and an individual ID, that was used primarily to link the data collected at different time points, as all data were collected in an anonymous form. The IDs were also used to check participants' progress and compliance. Withdrawal was possible at any time. Participants wanting to withdraw were asked to send an email to the principal investigator, and they would be removed from the participants' list, and no other data would be collected from them. Data already collected would be removed from the data before the analyses of them, these being recognisable thanks to the ID code.

5.3.3. Interventions

5.3.3.1. Group C: control

No cooking activity was planned for this group. All participants allocated to this group were completing the same questionnaires as the groups "L" and "W", except for cooking-related assessments.

5.3.3.2. Group L: leaflets

Participants allocated to this group received leaflets at home and were invited to engage in cooking activities at home and had two weeks to replicate the recipes described in the leaflets. They were also asked to complete a recipe assessment questionnaire for each replicated recipe. To access the recipe assessment questionnaire, they could use the QR code on each leaflet page or the link they received via email from the principal investigator.

5.3.3.3. Group W: workshops

Participants allocated to group “W” were invited to engage in cooking activities while attending a two-session workshop at the Institut Lyfe, Ecully. Each workshop lasted about 90 minutes and was led by a trained chef teaching three fermented dairy-based recipes per session: a smoothie (drinkable), a savoury dish, and a dessert. At the end of each session, each participant answered a feedback questionnaire and left with the food prepared during the session. At the end of the second session, they were also given a leaflet including all the recipes they learnt during the workshops, and they were asked to replicate them at home during the following two weeks and complete a recipe assessment questionnaire for each replicated recipe. To access the recipe assessment questionnaire, they could use the QR code on each leaflet page or the weblink they received via email from the principal investigator.

5.3.3.4. Recipes

Two trained chefs working in the innovation hub of the Research and Innovation Center of the Institute Lyfe were in charge of recipe development. All recipes were required to be suitable for creating or increasing occasions for consumption of soft dairy, particularly fermented dairy products. Dimensions explored in the characterisation study, i.e., savoury vs sweet, eatable vs drinkable, were used to develop a list of recipes. All recipes had to include fermented dairy products and needed to fit into a proper meal but could also be consumed alone. To ensure participants' engagement, all recipes had to be challenging but not too demanding in terms of degree of difficulty. A list of fifteen recipes was developed based on these requirements:

1. Pancakes lait ribot, caramel fermenté et granola (en: pancakes with lait ribot, fermented caramel and granola)
2. Panacotta au lait fermenté, coulis de fruit (en: pannacotta with fermented milk and fruit coulis)
3. Faisselle au miel et aux fruits rouges (en: Faisselle with honey and red berries)

4. Cheesecake sans cuisson ricotta et citron (en: no-bake cheesecake with ricotta and lemon)
5. Riz au lait fermenté (en: rice pudding with fermented milk)
6. Crêpes salées et sauce fermentée façon « tzatziki » (en: savoury crêpes and fermented «tzatziki»)
7. Muffins salés tomates séchées, olives, basilic, et chèvre frais (en: savoury muffins with sun-dried tomatoes, olives, basil, and goat cheese. *Note:* fermented milk is in the muffin mixture.)
8. Rillettes de thon, cottage cheese et agrumes (en: tuna pâté with cottage cheese and citrus fruits)
9. Houmous aux épices douces, crackers aux graines (en: hummus with sweet spices and crackers with grains)
10. Poulet croustillant mariné au lait ribot sauce aux herbes (en: crispy chicken marinated with lait ribot, and herbs sauce)
11. Poulet à la Crème Fraîche et à l'ail (en: chicken with crème fraîche and garlic)
12. Quiche potiron, fromage bleu et bacon (en: quiche: pumpkin, blue cheese and bacon)
13. Smoothie Energy au lait fermenté (en: energy smoothie with fermented milk)
14. Smoothie lacté « choco-coco » (en: milky smoothie «choco-coco»)
15. Smoothie au kéfir et aux fruits (en: smoothie with kefir and fruit)

As at the time of the development of the study the principal investigator was not in France, two interns recruited high consumers of fermented products aged between 18- and 30 years old living in Ecully and conducted individual interviews to explore which recipes among the fifteen listed above would be considered interesting among high consumers of fermented dairy. Considering the results of these interviews, the chefs' feedback on recipes, the development of the organisational aspects of each workshop session, i.e., total duration and participants' engagement, and all the logistical aspects, e.g., ingredient seasonality, six recipes were selected:

- Muffins (fermented dairy in the muffin mixture), in two versions: 1) pumpkin, blue cheese, and bacon; 2) sun-dried tomato, goat cheese, and basil.
- Fried chicken, sauce with yoghurt and fresh herbs (fermented dairy in the marinade)
- Deconstructed cheesecake with raspberries and rose
- Panna cotta vanilla, tangerine and pistachios
- Smoothie "Red berries"

- Smoothie “Back to Acapulco”

All recipes were piloted twice to test their sensory characteristics and adjusted by chefs accordingly. Each workshop recipe list was structured as a menu, and participants learnt a savoury recipe, a sweet recipe, and a drinkable recipe each day, i.e., three recipes a day for a total of six recipes. The savoury one was generally the most challenging, and the drinkable one the easiest.

All recipes were developed using French ingredients but were suitable for being replicated elsewhere, e.g., in the UK, with the substitution of fermented dairy products with other similar dairy, and could accommodate other needs, e.g., availability. For instance, *lait ribot*, unpopular outside France, could be substituted with kefir.

5.3.4. Outcomes

The primary outcome of this study was the change in soft dairy consumption, particularly fermented dairy products, intended as frequency and quantity of consumption. Secondary outcomes were changes in attitudes, cooking activities assessment, recipe assessment. Table 5.1 summarizes the outcomes and reports the dimensions, index, and time points of data collection.

Table 5. 1.

Outcomes of the study and time points of data collection.

Dimension	Index	Aim	Time point
Dairy consumption	Dairy consumption questionnaire based on food frequency consumption questionnaire	To explore and evaluate change (before/after) in dairy consumption as frequency	T1 = baseline (screening) T3 = week 6 (follow-up)
	3-day food journal	To explore and evaluate change (before/after) in dairy consumption as quantity consumed. <i>Only data concerning dairy products were considered among data collected in the food diaries</i>	T1 = baseline (after allocation) T2 = week 2 (after the intervention) T3 = week 6 (follow-up)
Attitudes toward soft dairy consumption	Attitudes questionnaire	To explore and evaluate change (before/after) in attitudes toward soft dairy consumption	T1 = baseline (after allocation) T2 = week 2 (after the intervention)

			T3 = week 6 (follow-up)
Recipes assessment	Questionnaire on workshops	To evaluate cooking activities, learnt skills, and recipes (difficulty, efficiency).	After each workshop as a debrief.
	Questionnaire on recipes	To evaluate recipes (sensory aspects, difficulty).	Every time a recipe was replicated at home (deadline week 2).
Demographics	- Sex - Age - Weight and height (to calculate BMI) - Education – Job - SES	To explore demographic profiles	T1 = baseline (screening)

5.3.5. Sample size

A recruitment target of at least 117 young adults aged 18-30 years old living in France was set for this dietary study. The number of total participants was computed considering different aspects: previous studies and findings (Reicks et al., 2018; Seeley et al., 2010), a dropout rate of 20% (Bell et al., 2013), and the maximum capacity of the workshop room. The sample size was calculated for a confidence level of 95%, at power = 0.7. Considering the target population of this research project, and to have a balanced sample, the target was a sample with a ratio of 50% females/males, and 50% students/non-students, including non-workers.

5.3.6. Eligibility and screening measurements

All participants, after giving consent, completed a screening questionnaire to check their eligibility to take part in this study. This questionnaire was divided into three parts, a demographic questionnaire, a food neophobia questionnaire also checking their enjoyment in cooking activities, e.g., cooking following recipes, and a food frequency questionnaire. In this phase, their contact details, i.e., phone number and e-mail, were collected. Participants could enter the name, phone number, and e-mail of other participants taking part in the study with them, to be allocated to the same group. All personal information, i.e., name, phone number, and e-mail, was known only by the principal investigator and used only to contact them to send links to the questionnaires during data collection. At this stage, participants were able to give their consent to take part in a prize draw that took place at the end of the study and data collection. Taking part in the prize draw was not mandatory.

5.3.6.1. Demographics

All participants completed a demographic survey, during which they were asked about their gender, age, ethnicity, diet, size of the city they live in, weight and height (to compute BMI), higher education, employment status, their availability to go to the Institut Lyfe. No participant was admitted to the study if aged more than 30 years old, following a vegan diet, or unable to visit the Institut Lyfe. When selecting one of these, age >30 years old and/or following a vegan diet and/or not available to go to the Institut Lyfe, they were automatically redirected to the last page of the questionnaire and excluded from the study.

5.3.6.2. Cooking enjoyment and food neophobia questionnaire

Cooking enjoyment questions and the food neophobia questionnaire were used to aid participant engagement and reduce the risk of dropouts. The expected risk was that people not enjoying cooking and/or cooking following a recipe, and with a higher neophobia score would be more likely to withdraw, particularly if allocated to an intervention group, from non-enjoyment of the activities. Drop-outs are, indeed, one of the biggest limitations of research (Armijo-Olivo et al., 2009; Hoerger, 2010). Data on cooking enjoyment and neophobia were not taken into account for analyses and were exclusively used to check eligibility.

All participants admitted to the study, i.e., aged 18-30 years old, not following a vegan diet, available to go to the Institut Lyfe, were asked if they enjoy cooking (possible answers: yes, no), how many times per week they cook at home (possible answers: 0,1,2,3,4 or more) and if they enjoy cooking following recipes (possible answers: yes, no). If participants answered that they enjoy cooking, they were admitted to the study; for participants answering “no”, other answers were checked, and if they answered “0” and “no” to the two following questions they were not admitted to the study.

After that, they were asked to complete the neophobia questionnaire developed by Pliner & Hobden and adapted by Hazley *et al.* (Hazley et al., 2022). This scale was used as it was already used, adapted, and validated through different cultures and ages, both for construct and content validity (Aqueveque, 2015; Barrena & Sánchez, 2013; Elmas & Kabaran, 2021; Guidetti et al., 2018; Siegrist et al., 2013). All participants were asked to evaluate 10 statements on a 7-point scale (from *Strongly disagree* =7 to *Strongly agree* =1). Table 5.2 reports an example of the questionnaire structure.

Table 5. 2.

Scale for the neophobia questionnaire.

Please indicate how strongly you agree/disagree with each of the following statements. Make your ratings promptly, based on your first impression. No right or wrong responses exist, only your personal opinion counts.

	STRONG LY DISAGR EE	MODERAT ELY DISAGREE	DISAGR EE SLIGHT LY	NEITHE R AGREE NOR DISAGR EE	AGREE SLIGHT LY	MODERAT ELY AGREE	STRONG LY AGREE
(STATEMENT)	☐	☐	☐	☐	☐	☐	☐

Participants were evaluating each of the following statements, and could not proceed to the next questionnaire until they had completed all:

- 1. I am constantly sampling new and different foods
- 2. If I don't know what a food is, I won't try it
- 3. I don't trust new foods.
- 4. I like foods from different cultures
- 5. Ethnic food looks too weird to eat
- 6. At dinner parties, I will try new foods
- 7. I am afraid to eat things I have never had before
- 8. I am very particular about the foods I eat
- 9. I will eat almost anything
- 10. I like to try new ethnic restaurants

Based on the participants' answers, an individual score was computed. Participants with a score >40 were considered neophobic, and thus not admitted to the study.

5.3.6.3. Food frequency questionnaire

All participants completed at this time their first food frequency questionnaire, for all dairy categories, one by one. The questionnaire was the same as the FFQ used in the quantitative study exploring frequency of consumption, the only difference was that here fermented dairy products were asked as a separate category from yoghurt, and respondents were asked about their last week of consumption. The question and the scale are reported in Table 5.3, and the list of products for each category is reported in Table 5.4. Participants had to answer for all products before submitting their answers.

Table 5. 3.

Food frequency questionnaire used to explore the frequency of consumption of a list of dairy products. An “Other (please specify)” row was always left as a free text box at the end of each product category and participants could type in a single product if they considered it missing from the list.

How often do you consume the following products?

Please consider your consumption in the last week.

		Every day	3-5 times a week	1-2 times a week	1-2 times a fortnight	1-2 times a month	Less than once a month	Never
List of products		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
	Other (please specify)	☐	☐	☐	☐	☐	☐	☐

Table 5. 4.

List of products participants were asked about in the food frequency questionnaire.

Product category	List of products
Milk	Whole, full fat cow's milk, Semi-skimmed cow's milk, Skimmed cow's milk, Lactose-free milk, Goat's milk, Sheep's milk
Yoghurt	Whole, full fat cow's yoghurt – flavoured, Whole, full fat cow's yoghurt – unflavoured, Low fat cow's yoghurt – flavoured, Low fat cow's yoghurt – unflavoured, 0% fat cow's yoghurt – flavoured, 0% fat cow's yoghurt – unflavoured, Goat's/sheep's yoghurt – flavoured, goat's/sheep's yoghurt – unflavoured, Yoghurt to drink (e.g., Yop, Michel et Augustin) – flavoured, Yoghurt to drink with probiotics (e.g., Actimel, Yakult) – flavoured, Yoghurt to drink with probiotics (e.g., Actimel, Yakult) – unflavoured
Fermented dairy	Kefir – flavoured, Kefir – unflavoured, Crème fraiche. Buttermilk, Lait ribot, Cottage cheese, Quark, Fromage blanc, Faisselle, Petit suisse
Hard cheese and other cheeses	Cow's semi-hard or hard cheese (e.g., Cheddar, Comte, Gouda, Gruyere, Parmigiano), Goat's semi-hard or hard cheese, Sheep's semi-hard or hard cheese, Blue cheese (e.g., Stilton, Fourme d'Ambert), Smoked cheese, Cheese with herbs, flowers or fruits

	(e.g., Gouda with cumin seeds, Wensleydale with apricots, Cheddar with mango, Alp blossom)
<i>Soft cheese</i>	Fresh cheese (e.g., Mozzarella, Feta, Paneer), Goat's fresh cheese, Sheep's fresh cheese, Moulded cheese (e.g., Brie, Camembert), Blue cheese (e.g., Roquefort, Gorgonzola, Bleu d'Auvergne), Cream cheese (e.g. Philadelphia, Boursin), Cheese spread, (e.g. Laughing cow, dairylea, Kiri)
<i>Other dairy products</i>	Flavoured milk, Milkshakes, Frappé with milk, Lattes, Milk with syrups, Ice-cream, Frozen yoghurt, Pudding, Custard, Cheesecake, Other dairy desserts (e.g., dulce de leche, tiramisu), Whipped cream, Clotted cream, Sour cream, Condensed milk, Evaporated milk, Single and/or double cream, Milk powder, Whey

Consumption of fermented dairy products was used to classify each respondent as “high fermented dairy consumer” or “low fermented dairy consumer” (cut-off for “high” >0). This cut-off was based on results of Study 3 (Chapter 4). This classification was used to allocate them to balanced intervention groups, based on initial consumption of fermented dairy and gender. Participants completed this questionnaire again four weeks after the intervention (follow-up), regardless of their allocation group.

5.3.7. Food journals

Participants were asked to complete three-day food journals at different time points, i.e., before, two weeks after the intervention, and six weeks after the intervention (follow-up). Time points were the same regardless of their allocation group.

Food journals were used to evaluate changes in intake of soft dairy products. The characterisation study (Chapter 4) showed that the number of entries alone does not show quantitative changes. There may indeed be an increase in the frequency of consumption, due to reasons such as increased consumption opportunities, but this does not necessarily mean that the quantities are increasing. In this study, the use of food journals was included to verify and explore the actual intake of participants and potential changes.

Participants were required to complete a three-day food journal three times, specifically two consecutive weekdays, i.e., Thursday and Friday, and a weekend day, i.e., Sunday. Instructions stated: “Please, keep a record of what you eat and drink on Thursday / Friday / Sunday and particularly: the quantity of food and drinks you consumed, when you consumed

each product (please, use the 24-hour format, e.g., 14:00 and not 2 pm), tell us about the meal (if it is breakfast, snack, etc.)". They had access to a Qualtrics link, and they were asked to type in their ID code and the date of day the recorded dairy would refer to (dd/mm/yy) before starting the diary. Food journals are considered a good individual-level tool for estimating food intake (Coates et al., 2012). To better capture consumption, at least two days of recording are suggested (Coates et al., 2012). Food consumption may differ from week to weekend due to individual patterns and habits, e.g., differences in work or school schedules (An, 2016), thus they were asked to fill in two weekdays and one Sunday.

5.3.8. Attitudes toward soft dairy products

Participants were asked to complete a questionnaire evaluating their attitudes towards soft dairy consumption at different time points, i.e., before, two weeks after the intervention, and six weeks after the intervention (follow-up). Time points were the same regardless of their allocation group.

Attitudes towards soft dairy products were explored through the attitudes questionnaire that was developed for the questionnaire study (Study 2, Chapter 3). Participants were asked to evaluate 40 statements (positive and negative) developed from the 17 sub-themes found to impact dairy consumption in the qualitative study. Statements are reported in Table 5.5, grouped by theme and sub-theme. These are the same statements as used in the questionnaire study. Participants answered the questionnaire in one sit, four times, once considering their consumption of milk, then yoghurt, fermented dairy, and finally soft cheese.

Table 5. 5.

Statements that participants were asked to evaluate in the questionnaire exploring attitudes towards soft dairy consumption.

Theme	Sub-theme	Positive statement	Negative statement
PRODUCT-RELATED	<i>Sensory</i>	I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
	<i>Composition</i>	It is natural	It is too processed
	<i>Non-sensory</i>	Consuming it boosts my health	It is unhealthy
INDIVIDUAL-RELATED	<i>Mode of consumption</i>	I can consume it on its own, in recipes or in combination with some foods	I cannot use this product in many ways
	<i>Preferences</i>	I like this product	I do not enjoy consuming it

	<i>Personal reasons</i>	I never experience body symptoms when consuming it I have always consumed this product	Body symptoms occur when I consume this product I did not consume it while growing up
	<i>Knowledge</i>	It contributes to a balanced diet	As an adult, I do not need to consume it to be healthy Reducing its consumption will benefit my health
	<i>Attitudes and concerns</i>	It is environmentally friendly It is animal friendly	It is not sustainable Reducing its consumption will benefit the environment
	<i>Needs or cravings</i>	I consume it when I want to treat or reward myself	I would not consume it on special occasions
CULTURAL ASPECTS	<i>Structure of the meal</i>	I would finish a meal with this product	This product is not suitable as the final course of a meal
	<i>Social norms</i>	I consume it because of my family/friends	No one I know consumes this as I do
	<i>Use</i>	It is common to consume it in my culture	It is unusual to consume this product in my culture
	<i>Categorisation</i>	I consume it because it is a good source of protein	It is a totally different category of food from meat/eggs/tofu
MARKET OFFERING	<i>Availability</i>	I can find it in the shops	It is not always available where I shop
	<i>Alternative</i>	It is a good replacement for other foods	This cannot be used to replace other products
	<i>Value for money</i>	It is worth the price	It is too expensive
	<i>Packaging</i>	I can consume what I buy within the expiration date	It expires too quickly I often waste it

Participants were evaluating each statement on a 5-point scale, from *Strongly disagree* (-2) to *Strongly agree* (+2). Table 5.6 reports the structure of the questionnaire and its scale. Participants were required to answer each point before being able to submit their answers.

Table 5. 6.

Structure for attitudes questionnaire. The scale went from strongly disagree (-2) to strongly agree (+2).

<u>PARTICIPANT CODE</u>	Strongly disagree	Moderately disagree	Neither agree nor disagree	Moderately agree	Strongly agree
Please indicate how strongly you agree/disagree with each of the following statements in relation to your fermented dairy consumption.					
(statement)	☐	☐	☐	☐	☐

5.3.9. Pulses consumption

Each participant was also asked to complete a questionnaire exploring the consumption of pulses (Appendix 5.4) at each time point. This questionnaire was used as a distractor to reduce the risk of participants understanding the real aim of the study. Data collected were not analysed.

5.3.10. Workshop assessment

Each participant attending workshops was asked to complete a workshop assessment at the end of each session. The questionnaire aimed to collect data about their satisfaction and feedback on the schedule, staff, recipes, location, time of the day, and duration. Attendees were evaluating the content/agenda, activities, trainers/staff, recipes, length of the workshop, logistical arrangements, venue, time of the day, total number of attendees, and attendees' engagement during the workshop on a 5-point scale (*unsatisfactory, poor, average, good, excellent*). They were then asked to rate from 1 (*not at all*) to 10 (*completely*) "To what extent do you feel the workshop objectives were achieved?", "Was the trained staff organized?" and "Were the trainers and resource persons knowledgeable?". They were also able to add details and opinions in free-text boxes, and particularly they were asked to give details on "What is the most important thing that you learnt?", "What aspects of the workshop do you see yourself using within the next two months?", "Please give one or two practical suggestions for how we could improve this workshop:". Finally, they were able to add more details in an "Other comments" text box. This was the only questionnaire for which data were collected on paper

and not online. ID code was still asked at the beginning, and participants completed it while the chef and staff were re-arranging the workshop room at the end of the session to avoid interference.

5.3.11. Recipes assessment

Each participant in groups “W” and “L” received a leaflet (Appendix 5.5) containing fermented dairy-based recipes that they were asked to replicate at home. Every time they engaged in the cooking activity and prepared one of the recipes at home, they were asked to complete a recipe assessment questionnaire and give their feedback on it. The aim was to assess their satisfaction and collect feedback on the sensory aspects of the recipes, alongside difficulty and willingness to try them again at home. They were asked “Did you know this recipe before” (potential answers “yes”, “no”), then they were asked “How satisfied or dissatisfied” they were with its taste, smell, appearance, and texture (possible answers: “Very satisfied”, “Somewhat satisfied”, “Neither satisfied nor dissatisfied”, “Somewhat dissatisfied”, “Very dissatisfied”). They were asked the degree of difficulty, “How easy was it for you to make this recipe?” (possible answers: “Very easy”, “Somewhat easy”, “Neither easy nor difficult”, “Somewhat difficult”, “Very difficult”) and if they would consider doing it again, “Will you make it again?” (possible answers “yes”, “no”). They were able to add details on reasons why they would not do it again, if they would change something, and other suggestions in free-text boxes.

5.3.12. Debriefing

At the end of the data collection, each person who completed the screening questionnaire and gave consent for their data to be collected, regardless of their degree of participation, was contacted via email and received a debriefing with the real aim of the study and a questionnaire to complete. The debriefing questionnaire aimed to assess its potential strengths and weaknesses. Particularly, participants had the possibility of entering their comments for each stage of the study, including what in their opinion were limitations.

1. The first part of the debriefing questionnaire was used to inform the respondents about the real aim of the study. They were asked to guess it, then they had access to a detailed explanatory page.
2. “Has your attitude toward fermented dairy changed during the time of this study (from January to June)?” (possible answers “yes”, “no”); “Can you tell us a bit more?” (free text)

3. Recruitment and screening: respondents were at this point asked if they contacted the principal investigator before the start of the study, if they considered the information sheet clear enough, and had free textboxes to add details. They were asked if they were directly contacted by the principal investigator to check their availability. Eventually, they were asked for opinions and suggestions to improve the recruitment process.
4. Allocation to groups: respondents were asked about their allocation group. They were asked if they liked the one they were allocated to, and if they would have preferred selecting their group instead of being allocated. They were also asked if the information about their expected tasks was clear enough.
5. Activities: all activities, including measurements, were explained and evaluated one by one. Particularly, respondents were asked what they thought about each activity, regardless of whether they did or did not take part in it. They were also asked for opinions and suggestions to increase engagement rates, besides reminders.
6. Length of the study: respondents were asked their opinions about the length of the study, and particularly how the study was structured with a two-week gap between the intervention and the measurements, and again four weeks before follow-up data collection.
7. Other suggestions: respondents were asked to share opinions and suggestions to implement data collection during future studies.
8. Respondents could subscribe to a voluntary list of potential participants that could be contacted for future studies.

5.3.13. Procedure

Participants were recruited via flyers, social media, online posts, newsletters, and snowball sampling. Recruitment started in early January 2024 and finished in early April 2024. All participants could enter a prize draw to win a 50 euros gift voucher, but entering the draw was not mandatory. Participants entering the draw were asked to accept Bournemouth University rules for prize draws, otherwise they could not enter it. Participants entering the draw knew that they would not have any other kind of reimbursement and that the prize could not be exchanged for money.

After being recruited, participants gave their consent for data collection directly on Qualtrics, before starting their screening questionnaires. They were randomly allocated to a group based on their gender and their fermented dairy consumption (low vs high, whereas “high” consumption was defined as a score >0). They were asked to meet the principal investigator

at the Institut Lyfe to receive an envelope coded with their ID, and containing an invitation letter explaining what they were required to do during the study. Participants allocated to group “W” were given a link to access an online platform and book the day and time they would like to attend each workshop session; while participants allocated to group “L” were given a link to access an online platform and decide when to receive their recipe leaflet. Participants in group “L” could decide if they preferred receiving the leaflets in a paper format or via email. Participants in the group “W” were receiving the leaflets in a paper format at the end of their last workshop session. On each leaflet’s page, participants could find a QR code to have direct access to the recipes’ assessment questionnaire.

Regardless of their group, participants received via email from the principal investigator a link for each dietary questionnaire scheduled on week -1, week 2, and week 6. In week 2, participants in groups “W” and “L” received in the email a direct link to the recipes’ questionnaire too. The principal investigator was in charge of checking their compliance and emailed them again two days after each first email as a reminder to complete the questionnaires. All data, except for the questionnaire assessing workshops, were collected online. Before starting the completion of each questionnaire, participants were required to type their ID. At the end of data collection, all participants received a debriefing, and access to recipes (videos and leaflets), to thank them for their time in taking part in the study. Study design and measurements per time point and group are summarised in Figure 5.1 and Table 5.7.

5.3.14. Randomisation

All participants were randomly allocated to only one of the groups “W”, “L”, or “C”. They were not aware of other groups or their tasks. They became aware of the group to which they were allocated when meeting the principal investigator at the Institut Lyfe, during which time they received a sealed, opaque envelope containing their invitation letter. On the envelope they could find their ID; in the letter, they would find the name of the group and details of the activities. These invitation letters and ID codes were also delivered to them by email. Participants were randomized to the three trial arms at a ratio of 1:1:1. Randomisation was stratified by gender (male, female, other) and fermented dairy consumption (low versus high) using block randomisation (block size = 6). Sequences were generated using a random number generator, per stratified group. This study was originally designed as a randomised trial, with the principal investigator not expected to know to which group participants were allocated or attend any cooking activities but to only see participants once, i.e., when giving them their invitation letter and ID, and to remain in charge of all data collection. However, due

to logistical difficulties, the principal investigator managed all cooking assessments and attended all workshops. Finally, the principal investigator was also involved in preparing the invitation letters and placing them in identical, sealed, opaque envelopes. The principal investigator oversaw allocating each participant to a group; however, the sequences were given to the principal investigator in a list on Excel organised by another researcher in randomised blocks.

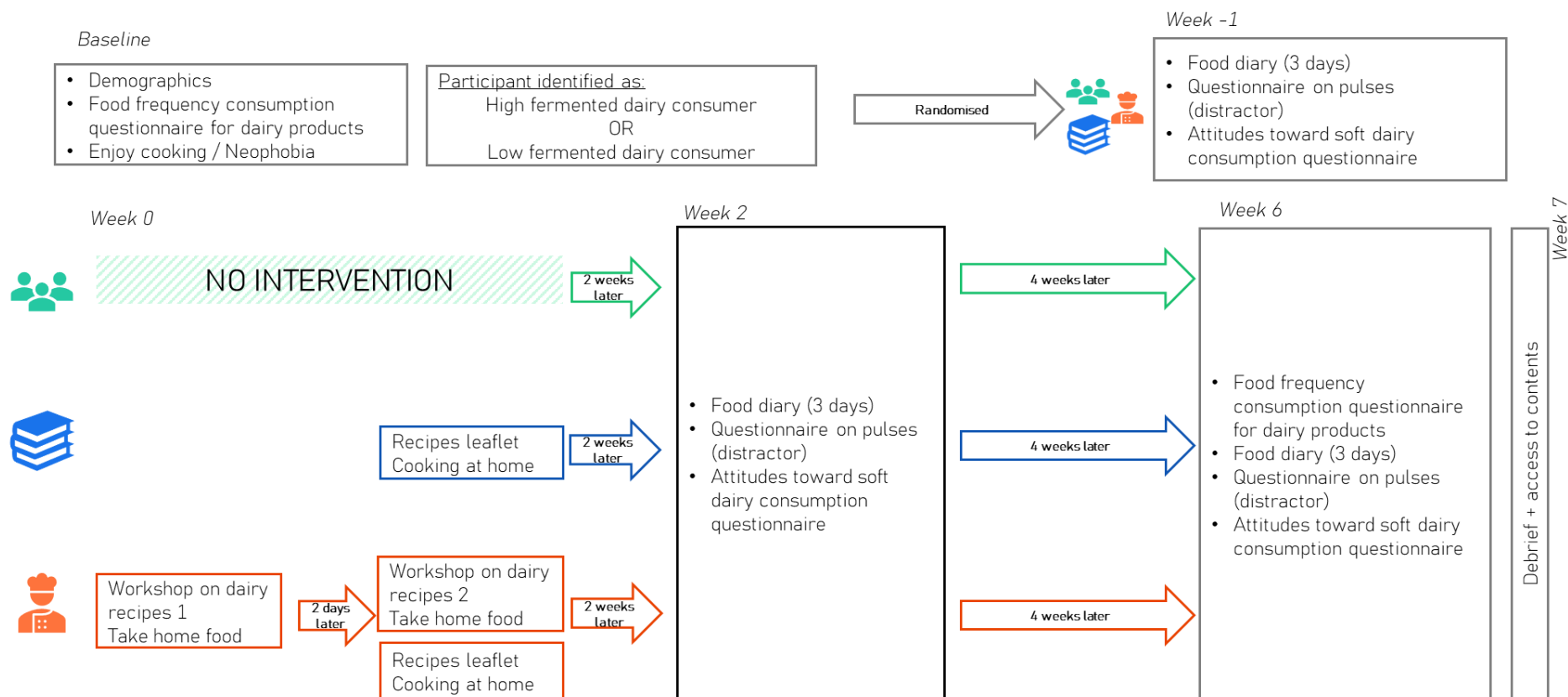
Figure 5. 1.*Diagram of the study design.*

Table 5. 7.

Questionnaires and intervention time points. Checkmarks are intended for all groups completing those measures at that time point. When not all groups were required to engage in activities or complete an assessment, the group that was expected to do that is stated.

[illegible]

5.3.15. Analyses

All data collection was based on Qualtrics, the same online platform used for the quantitative study, except for the workshop assessment that was collected on paper. Data were analysed following an intention-to-treat procedure (Armijo-Olivo et al., 2009), but considering only fully completed answers at baseline. Missing data were treated as missing completely at random (MCAR), and computed following a likelihood method, i.e., expectation-maximization approach (Bennett, 2001; Shin et al., 2017). Single imputation methods, e.g., mean imputation or last value carried forward, while considered acceptable for MCAR, could be risky for generating misleading results for variance, dispersion measurements, and p-values (Bennett, 2001; Fielding et al., 2012). Multiple imputation methods were not considered as not recommended for MCAR (Bennett, 2001; Jakobsen, 2017), while maximum likelihood is considered the best way to handle missing data, for its higher precision and lower risk of under- or overestimated effects (Bennett, 2001; Fielding et al., 2012; Shin et al., 2017). After organizing the collected data on Excel, missing data were computed using missing data analyses on IBM SPSS Statistics software, Version 28 for Windows (IBM Corp., Armonk, NY, USA), EM estimation. Descriptive analyses were run on Excel, inferential analyses were performed on IBM SPSS.

5.3.15.1. Food journals

Each food journal was checked, and an entry was created for each dairy intake. Each dairy entry reported the exact consumed product as it was described by the participant, e.g., brand, quantity, and the other details that the participant entered. Each dairy entry was then classified by dairy type. Median daily consumption was calculated from entries' quantities, for each soft dairy singularly and overall, and overall for all dairy products. Two sets of inferential analyses were performed as data were not normally distributed. To test differences in consumption for each soft dairy category among the groups at T1, T2, T3 and computed T2-T1 and T3-T1, Independent-Samples Kruskal-Wallis Tests were performed. Related-Samples Friedman's Two-Way Analysis of Variance by Ranks was performed to test differences in soft dairy intakes within subjects for each group at time points T1, T2, and T3.

5.3.15.2. Food frequency questionnaire

Food frequency questionnaires were first explored in Excel. A numeric score was computed based on Table 5.8, and then a frequency score was computed for each category summing up all answers.

Table 5. 8.

Mathematic computation to compute numeric scores in the FFQ.

Answers	Average days per month	Mathematic computation	Score
Every day	30	30/30	1
3-5 times a week	4 days * 4 weeks	4*4/30	.533
1-2 times a week	1.5 days * 4 weeks	1.5*4/30	.2
1-2 times a fortnight	1.5 days * 2 weeks	1.5*2/30	.1
1-2 times a month	1.5 days	1.5/30	.05
Less than once a month	0.5 days	0.5/30	.0167
Never	0	0/30	0

Two sets of inferential analyses were performed as data were not normally distributed. Firstly, Independent-Samples Kruskal-Wallis Tests were performed to test differences in consumption for each dairy category among the groups at different time points, i.e., T1, T3, and T3-T1 [computed]. Then Related-Samples Wilcoxon Signed Rank Tests were performed to test potential differences in consumption within subjects for each group at time points T1 and T3.

5.3.15.3. Attitudes towards consumption

Due to data limitation, results from the attitudes towards soft dairy consumption questionnaire were explored on Excel only. Instead of exploring them one by one and for sub-themes, statements were grouped using the results of the principal component analyses performed while exploring the quantitative study's results (Chapter 3), reported in Table 5.9. These were preferred to exploring each sub-theme as not all attitudes were expected to change, and the small sample size could lead to non-noticeable results due to small values and to misinterpreting results.

Table 5. 9.

PCA components for each soft dairy category and included attitudes. In brackets, covered variance.

Product category	Component	Label, (% covered variance)	Attitudes
Milk	Component 1	Individual practices of consumption (24%)	sensory, non-sensory, mode of consumption,

Yoghurt and other fermented dairy

		preferences, personal reasons, use, value for money, packaging
Component 2	Beliefs (11.9%)	availability, alternative, structure of the meal, knowledge, attitudes and concerns
Component 3	Suitability (9%)	composition, needs or cravings
Component 4	Social norms (6%)	social norms
Component 5	Categorisation (6%)	categorisation
Component 1	Individual practices of consumption (22%)	sensory, preferences, personal reasons, structure of the meal, use, availability, packaging
Component 2	Beliefs (17%)	categorisation, composition, non-sensory, knowledge, attitudes and concerns
Component 3	Mode of consumption (7.6%)	mode of consumption
Component 4	Supply (7.3%)	alternative, value for money
Component 5	Occasion (6.6%)	social norms, needs or cravings
Component 1	Individual practices of consumption (27%)	sensory, mode of consumption, preferences, personal reasons, needs or cravings, structure of the meal, social norms, use, availability, value for money, packaging
Component 2	Beliefs (16.9%)	alternative, categorisation, composition, non-sensory, knowledge, attitudes and concerns
Component 3 (all negative scores)	Occasion (7.11%)	categorisation, needs or cravings, structure of the meal
Component 4 (all negative scores)	Concerns (6.2%)	attitudes and concerns

Soft cheese

Since at the time of the quantitative study fermented dairy products were included in the “Yoghurt and fermented dairy” section, the same components were used to group fermented dairy and yoghurt attitudes.

5.3.15.4. Other data

Other questionnaires, i.e., workshop assessments, recipe assessments, and debriefing questionnaires, have been explored in Excel only. All variables were explored as absolute values (number of responses) and percentages. No inferential analysis was performed.

5.4. Results

The study took place entirely in France, Ecully, from January 2024 to June 2024. Workshops took place at the Pop-Up restaurant of the Institut Lyfe, Ecully, France. Due to room’s availability constraints, each workshop session was run twice per week for a total of three weeks during data collection. The participants' flow diagram is shown in Figure 5.2.

Two sets of results will be reported in this section. The first one (intention to treat) considers all participants who were randomised and completed the first measurements entirely (n=38). The second set will report results for a reduced sample of n=34: four participants allocated in the workshop group were removed from the analyses to reduce the risk of biased results.

5.4.1. Intention to treat

5.4.1.1. Sample demographics and answer rates

Table 5.10 reports the main demographic details for the sample by group.

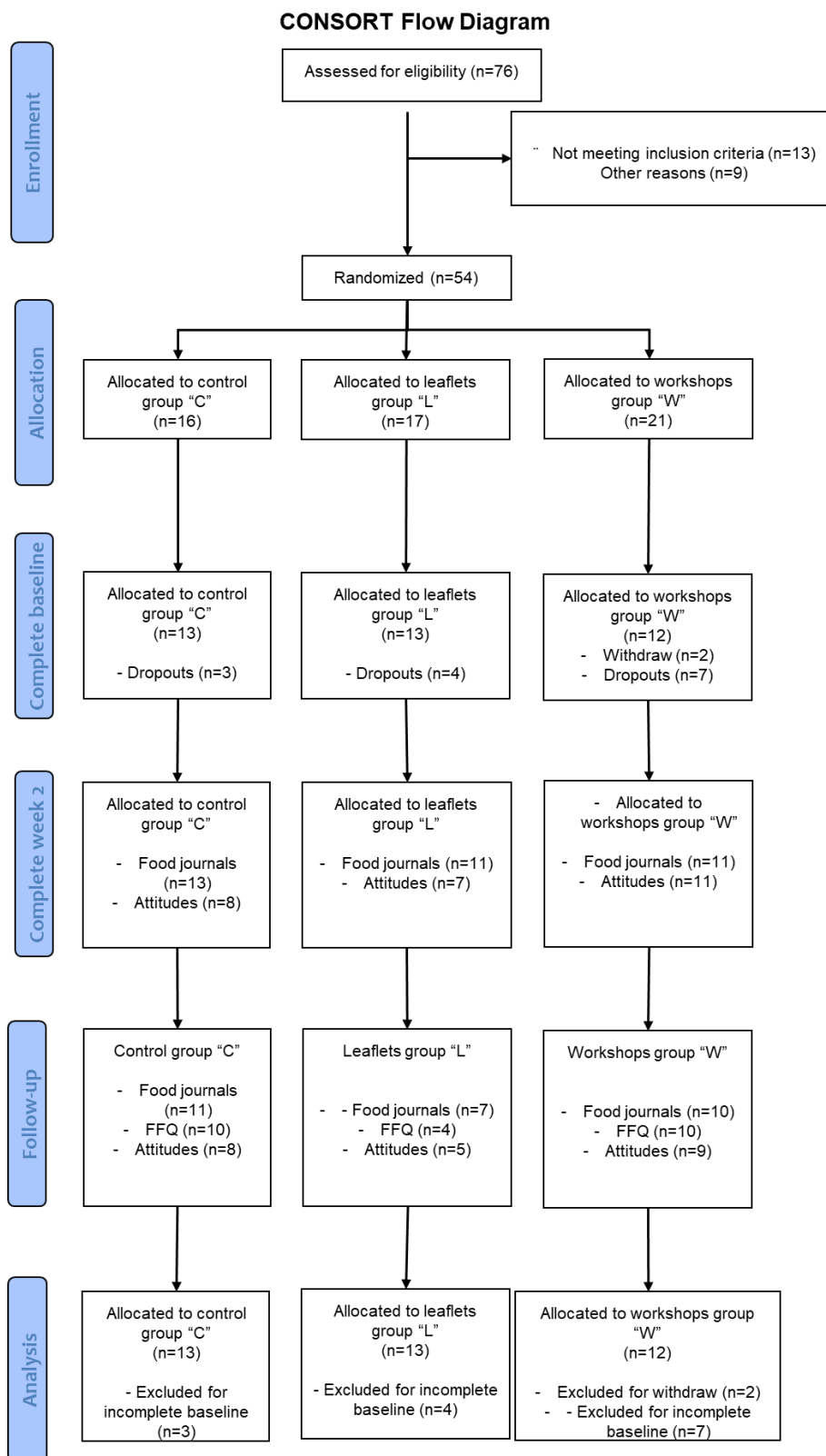
Table 5. 10.

Main demographics characteristics by group, percentages in brackets.

	Group “C”	Group “L”	Group “W”
<i>Total</i>	13	13	12
<i>Females</i>	11 (84,6%)	10 (71%)	10 (83%)
<i>Age</i>	24.5 years old	22 years old	23 years old
<i>French (including overseas territories)</i>	12 (92%)	14 (100%)	10 (83%)
<i>High education</i>	13 (100%)	13 (100%)	12 (100%)
<i>Students</i>	6 (46%)	9 (64%)	9 (75%)
<i>BMI</i>	22	20.5	22.8

Figure 5. 2.

Participants flow diagram, with number of participants [total and per group] completing data collection.



Answer rates differed between groups, measurements, and time points, and are summarised in Table 5.11.

Table 5. 11.

Answer ratio by time point and measurements per each group.

		T1 (week - 1)	T2 (week 2)	T3 (week 6)
Food journals	Control	13 (100%)	13 (100%)	11 (84.6%)
	Leaflets	13 (100%)	11 (78.5%)	7 (50%)
	Workshops	12 (100%)	11 (91.6%)	10 (83%)
Food frequency questionnaire	Control	13 (100%)	N/A	10 (76.9%)
	Leaflets	13 (100%)	N/A	4 (28.5%)
	Workshops	12 (100%)	N/A	10 (83%)
Attitudes toward consumption	Control	13 (100%)	8 (57%)	8 (61.5%)
	Leaflets	13 (100%)	7 (50%)	5 (35.7%)
	Workshops	12 (100%)	11 (91.6%)	9 (75%)

5.4.1.2. Food journals

Table 5.12 shows the median intake of soft dairy, per category and overall, and the median intake of dairy overall, for each group at each time point, baseline (T1), two weeks after the intervention (T2), and six weeks after the intervention (T3), and the two computed T2-T1 and T3-T1. The table also reports the test statistics and p-values of Kruskal-Wallis tests performed to test differences in consumption at different time points. No significant differences was observed in the sample, regardless the moment of data collection and the category product.

Table 5. 12.

Median intakes in medians (interquartile range in brackets) for soft dairy products and overall soft dairy and dairy products [grams/day]. Test statistics, df [degree of freedom], and p-value refer to Kruskal-Wallis tests. Kruskal-Wallis tests were performed to test differences between median intake across groups at different time points. P-values are considered significant at $p < .05$.

		GROUP C	GROUP L	GROUP W	Test statistic	df	p-value
DAIRY OVERALL	T1	119.9 (116.85)	41.6 (163.95)	76.6 (166.68)	1.59	2	.45
	T2	58.3 (143.15)	15 (148.83)	85.93 (263.65)	1.79	2	.40
	T3	43.3 (114.29)	10 (103.67)	115.93 (190.83)	2.54	2	.28
	T2-T1	-98.3 (191.30)	-18.3 (126.52)	-1.65 (77.45)	.68	2	.70
	T3-T1	-46.7 (227.22)	-41.6 (190.17)	18.53 (231.07)	.64	2	.72
SOFT DAIRY OVERALL	T1	103.3 (133.25)	41.60 (168.95)	69.9 (150.48)	1.29	2	.52
	T2	51.60 (131.55)	12.30 (131.31)	71.76 (257.40)	1.21	2	.54
	T3	43.3 (111.76)	10 (98.62)	107.61 (191.65)	1.96	2	.37
	T2-T1	-59.90 (165.25)	0 (129.84)	-8.30 (82.85)	.38	2	.82
	T3-T1	-46.7 (222.22)	-41.6 (201.77)	16.01 (219.94)	.39	2	.82
MILK	T1	0 (53.30)	0 (23.15)	0 (64.10)	.36	2	.83
	T2	0 (0)	0 (25.87)	0 (157.89)	1.11	2	.57
	T3	0 (41.74)	0 (41.74)	0 (72.91)	.43	2	.80
	T2-T1	0 (29.50)	0 (9.22)	0 (37.50)	2.15	2	.34
	T3-T1	0 (71.24)	0 (64.89)	0 (77.93)	.02	2	.99
YOGHURT	T1	33.3 (137.50)	33.3 (93.30)	0 (4.95)	3.38	2	.18
	T2	33.3 (61.60)	0 (37.58)	0 (33.49)	1.61	2	.44
	T3	0 (37.58)	10 (33.55)	0 (39.59)	.17	2	.91
	T2-T1	-8.3 (161.65)	-33.3 (99.83)	0 (24.98)	1.77	2	.41
	T3-T1	0 (116.68)	-8.05 (71.00)	0 (44.54)	2.5	2	.28
FERMENTED DAIRY	T1	0 (26.65)	0 (0)	0 (76.65)	3.99	2	.13
	T2	0 (29.95)	0 (10.00)	0 (16.37)	.82	2	.66
	T3	0 (15.67)	0 (15.67)	0 (11.75)	.12	2	.93
	T2-T1	0 (32.45)	0 (2.50)	0 (23.75)	1.14	2	.56
	T3-T1	0 (40.62)	0 (7.84)	0 (43.20)	1.53	2	.46
SOFT CHEESE	T1	5 (10.00)	0 (0)	0 (19.15)	2.81	2	.24
	T2	0 (6.65)	0 (1.30)	3.83 (29.98)	3.89	2	.14
	T3	0 (7.66)	0 (7.66)	0 (7.66)	.05	2	.97
	T2-T1	0 (10.00)	0 (1.30)	0 (29.18)	1.1	2	.57
	T3-T1	0 (11.33)	0 (7.66)	0 (16.68)	1.6	2	.44

Median intakes and results of Related-Samples Friedman's Two-Way Analysis of Variance by Ranks are summarised in Table 5.13, organised by group. The test was performed to check

potential changes in soft dairy intakes within subjects for each group at time points T1, T2, and T3; however, no significant results was observed.

Table 5. 13.

Median intakes (interquartile range in brackets) for soft dairy products and overall soft dairy and dairy products [grams/day]. Test statistics, degree of freedom [df], and p-value refer to Related-Samples Friedman's tests. The Related-Samples Friedman's tests were performed to test for differences in median intakes in each group at different time points, i.e., T1, T2, T3. P-values are considered significant at $p < .05$

Dairy category		T1	T2	T3	test statistics	df	p-value
DAIRY OVERALL	GROUP C	119.9 (116.85)	58.3 (143.15)	43.3 (114.29)	.89	2	.64
SOFT DAIRY OVERALL		103.3 (133.25)	51.60 (131.55)	43.3 (111.76)	1.21	2	.54
MILK		0 (53.30)	0 (0)	0 (41.74)	1.52	2	.46
YOGHURT		33.3 (137.50)	33.3 (61.60)	0 (37.58)	1.72	2	.42
FERMENTED DAIRY		0 (26.65)	0 (29.95)	0 (15.67)	.23	2	.88
SOFT CHEESE		5 (10.00)	0 (6.65)	0 (7.66)	2.38	2	.30
DAIRY OVERALL	GROUP L	41.6 (163.95)	15 (148.83)	10 (103.67)	1.79	2	.40
SOFT DAIRY OVERALL		41.60 (168.95)	12.30 (131.31)	10 (98.62)	.4	2	.81
MILK		0 (23.15)	0 (25.87)	0 (41.74)	.46	2	.79
YOGHURT		33.3 (93.30)	0 (37.58)	10 (33.55)	1.85	2	.39
FERMENTED DAIRY		0 (0)	0 (10.00)	0 (15.67)	1.2	2	.54
SOFT CHEESE		0 (0)	0 (1.30)	0 (7.66)	1.46	2	.48
DAIRY OVERALL	GROUP W	76.6 (166.68)	85.93 (263.65)	115.93 (190.83)	.19	2	.90
SOFT DAIRY OVERALL		69.9 (150.48)	71.76 (257.40)	107.61 (191.65)	.57	2	.75
MILK		0 (64.10)	0 (157.89)	0 (72.91)	0	2	1
YOGHURT		0 (4.95)	0 (33.49)	0 (39.59)	.69	2	.70
FERMENTED DAIRY		0 (76.65)	0 (16.37)	0 (11.75)	2.38	2	.30
SOFT CHEESE		0 (19.15)	3.83 (29.98)	0 (7.66)	1.15	2	.56

5.4.1.3. Food frequency questionnaire

Participants were completing the food frequency for all soft dairy categories, and hard cheese, other dairy, and PBDA too. Overall median scores were calculated from all scores computed as per Table 5.8, for dairy, and all scores of milk, yoghurt, fermented dairy, and soft cheese for soft dairy. Frequency scores and results of Kruskal-Wallis tests are summarised in Table 5.14. Only a significant result was observed for $p < .05$ in the PBDA score. However, two p-values were observed as $p = .05$ for yoghurt and fermented dairy at T3-T1. This score, T3-T1, was

calculated to measure the difference between initial and final scores. When this is negative, it means that the frequency of consumption has decreased since the beginning of the study. However, it should be remembered that this does not necessarily mean a decrease in consumption since the two measures, i.e., frequency and quantity, are not directly related.

Table 5. 14.

Median frequency scores (interquartile range in brackets). Test statistics, degree of freedom [df], and p-values refer to the Kruskal-Wallis performed to test changes at different time points between groups. Kruskal-Wallis tests were performed to test differences between frequency scores across the three groups at different time points. Results are considered significant at p-value <.05.

		GROUP C	GROUP L	GROUP W	Test statistic	df	p-value
DAIRY OVERALL	T1	2.34 (1.74)	2.45 (1.94)	2.89 (2.39)	1.24	2	.53
	T3	2.67 (1.49)	2.77 (.25)	2.77 (2.39)	2.61	2	.27
	T3-T1	-0.82 (1.21)	-0.21 (1.91)	0.02 (1.75)	1.25	2	.53
SOFT DAIRY OVERALL	T1	1.58 (1)	1.69 (1.87)	1.93 (1.73)	.55	2	.75
	T3	1.85 (1.38)	1.88 (0.45)	1.88 (2.33)	1.17	2	.55
	T3-T1	-0.18 (1.32)	-0.12 (1.23)	.27 (1.38)	1.86	2	.39
MILK	T1	0.36 (0.91)	0.20 (0.41)	0.36 (0.92)	.52	2	.77
	T3	0.20 (0.39)	0.46 (0.03)	0.53 (0.89)	3.66	2	.16
	T3-T1	0.02 (0.59)	0.26 (0.41)	0.03 (0.30)	2.34	2	.31
YOGHURT	T1	0.54 (0.74)	0.80 (1.17)	0.17 (0.41)	4.41	2	.11
	T3	0.32 (0.52)	0.53 (0.09)	0.40 (0.60)	1.92	2	.38
	T3-T1	-0.06 (0.48)	-0.27 (0.85)	0.10 (0.54)	5.81	2	.05
FERMENTED DAIRY	T1	0.31 (0.41)	0.30 (0.37)	0.53 (0.76)	3.09	2	.21
	T3	0.47 (0.54)	0.47 (0.24)	0.45 (0.39)	2.00	2	.36
	T3-T1	0.10 (0.35)	-0.02 (0.26)	-0.11 (0.44)	6.19	2	.05
SOFT CHEESE	T1	0.26 (0.35)	0.40 (0.82)	0.31 (0.74)	.59	2	.74
	T3	0.23 (0.29)	0.42 (0.11)	0.43 (0.53)	3.82	2	.14
	T3-T1	-0.13 (0.27)	0.00 (0.57)	-0.04 (0.44)	.82	2	.66
HARD CHEESE	T1	0.22 (0.45)	0.54 (0.68)	0.46 (0.53)	2.18	2	.33
	T3	0.22 (0.27)	0.43 (0.11)	0.41 (0.60)	1.87	2	.39
	T3-T1	0.00 (0.23)	-0.11 (0.59)	-0.16 (0.44)	.27	2	.87
OTHER DAIRY	T1	0.24 (0.41)	0.30 (0.43)	0.45 (0.46)	4.67	2	.09
	T3	0.30 (0.39)	0.46 (0.05)	0.43 (0.33)	3.04	2	.21
	T3-T1	-0.02 (0.33)	0.12 (0.49)	-0.02 (0.28)	1.01	2	.60
PBDA	T1	0.05 (0.45)	0 (0.04)	0.12 (0.38)	8.73	2	.01
	T3	0.18 (0.23)	0.18 (0.18)	0.14 (0.57)	.61	2	.73
	T3-T1	0.00 (0.12)	0.18 (0.18)	0.00 (0.20)	1.91	2	.38

Related-Samples Wilcoxon tests were performed to test changes within subjects. Median scores are reported again in Table 5.15, with test statistics, Z-scores, degree of freedom, and p-values. Only a significant result was observed in the leaflet group, for PBDA consumption.

A p-value=.05 was observed for fermented dairy consumption in the control group. However, results are considered significant per p-value <.05.

Table 5. 15.

Median frequency scores (interquartile range in brackets) and statistics details of Wilcoxon test. Wilcoxon tests were performed to test for significant difference in median frequency scores in each group at T1 and T3. Results are considered significant per p-value <.05 (in bold).

		T1	T3	test statistics	Z-score	p-value
DAIRY OVERALL	GROUP C	2.34 (1.74)	2.67 (1.49)	29	-1.15	.24
SOFT DAIRY		1.58 (1)	1.85 (1.38)	34	-.8	.42
MILK		0.36 (0.91)	0.20 (0.39)	38.5	-.49	.62
YOGHURT		0.54 (0.74)	0.32 (0.52)	26	-1.36	.17
FERMENTED DAIRY		0.31 (0.41)	0.47 (0.54)	63.5	1.92	.05
SOFT CHEESE		0.26 (0.35)	0.23 (0.29)	26	-1.02	.30
HARD CHEESE		0.22 (0.45)	0.22 (0.27)	21	-1.06	.28
OTHER DAIRY		0.24 (0.41)	0.30 (0.39)	41	-.31	.75
PBDA		0.05 (0.45)	0.18 (0.23)	24.5	.91	.36
DAIRY OVERALL	GROUP L	2.45 (1.94)	2.77 (0.25)	32	-.94	.34
SOFT DAIRY		1.69 (1.87)	1.88 (0.45)	31	-1.01	.31
MILK		0.20 (0.41)	0.46 (0.03)	52	1.02	.30
YOGHURT		0.80 (1.17)	0.53 (0.09)	24	-1.5	.13
FERMENTED DAIRY		0.30 (0.37)	0.47 (0.24)	50	.31	.75
SOFT CHEESE		0.40 (0.82)	0.42 (0.11)	22.5	0	.10
HARD CHEESE		0.54 (0.68)	0.43 (0.11)	26	-1.02	.30
OTHER DAIRY		0.30 (0.43)	0.46 (0.05)	55.5	.69	.48
PBDA		0 (0.04)	0.18 (0.18)	52	2.64	.00
DAIRY OVERALL	GROUP W	2.89 (2.39)	2.77 (2.39)	41	.15	.87
SOFT DAIRY		1.93 (1.73)	1.88 (2.33)	47	.62	.53
MILK		0.36 (0.92)	0.53 (0.89)	28	.65	.51
YOGHURT		0.17 (0.41)	0.40 (0.60)	49	1.42	.15
FERMENTED DAIRY		0.53 (0.76)	0.45 (0.39)	21.5	-1.37	.16
SOFT CHEESE		0.31 (0.74)	0.43 (0.53)	32	-.55	.58
HARD CHEESE		0.46 (0.53)	0.41 (0.60)	18	-1.33	.18
OTHER DAIRY		0.45 (0.46)	0.43 (0.33)	30	-.70	.48
PBDA		0.12 (0.38)	0.14 (0.57)	27	1.26	.20

5.4.1.4. Attitudes towards consumption of soft dairy products

Attitudes towards soft dairy consumption were explored only in Excel, and instead of being explored by attitudes sub-theme (n=17), they were explored and grouped by PCA components.

Figures 5.3-5.6 show results for each soft dairy by group and time points. Overall, attitudes are changing more among participants in the intervention group “W”, workshops, compared to changes in the leaflets group, and particularly concerning components that refer to beliefs, mode of consumption, occasions. Scores appeared overall higher in the control group, except for few components, e.g., PC5 in milk, PC4 in soft cheese and PC2 across all categories. These components include sub-themes that refer to dimensions that could be impacted by cooking activities, e.g., mode of consumption. It is interesting to observe that in the leaflet and workshops groups, while PC3, *mode of consumption*, increased in both yoghurt and fermented dairy, PC5, *occasion*, increased in yoghurt but decreased in the fermented dairy category when compared to T1. Moreover, while in yoghurts attitudes increased at T2, decreasing at T3, in fermented dairy T3 have higher scores than T2.

Figure 5. 3.

Attitudes towards consumption of milk. Attitudes are grouped based on PCA components explored in Chapter 3, respectively PCA1: Individual practices of consumption; PCA2: Beliefs; PCA3: Suitability; PCA4: Social norms; PCA5: Categorisation.

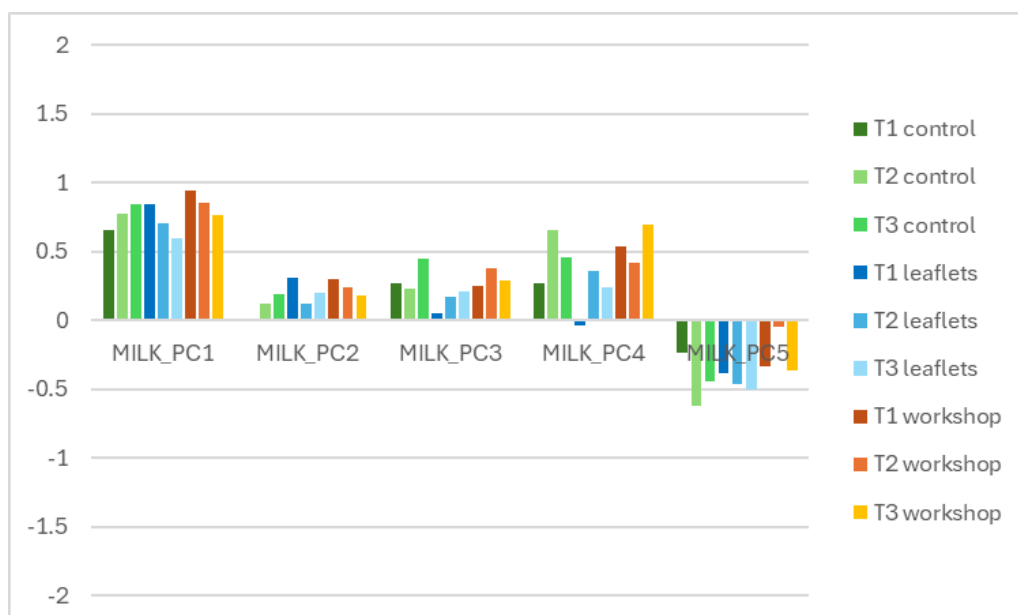
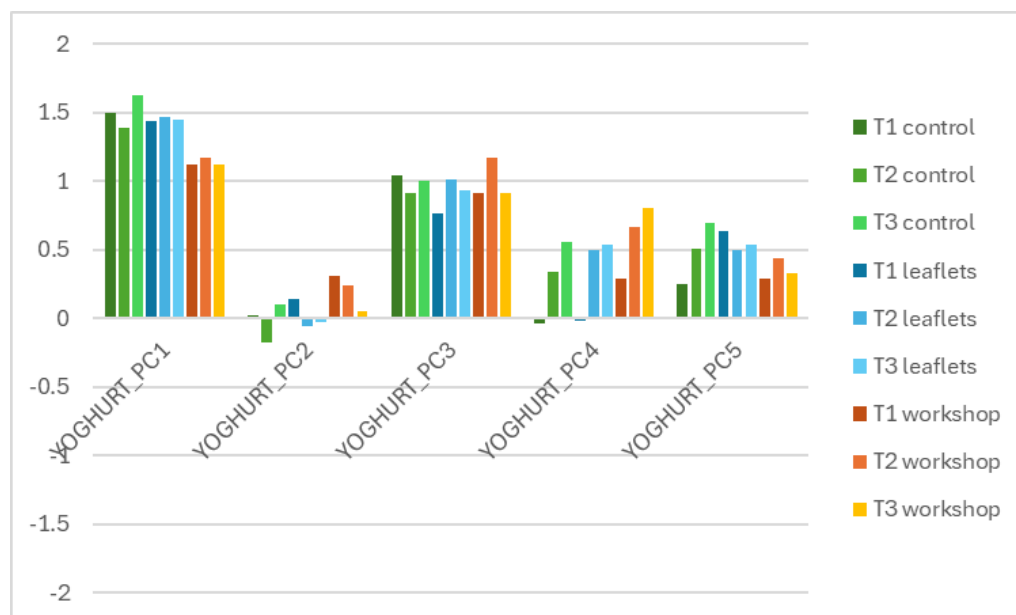


Figure 5. 4.

Attitudes towards consumption of yoghurt. Attitudes are grouped based on PCA components explored in Chapter 3, respectively PCA1: Individual practices of consumption; PCA2: Beliefs; PCA3: Mode of consumption; PCA4: Supply; PCA5: Occasion.

**Figure 5. 5.**

Attitudes towards consumption of fermented dairy. Attitudes are grouped based on PCA components explored in Chapter 3, respectively PCA1: Individual practices of consumption; PCA2: Beliefs; PCA3: Mode of consumption; PCA4: Supply; PCA5: Occasion. In the questionnaire, yoghurt and fermented dairy products were explored in the same product category, which is why their principal components are the same.

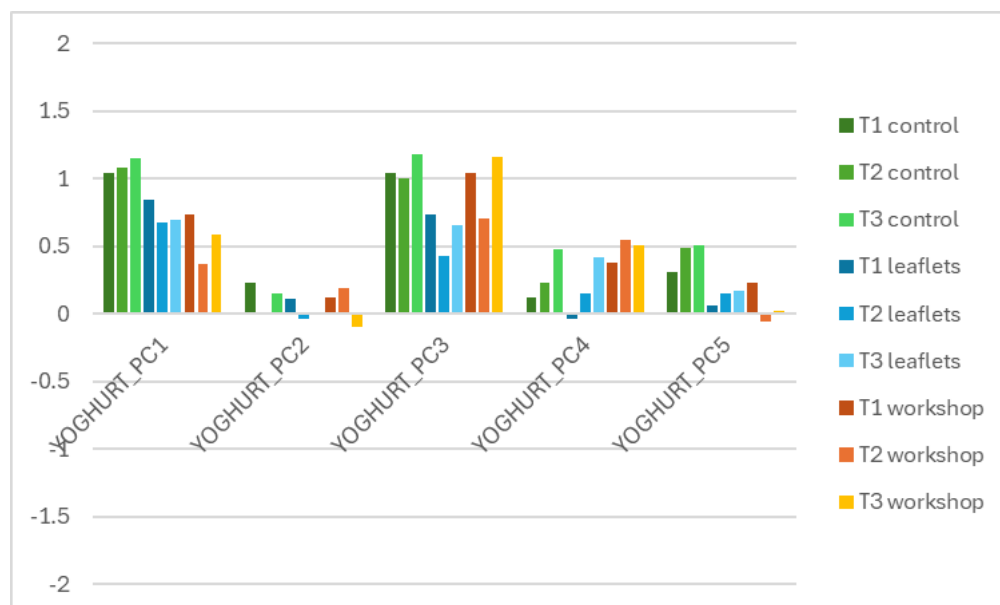
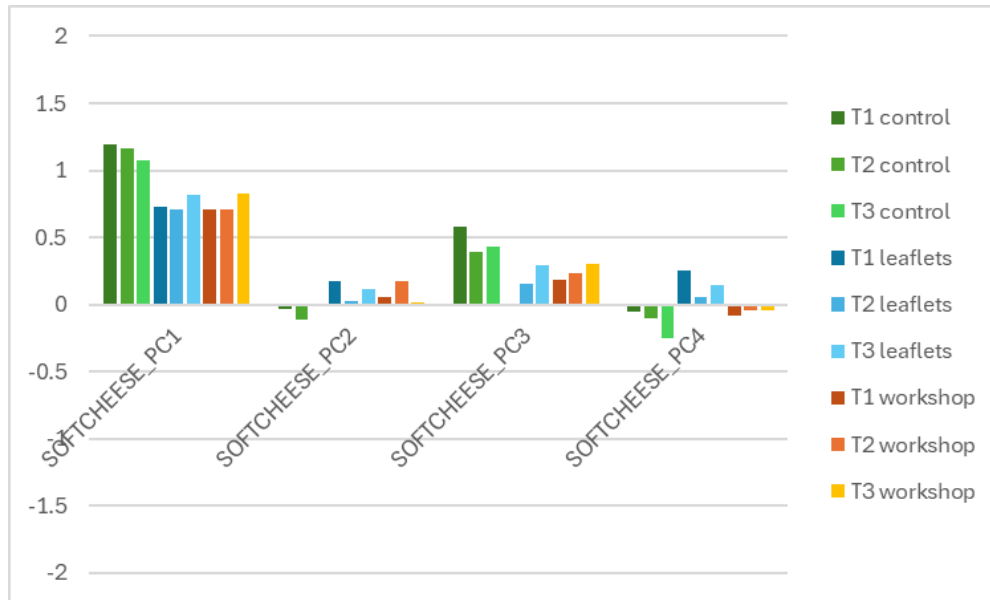


Figure 5. 6.

Attitudes towards consumption of soft cheese. Attitudes are grouped based on PCA components explored in Chapter 3, respectively PCA1: Individual practices of consumption; PCA2: Beliefs; PCA3: Occasion; PC4: Concerns.

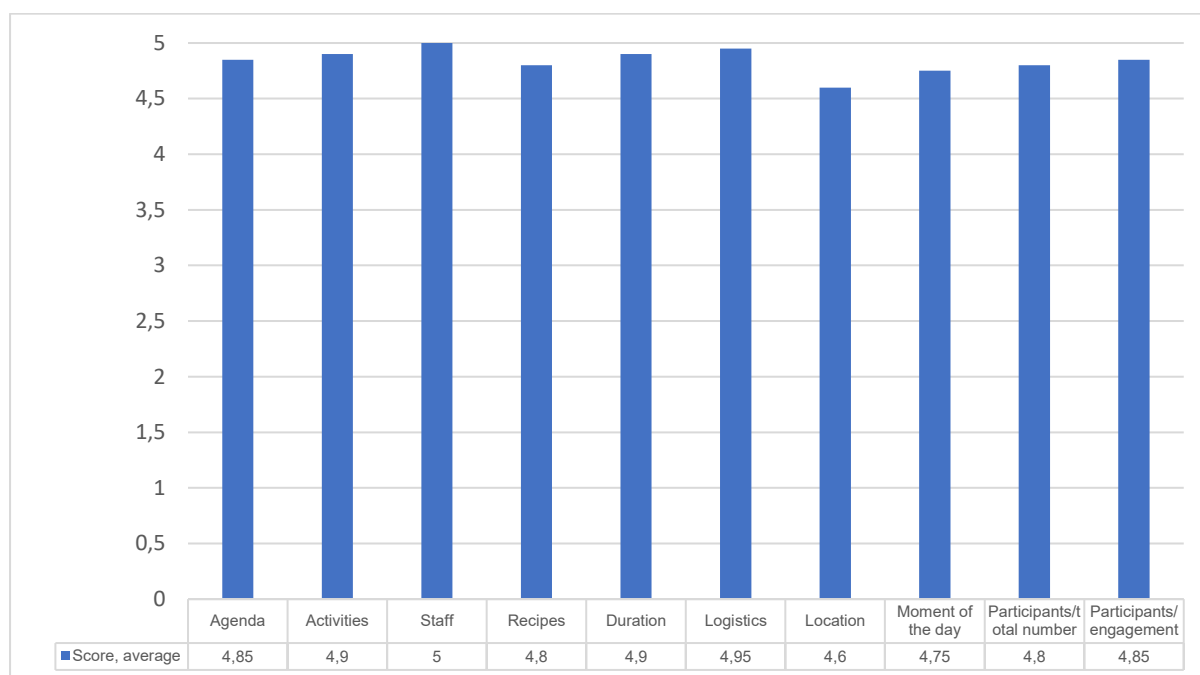


5.4.1.5. Recipes and workshop assessments

A total of 10 participants attended the workshop. An overall score was computed from the workshop assessments, and it is shown in Figure 5.7. Each participant completed the assessment twice, at the end of each session. Scores for each dimension explored are also reported in Figure 5.7.

Figure 5. 7.

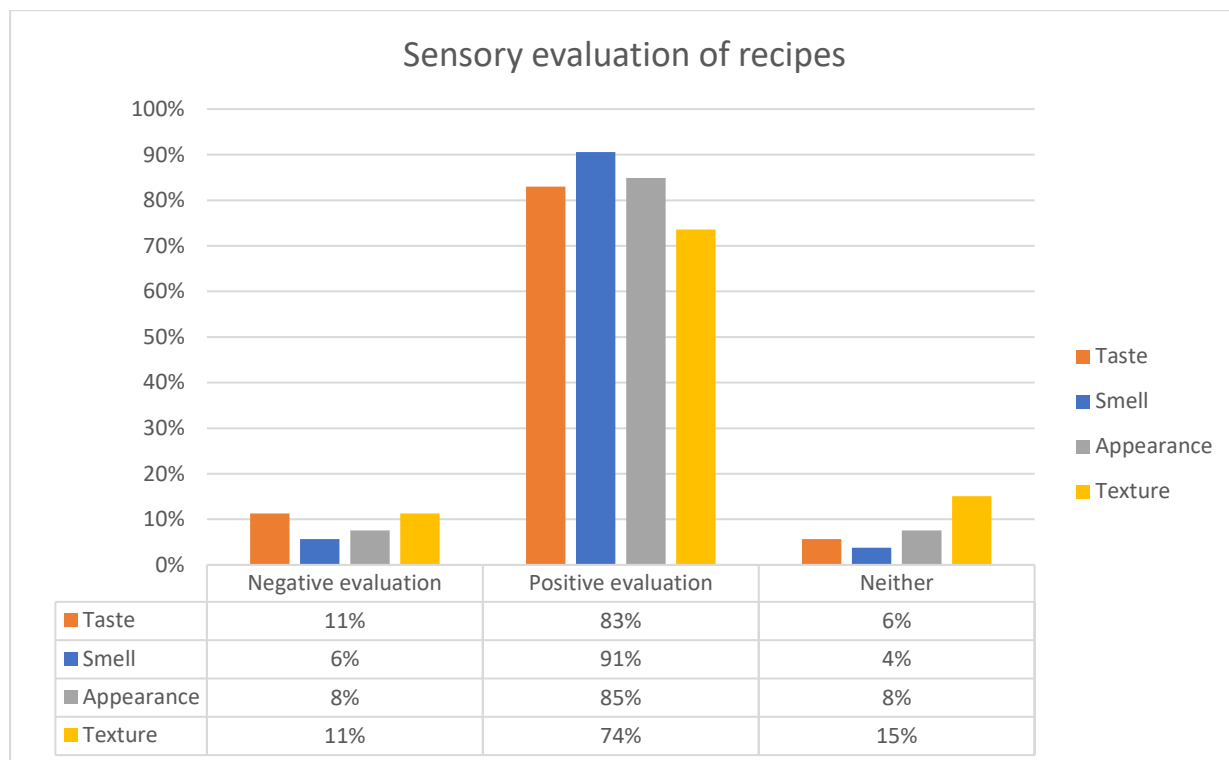
Workshop assessment, n=10. Participants evaluated each dimension from 0 [not satisfied at all] to 5 [strongly satisfied].



Recipe assessment concerned cooking activities at home. Overall scores were computed for taste, smell, texture, and visual appearance from all recipe assessments and are shown in Figure 5.8; however, participants were able to select the recipe they replicated at home and give an assessment for that one. Recipes were replicated at home a total of 53 times, 75% of times participants declared to not know that recipe, 83% of times to be satisfied and 87% of times to have found the recipe easy to make. Figure 5.8 also reports the percentage of positive and negative evaluations for each dimension explored.

Figure 5. 8.

Recipes assessment. Overall scores were computed from the 53 recipe assessments for the sensory evaluation of each of them. Participants were asked to select between three choices: satisfying [for positive evaluation], not satisfying [for negative evaluation], and neither.



5.4.2. Per protocol n=34

A second sample n=34 was also considered, after removing four people from the original sample of 38. All four were allocated to the intervention group “W”, workshops. Two of them, after being allocated, emailed the principal investigator that they would not be available at the time of the sessions to take part in them; they both took part in the study as if they were in the leaflet groups, engaging in activities at home, but knowing about the workshops. The other two participants took part in the second session of the workshops after completing measurements in week 2, due to a refrigerator malfunctioning that led to rescheduling the session. Table 5.16 reports sample demographics considering group “W” n=8, and Table 5.17 reports answer rates. Other groups remained unchanged.

Table 5. 16.*Main demographics characteristics by group.*

	Group “C”	Group “L”	Group “W”
<i>Total</i>	13	13	8
<i>Females</i>	11 (84,6%)	10 (71%)	7 (87%)
<i>Age</i>	24.5 years old	22 years old	22.5 years old
<i>French (including overseas territories)</i>	12 (92%)	14 (100%)	7 (87%)
<i>High education</i>	13 (100%)	14 (100%)	8 (100%)
<i>Students</i>	6 (46%)	9 (64%)	6 (75%)
<i>BMI</i>	22	20.5	22

Table 5. 17.*Answer ratio by time point and measurements per each group.*

		T1 (week -1)	T2 (week 2)	T3 (week 6)
Food journals	Control	13 (100%)	13 (100%)	11 (84.6%)
	Leaflets	13 (100%)	11 (78.5%)	7 (50%)
	Workshops	8 (100%)	7 (87.5%)	7 (87.5%)
Food frequency questionnaire	Control	13 (100%)	N/A	10 (76.9%)
	Leaflets	13 (100%)	N/A	4 (28.5%)
	Workshops	8 (100%)	N/A	10 (83%)
Attitudes toward consumption	Control	13 (100%)	8 (57%)	8 (61.5%)
	Leaflets	13 (100%)	7 (50%)	5 (35.7%)
	Workshops	8 (100%)	7 (87.5%)	7 (87.5%)

5.4.2.1. Dairy consumption

This section will report the results of analyses performed on sample n=34. Table 5.18 shows the median daily intake of soft dairy, per category and overall, and the average dairy intake of dairy overall, for each group at each time point of food journals: baseline (T1), two weeks after the intervention (T2), and six weeks after the intervention (T3), and the two computed T2-T1 and T3-T1. The table also reports the test statistics, degree of freedom and p-values of Kruskal-Wallis tests performed to test differences in consumption at different time points.

Table 5. 18.

Median intakes (interquartile range in brackets) for soft dairy products and overall soft dairy and dairy products [grams]. Test statistics, degree of freedom [df] and p-value refer to Kruskal-Wallis tests. Kruskal-Wallis tests were performed to test differences between median intake across groups at different time points. P-values are considered significant at $p < .05$

		GROUP C	GROUP L	GROUP W n=8	test statistics	Df	p-value
DAIRY OVERALL	T1	119.9 (116.85)	41.6 (163.95)	69.90 (54.62)	2.24	2	.32
	T2	58.3 (143.15)	15 (148.83)	64.85 (263.65)	.85	2	.65
	T3	43.3 (114.29)	10 (103.67)	142.4 (165.73)	3.12	2	.20
	T2-T1	-98.3 (191.30)	-18.3 (126.52)	-5 (152.85)	.9	2	.63
	T3-T1	-46.7 (227.22)	-41.6 (190.17)	80.45 (132.38)	3.05	2	.21
SOFT DAIRY OVERALL	T1	103.3 (133.25)	41.60 (168.95)	66.6 (52.47)	1.6	2	.44
	T2	51.60 (131.55)	12.30 (131.31)	39.10 (257.40)	.66	2	.71
	T3	43.3 (111.76)	10 (98.62)	136.6 (167.00)	2.92	2	.23
	T2-T1	-59.90 (165.25)	0 (129.84)	-10 (154.52)	.54	2	.76
	T3-T1	-46.7 (222.22)	-41.6 (201.77)	81.65 (133.65)	2.58	2	.27
MILK	T1	0 (53.30)	0 (23.15)	0 (64.10)	.46	2	.79
	T2	0 (0)	0 (25.87)	0 (147.45)	.7	2	.70
	T3	0 (41.74)	0 (41.74)	0 (72.91)	.16	2	.92
	T2-T1	0 (29.50)	0 (9.22)	0 (37.50)	2.28	2	.31
	T3-T1	0 (71.24)	0 (64.89)	0 (77.93)	0	2	.99
YOGHURT	T1	33.3 (137.50)	33.3 (93.30)	0 (0)	3.91	2	.14
	T2	33.3 (61.60)	0 (37.58)	0 (0)	5.15	2	.07
	T3	0 (37.58)	10 (33.55)	0 (75.89)	.19	2	.90
	T2-T1	-8.3 (161.65)	-33.3 (99.83)	0 (0)	.65	2	.72
	T3-T1	0 (116.68)	-8.05 (71.00)	0 (75.89)	2.42	2	.29
FERMENTED DAIRY	T1	0 (26.65)	0 (0)	0 (76.65)	3.67	2	.15
	T2	0 (29.95)	0 (10.00)	5.80 (54.10)	1.36	2	.50
	T3	0 (15.67)	0 (15.67)	0 (11.75)	.07	2	.96
	T2-T1	0 (32.45)	0 (2.50)	0 (27.45)	.07	2	.96
	T3-T1	0 (40.62)	0 (7.84)	0 (38.20)	.56	2	.75
SOFT CHEESE	T1	5 (10.00)	0 (0)	0 (19.15)	2.6	2	.27
	T2	0 (6.65)	0 (1.30)	5 (29.98)	3.3	2	.19
	T3	0 (7.66)	0 (7.66)	0 (21.87)	.21	2	.89
	T2-T1	0 (10.00)	0 (1.30)	0 (26.68)	1.82	2	.40
	T3-T1	0 (11.33)	0 (7.66)	0 (22.42)	.86	2	.65

Food journals' median daily intakes and results of Related-Samples Friedman's Two-Way Analysis of Variance by Ranks are summarised in Table 5.19, organised by group. The test was performed to check potential changes in soft dairy intakes within subjects for each group at time points T1, T2, and T3.

Table 5. 19.

Media intakes (interquartile range in brackets) for soft dairy products and overall soft dairy and dairy products [grams/day]. Test statistics, degree of freedom [df] and p-value refer to Related-Samples Friedman's tests. The Related-Samples Friedman's tests were performed to test for differences in median intakes in each group at different time points, i.e., T1, T2, T3 P-values are considered significant at $p < .05$

		T1	T2	T3	test statistics	df	p-value
DAIRY OVERALL	GROUP C	119.9 (116.85)	58.3 (143.15)	43.3 (114.29)	.89	2	.64
SOFT DAIRY OVERALL		103.3 (133.25)	51.60 (131.55)	43.3 (111.76)	1.21	2	.54
MILK		0 (53.30)	0 (0)	0 (41.74)	1.52	2	.46
YOGHURT		33.3 (137.50)	33.3 (61.60)	0 (37.58)	1.72	2	.42
FERMENTED DAIRY		0 (26.65)	0 (29.95)	0 (15.67)	.23	2	.88
SOFT CHEESE		5 (10.00)	0 (6.65)	0 (7.66)	2.38	2	.30
DAIRY OVERALL	GROUP L	41.6 (163.95)	15 (148.83)	10 (103.67)	1.79	2	.40
SOFT DAIRY OVERALL		41.60 (168.95)	12.30 (131.31)	10 (98.62)	.4	2	.81
MILK		0 (23.15)	0 (25.87)	0 (41.74)	0.46	2	.79
YOGHURT		33.3 (93.30)	0 (37.58)	10 (33.55)	1.85	2	.39
FERMENTED DAIRY		0 (0)	0 (10.00)	0 (15.67)	1.2	2	.54
SOFT CHEESE		0 (0)	0 (1.30)	0 (7.66)	1.46	2	.48
DAIRY OVERALL	GROUP W n=8	69.90 (54.62)	64.85 (263.65)	142.4 (165.73)	3.42	2	.18
SOFT DAIRY OVERALL		66.6 (52.47)	39.10 (257.40)	136.6 (167.00)	3.71	2	.15
MILK		0 (64.10)	0 (147.45)	0 (72.91)	.11	2	.94
YOGHURT		0 (0)	0 (0)	0 (75.89)	2.92	2	.23
FERMENTED DAIRY		0 (76.65)	5.80 (54.10)	0 (11.75)	.93	2	.62
SOFT CHEESE		0 (19.15)	5 (29.98)	0 (21.87)	.33	2	.84

Table 5.20 reports frequency scores and results of Kruskal-Wallis test performed on FFQ data. Participants were completing this questionnaire considering their consumption of all soft dairy foods, hard cheese, other dairy, and PBDA.

Table 5. 20.

Frequency scores (interquartile range in brackets). Test statistics, degree of freedom [df] and p-values refer to the Kruskal-Wallis performed to test changes at different time points between groups. Results are considered significant at p-value $< .05$ (in bold).

		GROUP C	GROUP L	GROUP W n=8	test statistics	df	p-value
DAIRY OVERALL	T1	2.34 (1.74)	2.45 (1.94)	3.01 (1.64)	1.91	2	.38
	T3	2.67 (1.49)	2.77 (.25)	2.73 (2.39)	2.46	2	.29
	T3-T1	-0.82 (1.21)	-0.21 (1.91)	-0.22 (2.94)	.23	2	.88

SOFT DAIRY OVERALL	T1	1.58 (1)	1.69 (1.87)	1.99 (1.33)	.81	2	.66
	T3	1.85 (1.38)	1.88 (.45)	1.68 (2.18)	.71	2	.69
	T3-T1	-.018 (1.32)	-.12 (1.23)	-.07 (1.62)	.36	2	.83
MILK	T1	0.36 (0.91)	0.20 (0.41)	0.53 (0.97)	1.39	2	.49
	T3	0.20 (0.39)	0.46 (0.03)	0.60 (1.04)	6.18	2	.04
	T3-T1	0.02 (0.59)	0.26 (0.41)	0.07 (0.30)	2.49	2	.28
YOGHURT	T1	0.54 (0.74)	0.80 (1.17)	0.20 (0.39)	3.41	2	.18
	T3	0.32 (0.52)	0.53 (0.09)	0.30 (0.60)	2.09	2	.35
	T3-T1	-.06 (0.48)	-.27 (0.85)	0.05 (0.60)	2.41	2	.29
FERMENTED DAIRY	T1	0.31 (0.41)	0.30 (0.37)	0.56 (0.75)	5.13	2	.07
	T3	0.47 (0.54)	0.47 (0.24)	0.36 (0.44)	1.85	2	.39
	T3-T1	0.10 (0.35)	-.02 (0.26)	-.26 (0.59)	7.10	2	.02
SOFT CHEESE	T1	0.26 (0.35)	0.40 (0.82)	0.31 (0.75)	.31	2	.85
	T3	0.23 (0.29)	0.42 (0.11)	0.43 (0.44)	2.96	2	.22
	T3-T1	-.13 (0.27)	0 (0.57)	-.04 (0.49)	.70	2	.70
HARD CHEESE	T1	0.22 (0.45)	0.54 (0.68)	0.46 (0.40)	1.93	2	.38
	T3	0.22 (0.27)	0.43 (0.11)	0.38 (0.69)	1.74	2	.41
	T3-T1	0.00 (0.23)	-.11 (0.59)	-.16 (0.44)	.14	2	.93
OTHER DAIRY	T1	0.24 (0.41)	0.30 (0.43)	0.60 (0.56)	6.31	2	.04
	T3	0.30 (0.39)	0.46 (0.05)	0.43 (0.42)	3.47	2	.17
	T3-T1	-.02 (0.33)	0.12 (0.49)	-.01 (0.77)	.80	2	.66
PBDA	T1	0.05 (0.45)	0 (0.04)	0.25 (0.38)	8.97	2	.11
	T3	0.18 (0.23)	0.18 (0.18)	0.14 (0.76)	.73	2	.69
	T3-T1	0.00 (0.12)	0.18 (0.18)	0.00 (0.31)	1.64	2	.43

Table 5.21 reports median scores, alongside results from related-Samples Wilcoxon tests were performed to test changes within subjects.

Table 5. 21.

Median frequency scores (n brackets) and statistics details of Wilcoxon test. Wilcoxon tests were performed to test for significant difference in median frequency scores in each group at T1 and T3. Results are considered significant per p-value <.05.

		T1	T3	test statistics	Z-score	p-value
DAIRY OVERALL	GROUP C	2.34 (1.74)	2.67 (1.49)	29	-1.15	.24
SOFT DAIRY		1.58 (1)	1.85 (1.38)	34	-.8	.42
MILK		0.36 (0.91)	0.20 (0.39)	38.5	-.49	.62
YOGHURT		0.54 (0.74)	0.32 (0.52)	26	-1.36	.17
FERMENTED DAIRY		0.31 (0.41)	0.47 (0.54)	63.5	1.92	.05
SOFT CHEESE		0.26 (0.35)	0.23 (0.29)	26	-1.02	.30

HARD CHEESE		0.22 (0.45)	0.22 (0.27)	21	-1.06	.28
OTHER DAIRY		0.24 (0.41)	0.30 (0.39)	41	-.31	.75
PBDA		0.05 (0.45)	0.18 (0.23)	24.5	.91	.36
DAIRY OVERALL	GROUP L	2.45 (1.94)	2.77 (0.25)	32	-.94	.34
SOFT DAIRY		1.69 (1.87)	1.88 (0.45)	31	-1.01	.31
MILK		0.20 (0.41)	0.46 (0.03)	52	1.02	.30
YOGHURT		0.80 (1.17)	0.53 (0.09)	24	-1.5	.13
FERMENTED DAIRY		0.30 (0.37)	0.47 (0.24)	50	.31	.75
SOFT CHEESE		0.40 (0.82)	0.42 (0.11)	22.5	0	1
HARD CHEESE		0.54 (0.68)	0.43 (0.11)	26	-1.02	.30
OTHER DAIRY		0.30 (0.43)	0.46 (0.05)	55.5	.69	.48
PBDA		0 (0.04)	0.18 (0.18)	52	2.64	.00
DAIRY OVERALL		3.01 (1.64)	2.73 (2.39)	15	-.42	.67
SOFT DAIRY	GROUP W n=8	1.99 (1.33)	1.68 (2.18)	16	-.28	.77
MILK		0.53 (0.97)	0.60 (1.04)	18	.67	.49
YOGHURT		0.20 (0.39)	0.30 (0.60)	23	.7	.48
FERMENTED DAIRY		0.56 (0.75)	0.36 (0.44)	6	-1.68	.09
SOFT CHEESE		0.31 (0.75)	0.43 (0.44)	12	-.84	.40
HARD CHEESE		0.46 (0.40)	0.38 (0.69)	9	-.84	.39
OTHER DAIRY		0.60 (0.56)	0.43 (0.42)	14	-.56	.57
PBDA		0.25 (0.38)	0.14 (0.76)	10.5	.81	.41

Attitudes towards soft dairy consumption were explored only in Excel, and instead of being explored by attitudes sub-theme (n=17), they were explored and grouped by PCA components. Figures 5.9-5.12 show results for each soft dairy by group and time points. Overall, except for few components, scores were positive at T1 and remained positive throughout all the study.

Figure 5. 9.

Attitudes towards consumption of milk. Attitudes are grouped based on PCA components explored in Chapter 3, respectively PCA1: Individual practices of consumption; PCA2: Beliefs; PCA3: Suitability; PCA4: Social norms; PCA5: Categorisation.

**Figure 5. 10.**

Attitudes towards consumption of yoghurt. Attitudes are grouped based on PCA components explored in Chapter 3, respectively PCA1: Individual practices of consumption; PCA2: Beliefs; PCA3: Mode of consumption; PCA4: Supply; PCA5: Occasion.

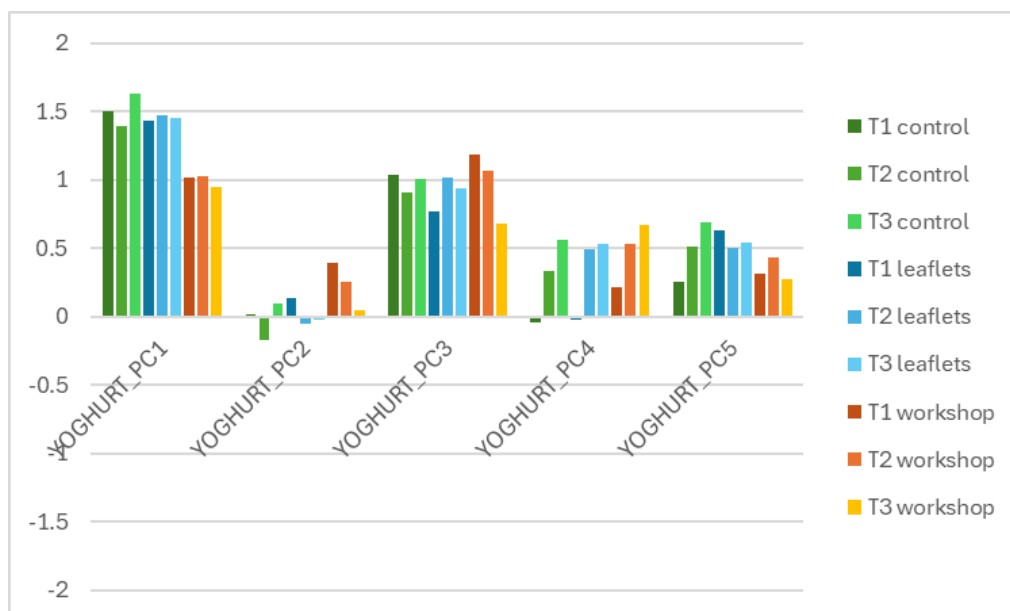
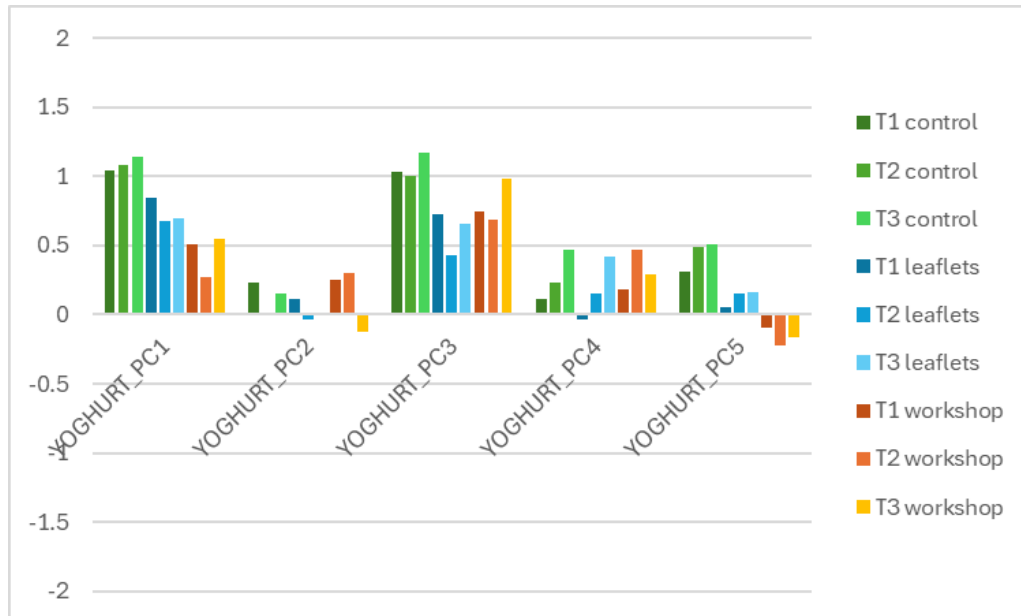
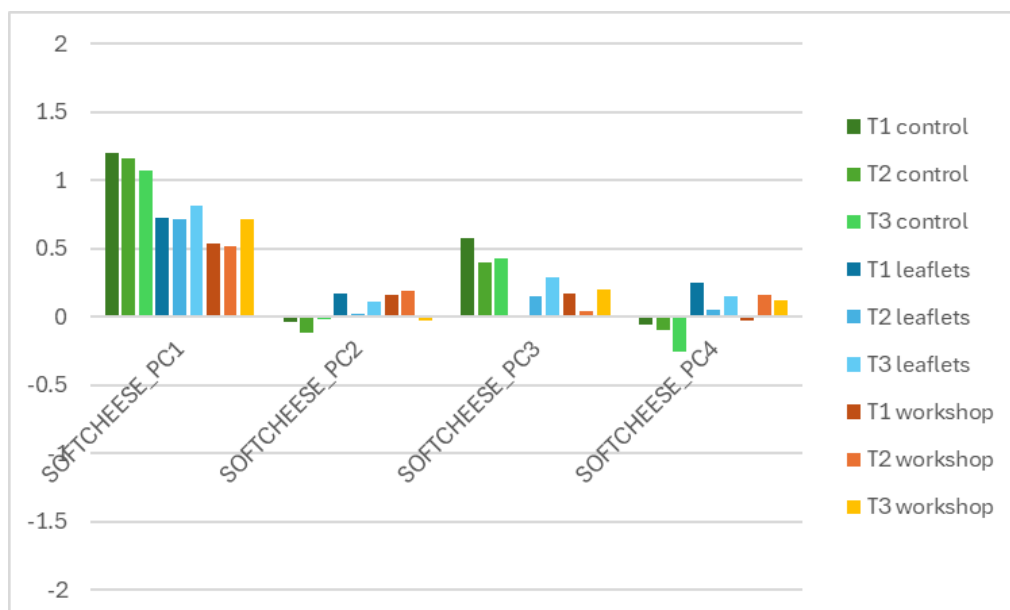


Figure 5. 11.

Attitudes towards consumption of fermented dairy. Attitudes are grouped based on PCA components explored in Chapter 3, respectively PCA1: Individual practices of consumption; PCA2: Beliefs; PCA3: Mode of consumption; PCA4: Supply; PCA5: Occasion. In the questionnaire, yoghurt and fermented dairy products were explored in the same product category, which is why their principal components are the same.

**Figure 5. 12.**

Attitudes towards consumption of soft cheese. Attitudes are grouped based on PCA components explored in Chapter 3, respectively PCA1: Individual practices of consumption; PCA2: Beliefs; PCA3: Occasion; PC4: Concerns.

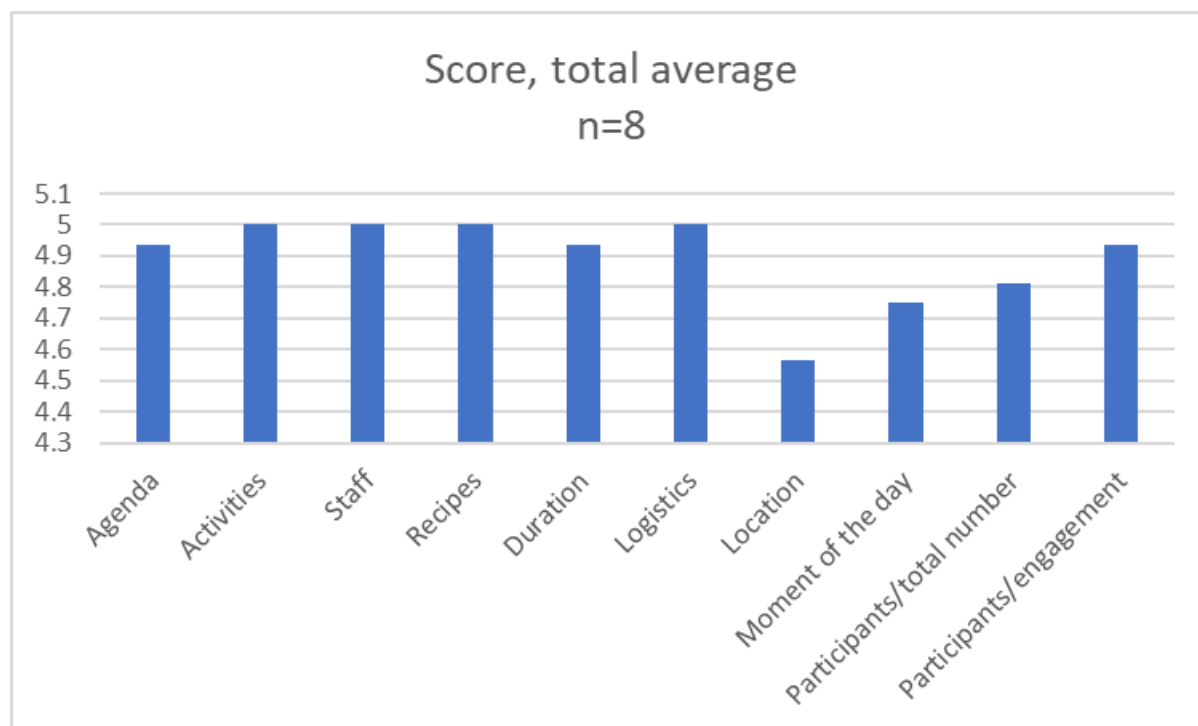


5.4.2.2. Workshops and recipe assessments

Figure 5.13 shows the workshop assessment results for the reduced sample size of group “W” n=8. All participants in this sample attended the classes as expected before week 2.

Figure 5. 13.

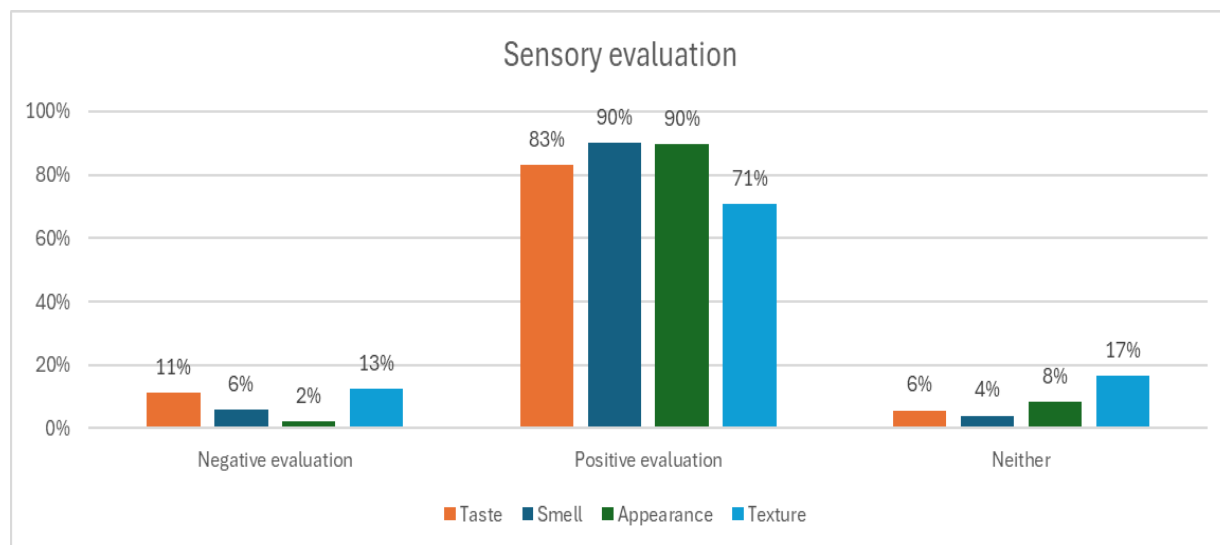
Results of workshop assessment.



Recipes at home were replicated a total of 48 times, meaning that the removed participants were replicating recipes only 5 times. 79% of the time recipes were not known, 88% of the time they were considered easy, and 58% of the time participants reported they would try them again, while 33% selected “Maybe” and 8% “No”. Figure 5.14 shows the general sensory evaluation for all recipes and percentages.

Figure 5. 14.

Recipe assessment. Evaluation of taste, smell, appearance, and texture overall.



5.4.3. Debriefing questionnaire

The debriefing questionnaire was sent to everyone who completed part of the screening (n=75). It was completed by 28 people, 18 (64%) of them took part in and completed the study. Respondents were able to add comments, suggestions, and opinions in free textboxes for each question. Some concepts appeared recurrent and were grouped in Table 5.22, stating how many times these were cited in the free text boxes [n].

Table 5. 22.

Main findings of the debriefing questionnaire, and number of times [n] that concept appeared in the free text boxes, with further details.

	n	Further details
Respondents	28	
Took part in the study	18	
Group Control	7	Four of them reported they would have preferred the workshops group, and two of them the leaflets one
Group Leaflets	6	One would have preferred the workshops group
Group Workshop	5	Two of them would have preferred the leaflets group
Guessed the study was on dairy	9	Two of them guessed the study focused on fermented dairy; the other seven referred to dairy in general
Changed their attitudes towards fermented dairy	3	One of them reported learning new skills, one stated discovering new products, and the last one reported eating more fermented dairy products as discovered they are healthy

<i>Questionnaires were interesting</i>	5	
<i>Questionnaires were too long</i>	12	
<i>Questionnaires were repetitive</i>	5	
<i>Food journals would have been better with automatic entries</i>	9	Respondents suggested using an automatic fill-in system, with brands and quantities. Also, they reported difficulties in completing the food journals when eating at restaurants
<i>It was hard to estimate quantities</i>	7	Respondents suggested to use fixed portion sizes, e.g., cups
<i>The gap between questionnaires was okay</i>	9	
<i>The gap between questionnaires was too long</i>	5	Respondents stated that filling in the questionnaires in two and six weeks may lead the investigators to miss something
<i>The gap between questionnaires was too short</i>	7	Respondents reported the gap is too short as the questionnaires are too long and there was not enough time to complete them
<i>Workshops were too late/too early in the evening</i>	3	Individual reasons
<i>Having fixed date/time would have helped to have more people attending the workshops</i>	5	Respondents reported that giving the possibility to choose date/time may lead people to not choose at all to avoid new tasks
<i>Recipes were interesting</i>	6	
<i>Two weeks to replicate recipes are not enough</i>	8	Respondents stated two weeks was not enough or there were too many recipes to replicate
<i>Ingredients for recipes were too expensive</i>	4	Respondents complained about the cost of ingredients, considering big sizes of ingredients for little use and/or unusual ingredients that were difficult to find, e.g., rose aroma. They also suggested giving a grocery voucher to buy ingredients.
<i>Recipes were unusual</i>	7	Four respondents reported recipes were unusual but positive, and three of them reported individual reasons for disliking
<i>Sending reminders helped to stay engaged</i>	17	Most respondents found reminders useful. They reported that reminders helped them against some degree of disengagement that could have led them to withdraw
<i>Sending reminders was not necessary</i>	2	One respondent particularly found reminders too much

<i>A reminder every day would have been better</i>	1	A respondent reported that receiving reminders every day would have had a better impact on the engagement
<i>A phone call as a reminder would have been better</i>	4	Respondents stated that phone reminders would have helped more
<i>Engagement is a common issue, and it is independent of this study</i>	10	Respondents stated that disengaged participants should have withdrawn or not taken part in the study at all; they also stated that more outreach activities are needed to make sure potential participants know about research studies
<i>Participants should have received a reimbursement</i>	7	Respondents suggested giving some sort of reimbursement could help in participants' engagement
<i>Groups were not equal</i>	4	Groups were not perceived as equal, particularly as the workshops group was allowed to engage in cooking activities with a chef; the leaflet group was asked to replicate recipes at home at their expenses

5.5. Discussion

This study aimed to increase intakes of soft dairy products, particularly fermented dairy, and attitudes towards them while assessing if engaging in cooking activities could help changes in attitude. Cooking activities were chosen as interventions because learning new recipes could address some of the barriers that seemed to impact French participants who do not consume fermented dairy, for instance, sensory-related and individual-related aspects (Bramston et al., 2020; Dogherty & Estabrooks, 2015; Kulmala et al., 2021; N. I. Larson et al., 2006; Reicks et al., 2018; Rogers et al., 2021). However, besides the engagement in the cooking activities and the positive feedback, results show little to no change in consumption of fermented dairy and other soft dairy products, with few significant results when inferential analyses were performed. For instance, PBDA frequency of consumption increased, yoghurt frequency of consumption increased in the workshops group, but the fermented dairy one increased only among the control group. Many reasons may explain why the interventions were not effective, and some of them could be reinforced by the results of the debriefing questionnaire.

5.5.1. Fermented dairy

Fermented dairy was chosen as the target product of this study as it was the least consumed category of soft dairy in the characterisation study (Chapter 3). Although these data refer to data collected almost ten years ago (INCA3 2014-2015), the quantities recorded in food journals by participants confirmed that they are still the least consumed category, although

new market trends promote their consumption for health- and environmental-related benefits (El Sheikha, 2022; Farag et al., 2020). The fermented dairy category includes products that are common in French diets, such as *fromage blanc* or petit Suisse (Cesbron-Lavau et al., 2017), products that are occasionally referred to as yoghurt or cheese (Alvaro et al., 2007; Charby et al., 2017). However, this study proposed recipes including less common fermented dairy, such as *lait ribot*, a traditional cultured milk from Brittany (Bourlioux, 2007). Other common fermented products were included, such as Faisselle, however, fermented milks were the majority, as their intake was almost non-existent in the characterisation study, and they are suitable for sweet/savoury, drinkable/edible dishes. These were also the most negatively cited dairy products among participants taking part in the qualitative study (Chapter 2), for their sensory characteristics. This study aimed to address this barrier, i.e., sensory characteristics, while increasing consumption opportunities through learning new recipes. However, the attitudes questionnaire did not reveal particularly low scores in aspects related to PC1, individual consumption practices, which includes liking and sensory aspects. Except for a slight descent in week two in the workshop group, the score remained overall positive. A change in score that was found also among the group leaflets, and may be related to any other aspects included in PC1, i.e., *structure of the meal, use, availability, packaging*, alongside *sensory, preferences*, and *personal reasons* too; however, the feedback on the activities was positive, and despite the slight decline, the overall score for individual consumption factors remained high and positive at every data collection point. It is interesting in any case to note that the final score [at T3] in both groups was lower than the initial one [T1], recorded before the activities. This could be due to the type of product used, not perceived negatively but still less appreciated than others or simply a product that people experienced less (Cardello et al., 2024; Ojeda et al., 2021). It is in fact known that personal experiences and familiarity impact food intake (Barrena & Sánchez, 2013; Cook et al., 2015; Laila et al., 2021). PC1 includes also the sub-theme *availability*. While having healthy food items available at home has already been shown to increase opportunities for consumption (Cook et al., 2015), personal experiences seemed to have a stronger effect, particularly when combined with social occasions (Cook et al., 2015; Cruwys et al., 2015).

Increasing the chances of consumption of these products benefited the leaflet group, but only partly. In fact, while in both groups, the median intake did not change, in the leaflets group, the frequency of consumption of fermented products increased. In this regard, it is important to remember that while food journals give an effective overview of intakes, the FFQ provides information on frequency. Consumption opportunities is indeed linked to PC3, *mode of consumption*. Increasing how a product type can be consumed could have two main impacts: first, simply increase its intake (Jung et al., 2015; Laila et al., 2021); second, increase the

opportunities for consumption, e.g., the number of meals, with no change in the general intake (Kahleova et al., 2014; N. I. Larson et al., 2009).

Different settings, in a group and with a chef, or at home, may impact the degree of engagement, and consequently results (Reicks et al., 2018). The score for PC5, which includes the *social norms* and *needs or cravings* sub-themes, decreased in the workshops group, while it increased in the leaflets one. A decrease among participants in the workshops group may be due to setting of the intervention activity more than products per se. Social influences can notably impact food consumption, but also influence engagement in new activities, sometimes even preventing changes (Cruwys et al., 2015; Dyen & Sirieix, 2016; Hardin-Fanning & Ricks, 2017). It is interesting to consider that PC5 increased among participants in the leaflets one along with frequency of consumption of these products, as this may mean that other than reporting an increase in the opportunities for consumption, these products could be considered in social contexts or for healthier choices while rewarding themselves (Bucher et al., 2016). Notably, comfort foods are sweeter, fattier, or in general higher in palatability (Hebden et al., 2015; Locher et al., 2005; Sadler et al., 2021; Tomiyama et al., 2015), while fermented dairy products are often described as sour, acidic, or bitter (Conti-Silva & Souza-Borges, 2019; Narvhus & Abrahamsen, 2023). In this sense the possibility of considering them in rewarding situations, e.g., celebratory meals, may mean that better sensory characteristics were achieved through recipes.

The lower score recorded in the attitudes questionnaire was PC2, *beliefs*, including sub-themes as *knowledge, attitudes and concerns, categorisation, non-sensory, composition*; a score that compared to the others was lower from the beginning. This may indicate that these products are little known, before being little consumed (Bourlioux, 2007; Cesbron-Lavau et al., 2017; Charby et al., 2017). Indeed, the focus of PC2 is participants' perceptions regarding the consumption of these products and the impact that this could have on health, environment, and even animal welfare. The scores are inexplicably low for a product category whose consumption is notably promoted to boost health benefits and engage in more sustainable diets (Basaran & Telci, 2022; Baschali et al., 2017; Kok & Hutkins, 2018; Savaiano & Hutkins, 2021).

Another interesting aspect to evaluate is the effect of activities on the workshop group. Scores related to the consumption barriers directly targeted for this study, PC1, i.e., individual practices of consumption, including *preferences, personal reasons, sensory-related aspects*, and PC3, i.e., *mode of consumption*, had a setback just after the workshops, only to settle again in the follow-ups. PC1 remained, in the end, lower than the starting score. This could mean that, although the recipes were appreciated and the workshops have been positively

evaluated, this did not seem the most appropriate type of activity to increase consumption of these products. Considering also the other considerations, particularly made on PC2's scores, and other studies outcomes fading in long-term scenarios (Reicks et al., 2018; Seeley et al., 2010), cooking activities alone was not the right intervention to address these barriers. More complete education programs, including these activities alongside others, may have more positive outcomes (Hersch et al., 2014; Sullivan et al., 2025). Food awareness, nutrition literacy, along cooking skills can promote engaging with varied and balanced diets (Albano, 2022; Y. Lee et al., 2022; Ronto et al., 2022).

It is interesting to note that scores in the control group are overall positive, and PC1, PC3, PC4 increased during the study, while PC5 slightly decreased. PC2 was the only component decreasing. This group received no dietary guideline, but it could be that the mere participation in a study with dietary measurements may have influenced the attitude of these participants towards their overall diet. The fact the PC2, *beliefs*, remains a low score, may be due to the context. The participants, regardless of the group in which they were placed, all lived in Ecully, Lyon, or surrounding areas. This score may reflect the recruitment context.

5.5.2. Considerations about other soft dairy products

Alongside fermented dairy, other soft dairy products, i.e., milk, yoghurt, and soft cheese, were targeted in this study. None of these products were significantly increased in intake, however, a change is recorded in the frequency of consumption. In fact, except for yoghurt consumption, whose frequency decreased in the leaflets group, the scores for the other categories all increased. Moreover, the score of another dairy category, i.e., hard cheese, decreased, while the 'other dairy' category score decreased among participants in the leaflets group but increased in the workshops one. Attitudes for these two were not explored, thus it will be impossible to know if this change was related to the fact that some soft dairy products are similar enough to each other, that they can easily be used to substitute other products in the dairy group (De Groot et al., 1998; Hersleth et al., 2005; Prättälä, 1989).

Attitudes were explored for all soft dairy products. However, only the yoghurt category can be directly compared to the fermented dairy one, as their scores were computed based on the same PCA results (Chapter 4). For this reason, milk and soft cheese will be discussed with no direct comparison, even though some aspects may impact findings similarly among all of them.

The first thing that it is possible to notice is that the results from the attitudes questionnaire for the yoghurt category differed from those for the fermented dairy category, particularly at T2 among participants in the workshops group. At week 2, except for PC2, *beliefs*, all other scores

increased, and the score for PC1, which decreased among all other soft dairy categories, remained unchanged. The effect of cooking activities was stronger in that group, compared to the small changes in attitudes in the leaflets group, but overall the yoghurt scores were higher than the fermented dairy ones. Even if similar to fermented dairy, there are some differences to consider when exploring this category. Yoghurt is the most common dairy category in France, in terms of products variability (Cesbron-Lavau et al., 2017; Charby et al., 2017; Les marchés des produits laitiers, carnés et avicoles. Bilan 2022/Perspectives 2023, 2023; Valli & Traill, 2005). It is an overall well-known and accepted food category (Almli et al., 2011; Pattisson & Lindgreen, 2004; Pettinger et al., 2006) and occasionally the term “yoghurt” can be used to refer to other fermented dairy products too (Cesbron-Lavau et al., 2017), as their process of production is similar (Bylund, 1995; Savaiano & Hutkins, 2021). Moreover, some fermented products, such as *fromage blanc*, and Faisselle, could be confused with yoghurts, not only for their appearance but also for their context of consumption (Kemp et al., 2017; Lewis & Dale, 1994; Pattisson & Lindgreen, 2004). The findings of this study however are not necessarily related to a misinterpretation of the category, as participants were contextually informed about the products to be considered in their responses at the beginning of each questionnaire page. They may, however, suggest that this type of intervention could be more valid for a more well-known product category, such as yoghurt. It is also interesting to note that starting scores for PC3, *mode of consumption*, and PC4, *supply*, were higher for fermented products. Particularly the fact that PC3 was higher, can be interpreted as a confirmation of findings of the characterisation study (Chapter 3), in which fermented dairy was found to be consumed in different kinds of food combinations and dishes, more than other dairy products in general. Finally, PC2, *beliefs*, showed low scores for yoghurt as well, especially among participants in the leaflets group, even decreasing during the study. None of the sub-themes included in the PC2, beliefs, i.e., *knowledge, attitudes and concerns, categorisation, non-sensory, composition*, were targeted in this study. However, a decline in dairy consumption has been already associated with health-related concerns (S. Allen et al., 2018), and this result may in fact mean that a product, however popular, is not immune to the risk that its consumption will be reduced due to limited food awareness (Collins & Lalor, 2023). In this sense, action to broaden knowledge of these products seems at present most necessary, considering that overall scores for PC1 and PC3 were still both positive.

Besides the fact that PC1 decreased in scores in all soft dairy categories, except for yoghurt, in the milk category all other factors decreased after the intervention, except for PC3, which increased in both workshops and leaflets groups and PC4 increased in the leaflets group. Despite changing, PC1 and PC4 remained positive overall, and PC2, beliefs, remained stable when compared to the scores of the other soft dairy categories. It may be valuable to focus

on PC5, *categorisation*, as its score was negative at the beginning of data collection, and still at the end of this study. Milk is indeed known as a nutrient-rich food (Roy, 2008; Scholz-Ahrens et al., 2020; Smith et al., 2022; Weaver, 2009), but besides its nutritional content, it is not considered as rich as any other animal-derived products (Friedman, 1996; Phillips et al., 2015; Wang et al., 2022). 100g of cow's milk contains 3.5g of proteins (Bylund, 1995), a quantity that might seem insignificant compared to another protein source such as meat, e.g., poultry has an average content of 7.9 grams of protein/100 grams of product (Phillips et al., 2015), but with high biological value (Hoffman & Falvo, 2005) that instead could be a help in the case of habitual milk consumption, considering all other positive side effects on health, environment and costs (Hobbs et al., 2020).

Concerning the soft cheese scores, the scores in PC1, individual practices of consumption, remained stable after the intervention and increased in the follow-up in both leaflets groups and workshops, with similar scores in both groups. In both groups, PC3, *occasion*, including sub-themes *categorisation*, *needs or cravings*, *structure of the meal*, increased as well slightly. PC2 and PC4 had the least stable scores among all. PC2, beliefs, was the aspect with the lowest score among all products, except for milk and, to some extent, the workshops group in yogurts. Considerations already made for other products may be valid as well for soft cheese. PC4, *attitudes and concerns*, dropped after the second week, to rise again in group leaflets; while in the workshops group, it remained negative, despite improving slightly. This difference in scores, although not directly comparable, may suggest that for this product category an intervention aiming at expanding the knowledge of the product, as well as its impact on health and the environment, including animal welfare, could have a more positive impact than culinary activities. Results show in fact that the aspects related to liking, sensory aspects, and ways of consumption, all included in PC1, did not have particularly low scores, while the low scores of PC2 and PC4 may be due to a misperception of these products as less environmentally friendly, maybe associated also to other cheeses (Gaillac & Marbach, 2021).

5.5.3. Considerations about the debriefing questionnaire

A debriefing questionnaire was sent to all people who completed the screening measurements, regardless of their degree of engagement in the study. They were able to give details about their opinions and insights about all stages of the study, including recruitment and measurements.

Individual reasons such as the expectation of disliking led participants to limit their engagement, and the idea of food as “bad to eat” has already been demonstrated to be a strong barrier to consumption (Fischler, 1980; Harris, 1998). Food customs are socially

accepted and need time to change (Harris, 1998; Rappoport, 2003; Shekriladze et al., 2019), and it is well-known that food habits are intrinsically linked to food culture (Fischler, 1980).

It is interesting to note that while for some participants the week gaps between measurements, i.e., two and four weeks, were not enough, for others were too long, with one person specifically speaking about everyday changes. Many approaches may be found in the literature (Casini et al., 2015; Verplanken & Orbell, 2022), but habits and behavioural long-term changes indeed occur with daily small assessments (Verplanken & Orbell, 2022), and considering our debriefing feedback, asking participants to replicate all recipes in two weeks was perceived as too demanding. Consumers are likely to keep their already existing eating patterns and purchasing schemes (Ji & Wood, 2007; Ternier, 2010); new ones have to be somehow convenient (Brunner et al., 2010; Carrigan et al., 2006), and this often means convenient for the entire household (Brunner et al., 2010; Carrigan et al., 2006).

Feedback about the workshops was overall positive, however, only one respondent in the debriefing questionnaire reported about the learnt skills and how this led to a shift in fermented dairy use in the kitchen. Even though fermented dairy products were present in each recipe as ingredients, and recipes were overall appreciated, fermented dairy was not the main ingredient. This seemed reasonable when developing the study, as these products are not popular in France and some participants in the focus groups were disgusted by them; however, it could have redirected the focus from creating a new occasion to consume fermented dairy foods to replicating a specific recipe. Some respondents stated that they substituted the fermented dairy to have the recipe done, and they also reported how this process was somehow hard because they did not know the original item.

Lastly, reimbursements or other monetary compensations were suggested by respondents, particularly to bridge the gaps between groups and their benefits. Monetary reimbursement is a controversial topic in research, however this study increases the necessity of exploring and identifying new strategies to ensure participation, while also considering how reimbursement can be used as a long-term engagement strategy (Ripley, 2006; Russell et al., 2000).

5.5.4. Implications and limitations

The study aims of increasing the intake of soft dairy products, in particular fermented ones, were not achieved. The type of intervention, although it has not made significant changes to the consumption of target products, has been explored to consider its effect on quantities consumed and attitudes towards soft dairy products. In this study, it became evident that the fermented dairy used in the recipes was not well-known among the sample. Other studies

showed that cooking activities alone could improve attitudes but have a mixed effects on consumption, not always increasing intakes of targeted products (Bramston et al., 2020; Hasan et al., 2019; Reicks et al., 2018). Assessing participants knowledge, followed by activities addressing misconceptions and improving food literacy, awareness, and cooking skills, may lead to better outcomes (Jung et al., 2015; Y. Lee et al., 2022; Reicks et al., 2018; Ronto et al., 2022; Sullivan et al., 2025; Ternier, 2010). Thus, future studies aiming at increasing occasions for consumption of fresh fermented dairy products would benefit from the combination of information and culinary activities. Furthermore, given the feedback from participants, it seems necessary to develop activities that maintain the degree of daily commitment in addition to follow-up measures, creating tasks that can be interspersed or modulated in a routine without necessarily requiring a commitment that can be perceived as too time-dispersive or cost-consuming.

5.6. Conclusions

The results of this study did not show any significant change in intake or attitudes. However, besides the small sample size, many interesting points arose from the data, that may aid in developing effective strategies to boost soft dairy consumption in the future. For instance, cooking activities were perceived positively, and attitudes towards consumption were overall positive too, particularly towards *mode of consumption* and *sensory-related* aspects. Future studies could be developed addressing other barriers to consumption, such as food awareness, while using cooking activities as complementary interventions.

Take home message

Aim of the study	Assess the effectiveness of cooking activities for changing soft dairy consumption, particularly fermented dairy, and attitudes towards them.
Methodology	Real-life intervention
Methods	Randomised control trial
Eligibility criteria	Being aged 18-30 years old; living in the UK or France; speaking the country's language fluently. Consent was required before the start of the questionnaire.
Groups	Control group: no interventions. Leaflets group: cooking activities at home. Workshops group: cooking activities with a chef and at home.
Data collection	Participants were completing food journals and questionnaires at the baseline (week 0), at week 2 and week 4: - A three-day food journal to estimate intakes - A FFQ to estimate frequency of consumption (not completed at week 2) - An attitudes questionnaire to estimate changes in attitudes Participants in leaflets and workshops groups were asked to complete a recipe assessment every time they engaged in cooking activities at home (deadline week 2). Participants in the workshops group were completing a workshop assessment at the end of each workshop.
Data analyses	Descriptive and inferential analyses have been performed in Excel and SPSS.
Participants	75 participants were enrolled in the study; 38 of them completed the baseline entirely and were considered for data analyses.
Results	Cooking activities did not appear as the right intervention to increase consumption of fermented dairy, nor change positively attitudes towards this soft dairy category. Negative scores were found among attitudes referring to knowledge, animal and environmental concerns, and health. This suggests that interventions aiming at broadening knowledge of these products could be more beneficial. Cooking activities had positive feedback, and this could help to reinforce new knowledge, however this type of activity by itself has not brought the desired results.

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6. Chapter Six: Integration and discussion of key findings

6.1. Overview of key findings on soft dairy consumption

As stated in Chapter 1, this research project aimed to:

- (*Aim 1*) Identify and explore reasons for consumption and non-consumption of soft dairy products among a target population of young adults aged between 18 and 30 years old and living in the UK and France, to also identify and explore similarities and differences between these two countries.
- (*Aim 2*) Develop and test strategies to boost healthy soft dairy consumption among the target population in the target countries, directly addressing barriers to consumption and/or promoting facilitators found to play a role in facilitating intakes.

To achieve these aims, four studies were conducted between May 2022 and June 2024; two of them (Studies 1-2, Chapters 2-3) were conducted in both the UK and France, focusing on facilitators and barriers to consumption, while one of them (Study 3) explored an already existing dataset to explore consumption in quantities and potential eating patterns among French adults (Chapter 4). Eventually, a fourth study (Chapter 5) was conducted in Ecully, Lyon, to test the effect of cooking activities on increasing intake and occasions for consumption of fermented dairy products.

This chapter will summarise the main results of the four studies, with considerations of aims and whether they have or have not been achieved. When explored, the category hard cheese will be included in the summary of key findings, as this dairy category was often used as a reference category throughout all the studies, as well as “other dairy products”, i.e., dairy-based desserts, byproducts, sauces, creams. Exploring a wider range of dairy categories was fundamental to correctly placing the results of these studies in the research context. Many aspects can influence consumption. For instance, similar products may be preferred to others for individual preferences, different nutritional needs, or their impact on the environment (Almena-Aliste & Mietton, 2017; Bylund, 1995; Chollet et al., 2022; Conti-Silva & Souza-Borges, 2019; Corvera-Paredes et al., 2022; Duncan, 1998; Gavrilova et al., 2020; Hoffman & Falvo, 2005; Johnson, 2017; Kemp et al., 2017; Milani et al., 2011; Narvhus & Abrahamsen, 2023; Verain et al., 2022). Considering that many aspects may have a role in determining not only which dairy product is consumed, but also how and when, other dairy categories, i.e., hard cheese, other dairy, including dairy-based desserts, were investigated for a more in-depth knowledge of the research context. However, the primary focus remained on soft dairy. PBDA will be discussed separately.

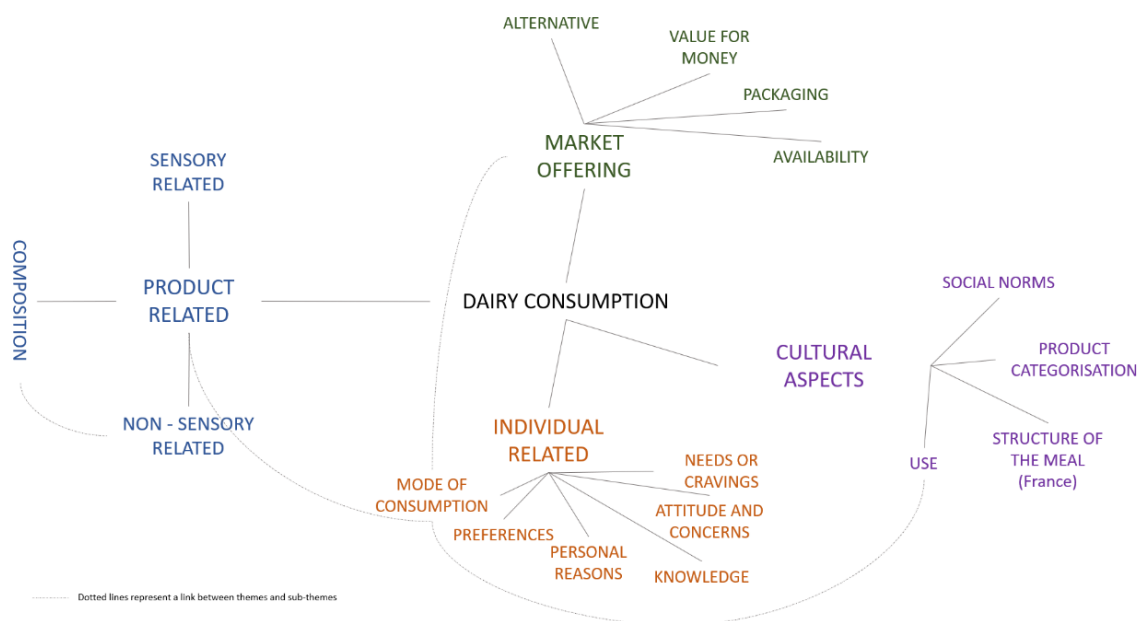
The key findings will be integrated and discussed, including strengths, challenges, and limitations, along with novel insights and future research perspectives.

6.1.1. Study 1: Reasons for consumption and non-consumption

The first study of this PhD project (Study 1, Chapter 2) aimed at identifying and exploring reasons for consumption and non-consumption of dairy products, including soft dairy products, through focus groups and individual interviews, conducted both in the UK and France. Figure 6.1. (Chapter 2, Figure 2.1) shows four themes and seventeen sub-themes were found to have an impact on consumption. Themes and sub-themes are intended with the same degree of influence and with a neutral valence.

Figure 6. 1.

Visual maps of themes and sub-themes found to impact dairy consumption, including consumption of soft dairy products, in both the UK and France.



6.1.2. Study 2: Facilitators and barriers to consumption of least consumed soft dairy

Reasons for consumption and non-consumption identified in Study 1 were used to develop an online questionnaire exploring least consumed soft dairy and hard cheeses that participants would consider consuming more (Study 2, Chapter 3). This design was chosen to identify the least consumed products among the target categories, as results were planned to be used in

developing Study 4. Participants evaluated their attitudes towards consumption of each of these selected products on a 5-point scale from *Strongly disagree* (-2) to *Strongly agree* (+2).

Regression models were run to test how these would impact consumption as facilitators or barriers. Table 6.1 reports results for the general model, including country among other predictors, and Table 6.2 reports country-specific results. It is immediately obvious that the main predictors of dairy consumption are individual factors that have positive β -values, indicating that they are all facilitators to consumption. No statistical analyses were run to directly test differences between the two. Results are shown only for significant results $p < .05$ (Chapter 3, Tables 3.15 and 3.18).

Table 6. 1.

Sub-themes significantly impacting consumption of soft dairy products in the UK and France. The two countries were tested together.

Theme	Sub-theme	Milk	Yoghurt and other fermented dairy	Soft cheese	Hard cheese
Product- related	<i>Sensory</i>				
	<i>Composition</i>				
	<i>Non-sensory</i>	(β -.08)	(β -.09)		
Individual-related	<i>Mode of consumption</i>		(β .12)		
	<i>Preferences</i>	(β .34)	(β .22)	(β .43)	(β .29)
	<i>Personal reasons</i>		(β .13)		(β .14)
	<i>Knowledge</i>				
	<i>Attitudes and concerns</i>				
	<i>Needs or cravings</i>	(β .11)	(β .12)	(β .18)	(β .17)
Cultural aspects	<i>Structure of the meal</i>				
	<i>Social norms</i>				
	<i>Use</i>	(β .09)			
	<i>Categorisation</i>			(β .09)	
Market	<i>Availability</i>				

	<i>Alternative</i>				
	<i>Value for money</i>				
	<i>Packaging</i>				

Table 6. 2.

Sub-themes significantly impacting consumption of soft dairy products in the UK and France. The two countries were tested separately.

Theme	Sub-theme	Milk	Yoghurt and other fermented dairy	Soft cheese	Hard cheese
<i>Product-related</i>	<i>Sensory</i>				
	<i>Composition</i>				
	<i>Non-sensory</i>				
<i>Individual-related</i>	<i>Mode of consumption</i>		FR (β .17)	FR (β .12)	FR (β .15)
	<i>Preferences</i>	UK (β .27) FR (β .36)	UK (β .18) FR (β .18)	UK (β .30) FR (β .27)	UK (β .36)
	<i>Personal reasons</i>		FR (β .17)	UK (β .15)	FR (β .16)
	<i>Knowledge</i>				
	<i>Attitudes and concerns</i>				
	<i>Needs or cravings</i>	UK (β .14)	UK (β .15)	UK (β .20) FR (β .15)	UK (β .17) FR (β .13)
	<i>Structure of the meal</i>				
	<i>Social norms</i>				
<i>Cultural aspects</i>	<i>Use</i>				
	<i>Categorisation</i>				
<i>Market offering</i>	<i>Availability</i>				
	<i>Alternative</i>				
	<i>Value for money</i>				
	<i>Packaging</i>			UK (β -.11)	

Table 6.3 (Chapter 3, Table 3.17) reports all demographic factors tested as potential predictors in the general model (including country among other predictors), and Table 6.4 (Chapter 3, Table 3.19) reports results for country-specific models, including computed variables, i.e., *number of dairy categories consumed* and *average frequency of consumption*. .

No statistical analyses were run to directly test differences between the two. Results are shown only for significant results $p < .05$.

Table 6. 3.

Demographic factors significantly impacting consumption of soft dairy products in the UK and France. The two countries were tested together, and the variable country was tested as potential predictor.

Demographics	Milk	Yoghurt and other fermented dairy	Soft cheese	Hard cheese
<i>Seasonality</i>				
<i>Following a diet limiting animal-based products, i.e., vegetarian, ovo-vegetarian, lactose-vegetarian, flexitarian / Not following a diet</i>	(β .22)	(β .14)	(β .14)	(β .08)
<i>Following a lactose-free</i>		(β .09)		
<i>Number of dairy categories consumed</i>	(β -.07)			
<i>Average frequency of consumption</i>		(β .14)	(β .20)	
<i>Country</i> (UK=0, France=1)		(β .10)	(β -.13)	
<i>Gender - Male/female</i>		(β -.07)	(β -.07)	
<i>Gender - Binary/other</i>				
<i>Age</i>		(β .08)	(β .13)	(β .11)
<i>BMI</i>				
<i>City</i>	(β -.14)			
<i>Higher education</i>		(β -.07)	(β -.09)	(β -.09)
<i>Student</i>				
<i>Non-employed</i>				
<i>Living with adults</i>				
<i>Living with children</i>	(β .17)	(β .13)		

<i>Eating alone or with someone else</i>				
<i>Weekly budget</i>		(β .14)	(β .14)	
<i>Weekly food budget</i>				
<i>Holidays abroad</i>				

Table 6. 4.

Demographic factors significantly impacting consumption of soft dairy products in the UK and France. The two countries were tested separately. Consequently, the variable country was not tested as a potential predictor.

Demographics	Milk	Yoghurt and other fermented dairy	Soft cheese	Hard cheese
<i>Seasonality</i>				
<i>Following a diet limiting animal-based products, i.e., vegetarian, ovo-vegetarian, lactose-vegetarian, flexitarian / Not following a diet</i>	UK (β .30)	UK (β .21)	UK (β .22)	UK (β .17)
<i>Following a lactose-free</i>		UK (β .13)		
<i>Number of dairy categories consumed</i>		FR (β .10)		
<i>Average frequency of consumption</i>	UK (β -.16) FR (β .30)	FR (β .32)	FR (β .28)	FR (β .17)
<i>Gender - Male/female</i>				
<i>Gender - Binary/other</i>				
<i>Age</i>				
<i>BMI</i>				
<i>City</i>	UK (β -.11) FR (β -.13)			
<i>Higher education</i>		UK (β -.12)		
<i>Student</i>				
<i>Non-employed</i>				

<i>Living with adults</i>				
<i>Living with children</i>	FR (β .17)	FR (β .21)		
<i>Eating alone or with someone else</i>				
<i>Weekly budget</i>				
<i>Weekly food budget</i> France was not tested due to multicollinearity with weekly budget				
<i>Holidays abroad</i>				

A principal component analysis was run for each category to identify potential patterns of predictors. Table 6.5 (Chapter 3, Table 3.22) summarises the sub-themes included in each principal component per category, and the covered variance. While each product category has its specificities, there are similarities in the first two components. The PC1 includes in all four categories attitudes related to individual consumption and *sensory*, while the PC2 includes attitudes as *knowledge*, and *attitudes and concerns*.

Table 6. 5.

Labels for each PCA component and included attitudes. In brackets, covered variance.

Product category	Component	Label, (% covered variance)	Attitudes
<i>Milk</i>	Component 1	Individual practices of consumption (24%)	sensory, non-sensory, mode of consumption, preferences, personal reasons, use, value for money, packaging
	Component 2	Beliefs (11.9%)	availability, alternative, structure of the meal, knowledge, attitudes and concerns
	Component 3	Suitability (9%)	composition, needs or cravings
	Component 4	Social norms (6%)	social norms
	Component 5	Categorisation (6%)	Categorisation
<i>Yoghurt and other</i>	Component 1	Individual practices of consumption (22%)	sensory, preferences, personal reasons, structure of the meal, use, availability, packaging

	Component 2	Beliefs (17%)	categorisation, composition, non-sensory, knowledge, attitudes and concerns
	Component 3	Mode of consumption (7.6%)	mode of consumption
	Component 4	Supply (7.3%)	alternative, value for money
	Component 5	Occasion (6.6%)	social norms, needs or cravings
<i>Soft cheese</i>	Component 1	Individual practices of consumption (27%)	sensory, mode of consumption, preferences, personal reasons, needs or cravings, structure of the meal, social norms, use, availability, value for money, packaging
	Component 2	Beliefs (16.9%)	alternative, categorisation, composition, non-sensory, knowledge, attitudes and concerns
	Component 3 (all negative scores)	Occasion (7.11%)	categorisation, needs or cravings, structure of the meal
	Component 4 (all negative scores)	Concerns (6.2%)	attitudes and concerns
<i>Hard cheese</i>	Component 1	Individual practices of consumption (27%)	sensory, preferences, personal reasons, needs or cravings, structure of the meal, social norms, use, packaging
	Component 2	Beliefs (14%)	knowledge, attitudes and concerns, composition
	Component 3	Suitability (7.9%)	alternative, categorisation, non-sensory
	Component 4	Supply (6.7%)	value for money, availability, mode of consumption

6.1.2.1. Study 2: other considerations on consumption

6.1.2.1.1. Frequency of consumption of soft dairy, hard cheese, and other dairy products

For each dairy category they reported consuming, participants were asked how often they consumed a list of products of that specific category, before being asked to choose the least consumed product. These data were used to compute a frequency monthly score of consumption of each category. Table 6.6 reports scores for both countries, highlighting differences between them, and between product categories (Chapter 3, Table 3.14).

Table 6. 6.

Frequency monthly score of consumption of dairy categories, including p-values of Welch ANOVA performed to test differences in frequencies scores among the two samples. Significant results, $p < .05$, are in bold.

	UK score	times in a month UK	FR score	times in a month FR	sig.
Milk	0.814	24.41	0.701	21.03	.20
Yoghurt and fermented dairy	1.478	44.35	1.172	35.17	.58
Hard cheese	0.793	23.79	0.723	21.68	.06
Soft cheese	1.206	36.19	0.873	26.20	.49
Other dairy	1.845	55.36	0.859	25.77	<.001

6.1.2.1.2. Contexts of consumption of least consumed soft dairy and hard cheese

Table 6.7 summarises the main context of consumption of each dairy category, in terms of the most selected number of times of “often” and “always”, for food combinations, meals, and social occasions. Differences can be seen between products and countries.

Table 6. 7.

Main context of consumption of each dairy category.

	UK	France
Milk	With coffee, cocoa, tea Before going to sleep Alone	With coffee, cocoa, tea Main meal Alone
Yoghurt and other fermented dairy	With something else Snack Alone	On its own Main meal Alone
Soft cheese	With something else Main meal Alone / Special occasion	With something else Main meal / Snack With someone
Hard cheese	With something else Main meal Special occasion	With something else Main meal Alone / With someone

6.1.2.1.3. Consumption of local and organic dairy products, and considerations of willingness to change consumption

Main reasons (>50% of the answers) influencing participants consuming and non-consuming local and organic dairy products are summarised in Table 6.8.

Table 6. 8.

Main reasons for consumption and non-consumption of local and organic dairy products.

	UK	France
Local, consumption	Available, tastes better, healthier	Healthier, tastes better, not available
Local, non-consumption	Not available, no differences between local and non-local, expensive	Expensive, no differences between local and non-local
Organic, consumption	Healthier, tastes better	Healthier, expensive, tastes better
Organic, non-consumption	Expensive, not available, no differences between organic and non-organic	Expensive, no differences between organic and non-organic

Table 6.9 summarises the main reasons (>50% of the answers) that led in the past or could lead in the future to changes in consumption, i.e., consuming more or consuming less dairy.

Table 6. 9.

Reasons that led to changes in consumption in the previous 6 months and reasons that could lead to changes in consumption in the future 6 months.

		UK	France
Past	Yes, more	Diet, health	External reasons, diet
	Yes, less	Health, diet	Health, diet
Future	Yes, more	Health, diet	External reasons, diet
	Yes, less	Health, diet	Health, not sustainable

6.1.2.1.4. Reasons for non-consumption of non-consumed soft dairy and cheese

Table 6.10 summarises the main reasons (>45%) for the non-consumption of the non-consumed dairy category per country. Cheese was explored, including hard and soft cheeses

together. Reasons for non-consumption of non-consumed dairy categories were not explored further.

Table 6. 10.

Main reasons for non-consumption of non-consumed dairy products.

Theme	Sub-theme	Dairy	Milk	Yoghurt and other fermented dairy	Cheese
<i>Product-related</i>	<i>Sensory</i>	FR	UK, FR	UK, FR	UK, FR
	<i>Composition</i>			FR	
	<i>Non-sensory</i>	UK, FR	UK		UK
<i>Individual-related</i>	<i>Mode of consumption</i>				
	<i>Preferences</i>	UK	UK, FR	UK, FR	UK, FR
	<i>Personal reasons</i>	UK, FR	UK, FR	UK, FR	UK
	<i>Knowledge</i>		FR	UK	
	<i>Attitudes and concerns</i>	UK, FR			
	<i>Needs or cravings</i>				
<i>Cultural aspects</i>	<i>Structure of the meal</i>				
	<i>Social norms</i>				
	<i>Use</i>				
	<i>Categorisation</i>		FR	FR	FR
<i>Market offering</i>	<i>Availability</i>				
	<i>Alternative</i>				
	<i>Value for money</i>				FR
	<i>Packaging</i>				
	<i>Never tested</i>				

6.1.3. Study 3: intake and eating patterns

Study 3 (Chapter 4) aimed to characterise soft dairy consumption in terms of intake and eating patterns among a target population of French adults aged 18-44 years old. Eating patterns were explored in four different dimensions: eaten vs drunk; savoury vs sweet; by itself vs food combination; and moment, i.e., hour, of the day. From the latest, a fifth dimension was derived, i.e., traditional mealtime vs snack. Table 6.11 reports the results for each soft dairy. Whereas similarities can be seen, these results also reveal specificity for each product.

Table 6. 11.

Main findings regarding soft dairy average intakes [in grams and kJ], and their eating patterns.

Product	Intake grams (kJ)	Eaten vs drunk	Savoury vs sweet	By itself vs with other foods	Moment of the day
Milk	117.5g (252 kJ)	Drunk	Neither	With coffee, cocoa, tea	Morning
Yoghurt	63g (227 kJ)	Eaten	Mostly sweet	During a meal, not always with other foods	Main mealtimes
Fermented dairy products	15g (75 kJ)	Eaten	Both	Food combination	Main mealtimes
Soft cheese	19g (227 kJ)	Eaten	Savoury	During a meal; mostly with bread	Main mealtimes
Hard cheese	12g (187 kJ)	Eaten	Savoury	During a meal, grated or with bread	Main mealtimes
Desserts	19g (151 kJ)	Eaten	Sweet	During a meal, not always with other foods	Main mealtimes
Creams	0.2g (2.4 kJ)	Eaten	Sweet	With fruits	NA
Sauces	0.5g (2.5 kJ)	Eaten	Savoury	With pasta, or in recipes	NA

6.1.4. Study 4: Cooking activities to increase soft dairy intakes and change attitudes

Study 4 (Chapter 5) was developed from the results of Study 1 and Study 3, whereas Study 2 was still ongoing. This study aimed at increasing the consumption of fermented dairy products while assessing if cooking strategies could be an effective strategy to address sensory-related or individual-related barriers, and/or boost facilitators as *mode of consumption*. Participants engaging in cooking activities were either invited to participate in two workshops with a trained chef, given a leaflet with recipes, and asked to replicate them at home over two weeks, or given a leaflet with recipes and asked to replicate them at home over two weeks without taking part in workshops. A control group was not invited to do any cooking activities but completed questionnaires, as the other two groups, except for those concerning cooking activities. Intake, frequency, and attitudes towards soft dairy consumption were measured at the beginning of the study, at week 2, and week 6.

Little to no changes were seen in the sample in terms of quantity and frequency of consumption. The results of this study showed that cooking activities were not the right strategy to boost the intake of these products. However, the results gave insights into attitudes towards consumption. Overall, attitudes scores were positive, except for a few components. Specifically, attitudes towards individual consumption practices, which included the targeted sub-theme *sensory*, were positive before the study and remained positive, with some different variations among the soft dairy categories. Attitudes towards the *mode of consumption* were also positive, whereas attitudes regarding beliefs, which also included sub-themes as *knowledge* and *attitudes, and concerns*, were particularly low in all soft dairy categories, and negative for fermented dairy in both interventional groups at the end of the study. Few other components were reported with negative scores, i.e., *categorisation* (PC5) in milk, *occasion* (PC5) in fermented dairy, among workshops group only, *concerns* (PC4) in soft cheese.

6.1.5. Consideration about PBDA

PBDA is notably not a dairy food, but these products have been developed as real substitutes, to be consumed in the same contexts, and because of that can be categorised as traditional dairy products (Adamczyk et al., 2022; Chollet et al., 2022). For these reasons, and to have a wider panorama of consumption, PBDA consumption was explored in this research project along with soft dairy and other common dairy products, e.g., hard cheese. However, the primary focus remained on soft dairy.

Main results and findings are the following:

1. Study 1: reasons for consumption and non-consumption of these products are the same as reported in Figure 6.1 and Table 6.1.
2. Study 2: the same considerations made for dairy products are valid for the variability in the frequency of consumption of more products in different consumption contexts. In the UK, the overall frequency monthly score was 0.9 (28 times in a month), while in France it was 0.3 (9 times in a month), outlining a difference in consumption between the two countries. Instead of the least consumed product, participants were asked to select the most consumed PBDA category before evaluating attitudes towards consumption. Due to this difference, PBDA and dairy categories cannot be directly compared. A general regression model was run and found the following to have an impact on consumption: attitudes and concerns (β -.12), needs or cravings (β -.15), following a diet limiting animal-based products, i.e., vegetarian, ovo-vegetarian, lactose-vegetarian, flexitarian / not following a diet (β .16); country (β .13); eating alone or with someone else (β .12), weekly budget (β .18). Two other models were run to test

predictors in each country separately. Among the UK sample, needs or cravings (β .14), categorisation (β .15), alternative (β -.18), and gender (β -.14) were found to significantly impact consumption of most consumed PBDA category. Among the French sample only availability (β -.17) and average frequency of consumption (β .33) were found as predictors. A principal component analysis was run for PBDA, finding 5 components covering 56,7% of variance. Table 6.12 (Chapter 3, Table 3.35) summarises findings, and covered variance by each component and attitudes included. Main reasons for non-consumption of non-consumed PBDA were related to sensory aspects, preferences, and market, i.e., expensive, in both the UK and France.

Table 6.12.

PCA results for PBDA consumption.

<i>Product category</i>	Component	Label, (% covered variance)	Attitudes
PBDA	Component 1	Sustainability, health, and diets (24%)	sensory, composition, non-sensory, mode of consumption, preferences, personal reasons, knowledge, attitudes and concerns, alternative, packaging
	Component 2	External factors (10%)	value for money, use, social norms
	Component 3	Supply (8.7%)	availability, structure of the meal
	Component 4	Reward (8%)	needs or cravings
	Component 5	Categorisation (6%)	Categorisation

- Study 3: PBDA was again explored as category and not by products, as these products were not often entered in the database used to characterise consumption. The average daily intake was 3g (7 kJ). These products were more likely to be eaten, except for plant-based milks; be consumed mostly in sweet dishes during a meal, by itself, or mostly with cereal. The dimension *moment of the day* was not explored.
- Study 4: PBDA was explored only in terms of frequency of consumption. Little change was seen among participants. However, since the attitudes towards these products were not explored, no other considerations could be made.

6.2. Integration and discussion of research key findings

6.2.1. Aim 1.

Identify and explore reasons for consumption and non-consumption of soft dairy products among a target population of young adults aged between 18 and 30 years old and living in the UK and France, to also identify and explore similarities and differences between these two countries.

6.2.1.1. Studies 1-2: predictors of consumption

The results of the qualitative study found four themes to influence dairy consumption in both the UK and France. Even though each theme and sub-theme could be interpreted differently among the samples, with positive and negative valences, the only difference that primarily appeared among participants was that a particular sub-theme in the cultural aspects, *structure of the meal*, seemed to influence dairy consumption only in France. All themes and sub-themes, including *structure of the meal*, were used in the development of Study 2, investigating reasons for consumption in a larger population in both countries. Results of regression analyses showed that the most important predictors are attitudes related to individual aspects, i.e., *preferences*, *personal reasons*, *needs or cravings*. They were all found to significantly impact consumption in both models, the one including country as a potential predictor and the one testing potential facilitators and barriers in the UK and France separately (country-specific). Moreover, in the general one (not country-specific) *preferences* and *needs or cravings* were found to significantly impact consumption of each dairy product category that was investigated. All three, i.e., *preferences*, *personal reasons*, *needs or cravings* were found to play a significant positive role as facilitators in consumption, and *preferences* and *personal reasons* were also included in the PC1 *individual practices of consumption* of each dairy category. Individual reasons for consumption have already been investigated and associated with facilitators of consumption of dairy products and many other healthy foods (Bimbo, 2017; Cardello et al., 2024; Conti-Silva & Souza-Borges, 2019; Deliens et al., 2014; Gracia & Albisu, 2001; Gupta et al., 2022; Hersleth et al., 2005; Merlino et al., 2022; Ojeda et al., 2021; Palacios et al., 2009; Recio-Román et al., 2020; Saint-Eve et al., 2016). However, Study 2 findings make it clear that these are the most important predictors among all. They have the highest β -values, and while they are common to both models, they also are the only ones significantly impacting consumption in the country-specific models, with only two exceptions, i.e., *mode of consumption* in France and *packaging* in the UK. Knowing that individual reasons for consumption are the most important predictors may help in developing new strategies for

consumption that, instead of focusing on addressing barriers, could boost facilitators (Michie et al., 2011), for instance, creating positive experiences of consumption.

Preferences is the most impacting predictor and is positively associated with consumption of all dairy categories. It is important to remember that participants were evaluating their attitudes towards the least consumed products. Knowing that their low consumption of these products is not due to disliking, is an encouraging fact. The appreciation of a product can vary according to many aspects and could change during life (Koehler & Leonhaeuser, 2008). The attitude *personal reasons* refers to individual experiences, specifically related to their familiarity with the products and body symptoms related to consumption. Past positive experiences while eating foods are indeed facilitators of consumption (Barrena & Sánchez, 2013; Cook et al., 2015; Cruwys et al., 2015; Kharuhayothin & Kerrane, 2018; Laila et al., 2021; Piqueras-Fiszman & Jaeger, 2016). Familiarity and being exposed to someone else in the same household consuming these foods have already been associated with increased intakes of healthy products (Cook et al., 2015; Cruwys et al., 2015; Kharuhayothin & Kerrane, 2018). These episodes were found to positively impact consumption more than others, for instance, more than higher availability of products (Cook et al., 2015; Cruwys et al., 2015; Kharuhayothin & Kerrane, 2018). *Needs or cravings* aimed at exploring the possibility of eating soft dairy out of enjoyment. People notably consume foods for physical hunger and nutritional necessity, but for pleasure too (Firat & Kutucuo, 2013; Hu & Min, 2022; Weltens et al., 2014). While it is interesting to note that this attitude was found as a facilitator to consumption, meaning that participants could consider healthy soft dairy as suitable for special occasions or celebratory meals, it is important to remember that concepts such as treating or rewarding themselves with foods could also refer to occasions during which consumers indulge in overeating, an aspect that has often been associated with negative emotions (Hu & Min, 2022; Weltens et al., 2014). While working on optimising facilitators to boost consumption, it would indeed be valuable to develop different specific strategies assessing and addressing different aspects of consumption (E. Lee, 2025; Wahlqvist, 2009).

In the general non-country-specific model, three other attitudes were found to impact consumption. Two of them, *use* and *categorisation*, belong to the cultural theme and were found to positively influence consumption. They can also serve in the development of strategies to boost the consumption of healthy soft products, combined with individual reasons for consumption. For instance, the *categorisation* sub-theme refers to the protein content of soft cheese, which can be enhanced while also boosting its degree of versatility in different recipes. The only attitude found to be associated with lower consumption was the *non-sensory* sub-theme, suggesting that participants perceive some dairy products as unhealthy. While enhancing facilitators, barriers like these may indeed be addressed too (Michie et al., 2011).

For instance, consumers could be informed about the health benefits associated with the consumption of the products. Studies show that providing more information, directly on the products, e.g., labelling, or through educational activities, might address these kinds of barriers and boost consumption (Hertzler & Bruce, 2002; Martinho, 2020).

The concept of healthiness was also found among the reasons for consumption and non-consumption of organic and/or local products and for possible changes in consumption. Local and organic dairy products were perceived as healthier among participants who reported consuming them, along with tasting better, while the non-consumers reported that there were no differences between organic/local and other dairy products. This confirms recent studies that show that consumption of these products is more likely among people already consuming them and tends to be associated with health claims (Christoph-Schulz et al., 2015; Fusté-Forné, 2021; Kurajdova & Tábořecka-Petrovicova, 2015; Merlino et al., 2022). Health reasons were also selected to explain the willingness to change consumption, both by people considering increasing and people considering decreasing consumption. This section was not investigated in detail; however, it is interesting to note that both directions of change were associated with health, and this may suggest that consumers do not have a clear idea about the role of dairy in general health (S. Allen et al., 2018; Kurajdova & Tábořecka-Petrovicova, 2015; Morelli & Vitale, 2020). Although the consumption of dairy products has already been associated with positive effects on health (Prentice, 2014), these findings may indicate that the message, while scientifically clear, that the consumption of these products is beneficial for health, is not clear to the general population of young adults, and therefore, more outreach activities are necessary.

It is interesting to note that attitudes such as *preferences*, *personal reasons*, and *non-sensory*, were found among the reasons for non-consumption of non-consumed dairy products. Even if not possible to make other deeper considerations, exploring further the non-consumption of non-consumed products may be necessary to develop ad hoc strategies aiming at creating positive experiences while consuming these foods, and create a positive reinforcement to change the eating habits of a potential consumer. It is interesting to note that, again, the *categorisation* attitude is present. Enhancing the protein component of these foods, which can be consumed daily as an alternative to other animal-based foods, could already be an effective strategy to boost their intake. New protein-enriched foods were recently launched, resulting in new trends in consumption (Banovic et al., 2018). This increase in consumption is associated with concepts such as healthiness, clean eating, and better physical performance (Arenas-Jal et al., 2020; Banovic et al., 2018; Hartmann & Siegrist, 2017; Hohoff et al., 2021). However, further research is needed to explore consumers' perception of foods that are naturally rich in proteins vs technologically enhanced protein content (Arenas-Jal et al., 2020; Banovic et al.,

2018). Understanding how consumers define and associate protein-enriched foods could aid in designing new tailored strategies.

6.2.1.2. Considerations about target population and other demographic factors

The target population of this PhD was set as young adults aged between 18 and 30 years old because for this population, a reduction in dairy consumption may negatively impact their quality of life in the long-term (Das et al., 2023; Gordon et al., 2017; Rizzoli, 2014; Stroud et al., 2015; Yackobovitch-Gavan et al., 2017; Yeung et al., 2021). Both students and non-students were targeted since being a student is already notably associated with poorer food choices (Aceijas et al., 2017; Betts et al., 1997; Deliens et al., 2016; Hebden et al., 2015; Howse et al., 2018; Sprake et al., 2018), but non-students can also be exposed to the risk of developing unhealthy habits, particularly when they leave school without obtaining a higher education diploma. While employment status, e.g., student vs non-student, was not found to impact dairy consumption among participants in Study 2, level of education was found to play a role as a barrier to consumption. The level of education is considered to be the most reliable parameter at this stage of life to get an idea of the socio-economic status of a young adult, considering that other parameters, e.g., income, are often not related to the single individual (Darmon & Drewnowski, 2008; Desbouys et al., 2020). This is a phase of life in which young adults are often still included in the original household, thus considering parents' and other family members' income (Desbouys et al., 2020). Having a better understanding of the reasons that impact consumption and non-consumption of both students and non-students is particularly important and valuable when developing strategies to boost soft dairy intake.

Study 2 explored other demographic factors that may help in further segmentation of the sample. In fact, even though demographic factors cannot be changed or are difficult to modify, considering them as parameters for defining the target population could broaden the possibilities of achieving aims (Klößner, 2015; Parshetty et al., 2024). Further segmentation of the sample can not only take into account the results of the general model, but also the ones in country-specific models, and the differences that have been found between different dairy categories. For instance, while developing a strategy to increase yoghurt and other fermented dairy products consumption in the UK, it may be valuable to target young adults following a lactose-free diet and with a degree of education above A-level, while emphasizing facilitators such as *preferences* and the consumption of these foods at a special event (*needs or cravings*), perhaps even developing recipes that can be replicated in celebratory meals.

Moreover, taking into account demographic aspects could help in shaping tailored dietary guidelines and ensure detailed suggestions to enable young adults to achieve recommended

intakes. Daily recommendations were debated among the participants of the first study, and it seems that for some of them is not clear how much dairy they should consume, and sometimes not even which products they should prefer. Generally, people with a higher qualification are those who try to achieve a higher adherence to the food guidelines (Desbouys et al., 2020). However, findings in Study 2 confirmed that young adults may consume fewer dairy products when they have a higher level of education. Interventions that focus on this and consider a target population of young adults with a high level of education could be useful both for developing healthier habits and addressing specific barriers.

6.2.1.3. Cross-cultural similarities and differences

This research project aimed to identify potential similarities and differences between the two target countries, i.e., the UK and France, while exploring reasons for (non)consumption of soft dairy products. Studies 1-2 focused on facilitators and barriers in both countries, while the other two focused on consumption only in France.

The findings of Study 1 revealed a difference between countries. In fact, the sub-theme *structure of the meal* seemed to impact consumption only among participants in France. However, this attitude was tested in Study 2 and was not found to significantly impact consumption in either country. Individual reasons were found to significantly affect consumption positively in both countries, with differences across products. Only two attitudes were found to play a different role based on the country: *mode of consumption* was found to significantly impact consumption in France as a facilitator, while *packaging* was found to significantly impact consumption in the UK as a barrier. These differences may be due to cultural reasons. For instance, it seems that in France, the sense of identity of belonging to a group that shares the same food structure would seem to play an important role, and consequently the when and how a food, in this case dairy products, are inserted and consumed during a meal (Germov & Williams, 1999), while in the UK sustainability and other environmental concerns appeared to be more debated (Dicks et al., 2013). However, when combined with the other predictors, these two could represent a breakthrough in strategy development for country-specific actions. For instance, in France, creating positive experiences while enhancing the versatility of these products could be a good strategy to increase consumption of these products. The degree of versatility of soft dairy products is an already well-debated concept, according to which some products may be interchangeable because of their similar sensory characteristics, e.g., texture (Cardello et al., 2024; Gupta et al., 2022). Conversely, in the UK, promoting positive experiences while giving tools to avoid waste may be a good strategy to increase consumption (Brennan et al., 2023; Brščić, 2020).

Some demographic factors were found to differently impact consumption in the two countries, while some similarities can be seen across countries and dairy categories. For instance, in the UK the diet followed by participants was found to positively impact the consumption of dairy, and particularly following a lactose-free diet played a role in facilitating yoghurt and fermented dairy consumption, while higher education was found to impact consumption negatively. As already discussed, this may be due to the growing presence of behaviours such as self-diagnosis and "do it yourself" diets without medical advice (Morelli & Vitale, 2020). Moreover, in the UK, students in higher education, especially at university, are more exposed to sustainability policies, promoting more responsible lifestyles (Cotton & Alcock, 2013; Zhou, 2025). In France, none of these were found to play a role in consumption; instead, the total number of dairy categories consumed among the five explored and living with children was found to impact consumption positively, and this may be linked to the fact that French meals are still family-centred (López-Gil et al., 2025). The only common predictor was found among the two countries, i.e., the city. Living in a smaller city or the countryside was found to negatively impact consumption in both countries, and this is in line with the recent literature investigating the concept of urban desertification (Furey et al., 2001). Moreover, young adults have less availability in terms of budget or may be limited in terms of mobility (Furey et al., 2001).

While similar answers were selected to justify consumption and non-consumption of local and/or organic dairy products, differences could be seen in reasons considered by consumers when willing to change consumption of dairy products. While in the UK sample health and diets were the main reasons to change, in both directions, in France participants selected external reasons, i.e., reasons related to their living situation or their household, availability, as the main reasons to increase consumption. While considering eating less dairy in the future, they selected "not sustainable" as a main reason along with health. This may be related to the increasing attention to the adoption of more sustainable practices among French consumers (Adamczyk et al., 2022; Varela et al., 2022).

Participants in both the UK and France selected individual reasons to justify their non-consumption of non-consumed products, along with *sensory*, *non-sensory*, *knowledge*, and *attitudes and concerns*. Some differences and similarities can be seen across dairy categories as well; however, in the French sample, the attitudes *categorisation* and *value for money* were also included as main reasons for non-consumption of non-consumed. Besides the fact that as previously mentioned no in-depth considerations can be made due to a lack of detailed investigations, these aspects are related to the fact that potential consumers may not consider dairy products for their protein content, despite the fact that they are a protein-rich food (Hoffman & Falvo, 2005). Moreover, market offer is indeed different in each country and this

may impact the perception of prices (Martinho, 2020). However, a more detailed and country-specific investigation would be valuable to better understand the non-consumption of common dairy products.

6.2.2. Aim 2.

Develop and test strategies to boost healthy soft dairy consumption among the target population in the target countries, directly addressing barriers to consumption and/or promoting facilitators found to play a role in facilitating intakes.

6.2.2.1. Studies 2-3: patterns of consumption in France

While Studies 2 and 3 were not directly aiming to achieve *Aim 2*, their findings were planned to be used to develop a strategy aiming at increasing consumption of healthy soft dairy products. However, only findings from Study 3 were used in the development and design of Study 4. Study 2 also explored dimensions, i.e., frequency of consumption, and contexts of consumption, that could be used for the development of a strategy to be put in place for this purpose. Although Study 2 investigated these dimensions in both countries, only findings related to the French sample will be discussed in this section, as the characterisation of dairy eating patterns in Study 3 concerned only that country. Specific differences and similarities found in frequency and contexts between the UK and France have already been presented in Chapter 3 of this manuscript.

In Study 2, the frequency of consumption was explored for all products of each product and dairy category. While results suggested that young adults do consume dairy products daily, no quantities were recorded. However, the average quantity consumed was explored in Study 3 and that was lower than expected. Contexts of consumption were also explored in both studies. While Study 3 was investigating more detailed dimensions of patterning, participants in Study 2 had to give information about the frequency of consumption of least consumed products in each context of consumption, including social events, i.e., alone vs with someone else, but including fewer details on food combination. The results are similar. Except for soft cheese, also reported as a snack, all other dairy investigated in Study 2 were more likely to be consumed in a main meal, as was found in Study 3 as well. Study 3 gave more specific details about patterns of consumption of each dairy category, considering fermented dairy products separately from the yoghurt category. Milk is as expected consumed more in the morning, while other dairy products are more likely to be consumed in other main meals, i.e.,

lunch or dinner, and this confirms literature (Charby et al., 2017; Condon et al., 2009; Hébel, 2007; Le Pape & Plessz, 2017).

Considering results of Studies 1-3 for France, findings may indeed suggest that along with boosting facilitators, creating new occasions for consumption may be a valuable strategy to increase intakes, while for instance boosting consumption in social events, celebratory meals, or as comfort food, as reinforcing occasions to create positive experiences. Milk and soft cheese had the lowest scores among all frequency scores. For instance, a possible strategy may be developing recipes, using products selected as least consumed soft cheese, i.e., fresh cheese (20%), cheese spread (11%), cream cheese (10%), while increasing the manner of consumption of these products in savoury and sweet dishes, to be consumed in the main meal or as a snack. *Fromage blanc* was selected as the least consumed product by 17% of the participants. This fermented dairy has similar organoleptic characteristics of other soft cheese. One strategy could be to promote substitutions between products which, while not directly belonging to the same category of dairy product, have similar characteristics. This may help those potential consumers who, during Study 1, have reported not buying alternative products if the one they normally consume is not available.

6.2.2.2. Study 4: strategies to boost consumption in France

Based on previous results, cooking activities could be considered as a good strategy to increase consumption of healthier soft dairy.

Exploring the changes in attitudes towards consumption, in fact, components including the facilitators that were found to positively influence consumption, i.e., *preferences*, *personal reasons*, and *mode of consumption*, were overall positive and increasing after the intervention or at the end of the study. These changes, while not tested with inferential analyses, are promising in terms of strategies aiming at boosting facilitators targeting yoghurt, fermented dairy products, and soft cheese. The category milk was the only one with a decrease in the PC1 in both leaflets and workshops group, and this may be because only the attitude *preferences* was found to significantly play a role in consumption as a facilitator. However, similar strategies for increasing consumption occasions, such as promoting adding milk in smoothies, or coffee, seem to have a positive effect in developing the habits of daily milk consumption (Jung et al., 2015).

Besides these, *Aim 2* was not achieved as no increase in consumption was found at the end of Study 4. Intakes and frequency scores remained low throughout the entire study, confirming the low quantities seen in Study 3 and the decrease in consumption among the target

population (Dubuisson et al., 2010; Ng et al., 2012). While the cooking activities had positive effects on attitudes that were found to impact consumption significantly as facilitators in Study 2, other scores were found to decrease during the study. Particularly, the component PC2 *beliefs* was the one with the overall lowest score among all components. This component was similar among all soft dairy categories and included attitudes as *knowledge* and *attitudes and concerns*. An interesting difference to note is that for yoghurt, fermented products, and soft cheese, this component also included the *non-sensory* attitude, which is not present in the milk PC2. Although declining, PC2 in milk remained overall positive, while in the other categories, the decline seemed sharper. This attitude notably refers to the concept of healthiness, and this may again suggest the health benefits of consumption of these products are not considered as such (S. Allen et al., 2018; Kurajdova & Táborecka-Petrovicova, 2015; Morelli & Vitale, 2020). It could therefore be that the consumption of soft dairy products is not in this specific population associated with the concept of healthy food. The pilot sample was recruited in the same catchment area as the sample of Study 1, whose participants showed a certain aversion to the consumption of these products. It is important to remember that in Study 2 attitudes to consumption towards yoghurt and fermented dairy products were explored together, and it is possible that some degree of difference was not seen because of this.

The recruitment area was an environment also known for the presence of a French institute of haute cuisine. This may have affected the results as part of the sample was, at the time of the study, studying in that institution. The presence of recipes to learn and replicate at home, in this sample, may be perceived as a less interesting activity. Moreover, some of these reported not having an oven or all the other tools that were required for recipes. Some considerations and further segmentation of the sample could have been done if Study 2 had been completed as planned. However, recruitment limitations were encountered in this study, and most participants allocated to intervention groups were students at the time of the study.

Overall, learning new recipes gave participants new ways to consume and combine these products in a meal or snack, and these were positively evaluated by all participants, thus supposedly acting as a positive reinforcement for consumption. This design could easily be integrated, considering more aspects, for instance, creating a tasting session of recipes participants learn during the workshops, while also debating nutritional and health information.

6.2.3. Discussion on PBDA

This research project focused on soft dairy products. However, to have a better understanding of the research context and how consumers and potential consumers may substitute them in their diet, hard cheese, other dairy, e.g., dairy-based desserts, and PBDA were also explored.

PBDA is notably considered a different category (CXS 206, 1999; Weltgesundheitsorganisation & FAO, 2011), however, recent studies have focused on them to explore consumers' perceptions of PBDA (Adamczyk et al., 2022; Chollet et al., 2022; Varela et al., 2022).

Reasons for consumption and non-consumption of PBDA were explored in Studies 1-2, as per dairy products. Study 2 explored the frequency of consumption of these products as a “category of products” instead of a specific list of products for each corresponding category, e.g., skimmed-PBDA-milk. PBDA is a less variable category than animal-based products in terms of nutritional content but offers the more variable origin of raw ingredients, i.e., milks from cereal, nuts, or mixed (Drigon et al., 2023; Guyomarc'h et al., 2021). The frequency of consumption was lower in France, i.e., 9 times in a month, than in the UK, i.e., 28 times in a month. Contexts, facilitators, and barriers were explored for the most consumed PBDA category, to have a better understanding of how these alternatives are consumed. The differences between PBDA and dairy products cannot be argued precisely because of the differences in the design of the two sections. However, it is interesting to note that among predictors, individual reasons that were found to strongly influence consumption among soft dairy and hard cheese were not found significant for PBDA, except for *needs or cravings*. Moreover, attitudes described as *knowledge* and *attitudes and concerns*, found as predictors of consumption in the general model, were included in PC1, while these attitudes in the soft dairy and hard cheese were included in PC2, outlining a difference in the role of possible predictors in the consumption of these different products.

The frequency of consumption of PBDA was also explored during study 4, but without investigating in detail the reasons for consumption. This remained low, and although the details of the amount consumed have not been considered, it could be assumed that, like dairy products, PBDA has a low average consumption, and this could be justified by the fact that potential consumers have not fully migrated from a dairy product to its plant-based alternative.

6.3. Strengths and novelties

This research project has some new features compared to the context in which it has been developed and carried out. Firstly, while focusing on soft dairy, it explores the reasons for consumption and dietary patterns of all major categories of dairy products, and includes PBDA in this investigation. While usually explored individually, investigating these products together gave a more global insight into the sector and its consumption, confirming that predictors are not only individual- or context-related, but can also be product-related (Chollet et al., 2022;

Jaeger & Porcherot, 2017; Ojeda et al., 2021; Rabiei et al., 2021; Varela et al., 2022; Verain et al., 2022).

Secondly, the biggest study of this project (Study 2, Chapter 3) focused on the least consumed dairy products, which are already consumed, but not on a daily basis and that participants would consider consuming more. To be chosen, these products were necessarily known among the sample. Moreover, as participants chose a product they would consider increasing in intake, it would make it easier to select one or more of these foods as a target for studies aiming to test strategies to address barriers aiming at an increase in intake. Targeting the least consumed products among all, as happened in Study 4, may be risky, as it is unknown how the participants would perceive them, while least consumed products, as per Study 2, are more likely to be appreciated, as participants chose among them the ones they would already consider consuming more.

This research project explored, among others, reasons for the non-consumption of non-consumed products. Knowing these reasons may help in understanding non-consumption further and assessing expectations, preconceptions, and biases that may stop a potential consumer from being an actual consumer (Aqueveque, 2015; Harris, 1998; Laila et al., 2021; Manohar et al., 2021; Tuorila & Hartmann, 2020). As this was not the primary aim of this PhD, these were not investigated in depth; however, findings may be used to develop exploratory studies that could eventually lead to a better insight into non-consumption.

Finally, this PhD targeted a population of young adults aged between 18 and 30 years old, including both students and non-students. This population could indeed be challenging, and the majority of past studies focusing on young adulthood tend to recruit university students (Aceijas et al., 2017; Betts et al., 1997; Deliens et al., 2016; Hebden et al., 2015; Howse et al., 2018; Poobalan et al., 2014; Sprake et al., 2018). However, the literature has repeatedly shown that some aspects, such as social inequalities, including poorer dietary choices, are more evident and compromising in subjects with lower levels of education and lower socio-economic positions (Betts et al., 1997; Darmon & Drewnowski, 2008; Winpenny et al., 2021), and for these reasons is valuable to explore both students and non-students.

6.4. Challenges and limitations

The biggest challenge of this PhD occurred in France in the recruitment phases for studies 1, 2, and 4. One of the assumptions made at the beginning of this PhD was that French potential participants in the recruitment phase would adopt the same behaviour as the English ones. Recruitment, and engagement in research are strongly influenced by social and cultural

factors (Allen & Vardaman, 2017; Corbie-Smith, 2004; Ma & Allen, 2009; Quay et al., 2017), so each country needs different aspects and techniques to be considered during this phase to reach an adequate number of participants. The practice of compensating participants is still debated (Chaudhari et al., 2020; Russell et al., 2000). While facing this challenge, some tools more than others can help to reach an audience of potential participants, i.e., the use of recruitment platforms and social media (Fenner et al., 2012; Rahman et al., 2022; Topolovec-Vranic & Natarajan, 2016). In this research, social networks such as Twitter and Facebook, with their sharing and re-posting options, helped in reaching a wider user base, but in Study 2, it was also necessary to use online platforms, i.e., Prolific, to reach the target of 100 participants recruited each month. Being an in-person study, Prolific could not be used in the recruitment of participants for Study 4, the use of social media did not have the desired effect, and the target number of participants was not achieved.

Some participants are more driven than others to participate in research (Luchtenberg et al., 2015; McCann et al., 2010, 2013), and from the concepts reported in the debriefing questionnaire of Study 4, communication activities on the importance of engagement in this type of project were not sufficient. More participant-centric approaches are needed (Poongothai et al., 2023). Opportunities for outreach activities should be increased, along with further investigation of other recruitment tools and methods, with the potential reevaluation of compensation, reimbursement, and benefits to ensure participation retention. For instance, assuring participants with a grocery voucher while asking them to engage in cooking activities at home, reimbursing their journeys to reach the study's location, and providing for reimbursement of expenses are strategies that could help in maintaining engagement to the end.

The unplanned slowdown in the recruitment of Study 2 led to a change in the original plan of this research project, and the necessity of developing Study 4 only based on the results of Studies 1 and 3. This is a strong limitation, as those results would have allowed a more precise targeting of products, contexts, barriers, and facilitators to the consumption of fermented products. For instance, Study 2 confirmed that mode of consumption is a facilitator, but also gave insight into other barriers, and sensory aspects were not among the predictors. In addition, by crossing frequencies of selected products and least consumed products, it becomes evident that fermented milks are not among the fermented products consumed, even if not daily, that participants would consider consuming more. Considering Studies 2-3, it would be valuable to develop and test strategies to boost the consumption of other fermented dairy foods, for instance, *fromage blanc*, or other categories, such as milk and soft cheese.

Finally, the aim of changing eating habits could also be considered as a constraint or, at least, as a challenge. The duration of Study 4 and the gap between the various data collections opened a debate about what could be the time needed to estimate to see an actual change in eating habits, given that the aim is to have a long-term result (Ji & Wood, 2007; Knakiewicz, 2015; Y. Lee et al., 2022; Reicks et al., 2018; Verplanken & Orbell, 2022). The debriefing questionnaire showed that having only two weeks to replicate the recipes was considered too short and that participants had different opinions on what the gaps should be between each measurement. This factor, as well is linked to cultural aspects (Fischler, 1980; Hartwell et al., 2011; Knakiewicz, 2015; Verplanken & Orbell, 2022). Introducing new eating habits in a country whose culinary identity and sense of belonging are very strong, such as France, may require different adjustments, such as repeated and constant inputs for a longer time (Almerico, 2014; Cassel, 1957; Mead, 1943; Niehoff, 1965). In any case, the goal of improving diet and lifestyle should not be related or limited by this, but an effective strategy must take account of it while focusing on a specific population and specific facilitators or barriers.

6.5. Future research

The results of this research project fit into a broader framework that combines the need to improve food choices in the target population with the dual objective of encouraging healthier diets and more sustainable practices, such as environmentally friendly diets and more ethical usage of natural resources.

The findings of this project partially confirm the pre-existing literature, giving new insights into reasons for consumption and non-consumption in two countries with a strong gastronomic culture and in a target population still little explored. The clear association between facilitators and barriers to the consumption of products already under-consumed can help in the development of studies with specific objectives. Strategies aiming at creating a positive association with the consumption of these products should be developed or reinforced, both in short and long-term settings, individually and in groups, while focusing on attitudes referred to as *preferences*, *personal reasons*, and *needs or cravings*. Country-specific findings may aid in the development of more effective strategies, for instance, including new recipes to boost the *mode of consumption* in France or address waste risk in the UK (attitude towards *packaging*). For instance, the development of new products could better suit the needs of young consumers of dairy products, of products that meet their tastes and preferences, and increase the opportunities for consumption. Specifically for the UK, these could also be provided in more limited quantities, or longer shelf-life. Since, for soft, unripe dairy products, the shelf life and expiry date cannot be extended, particularly, selling these products in smaller

portions should be considered. This could increase consumption among those consumers who do not belong to large households and do not buy the product for fear of wasting it. This population, as already seen, is particularly attentive to the debate on food waste, and the cost of reducing it, and prefers not to buy products which, because of their large quantities, would not be consumed before the expiry date and then thrown away.

Findings in this research project also gave a better insight into the younger adult population. Many demographic factors were explored and tested as potential predictors. Knowing their impact on consumption and non-consumption can help in the development of studies in an even more specific population. This PhD project focused on young adults, both females and males. However, literature suggests that females are exposed to worse long-term health risks due to non-consumption of dairy products during adolescence and the beginning of their adulthood, such as early menopause and frailty in the elderly (Purdue-Smithe et al., 2017; Witard et al., 2025). For these reasons, future studies are needed to test gender-specific strategies that could boost consumption and increase long-term, healthier lifestyles.

In future explorations, it could also be valuable to focus more on non-consumed products and identify the reasons for non-consumption, especially in the case of healthy products, i.e., milk, yoghurt, and other fermented dairy, soft cheese. Some of them may be poorly known, others may have been mistakenly associated with health risks, although academically they have been associated with benefits. To get a clearer picture of the situation, an in-depth exploration of this context could provide important insight.

6.6. Conclusion

The results of this research project reveal that although the reasons for consumption and non-consumption of dairy products may vary among young adults aged between 18 and 30 years old, the most important predictors are individual-related, i.e., *preferences*, *personal reasons*, and *needs or cravings*. It also highlights the importance of country-specific studies to properly identify the role of predictors before developing strategies where the objective is to emphasize enablers or reduce barriers to consumption. As for the country-specific, the deeper investigation of potential demographic predictors suggests that different segments of the young population may interact differently depending on the tools or strategies provided to increase their consumption of healthier dairy products.

Integrating findings from the four studies conducted during this PhD, the strategy developed and tested during Study 4 (Chapter 5), although not having achieved the aims set, could be seen as the basis for an effective strategy, if implemented considering other studies' findings.

Some changes in the design should be considered. For instance, the consumption of another type of product could be encouraged, e.g., soft cheese, or more marked attention to the creation of positive consumption contexts while also discussing nutritional and health-related aspects, e.g., organising educational workshops with tasting sessions, may be preferred to the simple request of engagement in cooking activities. The wide context of exploration and investigation of different dairy products opens the possibility to develop more strategies that can either focus on one of them or be transversal to more similar or alternative products.

This project also demonstrates that other considerations need to be made in addition to those relating to the predictors of consumption. Information and details provided by a detailed characterisation of practices of consumption are crucial in enabling the development of effective tools or strategies.

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References

- Abbey, J. D., & Meloy, M. G. (2017). Attention by design: Using attention checks to detect inattentive respondents and improve data quality. *Journal of Operations Management*, 53–56(1), 63–70. <https://doi.org/10.1016/j.jom.2017.06.001>
- Aceijas, C., Waldhäusl, S., Lambert, N., Cassar, S., & Bello-Corassa, R. (2017). Determinants of health-related lifestyles among university students. *Perspectives in Public Health*, 137(4), 227–236. <https://doi.org/10.1177/1757913916666875>
- Acocella, I. (2012). The focus groups in social research: Advantages and disadvantages. *Quality & Quantity*, 46(4), 1125–1136. <https://doi.org/10.1007/s11135-011-9600-4>
- Adamczyk, D., Jaworska, D., Affeltowicz, D., & Maison, D. (2022). Plant-Based Dairy Alternatives: Consumers' Perceptions, Motivations, and Barriers—Results from a Qualitative Study in Poland, Germany, and France. *Nutrients*, 14(10), 2171. <https://doi.org/10.3390/nu14102171>
- Addis, M., & Holdbrook, M. B. (2019). From food services to food experiences. Eating, wellbeing, and marketing. In *Food and Experiential Marketing* (Vol. 1, p. 22). Routledge. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781351182201-2/food-services-food-experiences-michela-addis-morris-holbrook>
- Adesogan, A. T., & Dahl, G. E. (2020). MILK Symposium Introduction: Dairy production in developing countries. *Journal of Dairy Science*, 103(11), 9677–9680. <https://doi.org/10.3168/jds.2020-18313>
- Agence de la transition écologique. (2021). *Agribalyse dataset, Synthèse*. <https://doc.agribalyse.fr/documentation-en/agribalyse-data/data-access>
- Agence nationale de sécurité sanitaire (ANSES). (2017a). *Étude individuelle nationale des consommations alimentaires 3 (INCA 3)—Avis de l'Anses—Rapport d'expertise collective* (Édition scientifique No. Saisine n° « 2014-SA-0234 »). Agence nationale de sécurité sanitaire (ANSES).

- Agence nationale de sécurité sanitaire (ANSES). (2017b, July). *INCA 3: Evolution des habitudes et modes de consommation, de nouveaux enjeux en matière de sécurité sanitaire et de nutrition*. <https://www.anses.fr/fr/content/inca-3-evolution-des-habitudes-et-modes-de-consommation-de-nouveaux-enjeux-en-mati%C3%A8re-de>
- Alae-Carew, C., Green, R., Stewart, C., Cook, B., Dangour, A. D., & Scheelbeek, P. F. D. (2022). The role of plant-based alternative foods in sustainable and healthy food systems: Consumption trends in the UK. *Science of The Total Environment*, 807, 151041. <https://doi.org/10.1016/j.scitotenv.2021.151041>
- Albano, C. (2022). Evaluation of nutritional status, body composition and nutrition literacy in adolescent dancers; *Advances in Obesity Weight Management & Control*, 12(5).
- Allen, D. G., & Vardaman, J. M. (2017). Recruitment and Retention Across Cultures. *Annual Review of Organizational Psychology and Organizational Behavior*, 4(1), 153–181. <https://doi.org/10.1146/annurev-orgpsych-032516-113100>
- Allen, S., Goddard, E., & Farmer, A. (2018). How knowledge, attitudes, and beliefs impact dairy anti-consumption. *British Food Journal*, 120(10), 2304–2316. <https://doi.org/10.1108/BFJ-12-2017-0733>
- Almena-Aliste, M., & Miettinen, B. (2017). Cheese Classification, Characterization, and Categorization: A Global Perspective. *Microbiol Spectrum*, 2(1), 29.
- Almerico, G. M. (2014). Food and identity: Food studies, cultural, and personal identity. *Journal of International Business and Cultural Studies*, 8.
- Almli, V. L., Næs, T., Enderli, G., Sulmont-Rossé, C., Issanchou, S., & Hersleth, M. (2011). Consumers' acceptance of innovations in traditional cheese. A comparative study in France and Norway. *Appetite*, 57(1), 110–120. <https://doi.org/10.1016/j.appet.2011.04.009>
- Altintzoglou, T., Birch Hansen, K., Valsdottir, T., Øyvind Odland, J., Martinsdóttir, E., Brunsø, K., & Luten, J. (2010). Translating barriers into potential improvements: The case of new healthy

seafood product development. *Journal of Consumer Marketing*, 27(3), 224–235.

<https://doi.org/10.1108/07363761011038293>

Alvaro, E., Andrieux, C., Rochet, V., Rigottier-Gois, L., Lepercq, P., Sutren, M., Galan, P., Duval, Y., Juste, C., & Doré, J. (2007). Composition and metabolism of the intestinal microbiota in consumers and non-consumers of yogurt. *British Journal of Nutrition*, 97(1), 126–133.

<https://doi.org/10.1017/S0007114507243065>

An, R. (2016). Weekend-weekday differences in diet among U.S. adults, 2003–2012. *Annals of Epidemiology*, 26(1), 57–65. <https://doi.org/10.1016/j.annepidem.2015.10.010>

ANSES. (2016). *Ciqual Table de composition nutritionnelle des aliments*. <https://ciqual.anses.fr/>

Appleton, K. (2016). Barriers to and Facilitators of the Consumption of Animal-Based Protein-Rich Foods in Older Adults. *Nutrients*, 8(4), 187. <https://doi.org/10.3390/nu8040187>

Appleton, K. M. (2023). Barriers to and Facilitators of the Consumption of Animal-Based Protein-Rich Foods in Older Adults: Re-Analysis with a Focus on Sustainability. *Nutrients*, 15(2), 470. <https://doi.org/10.3390/nu15020470>

Aqueveque, C. (2015). Intention to Try Unfamiliar Food: The Role of Level and Type of Unfamiliarity, Food Neophobia, and Ethnocentrism. *Journal of Food Products Marketing*, 21(3), 244–254. <https://doi.org/10.1080/10454446.2013.807414>

Arenas-Jal, M., Suñé-Negre, J. M., Pérez-Lozano, P., & García-Montoya, E. (2020). Trends in the food and sports nutrition industry: A review. *Critical Reviews in Food Science and Nutrition*, 60(14), 2405–2421. <https://doi.org/10.1080/10408398.2019.1643287>

Ares, G., Giménez, A., & Gámbaro, A. (2009). Consumer perceived healthiness and willingness to try functional milk desserts. Influence of ingredient, ingredient name and health claim. *Food Quality and Preference*, 20(1), 50–56. <https://doi.org/10.1016/j.foodqual.2008.07.002>

Armijo-Olivo, S., Warren, S., & Magee, D. (2009). Intention to treat analysis, compliance, drop-outs and how to deal with missing data in clinical research: A review. *Physical Therapy Reviews*, 14(1), 36–49. <https://doi.org/10.1179/174328809X405928>

- Askegaard, S., & Linnet, J. T. (2011). Towards an epistemology of consumer culture theory: Phenomenology and the context of context. *Marketing Theory*, 11(4), 381–404.
<https://doi.org/10.1177/1470593111418796>
- Askegaard, S., & Madsen, T. K. (1998). The local and the global: Exploring traits of homogeneity and heterogeneity in European food cultures. *International Business Review*, 7(6), 549–568.
[https://doi.org/10.1016/S0969-5931\(98\)00028-6](https://doi.org/10.1016/S0969-5931(98)00028-6)
- Baca, G., & Reshidi, N. (2025). Green Branding and Consumer Behavior, Unveiling the Impact of Environmental Marketing Strategies on Purchase Decisions. *Business Strategy and the Environment*, 34(3), 3701–3713. <https://doi.org/10.1002/bse.4172>
- Bailey, R. L., Gutschall, M. D., Mitchell, D. C., Miller, C. K., Lawrence, F. R., & Smiciklas-Wright, H. (2006). Comparative Strategies for Using Cluster Analysis to Assess Dietary Patterns. *Journal of the American Dietetic Association*, 106(8), 1194–1200.
<https://doi.org/10.1016/j.jada.2006.05.012>
- Baker, I. A., Elwood, P. C., Hughes, J., Jones, M., Moore, F., & Sweetnam, P. M. (1980). A randomised controlled trial of the effect of the provision of free school milk on the growth of children. *Journal of Epidemiology & Community Health*, 34(1), 31–34. <https://doi.org/10.1136/jech.34.1.31>
- Banovic, M., Arvola, A., Pennanen, K., Duta, D. E., Brückner-Gühmann, M., Lähteenmäki, L., & Grunert, K. G. (2018). Foods with increased protein content: A qualitative study on European consumer preferences and perceptions. *Appetite*, 125, 233–243.
<https://doi.org/10.1016/j.appet.2018.01.034>
- Barrena, R., & Sánchez, M. (2013). Neophobia, personal consumer values and novel food acceptance. *Food Quality and Preference*, 27(1), 72–84. <https://doi.org/10.1016/j.foodqual.2012.06.007>
- Basaran, O., & Telci, E. (2022). A study on kefir, a popular drink. *Journal of Basic Health*, 1(1), 20–38.
- Baschali, A., Tsakalidou, E., Kyriacou, A., Karavasiloglou, N., & Matalas, A.-L. (2017). Traditional low-alcoholic and non-alcoholic fermented beverages consumed in European countries: A neglected

food group. *Nutrition Research Reviews*, 30(1), 1–24.

<https://doi.org/10.1017/S0954422416000202>

Batty, D., Waite-Cusic, J. G., & Meunier-Goddik, L. (2019). Influence of cheese-making recipes on the composition and characteristics of Camembert-type cheese. *Journal of Dairy Science*, 102(1), 164–176. <https://doi.org/10.3168/jds.2018-14964>

Bell, M. L., Kenward, M. G., Fairclough, D. L., & Horton, N. J. (2013). Differential dropout and bias in randomised controlled trials: When it matters and when it may not. *BMJ*, 346(jan21 1), e8668–e8668. <https://doi.org/10.1136/bmj.e8668>

Belotto, M. (2018). Data Analysis Methods for Qualitative Research: Managing the Challenges of Coding, Interrater Reliability, and Thematic Analysis. *The Qualitative Report*. <https://doi.org/10.46743/2160-3715/2018.3492>

Bennett, D. A. (2001). How can I deal with missing data in my study? *Australian and New Zealand Journal of Public Health*, 25(5), 464–469. <https://doi.org/10.1111/j.1467-842X.2001.tb00294.x>

Berners-Lee, M., Hoolohan, C., Cammack, H., & Hewitt, C. N. (2012). The relative greenhouse gas impacts of realistic dietary choices. *Energy Policy*, 43, 184–190. <https://doi.org/10.1016/j.enpol.2011.12.054>

Betts, N. M., Amos, R. J., Keim, K., Peters, P., & Stewart, B. (1997). Ways Young Adults View Foods. *Journal of Nutrition Education*, 29(2), 73–79. [https://doi.org/10.1016/S0022-3182\(97\)70158-4](https://doi.org/10.1016/S0022-3182(97)70158-4)

Bimbo, F. (2017). Consumers' acceptance and preferences for nutrition-modified and functional dairy products: A systematic review. *Appetite*, 113, 141–154.

Blondin, S. A., Goldberg, J. P., Cash, S. B., Griffin, T. S., & Economos, C. D. (2018). Factors Influencing Fluid Milk Waste in a Breakfast in the Classroom School Breakfast Program. *Journal of Nutrition Education and Behavior*, 50(4), 349-356.e1. <https://doi.org/10.1016/j.jneb.2017.12.006>

- Bojnec, Š., & Fertő, I. (2014). Export competitiveness of dairy products on global markets: The case of the European Union countries. *Journal of Dairy Science*, 97(10), 6151–6163.
<https://doi.org/10.3168/jds.2013-7711>
- Borghini, A. (2015). What Is a Recipe? *Journal of Agricultural and Environmental Ethics*, 28(4), 719–738. <https://doi.org/10.1007/s10806-015-9556-9>
- Bouamra-Mechemache, Z., Réquillart, V., Soregaroli, C., & Trévisiol, A. (2008). Demand for dairy products in the EU. *Food Policy*, 33(6), 644–656. <https://doi.org/10.1016/j.foodpol.2008.05.001>
- Bourlioux, P. (2007). Histoire des laits fermentes. *Cahiers de Nutrition et de Diététique*, 42(2), 6.
[https://doi.org/10.1016/S0007-9960\(07\)91314-0](https://doi.org/10.1016/S0007-9960(07)91314-0)
- Bramston, V., Rouf, A., & Allman-Farinelli, M. (2020). The Development of Cooking Videos to Encourage Calcium Intake in Young Adults. *Nutrients*, 12(5), 1236.
<https://doi.org/10.3390/nu12051236>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Brennan, L., Francis, C., Jenkins, E. L., Schivinski, B., Jackson, M., Florence, E., Parker, L., Langley, S., Lockrey, S., Verghese, K., Phan-Le, N. T., Hill, A., & Ryder, M. (2023). Consumer Perceptions of Food Packaging in Its Role in Fighting Food Waste. *Sustainability*, 15(3), 1917.
<https://doi.org/10.3390/su15031917>
- Brislin, R. W. (1983). Cross-Cultural Research in Psychology. *Annual Review of Psychology*, 34(1), 363–400. <https://doi.org/10.1146/annurev.ps.34.020183.002051>
- Brščić, M. (2020). Refining consumer attitudes to milk and dairy product purchase and use to reduce food waste and improve animal welfare on-farm. *Journal of Dairy Research*, 87(S1), 9–12.
<https://doi.org/10.1017/S0022029920000631>
- Brunner, T. A., Van Der Horst, K., & Siegrist, M. (2010). Convenience food products. Drivers for consumption. *Appetite*, 55(3), 498–506. <https://doi.org/10.1016/j.appet.2010.08.017>

- Bucher, T., Collins, C., Rollo, M. E., McCaffrey, T. A., De Vlieger, N., Van Der Bend, D., Truby, H., & Perez-Cueto, F. J. A. (2016). Nudging consumers towards healthier choices: A systematic review of positional influences on food choice. *British Journal of Nutrition*, 115(12), 2252–2263. <https://doi.org/10.1017/S0007114516001653>
- Buttriss, J. (1997). Food and nutrition: Attitudes, beliefs, and knowledge in the United Kingdom. *The American Journal of Clinical Nutrition*, 65(6), 1985S-1995S. <https://doi.org/10.1093/ajcn/65.6.1985S>
- Bylund, G. (1995). *Dairy Processing Handbook* (Vol. 1–1). Tetra Pak Processing Systems. <https://dairyprocessinghandbook.tetrapak.com/>
- Cade, J., Thompson, R., Burley, V., & Warm, D. (2002). Development, validation and utilisation of food-frequency questionnaires – a review. *Public Health Nutrition*, 5(4), 567–587. <https://doi.org/10.1079/PHN2001318>
- Canellada, F., Laca, A., Laca, A., & Díaz, M. (2018). Environmental impact of cheese production: A case study of a small-scale factory in southern Europe and global overview of carbon footprint. *Science of The Total Environment*, 635, 167–177. <https://doi.org/10.1016/j.scitotenv.2018.04.045>
- Caprara, G. (2018). Diet and longevity: The effects of traditional eating habits on human lifespan extension. *Mediterranean Journal of Nutrition and Metabolism*, 11(3), 261–294. <https://doi.org/10.3233/MNM-180225>
- Cardel, M. I., Szurek, S. M., Dillard, J. R., Dilip, A., Miller, D. R., Theis, R., Bernier, A., Thompson, L. A., Dulin, A., Janicke, D. M., & Lee, A. M. (2020). Perceived barriers/facilitators to a healthy lifestyle among diverse adolescents with overweight/obesity: A qualitative study. *Obesity Science & Practice*, 6(6), 638–648. <https://doi.org/10.1002/osp4.448>
- Cardello, A. V., Llobell, F., Giacalone, D., Roigard, C. M., & Jaeger, S. R. (2022). Plant-based alternatives vs dairy milk: Consumer segments and their sensory, emotional, cognitive and

situational use responses to tasted products. *Food Quality and Preference*, 100, 104599.

<https://doi.org/10.1016/j.foodqual.2022.104599>

Cardello, A. V., Llobell, F., Jin, D., Ryan, G. S., & Jaeger, S. R. (2024). Sensory drivers of liking, emotions, conceptual and sustainability concepts in plant-based and dairy yoghurts. *Food Quality and Preference*, 113, 105077. <https://doi.org/10.1016/j.foodqual.2023.105077>

Carrigan, M., Szmigin, I., & Leek, S. (2006). Managing routine food choices in UK families: The role of convenience consumption. *Appetite*, 47(3), 372–383. <https://doi.org/10.1016/j.appet.2006.05.018>

Casini, L., Contini, C., Romano, C., & Scozzafava, G. (2015). Trends in food consumptions: What is happening to generation X? *British Food Journal*, 117(2), 705–718. <https://doi.org/10.1108/BFJ-10-2013-0283>

Cassel, J. (1957). Social and Cultural Implications of Food and Food Habits. *American Journal of Public Health and the Nations Health*, 47(6), 732–740. <https://doi.org/10.2105/AJPH.47.6.732>

Cesbron-Lavau, E., Lubrano-Lavadera, A.-S., Braesco, V., & Deschamps, E. (2017). Fromages blancs, petits-suisses et laits fermentés riches en protéines. *Cahiers de Nutrition et de Diététique*, 52(1), 33–40. <https://doi.org/10.1016/j.cnd.2016.10.004>

Charby, J., Hébel, P., & Vaudaine, S. (2017). Les produits laitiers en France: Évolution du marché et place dans la diète. *Cahiers de Nutrition et de Diététique*, 52, S25–S34. [https://doi.org/10.1016/S0007-9960\(17\)30196-7](https://doi.org/10.1016/S0007-9960(17)30196-7)

Chaudhari, N., Ravi, R., Gogtay, N., & Thatte, U. (2020). Recruitment and retention of the participants in clinical trials: Challenges and solutions. *Perspectives in Clinical Research*, 11(2), 64. https://doi.org/10.4103/picr.PICR_206_19

Chinea, C., Suárez, E., & Hernández, B. (2020). Meaning of food in eating patterns. *British Food Journal*, 122(11), 3331–3341. <https://doi.org/10.1108/BFJ-02-2020-0144>

- Chollet, M., Gille, D., Piccinali, P., Bütikofer, U., Schmid, A., Stoffers, H., Altintzoglou, T., & Walther, B. (2014). Short communication: Dairy consumption among middle-aged and elderly adults in Switzerland. *Journal of Dairy Science*, 97(9), 5387–5392. <https://doi.org/10.3168/jds.2014-8193>
- Chollet, S., Sénécal, C., Woelki, L., Cortesi, A., Fifi, V., Arvisenet, G., & Valentin, D. (2022). How protein containing foods are represented in memory? A categorization study. *Food Quality and Preference*, 96, 104381. <https://doi.org/10.1016/j.foodqual.2021.104381>
- Christoph-Schulz, I., Salamon, P., & Weible, D. (2015). What is the benefit of organically-reared dairy cattle? Societal perception towards conventional and organic dairy farming. *Int. J. Food System Dynamics*. 6 (3), 139-146.
- Cifelli, C. J., Fulgoni, K., Fulgoni, V. L., & Hess, J. M. (2023). Disparity in Dairy Servings Intake by Ethnicity and Age in NHANES 2015–2018. *Current Developments in Nutrition*, 7(2), 100010. <https://doi.org/10.1016/j.cdnut.2022.100010>
- Clay, N., Garnett, T., & Lorimer, J. (2020). Dairy intensification: Drivers, impacts and alternatives. *Ambio*, 49(1), 35–48. <https://doi.org/10.1007/s13280-019-01177-y>
- Clegg, M. E., Tarrado Ribes, A., Reynolds, R., Kliem, K., & Stergiadis, S. (2021). A comparative assessment of the nutritional composition of dairy and plant-based dairy alternatives available for sale in the UK and the implications for consumers' dietary intakes. *Food Research International*, 148, 110586. <https://doi.org/10.1016/j.foodres.2021.110586>
- Coates, J., Colaiezzi, B., Fiedler, J. L., Wirth, J., Lividini, K., & Rogers, B. (2012). A Program Needs-Driven Approach to Selecting Dietary Assessment Methods for Decision-Making in Food Fortification Programs. *Food and Nutrition Bulletin*, 33(3_suppl2), S146–S156. <https://doi.org/10.1177/15648265120333S202>
- Collins, N., & Lalor, F. (2023). Consumer behaviour towards milk and dairy yoghurt products carrying nutrition and health claims: A qualitative study. *Nutrition & Food Science*, 54(1), 56–70. <https://doi.org/10.1108/NFS-11-2022-0374>

- Comer, M. (2015). *Consumer evaluation: The link between body mass index, reward sensitivity, product liking and emotion* [California Polytechnic State University].
<https://doi.org/10.15368/theses.2015.44>
- Comerford, K. B., Miller, G. D., Boileau, A. C., Masiello Schuette, S. N., Giddens, J. C., & Brown, K. A. (2021). Global Review of Dairy Recommendations in Food-Based Dietary Guidelines. *Frontiers in Nutrition*, 8, 671999. <https://doi.org/10.3389/fnut.2021.671999>
- Condon, E. M., Crepinsek, M. K., & Fox, M. K. (2009). School Meals: Types of Foods Offered to and Consumed by Children at Lunch and Breakfast. *Journal of the American Dietetic Association*, 109(2), S67–S78. <https://doi.org/10.1016/j.jada.2008.10.062>
- Conti-Silva, A. C., & Souza-Borges, P. K. D. (2019). Sensory characteristics, brand and probiotic claim on the overall liking of commercial probiotic fermented milks: Which one is more relevant? *Food Research International*, 116, 184–189. <https://doi.org/10.1016/j.foodres.2018.08.011>
- Cook, L. T., O'Reilly, G. A., DeRosa, C. J., Rohrbach, L. A., & Spruijt-Metz, D. (2015). Association between home availability and vegetable consumption in youth: A review. *Public Health Nutrition*, 18(4), 640–648. <https://doi.org/10.1017/S1368980014000664>
- Corbie-Smith, G. M. (2004). Minority Recruitment and Participation in Health Research. *North Carolina Medical Journal*, 65(6), 385–387. <https://doi.org/10.18043/ncm.65.6.385>
- Corrêa Leite, M. L., Nicolosi, A., Cristina, S., Hauser, W. A., Pugliese, P., & Nappi, G. (2003). Dietary and nutritional patterns in an elderly rural population in Northern and Southern Italy: (I). A cluster analysis of food consumption. *European Journal of Clinical Nutrition*, 57(12), 1514–1521. <https://doi.org/10.1038/sj.ejcn.1601719>
- Corvera-Paredes, B., Sánchez-Reséndiz, A. I., Medina, D. I., Espiricueta-Candelaria, R. S., Serna-Saldívar, S., & Chuck-Hernández, C. (2022). Soft Tribology and Its Relationship With the Sensory Perception in Dairy Products: A Review. *Frontiers in Nutrition*, 9, 874763. <https://doi.org/10.3389/fnut.2022.874763>

- Cruwys, T., Bevelander, K. E., & Hermans, R. C. J. (2015). Social modeling of eating: A review of when and why social influence affects food intake and choice. *Appetite*, 86, 3–18.
<https://doi.org/10.1016/j.appet.2014.08.035>
- Cuschieri, S. (2019). The CONSORT statement. *Saudi Journal of Anaesthesia*, 13(5), 27.
https://doi.org/10.4103/sja.SJA_559_18
- D Souza, S. (2023). Why Breakfast should be an important meal among school children life? *Egyptian Journal of Nutrition*, 38(4), 88–95. <https://doi.org/10.21608/enj.2023.247292.1020>
- Danby, F. W. (2005). Acne and milk, the diet myth, and beyond. *Journal of the American Academy of Dermatology*, 52(2), 360–362. <https://doi.org/10.1016/j.jaad.2004.09.022>
- Darmon, N., & Drewnowski, A. (2008). Does social class predict diet quality? *The American Journal of Clinical Nutrition*, 87(5), 1107–1117. <https://doi.org/10.1093/ajcn/87.5.1107>
- Das, C., Das, P. P., & Kambhampati, S. B. S. (2023). Sarcopenia and Osteoporosis. *Indian Journal of Orthopaedics*, 57(S1), 33–41. <https://doi.org/10.1007/s43465-023-01022-1>
- De Cock, N. (2017). *Using the rewarding value of food and sensitivity to reward to improve the snacking behavior of adolescents*. Ghent University.
- de Goede, J., Geleijnse, J. M., Ding, E. L., & Soedamah-Muthu, S. S. (2015). Effect of cheese consumption on blood lipids: A systematic review and meta-analysis of randomized controlled trials. *Nutrition Reviews*, 73(5), 259–275. <https://doi.org/10.1093/nutrit/nuu060>
- De Groot, C. P. G. M., Schlettwein-Gsell, D., Schroll-Bjørnsbo, K., & Van Staveren, W. A. (1998). Meal patterns and food selection of elderly people from six European towns. *Food Quality and Preference*, 9(6), 479–486. [https://doi.org/10.1016/S0950-3293\(98\)00030-5](https://doi.org/10.1016/S0950-3293(98)00030-5)
- De Hooge, I. E. (2025). Increasing the purchase intentions for suboptimal products: Comparing potential marketing strategies. *Food Quality and Preference*, 123, 105314.
<https://doi.org/10.1016/j.foodqual.2024.105314>
- Delfosse, C. (2012a). La diffusion mondiale de la consommation de fromage, de l'ingrédient de pizza au produit de terroir: *Pour*, N° 215-216(3), 123–129. <https://doi.org/10.3917/pour.215.0123>

- Delfosse, C. (2012b). La France et ses terroirs. Un siècle de débats sur les produits et leurs liens à l'espace: *Pour*, N° 215-216(3), 63–74. <https://doi.org/10.3917/pour.215.0061>
- Deliens, T., Clarys, P., De Bourdeaudhuij, I., & Deforche, B. (2014). Determinants of eating behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, 14(1), 53. <https://doi.org/10.1186/1471-2458-14-53>
- Deliens, T., Deforche, B., De Bourdeaudhuij, I., & Clarys, P. (2015). Determinants of physical activity and sedentary behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, 15(1), 201. <https://doi.org/10.1186/s12889-015-1553-4>
- Deliens, T., Van Crombruggen, R., Verbruggen, S., De Bourdeaudhuij, I., Deforche, B., & Clarys, P. (2016). Dietary interventions among university students: A systematic review. *Appetite*, 105, 14–26. <https://doi.org/10.1016/j.appet.2016.05.003>
- Desbouys, L., Méjean, C., De Henauw, S., & Castetbon, K. (2020). Socio-economic and cultural disparities in diet among adolescents and young adults: A systematic review. *Public Health Nutrition*, 23(5), 843–860. <https://doi.org/10.1017/S1368980019002362>
- D'Haene, E., Desiere, S., D'Haese, M., Verbeke, W., & Schoors, K. (2019). Religion, Food Choices, and Demand Seasonality: Evidence from the Ethiopian Milk Market. *Foods*, 8(5), 167. <https://doi.org/10.3390/foods8050167>
- Dickerson, K. L., & Quas, J. A. (2021). Perceived life expectancy, environmental unpredictability, and behavior in high-risk youth. *Journal of Applied Developmental Psychology*, 77, 101344. <https://doi.org/10.1016/j.appdev.2021.101344>
- Dicks, L., Bardgett, R., Bell, J., Benton, T., Booth, A., Bouwman, J., Brown, C., Bruce, A., Burgess, P., Butler, S., Crute, I., Dixon, F., Drummond, C., Freckleton, R., Gill, M., Graham, A., Hails, R., Hallett, J., Hart, B., Sutherland, W. (2013). What Do We Need to Know to Enhance the Environmental Sustainability of Agricultural Production? A Prioritisation of Knowledge Needs for the UK Food System. *Sustainability*, 5(7), 3095–3115. <https://doi.org/10.3390/su5073095>

Dietary Guidelines for Americans, 2020-2025. (2020). What foods are included in the Dairy Group?

[Informative]. *myplate.gov* USDA. <https://www.myplate.gov/eat-healthy/dairy>

Dogherty, E. J., & Estabrooks, C. A. (2015). Why do barriers and facilitators matter? In *Complex Interventions in Health: An overview of research methods*. (Vol. 1). Routledge London and New York.

https://books.google.it/books?hl=it&lr=&id=021KCAAQBAJ&oi=fnd&pg=PA273&ots=9w_kgZgJ1E&sig=1yljbKpfs6VRHfSeQ37epdREXYg&redir_esc=y#v=onepage&q&f=false

Dooley, L., & Kirk, D. (2007). University-industry collaboration: Grafting the entrepreneurial paradigm onto academic structures. *European Journal of Innovation Management*, 10(3), 316–332. <https://doi.org/10.1108/14601060710776734>

Douglas, A., Reynolds, C. K., Givens, I. D., Elwood, P. C., & Minihane, A. M. (2011). Associations between dairy consumption and body weight: A review of the evidence and underlying mechanisms. *Nutrition Research Reviews*, 24(1), 72–95. <https://doi.org/10.1017/S095442241000034X>

Douglas, M. (1972). *Deciphering a Meal*. The MIT Press on behalf of American Academy of Arts & Sciences.

Drewnowski, A. (2018). Measures and metrics of sustainable diets with a focus on milk, yogurt, and dairy products. *Nutrition Reviews*, 76(1), 21–28. <https://doi.org/10.1093/nutrit/nux063>

Drigon, V., Nicolle, L., Guyomarc'H, F., Gagnaire, V., & Arvisenet, G. (2023). Attitudes and beliefs of French consumers towards innovative food products that mix dairy and plant-based components. *International Journal of Gastronomy and Food Science*, 32, 100725. <https://doi.org/10.1016/j.ijgfs.2023.100725>

Dror, D. K., & Allen, L. H. (2014). Dairy product intake in children and adolescents in developed countries: Trends, nutritional contribution, and a review of association with health outcomes. *Nutrition Reviews*, 72(2), 68–81. <https://doi.org/10.1111/nure.12078>

- Dubuisson, C., Lioret, S., Touvier, M., Dufour, A., Calamassi-Tran, G., Volatier, J.-L., & Lafay, L. (2010). Trends in food and nutritional intakes of French adults from 1999 to 2007: Results from the INCA surveys. *British Journal of Nutrition*, 103(7), 1035–1048.
<https://doi.org/10.1017/S0007114509992625>
- Duncan, S. E. (1998). Dairy Products: The Next Generation. Altering the Image of Dairy Products Through Technology. *Journal of Dairy Science*, 81(4), 877–883.
[https://doi.org/10.3168/jds.S0022-0302\(98\)75646-2](https://doi.org/10.3168/jds.S0022-0302(98)75646-2)
- Dyen, M., & Sirieix, L. (2016). How does a local initiative contribute to social inclusion and promote sustainable food practices? Focus on the example of social cooking workshops. *International Journal of Consumer Studies*, 40(6), 685–694. <https://doi.org/10.1111/ijcs.12281>
- Eating Better. (2020). *Eating Better—2019-20 Impact Report*. www.eating-better.org
- El Sheikha, A. F. (2022). Why Fermented Foods are the Promising Food Trends in the Future? *Current Research in Nutrition and Food Science Journal*, 10(3), 827–829.
<https://doi.org/10.12944/CRNFSJ.10.3.1>
- Elmas, C., & Kabaran, S. (2021). Food Neophobia Scale (FNS): Testing The Validity and Reliability of the Turkish Version in School-Age Children: Turkish Validity and Reliability Study. *Progress in Nutrition*, 23(1), e2021021. <https://doi.org/10.23751/pn.v23i1.9295>
- Ember, C. R., & Ember, M. (2002). On cross-cultural research. *Cross-Cultural TOC*.
- European Commission. (2023). *MMO Economic Board. Milk market observatory. Annex: Milk market situation* (p. 84).
- European Commission. Directorate General for Agriculture and Rural Development. (2024). *EU agricultural outlook: 2024 2035*. Publications Office. <https://data.europa.eu/doi/10.2762/2329210>
- European Dairy Association. (2021). *EDA Factsheet 'Daily Dairy Recommendations: Are we eating enough dairy?'* (p. 30).
- Faber, I. (2023). *Consumer strategic insights towards more plant-based food consumption in Europe*. University of Copenhagen, Department of Food Science.

- Faber, I., Castellanos-Feijoó, N. A., Van De Sompel, L., Davydova, A., & Perez-Cueto, F. J. A. (2020). Attitudes and knowledge towards plant-based diets of young adults across four European countries. Exploratory survey. *Appetite*, 145, 104498. <https://doi.org/10.1016/j.appet.2019.104498>
- Fagt, S., Matthiessen, J., Thyregod, C., Kørup, K., & Biloft-Jensen, A. (2018). Breakfast in Denmark. Prevalence of Consumption, Intake of Foods, Nutrients and Dietary Quality. A Study from the International Breakfast Research Initiative. *Nutrients*, 10(8), 1085. <https://doi.org/10.3390/nu10081085>
- FAO. (2022). *FAO Strategy on Climate Change 2022–2031*. FAO Rome. <https://rivistanatura.com/wp-content/uploads/2023/07/cc2274en.pdf>
- Farag, M. A., Jomaa, S. A., Abd El-Wahed, A., & R. El-Seedi, H. (2020). The Many Faces of Kefir Fermented Dairy Products: Quality Characteristics, Flavour Chemistry, Nutritional Value, Health Benefits, and Safety. *Nutrients*, 12(2), 346. <https://doi.org/10.3390/nu12020346>
- Faye, B., & Konuspayeva, G. (2012). The sustainability challenge to the dairy sector – The growing importance of non-cattle milk production worldwide. *International Dairy Journal*, 24(2), 50–56. <https://doi.org/10.1016/j.idairyj.2011.12.011>
- Fenner, Y., Garland, S. M., Moore, E. E., Jayasinghe, Y., Fletcher, A., Tabrizi, S. N., Gunasekaran, B., & Wark, J. D. (2012). Web-Based Recruiting for Health Research Using a Social Networking Site: An Exploratory Study. *Journal of Medical Internet Research*, 14(1), e20. <https://doi.org/10.2196/jmir.1978>
- Fielding, S., Fayers, P., & Ramsay, C. R. (2012). Analysing randomised controlled trials with missing data: Choice of approach affects conclusions. *Contemporary Clinical Trials*, 33(3), 461–469. <https://doi.org/10.1016/j.cct.2011.12.002>
- Finch, L. E., & Tomiyama, A. J. (2015). Comfort eating, psychological stress, and depressive symptoms in young adult women. *Appetite*, 95, 239–244. <https://doi.org/10.1016/j.appet.2015.07.017>

- Finnegan, W., Yan, M., Holden, N. M., & Goggins, J. (2018). A review of environmental life cycle assessment studies examining cheese production. *The International Journal of Life Cycle Assessment*, 23(9), 1773–1787. <https://doi.org/10.1007/s11367-017-1407-7>
- Firat, A., & Kutucuo, K. Y. (2013). Consumption, consumer culture and consume society. *Journal of Community Positive Practices*, 13(1), 182-203. ISSN Print: 1582-8344; Electronic: 2247-6571
- Fischler, C. (1980). Food habits, social change and the nature/culture dilemma. *Social Science Information*, 19(6), 937–953. <https://doi.org/10.1177/053901848001900603>
- Flamant, J.-C. (1983). La production de lait de brebis, le modèle de Roquefort et son avenir en France méridionale. *Revue géographique des Pyrénées et du Sud-Ouest*, 54(3), 327–340. <https://doi.org/10.3406/rgpso.1983.3713>
- Freeman, C. R., Zehra, A., Ramirez, V., Wiers, C. E., Volkow, N. D., & Wang, G.-J. (2018). Impact of sugar on the body brain and behavior. *Frontiers in Bioscience*, 23(12), 2255–2266. <https://doi.org/10.2741/4704>
- Fresán, U., & Sabaté, J. (2019). Vegetarian Diets: Planetary Health and Its Alignment with Human Health. *Advances in Nutrition*, 10(Supplement_4), S380–S388. <https://doi.org/10.1093/advances/nmz019>
- Frez-Muñoz, L., Kampen, J. K., Fogliano, V., & Steenbekkers, B. L. P. A. (2021). The Food Identity of Countries Differs Between Younger and Older Generations: A Cross-Sectional Study in American, European and Asian Countries. *Frontiers in Nutrition*, 8, 653039. <https://doi.org/10.3389/fnut.2021.653039>
- Friedman, M. (1996). Nutritional Value of Proteins from Different Food Sources. A Review. *Journal of Agricultural and Food Chemistry*, 44(1), 6–29. <https://doi.org/10.1021/jf9400167>
- Fugard, A. J. B., & Potts, H. W. W. (2015). Supporting thinking on sample sizes for thematic analyses: A quantitative tool. *International Journal of Social Research Methodology*, 18(6), 669–684. <https://doi.org/10.1080/13645579.2015.1005453>

- Fumey, G. (2012). La France, un plateau de fromages: *La Géographie*, N° 1544(1), 25–27.
<https://doi.org/10.3917/geo.1544.0025>
- Furey, S., Strugnell, C., & McIlveen, H. (2001). An investigation of the potential existence of “food deserts” in rural and urban areas of Northern Ireland. *Agriculture and Human Values*, 18, 447–457.
- Fusté-Forné, F. (2021). Dairy Tourism: A Local Marketing Perspective. *Dairy*, 2(1), 14–24.
<https://doi.org/10.3390/dairy2010002>
- Gaillac, R., & Marbach, S. (2021). The carbon footprint of meat and dairy proteins: A practical perspective to guide low carbon footprint dietary choices. *Journal of Cleaner Production*, 321, 128766. <https://doi.org/10.1016/j.jclepro.2021.128766>
- Galić, K., Božanić, R., Lisak Jakopović, K., Kurek, M., Barukčić, I., & Ščetar, M. (2019). Packaging perspective of milk and dairy products. *Mljekarstvo*, 69(1), 3–20.
<https://doi.org/10.15567/mljekarstvo.2019.0101>
- Gavrilova, N. B., Chernopolskaya, N. L., Bukharev, A. G., Pogorelova, N. A., Dolmatova, I. A., & Salekhov, S. A. (2020). Current trend in the development of biotechnology of a specialized dairy product for nutrition of athletes. *IOP Conference Series: Earth and Environmental Science*, 613(1), 012036. <https://doi.org/10.1088/1755-1315/613/1/012036>
- General Standard for the Use of Dairy Terms., CXS 206—1999 § Codex Alimentarius - International Food Standards (1999). This Standard replaced the Code of Principles Concerning Milk and Milk Products. <https://www.fao.org/fao-who-codexalimentarius/codex-texts/list-standards/en/>
- Gerber, P. J., & Food and Agriculture Organization of the United Nations (A c. Di). (2013). *Tackling climate change through livestock: A global assessment of emissions and mitigation opportunities*. Food and Agriculture Organization of the United Nations.
- Germov, J., & Williams, L. (1999). *A sociology of food and nutrition: The social appetite* (4th Edition, Vol. 1). Oxford University Press.

- Gerosa, S., & Skoet, J. (2012). Milk availability: Trends in production and demand and medium- term outlook. *ESA Working Paper, No. 12-01*.
- Ghosh, D., & Chattopadhyay, P. (2012). Application of principal component analysis (PCA) as a sensory assessment tool for fermented food products. *Journal of Food Science and Technology*, 49(3), 328–334. <https://doi.org/10.1007/s13197-011-0280-9>
- Givens, D. I. (2010). Milk and meat in our diet: Good or bad for health? *Animal*, 4(12), 1941–1952. <https://doi.org/10.1017/S1751731110001503>
- Gomes, D. G. E., Pottier, P., Crystal-Ornelas, R., Hudgins, E. J., Foroughirad, V., Sánchez-Reyes, L. L., Turba, R., Martinez, P. A., Moreau, D., Bertram, M. G., Smout, C. A., & Gaynor, K. M. (2022). Why don't we share data and code? Perceived barriers and benefits to public archiving practices. *Proc. R. Soc. B*, 289, 11. <https://doi.org/doi.org/10.1098/rspb.2022.1113>
- Gordillo, P., & Prescott, M. P. (2023). Assessing the Use of Social Cognitive Theory Components in Cooking and Food Skills Interventions. *Nutrients*, 15(5), 1287. <https://doi.org/10.3390/nu15051287>
- Gordon, C. M., Zemel, B. S., Wren, T. A. L., Leonard, M. B., Bachrach, L. K., Rauch, F., Gilsanz, V., Rosen, C. J., & Winer, K. K. (2017). The Determinants of Peak Bone Mass. *The Journal of Pediatrics*, 180, 261–269. <https://doi.org/10.1016/j.jpeds.2016.09.056>
- Gracia, A., & Albisu, L. M. (2001). Food consumption in the European Union: Main determinants and country differences. *Agribusiness*, 17(4), 469–488. <https://doi.org/10.1002/agr.1030>
- Gray, A. (2010). «The Greatest Ordeal»: Using Biography to Explore the Victorian Dinner. *Post-Medieval Archaeology*, 44(2), 255–272. <https://doi.org/10.1179/174581310X12810074246582>
- Green, R. G., Murphy, K. D., & Snyder, S. M. (2000). Should demographics be placed at the end or at the beginning of mailed questionnaires? An empirical answer to a persistent methodological question. *Social Work Research, Oxford*, 24(4), 237–241.

- Guidetti, M., Carraro, L., Cavazza, N., & Roccato, M. (2018). Validation of the revised Food Neophobia Scale (FNS-R) in the Italian context. *Appetite*, 128, 95–99.
<https://doi.org/10.1016/j.appet.2018.06.004>
- Guiné, R. P. F., Florença, S. G., Carpes, S., & Anjos, O. (2020). Study of the Influence of Sociodemographic and Lifestyle Factors on Consumption of Dairy Products: Preliminary Study in Portugal and Brazil. *Foods*, 9(12), 1775. <https://doi.org/10.3390/foods9121775>
- Gupta, M. K., Torrico, D. D., Ong, L., Gras, S. L., Dunshea, F. R., & Cottrell, J. J. (2022). Plant and Dairy-Based Yogurts: A Comparison of Consumer Sensory Acceptability Linked to Textural Analysis. *Foods*, 11(3), 463. <https://doi.org/10.3390/foods11030463>
- Guy, D. J., Bray, J., & Appleton, K. M. (2024). Select dietary changes towards sustainability: Impacts on dietary profiles, environmental footprint, and cost. *Appetite*, 194, 107194.
<https://doi.org/10.1016/j.appet.2023.107194>
- Guyomarc'h, F., Arvisenet, G., Bouhallab, S., Canon, F., Deutsch, S.-M., Drigon, V., Dupont, D., Famelart, M.-H., Garric, G., Guédon, E., Guyot, T., Hiolle, M., Jan, G., Le Loir, Y., Lechevalier, V., Nau, F., Pezennec, S., Thierry, A., Valence, F., & Gagnaire, V. (2021). Mixing milk, egg and plant resources to obtain safe and tasty foods with environmental and health benefits. *Trends in Food Science & Technology*, 108, 119–132. <https://doi.org/10.1016/j.tifs.2020.12.010>
- Haenlein, G. F. W. (2007). About the evolution of goat and sheep milk production. *Small Ruminant Research*, 68(1–2), 3–6. <https://doi.org/10.1016/j.smallrumres.2006.09.021>
- Hagquist, C., & Stenbeck, M. (1998). Goodness of Fit in Regression Analysis – R2 and G2 Reconsidered. *Quality & Quantity*, 32, 229–245.
- Hardin-Fanning, F., & Ricks, J. M. (2017). Attitudes, social norms and perceived behavioral control factors influencing participation in a cooking skills program in rural Central Appalachia. *Global Health Promotion*, 24(4), 43–52. <https://doi.org/10.1177/1757975916636792>

- Harding, G. (2021). Dinner Is the Great Trial: Sociability and Service à la Russe in the Long Nineteenth Century. *European Journal of Food Drink and Society*, 1(1). <https://doi.org/10.21427/ETPS-Q755>
- Harris, M. (1998). *Good to eat: Riddles of food and culture* (Second). Waveland Press.
- Hartmann, C., & Siegrist, M. (2017). Consumer perception and behaviour regarding sustainable protein consumption: A systematic review. *Trends in Food Science & Technology*, 61, 11–25. <https://doi.org/10.1016/j.tifs.2016.12.006>
- Hartwell, H. J., Edwards, J. S. A., & Brown, L. (2011). Acculturation and food habits: Lessons to be learned. *British Food Journal*, 113(11), 1393–1405. <https://doi.org/10.1108/00070701111180003>
- Hasan, B., Thompson, W. G., Almasri, J., Wang, Z., Lakis, S., Prokop, L. J., Hensrud, D. D., Frie, K. S., Wirtz, M. J., Murad, A. L., Ewoldt, J. S., & Murad, M. H. (2019). The effect of culinary interventions (cooking classes) on dietary intake and behavioral change: A systematic review and evidence map. *BMC Nutrition*, 5(1), 29. <https://doi.org/10.1186/s40795-019-0293-8>
- Hazley, D., Stack, M., Walton, J., McNulty, B. A., & Kearney, J. M. (2022). Food neophobia across the life course: Pooling data from five national cross-sectional surveys in Ireland. *Appetite*, 171, 105941. <https://doi.org/10.1016/j.appet.2022.105941>
- He, Z., & Schonlau, M. (2020). Automatic Coding of Open-ended Questions into Multiple Classes: Whether and How to Use Double Coded Data. *Survey Research Methods*, 267-287 Pages. <https://doi.org/10.18148/SRM/2020.V14I3.7639>
- Hebden, L., Chan, H. N., Louie, J. C., Rangan, A., & Allman-Farinelli, M. (2015). You are what you choose to eat: Factors influencing young adults' food selection behaviour. *Journal of Human Nutrition and Dietetics*, 28(4), 401–408. <https://doi.org/10.1111/jhn.12312>
- Hébel, P. (2007). Le petit déjeuner anglo-saxon s'installe peu à peu. *Credoc - Consommation et Modes de vie*, 204.

- Hemler, E. C., & Hu, F. B. (2019). Plant-Based Diets for Personal, Population, and Planetary Health. *Advances in Nutrition*, 10(4), S275–S283. <https://doi.org/10.1093/advances/nmy117>
- Hennink, M. M., Kaiser, B. N., & Weber, M. B. (2019). What Influences Saturation? Estimating Sample Sizes in Focus Group Research. *Qualitative Health Research*, 29(10), 1483–1496. <https://doi.org/10.1177/1049732318821692>
- Hercberg, S., Touvier, M., & Salas-Salvado, J. (2022). The Nutri-Score nutrition label: A public health tool based on rigorous scientific evidence aiming to improve the nutritional status of the population. *International Journal for Vitamin and Nutrition Research*, 92(3–4), 147–157. <https://doi.org/10.1024/0300-9831/a000722>
- Hereford, T., Kellish, A., Samora, J. B., & Reid Nichols, L. (2024). Understanding the importance of peak bone mass. *Journal of the Pediatric Orthopaedic Society of North America*, 7, 100031. <https://doi.org/10.1016/j.jposna.2024.100031>
- Herpin, N. (1988). Le repas comme institution: Compte rendu d'une enquête exploratoire. *Revue Française de Sociologie*, 29(3), 503. <https://doi.org/10.2307/3321627>
- Hersch, D., Perdue, L., Ambroz, T., & Boucher, J. L. (2014). The Impact of Cooking Classes on Food-Related Preferences, Attitudes, and Behaviors of School-Aged Children: A Systematic Review of the Evidence, 2003–2014. *Preventing Chronic Disease*, 11, 140267. <https://doi.org/10.5888/pcd11.140267>
- Hersleth, M., Ueland, Ø., Allain, H., & Næs, T. (2005). Consumer acceptance of cheese, influence of different testing conditions. *Food Quality and Preference*, 16(2), 103–110. <https://doi.org/10.1016/j.foodqual.2004.02.009>
- Hertzler, A. A., & Bruce, F. A. (2002). Cooking, recipe use and food habits of college students and nutrition educators. *International Journal of Consumer Studies*, 26(4), 340–345. <https://doi.org/10.1046/j.1470-6431.2002.00248.x>

- Hirahatake, K. M., Astrup, A., Hill, J. O., Slavin, J. L., Allison, D. B., & Maki, K. C. (2020). Potential Cardiometabolic Health Benefits of Full-Fat Dairy: The Evidence Base. *Advances in Nutrition*, 11(3), 533–547. <https://doi.org/10.1093/advances/nmz132>
- Ho, C. (2009). Cross Cultural Collaboration: Opportunities and Challenges. *Cosmopolitan Civil Societies: An Interdisciplinary Journal*, 1(2), 52–62. <https://doi.org/10.5130/ccs.v1i2.1047>
- Hobbs, D. A., Durrant, C., Elliott, J., Givens, D. I., & Lovegrove, J. A. (2020). Diets containing the highest levels of dairy products are associated with greater eutrophication potential but higher nutrient intakes and lower financial cost in the United Kingdom. *European Journal of Nutrition*, 59(3), 895–908. <https://doi.org/10.1007/s00394-019-01949-y>
- Hodgson, H. J. (1979). Role of the Dairy Cow in World Food Production. *Journal of Dairy Science*, 62(2), 343–351. [https://doi.org/10.3168/jds.S0022-0302\(79\)83246-4](https://doi.org/10.3168/jds.S0022-0302(79)83246-4)
- Hoerger, M. (2010). Participant Dropout as a Function of Survey Length in Internet-Mediated University Studies: Implications for Study Design and Voluntary Participation in Psychological Research. *Cyberpsychology, Behavior, and Social Networking*, 13(6), 697–700. <https://doi.org/10.1089/cyber.2009.0445>
- Hoffman, J. R., & Falvo, M. J. (2005). Protein—Which is best? *Journal of Sports Science and Medicine*, 3, 118–130.
- Hohoff, E., Perrar, I., Jancovic, N., & Alexy, U. (2021). Age and time trends of dairy intake among children and adolescents of the DONALD study. *European Journal of Nutrition*, 60(7), 3861–3872. <https://doi.org/10.1007/s00394-021-02555-7>
- Holm, L., Skov Luridsen, D., Gronow, J., Khama, N., Kjærnes, U., Bøker Lund, T., Mäkelä, J., & Niva, M. (2019). The food we eat. In *Everyday Eating in Denmark, Finland, Norway and Sweden. A Comparative Study of Meal Patterns 1997-2012* (1st ed., p. 248). Bloomsbury Publishing.
- Howse, E., Hankey, C., Allman-Farinelli, M., Bauman, A., & Freeman, B. (2018). ‘Buying Salad Is a Lot More Expensive than Going to McDonalds’: Young Adults’ Views about What Influences Their Food Choices. *Nutrients*, 10(8), 996. <https://doi.org/10.3390/nu10080996>

- Hu, Y., & Min, H. (Kelly). (2022). Enjoyment or indulgence: What draws the line in hedonic food consumption? *International Journal of Hospitality Management*, 104, 103228.
<https://doi.org/10.1016/j.ijhm.2022.103228>
- Huth, P. J., DiRienzo, D. B., & Miller, G. D. (2006). Major Scientific Advances with Dairy Foods in Nutrition and Health. *Journal of Dairy Science*, 89(4), 1207–1221.
[https://doi.org/10.3168/jds.S0022-0302\(06\)72190-7](https://doi.org/10.3168/jds.S0022-0302(06)72190-7)
- IDF Communications. (2018, luglio 3). OECD expects dairy fat consumption to continue to increase [IDF Press Releases]. *International Dairy Federation (IDF)*. https://fil-idf.org/news_insights/oecd/
- Ireland, J., Van Erp-Baart, A., Charrondière, U., Møller, A., Smithers, G., Trichopoulou, A., & for the EFCOSUM Group. (2002). Selection of a food classification system and a food composition database for future food consumption surveys. *European Journal of Clinical Nutrition*, 56(S2), S33–S45. <https://doi.org/10.1038/sj.ejcn.1601427>
- Ivanova, M., Odzaklieska, D., & Yilmaz, R. (2024). *XXII. International Balkan and Near Eastern Congress Series on Economics, Business and Management-Ohrid / Republic of North Macedonia* (Vol. 1). University of Agribusiness and Rural Development / Bulgaria University «St. Kliment Ohridski» Faculty of Economics / Republic of North Macedonia University “Isa Boletini”- Mitrovica, Faculty of Economics / Republic of Kosovo IBANESS.
- Jaeger, S. R., & Porcherot, C. (2017). Consumption context in consumer research: Methodological perspectives. *Current Opinion in Food Science*, 15, 30–37.
<https://doi.org/10.1016/j.cofs.2017.05.001>
- Jakobsen, J. C. (2017). *When and how should multiple imputation be used for handling missing data in randomised clinical trials – a practical guide with flowcharts*.
- Jarosz, L. (2008). The city in the country: Growing alternative food networks in Metropolitan areas. *Journal of Rural Studies*, 24(3), 231–244. <https://doi.org/10.1016/j.jrurstud.2007.10.002>

- Jensen, P. D., & Orfila, C. (2021). Mapping the production-consumption gap of an urban food system: An empirical case study of food security and resilience. *Food Security*, 13(3), 551–570.
<https://doi.org/10.1007/s12571-021-01142-2>
- Ji, M. F., & Wood, W. (2007). Purchase and Consumption Habits: Not Necessarily What You Intend. *Journal of Consumer Psychology*, 17(4), 261–276. [https://doi.org/10.1016/S1057-7408\(07\)70037-2](https://doi.org/10.1016/S1057-7408(07)70037-2)
- Jiang, R., Sharma, C., Bryant, R., Mohan, M. S., Al-Marashdeh, O., Harrison, R., & Torrico, D. D. (2021). Animal welfare information affects consumers' hedonic and emotional responses towards milk. *Food Research International*, 141, 110006.
<https://doi.org/10.1016/j.foodres.2020.110006>
- Johnson, M. E. (2017). A 100-Year Review: Cheese production and quality. *Journal of Dairy Science*, 100(12), 9952–9965. <https://doi.org/10.3168/jds.2017-12979>
- Juhl, C. R., Bergholdt, H. K. M., Miller, I. M., Jemec, G. B. E., Kanters, J. K., & Ellervik, C. (2018). Dairy Intake and Acne Vulgaris: A Systematic Review and Meta-Analysis of 78,529 Children, Adolescents, and Young Adults. *Nutrients*, 10(8), 1049. <https://doi.org/10.3390/nu10081049>
- Jung, M. E., Mistry, C., Bourne, J. E., Perrier, M.-J., Martin Ginis, K. A., & Latimer-Cheung, A. E. (2015). A qualitative investigation of adults' perceived benefits, barriers and strategies for consuming milk and milk products. *Health Education Journal*, 74(3), 364–378.
<https://doi.org/10.1177/0017896914540295>
- Kahleova, H., Belinova, L., Malinska, H., Oliarynyk, O., Trnovska, J., Skop, V., Kazdova, L., Dezortova, M., Hajek, M., Tura, A., Hill, M., & Pelikanova, T. (2014). Eating two larger meals a day (breakfast and lunch) is more effective than six smaller meals in a reduced-energy regimen for patients with type 2 diabetes: A randomised crossover study. *Diabetologia*, 57(8), 1552–1560.
<https://doi.org/10.1007/s00125-014-3253-5>
- Kandiko, C. B., & Kinchin, I. M. (2012). Challenges in cross-cultural PhD supervision: Mapping to facilitate dialogue. *Proc. of the Fifth Int. Conference on Concept Mapping Valletta, Malta 2012*.

- Kant, A. K. (2018). Eating patterns of US adults: Meals, snacks, and time of eating. *Physiology & Behavior*, 193, 270–278. <https://doi.org/10.1016/j.physbeh.2018.03.022>
- Kapaj, A. (2018). Factors that influence milk consumption world trends and facts. *Uropean Journal of Business, Economics and Accountancy*, 6(2).
- Karanicolas, P. J., Farrokhyar, F., & Bhandari, M. (2009). Blinding: Who, what, when, why, how? *Continuing Medical Education*.
- Kearney, J. (2010). Food consumption trends and drivers. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365(1554), 2793–2807. <https://doi.org/10.1098/rstb.2010.0149>
- Kemp, B. J., White-Flynn, T. T., Lyons, O. C., Cronin, B. E., O'Donovan, C. B., Donovan, C. M., & Flynn, M. A. T. (2017). Is it yoghurt or is it a dessert? *Proceedings of the Nutrition Society*, 76(OCE3), E69. <https://doi.org/10.1017/S0029665117001422>
- Kharuhayothin, T., & Kerrane, B. (2018). Learning from the past? An exploratory study of familial food socialization processes using the lens of emotional reflexivity. *European Journal of Marketing*, 52(12), 2312–2333. <https://doi.org/10.1108/EJM-10-2017-0694>
- King, S. C., Meiselman, H. L., Hottenstein, A. W., Work, T. M., & Cronk, V. (2007). The effects of contextual variables on food acceptability: A confirmatory study. *Food Quality and Preference*, 18(1), 58–65. <https://doi.org/10.1016/j.foodqual.2005.07.014>
- Klöckner, C. A. (2015). Target Group Segmentation—Why Knowing Your Audience Is Important. In *The Psychology of Pro-Environmental Communication* (pp. 146–160). Palgrave Macmillan.
- Knakievicz, T. (2015). Cognitive Structure of Beliefs and Habits: How to Challenge Them? *OALib*, 02(12), 1–4. <https://doi.org/10.4236/oalib.1102170>
- Koehler, J., & Leonhaeuser, I.-U. (2008). Changes in Food Preferences during Aging. *Annals of Nutrition and Metabolism*, 52(Suppl. 1), 15–19. <https://doi.org/10.1159/000115342>
- Kok, C. R., & Hutkins, R. (2018). Yogurt and other fermented foods as sources of health-promoting bacteria. *Nutrition Reviews*, 76(Supplement_1), 4–15. <https://doi.org/10.1093/nutrit/nuy056>

- Komada, Y., Okajima, I., & Kuwata, T. (2020). The Effects of Milk and Dairy Products on Sleep: A Systematic Review. *International Journal of Environmental Research and Public Health*, 17(24), 9440. <https://doi.org/10.3390/ijerph17249440>
- Kostkova, P., Brewer, H., De Lusignan, S., Fottrell, E., Goldacre, B., Hart, G., Koczan, P., Knight, P., Marsolier, C., McKendry, R. A., Ross, E., Sasse, A., Sullivan, R., Chaytor, S., Stevenson, O., Velho, R., & Tooke, J. (2016). Who Owns the Data? Open Data for Healthcare. *Frontiers in Public Health*, 4. <https://doi.org/10.3389/fpubh.2016.00007>
- Kouvelioti, R., Josse, A. R., & Klentrou, P. (2017). Effects of Dairy Consumption on Body Composition and Bone Properties in Youth: A Systematic Review. *Current Developments in Nutrition*, 1(8), e001214. <https://doi.org/10.3945/cdn.117.001214>
- Krueger, J. S., & Lewis-Beck, M. S. (2007). Goodness-of-Fit: R-Squared, SEE and 'Best Practice'. *The Political Methodologist*, 15(1).
- Kruger, L. J., Rodgers, R. F., Long, S. J., & Lowy, A. S. (2019). Individual interviews or focus groups? Interview format and women's self-disclosure. *International Journal of Social Research Methodology*, 22(3), 245–255. <https://doi.org/10.1080/13645579.2018.1518857>
- Kulmala, J., Rosenberg, A., Ngandu, T., Hemiö, K., Tenkula, T., Hyytiä, A., Vienola, M., Huhtamäki-Kuoppala, M., Saarinen, A., Korkki, S., Laatikainen, T., Solomon, A., & Kivipelto, M. (2021). Facilitators and barriers to implementing lifestyle intervention programme to prevent cognitive decline. *European Journal of Public Health*, 31(4), 816–822. <https://doi.org/10.1093/eurpub/ckab087>
- Kupiec, B., & Revell, B. (1998). Speciality and artisanal cheeses today: The product and the consumer. *British Food Journal*, 100(5), 236–243. <https://doi.org/10.1108/00070709810221454>
- Kurajdova, K., & Tábořecká-Petrovicová, J. (2015). Literature Review on Factors Influencing Milk Purchase Behaviour. *International Review of Management and Marketing* 5(1), 9-25. ISSN: 2146-4405

- Kuźniar, W., Surmacz, T., & Wierzbiński, B. (2021). The Impact of Ecological Knowledge on Young Consumers' Attitudes and Behaviours towards the Food Market. *Sustainability*, 13(4), 1984. <https://doi.org/10.3390/su13041984>
- Kymäläinen, T., Seisto, A., & Malila, R. (2021). Generation Z Food Waste, Diet and Consumption Habits: A Finnish Social Design Study with Future Consumers. *Sustainability*, 13(4), 2124. <https://doi.org/10.3390/su13042124>
- Lacroix, M.-J., Desroches, S., Turcotte, M., Painchaud Guérard, G., Paquin, P., Couture, F., & Provencher, V. (2016). Salient beliefs among Canadian adults regarding milk and cheese consumption: A qualitative study based on the theory of planned behaviour. *BMC Nutrition*, 2(1), 48. <https://doi.org/10.1186/s40795-016-0087-1>
- Lad, S. S., Aparnathi, K. D., Mehta, B., & Velpula, S. (2017). Goat Milk in Human Nutrition and Health – A Review. *International Journal of Current Microbiology and Applied Sciences*, 6(5), 1781–1792. <https://doi.org/10.20546/ijcmas.2017.605.194>
- Laila, A., Topakas, N., Farr, E., Haines, J., Ma, D. W., Newton, G., & Buchholz, A. C. (2021). Barriers and facilitators of household provision of dairy and plant-based dairy alternatives in families with preschool-age children. *Public Health Nutrition*, 24(17), 5673–5685. <https://doi.org/10.1017/S136898002100080X>
- Laird, E., Casey, M. C., Ward, M., Hoey, L., Hughes, C. F., Mccarroll, K., Cunningham, C., Strain, J. J., McNulty, H., & Molloy, A. M. (2017). Dairy intakes in older Irish adults and effects on vitamin micronutrient status: Data from the TUDA study. *J Nutr Health Aging*, 21(9), 8.
- Lake, A. A., Rugg-Gunn, A. J., Hyland, R. M., Wood, C. E., Mathers, J. C., & Adamson, A. J. (2004). Longitudinal dietary change from adolescence to adulthood: Perceptions, attributions and evidence. *Appetite*, 42(3), 255–263. <https://doi.org/10.1016/j.appet.2003.11.008>
- Lambert, S. D., & Loiselle, C. G. (2008). Combining individual interviews and focus groups to enhance data richness. *Journal of Advanced Nursing*, 62(2), 228–237. <https://doi.org/10.1111/j.1365-2648.2007.04559.x>

- Larson, N. I., Nelson, M. C., Neumark-Sztainer, D., Story, M., & Hannan, P. J. (2009). Making Time for Meals: Meal Structure and Associations with Dietary Intake in Young Adults. *Journal of the American Dietetic Association*, 109(1), 72–79. <https://doi.org/10.1016/j.jada.2008.10.017>
- Larson, N. I., Perry, C. L., Story, M., & Neumark-Sztainer, D. (2006). Food Preparation by Young Adults Is Associated with Better Diet Quality. *Journal of the American Dietetic Association*, 106(12), 2001–2007. <https://doi.org/10.1016/j.jada.2006.09.008>
- Larson, N., & Story, M. (2009). A Review of Environmental Influences on Food Choices. *Annals of Behavioral Medicine*, 38(S1), 56–73. <https://doi.org/10.1007/s12160-009-9120-9>
- Le Pape, M.-C., & Plessz, M. (2017). C'est l'heure du petit-déjeuner ? Rythme des repas, incorporation et classe sociale: *L'Année sociologique*, Vol. 67(1), 73–106. <https://doi.org/10.3917/anso.171.0073>
- Lee, E. (2025). The World Health Organization's Global Strategy on Diet, Physical Activity, and Health: Turning Strategy Into Action. *Food and Drug Law Journal*, 60.
- Lee, Y., Kim, T., & Jung, H. (2022). The Relationships between Food Literacy, Health Promotion Literacy and Healthy Eating Habits among Young Adults in South Korea. *Foods*, 11(16), 2467. <https://doi.org/10.3390/foods11162467>
- Leech, R. M., Worsley, A., Timperio, A., & McNaughton, S. A. (2015). Characterizing eating patterns: A comparison of eating occasion definitions. *The American Journal of Clinical Nutrition*, 102(5), 1229–1237. <https://doi.org/10.3945/ajcn.115.114660>
- Léegaré, F., & Zhang, P. (2013). Barriers and facilitators: Strategies for Identification and Measurement. In S. E. Straus, J. Tetroe, & I. D. Graham (A c. Di), *Knowledge Translation in Health Care* (1^a ed., pp. 121–136). Wiley. <https://doi.org/10.1002/9781118413555.ch11>
- Lejeune, A. (2023, maggio 26). Le Cniel alerte sur l'évolution du Nutri-Score qui classerait le lait en boisson [Informative]. *Lineares*. <https://www.lineaires.com/les-produits/le-cniel-alerte-sur-l-evolution-du-nutri-score-qui-classerait-le-lait-en-boisson>

- Leme, A. C. B., Hou, S., Fisberg, R. M., Fisberg, M., & Haines, J. (2021). Adherence to Food-Based Dietary Guidelines: A Systemic Review of High-Income and Low- and Middle-Income Countries. *Nutrients*, 13(3), 1038. <https://doi.org/10.3390/nu13031038>
- Les marchés des produits laitiers, carnés et avicoles. Bilan 2022/Perspectives 2023* (p. 196). (2023). France AgriMer,. www.franceagrimer.fr
- Lewis, M., & Dale, R. H. (1994). Chilled yogurt and other dairy desserts. In *Shelf Life Evaluation of Foods*. (pp. 127–155). Springer, Boston, MA.
- Lind, F., Styhre, A., & Aaboen, L. (2013). Exploring university-industry collaboration in research centres. *European Journal of Innovation Management*, 16(1), 70–91. <https://doi.org/10.1108/14601061311292869>
- Locher, J. L., Yoels, W. C., Maurer, D., & van Ells, J. (2005). Comfort Foods: An Exploratory Journey Into The Social and Emotional Significance of Food. *Food and Foodways*, 13(4), 273–297. <https://doi.org/10.1080/07409710500334509>
- López-Gil, J. F., Smith, L., Tully, M. A., Álvarez-Pitti, J., Gómez, S. F., & Schröder, H. (2025). Prevalence of daily family meals among children and adolescents from 43 countries. *Maternal & Child Nutrition*, 21(1), e13706. <https://doi.org/10.1111/mcn.13706>
- Louie, J. C. Y., Flood, V. M., Gopinath, B., Burlutsky, G., Baur, L. A., & Mitchell, P. (2014). Pattern and predictors of dairy consumption during adolescence. *Journal of Nutrition & Intermediary Metabolism*, 1, 40. <https://doi.org/10.1016/j.jnim.2014.10.147>
- Lovegrove, J. A., & Givens, D. I. (2016). Dairy food products: Good or bad for cardiometabolic disease? *Nutrition Research Reviews*, 29(2), 249–267. <https://doi.org/10.1017/S0954422416000160>
- Lovegrove, J. A., & Hobbs, D. A. (2016). New perspectives on dairy and cardiovascular health. *Proceedings of the Nutrition Society*, 75(3), 247–258. <https://doi.org/10.1017/S002966511600001X>

- Lucas, A., Rock, E., Chamba, J.-F., Verdier-Metz, I., Brachet, P., & Coulon, J.-B. (2006). Respective effects of milk composition and the cheese-making process on cheese compositional variability in components of nutritional interest. *Le Lait*, 86(1), 21–41. <https://doi.org/10.1051/lait:2005042>
- Luchtenberg, M., Maeckelberghe, E., Locock, L., Powell, L., & Verhagen, A. A. E. (2015). Young People's Experiences of Participation in Clinical Trials: Reasons for Taking Part. *The American Journal of Bioethics*, 15(11), 3–13. <https://doi.org/10.1080/15265161.2015.1088974>
- Ma, R., & Allen, D. G. (2009). Recruiting across cultures: A value-based model of recruitment. *Human Resource Management Review*, 19(4), 334–346. <https://doi.org/10.1016/j.hrmr.2009.03.001>
- Macht, M. (1999). Characteristics of Eating in Anger, Fear, Sadness and Joy. *Appetite*, 33(1), 129–139. <https://doi.org/10.1006/appe.1999.0236>
- Mahi, T. E. (2013). Food customs and cultural taboos. *Sudanese Journal of Paediatrics*, 13(1), 90–95.
- Manohar, S., Rehman, V., & Sivakumaran, B. (2021). Role of unfamiliarity and information on consumers' willingness to try new healthy foods. *Food Quality and Preference*, 87, 104037. <https://doi.org/10.1016/j.foodqual.2020.104037>
- Marco, M. L., Heeney, D., Binda, S., Cifelli, C. J., Cotter, P. D., Foligné, B., Gänzle, M., Kort, R., Pasin, G., Pihlanto, A., Smid, E. J., & Hutkins, R. (2017). Health benefits of fermented foods: Microbiota and beyond. *Current Opinion in Biotechnology*, 44, 94–102. <https://doi.org/10.1016/j.copbio.2016.11.010>
- Markovic, M., Soldatovic, I., Bjekic, M., & Sipetic-Grujicic, S. (2019). Adolescents' self perceived acne-related beliefs: From myth to science. *Anais Brasileiros de Dermatologia*, 94(6), 684–690. <https://doi.org/10.1016/j.abd.2019.02.005>
- Martinho, V. J. P. D. (2020). Food Marketing as a Special Ingredient in Consumer Choices: The Main Insights from Existing Literature. *Foods*, 9(11), 1651. <https://doi.org/10.3390/foods9111651>
- McCann, S., Campbell, M., & Entwistle, V. (2013). Recruitment to clinical trials: A meta-ethnographic synthesis of studies of reasons for participation. *Journal of Health Services Research & Policy*, 18(4), 233–241. <https://doi.org/10.1177/1355819613483126>

- McCann, S., Campbell, M. K., & Entwistle, V. A. (2010). Reasons for participating in randomised controlled trials: Conditional altruism and considerations for self. *Trials*, 11(1), 31. <https://doi.org/10.1186/1745-6215-11-31>
- McCarthy, K. S., Parker, M., Ameerally, A., Drake, S. L., & Drake, M. A. (2017). Drivers of choice for fluid milk versus plant-based alternatives: What are consumer perceptions of fluid milk? *Journal of Dairy Science*, 100(8), 6125–6138. <https://doi.org/10.3168/jds.2016-12519>
- Mead, M. (1943). The Factor of Food Habits. *The ANNALS of the American Academy of Political and Social Science*, 225(1), 136–141. <https://doi.org/10.1177/000271624322500144>
- Merlino, V. M., Renna, M., Nery, J., Muresu, A., Ricci, A., Maggiolino, A., Celano, G., De Ruggieri, B., & Tarantola, M. (2022). Are Local Dairy Products Better? Using Principal Component Analysis to Investigate Consumers' Perception towards Quality, Sustainability, and Market Availability. *Animals*, 12(11), 1421. <https://doi.org/10.3390/ani12111421>
- Merriam-Webster. (2025). Dairy. In *Merriam-Webster*. <https://www.merriam-webster.com/dictionary/dairy>
- Merz, B., Temme, E., Alexiou, H., Beulens, J. W. J., Buyken, A. E., Bohn, T., Ducrot, P., Falquet, M.-N., Solano, M. G., Haidar, H., Infanger, E., Kühnelt, C., Rodríguez-Artalejo, F., Sarda, B., Steenbergen, E., Vandevijvere, S., & Julia, C. (2024). Nutri-Score 2023 update. *Nature Food*, 5(2), 102–110. <https://doi.org/10.1038/s43016-024-00920-3>
- Michaud, C., Baudier, F., Guilbert, P., Carel, D., Le Bihan, G., Gautier, A., & Delamaire, C. (2004). Les repas des français: Résultats du baromètre santé nutrition 2002. *Cahiers de Nutrition et de Diététique*, 39(3), 203–209. [https://doi.org/10.1016/S0007-9960\(04\)94454-9](https://doi.org/10.1016/S0007-9960(04)94454-9)
- Michels, N., De Henauw, S., Beghin, L., Cuenca-García, M., Gonzalez-Gross, M., Hallstrom, L., Kafatos, A., Kersting, M., Manios, Y., Marcos, A., Molnar, D., Roccald, R., Santaliestra-Pasías, A. M., Sjöström, M., Reye, B., Thielecke, F., Widhalm, K., & Claessens, M. (2016). Ready-to-eat cereals improve nutrient, milk and fruit intake at breakfast in European adolescents. *European Journal of Nutrition*, 55(2), 771–779. <https://doi.org/10.1007/s00394-015-0898-x>

- Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 42. <https://doi.org/10.1186/1748-5908-6-42>
- Milani, F. X., Nutter, D., & Thoma, G. (2011). Invited review: Environmental impacts of dairy processing and products: A review. *Journal of Dairy Science*, 94(9), 4243–4254. <https://doi.org/10.3168/jds.2010-3955>
- Ministère des solidarités et de la santé. (2016). *Actualisation des repères du PNNS : révision des repères de consommations alimentaires*. Ministère du travail, de la santé, des solidarités et de famille, France.
- Ministère des solidarités et de la santé. (2018). *Programme National Nutrition Santé (PNNS) 2019-2023* (p. 94).
- Ministère des solidarités et de la santé. (2019). *Programme National Nutrition Santé 2019-2023 (PNNS4), Annexe 4* (p. 86). Ministère du travail, de la santé, des solidarités et de famille, France.
- Ministère du travail, de la santé, des solidarités et de famille, France. (2025, February). *Programme national nutrition santé (PNNS)—Professionnels*. <https://sante.gouv.fr/prevention-en-sante/preserver-sa-sante/le-programme-national-nutrition-sante/article/programme-national-nutrition-sante-pnns-professionnels>
- Mintz, S. W., & Du Bois, C. M. (2002). The Anthropology of Food and Eating. *Annual Review of Anthropology*, 31(1), 99–119. <https://doi.org/10.1146/annurev.anthro.32.032702.131011>
- Moffitt, T. E., Belsky, D. W., Danese, A., Poulton, R., & Caspi, A. (2017). The Longitudinal Study of Aging in Human Young Adults: Knowledge Gaps and Research Agenda. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 72(2), 210–215. <https://doi.org/10.1093/gerona/glw191>

- Morelli, N., & Vitale, T. (2020). Take politics off the table: A study of Italian youth's self-managed dairy restriction and healthy consumerism. *Social Science Information*, 59(4), 679–703.
<https://doi.org/10.1177/0539018420973596>
- Moubarac, J.-C., Parra, D. C., Cannon, G., & Monteiro, C. A. (2014). Food Classification Systems Based on Food Processing: Significance and Implications for Policies and Actions: A Systematic Literature Review and Assessment. *Current Obesity Reports*, 3(2), 256–272.
<https://doi.org/10.1007/s13679-014-0092-0>
- Mozaffarian, D. (2019). Dairy Foods, Obesity, and Metabolic Health: The Role of the Food Matrix Compared with Single Nutrients. *Advances in Nutrition*, 10(5), 917S-923S.
<https://doi.org/10.1093/advances/nmz053>
- Mulet-Cabero, A.-I., Torres-Gonzalez, M., Geurts, J., Rosales, A., Farhang, B., Marmonier, C., Ulleberg, E. K., Hocking, E., Neiderer, I., Gandolfi, I., Anderson, L., Brader, L., Vermaak, M., Cameron, M., Myrup Christensen, M., Haryono, R., & Peters, S. (2024). The Dairy Matrix: Its Importance, Definition, and Current Application in the Context of Nutrition and Health. *Nutrients*, 16(17), 2908. <https://doi.org/10.3390/nu16172908>
- Murphy, M., Cowan, C., Meehan, H., & O'Reilly, S. (2004). A conjoint analysis of Irish consumer preferences for farmhouse cheese. *British Food Journal*, 106(4), 288–300.
<https://doi.org/10.1108/00070700410529555>
- Narvhus, J. A., & Abrahamsen, R. K. (2023). Traditional and modern Nordic fermented milk products: A review. *International Dairy Journal*, 142, 105641. <https://doi.org/10.1016/j.idairyj.2023.105641>
- Naspetti, S., Mandolesi, S., Buysse, J., Latvala, T., Nicholas, P., Padel, S., Van Loo, E. J., & Zanolli, R. (2021). Consumer perception of sustainable practices in dairy production. *Agricultural and Food Economics*, 9(1), 1. <https://doi.org/10.1186/s40100-020-00175-z>
- Nelson, D. W., & Baumgarte, R. (2004). Cross-Cultural Misunderstandings Reduce Empathic Responding¹. *Journal of Applied Social Psychology*, 34(2), 391–401.
<https://doi.org/10.1111/j.1559-1816.2004.tb02553.x>

- Ng, S. W., Ni Mhurchu, C., Jebb, S. A., & Popkin, B. M. (2012). Patterns and trends of beverage consumption among children and adults in Great Britain, 1986–2009. *British Journal of Nutrition*, 108(3), 536–551. <https://doi.org/10.1017/S0007114511006465>
- Niehoff, A. H. (1965). Food Habits and the Introduction of New Foods. *Journal of the Washington Academy of Sciences*, 30–37.
- Nolan-Clark, D. J., Neale, E. P., Probst, Y. C., Charlton, K. E., & Tapsell, L. C. (2011). Consumers' salient beliefs regarding dairy products in the functional food era: A qualitative study using concepts from the theory of planned behaviour. *BMC Public Health*, 11(1), 843. <https://doi.org/10.1186/1471-2458-11-843>
- OECD/FAO. (2024). Dairy and dairy products. In *OECD-FAO Agricultural Outlook 2024-2033*. OECD Agriculture statistics (database). (pp. 178–190).
- Ohlan, R. (2014). Growth and instability in dairy production and trade: A global analysis. *International Journal of Trade and Global Markets*, 7(2), 145. <https://doi.org/10.1504/IJTGM.2014.062856>
- Ojeda, M., Etaio, I., Valentin, D., Dacremont, C., Zannoni, M., Tupasela, T., Lilleberg, L., & Pérez-Elortondo, F. J. (2021). Effect of consumers' origin on perceived sensory quality, liking and liking drivers: A cross-cultural study on European cheeses. *Food Quality and Preference*, 87, 104047. <https://doi.org/10.1016/j.foodqual.2020.104047>
- Oostenbach, L. H., Slits, E., Robinson, E., & Sacks, G. (2019). Systematic review of the impact of nutrition claims related to fat, sugar and energy content on food choices and energy intake. *BMC Public Health*, 19(1), 1296. <https://doi.org/10.1186/s12889-019-7622-3>
- Our World in Data. (2025). “Yearly per capita supply of milk—Excluding butter” [dataset]. Food and Agriculture Organization of the United Nations, “Food Balances: Food Balances (-2013, old methodology and population)”; Food and Agriculture Organization of the United Nations, “Food Balances: Food Balances (2010-)” [original data]. Ourworldindata.Org. <https://archive.ourworldindata.org/20250801-120058/grapher/per-capita-milk-consumption.html>

- Oxford Learner's Dictionary of Academic English. (2024). Dairy. In *Oxford Learner's Dictionary of Academic English*. https://www.oxfordlearnersdictionaries.com/definition/english/dairy_1
- Ozdogan, Y., Yardimci, H., & Ozcelik, A. O. (2017). Young adults' milk consumption habits and knowledge about milk. *Studies on Ethno-Medicine*, 11(1), 106–113.
<https://doi.org/10.1080/09735070.2017.1311699>
- Palacios, O. M., Badran, J., Drake, M. A., Reisner, M., & Moskowitz, H. R. (2009). Consumer acceptance of cow's milk versus soy beverages: Impact of ethnicity, lactose tolerance and sensory preference segmentation. *Journal of Sensory Studies*, 24(5), 731–748.
<https://doi.org/10.1111/j.1745-459X.2009.00236.x>
- Parshetty, H., Palimkar, L., & Emandi, R. (2024). Customer Targeting and Segmentation. In *Predictive Analytics and Generative AI for Data-Driven Marketing Strategies* (1st Edition). Chapman and Hall/CRC.
- Pattisson, N., & Lindgreen, A. (2004). Successes and failures in the dairy industry: South west England and north west France. *British Food Journal*, 106(6), 422–435.
<https://doi.org/10.1108/00070700410539743>
- Paul, A. A., Kumar, S., Kumar, V., & Sharma, R. (2020). Milk Analog: Plant based alternatives to conventional milk, production, potential and health concerns. *Critical Reviews in Food Science and Nutrition*, 60(18), 3005–3023. <https://doi.org/10.1080/10408398.2019.1674243>
- Peacock, C., & Sherman, D. M. (2010). Sustainable goat production—Some global perspectives. *Small Ruminant Research*, 89(2–3), 70–80. <https://doi.org/10.1016/j.smallrumres.2009.12.029>
- Pei, R., Martin, D. A., DiMarco, D. M., & Bolling, B. W. (2017). Evidence for the effects of yogurt on gut health and obesity. *Critical Reviews in Food Science and Nutrition*, 57(8), 1569–1583.
<https://doi.org/10.1080/10408398.2014.883356>
- Pendergast, F. J., Livingstone, K. M., Worsley, A., & McNaughton, S. A. (2016). Correlates of meal skipping in young adults: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 13(125), 15. <https://doi.org/10.1186/s12966-016-0451-1>

- Perkmann, M., & Walsh, K. (2007). University–industry relationships and open innovation: Towards a research agenda. *International Journal of Management Reviews*, 9(4), 259–280.
<https://doi.org/10.1111/j.1468-2370.2007.00225.x>
- Pettinger, C., Holdsworth, M., & Gerber, M. (2006). Meal patterns and cooking practices in Southern France and Central England. *Public Health Nutrition*, 9(8), 1020–1026.
<https://doi.org/10.1017/PHN2006945>
- Phillips, S. M., Fulgoni, V. L., Heaney, R. P., Nicklas, T. A., Slavin, J. L., & Weaver, C. M. (2015). Commonly consumed protein foods contribute to nutrient intake, diet quality, and nutrient adequacy. *The American Journal of Clinical Nutrition*, 101(6), 1346S–1352S.
<https://doi.org/10.3945/ajcn.114.084079>
- Pieniak, Z., Verbeke, W., Vanhonacker, F., Guerrero, L., & Hersleth, M. (2009). Association between traditional food consumption and motives for food choice in six European countries. *Appetite*, 53(1), 101–108. <https://doi.org/10.1016/j.appet.2009.05.019>
- Piqueras-Fiszman, B., & Jaeger, S. R. (2016). The Incidental Influence of Memories of Past Eating Occasions on Consumers' Emotional Responses to Food and Food-Related Behaviors. *Frontiers in Psychology*, 7. <https://doi.org/10.3389/fpsyg.2016.00943>
- Pirisi, A., Comunian, R., Urgeghe, P. P., & Scintu, M. F. (2011). Sheep's and goat's dairy products in Italy: Technological, chemical, microbiological, and sensory aspects. *Small Ruminant Research*, 101(1–3), 102–112. <https://doi.org/10.1016/j.smallrumres.2011.09.030>
- Poobalan, A. S., Aucott, L. S., Clarke, A., & Smith, W. C. S. (2014). Diet behaviour among young people in transition to adulthood (18–25 year olds): A mixed method study. *Health Psychology and Behavioral Medicine*, 2(1), 909–928. <https://doi.org/10.1080/21642850.2014.931232>
- Poongothai, S., Anjana, R. M., Aarthy, R., Unnikrishnan, R., Venkat Narayan, K. M., Ali, M. K., Karkuzhali, K., & Mohan, V. (2023). Strategies for participant retention in long term clinical trials: A participant –centric approaches. *Perspectives in Clinical Research*, 14(1), 3–9.
https://doi.org/10.4103/picr.picr_161_21

- Poulain, J. P. (2002). The contemporary diet in France: “De-structuration” or from commensalism to “vagabond feeding”. *Appetite*, 39(1), 43–55. <https://doi.org/10.1006/appe.2001.0461>
- Prättälä, R. (1989). Teenage meal patterns and food choices in a Finnish city. *Ecology of Food and Nutrition*, 22(4), 285–295. <https://doi.org/10.1080/03670244.1989.9991077>
- Prentice, A. M. (2014). Dairy products in global public health. *The American Journal of Clinical Nutrition*, 99(5), 1212S–1216S. <https://doi.org/10.3945/ajcn.113.073437>
- Public Health England. (2016). *The Eatwell Guide* (p. 12).
- Pulina, G., Milán, M. J., Lavín, M. P., Theodoridis, A., Morin, E., Capote, J., Thomas, D. L., Francesconi, A. H. D., & Caja, G. (2018). Invited review: Current production trends, farm structures, and economics of the dairy sheep and goat sectors. *Journal of Dairy Science*, 101(8), 6715–6729. <https://doi.org/10.3168/jds.2017-14015>
- Purdue-Smithe, A. C., Whitcomb, B. W., Szegda, K. L., Boutot, M. E., Manson, J. E., Hankinson, S. E., Rosner, B. A., Troy, L. M., Michels, K. B., & Bertone-Johnson, E. R. (2017). Vitamin D and calcium intake and risk of early menopause. *The American Journal of Clinical Nutrition*, 105(6), 1493–1501. <https://doi.org/10.3945/ajcn.116.145607>
- Quay, T. A., Frimer, L., Janssen, P. A., & Lamers, Y. (2017). Barriers and facilitators to recruitment of South Asians to health research: A scoping review. *BMJ Open*, 7(5), e014889. <https://doi.org/10.1136/bmjopen-2016-014889>
- Rabiei, S., Zahedi, M., Abtahi, M., Doustmohammadian, A., Dadkhah, M., Zoghi, T., Shariat Zadeh, N., Khosroushahi, I., & Hajigholam-saryazdi, M. (2021). Consumption of milk and dairy products in Iranian population; barriers and facilitators. *Clinical Nutrition Open Science*, 38, 1–23. <https://doi.org/10.1016/j.nutos.2021.05.002>
- Racey, M., Bransfield, J., Capello, K., Field, D., Kulak, V., Machmueller, D., Preyde, M., & Newton, G. (2017). Barriers and Facilitators to Intake of Dairy Products in Adolescent Males and Females With Different Levels of Habitual Intake. *Global Pediatric Health*, 4, 2333794X1769422. <https://doi.org/10.1177/2333794X17694227>

- Rahman, M., Aydin, E., Haffar, M., & Nwagbara, U. (2022). The role of social media in e-recruitment process: Empirical evidence from developing countries in social network theory. *Journal of Enterprise Information Management*, 35(6), 1697–1718. <https://doi.org/10.1108/JEIM-12-2019-0382>
- Rappoport, L. (2003). *How we eat. Appetite, culture, and psychology of food*. (ECW Press, Vol. 1). https://books.google.it/books?hl=it&lr=&id=srj_y0b8Mh8C&oi=fnd&pg=PT12&dq=eating+culture+how+long&ots=vBT4QGuDE7&sig=1zhwp9AEtbNI76mCuwuDcmRRwfU&redir_esc=y#v=onepage&q=eating%20culture%20how%20long&f=false
- Rashidinejad, A., Bremer, P., Birch, J., & Oey, I. (2017). Nutrients in Cheese and Their Effect on Health and Disease. In *Nutrients in Dairy and their Implications on Health and Disease* (pp. 177–192). Elsevier. <https://doi.org/10.1016/B978-0-12-809762-5.00014-0>
- Raskind, I. G., Shelton, R. C., Comeau, D. L., Cooper, H. L. F., Griffith, D. M., & Kegler, M. C. (2019). A Review of Qualitative Data Analysis Practices in Health Education and Health Behavior Research. *Health Education & Behavior*, 46(1), 32–39. <https://doi.org/10.1177/1090198118795019>
- Rauber, F., Martins, C. A., Azeredo, C. M., Leffa, P. S., Louzada, M. L. C., & Levy, R. B. (2022). Eating context and ultraprocessed food consumption among UK adolescents. *British Journal of Nutrition*, 127(1), 112–122. <https://doi.org/10.1017/S0007114521000854>
- Raynal-Ljutovac, K., Lagriffoul, G., Paccard, P., Guillet, I., & Chilliard, Y. (2008). Composition of goat and sheep milk products: An update. *Small Ruminant Research*, 79(1), 57–72. <https://doi.org/10.1016/j.smallrumres.2008.07.009>
- R.E. Cotton, D., & Alcock, I. (2013). Commitment to environmental sustainability in the UK student population. *Studies in Higher Education*, 38(10), 1457–1471. <https://doi.org/10.1080/03075079.2011.627423>

- Recio-Román, A., Recio-Menéndez, M., & Román-González, M. V. (2020). Food Reward and Food Choice. An Inquiry Through The Liking and Wanting Model. *Nutrients*, 12(3), 639. <https://doi.org/10.3390/nu12030639>
- Reddy, G., & van Dam, R. M. (2020). Food, culture, and identity in multicultural societies: Insights from Singapore. *Appetite*, 149, 104633. <https://doi.org/10.1016/j.appet.2020.104633>
- Reicks, M., Kocher, M., & Reeder, J. (2018). Impact of Cooking and Home Food Preparation Interventions Among Adults: A Systematic Review (2011–2016). *Journal of Nutrition Education and Behavior*, 50(2), 148-172.e1. <https://doi.org/10.1016/j.jneb.2017.08.004>
- Reynolds, C. (2018). *The role of portion size, pack size, and packaging in sustainable healthy food consumption and food waste reduction*. <https://doi.org/10.13140/RG.2.2.15401.29284>
- Reynolds, C. J., Horgan, G. W., Whybrow, S., & Macdiarmid, J. I. (2019). Healthy and sustainable diets that meet greenhouse gas emission reduction targets and are affordable for different income groups in the UK. *Public Health Nutrition*, 22(8), 1503–1517. <https://doi.org/10.1017/S1368980018003774>
- Ripley, E. B. D. (2006). A Review of Paying Research Participants: It's Time to Move beyond the Ethical Debate. *Journal of Empirical Research on Human Research Ethics*, 9–20.
- Rizzoli, R. (2014). Dairy products, yogurts, and bone health. *The American Journal of Clinical Nutrition*, 99(5), S1256–S1262. <https://doi.org/10.3945/ajcn.113.073056>
- Rogers, H. L., Pablo Hernando, S., Núñez - Fernández, S., Sanchez, A., Martos, C., Moreno, M., & Grandes, G. (2021). Barriers and facilitators in the implementation of an evidence-based health promotion intervention in a primary care setting: A qualitative study. *Journal of Health Organization and Management*, 35(9), 349–367. <https://doi.org/10.1108/JHOM-12-2020-0512>
- Ronto, R., Saber, G., Carins, J., Papier, K., & Fox, E. (2022). Exploring young Australians' understanding of sustainable and healthy diets: A qualitative study. *Public Health Nutrition*, 25(10), 2957–2969. <https://doi.org/10.1017/S1368980022001513>

- Rouf, A., Clayton, S., & Allman-Farinelli, M. (2019). The barriers and enablers to achieving adequate calcium intake in young adults: A qualitative study using focus groups. *Journal of Human Nutrition and Dietetics*, 32(4), 443–454. <https://doi.org/10.1111/jhn.12653>
- Rouf, A. S., Grech, A., & Allman-Farinelli, M. (2018). Assessing the efficacy and external validity of interventions promoting calcium or dairy intake in young adults: A systematic review with meta-analysis. *Critical Reviews in Food Science and Nutrition*, 58(15), 2600–2616. <https://doi.org/10.1080/10408398.2017.1336508>
- Roy, B. D. (2008). Milk: The new sports drink? A Review. *Journal of the International Society of Sports Nutrition*, 5(1), 15. <https://doi.org/10.1186/1550-2783-5-15>
- Rozenberg, S., Body, J.-J., Bruyère, O., Bergmann, P., Brandi, M. L., Cooper, C., Devogelaer, J.-P., Gielen, E., Goemaere, S., Kaufman, J.-M., Rizzoli, R., & Reginster, J.-Y. (2016). Effects of Dairy Products Consumption on Health: Benefits and Beliefs—A Commentary from the Belgian Bone Club and the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases. *Calcified Tissue International*, 98(1), 1–17. <https://doi.org/10.1007/s00223-015-0062-x>
- Rozin, P. (2005). The Meaning of Food in Our Lives: A Cross-Cultural Perspective on Eating and Well-Being. *Journal of Nutrition Education and Behavior*, 37, S107–S112. [https://doi.org/10.1016/S1499-4046\(06\)60209-1](https://doi.org/10.1016/S1499-4046(06)60209-1)
- Rozin, P., Kurzer, N., & Cohen, A. B. (2002). Free associations to “food:” the effects of gender, generation, and culture. *Journal of Research in Personality*, 36(5), 419–441. [https://doi.org/10.1016/S0092-6566\(02\)00002-8](https://doi.org/10.1016/S0092-6566(02)00002-8)
- Rubio-Martín, E., García-Escobar, E., Ruiz De Adana, M.-S., Lima-Rubio, F., Peláez, L., Caracuel, A.-M., Bermúdez-Silva, F.-J., Soriguer, F., Rojo-Martínez, G., & Oliveira, G. (2017). Comparison of the Effects of Goat Dairy and Cow Dairy Based Breakfasts on Satiety, Appetite Hormones, and Metabolic Profile. *Nutrients*, 9(8), 877. <https://doi.org/10.3390/nu9080877>

- Russell, M. L., Moralejo, D. G., & Burgess, E. D. (2000). Paying research subjects: Participants' perspectives. *Journal of Medical Ethics*, 26, 126–130.
- Sadler, C. R., Grassby, T., Hart, K., Raats, M., Sokolović, M., & Timotijevic, L. (2021). Processed food classification: Conceptualisation and challenges. *Trends in Food Science & Technology*, 112, 149–162. <https://doi.org/10.1016/j.tifs.2021.02.059>
- Saint-Eve, A., Leclercq, H., Berthelo, S., Saulnier, B., Oettgen, W., & Delarue, J. (2016). How much sugar do consumers add to plain yogurts? Insights from a study examining French consumer behavior and self-reported habits. *Appetite*, 99, 277–284. <https://doi.org/10.1016/j.appet.2016.01.032>
- Sanchez-Villegas, A., Martínez, J. A., Prättälä, R., Toledo, E., Roos, G., Martínez-González, M. A., & for the FAIR-97-3096 group. (2003). A systematic review of socioeconomic differences in food habits in Europe: Consumption of cheese and milk. *European Journal of Clinical Nutrition*, 57(8), 917–929. <https://doi.org/10.1038/sj.ejcn.1601626>
- Sandström, V., Valin, H., Krisztin, T., Havlík, P., Herrero, M., & Kastner, T. (2018). The role of trade in the greenhouse gas footprints of EU diets. *Global Food Security*, 19, 48–55. <https://doi.org/10.1016/j.gfs.2018.08.007>
- Santé publique France. (2019a). *Programme National Nutrition Santé, 2019-2023*.
- Santé publique France. (2019b). *Recommandations sur l'alimentation, l'activité physique & la sédentarité pour les adultes* (p. 20).
- Sardar, S., & Vijay, T. S. (2025). Social Media Influencers and Purchase Intention: A Review and Research Agenda. *International Journal of Consumer Studies*, 49(3), e70046. <https://doi.org/10.1111/ijcs.70046>
- Sari Agricultural Sciences and Natural Resources University, Iran, Kaliji, S. A., Mojaverian, S. M., Sari Agricultural Sciences and Natural Resources University, Iran, Amirnejad, H., Sari Agricultural Sciences and Natural Resources University, Iran, Canavari, M., & Alma Mater Studiorum University of Bologna, Italy. (2019). Factors Affecting Consumers' Dairy Products Preferences.

Agris On-Line Papers in Economics and Informatics, 11(2), 3–11.

<https://doi.org/10.7160/aol.2019.110201>

Savaiano, D. A., & Hutkins, R. W. (2021). Yogurt, cultured fermented milk, and health: A systematic review. *Nutrition Reviews*, 79(5), 599–614. <https://doi.org/10.1093/nutrit/nuaa013>

Scarpi, P. (2005). *Il senso del cibo. Mondo antico e riflessi contemporanei*. Sellerio Editore.

Schiano, A. N., Harwood, W. S., Gerard, P. D., & Drake, M. A. (2020). Consumer perception of the sustainability of dairy products and plant-based dairy alternatives. *Journal of Dairy Science*, 103(12), 11228–11243. <https://doi.org/10.3168/jds.2020-18406>

Scholz-Ahrens, K. E., Ahrens, F., & Barth, C. A. (2020). Nutritional and health attributes of milk and milk imitations. *European Journal of Nutrition*, 59(1), 19–34. <https://doi.org/10.1007/s00394-019-01936-3>

Schwedhelm, C., Iqbal, K., Knüppel, S., Schwingshackl, L., & Boeing, H. (2018). Contribution to the understanding of how principal component analysis–derived dietary patterns emerge from habitual data on food consumption. *The American Journal of Clinical Nutrition*, 107(2), 227–235. <https://doi.org/10.1093/ajcn/nqx027>

Šedík, P., Horská, E., Predanócyová, K., Grunert, K. G., Hudecová, M., & Nagyová, L. (2023). Consumption Trends and Perspectives for Milk and Dairy Products in Slovakia. *Journal of International Food & Agribusiness Marketing*, 1–23. <https://doi.org/10.1080/08974438.2023.2275560>

Seeley, A., Wu, M., & Caraher, M. (2010). Should we teach cooking in schools? A systematic review of the literature of school-based cooking interventions. *Journal of the HEIA*, 17(1), 11.

Shekriladze, I., Javakhishvili, N., & Tchanturia, K. (2019). Culture Change and Eating Patterns: A Study of Georgian Women. *Frontiers in Psychiatry*, 10, 619. <https://doi.org/10.3389/fpsyt.2019.00619>

Shin, T., Davison, M. L., & Long, J. D. (2017). Maximum likelihood versus multiple imputation for missing data in small longitudinal samples with nonnormality. *Psychological Methods*, 22(3), 426–449. <https://doi.org/10.1037/met0000094>

- Shrestha, N. (2021). Factor Analysis as a Tool for Survey Analysis. *American Journal of Applied Mathematics and Statistics*, 9(1), 4–11. <https://doi.org/10.12691/ajams-9-1-2>
- Siegrist, M., Hartmann, C., & Keller, C. (2013). Antecedents of food neophobia and its association with eating behavior and food choices. *Food Quality and Preference*, 30(2), 293–298. <https://doi.org/10.1016/j.foodqual.2013.06.013>
- Silanikove, N., Leitner, G., & Merin, U. (2015). The Interrelationships between Lactose Intolerance and the Modern Dairy Industry: Global Perspectives in Evolutional and Historical Backgrounds. *Nutrients*, 7(9), 7312–7331. <https://doi.org/10.3390/nu7095340>
- Sinclair, M., Combet, E., Davis, T., & Papies, E. K. (2025). Sustainability in food-based dietary guidelines: A review of recommendations around meat and dairy consumption and their visual representation. *Annals of Medicine*, 57(1), 2470252. <https://doi.org/10.1080/07853890.2025.2470252>
- Sipple, L. R., Barbano, D. M., & Drake, M. (2020). Invited review: Maintaining and growing fluid milk consumption by children in school lunch programs in the United States. *Journal of Dairy Science*, 103(9), 7639–7654. <https://doi.org/10.3168/jds.2020-18216>
- Sluijs, I., Forouhi, N. G., Beulens, J. W., van der Schouw, Y. T., Agnoli, C., Arriola, L., Balkau, B., Barricarte, A., Boeing, H., Bueno-de-Mesquita, H. B., Clavel-Chapelon, F., Crowe, F. L., de Lauzon-Guillain, B., Drogan, D., Franks, P. W., Gavrila, D., Gonzalez, C., Halkjær, J., Kaaks, R., ... Wareham, N. J. (2012). The amount and type of dairy product intake and incident type 2 diabetes: Results from the EPIC-InterAct Study. *The American Journal of Clinical Nutrition*, 96(2), 382–390. <https://doi.org/10.3945/ajcn.111.021907>
- Smith, N. W., Fletcher, A. J., Hill, J. P., & McNabb, W. C. (2022). Modeling the Contribution of Milk to Global Nutrition. *Frontiers in Nutrition*, 8, 716100. <https://doi.org/10.3389/fnut.2021.716100>
- Snuggs, S., Clot, S., Lamport, D., Sah, A., Forrest, J., Helme-Guizon, A., Iqbal, Z., Caldara, C., Wilhelm, M.-C., Anin, C., & Vogt, J. (2022). *A mixed-methods approach to understanding barriers and facilitators to healthy eating and exercise from five European countries: Combining*

consumer science, behavioural economics, and psychology [Preprint]. PsyArXiv.

<https://doi.org/10.31234/osf.io/pq4bs>

Sprake, E. F., Russell, J. M., Cecil, J. E., Cooper, R. J., Grabowski, P., Pourshahidi, L. K., & Barker, M.

E. (2018). Dietary patterns of university students in the UK: A cross-sectional study. *Nutrition Journal*, 17(1), 90. <https://doi.org/10.1186/s12937-018-0398-y>

Stewart, H., Dong, D., & Carlson, A. (2012). Is Generational Change Contributing to the Decline in Fluid Milk Consumption? *Journal of Agricultural and Resource Economics*.

Stroud, C., Walker, L. R., Davis, M., & Irwin, C. E. (2015). Investing in the Health and Well-Being of Young Adults. *Journal of Adolescent Health*, 56(2), 127–129.

<https://doi.org/10.1016/j.jadohealth.2014.11.012>

Sullivan, A., Parsons, K., Therrien-Genest, M., & Yerxa, K. (2025). Cooking up Knowledge:

Empowering High School Students Through a Food Literacy Boot Camp. *American Journal of Lifestyle Medicine*, 15598276251319254. <https://doi.org/10.1177/15598276251319254>

Szczepańska, E., Janota, B., Wlazło, M., & Czapla, M. (2021). Eating behaviours, the frequency of consumption of selected food products, and selected elements of lifestyle among young dancers. *Roczniki Państwowego Zakładu Higieny*, 67–76.

<https://doi.org/10.32394/rpzh.2021.0151>

Taherdoost, H. (2022). What are Different Research Approaches? Comprehensive Review of Qualitative, Quantitative, and Mixed Method Research, Their Applications, Types, and Limitations. *Journal of Management Science & Engineering Research*, 5(1), 53–63.

<https://doi.org/10.30564/jmser.v5i1.4538>

Tamime, A. (2002). Fermented milks: A historical food with modern applications—a review. *European Journal of Clinical Nutrition*, 56(S4), S2–S15. <https://doi.org/10.1038/sj.ejcn.1601657>

Tamime, A. Y., & Robinson, R. K. (1988). Fermented milks and their future trends. Part II. Technological aspects. *Journal of Dairy Research*, 55(2), 281–307.

<https://doi.org/10.1017/S002202990002611X>

- Tanaka, K., Miyake, Y., & Sasaki, S. (2010). Intake of dairy products and the prevalence of dental caries in young children. *Journal of Dentistry*, 38(7), 579–583.
<https://doi.org/10.1016/j.jdent.2010.04.009>
- Teclaw, R., Price, M. C., & Osatuke, K. (2012). Demographic Question Placement: Effect on Item Response Rates and Means of a Veterans Health Administration Survey. *Journal of Business and Psychology*, 27(3), 281–290. <https://doi.org/10.1007/s10869-011-9249-y>
- Ternier, S. (2010). Understanding and measuring cooking skills and knowledge as factors influencing convenience food purchases and consumption. *SURG Journal*, 3(2), 69–76.
<https://doi.org/10.21083/surg.v3i2.1122>
- Thorning, T. K., Raben, A., Tholstrup, T., Soedamah-Muthu, S. S., Givens, I., & Astrup, A. (2016). Milk and dairy products: Good or bad for human health? An assessment of the totality of scientific evidence. *Food & Nutrition Research*, 60(1), 32527. <https://doi.org/10.3402/fnr.v60.32527>
- Timon, C. M., O'Connor, A., Bhargava, N., Gibney, E. R., & Feeney, E. L. (2020). Dairy Consumption and Metabolic Health. *Nutrients*, 12(10), 3040. <https://doi.org/10.3390/nu12103040>
- Tomiyama, J. A., Finch, L. E., & Cummings, J. R. (2015). Did That Brownie Do Its Job? Stress, Eating, and the Biobehavioral Effects of Comfort Food. In R. A. Scott & S. M. Kosslyn (A c. Di), *Emerging Trends in the Social and Behavioral Sciences* (1^a ed., pp. 1–15). Wiley.
<https://doi.org/10.1002/9781118900772.etrds0324>
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, 19(6), 349–357. <https://doi.org/10.1093/intqhc/mzm042>
- Topolovec-Vranic, J., & Natarajan, K. (2016). The Use of Social Media in Recruitment for Medical Research Studies: A Scoping Review. *Journal of Medical Internet Research*, 18(11), e286.
<https://doi.org/10.2196/jmir.5698>
- Trichia, E., Luben, R., Khaw, K.-T., Wareham, N. J., Imamura, F., & Forouhi, N. G. (2020). The associations of longitudinal changes in consumption of total and types of dairy products and

markers of metabolic risk and adiposity: Findings from the European Investigation into Cancer and Nutrition (EPIC)–Norfolk study, United Kingdom. *The American Journal of Clinical Nutrition*, 111(5), 1018–1026. <https://doi.org/10.1093/ajcn/nqz335>

Trichopoulos, D., Lagiou, P., & Trichopoulou, A. (2000). Evidence-based nutrition. *Asia Pacific Journal of Clinical Nutrition*, 9(S1). <https://doi.org/10.1046/j.1440-6047.2000.00174.x>

Trichopoulou, A., Soukara, S., & Vasilopoulou, E. (2007). Traditional foods: A science and society perspective. *Trends in Food Science & Technology*, 18(8), 420–427. <https://doi.org/10.1016/j.tifs.2007.03.007>

Tunick, M. H., & Van Hekken, D. L. (2015). Dairy Products and Health: Recent Insights. *Journal of Agricultural and Food Chemistry*, 63(43), 9381–9388. <https://doi.org/10.1021/jf5042454>

Tuorila, H., & Hartmann, C. (2020). Consumer responses to novel and unfamiliar foods. *Current Opinion in Food Science*, 33, 1–8. <https://doi.org/10.1016/j.cofs.2019.09.004>

Uberoi, E. (2021). *UK dairy industry statistics* (No. 2721; p. 16). House of Commons Library. commonslibrary.parliament.uk

U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2020). *Dietary Guidelines for Americans, 2020-2025* (9th edition). [DietaryGuidelines.gov](https://www.dietaryguidelines.gov)

Valli, C., & Traill, W. B. (2005). Culture and food: A model of yoghurt consumption in the EU. *Food Quality and Preference*, 16(4), 291–304. <https://doi.org/10.1016/j.foodqual.2004.05.006>

van de Kamp, M. E., Seves, S. M., & Temme, E. H. M. (2018). Reducing GHG emissions while improving diet quality: Exploring the potential of reduced meat, cheese and alcoholic and soft drinks consumption at specific moments during the day. *BMC Public Health*, 18(1), 264. <https://doi.org/10.1186/s12889-018-5132-3>

Van Selm, M., & Jankowski, N. W. (2006). Conducting Online Surveys. *Quality and Quantity*, 40(3), 435–456. <https://doi.org/10.1007/s11135-005-8081-8>

- Varela, P., Arvisenet, G., Gonera, A., Myhrer, K. S., Fifi, V., & Valentin, D. (2022). Meat replacer? No thanks! The clash between naturalness and processing: An explorative study of the perception of plant-based foods. *Appetite*, 169, 105793. <https://doi.org/10.1016/j.appet.2021.105793>
- Vargas-Bello-Pérez, E., Tajonar, K., Foggi, G., Mele, M., Simitzis, P., Mavrommatis, A., Tsiplakou, E., Habib, Md. R., Gonzalez-Ronquillo, M., & Toro-Mujica, P. (2022). Consumer attitudes toward dairy products from sheep and goats: A cross-continental perspective. *Journal of Dairy Science*, 105(11), 8718–8733. <https://doi.org/10.3168/jds.2022-21894>
- Vasileiou, K., Barnett, J., Thorpe, S., & Young, T. (2018). Characterising and justifying sample size sufficiency in interview-based studies: Systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology*, 18(1), 148. <https://doi.org/10.1186/s12874-018-0594-7>
- Veit, H. Z. (2011). 'So few fat ones grow old': Diet, health, and virtue in the golden age of rising life expectancy. *Endeavour*, 35(2–3), 91–98. <https://doi.org/10.1016/j.endeavour.2011.06.001>
- Verain, M. C. D., Bouwman, E. P., Galama, J., & Reinders, M. J. (2022). Healthy eating strategies: Individually different or context-dependent? *Appetite*, 168, 105759. <https://doi.org/10.1016/j.appet.2021.105759>
- Verplanken, B., & Orbell, S. (2022). Attitudes, Habits, and Behavior Change. *Annual Review of Psychology*, 73(1), 327–352. <https://doi.org/10.1146/annurev-psych-020821-011744>
- Vieux, F., Maillot, M., Marmonier, C., Rouault, A., Perignon, M., & Darmon, N. (2025). Relative environmental impacts and monetary cost of food categories: Functional unit matters. *Ecological Economics*, 234, 108620. <https://doi.org/10.1016/j.ecolecon.2025.108620>
- Visser, M. (2017). *The rituals of dinner. The origin, evolution, eccentricities and meaning of table manners*. (2nd ed.). Penguin Books.
- Wahlqvist, M. L. (2009). Connected Community and Household Food-Based Strategy (CCH-FBS): Its Importance for Health, Food Safety, Sustainability and Security in Diverse Localities. *Ecology of Food and Nutrition*, 48(6), 457–481. <https://doi.org/10.1080/03670240903308596>

- Wallace, T. C., Bailey, R. L., Lappe, J., O'Brien, K. O., Wang, D. D., Sahni, S., & Weaver, C. M. (2021). Dairy intake and bone health across the lifespan: A systematic review and expert narrative. *Critical Reviews in Food Science and Nutrition*, 61(21), 3661–3707. <https://doi.org/10.1080/10408398.2020.1810624>
- Wang, Y., Hill, E. R., Campbell, W. W., & O'Connor, L. E. (2022). Plant- and Animal-Based Protein-Rich Foods and Cardiovascular Health. *Current Atherosclerosis Reports*, 24(4), 197–213. <https://doi.org/10.1007/s11883-022-01003-z>
- Weaver, C. M. (2009). Should dairy be recommended as part of a healthy vegetarian diet? Point. *The American Journal of Clinical Nutrition*, 89(5), 1634S-1637S. <https://doi.org/10.3945/ajcn.2009.26736O>
- Weaver, C. M. (2014). How sound is the science behind the dietary recommendations for dairy? *The American Journal of Clinical Nutrition*, 99(5), 1217S-1222S. <https://doi.org/10.3945/ajcn.113.073007>
- Weltens, N., Zhao, D., & Van Oudenhove, L. (2014). Where is the comfort in comfort foods? Mechanisms linking fat signaling, reward, and emotion. *Neurogastroenterology & Motility*, 26(3), 303–315. <https://doi.org/10.1111/nmo.12309>
- Weltgesundheitsorganisation & FAO (A c. Di). (2011). *Milk and milk products. Second edition.* (2nd ed). Food and Agriculture Organization of the United Nations.
- Williams, V. F., Smith, A. A., Villanti, A. C., Rath, J. M., Hair, E. C., Cantrell, J., Teplitskaya, L., & Vallone, D. M. (2017). Validity of a Subjective Financial Situation Measure to Assess Socioeconomic Status in US Young Adults. *Journal of Public Health Management and Practice*, 23(5), 487–495. <https://doi.org/10.1097/PHH.0000000000000468>
- Winpenny, E. M., Smith, M., Penney, T., Foubister, C., Guagliano, J. M., Love, R., Clifford Astbury, C., Sluijs, E. M. F., & Corder, K. (2020). Changes in physical activity, diet, and body weight across the education and employment transitions of early adulthood: A systematic review and meta-analysis. *Obesity Reviews*, 21(4). <https://doi.org/10.1111/obr.12962>

- Winpenny, E. M., van Sluijs, E. M. F., & Forouhi, N. G. (2021). How do short-term associations between diet quality and metabolic risk vary with age? *European Journal of Nutrition*, 60(1), 517–527. <https://doi.org/10.1007/s00394-020-02266-5>
- Winpenny, E. M., van Sluijs, E. M. F., White, M., Klepp, K.-I., Wold, B., & Lien, N. (2018). Changes in diet through adolescence and early adulthood: Longitudinal trajectories and association with key life transitions. *International Journal of Behavioral Nutrition and Physical Activity*, 15(1), 86. <https://doi.org/10.1186/s12966-018-0719-8>
- Winpenny, E. M., Winkler, M. R., Stochl, J., van Sluijs, E. M. F., Larson, N., & Neumark-Sztainer, D. (2020). Associations of early adulthood life transitions with changes in fast food intake: A latent trajectory analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1), 130. <https://doi.org/10.1186/s12966-020-01024-4>
- Witard, O. C., Devrim-Lanpir, A., McKinley, M. C., & Givens, D. I. (2025). Navigating the protein transition: Why dairy and its matrix matter amid rising plant protein trends. *Nutrition Research Reviews*, 1–13. <https://doi.org/10.1017/S0954422425000101>
- Yackobovitch-Gavan, M., Phillip, M., & Gat-Yablonski, G. (2017). How Milk and Its Proteins Affect Growth, Bone Health, and Weight. *Hormone Research in Paediatrics*, 88(1), 63–69. <https://doi.org/10.1159/000456662>
- Yeung, S. S. Y., Kwan, M., & Woo, J. (2021). Healthy Diet for Healthy Aging. *Nutrients*, 13(12), 4310. <https://doi.org/10.3390/nu13124310>
- Yilmaz, K. (2013). Comparison of Quantitative and Qualitative Research Traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education*, 48(2), 311–325. <https://doi.org/10.1111/ejed.12014>
- Yuzbashian, E., Asghari, G., Mirmiran, P., Chan, C. B., & Azizi, F. (2021). Changes in dairy product consumption and subsequent type 2 diabetes among individuals with prediabetes: Tehran Lipid and Glucose Study. *Nutrition Journal*, 20(1), 88. <https://doi.org/10.1186/s12937-021-00745-x>

Zhou, R. (2025). How UK universities approach sustainability: A timely review. *Journal of Adult and Continuing Education*, 31(1), 54–73. <https://doi.org/10.1177/14779714241240985>

Zingone, F., Bucci, C., Iovino, P., & Ciacchi, C. (2017). Consumption of milk and dairy products: Facts and figures. *Nutrition*, 33, 322–325. <https://doi.org/10.1016/j.nut.2016.07.019>

Appendices

Appendix 2.1. Ethics checklist

About Your Checklist	
Ethics ID	43726
Date Created	01/04/2022 09:47:32
Status	Approved
Date Approved	04/05/2022 08:34:12
Risk	High
Project Details	
Title	Why people do or do not consume dairy? Focus groups to identify reasons and factors that may influence dairy consumption in the UK and in France.
Start Date of Project	01/03/2022
End Date of Project	31/08/2022
Proposed Start Date of Data Collection	19/04/2022
Original Supervisor	Katherine Appleton
Approver	Research Ethics Panel

Appendix 2.2. Information sheet and consent form

Why people do or do not consume dairy? Focus groups to identify reasons and factors that may influence dairy consumption in the UK and in France.

Invitation to take part

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part.

Who is organising/funding the research?

This study is organised by the Bournemouth University, UK, in collaboration with the Institute Paul Bocuse, Lyon, France.

What is the purpose of the project?

Dairy may have an important role in a healthy diet, as it provides calcium, vitamins, minerals and it may be a sustainable alternative to meat, but several factors may influence its consumption, such as availability, price, familiarity to the product, culture, individual preferences. The aim of this project is to identify and explore reasons and factors that may influence dairy consumption in England and France.

Why have I been chosen?

You have been chosen because you are aged between 18 and 30 years old, living in the UK and speaking fluent English.

You cannot take part to this study if you are vegan.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a participant agreement form. We want you to understand what participation involves, before you make a decision on whether to participate.

If you or any family member have an on-going relationship with BU or the research team, e.g. as a member of staff, as student or other service user, your decision on whether to take part (or continue to take part) will not affect this relationship in any way.

Can I change my mind about taking part?

Yes, you can stop participating in study activities at any time before or during the focus group and without giving a reason.

If I change my mind, what happens to my information?

After you decide to withdraw from the study, we will not collect any further information from or about you.

As regards information we have already collected before this point, your rights to access, change or move that information are limited. This is because we need to manage your information in specific ways in order for the research to be reliable and accurate. Further explanation about this is in the Personal Information section below.

What would taking part involve?

During this study, you will be asked to share your opinion about dairy consumption and related topics.

Will I be reimbursed for taking part?

Bournemouth University's Psychology SONA system will be used to recruit first and second-year undergraduate Psychology students who take part in return for research credits. This study takes between 30 and 40 minutes to complete so they will receive 1.5 SONA credits upon completion.

During the study, you will have the possibility to taste English, French and local dairy products. You will be compensated 10£ (or equivalent voucher) for your time.

What are the advantages and possible disadvantages or risks of taking part?

Whilst there are no immediate benefits to you participating in the project, it is hoped that this work will inform future research looking at cross-cultural differences.

Whilst we do not anticipate any risks to you in taking part in this study, there is a possibility some sensitive topics will emerge. The moderator will try to reduce them.

Food will be provided for voluntary consumption. If its consumption may damage your health, please do not consume it.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

During this study, you will be asked to share your opinion about dairy consumption and related topics. Sharing your opinion will help to identify and explore reasons and factors that may influence people to consume or not consume dairy. Moreover, it will help to define similarities and differences in factors that may influence dairy consumption between England and France.

Will I be recorded, and how will the recorded media be used?

The focus group will be recorded. The audio recordings of your activities made during this research will be used only for analysis and the transcription of the recording(s) for illustration in conference presentations and lectures. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings. The collected data will be treated confidentially and anonymised during the transcription process.

How will my information be managed?

Bournemouth University (BU) is the organisation with overall responsibility for this study and the Data Controller of your personal information, which means that we are responsible for looking after your information and using it appropriately. Research is a task that we perform in the public interest, as part of our core function as a university.

Undertaking this research study involves collecting and/or generating information about you. We manage research data strictly in accordance with:

- Ethical requirements; and
- Current data protection laws. These control use of information about identifiable individuals, but do not apply to anonymous research data: "anonymous" means that we have either removed or not collected any pieces of data or links to other data which identify a specific person as the subject or source of a research result.

BU's Research Participant Privacy Notice sets out more information about how we fulfil our responsibilities as a data controller and about your rights as an individual under the data protection legislation. We ask you to read this Notice so that you can fully understand the basis on which we will process your personal information.

Research data will be used only for the purposes of the study or related uses identified in the Privacy Notice or this Information Sheet. To safeguard your rights in relation to your personal information, we will use the minimum personally-identifiable information possible and control access to that data as described below.

Publication

You will not be able to be identified in any external reports or publications about the research without your specific consent. Otherwise your information will only be included in these materials in an anonymous form, i.e. you will not be identifiable.

Research results will be published in a peer-reviewed publication in a psychology or nutrition journal.

Security and access controls

BU will hold the information we collect about you in hard copy in a secure location and on a BU password protected secure network where held electronically.

Personal information which has not been anonymised will be accessed and used only by appropriate, authorised individuals and when this is necessary for the purposes of the research or another purpose identified in the Privacy Notice. This may include giving access to BU staff or others responsible for monitoring and/or audit of the study, who need to ensure that the research is complying with applicable regulations.

The collected data will be treated confidentially and anonymised during the transcription process. All the collected data will be stored confidentially and made available only to researchers related to the study.

Sharing your personal information with third parties

We will not share any personal information to any third parties.

Further use of your information

The information collected about you may be used in an anonymous form to support other research projects in the future and access to it in this form will not be restricted. It will not be possible for you to be identified from this data. To enable this use, anonymised data will be added to BU's online Research Data Repository: this is a central location where data is stored, which is accessible to the public.

Keeping your information if you withdraw from the study

If you withdraw from active participation in the study we will keep information which we have already collected from or about you, if this has on-going relevance or value to the study. This may include your personal identifiable information. As explained above, your legal rights to access, change, delete or move this information are limited as we need to manage your information in specific ways in order for the research to be reliable and accurate. However if you have concerns about how this will affect you personally, you can raise these with the research team when you withdraw from the study.

You can find out more about your rights in relation to your data and how to raise queries or complaints in our Privacy Notice.

Retention of research data

Project governance documentation, including copies of signed participant agreements: we keep this documentation for a long period after completion of the research, so that we have records of how we conducted the research and who took part. The only personal information in this documentation will be your name and signature, and we will not be able to link this to any anonymised research results.

Research results:

As described above, during the course of the study we will anonymise the information we have collected about you as an individual. This means that we will not hold your personal information in identifiable form after we have completed the research activities.

You can find more specific information about retention periods for personal information in our Privacy Notice.

We keep anonymised research data indefinitely, so that it can be used for other research as described above.

Contact for further information

If you have any questions or would like further information, please contact Caterina Franzon, PhD student,

cfranzon@bournemouth.ac.uk Department of Psychology, Room P302, Poole House Bournemouth University

Fern Barrow, Poole, BH12 5BB

Supervisor

Prof. Katherine Appleton k.appleton@bournemouth.ac.uk

Department of Psychology, Poole House

Bournemouth University

Fern Barrow, Poole, BH12 5BB

In case of complaints

Any concerns about the study should be directed to my supervisor Katherine Appleton in the first instance, and if not resolved you can contact Tiantian Zhang, Bournemouth University by email to researchgovernance@bournemouth.ac.uk.

Finally

If you decide to take part, you will be given a copy of the information sheet and a signed participant agreement form to keep.

Thank you for considering taking part in this research project.

Participant Agreement Form

Full title of project: Why people do or do not consume dairy? Focus groups to identify reasons and factors that may influence dairy consumption in the UK and in France. ("the Project")

Name, position and contact details of researcher: Caterina Franzon, PhD, Department of Psychology, Room P302, Poole House, Bournemouth University, Fern Barrow, Poole, BH12 5BB

Name, position and contact details of supervisor: Katherine Appleton, Department of Psychology, Faculty of Science and Technology, Poole House, Bournemouth University, Fern Barrow, Poole, BH12 5BB

Section A: Agreement to participate in the study

You should only agree to participate in the study if you agree with all of the statements in this table and accept that participating will involve the listed activities.

I have read and understood the Participant Information Sheet (FGs_Participant Information Sheet, Ref & Version 2) and have been given access to the BU Research Participant Privacy Notice which sets out how we collect and use personal information (<https://www1.bournemouth.ac.uk/about/governance/access-information/data-protection-privacy>).

I have had an opportunity to ask questions.

I understand that my participation is voluntary. I can stop participating in research activities at any time without giving a reason and I am free to decline to answer any particular question(s).

I understand that taking part in the research will include the following activity/activities as part of the research:

- being audio recorded during the project
- my words will be quoted in publications, reports, web pages and other research outputs, without using my real name.

I understand that, if I withdraw from the study, I will also be able to withdraw my data from further use in the study except where my data has been anonymised (as I cannot be identified) or it will be harmful to the project to have my data removed.

I understand that my data may be included in an anonymised form within a dataset to be archived at BU's Online Research Data Repository.

I understand that my data may be used in an anonymised form by the research team to support other research projects in the future, including future publications, reports or presentations.

Initial box to agree

I consent to take part in the project on the basis set out above (Section A)

Appendix 2.3. Moderator guide

Procedure

At the beginning of each focus group, the moderator welcome participants and explain the study details. They will be asked to sign the consent form. The moderator will explain that the collected data will be treated confidentially and anonymised, stored confidentially and made available only to researchers related to the study.

Participants will be asked to not use their phone during the focus group. If they need to use it, they will be asked to quietly leave the room to not disturb the discussion.

Participants will be asked to introduce themselves sharing one by one their favourite food or last memorable meal, so the moderator will be able to differentiate voices during the verbatim transcription.

During the focus groups, participants will be asked about their dairy consumption and related topics. It may happen that some of participants are less keen to share their opinion, so the moderator will try to involve them more. Also, there will be the possibility some participants are speaking more than others, the moderator will try to balance the discussion and obtain opinions from all participants.

The focus groups will be audio recorded. If they want to, participants will be able to taste French, English. Food will be available to them, but not mandatory. At the end of each focus group the moderator will summarise the covered topics, thank participants and give contact information for any follow-ups.

Please note that the focus groups will be conducted in English in the UK and in French in France.

Sample question guide (UK)

Welcome everyone,

My name is Caterina and I am a PhD student at Bournemouth University.

Before starting, I want to let you know that this focus group will be audio recorded. You can withdraw at any time during the focus group, it will not be possible to withdraw after its end. To take part, please sign now the consent form.

(giving the forms and then collecting them)

I would ask you to not crosstalk. You will all have the opportunity to speak and share your opinion about the topic, so please do not talk all together. Please, feel free to share your opinion. There are no right or wrong answers, and you do not need to agree with others. I would also ask you to not use your phone and turn it on silent mode. If you need to answer, I would ask you to leave the room quietly, to not disturb the discussion. The same when you are coming back. Today we will speak about dairy consumption. This focus group will help us to understand why we should or not consume dairy. You will also be able to taste some French and local cheeses. Before starting, can you tell us what's your favourite food or the last memorable meal you ate?

(participants introducing themselves)

(Milk)

What do you think about milk?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Which kind of milk are you consuming?

What could influence you to change your milk consumption?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

What about sheep's or goat's milk?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

What may lead you to change your sheep's or goat's milk consumption?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

Is there any particular occasion you are consuming milk?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

(Yoghurt)

What do you think about yoghurt?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Which kind of yoghurt are you consuming?

Is there any particular occasion you are consuming yoghurt?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

Are there some factors that may lead you to change your consumption of yoghurt?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

(Dairy to drink)

What about dairy beverages, such as flavoured milk, latte, yoghurt to drink or any other dairy to drink?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Did you ever hear about fermented milk, as kefir? What do you think about it?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Is there any particular occasion you are consuming dairy to drink?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

Are there some factors that may lead you to change your consumption of dairy to drink?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

(Dairy desserts)

What about dairy desserts, as ice-cream, custard, cheesecake, or pudding?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Is there any particular occasion you are consuming dairy desserts?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

What do you think about condensed or evaporated milk, cream or dairy topping cream?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Is there any particular occasion you are consuming these products?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

(Cheese)

What about cheese?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

What kind of cheese are you consuming?

What reasons may lead you to change your cheese consumption?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

What about sheep's or goat's cheese?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

What could lead you to change your consumption of sheep's and goat's cheeses?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

What do you think about soft cheeses, as Camembert or Brie for example?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

What sort of soft cheeses are you consuming?

Are there some reasons that could lead you to change your consumption of soft cheeses?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

What do you think about consuming local cheese?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Why are you choosing a product instead of one other?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Is there any particular occasion you are consuming cheese?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

What about cheese spread?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Is there any particular occasion you are consuming cheese spread?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

Are there some factors that may lead you to change your consumption of cheese spread?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

What do you think about cottage cheese?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Is there any particular occasion you are consuming cottage cheese?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

Are there some factors that may lead you to change your consumption of cottage cheese?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

Have you already tested quark? What do you think about it?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

Is there any particular occasion you are consuming quark?

Expected topics: (meals, habits, special occasions, special recipes, culture/religion)

Are there some factors that may lead you to change your consumption of quark?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

(General)

Does anyone consume organic products?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

What factors may cause you to buy or not organic dairy?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

What about local dairy?

Expected topics: (environment, health, familiarity, price, availability, individual tastes, habits, brand)

What factors may influence your decision to buy or not local products?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

Would you consider consuming dairy as a food alternative? (yes/no)

To which kind of food? Why?

Expected topics: (environment, health, familiarity, price, availability, individual tastes)

Are there some factors may lead you to increase dairy consumption during meals?

Expected topics: (environment, health, price, availability, individual tastes, type of meals, special occasions, special recipes)

And what about decreasing dairy consumption during meals?

Expected topics: (environment, health, price, availability, individual tastes, type of meals, special occasions, special recipes)

(PBDA)

Does anyone consume plant-based dairy? Why?

Expected topics: (environment, health, price, availability, individual tastes, habits, new products/new brands)

If someone is quiet, not speaking: Do you agree or disagree with (name)'s opinion?

If someone is speaking too much: That is a good point (name). Let's hear someone else

Appendix 3.1. Ethics checklist

About Your Checklist	
Ethics ID	46697
Date Created	05/12/2022 15:15:47
Status	Approved
Date Approved	07/12/2022 14:14:42
Risk	High
Project Details	
Title	Why young adults do or do not consume dairy? Online questionnaire to investigate dairy consumption in the UK and in France.
Start Date of Project	16/01/2023
End Date of Project	30/09/2023
Proposed Start Date of Data Collection	16/01/2023
Original Supervisor	Katherine Appleton
Approver	Research Ethics Panel

Appendix 3.2. Information sheet and consent form

Why young adults do or do not consume dairy?

Online questionnaire to investigate dairy consumption in the UK and in France.

What is the purpose of the research/questionnaire?

Dairy consumption is associated with both health and environmental benefits, but in the UK and in France its intake is lower than recommended, particularly for young adults aged 18-30 years old.

The purpose of this study is to explore and investigate frequency, context and mode of consumption, reasons, barriers, and other factors that may lead young adults to consume or not consume dairy products.

The questionnaire will be open for six months and will be available to English and French young adults, respectively in English and French, to identify potential similarities and differences between the two countries.

Why have I been chosen?

You have been chosen to take part in the study because you are aged between 18 and 30 years old, live in the UK and speak English fluently.

For this study, we aim to recruit 100 people every month in the UK and 100 people every month in France for a total of six months.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will have access to this information sheet to read. You can withdraw from participation at any time and without giving a reason, simply by closing the browser page.

Please note that once you have completed and submitted your survey responses, we are unable to remove your anonymised responses from the study.

If you or any family member have an on-going relationship with BU or the research team, e.g., as a member of staff, a student or other service user, your decision on whether to take part will not affect this relationship in any way.

How long will the questionnaire/online survey take to complete?

You will need up to 30 minutes to complete this questionnaire.

Will I be reimbursed for taking part?

Bournemouth University's Psychology SONA system will be used to recruit first and second-year undergraduate Psychology students who take part in return for research credits. This study takes up to 30 minutes to complete so they will receive 0.5 SONA credits upon completion.

As a thank you for completing the survey, at the end of the questionnaire you can decide to provide your details (name, email address) to enter a prize draw for a 1 in 10 chance to win one £10 Amazon voucher (€15 in France). This is not mandatory and will not impact your participation.

The draw is limited to one entry per person and is limited to participants who complete the whole questionnaire appropriately. Prizes will be randomly assigned using an online random selector tool every month, selecting among the participants of the previous month (first draw expected: February 2023; last expected: July 2023). The winners will receive the voucher by email. No alternative prize will be available.

What are the advantages and possible disadvantages or risks of taking part?

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will inform future research looking at dairy consumption and cross-cultural differences.

We do not anticipate any disadvantages or risks to taking part in this survey. Completion of the questionnaire will take a maximum of approximately 30 minutes.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

You will be asked to answer questions about your dairy consumption and related topics. You will also complete a demographic questionnaire.

From your answers, we will be able to better define what may impact dairy consumption in young adults, identify facilitators and barriers to consumption and develop a strategy to improve their diets.

Use of my information

Participation in this study is on the basis of consent: you do not have to complete the survey, and you can change your mind at any point before submitting the survey responses. Once we receive your survey response, your personal information is processed in compliance with data protection legislation. We will use your data on the basis that it is necessary for the conduct of research, which is an activity in the public interest.

Bournemouth University (BU) is a Data Controller of your information which means that we are responsible for looking after your information and using it appropriately. BU's Research Participant Privacy Notice sets out more information about how we fulfil our responsibilities as a data controller and about your rights as an individual under the data protection legislation. We ask you to read this Notice so that you can fully understand the basis on which we will process your information.

Once you have submitted your survey response it may not be possible for us to remove it from the study analysis, as this might affect our ability to complete the research appropriately or the accuracy and reliability of the research findings.

Sharing and further use of your personal information

The data collected in the questionnaire will be treated confidentially and anonymised.

Your details (name, email address) will be used only to enter you in a prize draw. This is not mandatory, and it will not impact your participation. Only BU staff working on the research project will have access to these data. Prizes will be randomly assigned using an online random selector tool every month, selecting among the participants of the previous month.

The information collected about you may be used in an anonymous form to support other research projects in the future and access to it in this form will not be restricted. It will not be possible for you to be identified from these data. Anonymised data will be added to BU's Data Repository (a central location where data is stored) and which will be publicly available.

Retention of your data

The only identifiable information collected from you will be your name and contact email for the prize draw. This is not mandatory; you may choose to not participate in the prize draw. These identifiable data will be used for said purpose only and will be destroyed immediately upon successful contact with and delivery of prizes to winners. Should you withdraw from the prize draw at any time point, your data will be destroyed immediately.

Contact for further information

If you have any questions or would like further information, please contact:

Caterina Franzon, PhD student

cfranzon@bournemouth.ac.uk

Department of Psychology

Room P302, Poole House

Bournemouth University
Fern Barrow, Poole, BH12 5BB
Supervisor
Prof. Katherine Appleton
k.appleton@bournemouth.ac.uk
Department of Psychology
Bournemouth University
Fern Barrow, Poole, BH12 5BB

In case of complaints

Any concerns about the study should be directed to my supervisor Katherine Appleton in the first instance, and if not resolved you can contact Prof. Tiantian Zhang, Deputy Dean for Research & Professional Practice, Faculty of Science & Technology, Bournemouth University by email to researchgovernance@bournemouth.ac.uk.

Consent to Participate

Please indicate that you have read and understood the Participant Information Sheet for this research project and that you consent to take part in this questionnaire before continuing:

- ☐ I have read and understood the Participant Information Sheet and consent to take part in this questionnaire
- ☐ I do not consent to take part in this questionnaire [exit at this point]

Please indicate your agreement for the Research Team to access and use your recorded responses to this questionnaire before continuing:

- ☐ I give permission for members of the Research Team to have access to my anonymised responses. I understand that my anonymised responses may be reproduced in reports, academic publications and presentations but I will not be identified or identifiable.
- ☐ I understand that my data may be included in an anonymised form within a dataset to be archived at BU's Online Research Data Repository.

Appendix 3.3. Questionnaire, English version

Are you fluent in English?

☐ Yes

☐ No

Are you aged between 18 and 30 years old included?

☐ Yes

☐ No

Do you live in the UK?

☐ Yes

☐ No

Are you following one of these diets?

☐ Vegan

(you follow a plant-based diet, not allowing the consumption of animal-based products)

☐ Vegetarian

(you follow a plant-based diet, allowing the consumption of animal-based by-products (e.g., dairy, eggs, honey) but not meat, fish, poultry)

☐ Lacto-vegetarian

(you follow a plant-based diet, allowing the consumption of dairy product, but not meat, fish, poultry, and eggs)

☐ Ovo-vegetarian

(your follow a plant-based diet, allowing the consumption of eggs, but not meat, fish, poultry, and dairy)

☐ Pescatarian

(you follow a vegetarian diet, allowing the consumption of fish, but not red meat or poultry)

☐ Flexitarian

(you follow a plant-based diet, allowing the consumption of animal-based products in moderation)

- ☐ Lactose-free
- ☐ Other (please specify)
- ☐ I do not follow a particular diet

Do you consume dairy?

Please consider ONLY your consumption of animal-based dairy products. DO NOT consider your consumption of plant-based alternatives to dairy.

- ☐ Yes
- ☐ No

If no

Why? Select the three main reasons and order them from 1 = most important, 2 = second most important, 3 = less important.

- ☐ One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
- ☐ It is too processed
- ☐ It is unhealthy
- ☐ Body symptoms occur when I consume it
- ☐ As an adult, I do not need to consume it to be healthy
- ☐ It is not environmentally friendly
- ☐ It is not animal friendly
- ☐ It is not sustainable
- ☐ It doesn't fit my diet
- ☐ I do not enjoy consuming it
- ☐ I prefer to consume other protein-rich foods (meat, eggs, tofu)
- ☐ It is unusual to consume it in my culture
- ☐ The products I like are not available where I shop
- ☐ It cannot be used to replace other products
- ☐ I often waste it
- ☐ It expires too quickly

- ☐ It is too expensive
- ☐ I've never tasted it
- ☐ Other (specify)

If yes

1.1 Do you consume milk?

Please consider ONLY your consumption of animal-based milk. DO NOT consider your consumption of plant-based alternatives to milk.

- ☐ Yes
- ☐ No

If no

Why? Select the three main reasons and order them from 1 = most important to 3 = less important.

- ☐ One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
- ☐ It is too processed
- ☐ It is unhealthy
- ☐ Body symptoms occur when I consume it
- ☐ As an adult, I do not need to consume it to be healthy
- ☐ It is not environmentally friendly
- ☐ It is not animal friendly
- ☐ It is not sustainable
- ☐ It doesn't fit my diet
- ☐ I do not enjoy consuming it
- ☐ I prefer to consume other protein-rich foods (meat, eggs, tofu)
- ☐ It is unusual to consume it in my culture
- ☐ The products I like are not available where I shop
- ☐ It cannot be used to replace other products

- ☐ I often waste it
- ☐ It expires too quickly
- ☐ It is too expensive
- ☐ I've never tasted it
- ☐ Other (specify)

If yes

How often do you consume the following products?

Please consider your consumption in the last 3 months.

	Every day	3-5 times a week	1-2 times a week	1-2 times a fortnight	1-2 times a month	Less than once a month	Never
Whole, full fat cow's milk	☐	☐	☐	☐	☐	☐	☐
Semi- skimmed cow's milk	☐	☐	☐	☐	☐	☐	☐
Skimmed cow's milk	☐	☐	☐	☐	☐	☐	☐
Lactose-free milk	☐	☐	☐	☐	☐	☐	☐
Goat's milk	☐	☐	☐	☐	☐	☐	☐
Sheep's milk	☐	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐	☐

Considering your milk consumption, please select one of the following products that you consume, but do not every day and you may consider consuming more:

- ☐ Whole, full fat cow's milk
- ☐ Semi-skimmed cow's milk
- ☐ Skimmed cow's milk
- ☐ Lactose-free milk
- ☐ Goat's milk
- ☐ Sheep's milk
- ☐ Other (please specify)

Considering the selected product, answer the next question ticking the appropriate box.

I consume this product:

	Every day	3-5 times a week	1-2 times a week	1-2 times a fortnight	1-2 times a month	Less than once a month	Never	N/A
On its own	☐	☐	☐	☐	☐	☐	☐	☐
With coffee, cocoa, or tea	☐	☐	☐	☐	☐	☐	☐	☐
With something else	☐	☐	☐	☐	☐	☐	☐	☐
During a main meal (breakfast, lunch, dinner)	☐	☐	☐	☐	☐	☐	☐	☐
As a snack	☐	☐	☐	☐	☐	☐	☐	☐
Before going to sleep	☐	☐	☐	☐	☐	☐	☐	☐
In cooking	☐	☐	☐	☐	☐	☐	☐	☐
On special occasions	☐	☐	☐	☐	☐	☐	☐	☐
When I am alone	☐	☐	☐	☐	☐	☐	☐	☐
When I am with someone else	☐	☐	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐	☐	☐

Considering the selected product, please indicate how strongly you agree/disagree with each of the following statements in relation to your milk consumption.

	Strongly disagree	Moderately disagree	Neither agree nor disagree	Moderately agree	Strongly agree
I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	☐	☐	☐	☐	☐
One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me	☐	☐	☐	☐	☐
It is natural	☐	☐	☐	☐	☐
It is too processed	☐	☐	☐	☐	☐
Consuming it boosts my health	☐	☐	☐	☐	☐

It is unhealthy	☐	☐	☐	☐	☐
I can consume it on its own, in recipes or in combination with some foods	☐	☐	☐	☐	☐
I cannot use this product in many ways	☐	☐	☐	☐	☐
I like this product	☐	☐	☐	☐	☐
I do not enjoy consuming it	☐	☐	☐	☐	☐
I never experience body symptoms when consuming it	☐	☐	☐	☐	☐
Body symptoms occur when I consume this product	☐	☐	☐	☐	☐
I have always consumed this product	☐	☐	☐	☐	☐
I did not consume it while growing up	☐	☐	☐	☐	☐
It contributes to a balanced diet	☐	☐	☐	☐	☐
As an adult, I do not need to consume it to be healthy	☐	☐	☐	☐	☐
Reducing its consumption will benefit my health	☐	☐	☐	☐	☐
It is environmentally friendly	☐	☐	☐	☐	☐
It is animal friendly	☐	☐	☐	☐	☐
It is not sustainable	☐	☐	☐	☐	☐
Reducing its consumption will benefit the environment	☐	☐	☐	☐	☐
I consume it when I want to treat or reward myself	☐	☐	☐	☐	☐
I would not consume it on special occasions	☐	☐	☐	☐	☐
I would finish a meal with this product	☐	☐	☐	☐	☐
This product is not suitable as the final course of a meal	☐	☐	☐	☐	☐

I consume it because of my family/friends	☐	☐	☐	☐	☐
No one I know consumes this as I do	☐	☐	☐	☐	☐
It is common to consume it in my culture	☐	☐	☐	☐	☐
It is unusual to consume this product in my culture	☐	☐	☐	☐	☐
I consume it because it is a good source of protein	☐	☐	☐	☐	☐
It is a totally different category of food from meat/eggs/tofu	☐	☐	☐	☐	☐
I can find it in the shops	☐	☐	☐	☐	☐
It is not always available where I shop	☐	☐	☐	☐	☐
It is a good replacement for other foods	☐	☐	☐	☐	☐
This cannot be used to replace other products	☐	☐	☐	☐	☐
It is worth the price	☐	☐	☐	☐	☐
It is too expensive	☐	☐	☐	☐	☐
I can consume what I buy within the expiration date	☐	☐	☐	☐	☐
It expires too quickly	☐	☐	☐	☐	☐
I often waste it	☐	☐	☐	☐	☐

1.2 Do you consume yoghurts or other fermented dairy products?

Please consider ONLY your consumption of animal-based products. DO NOT consider your consumption of plant-based alternatives.

In this section, please consider yoghurts, yoghurt-to-drink, fermented milks, kefir, crème fraîche, buttermilk, lait ribot, and other fermented dairy products. Please DO NOT consider your consumption of quark, cottage cheese, sour cream, faisselle, fromage blanc, petit Suisse in this section. Your consumption of these products will be assessed in a different section.

☐ Yes

☐ No

If no

Why? Select the three main reasons and order them from 1 = most important to 3 = less important.

- ☐ One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
- ☐ It is too processed
- ☐ It is unhealthy
- ☐ Body symptoms occur when I consume it
- ☐ As an adult, I do not need to consume it to be healthy
- ☐ It is not environmentally friendly
- ☐ It is not animal friendly
- ☐ It is not sustainable
- ☐ It doesn't fit my diet
- ☐ I do not enjoy consuming it
- ☐ I prefer to consume other protein-rich foods (meat, eggs, tofu)
- ☐ It is unusual to consume it in my culture
- ☐ The products I like are not available where I shop
- ☐ It cannot be used to replace other products
- ☐ I often waste it
- ☐ It expires too quickly
- ☐ It is too expensive
- ☐ I've never tasted it
- ☐ Other (specify)

If yes

How often do you consume the following products?

Please consider your consumption in the last 3 months.

Every day	3-5 times a week	1-2 times a week	1-2 times a fortnight	1-2 times a month	Less than once a month	Never

When I am alone	☐	☐	☐	☐	☐	☐	☐	☐
When I am with someone else	☐	☐	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐	☐	☐

Considering the selected product, please indicate how strongly you agree/disagree with each of the following statements in relation to your fermented dairy consumption.

	Strongly disagree	Moderately disagree	Neither agree nor disagree	Moderately agree	Strongly agree
I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	☐	☐	☐	☐	☐
One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me	☐	☐	☐	☐	☐
It is natural	☐	☐	☐	☐	☐
It is too processed	☐	☐	☐	☐	☐
Consuming it boosts my health	☐	☐	☐	☐	☐
It is unhealthy	☐	☐	☐	☐	☐
I can consume it on its own, in recipes or in combination with some foods	☐	☐	☐	☐	☐
I cannot use this product in many ways	☐	☐	☐	☐	☐
I like this product	☐	☐	☐	☐	☐
I do not enjoy consuming it	☐	☐	☐	☐	☐
I never experience body symptoms when consuming it	☐	☐	☐	☐	☐
Body symptoms occur when I consume this product	☐	☐	☐	☐	☐
I have always consumed this product	☐	☐	☐	☐	☐

I did not consume it while growing up	☐	☐	☐	☐	☐
It contributes to a balanced diet	☐	☐	☐	☐	☐
As an adult, I do not need to consume it to be healthy	☐	☐	☐	☐	☐
Reducing its consumption will benefit my health	☐	☐	☐	☐	☐
It is environmentally friendly	☐	☐	☐	☐	☐
It is animal friendly	☐	☐	☐	☐	☐
It is not sustainable	☐	☐	☐	☐	☐
Reducing its consumption will benefit the environment	☐	☐	☐	☐	☐
I consume it when I want to treat or reward myself	☐	☐	☐	☐	☐
I would not consume it on special occasions	☐	☐	☐	☐	☐
I would finish a meal with this product	☐	☐	☐	☐	☐
This product is not suitable as the final course of a meal	☐	☐	☐	☐	☐
I consume it because of my family/friends	☐	☐	☐	☐	☐
No one I know consumes this as I do	☐	☐	☐	☐	☐
It is common to consume this product in my culture	☐	☐	☐	☐	☐
It is unusual to consume this product in my culture	☐	☐	☐	☐	☐
I consume it because it is a good source of protein	☐	☐	☐	☐	☐
It is a totally different category of food from meat/eggs/tofu	☐	☐	☐	☐	☐
I can find it in the shops	☐	☐	☐	☐	☐

This is not always available where I shop	☐	☐	☐	☐	☐
It is a good replacement for other foods	☐	☐	☐	☐	☐
This cannot be used to replace other products	☐	☐	☐	☐	☐
It is worth the price	☐	☐	☐	☐	☐
It is too expensive	☐	☐	☐	☐	☐
I can consume what I buy within the expiration date	☐	☐	☐	☐	☐
It expires too quickly	☐	☐	☐	☐	☐
I often waste it	☐	☐	☐	☐	☐

XXX

This is an attention check. Which of the following is a fruit?

- ☐ Caterpillar
- ☐ Scissors
- ☐ Melon
- ☐ Armchair
- ☐ Potato

XXX

1.3 Do you consume cheese?

Please consider ONLY your consumption of animal-based cheese. DO NOT consider your consumption of plant-based alternatives to cheese.

- ☐ Yes
- ☐ No

If no

Why? Select the three main reasons and order them from 1 = most important to 3 = less important.

- ☐ One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
- ☐ It is too processed
- ☐ It is unhealthy
- ☐ Body symptoms occur when I consume it
- ☐ As an adult, I do not need to consume it to be healthy
- ☐ It is not environmentally friendly
- ☐ It is not animal friendly
- ☐ It is not sustainable
- ☐ It doesn't fit my diet
- ☐ I do not enjoy consuming it
- ☐ I prefer to consume other protein-rich foods (meat, eggs, tofu)
- ☐ It is unusual to consume it in my culture
- ☐ The products I like are not available where I shop
- ☐ It cannot be used to replace other products
- ☐ I often waste it
- ☐ It expires too quickly
- ☐ It is too expensive
- ☐ I've never tasted it
- ☐ Other (specify)

If yes

How often do you consume the following products?

Please, consider ONLY hard and semi-hard cheeses. Your consumption of soft cheese will be assessed in a different section.

Please consider your consumption in the last 3 months.

	Every day	3-5 times a week	1-2 times a week	1-2 times a fortnight	1-2 times a month	Less than	Never

						once a month	
Cow's semi-hard or hard cheese (e.g., Cheddar, Comte, Gouda, Gruyere, Parmigiano)	☐	☐	☐	☐	☐	☐	☐
Goat's semi-hard or hard cheese	☐	☐	☐	☐	☐	☐	☐
Sheep's semi-hard or hard cheese	☐	☐	☐	☐	☐	☐	☐
Blue cheese (e.g., Stilton, Fourme d'Ambert)	☐	☐	☐	☐	☐	☐	☐
Smoked cheese	☐	☐	☐	☐	☐	☐	☐
Cheese with herbs, flowers or fruits (e.g., Gouda with cumin seeds, Wensleydale with apricots, Cheddar with mango, Alp blossom)	☐	☐	☐	☐	☐	☐	☐
Other cheese (please specify)	☐	☐	☐	☐	☐	☐	☐

Considering your consumption of hard and semi-hard cheese, please select one of the following products that you consume, but do not every day and you may consider consuming more:

- ☐ Cow's semi-hard or hard cheese (e.g., Cheddar, Comte, Gouda, Gruyere, Parmigiano)
- ☐ Goat's semi-hard or hard cheese
- ☐ Sheep's semi-hard or hard cheese
- ☐ Blue cheese (e.g., Stilton, Fourme d'Ambert)
- ☐ Smoked cheese
- ☐ Cheese with herbs, flowers or fruits (e.g., Gouda with cumin seeds, Wensleydale with apricots, Cheddar with mango, Alp blossom)
- ☐ Other (please specify)

Considering the selected product, answer the next question ticking the appropriate box.

I consume this product:

	Every day	3-5 times a week	1-2 times a week	1-2 times a fortnight	1-2 times a month	Less than once a month	Never	N/A
On its own	☐	☐	☐	☐	☐	☐	☐	☐
With something else	☐	☐	☐	☐	☐	☐	☐	☐
During a main meal (breakfast, lunch, dinner)	☐	☐	☐	☐	☐	☐	☐	☐
Grated in a dish	☐	☐	☐	☐	☐	☐	☐	☐
As a snack	☐	☐	☐	☐	☐	☐	☐	☐
Before going to sleep	☐	☐	☐	☐	☐	☐	☐	☐
In cooking	☐	☐	☐	☐	☐	☐	☐	☐
On special occasions	☐	☐	☐	☐	☐	☐	☐	☐
When I am alone	☐	☐	☐	☐	☐	☐	☐	☐
When I am with someone else	☐	☐	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐	☐	☐

Considering the selected product, please indicate how strongly you agree/disagree with each of the following statements in relation to your hard and semi-hard cheese consumption.

	Strongly disagree	Moderately disagree	Neither agree nor disagree	Moderately agree	Strongly agree
I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	☐	☐	☐	☐	☐
One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me	☐	☐	☐	☐	☐
It is natural	☐	☐	☐	☐	☐
It is too processed	☐	☐	☐	☐	☐
Consuming it boosts my health	☐	☐	☐	☐	☐
It is unhealthy	☐	☐	☐	☐	☐
I can consume it on its own, in recipes or in	☐	☐	☐	☐	☐

combination with some foods					
I cannot use this product in many ways	☐	☐	☐	☐	☐
I like this product	☐	☐	☐	☐	☐
I do not enjoy consuming it	☐	☐	☐	☐	☐
I never experience body symptoms when consuming it	☐	☐	☐	☐	☐
Body symptoms occur when I consume this product	☐	☐	☐	☐	☐
I have always consumed this product	☐	☐	☐	☐	☐
I did not consume it while growing up	☐	☐	☐	☐	☐
It contributes to a balanced diet	☐	☐	☐	☐	☐
As an adult, I do not need to consume it to be healthy	☐	☐	☐	☐	☐
Reducing its consumption will benefit my health	☐	☐	☐	☐	☐
It is environmentally friendly	☐	☐	☐	☐	☐
It is animal friendly	☐	☐	☐	☐	☐
It is not sustainable	☐	☐	☐	☐	☐
Reducing its consumption will benefit the environment	☐	☐	☐	☐	☐
I consume it when I want to treat or reward myself	☐	☐	☐	☐	☐
I would not consume it on special occasions	☐	☐	☐	☐	☐
I would finish a meal with this product	☐	☐	☐	☐	☐
This product is not suitable as the final course of a meal	☐	☐	☐	☐	☐
I consume it because of my family/friends	☐	☐	☐	☐	☐
No one I know consumes this as I do	☐	☐	☐	☐	☐

FRESH CHEESE (E.G., MOZZARELLA, FETA, PANEER)	☐	☐	☐	☐	☐	☐	☐
Goat's fresh cheese	☐	☐	☐	☐	☐	☐	☐
Sheep's fresh cheese	☐	☐	☐	☐	☐	☐	☐
Moulded cheese (e.g., Brie, Camembert)	☐	☐	☐	☐	☐	☐	☐
Blue cheese (e.g., Roquefort, Gorgonzola, Bleu d'Auvergne)	☐	☐	☐	☐	☐	☐	☐
Cream cheese (e.g. Philadelphia, Boursin)	☐	☐	☐	☐	☐	☐	☐
Cheese spread, (e.g. Laughing cow, DairyLea, Kiri)	☐	☐	☐	☐	☐	☐	☐
Other soft cheese (please specify)	☐	☐	☐	☐	☐	☐	☐

Considering your consumption of soft cheese, please select one of the following products that you consume, but do not every day and you may consider consuming more:

- ☐ Cottage cheese
- ☐ Quark
- ☐ Fromage blanc
- ☐ Faisselle
- ☐ Petit Suisse
- ☐ Fresh cheese (e.g., Mozzarella, Feta, Paneer)
- ☐ Goat's fresh cheese
- ☐ Sheep's fresh cheese
- ☐ Moulded soft cheese (e.g., Brie, Camembert)
- ☐ Blue cheese (e.g., Roquefort, Gorgonzola, Bleu d'Auvergne)

- ☐ Cream cheese (e.g. Philadelphia, Boursin)
- ☐ Cheese spread (e.g. Laughing cow, DairyLea, Kiri)
- ☐ Other (please specify)

Considering the selected product, answer the next question ticking the appropriate box.

I consume this product:

	Every day	3-5 times a week	1-2 times a week	1-2 times a fortnight	1-2 times a month	Less than once a month	Never	N/A
On its own	☐	☐	☐	☐	☐	☐	☐	☐
With something else	☐	☐	☐	☐	☐	☐	☐	☐
During a main meal (breakfast, lunch, dinner)	☐	☐	☐	☐	☐	☐	☐	☐
As a snack	☐	☐	☐	☐	☐	☐	☐	☐
Before going to sleep	☐	☐	☐	☐	☐	☐	☐	☐
In cooking	☐	☐	☐	☐	☐	☐	☐	☐
On special occasions	☐	☐	☐	☐	☐	☐	☐	☐
When I am alone	☐	☐	☐	☐	☐	☐	☐	☐
When I am with someone else	☐	☐	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐	☐	☐

Considering the selected product, please indicate how strongly you agree/disagree with each of the following statements in relation to your soft cheese consumption.

	Strongly disagree	Moderately disagree	Neither agree nor disagree	Moderately agree	Strongly agree
I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	☐	☐	☐	☐	☐
One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me	☐	☐	☐	☐	☐
It is natural	☐	☐	☐	☐	☐

It is too processed	☐	☐	☐	☐	☐
Consuming it boosts my health	☐	☐	☐	☐	☐
It is unhealthy	☐	☐	☐	☐	☐
I can consume it on its own, in recipes or in combination with some foods	☐	☐	☐	☐	☐
I cannot use this product in many ways	☐	☐	☐	☐	☐
I like this product	☐	☐	☐	☐	☐
I do not enjoy consuming it	☐	☐	☐	☐	☐
I never experience body symptoms when consuming it	☐	☐	☐	☐	☐
Body symptoms occur when I consume this product	☐	☐	☐	☐	☐
I have always consumed this product	☐	☐	☐	☐	☐
I did not consume it while growing up	☐	☐	☐	☐	☐
It contributes to a balanced diet	☐	☐	☐	☐	☐
As an adult, I do not need to consume it to be healthy	☐	☐	☐	☐	☐
Reducing its consumption will benefit my health	☐	☐	☐	☐	☐
It is environmentally friendly	☐	☐	☐	☐	☐
It is animal friendly	☐	☐	☐	☐	☐
It is not sustainable	☐	☐	☐	☐	☐
Reducing its consumption will benefit the environment	☐	☐	☐	☐	☐
I consume it when I want to treat or reward myself	☐	☐	☐	☐	☐
I would not consume it on special occasions	☐	☐	☐	☐	☐

Milkshakes	☐	☐	☐	☐	☐	☐	☐
Frappé with milk	☐	☐	☐	☐	☐	☐	☐
Lattes	☐	☐	☐	☐	☐	☐	☐
Milk with syrups	☐	☐	☐	☐	☐	☐	☐
Ice-cream	☐	☐	☐	☐	☐	☐	☐
Frozen yoghurt	☐	☐	☐	☐	☐	☐	☐
Pudding	☐	☐	☐	☐	☐	☐	☐
Custard	☐	☐	☐	☐	☐	☐	☐
Cheesecake	☐	☐	☐	☐	☐	☐	☐
Other dairy desserts (e.g., dulce de leche, tiramisu)	☐	☐	☐	☐	☐	☐	☐
Whipped cream	☐	☐	☐	☐	☐	☐	☐
Clotted cream	☐	☐	☐	☐	☐	☐	☐
Sour cream	☐	☐	☐	☐	☐	☐	☐
Condensed milk	☐	☐	☐	☐	☐	☐	☐
Evaporated milk	☐	☐	☐	☐	☐	☐	☐
Single and/or double cream	☐	☐	☐	☐	☐	☐	☐
Milk powder	☐	☐	☐	☐	☐	☐	☐
Whey	☐	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐	☐

General questions

Do you consume organic dairy products?

Organic dairy products are produced without the use of chemical fertilizers, pesticides, or other artificial chemicals. Please consider ONLY your consumption of animal-based dairy products. DO NOT consider your consumption of plant-based alternatives to dairy.

☐ Yes

☐ No

Why? Check all that apply.

☐ Organic dairy products taste better than non-organic dairy products

- ☐ Organic dairy products are healthier than non-organic dairy products
- ☐ Organic dairy products are not always available where I shop
- ☐ Organic dairy products are more available
- ☐ Organic dairy products are cheaper than non-organic products
- ☐ Organic dairy products are too expensive
- ☐ Whether a product is organic or not makes no difference to me
- ☐ Other (please specify)

Do you consume local dairy products?

Local food is food that is produced within a short distance of where it is consumed. Please consider ONLY your consumption of animal-based dairy products. DO NOT consider your consumption of plant-based alternatives to dairy.

- ☐ Yes
- ☐ No

Why? Check all that apply.

- ☐ Local dairy products taste better than non-local dairy products
- ☐ Local dairy products are healthier than non-local dairy products
- ☐ Local dairy products are not always available where I shop
- ☐ Local dairy products are more available
- ☐ Local dairy products are cheaper than non-local products
- ☐ Local dairy products are too expensive
- ☐ Whether a product is local or not makes no difference to me
- ☐ Other (please specify)

Has your dairy consumption changed in the past 6 months?

- ☐ Yes, I now consume less dairy
- ☐ Yes, I now consume more dairy
- ☐ No, my dairy consumption has not changed

If yes

Why did your dairy consumption change? Check all that apply.

- ☐ Diet-related reasons

- ☐ Health-related reasons
- ☐ For external reasons, e.g., reasons related to your living situation or your household, availability
- ☐ Dairy is getting too expensive
- ☐ Dairy products are not sustainable
- ☐ Other (please specify)

Do you plan to change your dairy consumption in the next 6 months?

- ☐ Yes, I would like to consume less dairy
- ☐ Yes, I would like to consume more dairy
- ☐ No, my dairy consumption will not change

If yes

Why do you plan to change your dairy consumption? Check all that apply.

- ☐ Diet-related reasons
- ☐ I experience body symptoms when consuming dairy
- ☐ For external reasons, e.g., reasons related to your living situation or your household, availability
- ☐ Dairy is getting too expensive
- ☐ Dairy products are not sustainable
- ☐ Other (please specify)

Do you consume plant-based dairy alternatives?

Please consider ONLY your consumption of plant-based alternatives to dairy. DO NOT consider your consumption of animal-based dairy.

- ☐ Yes
- ☐ No

If no

Why? Select the three main reasons and order them from 1 = most important to 3 = less important.

- ☐ One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me
- ☐ It is too processed
- ☐ It is unhealthy
- ☐ Body symptoms occur when I consume it

If yes

How often do you consume the following products?

Please consider your consumption in the last 3 months.

[illegible]

[illegible]

Considering your consumption of plant-based dairy alternatives, please select from the list below the product you consume THE MOST OFTEN:

- ☐ Plant-based unflavoured milk
- ☐ Plant-based flavoured milk
- ☐ Plant-based unflavoured yoghurt
- ☐ Plant-based flavoured yoghurt
- ☐ Plant-based dairy dessert
- ☐ Plant-based hard or semi-hard cheese
- ☐ Plant-based soft cheese
- ☐ Other (please specify)

Considering the selected product, answer the next question ticking the appropriate box.

I consume this product:

[illegible]

As a snack	☐	☐	☐	☐	☐	☐	☐	☐
Before going to sleep	☐	☐	☐	☐	☐	☐	☐	☐
In cooking	☐	☐	☐	☐	☐	☐	☐	☐
On special occasions	☐	☐	☐	☐	☐	☐	☐	☐
When I am alone	☐	☐	☐	☐	☐	☐	☐	☐
When I am with someone else	☐	☐	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐	☐	☐

Considering the selected product, please indicate how strongly you agree/disagree with each of the following statements in relation to your plant-based dairy consumption.

	Strongly disagree	Moderately disagree	Neither agree nor disagree	Moderately agree	Strongly agree
I consume it because of one or more of its sensory characteristics (taste, smell, appearance, texture)	☐	☐	☐	☐	☐
One or more of its sensory characteristics (taste, smell, appearance, texture) is unappealing to me	☐	☐	☐	☐	☐
It is natural	☐	☐	☐	☐	☐
It is too processed	☐	☐	☐	☐	☐
Consuming it boosts my health	☐	☐	☐	☐	☐
It is unhealthy	☐	☐	☐	☐	☐
I can consume it on its own, in recipes or in combination with some foods	☐	☐	☐	☐	☐
I cannot use this product in many ways	☐	☐	☐	☐	☐
I like this product	☐	☐	☐	☐	☐
I do not enjoy consuming it	☐	☐	☐	☐	☐
I never experience body symptoms when consuming it	☐	☐	☐	☐	☐

Body symptoms occur when I consume this product	☐	☐	☐	☐	☐
I have always consumed this product	☐	☐	☐	☐	☐
I did not consume it while growing up	☐	☐	☐	☐	☐
It contributes to a balanced diet	☐	☐	☐	☐	☐
As an adult, I do not need to consume it to be healthy	☐	☐	☐	☐	☐
Reducing its consumption will benefit my health	☐	☐	☐	☐	☐
It is environmentally friendly	☐	☐	☐	☐	☐
It is animal friendly	☐	☐	☐	☐	☐
It is not sustainable	☐	☐	☐	☐	☐
Reducing its consumption will benefit the environment	☐	☐	☐	☐	☐
I consume it when I want to treat or reward myself	☐	☐	☐	☐	☐
I would not consume it on special occasions	☐	☐	☐	☐	☐
I would finish a meal with this product	☐	☐	☐	☐	☐
This product is not suitable as the final course of a meal	☐	☐	☐	☐	☐
I consume it because of my family/friends	☐	☐	☐	☐	☐
No one I know consumes this as I do	☐	☐	☐	☐	☐
It is common to consume this product in my culture	☐	☐	☐	☐	☐
It is unusual to consume this product in my culture	☐	☐	☐	☐	☐
I consume it because it is a good source of protein	☐	☐	☐	☐	☐

It is a totally different category of food from meat/eggs/tofu	☐	☐	☐	☐	☐
I can find it in the shops	☐	☐	☐	☐	☐
This is not always available where I shop	☐	☐	☐	☐	☐
It is a good replacement for other foods	☐	☐	☐	☐	☐
This cannot be used to replace other products	☐	☐	☐	☐	☐
It is worth the price	☐	☐	☐	☐	☐
It is too expensive	☐	☐	☐	☐	☐
I can consume what I buy within the expiration date	☐	☐	☐	☐	☐
It expires too quickly	☐	☐	☐	☐	☐
I often waste it	☐	☐	☐	☐	☐

Demographics

Gender

- ☐ Female
- ☐ Male
- ☐ Non-binary / Third gender
- ☐ Other
- ☐ Prefer not to say

How would you best describe yourself?

- ☐ English/Welsh/Scottish/Northern Irish/British
- ☐ French
- ☐ French from overseas territories
- ☐ European (other than French)
- ☐ Maghrebis, North African
- ☐ African (other than Maghrebis, North African)
- ☐ Asian

- ☐ Other (please specify)
- ☐ Prefer not to say

How old are you? Choose an item. (years)

How much do you weigh?
_____ (kg)

How tall are you?
_____ (cm)

Where do you live?

- ☐ England
- ☐ Wales
- ☐ Scotland
- ☐ Northern Ireland
- ☐ France

Where do you live?

- ☐ Big city
- ☐ Town
- ☐ Countryside
- ☐ Paris
- ☐ London

What is the highest qualification you have completed?

- ☐ No qualifications
- ☐ GCSEs or equivalent
- ☐ A-levels or equivalent
- ☐ Foundation degree or equivalent

- ☐ Bachelor's degree or equivalent
- ☐ Master's degree or equivalent,
- ☐ Professional degree
- ☐ Doctorate degree

What is your current employment status?

- ☐ Full-time employed 35+ hours per week
- ☐ Part time employed
- ☐ Self-employed
- ☐ Unemployed – looking for work
- ☐ Unemployed – not looking for work
- ☐ Full-time student
- ☐ Part-time student
- ☐ Unable to work

How many people do you live with?

_____ adults (If you live alone, put 0)
_____ children (0-17 years old)

How many people do you usually eat with? _____

How much is your average disposable income per week (in £)? _____

How much money do you spend on food each week (in £)? _____

How many holidays abroad do you plan in a year?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4 or more

Appendix 4.1. Ethics checklist

About Your Checklist	
Ethics ID	45760
Date Created	15/09/2022 10:08:39
Status	Approved
Date Approved	26/09/2022 12:16:51
Risk	Low
Project Details	
Title	People do or do not consume dairy? Use of the National Diet and Nutrition Survey (NDNS) and the Individual and National Survey on Food Consumption (INCA) to investigate dairy consumption and eating patterns in the UK and in France in adults aged 18-44 years old.
Start Date of Project	03/10/2022
End Date of Project	30/06/2023
Proposed Start Date of Data Collection	03/10/2022
Original Supervisor	Katherine Appleton
Approver	Liam Wignall

Appendix 5.1. Ethics checklist

About Your Checklist	
Ethics ID	52913
Date Created	12/11/2023 12:31:14
Status	Approved
Date Approved	07/12/2023 17:10:46
Risk	High
Project Details	
Title	“DIY!” (Dairy it yourself) A randomised trial testing two cooking strategies to increase intakes of fermented dairy products among young adults aged 18-30 years old and living in France.
Start Date of Project	08/01/2024
End Date of Project	30/09/2024
Proposed Start Date of Data Collection	08/01/2024
Original Supervisor	Katherine Appleton
Approver	Research Ethics Panel

Appendix 5.2. Information sheet and consent form

Effects of different strategies for changing dietary intakes on diets among young adults aged 18-30 years old and living in France.

Invitation to take part

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part.

Who is organising/funding the research?

This study is organised by Bournemouth University, UK, in collaboration with the Institut Lyfe, Lyon, France.

What is the purpose of the project?

This project aims to test the effects of different strategies for changing dietary intakes on diets among young adults aged 18-30 years old and living in France. As in this stage of life people develop new habits that may influence their health, it appears necessary to identify valid strategies that may lead individuals to improve their diets and lifestyles in a long-term perspective.

Why have I been invited?

You have been chosen because you are between 18 and 30 years old, living in France, and speaking fluent French. You cannot take part in this study if you are vegan.

To take part in this study, you must be able to go in person at the Research Center of the Institut Lyfe, at 1A Chem. de Calabert, 69130 Écully.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a participant agreement form. We want you to understand what participation involves before you make a decision on whether to participate.

If you or any family member have an on-going relationship with Bournemouth University or Institut Lyfe or the research team, e.g. as a member of staff, as student or other service user, your decision on whether to take part (or continue to take part) will not affect this relationship in any way.

Can I change my mind about taking part?

Yes, you can stop participating in study activities at any time and without giving a reason. To withdraw, you have to send an email to Caterina Franzon, at cfranzon@bournemouth.ac.uk.

If I change my mind, what happens to my information?

After you decide to withdraw from the study, we will not collect any further information from or about you.

As regards the information we have already collected before this point, your rights to access, change, or move that information are limited. This is because we need to manage your information in specific ways in order for the research to be reliable and accurate. Further explanation about this is in the Personal Information section below.

What would taking part involve?

This study will last four weeks. During this study you may be asked to take part in different tasks and activities, e.g., cooking workshops (residential); cooking workshops (evening); engaging in cooking activities at home; recording your food intake; following specific targeted instructions, e.g., eat more fruits. Some participants may also be asked to do nothing as a control group. You will receive an invitation letter explaining what you will need to do and when. Please only take part in the study if you would be willing to undertake each of these activities. You will also complete questionnaires about your food intake and attitudes toward food products.

Four weeks after the end of the study, you will be invited to complete all questionnaires again, as a follow-up, and may be contacted again to fill in a debriefing questionnaire.

Will I be reimbursed for taking part?

Participants taking part in this study will not be reimbursed economically. Depending on the activities, they may receive recipe leaflets, kitchen equipment or foods to take home.

What are the advantages and possible disadvantages or risks of taking part?

Whilst there are no immediate benefits to you participating in the project, it is hoped that the strategies tested in the work will help develop further successful interventions aiming to improve diets in the target population, for health and environmental reasons.

In this project, you may be asked to be directly involved in cooking activities and all recipes will contain dairy and milk derivatives. Although recipes may be suitable for the majority of people, including lactose intolerant subjects, please do not take part in this study if you think that handling or consuming dairy or milk products may cause harm or damage your health.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

During the study, you may be asked to engage in different kinds of activities and record information about your diet. You will be asked to fill in questionnaires about your food intakes and attitudes toward food products at different stages of the study, to monitor and eventually consider the validity of the strategy tested (changes before/after the study). Filling in the questionnaires will take from 5 to 30 minutes.

You will be given an alphanumeric code to type in every time you complete a questionnaire. Personal data such as name, and email, may be asked to send you a reminder to complete a task. All personal information will be deleted at the end of data collection.

How will my information be managed?

Bournemouth University (BU) is the organisation with overall responsibility for this study and the Data Controller of your personal information, which means that we are responsible for looking after your information and using it appropriately. Research is a task that we perform in the public interest, as part of our core function as a university.

Undertaking this research study involves collecting and/or generating information about you. We manage research data strictly in accordance with:

- Ethical requirements; and
- Current data protection laws. These control use of information about identifiable individuals, but do not apply to anonymous research data: “anonymous” means that we have either removed or not collected any pieces of data or links to other data which identify a specific person as the subject or source of a research result.

BU’s Research Participant Privacy Notice sets out more information about how we fulfil our responsibilities as a data controller and about your rights as an individual under the data protection legislation. We ask you to read this Notice so that you can fully understand the basis on which we will process your personal information.

Research data will be used only for the purposes of the study or related uses identified in the Privacy Notice or this Information Sheet. To safeguard your rights in relation to your personal information, we will use the minimum personally-identifiable information possible and control access to that data as described below.

Publication

You will not be able to be identified in any external reports or publications about the research without your specific consent. Otherwise, your information will only be included in these materials in an anonymous form, i.e. you will not be identifiable.

Research results will be published in a peer-reviewed publication in a psychology or nutrition journal.

Security and access controls

BU will hold the information we collect about you in hard copy in a secure location and on a BU password protected secure network where held electronically.

Personal information which has not been anonymised will be accessed and used only by appropriate, authorised individuals and when this is necessary for the purposes of the research or another purpose identified in the Privacy Notice. This may include giving access to BU staff or others responsible for monitoring and/or audit of the study, who need to ensure that the research is complying with applicable regulations.

You will be given an alphanumeric code to type in every time you complete a questionnaire. Personal data such as name, email, and phone number, may be asked to send you a reminder to complete a task. All personal information will be deleted at the end of data collection.

Sharing your personal information with third parties

We will not share any personal information with any third parties.

Further use of your information

The information collected about you may be used to support other research projects in the future and access to it will not be restricted. You will not be able to be identified in the data without your specific consent. To enable this use, the data will be added to an appropriate research data repository such as BORDaR (BU's Data Repository): this is a central location where data is stored, which is accessible to the public.

Keeping your information if you withdraw from the study

If you withdraw from active participation in the study we will keep information that we have already collected from or about you, with your consent. This will not include your personal identifiable information. As explained above, your legal rights to access, change, delete, or move this information are limited as we need to manage your information in specific ways for the research to be reliable and accurate. However if you have concerns about how this will affect you personally, you can raise these with the research team when you withdraw from the study.

You can find out more about your rights in relation to your data and how to raise queries or complaints in our Privacy Notice.

Retention of research data

Project governance documentation, including copies of signed participant agreements: we keep this documentation for a long period after completion of the research, so that we have records of how we conducted the research and who took part. The only personal information in this documentation will be your name and signature, and we will not be able to link this to any anonymised research results.

Research results:

As described above, during the course of the study we will anonymise the information we have collected about you as an individual. This means that we will not hold your personal information in identifiable form after we have completed the research activities.

You can find more specific information about retention periods for personal information in our Privacy Notice.

We keep anonymised research data indefinitely, so that it can be used for other research as described above.

Concerning this study, you will receive a later newsletter informing you with the results. You can contact Caterina Franzon at cfranzon@bournemouth.ac.uk at the end of the data collection to express your interest in receiving follow-ups about the study, e.g. link to publication.

Contact for further information

If you have any questions or would like further information, please contact:

Caterina Franzon, PhD student,

cfranzon@bournemouth.ac.uk

Department of Psychology, Room P302, Poole House

Bournemouth University

Fern Barrow, Poole, BH12 5BB

Supervisor

Prof. Katherine Appleton

k.appleton@bournemouth.ac.uk

Department of Psychology, Poole House

Bournemouth University

Fern Barrow, Poole, BH12 5BB

In case of complaints

Any concerns about the study should be directed to Prof. Tiantian Zhang, Deputy Dean for Research & Professional Practice, Faculty of Science & Technology, Bournemouth University by emailing researchgovernance@bournemouth.ac.uk.

Finally

If you decide to take part, you will be given a copy of the information sheet and a signed participant agreement form to keep.

Thank you for considering taking part in this research project.

Consent to Participate

Please indicate that you have read and understood the Participant Information Sheet for this research project and that you consent to take part in this study before continuing:

- ☐ I have read and understood the Participant Information Sheet and consent to take part in this study
- ☐ I do not consent to take part in this study [exit at this point]

Please indicate your agreement for the Research Team to access and use your recorded responses to this questionnaire before continuing:

- ☐ I give permission for members of the Research Team to have access to my responses. I understand that my anonymised responses may be reproduced in reports, academic publications and presentations but I will not be identified or identifiable.
- ☐ I understand that my data may be included in an anonymised form within a dataset to be archived at BU's Online Research Data Repository.

Appendix 5.3. Invitation letters

Letter of invitation (group C)

Dear Invitee,

Thanks for accepting to help us.

You will find below the details about your participation.

Please, do not share the information in this invitation letter with anyone, including researchers! Participants may receive different activities depending on the group they have been assigned to, and researchers should not know what participants are doing to avoid any risk of influencing them or the study's results.

You have been assigned to the food record group.

Go to cally.com and book the day you want to receive the link for your food diary. Your task during this study will be to record your food intake for three days 3 times.

You will also fill in different questionnaires about your dietary intake and attitudes toward food consumption.

You will receive an email from cfranzon@bournemouth.ac.uk with all links to the food record and food questionnaires. When completing these tasks, please insert your unique code. You can find it written on the envelope.

Let's sum up your tasks:

- Three times you will fill in:

1. A three-day food diary. We will email you on Wednesday, and we would like you to keep a record of what you eat and drink on Thursday, Friday, and Sunday. Please, record the quantity of food/drinks, the time, and the meal (if it is breakfast, snack, etc.)
2. Dietary questionnaire(s).

I would like to remind you that all the data will be anonymised. If you wish to withdraw, please send an email to cfranzon@bournemouth.ac.uk.

Thank you again for your help!

Letter of invitation (group B)

Dear Invitee,

Thanks for accepting to help us.

You will find below the details about your participation.

Please, do not share the information in this invitation letter with anyone, including researchers! Participants may receive different activities depending on the group they have been assigned to, and researchers should not know what participants are doing to avoid any risk of influencing them or the study's results.

You have been assigned to the dairy recipes at home group.

Go to cally.com and book the day you want to receive a leaflet containing dairy-based recipes by email. Your task is to try the recipes at home and let us know what you think about them, filling in a questionnaire every time you try one of them! You will find the QR code to each questionnaire on the recipe's page.

During this study, you will also record your food intake for three days 3 times and fill in different questionnaires about your dietary intake and attitudes toward food consumption. You will receive an email from cfranzon@bournemouth.ac.uk with all links to the food diary and food questionnaires. When completing these tasks, please insert your unique code. You can find it written on the envelope.

Let's sum up your tasks:

- Book in the day you would like to receive the leaflet containing dairy-based recipes. You will have two weeks to have a try and let us know what you think about them!
- Three times you will fill in:
 1. A three-day food diary. We will email you on Wednesday, and we would like you to keep a record of what you eat and drink on Thursday, Friday, and Sunday. Please, record the quantity of food/drinks, the time, and the meal (if it is breakfast, snack, etc.)
 2. Dietary questionnaire(s).

I would like to remind you that all the data will be anonymised. If you wish to withdraw, please send an email to cfranzon@bournemouth.ac.uk.

Thank you again for your help!

Letter of invitation (group A)

Dear Invitee,

Thanks for accepting to help us.

You will find below the details about your participation.

Please, do not share the information in this invitation letter with anyone, including researchers! Participants may receive different activities depending on the group they have been assigned to, and researchers should not know what participants are doing to avoid any risk of influencing them or the study's results.

You have been assigned to the evening workshops group.

First of all, you need to book the dates of your workshops. Please go to cally.com and book in! Each workshop will take place at the Pop-Up Restaurant at Institut Lyfe, 3 bis Av. Guy de Collongue, 69130 Écully, France.

After the last workshop, you will receive a leaflet containing the recipes you learnt during the two sessions. Your task is to try the recipes at home and let us know what you think about them. Fill in a questionnaire every time you try one of them! You will find the QR code to each questionnaire on the recipe's page.

During this study, you will also record your food intake for three days 3 times and fill in different questionnaires about your dietary intake and attitudes toward food consumption. You will receive an email from cfranzon@bournemouth.ac.uk with all links to the food diary and food questionnaires. When completing these tasks, please insert your unique code. You can find it written on the envelope.

Let's sum up your tasks:

- Book in the days you would like to take part in workshops.

If unable to attend, email _____

- You will receive a leaflet containing the recipes learnt during the workshops.

You will have two weeks to have a try. Let us know what you think about them!

- Three times you will fill in:

1. A three-day food diary. We will email you on Wednesday, and we would like you to keep a record of what you eat and drink on Thursday, Friday, and Sunday. Please, record the quantity of food/drinks, the time, and the meal (if it is breakfast, snack, etc.)

2. Dietary questionnaire(s).

I would like to remind you that all the data will be anonymised. If you wish to withdraw, please send an email to cfranzon@bournemouth.ac.uk.

Thank you again for your help!

Appendix 5.4. Pulses questionnaire

Q1 How often do you eat each of the following? Please tick in the appropriate box. Please ensure you tick one box for every food type.

	EVERY DAY	3-5 TIMES A WEEK	1-2 TIMES A WEEK	1-2 TIMES A FORTNIGHT	1-2 TIMES A MONTH	LESS THAN ONCE A MONTH	NEVER
BAKED BEANS	☐	☐	☐	☐	☐	☐	☐
KIDNEY, CANNELLINI OR BORLOTTI BEANS	☐	☐	☐	☐	☐	☐	☐
BLACK, PINTO, OR BUTTER BEANS	☐	☐	☐	☐	☐	☐	☐
BROAD OR FAVA BEANS	☐	☐	☐	☐	☐	☐	☐
OTHER BEANS	☐	☐	☐	☐	☐	☐	☐
LENTILS	☐	☐	☐	☐	☐	☐	☐
CHICKPEAS	☐	☐	☐	☐	☐	☐	☐
PEAS	☐	☐	☐	☐	☐	☐	☐
PEANUTS	☐	☐	☐	☐	☐	☐	☐
MILKS	☐	☐	☐	☐	☐	☐	☐
YOGHURTS.	☐	☐	☐	☐	☐	☐	☐
CUSTARD, BLANCMAGES	☐	☐	☐	☐	☐	☐	☐
SOFT CHEESES (E.G. CREAM CHEESE, DAIRYLEA, CAMENBERT)	☐	☐	☐	☐	☐	☐	☐
HARD CHEESES (E.G. CHEDDAR, STILTON, EMMENTAL)	☐	☐	☐	☐	☐	☐	☐
NUTS, OTHER THAN PEANUTS	☐	☐	☐	☐	☐	☐	☐
EGGS	☐	☐	☐	☐	☐	☐	☐
PROTEIN SUBSTITUTES (E.G., QUORN)	☐	☐	☐	☐	☐	☐	☐

Q2 For the following statements, please think about Pulses - that is beans, lentils, chickpeas and legumes, such as peas and peanuts. Tell us which option best describes the following statements. Please place a tick in the appropriate box. Please ensure you tick one box for every statement.

Strongly agree (1) Moderately agree (2) Slightly agree (3) Neither agree no disagree (4)
Slightly disagree (5) Moderately disagree (6) Strongly disagree (7)

[illegible]

Appendix 5.5. Recipes leaflets

Effets des différentes stratégies pour modifier les régimes alimentaires des jeunes adultes de 18 à 30 ans vivant en France.

Projet de recherche approuvé par le comité d'éthique de recherche du Bournemouth University, ID: 52913

Recettes lactières

Rapport technique

Contient 7 fiches techniques :

- **Muffins butternut, bleu d'Auvergne et bacon**
- **Muffins tomates séchées, fromage de chèvre et basilic**
- **Poulet crunchy, sauce yaourt et herbes fraîches**
- **Cheesecake déstructuré, framboise et rose**
- **Smoothie « Red berries »**
- **Smoothie « Back to Acapulco »**
- **Panna cotta vanille, coulis de mandarine, pistaches**

Muffins au butternut, bleu d'Auvergne et bacon

Recette pour 4 portions



Ingrédients

Muffins :

150 g de farine type 55
 ½ sachet de levure chimique
 3 œufs
 1 cc d'huile d'olive (cuisson du butternut)
 85 g d'huile d'olive
 120 g de lait fermenté
 100 g d'allumettes de bacon
 80 g de fromage bleu d'Auvergne
 80 g de butternut
 10 g de beurre (pour beurrer le moule)
 1 pincée de sel
 1 cc d'huile végétale (cuisson des allumettes de bacon)

Matériel utilisé

Balance – Poêle — Cul de poule – Planche – Maryse – Robot ou fouet– Moules à cake – Couteau

Étapes de préparation

Muffins :

Préparer tous les ingrédients et mettre en place le poste de travail.

Sur une planche, découper à l'aide d'un couteau, des cubes de fromage bleu d'Auvergne.

Eplucher et découper le butternut en petits cubes.

Dans une poêle, verser l'huile d'olive et faire cuire les cubes de butternut pendant quelques minutes afin qu'ils soient dorés.

Dans une poêle, verser l'huile végétale, et faire cuire les allumettes de bacon pendant quelques minutes afin d'obtenir une coloration dorée.

Dans un récipient, verser la farine, la levure, le sel et mélanger au fouet. Ajouter les œufs, le lait fermenté petit à petit, l'huile d'olive et fouetter de nouveau pour avoir un appareil homogène.

Ajouter à l'aide d'une maryse, les cubes de fromage bleu, les cubes de butternut et les allumettes de bacon.

Beurrer les moules à cake, verser la préparation délicatement dans les moules au 3/4 et mettre dans un four préchauffé à 180°C chaleur tournante pendant 20 minutes.

Laisser refroidir et les démouler avant de servir.



Que pensez-vous de cette recette ? 😊

Scannez le QR code pour un questionnaire de 2 minutes, promis ce n'est pas long !

Astuces du Chef

La recette peut être adaptée avec des légumes de saison, pour une recette d'été il est possible de remplacer le butternut par du petit pois.

Pour un muffin moins intense en goût, le bleu d'Auvergne peut être remplacé par de la mozzarella.

Muffins aux tomates séchées, fromage de chèvre et basilic

Recette pour 4 portions



Ingrédients

Muffins :

150 g de farine type 55
 ½ sachet de levure chimique
 3 œufs
 80 g d'huile d'olive
 120 g de lait fermenté
 80 g de tomates séchées
 80 g de fromage de chèvre
 ¼ de botte de basilic
 80 g d'olives vertes
 1 pincée de sel
 1 pincée de poivre
 5 g de beurre pour les moules
 1 cc d'huile végétale

Matériel utilisé

Balance – Planche – Passoire –
 Mandoline – Cul de poule –
 Robot ou fouet – Moules à cake
 – Couteau

Étapes de préparation

Muffins :

Préparer tous les ingrédients et mettre en place le poste de travail.

Sur une planche, égoutter et découper les tomates séchées en petits morceaux et réserver.

Ciseler finement le basilic.

Découper des petits cubes de fromage de chèvre.

Couper les olives vertes en petits morceaux et réserver.

Dans un récipient, verser la farine, la levure, le sel et mélanger au fouet. Ajouter les œufs, le lait fermenté petit à petit, l'huile d'olive et fouetter de nouveau pour avoir un appareil homogène.

Ajouter à l'aide d'une maryse, les olives, les tomates séchées et les cubes de fromage de chèvre. Ajouter le basilic.

Beurrer les moules à cake, verser la préparation délicatement, dans les moules aux ¾ et mettre dans un four préchauffé à 180°C pendant 20 minutes.

Laisser refroidir et les démouler par la suite avant de servir.



Que pensez-vous de cette recette ? 😊

Scannez le QR code pour un questionnaire de 2 minutes, promis ce n'est pas long !

Astuces du Chef

Il est possible de faire une variante avec de la courgette qui ira parfaitement avec le fromage de chèvre.

Pour apporter encore un peu de gourmandise, nous pouvons ajouter quelques pignons torréfiés.

Poulet crunchy, sauce au yaourt et herbes fraîches

Recette pour 4 portions



Ingrédients

Poulet crunchy :

4 aiguillettes de poulet
3 cc de mélange tandoori
200 g de lait ribot
150 g de farine
150 g de chapelure panko
150 g de chapelure de pain
0,5 L d'huile végétale pour la friture
3 œufs

Sauce yaourt et herbes ;

5 cs de yaourt grec
10 g de ciboulette
10 g de menthe
1 pincée de sel
1 pincée de poivre
4 cs de lait ribot
1 citron vert

Matériel utilisé

Balance – Casserole – Cul de poule – Spatule – Maryse – Robot – Râpe – Cuillère

Étapes de préparation

Poulet crunchy :

Préparer tous les ingrédients et mettre en place le poste de travail.

Dans un cul de poule, préparer la marinade avec le lait ribot, les épices et y ajouter le poulet. Laisser reposer pendant 10 minutes.

Egoutter les aiguillettes de poulet, les passer dans la farine, puis dans l'œuf et enfin dans le mélange de chapelure. Les repasser dans l'œuf et dans le mélange de chapelure.

Dans une casserole, verser l'huile et la faire chauffer à 180°C. Frire les aiguillettes de poulet pendant 8 minutes afin qu'ils soient bien croustillants et dorés. Saler le poulet.

Sauce yaourt et herbes ;

Prélever le zeste du citron vert à l'aide d'une râpe.

Ciseler finement la menthe et la ciboulette, réserver.

Dans un récipient, verser le yaourt grec, le lait ribot, les herbes, les zestes, le sel et le poivre. Mélanger à l'aide d'une cuillère.

Dressage :

Disposer la sauce dans un petit récipient et le poulet dans une grande creuse.



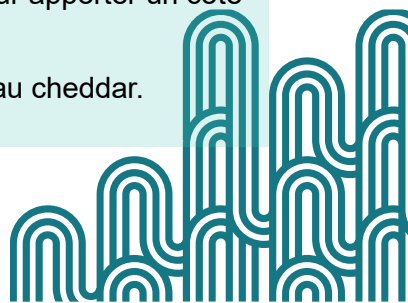
Que pensez-vous de cette recette ? 😊

Scannez le QR code pour un questionnaire de 2 minutes, promis ce n'est pas long !

Astuces du Chef

La ciboulette et la menthe peuvent être remplacées par de l'estragon et de l'aneth pour apporter un côté frais et anisé.

Pour une recette plus réconfortante et gourmande, il est possible de faire une sauce au cheddar.



Cheesecake déstructuré, framboise et rose

Recette pour 4 portions

Ingrédients

Crème cheesecake :

100 g de chocolat blanc
pâtissier
150 g de Philadelphia
150 g de faisselle

Crumble :

100 g de farine type 55
100 g de beurre doux
pommade
100 g de poudre d'amandes
70 g de sucre semoule

Coulis de framboise et rose :

250 g de framboises surgelées
25 g d'eau
50 g de sucre semoule
1 cc d'eau de rose (à adapter
selon les préférences)
½ feuille de gélatine

Matériel utilisé

Balance – Casserole – Cul de
poule – Spatule – Robot avec
feuille – Fouet – Papier cuisson
– Plaque four – Balance – Cul
de poule – Maryse - Blender –
Passoire



Crème cheesecake :

Préparer tous les ingrédients et mettre en place le poste de travail. Bien égoutter la faisselle.

Faire fondre le chocolat au bain-marie et réserver pour qu'il revienne à température ambiante.

Dans la cuve d'un robot avec un fouet, mélanger le Philadelphia et la faisselle à vitesse moyenne pendant 1 minute.

Ajouter le chocolat et mélanger à nouveau afin que le mélange soit homogène. Mettre dans un récipient au frais.

Crumble :

Dans la cuve d'un robot, mélanger avec la feuille la farine, le beurre pommade, la poudre d'amandes et le sucre pendant 2 minutes à vitesse moyenne. Déposer la préparation sur une plaque allant au four avec un papier cuisson dans un four préchauffé à 170°C chaleur tournante pendant 12 minutes.

Coulis de framboise et rose :

Faire tremper les feuilles de gélatine dans un bol d'eau froide. Dans une casserole, déposer les framboises, le sucre et l'eau et faire chauffer jusqu'à ébullition. Hors du feu, ajouter la gélatine et mélanger au fouet. Passer la préparation avec une passoire pour enlever les pépins de framboises. Ajouter l'eau de rose et réserver au frais.

Dressage :

Dans une verrine, déposer la crème du cheesecake, un peu de coulis et terminer par le coulis.

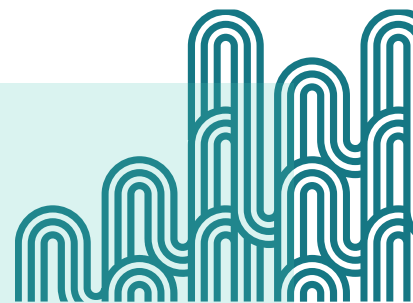


Que pensez-vous de cette recette ? 😊

Scannez le QR code pour un questionnaire de 2 minutes, promis ce n'est pas long !

Astuces du Chef

Le coulis de framboise et rose peut être adapté à toutes les saisons, avec par exemple un coulis de poire et châtaigne pour l'automne. Le Philadelphia peut être remplacé par du St môret ou du mascarpone.



Smoothie « Red berries »

Recette pour 4 portions

Ingrédients

Smoothie :

150 g de lait entier
50 g de framboises surgelées
100 g de mélange de fruits
rouges surgelé
110 g de kéfir
4 cs de miel
Le jus d'un pamplemousse

Matériel utilisé

Balance – Cul de poule –
Maryse - Blender – Presse
agrumes

Smoothie :

Prélever le jus de pamplemousse.

Dans un blender, mélanger tous les ingrédients pendant 2
minutes à vitesse moyenne.

Ajouter le jus de pamplemousse et mélanger à nouveau.

Servir bien frais.



Étapes de préparation



Que pensez-vous de cette recette ? 😊

Scannez le QR code pour un questionnaire de
2 minutes, promis ce n'est pas long !

Astuces du Chef

Des fraises fraîches peuvent être une bonne alternative aux framboises.

Pour une recette plus acidulée, le gingembre sera notre meilleur allié.



Smoothie « Back to Acapulco »

Recette pour 4 portions

Ingrédients

Smoothie :

100 g de lait entier
50 g de lait de coco
100 g de kéfir
½ banane
150 g d'ananas en morceaux
50 g de jus de passion
2 gr d'arôme de vanille
2 cs de miel de fleurs
¼ de citron vert

Matériel utilisé

Balance – Cul de poule –
Maryse – Blender- Presse
agrumes

Étapes de préparation

Smoothie :

Prélever le jus du citron vert.
Dans un blender, mélanger tous les ingrédients pendant 2
minutes à vitesse moyenne.
Ajouter le jus de citron vert et mélanger à nouveau.
Servir bien frais.



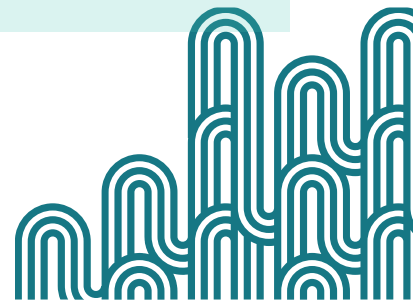
Que pensez-vous de cette recette ? 😊

Scannez le QR code pour un questionnaire de
2 minutes, promis ce n'est pas long !

Astuces du Chef

Pour accentuer le goût de la noix de coco, il est intéressant de faire des copeaux de noix de coco fraîche et de les disposer sur le dessus du smoothie

Ajouter de la menthe pourra apporter encore plus de fraîcheur au smoothie.



Panna cotta vanille, coulis de mandarine, pistaches torréfiées

Recette pour 4 portions

Ingrédients

Panna cotta vanille :

150 g de crème liquide
375 g de lait fermenté
2 cc d'arôme de vanille
6 g de gélatine
60 g de sucre semoule

Coulis de mandarine :

100 g de jus de mandarine
1 cs de jus de citron
10 g de sucre
1,5 g de gélatine

Dressage :

30 g de pistaches



Matériel utilisé

Balance – casserole – Cul de poule – Spatule – Plaque à four- Fouet

Panna cotta vanille :

Préparer tous les ingrédients et mettre en place le poste de travail.

Mettre la gélatine dans un bol d'eau froide.

Dans une casserole, mettre la crème, le sucre semoule et l'arôme vanille et porter à ébullition

Laisser reposer 2 minutes.

Essorer la gélatine et l'ajouter au fouet hors feu à la crème chaude, puis ajouter le lait fermenté. Verser dans des petits récipients.

Mettre 2 heures au frais minimum.

Coulis de mandarine :

Mettre la gélatine dans un bol d'eau froide.

Dans une casserole, verser le jus de mandarine et porter à ébullition. Verser le sucre et ajouter la gélatine hors feu en mélangeant énergiquement à l'aide du fouet.

Ajouter le jus de citron. Réserver au frais.

Dressage : Dans une poêle, faire pistaches, réserver puis les concasser.
Verser le coulis sur la panna cotta
pistaches sur le dessus



torréfier les
et ajouter les

Que pensez-vous de cette recette ? 😊

Scannez le QR code pour un questionnaire de 2 minutes, promis ce n'est pas long !

Numéro de projet: 0862

Date: 26/07/23

