Typology of archetype EU food environments

Deliverable D1.3

DELIVERABLE PLAN'EAT – D1.3
Typology of archetype EU Food Environments

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Website	https://planeat-project.eu/

Nature of the deliverable		
R	Document, report (excluding the periodic and final reports)	X
DEM	Demonstrator, pilot, prototype, plan designs	
DEC	Websites, patents filing, press & media actions, videos, etc.	
DATA	Data sets, microdata, etc.	
DMP	Data management plan	
ETHICS	Deliverables related to ethics issues.	
SECURITY	Deliverables related to security issues	
OTHER	Software, technical diagram, algorithms, models, etc.	

Dissemination level		
PU	Public	X
SEN	Sensitive, limited under the conditions of the Grant Agreement	
CI	Classified, EU RESTRICTED, CONFIDENTIAL or SECRET under the Commission Decision No2015/444	

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Contents

Abbreviations

Terms	Definition
EFA	Exploratory Factorial Analysis
KMO	Kaiser-Meyer-Olkin
LL	Living lab
SES	Socio-economic status

Executive summary

Fostering healthy and sustainable diets cannot be done solely by better informing consumers, as consumer choices are strongly influenced by the food environments in which they make their choices. Food environments result from the interaction between external and personal domains, which means that every individual has her own food environment, particularly as individuals experience the food environment in different ways. Hence, to be able to identify problematic areas in the food environment, inhibiting people from engaging in healthy and sustainable diets, it is important to analyze the food environment through the lens of consumers' lived experience. The objective of this deliverable is to identify challenges that PLAN'EAT living lab participants experience in their food environments. Insights thus gathered can inform the design of interventions aimed at fostering healthy and sustainable diets in the living labs. For this, a mixed method approach, involving both a quantitative survey of the perceived food environment and a combination of photovoice and focus group discussions among living lab participants has been implemented. The quantitative analysis highlighted that the majority of respondents in the living labs across Europe experience a positive food environment. Nevertheless, clusters having negative food environment experience can also be found consistently across all living labs, but no clear differences could be found based on socio-economic background information. The qualitative analysis did highlight a number of important themes that came as influential factors of participants' lived experience across different target groups: citizens across Europe are encountering various challenges and thus opportunities for improvement in their food environment. Their experiences generally correspond to the answers provided by the clusters having negative food environment experience and relate to difficulties in getting access to affordable healthy and sustainable food, and in being informed and supported to make the healthy and sustainable choices. The results also highlight the importance of traditions and social interactions both in terms of challenges and in finding solutions.

1. Introduction

Fostering healthy and sustainable diets cannot be done solely by better informing consumers, as consumer choices are strongly influenced by the food environments in which they make their choices. Turner et al. (2018) define the food environment as "the interface that mediates people's food acquisition and consumption within the wider food system. It encompasses external dimensions such as the availability, prices, vendor and product properties, and promotional information; and personal dimensions such as the accessibility, affordability, convenience and desirability of food sources and products" (Turner et al., 2018, p 95). What is critical here is that food environments result from the interaction between external and personal domains, and also that they are part of wider food systems (see Figure 1). While most studies have focused on the external dimensions characterizing the food environment, less is known about how to assess the subjective dimensions of the food environment.
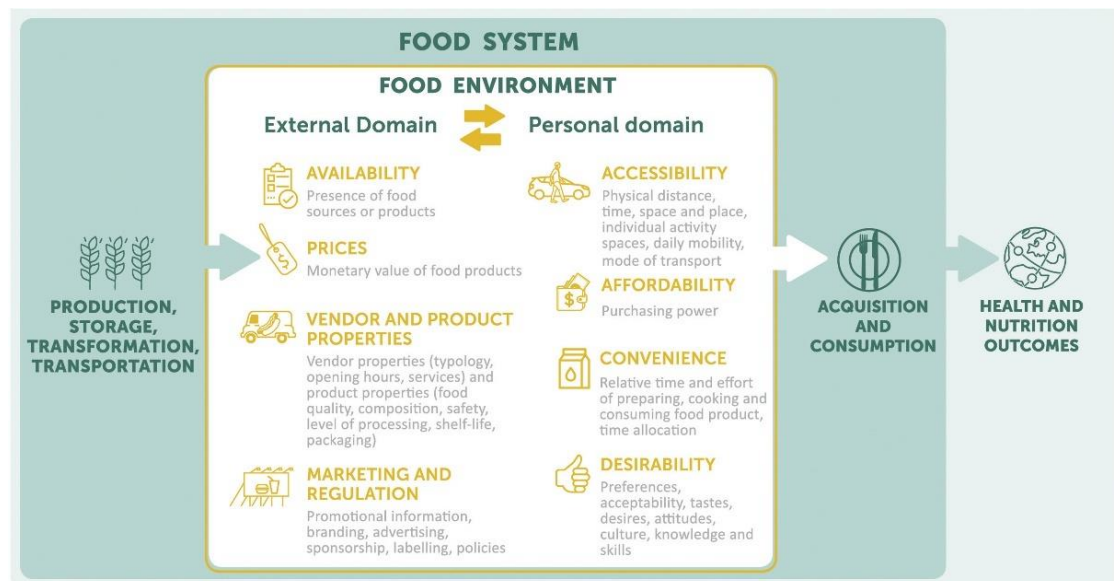

Figure 1: Conceptual model of the food environment (Turner et al., 2018)

The result of this broader conceptualisation is that there is not one food environment in a given situation, but that every individual has her own food environment, particularly as individuals experience the food environment in different ways. Hence, to be able to identify problematic areas in the food environment, inhibiting people from engaging in healthy and sustainable diets, it is important to analyse the food environment through the lens of consumers' lived experience.

Evidence into how people navigate their food environments in the context of their everyday realities can thus provide insights into how to design policies and interventions that more equitably and effectively improve diets, nutrition, health and wellbeing (Neve et al., 2021). In other words, interventions in the objective food environment have to reach and be absorbed by the individuals whose behaviour is to change. Moore et al. (2008) showed that individual perceptions of the local food environment are also associated with the objective local food environment, therefore, to obtain the desired results, the policies on diet related behaviour before investing in structural changes in the neighbourhood should take into account the effect that these changes have on people's perception (Katare et al., 2021).

The objective of this deliverable is to identify challenges that PLAN'EAT living lab (LL) participants experience in their food environments. Insights thus gathered can complement other information on food environments and dietary habits as collected in WP1 to inform the design of interventions aimed at fostering healthy and sustainable diets in the LLs. For this, a mixed method approach has been developed to explore and communicate the lived experiences of the various LL participants.

2. Materials and methods

2.1 Overview

Most of the literature analyzing the relationship between the food environment and diets starts by mapping the objective food environment, that is, the observable and measurable elements of the food environment such as the location of retail and restaurants outlets, the assortment those outlets have to offer and the way that assortment is organised in stores and restaurants, prices, distances between home and outlets and so on. In this way, scholars have been able to demonstrate correlations between such food environment variables and the incidence of non-communicable diseases. As research on the lived experiences of food environments has been limited, we implement a mixed-method approach with a people-centred perspective.

Focusing on the interaction between the external and personal dimensions characterizing the food environments, we draw on a definition of the conceptual model of the nutrition environment developed by Glanz et al. (2005), which allows us to comprehensively assesses the key dimensions of perceived food environments that have an influence on the everyday realities of the LL participants. For this, we used the NEMS-P survey, which was developed for the US context by Alber et al. (2018). The NEMS-P has been reformulated (translated) according to the various EU country contexts in which the 9 living labs are located (France, Germany, Spain, Greece, Italy, Ireland, Sweden, Hungary and Poland).

Parallel to mapping perceived food environments across European citizens, the exploration of the personal lived experiences and practices of LL participants are carried out using citizen science research methods: photovoice and focus group. Photovoice is an expansion of photo elicitation method and seeks to empower participants to take action or to advocate for change. The participants are stimulated to photograph what they wish and are involved in group discussion to reflect in a critical way the issues captured in the photographs taken. The focus group sessions are to be able to create a space for better understanding the underlying motivations and personal experience of participants in relation to food environments. The qualitative methods first entail a photo-elicitation method in which participants are asked to take at least 5 pictures of food activities during two days. The photovoice method provides more in-depth and illustrative information to understand and contextualize the various dimensions in perceptions towards local food environments that cannot be quantified (Harper, 2002). During the focus group sessions, the researchers encourage discussion and sharing on the same dimensions of the perceived food environments by showing the pictures taken by the participants in the photovoice session.

Table 1 summarises the characteristics of each living lab and the number of respondents for both the survey and the focus groups. Most living labs organised two focus groups, with the number of participants in the focus groups ranging from 3 to 9. The French living lab took a slightly different approach, organising three in-class workshops in three different schools, involving 23, 10 and 18 children respectively, applying a method adapted to the school context. No photovoice and focus groups were organised in the German living lab, due to practical issues.

Finally, we explored the development of personas as food environment user archetypes to integrate and communicate our results. Personas were developed in a workshop with all living lab leaders and other project partners organised during the Consortium Meeting in Barcelona. These personas profile were designed to catalyze discussions among researchers, shedding light on how diverse consumer segments might encounter potential barriers in their respective food environments .

Table 1: The target consumer profile and the number of participants involved per Living Lab			
Living Lab	**Target group design**	**Number of survey respondents**	**Number of focus group participants**
France	Children and adolescents' parents, with middle/high SES/ health status: healthy	9	23+10+18
Germany	Children and adolescents' parents, with all SES/ with obese children	3	no
Greece	Elderly people/ all SES/ health status: healthy	20	9+9
Hungary	Single parents (>18); low SES; health status: healthy	462	7+7
Ireland	Young Adults (18-30); all SES; health status: healthy	19	6+4
Italy	Adults (18-70); low SES; diabetic	12	13
Poland	Children and adolescents` parents, with low SES/ with healthy children	22	8+8
Spain	Adults (40-85); all SES; health status: healthy	210	6+6
Sweden	Toddlers' parents, with middle/high SES/ health status: healthy	23	3

2.2   Quantitative survey

NEMS-P is the product of a social cognitive theory based on the assumption that individuals are influenced or conditioned by their environment. The perceived and observed nutrition environments influences eating behaviours both directly and indirectly through food shopping behaviours (e.g., shopping frequency, grocery planning) and the home food environment. This conceptualisation suggests there is a relationship between food shopping behaviours and the home food environment, and in turn, the home food environment directly influences eating behaviour (Green and Glanz, 2015; Alber et al., 2018).

In this study, the NEMS-P questionnaire was adapted to align with the European context and the goals of the PLAN'EAT project. Our hypothesis posits that the perceived store, restaurant and home food environment influences participants' dietary behaviour. To define a healthy and sustainable diet, we followed the criteria outlined in 'the great transformation food' diet proposed by the EAT-LANCET Commission (Willett et al., 2019).

The questionnaire has three objectives:

- To explore perceptions of the food environment at the neighbourhood level by conducting an in-depth investigation into how participants in Living Labs (LLs) perceive their local food environment.

- To uncover key dimensions of food environments by identifying and analysing the key external and personal dimensions that shape participants' daily experiences with their food environments.

- Segmentation of consumers based on food environment experience through survey analysis, categorising participant groups to pinpoint those who do not encounter healthy food environments.

The survey thus included 157 items and is divided into six sections: the Home food environment (57 items), Food shopping questions (46 items), Restaurant/Eating out questions (20 items), Thoughts and Habits about food (22 items), Background characteristics and health status question (12 items) (see annex B). The survey data were analysed using factor and cluster analysis. Exploratory factor analysis makes it possible to identify from some of the questions in the survey what are the food environment dimensions that influence the food

choices of the participants. Cluster analysis makes it possible to define and describe the group of consumers that interact with the food environment dimensions identified. The background characteristics and health status questions are used to characterise the identified consumer groups.

The factor analysis enables to verify whether the information in the original measured variables can be agglomerated in latent constructs that can explain personal or external food environment domains. The exploratory factor analysis (EFA) allows to identify the underlying relationship between measured variables, summarizing the information in latent construct and minimizing information loss in terms of variance explained. This is achieved by converting the initial set of correlated variables into a new set of uncorrelated (orthogonal) variables. Varimax rotation was applied to enhance the interpretability of the EFA results and to optimize the variance of the squared loadings (Kaiser, 1960). In the factor matrix analysis, a minimum value of 0.5 was used (De Lillo et al., 2007). To assess the validity of the model, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test were used (Chan et al., 2017). The KMO test measures the adequacy of the latent constructs by evaluating the partial correlations between variables. KMO values range from 0 to 1, with low values indicating that the latent constructs are inappropriate because the correlations between pairs of variables cannot be explained by the shared variance among all variables. It is recommended that KMO values should not be below 0.5, with values above 0.7 considered satisfactory (Kaiser et al., 1974). To assess the validity of the model, Bartlett's test is commonly used to test the hypothesis that the correlation matrix is an identity matrix (Kumara et al.,2010). If Bartlett's test is not significant, the correlation matrix may match the identity matrix, implying that the factor model characterised by all identified latent constructs may not be appropriate.

Table 2: Survey items assessing dimensions of the perceived food environments	
	Survey item(s)
Composite item	
Store food environment	
Store accessibility	Q2.5 Thinking about the store **where you buy most of your food**, how do you usually travel to this store? [car or other form of transportation] Q2.6 About how long would it take to get from your home to the store **where you buy most of your food**, if you <u>walked</u> there? Q2.7 How important are each of the following factors in your decision to shop at the store where you **buy most of your food**? Q2.7. 1 Near your home Q2.7. 2 Near or on the way to other places where you spend time
Store availability of plant and animal-based product	Q2.1 Please mark whether you agree or disagree with the following statements: Q2.1.1 It is easy to buy plant-based products (fruit, vegetables, legumes, oils) in my neighborhood Q2.1.2 The plant-based products (fruit, vegetables, legumes, oils) in my neighborhood are of high quality Q2.1.3 There is a large selection of plant-based products (fruit, vegetables, legumes, oils) in my neighborhood Q2.1.4 It is easy to buy animal-based products (meat, eggs, dairy, product, fish) in my neighborhood. Q2.1.5 The animal-based products in my neighborhood are of high quality Q.2.1.6 There is a large selection of animal-based products available in my neighborhood
Store motivation	Q2.7 How important are each of the following factors in your decision to shop at the store where you **buy most of your food**? Q2.7.4 Selection of foods Q2.7.5 Quality of foods Q.2.7.6 Price of food
Price of food	2.9 At the store **where you buy most of your food**, how would you rate the price of fish (fresh or frozen)? 2.10 At the store **where you buy most of your food**, how would you rate the price of of red meat (not processed)?

	2.11 At the store/market **where you buy most of your food**, how would you rate the price of white meat (not processed)? 2.12 At the store/market **where you buy most of your food**, how would you rate the price of fruit and vegetables?
Placement/Promotion of healthy and unhealthy items	2.13 Please mark whether you agree or disagree with the following statements for the store **where you buy most of your food** and your shopping habits at that store. 2.13.1 I notice signs that encourage me to purchase healthy foods. 2.13.2 I often buy food items that are located near the cash register. 2.13.3 There are discounts or promotions on fruits and vegetables 2.13.4 There are discounts or promotions on red meat (pork, beef, lamb processed and not) 2.13.5 I often buy items that are eye-level on the shelves. 2.13.6 It is difficult to identify vegan/vegetarian food options (lack of clear labelling) 2.13.7 I look at nutrition labels or nutrition information for most of the packed food I buy 2.13.6 The foods near the cash register are mostly unhealthy choices.
Restaurant food environment	
Restaurant accessibility	Q3.2 About how long would it take to get from your home to the fast-food restaurant where you go most often, if you walked there? Q3.3 About how long would it take to get from your home to the sit-down restaurant where you go most often, if you walked there? Q4.3.4 When you eat out at a restaurant or get take-out food, how important to you is convenience?
Availability of healthy meals	Q3.5 Please mark whether you agree or disagree with the following statements: Q3.5.1 There are many healthy menu options at the restaurant. Q3.5.2 It is hard to find a healthy option when eating out at a restaurant. Q3.5.3 It is easy to find vegan/vegetarian menu at the restaurant
Promotion and cost of healthy options and promotion of nutrition information	Q3.5 Please mark whether you agree or disagree with the following statements: Q3.5.5 The restaurant provides nutrition information (such as calorie content) on a menu board or on the menu. Q3.5.6 Signs and displays encourage overeating or choosing unhealthy foods from the menu. Q3.5.7 The menu or menu board highlights and promotes the healthy options at the restaurant.
Home food environment	
Availability of food at home	Q1.5 Please indicate whether each of these food items were available in your home in the past week: Fruits (1); Vegetables (2); Sweets (cookies, pastries, baked goods) (3) ; Snack chips (potato chips, corn chips, tortilla chips, etc.) (4) ; Plant-based products (plant based milk, vegan/vegetarian burgers...) (5); Sugar-sweetened beverages (non-diet soft drinks/sodas, flavoured juice drinks) (6); Whole grains (bread, rice, pasta, corn and other) (7); Refined grains (Bread, polished rice, pasta, corn and other) (8); Potatoes (9); Legumes (10); Frozen and fresh fish (11); Red meat (beef, lamb, pork) (12); Processed red meat (sausages, salami, etc.) (13); White meat (poultry) (14); Processed fresh and frozen white meat (chicken nuggets, cutlet, sticks, etc.) (15); Dairy products (milk or derivative equivalents) (16); Eggs (17); Tree nuts and peanuts (18); Plant oils (olive oil, canola oil, palm oil) (19); Dairy fat (animal fat: butter, lard, tallow, ghee) (20)
Accessibility of foods at home	Q1.6 In your home, how often do you… Q1.6.4 Have snack chips and sweets on the counter Q1.6.5 Have meat (pork, beef, chicken and other poultry) in the refrigerator/freezer Q1.6.6 Have fresh or frozen fish in the refrigerator/freezer Q1.6.7 Have dry/canned/ frozen legumes

LL leaders were asked to collect at least 20 responses where possible. However, the number of respondents ranged between 3 and 462. The Living Labs in Hungary and Spain independently decided to distribute the questionnaire to a larger number of consumers with the characteristics of the respective target groups, resulting in sample sizes of 462 and 210 respectively. The LLs targeting the under 18s gave the questionnaire to the parents of the minors. Given the small sample sizes in all LLs (except Spain and Hungary), we merged

these dataset, but results from this analysis are to be considered indicative. The Spanish and the Hungarian datasets were analysed. The Hungarian LL modified the survey to adapt it to their specific target group (single parents (>18); low SES; health status: healthy) (Appendix C). The analysis of the Hungarian dataset was carried out on the same items indicated in Table 2.

2.3 Photovoice and focus group discussion

Photovoice is a qualitative and participatory methodology commonly practiced with a group of people or a placed-based community through digital or analog photographing. In the photovoice method, researchers use photos to generate discussion and storytelling and deconstruct specific issues by asking questions. It is often used in community development to capture individual communities' wishes, desires, expectations, and overlooked knowledge.

Participants were asked to take pictures with their phone or camera for at least 2 days, one weekday and one weekend day. Each participant should take 5 pictures of different food events: dining out, eating at home, grocery shopping, food preparation, food storage, food waste management, sharing food with others, and any other food-related activities they do during the two days. Participants were asked to take pictures that are a good example for them and one that evokes negative feelings.

A focus group is a qualitative research method that brings together a group of people (6-12 people) to answer questions and interact in a moderated setting. This setting allows the researcher to obtain more data than from individual interviews. Moreover, it also leaves room for the researcher to observe the group's dynamics, reactions, and participants' body language, which could lead to further research directions.

DATA COLLECTION

LL leaders received a detailed methodology guide and then participated in several workshops as part of the Community of Practice sessions organised by ESSRG in the framework of PLAN'EAT. In addition, they had the opportunity to receive support in carrying out the photovoice and focus group sessions in the form of individual online calls that focused on adapting the methodology to their specific context.

Qualitative data were gathered in a multi-stage process. First, LL leaders organised a workshop and presented the photovoice methodology to participants. Then participants had time to take pictures before regathering for the focus group sessions (Figure 2).
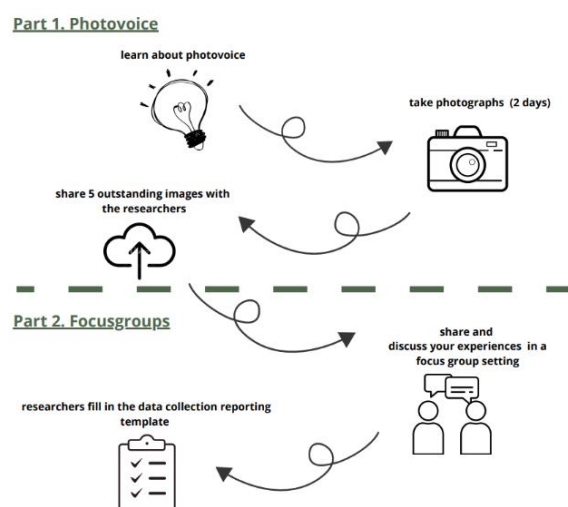

Figure 2: Overview of qualitative data collection

Slight deviations were necessary to adapt in the case of the French LL due to the fact that they worked with children and had difficulty in receiving pictures from all of the participants. In this case, the pictures used

were a mixture of the pictures brought by children and chosen by researchers. In addition, a game was incorporated in the focus group to support the discussion around the proposed dimensions.

Focus group discussions were facilitated by LL leaders using a semi-structured interview guide developed based on the research objective of aiming to understand better participants' lived experience of their food environment. The guide included open-ended questions designed to elicit in-depth responses from participants.

A template was delivered to enter the main findings according to the following themes:
- Availability & accessibility
- Affordability & price
- Availability & access to information
- Cultural aspects & interactions
- Social interactions & home food environment
- Emotional aspects
- Visions & expectations

The chosen broad themes were introduced.

LL leaders were asked to provide verbatim the relevant quotations for each of the dimensions and write their analyses and reflection of the sessions.

DATA ANALYSIS

LL leaders who had first-hand experience with their respective target groups and facilitated the photo voice and focus group sessions, reported the results of the sessions for each of the above detailed dimensions. This allowed for capturing nuances that might have been lost by solely working with the transcripts.

The second stage of analysis constituted of coding the direct quotations that LL leaders provided, allowing themes and patterns to emerge directly from the data. This approach aligns with the interpretivist paradigm, enabling a nuanced exploration of participants' perspectives. All reporting templates were carefully read and reread to gain a thorough understanding of the content. Initial thoughts and impressions were documented to guide the coding process. Open coding involved the systematic identification and labeling of concepts, ideas, and recurring patterns within the data. The preliminary codes were organised into a hierarchical codebook, capturing both overarching themes and more specific sub-themes. Throughout the coding process, constant comparison was applied, comparing new data with previously coded data to refine codes and ensure the accuracy and reliability of the emerging themes.

2.4   Data and ethical issues

All living labs have taken measures to be in compliance with ethical standards and data protection obligations.

Each photovoice and focus group participant received clear and understandable information about the nature, purpose, risks and benefits of their participation in PLAN'EAT, both verbally and in writing. Participants were also provided with a detailed description of the PLAN'EAT project and data management. More specifically, they were informed about the specific purpose for taking and using pictures and that the images cannot be used for any other purpose without obtaining additional consent. Participants completed a written consent form acknowledging that their participation was voluntary and that they could withdraw their consent at any time without giving a reason. They agreed that the information they provided could be used anonymously in a publication and other publications related to the PLAN'EAT project.

Participants were given training on how to take pictures in an ethical and GDPR compliant way. To protect personal data and give attention to the potentially sensitive nature of the topic, they were asked to avoid taking pictures of faces and identifiable personal traits. Pictures in the food environment photovoice should be focused on objects, settings, food, prices, and interesting phenomena. Otherwise, the consent of the

persons appearing in the pictures needs to be required and documented. All photographs were checked for compliance to data recommendations and amended if required.

Data and photos were anonymised and stored in password protected drives at the LL leader institutions with access only granted to PLAN'EAT researchers. Recordings of interviews and focus groups were transcribed and anonymised. Original recordings were destroyed. All data was de-identified. The de-identified data and the participants' name and details are stored separately on secured drives. Individuals have the right to access, rectify, erase, or restrict the processing of their images. They also have the right to object to the processing of their images and to withdraw their consent at any time. The de-identified data is stored for 10 years to ensure that the data is open to further investigation and in order to comply with the rules of scientific publications that data should not be destroyed for at least 5 years post publication. After 10 years, all data will be destroyed.

Ethical committee approval has been obtained by those living labs involving children. In France, ethical committee approval from Clermont Auvergne University has been obtained on the 23th of February, 2023 under the reference number IRB00011540-2022-97. In Sweden, ethical committee approval has been obtained (on April 18th, 2023) from the Swedish Ethical Review Authority under reference number Dnr 2023-01424-01. In addition, the Spanish and Irish living labs have also obtained ethical approval, respectively with reference CE22- PR17 from the Universitat Oberta de Catalunya and LS-23-41-Gibney from UCD.

2.5   Persona development

Personas are abstract representations of user archetypes as used in marketing, design, IT, etc. (Pruit and Grudin, 2003). Personas allow a more holistic approach to users than traditional segmentation techniques such as cluster analysis (Onel et al., 2018). More recently, personas have been used to typify sustainable consumption (Onel et al., 2018; Gonera et al., 2021) and to describe the lived experience of Philippine children in relation to healthy diets (Watson et al., 2023). Persona development typically involves a number of components, including identity (name, character, social background, etc.), attitudes and behaviours in relation to the focus area and a task context (Onel et al., 2018).

Here, we aimed at developing personas across living labs using the food environment dimensions as basis for attitudes and behaviours. We include questions on identity, such as name, gender, age, socio-economic status, country of origin, and family situation. We supplemented this with attitudes and behaviours associated with accessing the food environment, building on some problem areas encountered in the qualitative data analysis of each living lab. The personas were drawn up in a workshop with all living lab leaders and other project partners in October 2023 in Barcelona (see Picture 1). Participants were grouped into 4 groups, clustered around younger ages (living labs of Germany, France and Sweden); middle ages (Poland, Hungary and Ireland), and older ages (Greece, Italy and Spain), and a final group with an open assignment for additional personas. Participants were provided with a sheet of paper, magazines and colored papers, to draw up the identities and food environment issues of their persona.

Picture 1: Impression of persona workshop

3. Quantitative survey results

3.1   Hungary

The Hungarian sample consists of 462 observations. 98% of the participants are female, 52% of the sample is aged between 44 and 64. 26% have a bachelor's degree, 72% have a full-time job, 37% have a net monthly household income of 300,000-400,000 HUF. As indicators of health status, we asked participants to answer two questions, one about smoking habits and the other about the level of physical activity they do: for the Hungarian sample, 55% of participants are non-smokers and 45% do moderate physical activity. Full details of the participants' socio-demographic characteristics and health status are given in Table 3.

Table 3: Socio-demographic characteristics of the Hungarian sample

Gender

Male	Female	Missing value
9	452	1
2%	*98%*	*0%*

Age

18-24	25-28	29-43	44-64	65-82	Missing value
2	4	214	242	0	0
0%	*1%*	*46%*	*52%*	*0%*	*0%*

Level of education

Less than elementary school	Elementary school	Vocational school	High school	Associate degree	Bachelor's degree	Master 's degree	Doctoral degree	Missing value
0	16	44	96	107	120	74	5	0
0%	*3%*	*10%*	*21%*	*23%*	*26%*	*16%*	*1%*	*0%*

Employment status

Full time job	Part-time (15-30hrs/week)	Part-time (<15hrs/week)	Unemployed, looking for job	Temporary Company leave	Currently not employed	Missing value
333	58	7	18	36	9	1
72%	*12%*	*1%*	*4%*	*8%*	*2%*	*0%*

Household net monthly income

0-100.000 HUF	100.000-200.000 HUF	300.000-400.00 HUF	400.000-500.000 HUF	500.000-1.000.000 HUF	Over 1.000.000 HUF	Prefer not to say	Missing value
34	86	172	38	52	21	1	58
7%	18%	37%	8%	11%	4%	0%	12%

Health status variables							

Smoking habits

Yes, regularly	Yes, occasionally	No, I used to but I quit	I`ve never smoked	Missing value
45	42	121	254	0
10%	*9%*	*26%*	*55%*	*0%*

Physical activity

Not at all active	Moderately active	Relatively active (1-2 times a week)	Very active (at least 5 days a week)	Missing value
114	210	120	18	0
25%	*45%*	*26%*	*4%*	*0%*

Total	*462*

EXPLORATORY FACTOR ANALYSIS

EFA1 was carried out on 19 items related to the dimensions of store food environment (see Table A1). This resulted in 5 distinct factors:

- Store availability
- Price of food in the store
- Store motivation
- Promotion of food in the store
- Food location in the store

The first factor *Store availability* captures information about consumers' perceptions of the availability, quality and choice of plant-based (fruit, vegetables, pulses and oils) and animal-based (meat, eggs, dairy, fish) products in their neighborhood. This factor measures the weight that information about, for example, a wide selection of animal-based products available in the neighborhood and the availability of animal-based products has on the consumer's food shopping environment. *Food prices in the shop* is an external domain dimension characterising the food shopping environment expressed by the variables in which the participants were asked to rate the price of fish, fresh red meats, fresh white meats and of fruit and vegetables in the store where they buy most of their food. The third factor, *Store motivation*, is defined by the importance given by the participants to three factors that motivate them to choose the store where they buy most of their food: food prices, food quality and selection of food. *Promotion of food in the store* describes another external domain of the food shopping environment and capture information about consumers' perceptions on the promotions or discounts on fruit and vegetables and on red meat (processed or fresh) available in the store and whereas they perceived to be encouraged to purchase of healthy foods through ads and poster in it. Finally, *Food location in the store* is defined by how difficult can be to identify vegan/vegetarian foods (e.g., ambiguous labelling) in the store, by how often consumers buy items that are at eye level on the shelves or near the cash register.

EFA2 was carried out on 7 items related to the block of questions on restaurants/eating out (see Table A2). The items with a satisfactory KMO value define two factors:

- Menu content
- Availability and promotion of healthy meals

Menu content includes information about the participants' perception of the presence of signs and displays encouraging the choice of unhealthy food, whereas the restaurant provides nutritional information (such as calorie content) on a menu board or on the menu and the cost of buying healthy option. The *Availability and promotion of healthy meals* includes information also considers the availability of vegan/vegetarian menu.

EFA3 was conducted on 22 items related to the availability and accessibility of different food items in the participants' homes; 22 are the items with a satisfactory KMO value (see Table A3). As a result, the following four factors were identified:

- Junk food
- Healthy home food environment
- Potential healthy home food environment
- Meat and fish

The first factor *Junk food* includes information about the availability of junk food, in particular sweets, snacks, sugar-sweetened beverages and about the accessibility of sweets in the cupboard/pantry and of savory snack in the cupboard/pantry. *Healthy home food environment* describes the availability at home of vegetables, nuts or that are in the cupboard/pantry, fruits, alternative food (e.g., whole grain, sugar-free, with lower amount of salt, etc.), cold-pressed oil and plant-based meat substitutes. The third factor, *Potential healthy home food environment*, is defined by the availability at participant's homes of fruit, eggs, bread and pasta made from refined flour, fats of animal origin. Finally, the last factor, *Meat and fish* measures the weight that

information related to the availability at home of fresh or frozen white meat, fresh or frozen red meat or store-bought meat, fresh or frozen fish.

CLUSTER ANALYSIS

This section presents the main results of the application of cluster analysis to the eleven factors, the results of which led to the identification of three homogeneous clusters (see Table A4).

The first cluster was labelled *Restaurant and store food environments need improvement* and includes 40 consumers who live in a neighbourhood where there is not a wide range of high-quality products, both vegetable and animal, and where in the restaurants where they most often eat out is not easy to find healthy choices especially vegetarian or vegan ones. When they do food shopping in the store where buy most of their food, there are no discounts or promotions for fruit, vegetables and on red meat, the price of different foods (fish, red meat, white meat, fruit and vegetables) is high and they do not notice ads and posters encouraging the purchase of healthy food. They do not decide on the shop where to buy food based on the selection, quality and price of food offered. In their homes, they experience a healthy food environment, vegetables, nuts, fruits, alternative food (e.g., whole grain, sugar-free, with lower amount of salt, etc.), cold-pressed oil and plant-based meat substitutes are available most of the time.

The second group of 48 consumers labelled *Healthy food environments experience* has no difficulties in finding a wide range of high quality animal- and plant-based products in their neighborhood and when shopping they perceive that the price of different types of food (fish, red meat, white meat, fruit and vegetables) is not high, they have the opportunity to take advantage of promotions or discounts on fruit, vegetables and red meat. They do not buy products that are at eye-level on shelves or near the cash register. For them, it is important that the store where they buy food offers a wide selection of high-quality products for a good price. In the restaurants where they most often eat out, it is easy to find healthy options, also vegan or vegetarian meals, but they perceive the price of healthy meal higher and that there are signs and displays that encourage overeating and/or choosing unhealthy meal options. In their homes, junk food is not available, while vegetables, nuts, fruits, alternative food (e.g., whole grain, sugar-free, with lower amount of salt, etc.), cold-pressed oil and plant-based meat substitutes, meat, fish, eggs, fats and refined grain product are available most of the time.

The third group of 32 consumers labelled *Restaurant and home food environment need improvement* experiences a neighbourhood where they can find a wide range of high quality animal and plant based products; in the store in which they choose to buy most of their food, the price of fish, red meat, white meat, fruit and vegetables is not considered expensive but there are no discount or promotion on fruit, vegetable and meat. The selection, quality and price of the food are important factors to decide where to buy food. They often buy products that are on eye-level on the shelves or near the cash register. In the restaurants where they most often eat out, it is not easy to find healthy and vegan or vegetarian meal and they perceive the price of healthy meal is higher and that there are signs and displays that encourage overeating and/or choosing unhealthy meal options. In their homes, junk food, meat (white and red) and fish are available most of the time.

In terms of socio-demographic characteristics, there are no significant differences between the clusters, so a descriptive description of the cluster composition is provided:

The first cluster consists 100% of women of whom 50% are aged 29-43 years and the other 50% are aged 44-64 years. 65% have either a graduation (32.5%) or a higher vocational qualification (32.5%). 75% work more than 30 hours a week and the 41.6% have a net monthly household income of 200,000- 300,000 HUF. 60% of the respondents' households consist of 2 family members of whom one works (92.5%). In terms of health status indicators, 47.5% are moderately active and 70% of them have never smoked.

The second cluster consists mainly of women (97.92%), who are aged 44-64 years (64%). 25% of them hold a higher vocational qualification another 22.9% have a graduation. 79% work more than 30 hours a week and 31.7% have a net monthly household income of 200,000-300,000 HUF. The household of 50% of the respondents' households consist of 2 family members of whom one works (100%). In terms of health status indicators, 39.5% are relatively active (I do sports 1-2 times a week) and 60.4% of them have never smoked.

The third cluster consists mainly of women (96.8%) who are aged 29-43 years (56%). 56.2% hold either a graduation (28.1%) or a higher vocational qualification (28.1%). 72% work more than 30 hours a week and the 41.4% have a net monthly household income of 200,000-300,000 HUF. 59% of the respondents' households consist of 2 family members of whom one works (84.4%). In terms of health status indicators, 56% of them are moderately active and 47% of them have never smoked.

3.2 Small-sample dataset (France, Germany, Greece, Ireland, Italy, Poland, Sweden)

The small databases of Italian, Greek, French, Sweden, Irish, Polish and German LLs were analysed together and a merged dataset was created. The analysis is carried out on a total of 108 responses and should be interpreted with caution given the small sample sizes. The socio- demographic characteristics of the merged dataset are reported by LL country (Table 4):

- **Italy**: Most of the respondents in the Italian LL sample are women (75%), aged between 65 and 82 (67%). 50% of them have a bachelor's degree and 67% are not employed. 67% of them have a net monthly household income of €1000-3000. In terms of health indicators, 58% have never smoked and 33% are moderately to very physically active.
- **Greece**: Most of the respondents in the Greek LL sample are women (80%), aged between 65 and 82 (95%). 40% of them have a primary school degree/elementary school degree and 95% are not employed. 67% of them have a net monthly household income of €0-1000. In terms of health indicators, 45% have never smoked and 50% are moderately to very physically active.
- **Poland**: Most of the respondents in the Polish LL sample are women (95%), aged between 29-43 (73%). 50% of them have a high school degree and 55% have a full-time job (30+ hours a week). 68% of them have a net monthly household income of €0-1000. In terms of health indicators, 50% currently smoke and 45% are moderately physically active.
- **Sweden**: Most of the respondents in the Swedish LL sample are women (65%), aged between 29-43 (91%). 52% of them have a bachelor's degree and 89% have a full-time job (30+ hours a week). 87% of them have a net monthly household income of > € 3000. In terms of health indicators, 83% have never smoked and 52% are moderately physically active.
- **France**: Most of the respondents in the French LL sample are women (78%), aged between 44-64 (67%). 78% of them have a master's degree and 89% have a full-time job (30+ hours a week). 89% of them have a net monthly household income of > € 3000. In terms of health indicators, 78% have never smoked and 67% are moderately to very physically active.
- **Ireland**: Most of the respondents in the Irish LL sample are women (79%), aged between 25-28 (53%). 47% of them have a master's degree and 100% are not employed. 100% of them have a net monthly household income of > € 1000-3000. In terms of health indicators, 89% have never smoked and 68% are moderately physically active.
- **Germany:** Most of the respondents in the German LL sample are men (67%), aged between 17 and 24 (67%). 1 participant has a primary school degree and is not employed; the second has a secondary school degree and has a part-time job and the last has a master's degree and has a full-time job. Two participants have a net monthly household income of > € 1000-3000, while the one with a full-time job has a net monthly household income of > € 3000. Regarding health indicators, 100% have never smoked and 67% are moderately physically active.

Table 4: Socio-demographic characteristics of the LL sample

Country	Italy		Greece		Poland		Sweden		France		Ireland		Germany	
Age	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
17-24	0	0%	0	0%	0	0%	0	0%	0	0%	7	37%	2	67%
25-28	0	0%	0	0%	3	14%	0	0%	0	0%	10	53%	0	0%
29-43	0	0%	1	5%	16	73%	21	91%	3	33%	2	11%	1	33%
44-64	4	33%	0	0%	3	14%	2	9%	6	67%	0	0%	0	0%
65-82	8	67%	19	95%	0	0%	0	0%	0	0%	0	0%	0	0%
Gender	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Female	9	75%	16	80%	21	95%	15	65%	7	78%	15	79%	1	33%
Male	3	25%	4	20%	1	5%	8	35%	2	22%	4	21%	2	67%
Level of education	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
No degree	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Primary school degree/ elementary school	0	0%	8	40%	0	0%	0	0%	0	0%	0	0%	1	33%
Junior high school	2	17%	1	5%	0	0%	0	0%	0	0%	0	0%	0	0%
High school degree	4	33%	1	5%	11	50%	4	17%	0	0%	2	11%	1	33%
Vocational school degree	0	0%	1	5%	6	27%	4	17%	0	0%	1	5%	0	0%
Bachelor's degree	6	50%	1	5%	0	0%	12	52%	0	0%	5	26%	0	0%
Master's degree	0	0%	0	0%	3	14%	8	34%	7	78%	9	47%	1	33%
Doctoral	0	0%	0	0%	0	0%	1	4%	2	22%	2	11%	0	0%
Employment status	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Full time	2	17%	1	5%	12	55%	20	87%	8	89%	0	0%	1	33%
Part-time	1	8%	0	0%	4	18%	2	9%	1	11%	0	0%	1	33%
Unemployed	1	8%	0	0%	3	14%	0	0%	0	0%	0	0%	0	0%
Company leave	0	0%	0	0%	2	9%	1	4%	0	0%	0	0%	0	0%
Apprentice	0	0%	0	0%	1	5%	0	0%	0	0%	0	0%	0	0%
Not employed	8	67%	19	95%	0	0%	0	0%	0	0%	19	100%	1	33%
Household net monthly income	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
€0-1000	4	33%	12	60%	15	68%	0	0%	0	0%	0	0%	0	0%

	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
€1000-3000	8	67%	8	40%	7	32%	3	13%	1	11%	19	100%	2	67%
> € 3000	0	0%	0	0%	0	0%	20	87%	8	89%	0	0%	1	33%
Health status indicators														
Smoking habits	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Yes, I currently smoke	2	17%	5	25%	11	50%	0	0%	1	11%	0	0%	0	0%
No, but I used to smoke and quit	3	25%	6	30%	3	14%	4	17%	1	11%	2	11%	0	0%
No I have never smoked	7	58%	9	45%	8	36%	19	83%	7	78%	17	89%	3	100%
Physical activity	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Not at all active	3	25%	8	40%	3	14%	1	4%	0	0%	1	5%	1	33%
Moderately active	4	33%	10	50%	10	45%	12	52%	3	33%	13	68%	2	67%
Moderately to very active	4	33%	2	10%	6	27%	6	26%	6	67%	3	16%	0	0%
Very active	1	8%	0	0%	3	14%	4	17%	0	0%	2	11%	0	0%
Total	12		20		22		23		9		19		3	

EXPLORATORY FACTOR ANALYSIS

EFA1 was carried out on 12 items related to the dimensions of food shopping and food environment (see Table A5). This resulted in 4 distinct factors:

- Availability of plant and animal foods in the store
- Promotion of fruit and vegetables in the store
- Accessibility of the store
- Price of fruit, vegetables and fish

The first factor *Availability of plant and animal foods in the store*, captures information about consumers' perceptions of the availability, quality and choice of plant-based (fruit, vegetables, pulses and oils) and animal-based (meat, eggs, dairy, fish) products in their neighbourhood. This factor measures the weight that information about, for example, a wide range of animal-based products available in the neighbourhood and the availability of animal-based products has on the consumer's food shopping environment. The *Promotion or discount on fruit and vegetables* factor draws on information about the presence of promotions and discounts on these food categories in the store where participants buy most of their food. The third factor, *Accessibility of the store*, indicates how consumers travel to the store where they buy most of their food and how long it would take to get from their home to the store, so the relevance of these two variables in the factor analysis gives an idea of how store accessibility, which is an objective dimension of the neighbourhood of our consumers, influences the store food environment. The last factor, the *Price of fruit, vegetables and fish* in the store where the participants buy most of their food, is an external dimension counted in the store food environment of the Italian, Greek, Swedish, French, Polish and Irish sample; especially the price of fish explains much of the information related to this factor, but the price of fruit and vegetables has the main relevance in creating this factor.

EFA2 was carried out on 7 items related to the block of questions on restaurants/eating out (see Table A6). The items with a satisfactory KMO value define two factors:

- Availability and promotion of healthy meal
- Menu content

The first factor *Availability and promotion of healthy meal* includes information about the availability of healthy menus in the restaurant, considering also the availability of vegan/vegetarian menus and the consumer's opinion about the cost of the healthy options. The second factor *Menu content*, includes information about the participants' perception of the presence of signs and displays encouraging the choice of unhealthy food or of the healthy option and whether the restaurant provides nutritional information (such as calorie content) on a menu board or on the menu.

The EFA3 was conducted on 24 items related to the availability and accessibility of different food items in the participants' homes; twelve are the items with a satisfactory KMO value (see Table A7). As a result, the following three factors were identified:

- Junk food and processed meat
- Red meat and dairy
- Fats and carbs

The first factor *Junk food and processed meat,* includes information about the availability of junk food, in particular sweets, snacks, sugar-sweetened beverages and processed white and red meat in the homes of the participants. *Red meat and dairy* products (milk or derivative equivalents) are also available both of which can be stored in the refrigerator/freezer. Finally, a third factor was identified, *Fats and carbs*, that includes information about the availability of plant oils, dairy fat, potatoes and refined grains.

CLUSTER ANALYSIS

This section presents the main results of the application of cluster analysis to the nine factors, the results of which led to the identification of two homogeneous clusters (see Table A8) .

The first cluster of 48 consumers is labelled *Experiencing potential healthy food environments* and includes consumers who live in a neighborhood where there is a wide range of high quality products, both plant- and animal-based, and when consumers shop in the store where they buy most of their food, they perceive that there are promotions and discounts on fruit and vegetables, but they consider the price of these items quite high as also the price of fish. It does not take much time for them to travel from home to the shop. In the restaurant where they usually eat out, it is not difficult to find healthy options on the menu, such as vegan and vegetarian meals. There are no displays or signs to encourage the choice of unhealthy or healthy options and no nutritional information on the menu is provided. Junk food, processed white and red meat, potatoes, refined grains and fat (oils and dairy) are available in their homes.

The second group of 19 consumers is labelled *Inaccessible healthy food environments* because it takes more than 10 minutes to travel from their home to the shop where they buy most of their food, they do not walk or cycle, and they have difficulty finding a wide range of good quality animal- and plant-based products in their neighborhood. In addition, there are no promotions for fruit and vegetables, but they do not consider the price of fruit and vegetables to be high, nor the price of fish. In the restaurant where they most often eat out, it is difficult to find healthy options, especially vegan or vegetarian meals. There are no displays or signs to encourage the choice of unhealthy or healthy options and no nutritional information on the menu. Red meat and dairy products are available at home.

In terms of socio-demographic characteristics (Table 5), the two clusters are significant in terms of age, country, level of education and employment status. The first cluster of 48 "Experiencing potential healthy food environments" consists mainly of women (76%), 60.87% of whom have a Bachelor's (34.78%) or Master's (26.09%) degree. 56.52% come from Ireland (30.43%) and Sweden (26.09%). 41.30% of them are aged between 29 and 43 years and 71.88% of them have a full-time job and (46.8%) have a high income between €3000 and more than €7000.

The second cluster of 20 consumers, *Inaccessible healthy food environments*, consists mainly of women (78.9%). 26% of them do not have a degree, but 31.5% of them have a master' degree. 47.3% are from Greece. 52.6% are between 65 and 82 years old. 71.4% of them are not currently employed (e.g., student, military service, internship, volunteer, retired, early retirement). 42.8% of them have a medium income between €1000 and €3000.

Table 5: Comparison of the clusters in the merged small-sample dataset by age, country, level of education, employment status				
	Cluster 1 "Experiencing potential healthy food environments (n=48)		Cluster 2 "Inaccessible healthy food environments" (n=20)	
Age	Freq.	*%*	Freq.	*%*
19-24	6	*12%*	2	*5%*
25-28	9	*18%*	3	*16%*
29-43	19	*39%*	2	*10%*
44-64	7	*14%*	3	*16%*
65-82	5	*10%*	10	*53%*
Total	48	*100%*	20	*100%*
Country				
Italy	7	*15%*	1	*5%*
Greece	2	*4%*	9	*45%*
Poland	7	*15%*	0	*0%*
Sweden	12	*25%*	0	*0%*
France	4	*8%*	4	*20%*
Ireland	14	*29%*	5	*25%*
Germany	2	*4%*	1	*5%*
Total	48	*100%*	20	*100%*
Level of education				
No degree	0	*0%*	5	*25%*
Primary school degree/ elementary school	1	*2%*	3	*15%*
Junior high school	9	*19%*	0	*0%*
High school degree	4	*8%*	1	*5%*
Vocational school degree	16	*33%*	3	*15%*
Bachelor's degree	13	*27%*	6	*30%*
Master's degree	3	*6%*	2	*10%*
Doctoral degree	2	*4%*	0	*0%*
Total	48	*100%*	20	*100%*
Employment status				
Full time	24	*69%*	3	*21%*
Part-time	3	*9%*	1	*7%*
Unemployed	2	*6%*	0	*0%*
Company leave	1	*3%*	0	*0%*
Not employed	5	*14%*	10	*71%*
Total	35	*100%*	14	*100%*

3.3 Spain

The Spanish sample consists of 210 observations, but for 53 respondents values are missing, so the analyses were carried out on a total of 157 participants. 51% of the participants are female, 47% of the sample is aged between 44 and 64. 30% have a bachelor's degree, 51% have a full-time job, 34% have a net monthly household income of > €3000. As indicators of health status, we asked participants to answer two questions, one about smoking habits and the other about the level of physical activity they do: for the Spanish sample, 37% of participants are non-smokers and 36% do moderate physical activity. Full details of the participants' socio-demographic characteristics and health status are given in Table 6.

Table 6: Socio-demographic characteristics of the Spanish sample							
Gender							
Female		Male		Non- Binary		Missing Value	
107		47		3		53	
51%		*22%*		*1%*		*25%*	
Age							
19-24	25-28		29-43	44-64		65-82	Missing value
2	2		31	98		24	53
1%	*1%*		*15%*	*47%*		*11%*	*25%*
Level of education							
No degree	Primary school	Secondary school	Vocational/High school	Bachelor's degree	Master's degree	Doctoral degree	Missing value
0	1	5	30	64	38	19	53
0%	*0%*	*2%*	*14%*	*30%*	*18%*	*9%*	*25%*
Employment status							
Full time job	Part-time (15-29 hrs/week)	Part-time (15hrs/week)	Unemployed, looking for job	Temporary Company leave	Apprentice	Currently not employed	Missing value
107	9	4	4	3	1	29	53
51%	*4%*	*2%*	*2%*	*1%*	*0%*	*14%*	*25%*
Household net monthly income							
€0-1000		€1000-3000	> € 3000		Prefer not to say	Missing value	
3		69	72		22	53	
1%		*29%*	*34%*		*10%*	*25%*	
Heath status variables							
Smoking habits							
Yes, I currently smoke		No, but I used to smoke and quit		No, I have never smoked		Missed value	
22		57		78		53	
10%		*27%*		*37%*		*25%*	
Physical activity							
Not at all active, mostly sedentary		Moderately active	Moderately to very active		Very active (at least 5 days a week)	Missing value	
14		75	56		12	53	
7%		*36%*	*27%*		*6%*	*25%*	
Total							*210*

EXPLORATORY FACTOR ANALYSIS

EFA1 was carried out on 15 items related to store food environment' dimensions (see Table A9). This yielded 5 different factors:

- Store availability of plant- and animal-based food
- Price of different foods in the store
- Promotion or discount on fruit and vegetables and red meat
- Location in store
- Location in the store of unhealthy choice

The first factor *Store availability of plant- and animal-based food* draws information about consumer perceptions of the availability, the quality and selection of plant-based (fruit, vegetables, legumes and oils) and animal-based (meat, eggs, dairy, fish) products in their neighbourhood. This factor measures the weight that information related to, for example a large selection of animal-based product available in the neighbourhood and availability of plant-based product, has on the Store food environment. The second factor *Price of different foods* in the store where participants buy most of their food is an external dimension counted in the store food environment; especially the price of fish explains most of the information related to this second factor. The *Promotion or discount on fruit and vegetables and red meat* factor draws information about the presence of promotion and discounts on these two types of food categories in the store in which participants buy most of their food. The fourth factor, *Location in the store*, indicates how location influences the store food environment, especially when the food items are located at the eye-level on the shelves or near the cash register; while the *Location in the store of unhealthy food* factor indicates that many unhealthy choices can be incentivised because they are near the cash register.

EFA2 was carried out on 7 items related to the block of questions on restaurants/eating out (see Table A10). The items with a satisfactory KMO value define two factors:

- Availability and promotion of healthy food
- Availability and promotion of unhealthy food

In fact, the first item Q3.5.1. "There are many healthy menu options at the restaurant" explains the first factor *Availability and promotion of healthy food* for 56% but not the second; and in the same way the item Q3.5.2 "It is difficult to find a healthy option when eating out at the restaurant" works for the second factor *Availability and promotion of unhealthy food* but not for the first. The first factor includes information about how easy it is to find vegan/vegetarian menus in the restaurant, whether "the restaurant provides nutritional information on the menu board or on the menu" and the promotion of healthy options. The second factor includes information about the participants' perception of the presence of signs and displays encouraging the choice of unhealthy food on the menu and their opinion about the cost of the healthy option.

EFA3 was conducted on 24 items related to the availability and accessibility of different food items in the participants' homes (see Table A11). As a result, the following four factors were identified:

- White meat availability and accessibility
- Junk food availability and accessibility
- Pulses availability and accessibility
- Dairy eggs availability.

The first factor *White meat availability and accessibility* includes information about the availability of white meat in the homes of the participants and the way it is stored in the fridge/freezer with other types of meat or in the compartment for fresh or frozen fish. *Junk food availability and accessibility* indicates that junk food is also available in the homes of Spanish consumers, especially sweets and crisps, both of which can be found on the kitchen counter. *Pulses availability and accessibility* indicates that legumes are also available, and are stored in different ways: canned/dry or frozen. Finally, the last factor *Dairy eggs availability* indicates that for Spanish consumers, also dairy products and eggs are important items available at home.

CLUSTER ANALYSIS

This section presents the main results of the application of cluster analysis to the eleven factors, the results of which led to the identification of two homogeneous clusters (see Table A12).

The first cluster of 93 consumers was labelled *Healthy food environment experience* and includes consumers who live in a neighborhood where there is a wide range of high-quality products, both plant-and animal-based, and where the restaurants where they most often eat out offer and promote healthy food. In their homes, white meat is available and accessible and is preferred to other protein sources such as eggs and legumes.

The second group of 13 consumers labelled *Unhealthy food environment experience* has difficulties in finding a wide range of high quality animal- and plant-based products and when shopping they perceive that the price of different types of food (fish, red meat, white meat, fruit and vegetables) is quite high without having the opportunity to take advantage of promotions or discounts on fruit, vegetables and red meat. They notice and perceive that the food close to the cash register is mostly unhealthy. In the restaurants where they most often eat out, it is difficult to find healthy options and there are signs and displays that encourage overeating and/or choosing unhealthy meal options, plus the choice of healthy option is discouraged because of the higher prices. In their homes, junk food, including sweets and snacks is available and accessible on some counters of their kitchen.

In terms of socio-demographic characteristics, there are no significant differences between the clusters, so a descriptive description of the cluster composition is provided:

The first cluster is largely female (65.5%), 41% have a bachelor's degree, 50% have a net monthly household income of between €3000 and more than €7000 and 73.3% have a full-time job. In terms of health status indicators, 40% and 43% of consumers in the first cluster were smokers but have stopped and are non-smokers and overall, 78% carry out moderate to very active physical activity. In general, 75% of them consider their health to be good or very good. The household of 50% of them consists of 1 or 2 family members.

The second cluster is composed mainly of women (69.2%), 38.5% of them have a master's degree, 46% of them have a net monthly household income between 1000 and 3000 € and 69% of them have a full-time job. In terms of health status indicators, 46% of consumers belonging to the second cluster were smokers but have quit or are non-smokers and overall, 92% carry out moderate to very active physical activity. In general, 91% of them consider their health to be good or very good. The household of 69% of them consists of 1 or 2 family members.

4. Photovoice and Focus groups

Section 4.1 introduces how the different dimensions of food environments are experienced by the members of each Living Lab based on the assessment of the Living Lab Leaders of the focus group discussions that they had facilitated. Section 4.2 highlights the most relevant themes and insights that emerged from the open coding process of the qualitative data.

4.1 Lived experience of participants across the dimensions

FRANCE

Availability & accessibility. Most families buy their food from the supermarket. The images taken by the youngsters bear witness to this. Around ¼ goes to the market, more especially during spring and summer. Children go to supermarket most of the time with their mother, few with their father. Most of the time they go into the closer supermarket (closer by car) and make a mix with 2 or 3 supermarkets according to their income. There are no images of vegetable gardens, but an egg carton showing eggs produced by the children's grandparents (Picture 2). However, some children, particularly in suburban areas and rural areas, have a small garden in which they can grow tomatoes, lettuce, strawberries, etc., as well as a few fruit trees.

Living Lab leaders added images of farms and fields to the photos, however, very few children, mostly aged 12 and over, chose these images and were able to talk about them or make links between agriculture and their food. One of the original features of the results is the important role played by bakeries. In fact, they offer children, particularly those aged 10 and over, a start towards autonomy in terms of eating for pleasure and reward. They can go here by themselves, by foot. Some bakeries are close to their home or to their school. On one hand, bakeries become a place where they can buy by themselves some cakes for snacks afternoon, and worst, instead of breakfast (from artwork presented by students). On the other hand, most of them are very aware of the fact that having a home-made cake is healthier for them. Buying (or eating, i.e. in restaurants) outside home becomes what they call "food for pleasure, even if it's not good for health". The vast majority of children are very aware of the need to eat real, local, organic and minimally processed products. However, they know more or less where the food is produced, or whether it is imported. They are also very aware of packaging and the pollution it causes. Some of them are aware. Some are made aware of the pollution linked to pesticides on and in food, and the impact on their health.

Picture 2

Source: © INRAE 2023

Social interactions & home food environment. Lived and expected social organizations of food in our cases can be analyzed according to 3 aspects: (1) the sub-family interactions, i.e. meals shared between all family members, grand-parents, cousins, brothers ..., (2) interactions only between parents and the child and (3) interactions between the child and his friends. Lived social organizations it's when teens can describe the relations and emotions that some food or a meal situation cause: i.e. cooking with their parents, share a food

with a friend. The "home-made" was quoted several times. Meals prepared at home are generally perceived as better than canteen meals. Restaurant meals are more popular as the image of an exceptional meal that "mum doesn't know how to make" or of a time for family celebrations and sharing adds to the positive values of eating out. A minority of children cook with their parents. For those who do, our surveys show that before the age of 11 both boys and girls contribute to the family meal, but more specifically to the preparation of desserts, tarts and cakes. After the age of 12, girls are more involved in preparing the meal. In the eyes of children, homemade food is the most important factor in terms of nutritional quality: it's natural, contains no chemicals, you know what's in it, and it's a sign of love from the parent who spends time preparing it... However, we can see that these preparations are outweighed by the real quality of the products that parents choose. On reality, the children's point of view of homemade is in fact "only made at home", whatever the products: like homemade hamburgers, for example. When it comes to canteens, children's social representations are very negative. In other words, canteen food is not good. Our LL work has enabled us to explore this issue in greater depth, to try and understand why this is so. From the young people's point of view, several reasons stand out: meat always tastes the same, fresh produce such as fruit is of poorer quality than at home, etc., but above all the notion of a Pleasurable Meal. In their eyes, this meal of pleasure is the equivalent of a restaurant. Depending on the social category, it's either the equivalent of a fast-food meal at the canteen, or a gourmet menu.

Emotional aspects. Both negative and positive answers could be pronounced. Emotions appeared according to different categories of food representations: **1. the unrecognizable food**: some of the images showed dishes prepared in sauce. The blended appearance gives the dish a chunky shape which, for the younger children, looks like vomit and, for the older children, cannot be explained if they have never seen the dish before. The children themselves came up with solutions: separate the various ingredients that make up the dish, arrange them to give it a certain aesthetic appeal. **2. Food that reminds us of a social value that we don't share**: we were surprised by the reaction of the under-8s in particular about the importance of not killing animals to eat, but in the end, most of them don't know the composition of the meat dishes they eat. **3. Food in relation to health** (physical and mental): some children remind us what makes them allergic, for example, or the question of different tastes in different people. Certain foods are mentioned because they don't seem to be good for their health, diverse and less processed. They know this perfectly well, but like to eat them and explain this in a somewhat guilty way... justifying themselves once again on the fact that they are home-made or that the meal is a pleasure or a comfort (as a cuddly toy). **4. "Top health" foods or social injunction food**, particularly fresh fruit and vegetables, which are rarely cooked. The majority of children cite these as their favorite foods. For those who don't like them, they will cite them as essential foods, especially as they are "beautiful" because they are colorful and individually recognizable. We believe that the national slogan: "eat 5 fruits and vegetables a day" contributes to this representation. As a result, compote becomes a less popular food, and because it's served in a plastic pot it's sometimes even mistaken for yoghurt. **5. the funny food**: Shape, color and packaging are important criteria, as they are reminiscent of something funny (a laughing face, an extraordinary color, a strange shape, etc.) and quickly attract children because it makes them laugh. For the under-10s, they would like the foods they don't like to become funny. For teenagers, they have produced a film on this very theme to highlight a trap that children (and parents) fall into: the more colorful and complex the packaging, the greater the chance that the food is ultra-processed.

Visions & expectations. The main themes that emerged from the discussions were: Food for a better Health, Stop pollutions by chemistry and plastic packaging, Varied and local food offer, Less fat and sugar recipes, Valorization of the Home-made, More beautiful and funny food, Cooker of school restaurants should more communicate to children and look at their demands, Values around meat: eat less, eat insects, less kill animals.

GREECE

Availability & accessibility. Participants live in the Attica region. Most of the participants reported using a combination of supermarkets and farmers markets for purchasing foods, and most of them purchase fresh fruits and vegetables from farmer's markets. Many participants reported that shopping at the farmer's market is more familiar to them and also more affordable. The decision to shop foods at the supermarkets or the farmer's market is guided by the price (with most reporting that farmer's markets are cheaper) and the quality of the products (mostly focusing on the use of pesticides and relevant inspections and quality controls). Regarding the latter, opposing views were reported, with some believing that foods in the supermarkets have undergone more quality controls and thus are safer. On the contrary, some others believe that foods from farmer's markets are more "natural" and that the organised food industry that includes supermarkets is driven mainly by profit and thus believe that the safety of foods in supermarkets is questionable. Most participants prefer to purchase food products by themselves, with few reporting needing help by other persons (mainly family members), while rare use of delivery services in food purchasing is reported. Many participants report that food markets are within walking distance from their house and thus they have access to food markets on foot, while others use a combination of "on foot" and by car. Almost all participants reported that they do have access to healthy foods, although some limitations exist (primarily regarding food price) that makes them look for alternative choices within each food group.

Affordability & price. Almost all participants reported that food prices are very high and that they have to look for alternative choices in some circumstances. They reported that due to the high price they have to limit meat (red or white) consumption and consume more pulses instead. Many reported that they had to look for alternative choices in fish consumption, for example purchase small (and less expensive) fish (Picture 3) or purchase fish from fish farming instead of pelagic fish. Some substitutions in fruits were also reported, mainly purchasing local and seasonal fruits that are cheaper (Picture 4). Some participants also reported that due to the high cost they have to limit ready-to-eat foods or eating out.

Availability & access to information. The moderators judge the level of food literacy of the two groups of participants as moderate. Many of them had distorted perceptions of what a healthy diet really is. Most of the participants reported being informed on foods and diet from television or internet. Most of them raised questions on the validity of the available information that can have access from the internet.

Cultural aspects & interactions. Many participants reported that their diet is influenced by traditional-religious practices in Greece, for example avoiding meat products at least two days of the week or for an extended period of time (40 days) before Christmas and Easter holiday. Those engaged to these practices reported that they do so mainly for health reasons and to a lesser extent for religious reasons. Many others reported that these practices have faded in the Greek population and thus they do not follow such practices.

Social interactions & home food environment. Most participants reported that they do follow family meals and that their family influences their overall nutrition. Some participants reported that women may be better in purchasing foods or organise the meals of the family, although this practice is not reported by many others.

Picture 3

Source: LL Greece

Picture 4

Source: LL Greece

Emotional aspects. Most participants reported the lack of reliable information and some of them the lack of time.

Visions & expectations. Almost all participants reported that they wish to see a reduction in food prices. Many believe that the high prices of the products are the result of the high profit of intermediaries and wish for more effective inspections. Some others believe that the high price of the products is driven from the food industry or even the overall financial-political system of westernised societies. Most reported that they wish to see more inspections and more strict rules regarding the use of pesticides and fertilizers. Some participants reported wish for a strengthening of the primary production from the government and the European Union and also with to see more responsible and educated food producers (mainly farmers).

HUNGARY

Availability & accessibility. Accessibility is largely influenced by price and not having a car. Place of residence is an important factor, but emotional/habitual and financial aspects can override it. Participants often do not have time to do shopping separately, hence they go to large shopping centres where they can do everything in one place instead of going to several places.

Affordability & price. Prices strongly influence food choices. The money/time cross-section has the biggest influence on how and what they eat. Participants shared needing to plan ahead to be able to afford even small things. Some of them use paper and pan, some are using special applications on the phone to support planning and budgeting (Picture 5). In one of the focus groups, participants recounted organizing everything around discounts/sales. They mentioned deciding what to eat based on looking out for discounts in the stores and paying attention to what is in promotional magazines. It was a common experience to look through the magazines and circle what they are planning on buying. Participants also mentioned travelling great distances within the city to be able to take advantage of certain sales. Socio-economic status seemed to influence all aspects -also the frequency of shopping.

Picture 5

Source: LL Hungary

Availability & access to information. Attaining information online was the one most frequently mentioned. Finding best practices, recipes, and help - community. They expressed the feeling of being lost among all the information, not knowing whom they can believe and trust. Most participants agreed that information they teach in school is not relevant and they also shown diminished trust towards experts and nutritionists.

Cultural aspects & interactions. Participants were very different with regards to openness and curiosity towards dishes from other cultures and novelty in general. While some were very strongly attached to family traditions and "how things are supposed to be", others showed great level of openness. They mostly credited this to the influence of being exposed to various cuisines and dishes as a child and personal connection (e.g. living abroad, having a foreign family member). Participants were aware of the traditions of Hungarian cuisine, when they said something specific about the Hungarian cuisine (Picture 6), an experience of shared/ common knowledge was present. They expressed that family traditions and peer pressure, especially from members of the family play an important role in how and what they eat. They also shared that for most of them (all participants were single mothers) it is difficult to make their children try new foods. Many of them expressed that they are placing conscious effort on introducing novel foods by making it into a game/ritual/tradition for the children.

Picture 6

Source: LL Hungary

Social interactions & home food environment. Participants expressed that they lack support in their daily lives, not only from peers but it general, which might be an especially important aspect for this target group as they are mostly coming from disrupted family structures. They shared that in most cases they are the ones doing all food related chores, sometimes involving their children, mostly in shopping. They shared that as a single parent, they can get social support and solidarity from neighbours, from the Single Parents' Foundation, colleagues, etc. It emerged strongly how family disruption can influence eating habits. Some of them also expressed that there is a difference between what they eat as a mother and what the children eat (due to food sensitivities and children eating in the institutional canteens). Being an example to the children was important for many of them. Participants naturally supported each other with sharing tips and tricks and good practices on the spot, during the focus group discussion. In addition, shared stories of trying out recipes they shared during the first meeting where we introduced the task. They also expressed that the most valuable part of their participation was being able to come together with people who are living a similar experience and experience a sense of community.

Emotional aspects. Many of them shared experience where eating was associated with negative emotions, especially talking about sweets and unhealthy foods and how they could feel worse after eating. At the same time, many of them showed a higher level of awareness and they talked openly about the importance of consciously managing emotions and eliminating problems at their root rather than focusing on symptomatic

treatment. The influence of the menstrual cycle and the different emotional landscapes that emerged at each phase on eating habits were also mentioned.

Visions & expectations. Community gardens and closeness to nature came up often (Picture 7). The community aspect and going towards a "greener" future were represented in almost all of the drawings in one way of another.

Picture 7

Source: LL Hungary

Any other perceptions. Time pressure has played a dominant role in both focus groups in connection with stress and in connection to their family situation. Various illnesses (both sudden accidents, or terminal illness and food sensitivities) in the family can make their life difficult and have a big impact on their eating patterns (Picture 8). During the discussion, mothers shared various tips on how to save money and find cheap but healthy food alternatives. Moreover, there was a discussion around the topic of femininity, hormones, and menstruation. Children are picky and because of convenience and time constraints, participants mentioned being willing to let them eat certain things they would not normally allow. During the discussion, the topic of recycling and the use of food waste emerged. Also, various practices on how to share leftovers came up as an interesting topic for single mothers. It was connected to mainly online Facebook groups and communities. Accepting leftover food is unpleasant - they mentioned that they feel it is socially despised - and also the ingredients are unknown therefore it might be dangerous.

Picture 8

Source: LL Hungary

IRELAND

Availability & accessibility. Participants perceived that UCD provided access to a variety of foods; however, made particular reference to those with specific dietary requirements possibly being restricted. Students also commented on accessibility in terms of affordability, noting that although the options are available on campus, it may not be feasible for students to purchase these regularly due to the expense of the items (Picture 9). All participants reported that access to food on UCD campus is within walking distance. Students reported, albeit limited, sometimes using delivery services on campus. Some participants perceived it difficult to get access to healthy foods, e.g., fruit, vegetables and salads. In addition, some participants acknowledged

Picture 9

Source: LL Ireland

that healthy foods are available; however, reported additional barriers to accessing them as a student such as price and portion size.

Affordability & price. Price appears to be a priority when considering food choices on campus.

Availability & access to information. Participants identified a range of sources, such as Government guidelines, family, friends, school and social media/ online information. Some of those studying nutrition-related degrees made particular reference to the Government guidelines. Participants commented that accessing reliable information may not be a priority for students and that they may place greater importance on other competing factors, such as social influence, ease of access and taste.

Social interactions & home food environment. For the participants living at home, the majority reported eating dinner with their families. For those living away from home/ sharing accommodation, participant tend to consume their meals in isolation (Picture 10)

Picture 10

Source: LL Ireland

ITALY

Availability & accessibility. Access to food is all in all easy, supermarkets are fairly close to homes, but everyone comments that they are mostly expensive. The cheapest supermarkets (discount stores) are mostly out of the way, outside residential areas. Citizens tend to walk or take the bus to the supermarket. Few prefer to drive. Average distance 500-700 meters. They do not use online shipping. Some get help from neighbors when they are in distress (e.g., immobilization at home due to health problems). Access to farmers' markets is limited by the high cost of food sold, although they would be attracted to it (Picture 11). It is therefore difficult to access healthier food mainly because of the cost. The price of food has risen greatly, particularly in recent years, and citizens would be incentivised to eat better by more affordable prices.

Picture 11

Source: LL Italy

Picture 12

Source: LL Italy

Affordability & price. It seemed that choices are indeed strongly influenced by cost (Picture 12). No one reports not caring about groceries when shopping, and everyone reports noticing an increase in the average price of food and not finding healthy food at a low price.

Availability & access to information. The main factors influencing access to information include culture, age, access to internet/television, sharing time with other people. The level of food literacy of the group was more than expected, participation in this project created a lot of interest in the topic. Information is gathered through television programs and by word of mouth. Mass information prevails. Some people show mistrust of 'Bio' due to beliefs that it is all about 'label' rather than substance. The desire to find reliable information about food and food environment increased during the course of the task (between the two meetings).

Cultural aspects & interactions. Very much, especially for local Italians (in this case from Bologna) tradition represents the main factor influencing eating habits, which is difficult to transcend and has a strong "emotional" connotation. As far as immigrants are concerned, on the other hand, the cultural connotation remains strong. Some report that they continue to eat absolutely as they did in their country of origin, others have partially adapted to the Italian tradition, retaining some dietary cornerstones of the original culture. It emerges, as is well known, that food is not only a means of nourishment but also very much a way of reliving one's tradition and being together. Those who live alone are more likely to eat in a 'healthy' or at least less elaborate way, while convivial situations more often evoke less healthy habits (food excesses in general).

Social interactions & home food environment. It depends a lot on the household. Many people live alone or with two-family households: in this case there seems to be a certain 'traditionality': wife dedicated to food preparation, husband at most to shopping (Picture 13).

Emotional aspects. Again, the aspect of the high price of healthy food is very much emphasized as a negative aspect, so too is the emotional aspect of food perceived a lot and, in this case, it is noticed a lot more when it is associated with something negative (being depressed/unhappy=eating worse).

Being informed about good eating habits helps in making choices, and many of them feel they have improved in this respect since becoming informed about the PLANEAT project – food related behavior context

Picture 13

Source: LL Italy

Visions & expectations. Changes and interventions do they wish to see Include more accessible healthy food, less plastic and reduced sale of and access to junk food (Picture 14). Expectations for an ideal future food environment are limited: in general there was quite a lot of cynicism about a better future - more vague hopes than expectations - a lot of disillusionment about the modern generation. Some want to improve their lifestyle but are not sure if they can make it, however they are happy to inform themselves.

Picture 14

Source: LL Italy

POLAND

Availability & accessibility. Our interviewees live in the postindustrial, urbanised location of Nowa Huta district, and they have always had "some" access to (smaller or bigger) local shops and supermarkets. However, these often have not been places preferred by our interviewees. Therefore, they often go somewhere further, which can be difficult when one does not have a car (which was sometimes the case). Along with travelling to another, farther away store, there were other coping strategies for shortages of better quality food or desirable products (often these strategies occurred together). Some people go to different shopping places and make "selective" purchases at each one. A critical narrative on the quality of fruits and vegetables in bigger supermarkets often recurred throughout the research. Therefore, the interviewed people preferred to buy vegetables and fruits at local markets, where they already have befriended sellers who, if the product was of inferior quality, due to familiarity, informed them. Private networks of relatives are also an important source of supply. A major role in supporting parents (actually mothers, since all of the focus participants were women) is played by women from the older generation: mothers or mothers-in-law. According to the conducted focus interviews, 5 of the women interviewed are raising children on their own, and in these cases in particular, an important function was played by their own mother helping them. We can speak here of a form of managerial matriarchy, which is a common role for women in Poland, in which they are "overloaded, devoting themselves to their loved ones, convinced of their irreplaceable skills, managers of family life" (Titkow et al., 2004: 65). The vast majority of our interviewees regarded a school tuck shop as a significant obstacle to healthy eating, claiming that "apart from water, one can get nothing healthy there". Self-production of food is mentioned by most of the interviewees. They mostly live in apartments and rarely have regular gardening options but they use informal connections: via family and friends' networks. Family living in rural areas are frequent sources of fresh produce, eggs and meat. Also city allotments owned by interviewees or their friends and neighbors are places where food is both produced (afternoons, weekends) and collected. The post-industrial profile of the population can be recognized here: people migrated to Nowa Huta in 1950s and 60s from small villages. Nowadays these family connections tie working class Krakow citizens to their farming families – via food transfers. Intergenerational connections are particularly strong (older generations supporting young families/parents of small kids).

Affordability & price. The interviewed parents are willing to pay more for fruits and vegetables when higher price results in higher quality. In such cases, they usually buy them at local marketplaces or vegetable shops – sellers that they know are also a guarantee of quality. This shows once again how important individually developed access paths to healthier food are (rather than system-based ones). Sometimes the interviewed women had access to better quality food (e.g. village eggs) through their relatives who lived there, and in this way they avoided paying more for products they believed were of better quality. Due to the relatively low socio-economic status (and often other factors like illness or disability of the family member which further contribute to their difficult life situation), the interviewed mothers often tried to look for cheaper products to save money. This involved looking for discounts and visits to various shops. However, looking for cheaper products did not always mean looking for the same quality (or products), but the same "taste" (see the quotations). The fact that research participants buy more products on promotion when they have more money (and, for example, freeze these products) is also indicative of their difficult financial situation. Paradoxically, sometimes a worse economic situation indirectly contributes to healthier eating, as one of the interviewed women declared, they are not eating out (in MacDonald's restaurants or kebab bars) because it is too expensive. One woman, who stood out from the group as she did not eat meat and wanted to switch completely to a plant-based diet, was looking for some cheaper vegan food options, and tried to make homemade oat milk. Participants who were discussing financial constraints usually mentioned coping strategies developed to keep good quality and/or good taste of products. In order to save money and still have a 'decent meal' they use their cooking skills, spend more time, go to different stores (see selective shopping above), use personal and family networks to have access to cheaper, but still good food. They rarely focus on price only – usually it's elaborate juggling with money, taste, health etc.

Availability & access to information. Research participants gathered information mainly from the Internet. However, this seemed to be mainly practical information on recipes rather than educational information on, for example, the nutritional value of some products. Popular culture (cooking shows, TV advertisements) was also an important and easily accessible source of information about healthier eating practices but also some

novelties, like persimmon, not very well known in Poland. The abovementioned woman who was interested in switching to a vegan diet drew information from a book she had bought specially. Also, one of the interviewees (the second vegetarian in the sample) was familiar with the idea of food sharing and Facebook groups practicing it.

Cultural aspects & interactions. The diet of the research participant was quite traditional in several ways (Picture 15-16). First, they were not very eager to try new cuisines. When they mentioned some culinary experimentation, these were more a return to traditional Polish cuisine from the past like tripe stew, bigos (hunter's stew) or beef tongue. Second, as shown by these examples, the diet was also traditional because it was based on meat. Among 16 research participants, two were vegetarians. Third, if men are concerned about what they eat, this is usually because they are training at the gym and their diet is influenced by gym culture. Even though foreign food is increasingly easy to access in Poland (popular supermarkets organize Asian/Mexican/Spanish/Italian/Greek weeks during which they sell more products from these cuisines) our interviewees did not use these opportunities. It seems that the younger generation is more likely to try food that is less common in Poland (some research participants mentioned their children eating sushi or persimmon). Italian cuisine is generally quite popular in Poland (and our interviewees mentioned pizza and pasta). It seems that it is attractive for Poles because on the one hand it is something different than traditional Polish cuisine, but at the same time it is something that Poles have managed to familiarize themselves with. Although Poland is perceived as a highly religious country, religious issues (e.g. giving up meat on Fridays, fasting) did not appear during interviews. When asked about eating habits that are religiously motivated (e.g. cooking special dishes for religious holidays), interviewees did not take up the subject. This may result from the fact that religiosity and belief of the working class is usually not articulated and remains latent until the need appears. Also, religion in Poland is often something "habitual" and ritualized. Therefore, for instance preparation of sausage or cake for Easter will not be interpreted as connected to religion, but rather to a "natural" annual cycle.

Picture 15

Source: LL Poland

Picture 16

Source: LL Poland

Social interactions & home food environment. Responsibility for food preparation falls mainly on women. It was often claimed that men are "helping", which also suggest that planning what to eat and cooking is mainly women's domain. In many cases, men were virtually absent in these narratives. Also, the fact that no men came to the focus group is meaningful. Men also rarely come to parents-teacher meetings at school (where participants were recruited), which can be interpreted as intertwining with childcare and food work at home. It seems that around 1/3 of the sample are single mothers. Some of them were living with their own mothers and, in such cases, the women were receiving substantial help from their mothers. The interviewed women often emphasized and took pride in the fact that their children help, or cook on their own, in the kitchen. Some of the kids started helping at a young age (e.g. 5 years old). The children's involvement in the kitchen

was also due to the fact that especially the mothers of the sons emphasized they do not want to "raise a prince". Respondents often pointed to the communal, integrative aspect of eating. Sunday, a day off from work, is a particularly important day. However, sometimes food is the subject of exchanges and deals. One of the women mentioned she and her husband eat at McDonalds in secret from their children. Maybe this was because they want to "hide" unhealthy eating practices to give them only a good example, but it turned out this is due to their children's "voracity" (and perhaps also financial constraints). The same woman declared that she has a special lockable cabinet for sweets, because otherwise her kids would eat everything and nothing would be left for her. Maybe this is a pattern in bigger families (the woman mentioned was the mother of three children), as another woman (a mother of seven) said she does not eat everything, but whatever is left she can give to her kids, because they will eat everything.

Emotional aspects. Food selectivity was a problem that recurred in the interviews. Unfortunately, we do not know whether in any case the selectivity was diagnosed by a specialist. Interestingly, among children, only boys had it. Food selectivity is an obstacle for experimenting and changing eating habits. Another obstacle is the lack of time (and sometimes the lack of will) to cook. Most women are double-burdened and circulate between work and home. In cases when the child eats lunch at school and they do not need to cook, then they usually do not eat lunch themselves (only breakfast and dinner). The lack of control also is a negative determinant. Many mothers mentioned that kids, when they are not with them, buy sweets and fast food. A big problem is that such food is easily available in the school itself. The root of this lies among others in the fact that children often seem not to be aware of the negative effects of unhealthy eating. Even when they are told by an authority like a doctor, they do not care about these warnings. What seems to be a better strategy is showing a positive impact of healthy food e.g. being stronger, having skin in better condition. Young people are more concerned about the opinion of their friends rather than an adult, and some respondents mentioned peer pressure as another negative factor. For instance, the daughter of one of the women did not want to take homemade breakfast to school (especially in a lunchbox, which is more noticeable for peers) because it was embarrassing for her. More "fashionable" breakfasts are those purchased e.g. Seven Days croissant. Among positive factors, one of the most commonly mentioned was time spent with the family: preparing and eating food together (Picture 17) . The visual aspect of food is also important. Often, even if something tastes good but the appearance or form of serving is wrong, children do not want to eat it. Some parents try to ensure that varied food is available, hoping to enrich their children's diets in this way (Picture 18)

Picture 17

Source: LL Poland

Picture 18

Source: LL Poland

Visions & expectations. Parents were unanimous that school tuck shop needs some changes and better control as they are a key source of unhealthy food. However, some of them were more skeptical, claiming that this would not be an effective solution as children would still be able to find a new place where they can buy sweets. Some of the interviewees pointed out that there is a lack of knowledge among parents about what is healthy and what is not. However, they also noticed that education on the subject could be counterproductive as people do not like bans and orders. The main change that parents themselves declared they wanted to make was to reduce the amount of sweets consumed by their children. Some of the research participants had a more global consciousness, noting that what is happening not only locally but also globally has an impact on the quality of individual lives.

Any other perceptions. Topics that emerged during the research concerned diet motivated by disease (e.g. diabetes) and breastfeeding. We discovered that food selectivity was often a problem. Also, respondents and their children often had some health issues, such as: tuberculosis (one lung has been removed), asthma, cancer, disability, diabetes, and pre-diabetic state. These diseases could have contributed to the low socio-economic status of research participants.

SPAIN

Availability & accessibility. The most purchased foods are fruits and vegetables (Picture 19-20). The purchase is made generally once a week but some of them shop every 2-3 days for some type of food. The access to food looks easy for most people. Most people shop in big supermarkets and sometimes in local shops. Those who are more isolated go by car and for large purchases in big supermarkets, for daily products on foot, especially in the city: shopping is done in the neighborhood. Everyone goes shopping by themselves. One person sometimes asks to have their shopping delivered to their home.

Picture 19

Source: LL Spain

Picture 20

Source: LL Spain

Affordability & price. They all agree that they have to buy in big supermarkets because it is much cheaper. They talk a lot about prices, they give it a lot of importance. A small store is identified as more expensive and although they try to go for "quality or proximity" but for large purchases they go to the supermarket. Most believe that prices have risen sharply for all types of food and are much more expensive if food is healthy or organic. They all agree that they have to buy in big supermarkets if they have to purchase a big amount of food because it is much cheaper. But they consider the quality important and are likely to buy fruit and vegetables or other concrete products in local shops that are much more expensive because of its quality and taste. They think the price is important if you have to buy big quantities of food, but it is also important the quality of it. Most of them find that ecological and healthy food is more expensive than regular food. One person explains that it is not difficult to eat healthy food because fresh products such as legumes, rice, pasta and others are cheap and also it is important to buy seasonal fruits and vegetables so that they're cheaper and tastier.

Availability & access to information. There is one person in the group who seems to be very proactive in looking for healthy foods and how to combine the dishes. The other participants do not seem so proactive in this regard and think more to like the taste of what they eat. In general, they don't search for nutritional

information of products but some of them commented on the use of blogs sometimes. Their main motivation to look for information in food labelling is the environmental impact by looking for km0 fresh products.

Cultural aspects & interactions. One thing to keep in mind is the great importance that all participants give to eating in the company of their family or friends (Picture 21-22). One participant explains that he travels a lot because of work and that makes it easier for him to be more open to try foods from other cultures. Great relationship with less healthy foods and celebrations (pizzas, sweets...). Most people consider themselves open to trying foods from other cultures, such as Japanese food. There are fewer participants who are willing or who have tasted more exotic things such as insects, even so, one participant says that it is easier for her to want to taste something of this kind if it is compressed into a product such as in the form of flour.

Picture 21

Source: LL Spain

Picture 22

Source: LL Spain

Social interactions & home food environment. Children have a great influence on what is cooked, since if they have different tastes, they try to adapt to it. For example, children find it difficult to eat more vegetables. Positive perception of eating with company. The TV also comes on as "company". Some attempt not to put TV on to talk but yes in as "background". The fact of being at home is experienced positively because of the possibilities it offers to devote more time to cooking, thinking about what you are going to do, etc. And most agree that due to the pandemic, more people are teleworking, and this means that they can be more at home, an experience that they value positively.

Emotional aspects. It's seen that the participants were shocked when comparing two pictures of food environments that were totally opposites, making them realize both realities. They see the environment of supermarkets in which there are so many unhealthy foods as negative. It makes it difficult for them to choose only healthier foods. They believe that there is a great relationship between emotions. When emotionally they are not well, they eat worse (foods rich in carbohydrates/sugars), as also in the opposite sense, if they eat worse emotionally, they also have a negative impact. At the level of ethics, there is also a great influence with different food aspects and emotions, such as not wanting to eat mammals or meat (ethical/environmental) and that eating them causes you emotional discomfort. They experience eating out in restaurants and celebrating with friends/family around a meal as a situation that generates positive emotions. When eating unhealthy food and having bad habits they usually feel bad emotionally. They don't like the fact that healthy food is more expensive than unhealthy options.

Visions & expectations. In the debate on the drawings, there was much talk about individual orchards, exchange of products and Km0 products. Also, about the importance of conserving and storing food, and sharing food and meals. They see a world with more healthy food, less plastic, more reuse, modifications with marketing and prices, political changes (taxes on plastic bags)... Individual gardens, exchange of products or Km0 products, preserve and save, family sharing, redistribution of food that is not consumed (reuse).

SWEDEN

Availability & accessibility. All participants are women in their late 20's with a partner. All seemed to utilize the car for larger grocery shopping trips.

Affordability & price. All participants had at least to some degree changed what they eat due to higher prices. They seem to more actively look for offers and go to multiple stores to access those food offers to save money.

Availability & access to information. Parents in Sweden go to Maternal health care and Children's health care services during pregnancy and up to the age of 6. The recommendations from Swedish Food Agency (SFA) are highly promoted at both services. All participants feel very proactive and use reliable sources, such as SFA.

Cultural aspects & interactions. A lot of emphasis on home cooked meals, and them being more nutritious. Most participants agreed, however one highlighted that semi-prepared food isn't necessarily bad or non-nutritious and used them to get family life to work. It seems like peer-pressure from children's friends have not had an impact in the families (at least not yet). Cultural backgrounds mentioned were Indian and a hunting-family, which influence eating habits.

Social interactions & home food environment. Two of the participants were on maternal leave. Particularly in one family it seemed like the male was in charge of most of the cooking. Grocery shopping was a male or family activity. A lot of the discussions focused on home cooked meals, and them being more nutritious, healthy and sustainable. One reason to choose home cooked instead of pre-cooked meals were lower sugar-levels. It sounded like the parents liked the social and emotional aspects of providing their families with "proper food".

Emotional aspects. Negative: All the food packaging that is left after preparing foods which results in more work (go recycle) and that it looks and smells nasty (Picture 23). All the junk food in supermarkets, there are lots of e.g. cereals for sales but most of them are crap. Positive: Local and homecooked meals were highlighted as positive determinants, involving the kids in cooking, preparing meals for the family, especially in the weekend when there is more time (Picture 24).

Picture 23

Source: LL Sweden

Picture 24

Source: LL Sweden

Visions & expectations. They all wanted food offers on healthy foods. And a larger number of options of healthy foods (cereals, muesli and pasta were given as examples). We were not expecting a participant focusing on game, and only eating game-meat. It never became clear why they only eat game, but interesting discussion with a lot of focus on value of the meat and utilizing all meat from the game.

4.2   Results of coding

The following sections introduce the most relevant themes that emerged from the open coding process.

PERCEIVED MOTIVATIONS FOR MAKING FOOD RELATED DECISIONS

Besides the influence of one's financial situation on the experience of their food environments, the second most frequently identified theme across the different Living Lab target groups were their perception about why they make certain food related decisions. Going deeper into participants' experience and perceptions within this theme gives some insight into how the physical, socio-economic, interpersonal, and internal aspects might intertwine at the meso-level of food systems.

Figure 3: Word cloud of frequently mentioned drivers

Source: ESSRG

In line with the previous point, price emerged as the most frequently mentioned driver of choice. However, as shown in Figure 3, many other interrelated factors emerged from the discussions, which can be categorized into three main groups: product-related factors, individual-related factors, and context-related factors. Our findings are supported by the literature, which highlights the importance of not only individual and product-related choices, but also the influence of context and situation on everyday food choices (Köster, 2003; Meiselman, 2006; Machín et al., 2014).

The different dimensions along which the interactions of the target groups of each Living Lab were analysed can be grouped under these broader categories (Table 7).

Table 7: Perceived motivations for making food-related decisions

Product-related factors	Individual-related factors	Context-related factors
Environmental considerations *(local, ethically sourced, ecological, organic, seasonal)* Familiarity and personal connection to the product Characteristics of the product *(price; appearance, freshness, taste, texture-how much pleasure they derive from it; natural; portion-size; quality; convenience/comfort; time and difficulty of preparation)*	The role of community and culture *(influence of peer groups, eating together; traditions; preferred flavors)* Familiarity and personal connection to the seller (feeling of safety) Health considerations and information *(chemical free; salt free; sugar free; detox; ingredients; nutritional content (macro, micro, vitamins), protein content due to illness)* Personal characteristics *(cooking skills, available time; family and health status, etc.; life situation)*	Accessibility & Availability *(proximity and being in within walking distance, placement in the store; practicality)* Familiarity and personal connection to the store Properties of the place of purchase *(family-friendly; wide variety of products)* Properties of home food environment *(availability of assets like fridge or oven)*

Source: Own edit.

As the figure shows, the perceived motivations for food-related decisions are complex and highly product-, person- and context-specific. The aim here is to give a sense of the dimensions that determine choices within the larger categories. There is also the question of the order of preference that individuals set for themselves when making food choices. For example, there are individuals for whom interpersonal and emotional relationships are most influential in their food purchasing decisions, overriding the other dimensions in their lives. Similarly, characteristics of the home food environment may counteract individual-related factors such as health considerations and the role of the community. The following are some specific quotes that support the different dimensions in the three main groups (Table 8).

Table 8: Quotes that highlight the different food-related perceived motivations

Product-related	Individual-related	Context-related
"In my case I don't look at whether the food is healthy." I look at the origin or the quality, and the appearance." (SPAIN)	*"I really like combining foods, spices, everything, because it also gives different flavours and different sensations". (SPAIN)*	*"The supermarket does not create the same confidence (than local stores)" (SPAIN).*
"Well... it comes from a pastry shop, ... I think it's made with organic food..." (FRANCE)	*"For your health, it's better to go to the market! Because there, the products are less processed! Market produce comes from the farm! And it's better for the planet…" (FRANCE)*	*"It's not as good at the canteen as it is at home! (Classroom reaction: "Yeah, that's for sure") and at home it's better than at the restaurant, it's home-made and it's less fatty!" (FRANCE)*
"For people like us (elderly) first of all attention should be paid to the prices which should be compatible with our income and then look all the other factors." (GREECE)	*"In our family we have decreased meat consumption do the price…" (GREECE)*	*"We have chosen some specific supermarkets where we go in specific hours (due to work). (GREECE)*
"Family-friendly and mostly organic and we try to use only local products as ingredient…" (HUNGARY)	*"Only buy fish and meat from the market, there are well-established sellers…" (HUNGARY)*	*"I work in a vegan community kitchen, so it's all very family-friendly and mostly organic and we try to use only local products as ingredients. I work a lot and it's basically a lifestyle, so everything I do describes my food environment…" (HUNGARY)*

"Where the fish is sourced from for me would be like an important determinant in putting it in my shopping basket if I was going to, so I could be potentially negative here, um, just depending on, you know, if the fish is sourced sustainably, you know, ethically, I suppose…" (IRELAND)	"If someone has allergies or special dietary requirements, there probably isn't a lot of availability for them, it's kind of the smaller subgroups I'd say on campus probably struggle to find, struggle with access, whereas the general kind of students and staff, there probably is good availability I'd say…" (IRELAND)	"In terms of access, there's food there… I feel like there is a wide variety of options on campus…" (IRELAND)
"There is plastic everywhere…discounts often involve lower quality food…" (ITALY)	"When I'm alone I often eat poorly, out of haste, out of boredom, because I don't have patience often to buy and cook just for me. Also, I often think that maybe I would spend more money on groceries than buying something quick that satiates me quickly. it's sad to admit, but sometimes it's like that" (ITALY)	"Farmer's markets are an interesting reality, I don't know it though, I must admit. I never went there. some of my friends tell me about them, but they say they are very expensive, and they can't afford it except a few times in a year…" (ITALY)
"I am always checking for protein. how many grams are there. The older son (…) when we go shopping, he looks very much at the labels. Even the little one [says]: hey, we don't take this because it's better here, because there's less sugar…" (POLAND)	"There is no such knowledge, among parents, of what is healthy and what is not. I didn't pay attention to it completely before either…" (POLAND)	"Every day at exactly 6:15 a.m. [laughs], I start from the first shop and go one by one through the three shops and the vegetable stall. Every day. (…). Because there are no queues, I hate queues and… there are few people…" (POLAND)
"Well, previously I used to choose more organic products, but now... like whole grain pasta, we always buy whole grain bread, but whole grain pasta vs. regular pasta... it is like double the price! ...It might not be worth buying whole grain pasta every time, despite it being more nutritious…" (SWEDEN)	"Food waste, it breaks my heart to throw food away! Both when it comes to throwing food that could have been eaten, but also that you have planned to eat the food but is back on square one…"(SWEDEN)	"We have a larger store that is fairly close, so we walk there sometimes, but when we do a large grocery shopping like this... then it is very difficult to get home if you don't take the car…" (SWEDEN)

Source: Own edit.

In some cases, the aforementioned factors and preferences may apply simultaneously to food-related decisions. These examples illustrate the interaction of factors in the perceived motivations for making food-related decisions:

Interaction of ***context-related (accessibility) and individual-related (familiarity and personnel connections)*** factors:

"I prefer the farmer's market because it is more accessible and is a habit for people of my age. (…) I know the farmers and they are more familiar for me." (GREECE)

Interaction of ***product-related (taste) and individual-related (familiarity and personnel connections)*** factors:

"...We love apples, but I also like to shop there because people ask how you are...So, that kind of personal connection is made, and it makes you more willing to shop there. For me, yes, certainly, because they get to know us…" (HUNGARY).

Interaction of ***product-related (characteristics), individual-related (familiarity and personnel connections) and context-related (accessibility)*** factors:

"We also go to the market, but only occasionally, because the meat is fresher there, so before the holidays we definitely only buy fish and meat from the market, there are well-established sellers, luckily the market is close by, so it's within walking distance..." (HUNGARY)

In this last example, it can be argued that each of the three factors are present and interacting.

Depending on how people perceive their food environment across all dimensions, their motivations and preferences can be very different. To better understand how the various factors weigh in against each needs further research.

FINANCIAL SITUATION AND FOOD PRICES

The price of food significantly shapes individuals' experiences within their food environment and was an overarching theme in all Living Labs. During the inductive coding analysis, "Price" emerged as the most frequent code and a primary driver in influencing individuals' food choices. Contrary to the assumption that individuals of high socioeconomic status might be less influenced by economic considerations, our findings illuminate that even those with elevated economic standing considered and felt impacted by the rising price of food. *"It has become really expensive, and it has really influenced what we eat*!" (SWEDEN).

Participants highlighted in all Living Labs how they have made recent changes in what they are consuming and the limitations they experience due to how expensive certain food items are. They made dietary shifts both in terms of quantity and quality. Depending on the financial situation of the participants, decreasing quantity could mean decreasing overall food consumption, as well as certain food groups, such as meat and fish. *"Nowadays due to prices we choose to buy less amounts of foods compared to the previous years. We used to buy 10 kg of oranges and now we buy less kgs. We have also stopped buying pineapples dur to their price."* (GREECE).

The influence of *promotional magazines* and *in-store discounts/sales* also emerged. It was especially prevalent among participants of lower socio-economic status. Citizens can be hyper focused on the offers and organize their life and plan when and where they buy food around them. While in most cases this presents itself as a limitation, there have been also several examples of resourcefulness and creativity: *"I read about these discounts in the special-offer newspapers. Or if it so happens that I go to buy something that is on sale, and there isn't one, or maybe it's not as nice as I'd like, or let's say the other day mushrooms were on sale and I thought to make fried mushroom, and the bigger mushrooms are good for that, but the one on sale was tiny, then I looked at something else that might be on sale and then I redesigned [the plan] a little bit."* (HUNGARY). Nevertheless, the influence of deals, promotions, etc. have appeared across the different profiles and even participants with high economic status are influenced by them: *"We have also noticed an increase on the receipt now when we do grocery shopping... ...my husband has always looked for good deals and products on offer. But now when everything has become more expensive, he looks even more carefully for offers and choose to go to different stores to access the offers."* (SWEDEN)

Overall, the decreased or limited access is experienced as detrimental to the health and well-being of the participating citizens since they perceive "quality" and "healthier" food options to be more expensive and *"discounts often involve lower quality food"* (ITALY).

This pervasive influence extends beyond individual and community level well-being and resonates deeply in decisions related to planetary health and sustainability.

On the one hand, in several occurrences emerged the notion that affordability can override any health or environment related considerations: *"…if you're only providing me with certain options on campus and they're all really expensive, I'm not going to be worrying about sustainability or health, if you know, I'm worried about paying my rent…so it's all about the cost for me I'd say"* (IRELAND).

On the other hand, some of the cost induced limitations and behavioral changes that participants have mentioned, such as reducing meat consumption and/or substituting meat-based dishes with legumes, consciously planning and paying attention to avoiding food waste or buying seasonal fruits and vegetables could have a secondary beneficial effect.

INFLUENCE OF REFERENCE GROUPS

A consistent theme emerged in the focus groups regarding the profound impact of reference groups on participants' eating behavior. While the closest reference groups, namely family and friends, were the most frequently identified as influential forces in shaping participants' dietary choices, classmates and colleagues, as well as online reference groups, such as groups on social media were also mentioned.

Participants frequently described these influences as either limiting, constricting, or conflicting with their personal beliefs about what constitutes a healthy diet. Despite recognizing these constraints, individuals often found themselves succumbing to various degrees of "peer" pressure, underscoring the complex dynamics at play within these reference groups.

In case of family, they mentioned feeling limited in introducing novelty at home, difficulty in breaking away from family tradition, eating food items that they normally not eat and feel that they are detrimental to their health, eating in a way (e.g. in front of the television or in a hurry) that do not support their well-being only because *"that has already become a habit"* (SPAIN) when they are together and overeating so that they could please a family member.

"[She's] almost 11 and also [eats], chocolate, sweets, crisps, it's always everything. For example, now my aim is to reduce all that. Yes, but with such a dad for the moment, it is without a chance. (POLAND)

> *"So, that we have such a difficult, interesting situation and my dad is absolutely not open to new things. When my sister told me that she made me a cake, and I made it with lactose-free milk, because sometimes I can't stomach it either, he gave me a dirty look and said that's not how it's supposed to be."* (HUNGARY)

> *"I immediately started thinking about my partner's family, being of Indian origin and when we are at their house... how it becomes a bit of a culture clash. My partner's parents wanting to offer a large variety of foods and desserts... ...when we leave, both have a stomachache and says that we didn't make conscious choices this time either. ...when our child gets older, how should we think when we visit?"* (SWEDEN)

The beneficial influence of family came up either in the form of inherited recipes and traditions, as learnt openness towards other cultures, wanting to set a good example for children and paying more conscious attention to what is put on the table for the sake of family members.

> *"And I want to set an example for my daughters, because I've already lived through it, and I buy a lot of fruit and vegetables, and I always have them in the fridge at home, and they see them, and they start to ask me what's this, and what's this, and we make healthier sweets".* (HUNGARY)

> *"I cook more when my children come to visit on Sundays"* (ITALY)

Friends and colleagues were mostly mentioned as a *source of inspiration* for trying out new recipes and cuisines or as great "*accountability buddies*". Similarly, to the whole dataset, utterances regarding the influence of reference groups were mostly concerned with perceived health benefits and influence on participants' individual well-being and less with planetary health.

Albeit social gatherings were mentioned several times to have less healthy and environmentally friendly options, coming together and sharing food was always mentioned to make *"mealtime a moment of pleasure"* (ITALY).

Occasionally, certain reference groups can create environments that feel hostile to citizens, placing increasing pressure on the individual, even if in some cases the pressure is towards "better" eating habits.

> *"I got a backlash when I went to university. My classmates were so organic and vegetarian, vegan... real Hitlers all of them! They were just pushing a lot of information and said like "If you don't buy organic milk, you are a bad person". ... it made me consider bringing a lunch box with meat every day."* (SWEDEN)

Another interesting theme that surfaced was how certain experiences in the home and family environment can be the motivation for a different type of behavior later on in life.

> **Photovoice description:** *"..that we always have this breakfast menu at Christmas, and for me it's a negative experience because during my childhood, my mother raised us alone and Christmas was always about trepidation. Back then I vowed to myself that when I became a mum I would not be in a hurry during the holidays and would always have a cosy, relaxed Christmas morning. You can see on the picture, it's a chocolate bun and chocolate mousse, and I always decorate it for them and it's Christmas breakfast…'* (HUNGARY)

While the actual impact of reference groups is highly context specific and can influence one's food environment experience in both beneficial and detrimental ways, what has clearly shined through in each focus group is the deep influence they have to influence behavior.

SOCIAL CAPITAL & SHARING RESPONSIBILITIES

Social capital and support as well as community structure were other prominent themes based on inductive coding. There is a large body of literature supporting the view that an individual's social embeddedness can have a positive impact on their physical and mental health. How peer support and inclusion manifest themselves in the food sphere is interesting to explore. During the discussions, the following topics emerged as determining elements of eating habits: **gender roles; division of labor within the family unit; community support; meals as community activities, eating and sharing.**

The gendered division of household activities also relates to the food environment in the home, meaning that in some cultures and traditions, cooking or caring for food is seen as a social norm. These and similar beliefs can influence how food is perceived and consumed in everyday life. During the discussions, the issue of who does the cooking and who does the shopping came up the most. Perceptions and beliefs about which products/tastes are considered to be favoured by the different genders also emerged.

"Usually, the woman of the house cooks, because we work late (Pakistan)". (ITALY)

"My mother, she is very busy, so my father actually cooks a lot of the time as well, probably more so than my mother, which is unusual in a lot of households..." (IRELAND)

"I use my husband if I need to bring something heavy: potato, flour..." (POLAND)

"My partner is very interested in food and cook most of the food..." (SWEDEN)

Depending on the household, people share food-related tasks not only with their partners, but also with their children, other relatives and, where appropriate, even friends. In this context, the role of community support and connectedness is strong.

As previously discussed under the section on reference groups, the influence of coming together and sharing food with others can have both a beneficial and a detrimental effect in terms of how healthy or environmentally friendly food choices are made. However, the desire for community, as well as the potential of food as a means of getting people together, creating and strengthening communities was undisputed.

"You can't eat alone...A lot of times there's a conversation that starts at one of the tables, there's a community, there's absolutely a community... So that's another way to use the food, to use it in another aspect of the community, to support the community." (HUNGARY)

Fragmentation of communities, loneliness and the difficulties arising from managing food tasks and experiences were emerging themes. These phenomena, however, were present in the experience of people living in **one-person** and **one-adult** households, but also in how people can live together shared apartments

and sometimes even in larger families. So often, the experience was not the result of actual, physical separation from other people, but rather a deeper social issue.

Students living in shared flats were sharing how *"at dinner time, [they] will just prepare the food and go in each of [their] rooms and watch YouTube'* (IRELAND). Participants expressed in different ways, how coming together and sharing food could improve their well-being – *"When I have guests, I am happier and eat better"* (ITALY) – as well as how this level of individualism can create unnecessary food waste.

> *"With my friends we organized a night together to eat healthy and a we made artichokes. it was very nice but unfortunately it is a rare case. If I could always do that, I would eat better."* (ITALY)

"I'm in a house share and we don't really eat together…lots of cartons of milk in the fridge, lots of duplicate ingredients" (DUBLIN)

FOOD AS …

Each individual has a unique internal landscape build up from all the previous experience and influences they have encountered during their lifetime. This internal landscape can make a difference in how each person experiences their food environment. The following chapter details some of the most prevalent associations participants shared about what food mean to them. Despite the fact that participants are experiencing various challenges within the context of the food environment(s) they interact with, the majority of the associations and meanings assigned to food were positive.

Figure 4. Own image, generated with https://wordart.com/

> **Photovoice description:** : *"this is because it was a celebration of a therapeutic process that I am going through, and I was celebrating because I am doing so well, and I told my sister and a friend that we would have to celebrate everything that I am achieving, so we went directly at [x restaurant], it had meringue, raspberries, jam…, I didn't finish it all. Today I chose it because **it was a prize, a reward for everything I'm getting at this point in my life**."* (SPAIN)

Food as a source of pleasure or joy appeared across the various beneficiary groups and was one of the most frequent codes in this category. The connection with special occasions, ***celebration*** and thinking of food as a special "***prize or treat***" and as a form of showing care or love for someone appeared several times. References to the senses, the appearance, beauty, taste, and flavors were often connected with this association. *"I'm sensitive to "beauty" in general and I'm convinced that it's essential on the plate to help everyone eat well and enjoy eating well."* (FRANCE)

Photovoice description: *"...And that's what I was thinking about because we always, at least on the weekends, when we have time, we eat together. Either my daughter makes breakfast when she wants to surprise me or I do, we always try to prepare it in a funny way, so that these little heads and vegetable chips make our meal funnier and special for us..."* (HUNGARY)

While **pleasure, fun** and **joy have** been mentioned as important motivation for eating, in several cases, participants perceived a ***conflict and gap between what they believed to be "healthy" and what they "enjoyed"*** eating. The concept of "guilty pleasure" and eating in secret so that others, e.g. children, cannot see also appeared and that in special occasions or "once in a while" they consider it acceptable to eat foods that they perceive to be unhealthy.

"In fact, when we go to a restaurant, we don't go there to have salad! So, we go for chips and everything, we go for what we like, because we're not going to pay not to have fun, that's all! And for the future, they'll have to adapt the good stuff so that it's healthy at the same time." (FRANCE)

Food as a means of Connection

The importance of community and the influence of social connections on how people experience their food environment has been already discussed. This finding however goes a little further than that. Several participants have shared experiences where food meant connection for them, a way to create, maintain and deepen relationships. This has been mostly mentioned in the context of family relationships. In many cases, the mothers explained how they are consciously paying attention to creating these experiences of sharing meals together, using them as a way to spend quality time with their children. One mother even shared how food and shared mealtimes is kind of a last resort in family situation where the children are already growing up and starting to have other priorities.

Photovoice description: *"this is the picture [I chose] because my daughter and I are doing something together. It's not about the food, it's about the company, the conversation."* (POLAND)

Photovoice description: *" here we are making dinner on Sunday, with my daughter. Nikolka makes fillet a'la nuggets. (...). So I think it's important that we eat together and at least one day a week. When we don't have time, she's at school and I'm at work, we spend the weekend, at least one day.."* (POLAND)

"There's an important aspect of family meals that I've been holding on to as a mum lately, because the kids are getting so adolescent. And that's the moment when I can still pull the family together. When even the 20-year-old and the 18-year-old come and join the family at that moment. I can do that almost only with food. So that's very important from my point of view." (HUNGARY)

The same notion from the perspective of the children was expressed by the participant in France. Several of the children mentioned how important eating together with their family is for them. *"I like pizza! and I like Coca-Cola... because I like eating with my family!"* (FRANCE)

Ritual

"For me, food is this, it's a shared meal. ... thank God, it's the evening meal, it's such a small ritual." (HUNGARY)

Eating and sharing food being a ritual also appeared in various contexts. Most often with rather positive connotations, such as creating time for oneself or a way of connection, a way of celebration or even as a "sacred" time and space protected by outside influences, e.g. phone calls (POLAND)

Photovoice description: *"I choose this one where there are many dishes, and a lot of variety, because these are some meetings that we do with my best friends, who don't see each other much on a day-to-day basis and whenever we can we try to have dinner during the week, and normally each one carries different things. This makes me think that when we have to do any meeting or celebration it has to be around a table eating and at that moment, we do not think about health but rather sharing and with food we like most."* (SPAIN)

However, the food being a ritual can also mean that there are certain unspoken rules about 'how things need to be done' or what is expected in a certain situation.

"…When you meet with people it is about the ritual… the ritual is that I sit there and then I must consume something…" (HUNGARY)

Some less frequently mentioned, but rather interesting associations mentioned by participants were the following.

- ***Food as medicine***, where participants credited the healing they experienced to changing their eating habits.
- ***Food as source of safety/security***, both as a way of emotionally soothing and finding comfort and safety in it, and as a way to cope with the lack of safety net.
  "I'm staked for two months in advance. Now, I have no parents, no one, and I have to. So, that's where I'm at, that's why I have a pantry." (HUNGARY)
- ***Food as fuel*** was mentioned in different contexts, both as the main way of thinking about eating, simply consider it important because it is a way to gain energy (SWEDEN) and also in relation to other factors, such as taste and enjoyment.
  "On the other hand, the day we can cook, you can select the products you like"..."It's a little bit the feeling of filling the stomach versus enjoying"..."Enjoying represents having time to cook and take products that you don't normally take routinely." (SPAIN)
- ***Food as home,*** emerged in the context of immigrant communities where they mentioned that in order *"to feel at home [they] cook traditional foods [from their country of origin]"* (ITALY)
- ***Food as drug,*** emerged in relation to junk food.

Photovoice description: *"you know it's bad for you, but it generates a very transient state of well-being that helps to perpetuate the habit by generating a vicious cycle"* (ITALY)

VISIONS & EXPECTATIONS
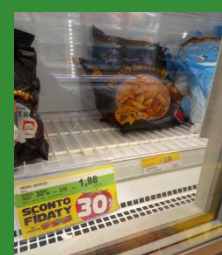
At the end of the focus groups participants were also asked to envision and draw a future food environment. Here participants were encouraged to explore the following topics:

- What are the changes and interventions they wish to see in their food environment?
- What are their expectations for an ideal future food environment?
- What does their future image look like?

Out of this experiment emerged various visions. Some approached the task on a personal level, concentrating on their own or their family's health and well-being, while others focused on what could be changed on a meso or macro level. The answers also showed a diverse picture in terms of what participants believed to be part of their circle of influence and how much they found their hope in taking responsibility or waiting for solutions to arrive from somewhere else.

While the level of confidence on the part of participants varied greatly about how much they believe certain visions are attainable, in all the focus groups emerged visions of desiring a "greener" future where people are living more in harmony with nature and their surroundings.

Images of people growing their own food, the notion of farm-to-table, community gardens, home-cooked warm meals and sharing meals in company, engaging with food in **community** appeared in various drawings.

Participants were imagining food environments with less (or no) pollution, chemicals, and plastic packaging, where *"more and more young people to try to be farmers and primary producers"* (GREECE). They imagined converting gardens into food forests, moving to the countryside, more local markets.

Compared to other parts of the discussion, planetary health received more attention in the visions, including references to animal welfare (this was particularly present in the utterances of children) - "*not to kill animals and to stop cutting down trees"* *(FRANCE)*, the importance of choosing seasonal and local ingredients and if possible, from organic production.

Figure 5: Drawings of the future visions from Focus Group 1 in Hungary.

Photovoice description: *"Importance of local shops specialized in different types of food related to them. Ex: One with coffee, milk, sugar, etc. The main reason is so that it's easier to get everything we need and avoid buying unnecessary things that are next to what we want to buy."* *(SPAIN)*

Personal health and well-being appeared as another important aspect in many of the participants' vision. Some shared about it more as a plan of action either for themselves or for their family, e.g. eating less sweets, cooking with less sugar and fat in general. Home-made, fresh, and cooked food appeared as highly valuable and desirable in many of the focus groups.

In addition, the desire for more time, slower, more relaxed way of living and eating. Portion control and avoiding excess consumption also appeared in various drawings.

The desire for more affordable food options and the question of price also emerged frequently. *"I wish everything cost less, especially things that are good for us. it would be an investment in health". (ITALY)*

Photovoice description: "*Being able to eat food grown in community gardens in company. Greener spaces. Having more capacity to be able to cook and think more healthily." (SPAIN)*

Cultivating traditions, and returning to customs of the past, e.g. making jams, also a desired vision. Some of the drivers that were previously mentioned also appeared in participants' desired future scenarios, such as variety, appearance and taste.

Two-way communication, education and conscious information sharing and marketing were also mentioned as important. "*One thing is how food is marketed, that you might actually try to promote the nutritious food. Put more emphasis on it than all this colourful unhealthy stuff." (SWEDEN)*

EXPERIENCED CHALLENGES & OPPORTUNITIES FOR INTERVENTION

As seen in the previous sections that detail the most important themes that came as influential factors of participants' lived experience, citizens across Europe are encountering various challenges and thus opportunities for improvement in their food environment. Understanding deeper what they experience as challenging or problematic in their food environment or what might support planetary health on the meso level can be an important input for future interventions. The following section highlights and summarizes the challenges mentioned by the beneficiary groups for each of the six predefined dimensions of the research.

Availability & Accessibility

In terms of availability and accessibility participants expressed encountering difficulties mainly on three levels.

- What kind of opportunities are available for acquiring food in the vicinity
- The organization and operation of shops, especially supermarkets
- Variety and type of food items available

Table 9 details the encountered challenges on each level, as well as provide some quotations for allowing deeper understanding of the contexts.

In the dimension of accessibility car ownership emerged as important factor.

Price & Accessibility

The dimension of price was explored in more detail in a previous chapter. The most frequently mentioned problem that participants experienced in this dimension is that they perceive **access to quality/healthy/more sustainable food to be determined primarily by their financial situation**.

Here it was mentioned that:

- discounts often imply lower quality food
- farmer's markets are too expensive
- *"Costs are getting higher and higher…"* (ITALY)

Access to information

Within the dimension of access to information, participants' main challenges fall into one of the below four categories, where the challenges often appear simultaneously: Lack, Confusion, Distrust, Overwhelm (Table 10).

Table 9: Challenges on availability levels		
Places to acquire food	**Shops/supermarkets**	**Food items**
Lack of shops in the vicinity/within walking distance It is not possible to buy everything in one place (time, effort, etc.)	Confusing and continuously changing store layouts Low quality (freshness) of supermarket products Plastic packaging Supermarkets are overstocked which also increases food waste	Difficult to find local products Lack of vegan/vegetarian/plant-based options Lack of healthy options Lack of options for individuals with special dietary requirements
"It's a wee bit of a food desert in the immediate surroundings" (IRELAND) *"I rented one of these community gardens for a year, for free. We enjoyed it very much, we tried to plant all sorts of things and it was very good, but I had to give it back because after a while, they moved it far away close to the Danube, and we had to cycle down most of the time, but to go down there every two days you really say, "Well, it's just not feasible, you don't have the time to do that…'* (HUNGARY)	*"Supermarket is a puzzle every month."* (GREECE) *"Supermarkets stress me out"..."There are too many things"..."You choose things you really don't want"* (SPAIN)	*"if they had cheaper options to make it a bit more accessible, more vegan options, more celiac options, um, maybe more catered to allergies"* (IRELAND)

Table 10: Challenges on accessibility levels	
Lack	lack of food literacy and knowledge of available opportunities lack of cooking skills *'I think maybe people have an idea of what sustainable diets are and, but maybe they just don't have the* *knowledge on how to make their diets more sustainable, they might like to achieve it, but just not know how to get there'* (IRELAND). *"There is no such knowledge, among parents, of what is healthy and what is not"* (POLAND)
Confusion	confusion between vegetarian and healthy/eco-sustainable *'I think the problem with sustainability is that it's not defined, nobody really knows what true sustainability is…when people say sustainability, nobody knows, I don't know, it's not defined what is sustainable and what is not'* (IRELAND).
Distrust	*…I even have a problem, I'll tell you frankly, with credibility. So whether its watching a news portal or whatever. Which is really true now? Now who could it be? He used to say XYZ because he was a credible person, he was a professor, he was knowledgeable and we said unconditionally you are, I am, he is, we* *accept that its a fact and its true. Now its no longer the case. There is no such thing…'* (HUNGARY).
Overwhelm	*Otherwise, I can't answer so clearly where I exactly am collecting my information from."* (SWEDEN)

Culture

Only a few challenges due to cultural or religious traditions were mentioned by the participants in relation to either how people with different cultural backgrounds can coexist within a family or how religion influenced eating habits can be difficult to follow when the environment is not supportive in terms of providing the kind of food that is required.

"I immediately started thinking about my partner's family, being of Indian origin and when we are at their house... how it becomes a bit of a culture clash. My partner's parents wanting to offer a large variety of foods and desserts... ...when we leave, both have a stomach ache and says that we didn't make conscious choices this time either. ...when our child gets older, how should we think when we visit?" (SWEDEN)

'I cannot eat meat over here since it needs to be slaughtered. So I'm only stuck with vegetarian and vegetarian options are not enough…there's vegetarian food in the SU shop and it costs €5 for a sandwich and it's not enough…you need to at least eat to feel full' (IRELAND)

Home

As previously explained in more detail, reference groups exert a very strong influence on someone's experience of their food environment, which in many cases can be limiting and make unhealthy and less environmentally friendly eating habits the norm. They can also limit openness to novelty. Nevertheless, here it is especially true that the challenge is also an opportunity at the same time.

Participants also recounted experiences of family disruption, such as death or divorce that can have a detrimental effect also on their connection to food and eating.

"…When my father died, then it was hard afterward because nothing interested me anymore so I ate in the evening, and that's when I started [eating] sweets, etc. So then unfortunately I got diabetes" (HUNGARY)

In addition, as explained earlier, one-person/one-adult households can entail not only needing to do all food related chores alone, but in some cases participants experienced the tendency to eat worse when alone.

Finally, they mentioned how cooking can be tedious and time consuming and detailed the difficulties introduced by the selective eating of children.

Emotions

Despite the fact that food, eating and emotions are very much interlinked, the focus groups were less successful in going into the depth of this dimensions, which could be expected to a certain extent due to its very personal nature. As one of the participants in HUNGARY expressed, *"for some people food, eating and all topic related to food is really a bit of an intimate thing, it's kind of like a taboo..".*
The most mentioned aspect was the experience of stress and time pressure and how not having enough time to eat mindfully, cook and prepare healthy dishes affected participants.

Photovoice description: *"So, for example this photo, I didn't eat anything all day. The office was constantly busy. Three people quit that week, and unfortunately you can't see it in the photo, it must have been about five o'clock when I started to feel dizzy and I had a headache, and I said oh my God! Gee, it's Tuesday and I haven't eaten anything. So I hadn't eaten anything on Monday or Tuesday, and this afternoon I've just stuffed myself with a kefir. There was a lot of driving, a lot of stress, everyone was yelling at everyone. So, it's been a very difficult week, and I'm constantly sick, because there is no sick leave, forget it, you can't go. It's been two weeks, and I haven't been able to come out [of the illness] since."* (HUNGARY)

While most participants did not recount such extreme difficulties that are illustrated in the above example, feeling stressed, not being able to sit down properly to eat have been mentioned in various occasions.

Apart from this, the themes of loneliness, emotional eating and junk food as a drug emerged.

5. Personas

To integrate and better communicate the results of the quantitative and qualitative analyses, we explored the development of Personas. In the Barcelona workshop, four personas were developed as summarised in Table 11.

Table 11 : Overview of personas				
	Persona 1	**Persona 2**	**Persona 3**	**Persona 4**
Name	Victor	Anna	George	Juana
Gender	M	F	M	F
Age	7	19	66	35
Region	Northern Europe	Central Europe	Southern Europe	Cuba to N-Europe
Family situation	Family with young children	Student	Widower	Partner
Socio-economic status	Middle SES	Low SES	Low SES	Low / Medium-high SES
Asset ownership	Suburban home	Low (student dormitory)	Medium	Medium (social housing / renting a house)

Persona 1: Victor

Figure 6: Victor

Source: Perchance AI Photo Generator

In the quiet embrace of a suburban neighbourhood, Victor, a child from a middle socioeconomic background embarks on a journey shaped by the contrasting influences of home and school. Raised by parents with Bachelor's degrees, the household is based on the wholesomeness of milk as a dietary cornerstone.

The suburban environment becomes a playground for Victor's hobbies, fostering a love for the outdoors. However, within the cozy confines of home, unhealthy food choices dominate, portraying a stark contrast to the nutritious options available at the school canteen. Here, a focus on low climate impact foods, exemplified by nutrient-rich legumes, presents a tantalizing alternative.

Victor's food choices become a collage of external inputs—TV advertisements, video games, YouTube, and the subtle sway of peer preferences. Parental and marketing impressions further shape these decisions, with snacks packaged in cute, child-friendly wrappings holding a particular allure.

Even during celebratory moments like birthday parties, Victor encounters a paradox. While the intention is to offer "healthy meals," the reality often involves a tempting duo of cake and coke. Beneath the surface lies a gap in understanding, as Victor grapples with a lack of nutrition knowledge, insufficient awareness of sustainability, and limited culinary skills. The narrative unfolds as a journey of influences, where Victor navigates the currents of a suburban upbringing, blending parental guidance, societal cues, and personal discovery on the path to shaping a relationship with food.

Persona 2: Anna

Figure 7: Anna

Source: Perchance AI Photo Generator

In the heart of Brno, Czech Republic, Anna, a 19-year-old first-year university student, embarks on a challenging journey shaped by her unique circumstances. Hailing from a single-parent household with limited financial means, Anna resides in a dormitory, navigating the intricate balance of academics, personal interests, and a constrained budget.

Passionate about travel, exploring new cultures, and savouring diverse cuisines, Anna's week unfolds with a vivid tapestry of experiences. Mondays bring a taste of home, featuring hearty, meat-heavy meals— a reflection of her family's culinary traditions, though not always considered the healthiest.

As the week progresses and academic demands intensify, Anna's time for home-cooked meals diminishes. Instead, she finds solace in quick, albeit unhealthy, snacks while immersed in her studies at the computer—chips, coke, and the occasional energy drink. Utilizing social media and food apps, Anna discovers affordable options, salvaging leftover items from local stores to stretch her budget.

Despite her financial constraints, Anna cherishes communal meals during weekends, sharing food and creating bonds with her roommates. Though armed with considerable knowledge about sustainability, health, and nutrition, she faces the challenge of balancing these ideals with the practicalities of her daily life. The tug-of-war between high food prices and the cultural influences from her home environment underscores Anna's ongoing struggle to adopt a healthier lifestyle.

Persona 3: George

Figure 8: George

Source: Perchance AI Photo Generator

In the bustling urban landscape of Greece, George, a seasoned 66-year-old with a chemistry background, finds himself at a crossroads in retirement. Once immersed in the industry, he now grapples with the challenges of low socioeconomic status. A widower, George carries the weight of his wife's absence, a void exacerbated by the memory of their two children and three grandchildren.

George's culinary journey unfolds in the charming chaos of local stores, his preferred haunts. Twice a week, his plate reflects processed foods, accompanied by sweet indulgences and thirst-quenching juices. However, amidst the flavours of urban life, George harbours aspirations. He envisions a diet rich in diverse food groups, a departure from the meat-dairy heaviness that currently defines his meals. A desire to control diabetes, enhance cardiovascular health, and embrace increased physical activity shapes his health goals.

Yet, George's preferences extend beyond the realm of nutrition. A distaste for eating alone forms a crucial facet of his culinary narrative, underscoring his need for companionship. Despite harbouring low cooking skills, he envisions a future where he can master the art of preparing wholesome, balanced meals.

As George navigates the tapestry of urban living in Greece, his story unfolds as a mosaic of resilience, familial ties, and personal aspirations, painting a portrait of a man striving for well-rounded health and meaningful connections in his golden years.

Persona 4: Juana & Luisa

Figure 9: 1 Juana & Luisa

Source: Perchance AI Photo Generator

In the vibrant tapestry of their 35-year-old lives, Juana and Luisa, two women of distinct socioeconomic backgrounds, engage in a nuanced discussion about the notions of health and prosperity. Their journeys, intertwined by migration from Cuba to Europe for educational pursuits, paint a portrait of adaptation and cultural fusion. Both women grapple with the intricate dance of traditional foods, influenced by the local and regional flavours they encounter in their adopted countries. Education emerges as a pivotal factor, with Juana holding a high academic standing, while Luisa has a lower educational background.

In this exchange of perspectives, the impact of socioeconomic status becomes evident. Juana, with the privilege of higher income, retains the ability to curate her diet, blending traditional and foreign influences. In contrast, Luisa, constrained by limited financial means, assimilates into the local diet for its affordability and accessibility.

The dialogue between Juana and Luisa reflects not only the intersection of personal experiences but also the broader societal structures that shape their choices. The narrative unfolds as a tapestry woven with threads of migration, cultural adaptation, financial constraints, and the profound influence of education on their culinary journey.

These personas are based on a limited set of characteristics, but for further use they may be further elaborated using the information from the quantitative survey and particularly the qualitative analysis.

6. Conclusions

How food environments influence consumer choices not only depends on how companies shape these environments using their product, pricing, advertising and distribution strategies, but is also determined by the lived experiences of individual consumers in their socio-economic context. This context plays an even greater role for vulnerable consumers (children, low income, old age, sickness, etc.).

The quantitative analysis highlighted that the majority of respondents in the living labs across Europe experience a positive food environment. Nevertheless, clusters having negative food environment experience can also be found consistently across all living labs, but no clear differences could be found based on socio-economic background information.

The qualitative analysis did highlight a number of important themes that came as influential factors of participants' lived experience across different target groups: citizens across Europe are encountering various challenges and thus opportunities for improvement in their food environment. Their experiences generally correspond to the answers provided by the clusters having negative food environment experience:

- *Availability and accessibility.* In terms of availability and accessibility, focus group participants expressed encountering difficulties mainly on acquiring food in the vicinity; the organization and operation of shops, especially supermarkets and the variety and type of food items available. These findings were confirmed by the survey also for restaurants where it is often difficult to find healthy options easily.

- *Affordability and price.* The most frequently mentioned problem that focus group participants experienced in the price dimension is that they perceive access to quality/healthy/more sustainable food to be determined primarily by their financial situation. Issues relate to discounts often implying lower quality food, farmers' markets being too expensive and costs are getting higher. The survey highlighted the lack of promotions and price discounts on fruit and vegetables across different LLs.

- *Information.* Within the dimension of access to information, focus group participants' main challenges fall into one of the following categories, where the challenges often appear simultaneously: lack of information, confusion, distrust and being overwhelmed. The survey results also suggest a lack of information in restaurants on healthy options or even displays encouraging consumers to overeat.

- *Culture.* Only a few challenges due to cultural or religious traditions were mentioned by the focus group participants in relation to either how people with different cultural backgrounds can coexist within a family or how religion influenced eating habits can be difficult to follow when the environment is not supportive in terms of providing the kind of food that is required.

- *Social interactions.* Reference groups exert a very strong influence on someone's experience of their food environment, which in many cases can be limiting and make unhealthy and less environmentally friendly eating habits the norm. They can also limit openness to novelty. Nevertheless, here it is especially true that the challenge is also an opportunity at the same time. Focus group participants recounted experiences of family disruption, such as death or divorce that can have a detrimental effect also on their connection to food and eating. In addition, one-person/one-adult households can entail not only needing to do all food related chores alone, but in some cases participants experienced the tendency to eat worse when alone. Participants mentioned how cooking can be tedious and time consuming and detailed the difficulties introduced by the selective eating of children.

Some of these challenges were integrated into four personas—characterizing four different situations. These personas can be further elaborated to integrate more challenges to better illustrate the lived experiences of individual consumers in their context.

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Appendix A: Exploratory factor analysis and cluster analysis tables

EFA enables us to examine whether factors can describe the external and personal domains dimension of the food environments. This was accomplished by transforming the initial collection of the correlated variables into a new collection of orthogonal variables. Varimax rotation was used to facilitate the understanding of EFA findings and optimize the variance of the sum of square loadings. Therefore, factor loadings and explained variance in the results tables will relate to the rotated components.

In the factor matrix analysis, we used 0.5 as the minimum value for EFA1, EFA2 and EFA3.

The model's fit was evaluated using the Kaiser–Meyer–Olkin (KMO) test, which is based on partial correlations between variables. The scores of the KMO test fall between 0 and 1. Low values indicate that the analysis is insufficient, since the correlation between pairs of variables cannot be explained by the variance shared by the whole collection of variables. Hence, it is advised that KMO test results do not fall below 0.5, while findings over 0.7 are regarded as satisfactory.

Concerning the evaluation of the model's validity, the Bartlett test is commonly utilized to test the hypothesis that the correlation matrix coincides with the identity matrix. When the Bartlett test is insignificant, the identity matrix may coincide with the correlation matrix; therefore, the factorial model may not be suitable.

To identify homogenous consumer groups, a cluster analysis using Ward`s method on factor scores derived from the EFAs was conducted. Ward's minimum variance criterion minimizes the total within-cluster variance. To implement this method, each step tries to find the pair of clusters that leads to minimum increase in total within-cluster variance after merging. This increase is a weighted squared distance between cluster centres. At the initial step, all clusters are singletons (clusters containing a single point). To apply a recursive algorithm under this objective function, the initial distance between individual objects must be (proportional to) squared Euclidean distance.

HUNGARY

Table A1: EFA1 Perceived store food environment						
	Store availability	Food prices in the shop	Store motivation	Promotion of food in the store	Food location in the store	KMO
Q2.1.4	0.9077					0.8419
Q2.1.5	0.8906					0.8666
Q2.1.6	0.8755					0.9135
Q2.1.1	0.8588					0.8332
Q2.1.2	0.8953					0.8355
Q.2.1.3	0.8425					0.9228
Q2.9		0.8298				0.7357
Q2.10		0.8535				0.7252
Q2.11		0.8282				0.7810
Q2.12		0.7718				0.7614
Q2.7.4			0.8772			0.7441
Q2.7.5			0.8621			0.7627
Q2.7.6			0.7991			0.8370
Q2.13.1				0.6224		0.8509
Q2.13.2					0.7893	0.6228
Q2.13.3				0.8548		0.6778
Q2.13.4				0.8341		0.6914
Q2.13.5					0.8094	0.6958
Q2.13.6					0.6978	0.6917
Bartlett test						0.000
Overall						0.809

Table A2: EFA 2 Perceived Restaurant food environment			
	Menu content	Availability of healthy meals	KMO
Q3.5.1		0.8868	0.6720
Q3.5.3		0.9192	0.6262
Q3.5.5	0.7757		0.7123
Q3.5.6	0.8700		0.6593
Q3.5.7	0.6896		0.8780
Bartlett test			0.000
Overall			0.683

Table A3 : EFA3 Home food environment					
	Junk food	**Healthy home food environment**	**Potential healthy home food environment**	**Meat and fish**	**KMO**
Q1.5.2		0.5245			0.8737
Q1.5.8			0.5674		0.8810
Q1.5.4	0.6775				0.8688
Q1.5.1		0.5168	0.5965		0.8805
Q1.5.10					0.9351
Q1.5.14				0.6347	0.8674
Q1.5.12				0.7010	0.9022
Q1.5.12_2				0.6956	0.9340
Q1.5.11				0.6151	0.8998
Q1.5.16					
Q.1.5.17			0.7051		0.9065
Q1.5.3	0.5440				0.9139
Q1.5.8					
Q1.5.7		0.6375			0.9018
Q1.5.18		0.7745			0.7963
Q1.5.19		0.5169			0.8836
Q.1.5.20			0.5757		0.9189
Q1.5.5		0.5688			0.7265
Q1.5.18_2		0.7178			0.8334
Q1.5.6	0.7672				0.9132
Q1.6.4	0.8589				0.7782
Q1.6.4_2	0.8432				0.7954
Bartlett test					0.000
Overall					0.870

Table A4: Results of cluster analysis using k ward method			
	Cluster 1 "Restaurant and store food environments need improvement" (n=40)	**Cluster 2 "Healthy food environments experience" (n=48)**	**Cluster 3 "Restaurant and home food environments need improvement" (n=32)**
Store food environment			
Store availability	-.7670774	.5955408	.1484068
Price food in the store	.3902905	-.1577381	-.1360474
Store motivation	-.0513823	.0608588	.3203131
Promotion of food in the store	-.2448711	.2468958	-.0018424
Food location in the store	-.1706181	-.4426906	1.132102
Restaurant food environment			
Availability of healthy meals	-.2144432	.4255447	-.6176325
Menu content	-.1677025	.1534115	.3170641
Home food environment			
Junk food	-.2082497	-.021765	.9755206
Healthy home food environment	.0310371	.3184283	-.3746087
Potential healthy home food environment	-.3597905	.5051904	-.2057825
Meat	-.3122904	.3195596	.268224

SMALL-SAMPLE DATASETS

Table A5: EFA1 Perceived store food environment					
	Store availability	**Promotion fruit and vegetables in the store**	**Store accessibility**	**Price fruit, vegetable and fish**	**KMO**
Q2.1.4	0.8831				0.8548
Q2.1.5	0.7942				0.7542
Q2.1.6	0.8583				0.8001
Q2.1.1	0.7913				0.8167
Q2.1.2	0.7824				0.8144
Q.2.1.3	0.7841				0.9049
Q2.9				0.7855	0.5577
Q2.12				0.6539	0.6399
Q2.13.1		0.7464			0.7279
Q2.13.3		0.7140			0.6273
Q25			0.8164		0.5771
Q26			0.8702		0.5812
Bartlett test					0.000
Overall					0.776

Table A6: EFA2 Perceived restaurant food environment			
	Availability and promotion healthy meals	**Menu content and restaurant setting**	**KMO**
Q3.5.1	0.8130		0.6604
Q3.5.2	-0.7604		0.6677
Q3.5.3	0.5818		0.7400
Q3.5.5		0.6720	0.6846
Q3.5.6		0.6007	0.6739
Q3.5.7	0.5119		0.7753
Q3.5.8		0.8019	0.5093
Bartlett test			0.000
Overall			0.6711

Table A7: EFA3 Home food environnent				
	Junk food and processed meat	**Red meat and dairy**	**Fats and carbs**	**KMO**
Q1.5.3	0.6960			0.7458
Q1.5.4	0.6933			0.8120
Q1.5.6	0.6709			0.8145
Q1.5.13	0.5968			0.7494
Q1.5.15	0.6858			0.7060
Q1.5.12		0.8008		0.6352
Q1.5.16		0.6455		0.6045
Q1.5.19			0.7508	0.6872
Q1.5.20			0.5263	0.7747
Q1.5.9			0.6044	0.6352
Q.1.5.8			0.6968	0.7462
Q1.6.5		0.7307		0.7747
Bartlett test				0.000
Overall				0.7390

Table A8: Results of cluster analysis using k ward method		
	Cluster 1 "Experiencing potential healthy food environments" (n=46)	**Cluster 2 "Inaccessible healthy food environments" (n=19)**
Store food environment		
Store availability	0.5161	0.0244
Promotion fruit and vegetables in the store	-1.4307	0.4981
Store accessibility	0.0530	0.0233
Price fruit, vegetable and fish	-0.2364	-0.3552
Restaurant food environment		
Availability and promotion healthy meal	0.2665	-0.0017
Menu content	-0.6966	-0.1049
Home food environment		
Junk food and processed meat	0.2324	0.2702
Red meat and dairy	-0.3665	0.2766
Fats and carbs	-0.1108	-0.4928

SPAIN

Table A9: EFA1 Perceived store food environment					
	Store availability of plant and animal-based food	**Price of different foods in the store**	**Promotion or discount on fruit and vegetables and red meat**	**Location in the store**	**Location in the store of unhealthy choice**	**KMO**
Q2.1.4	0.8454					0.8165
Q2.1.5	0.8510					0.6052
Q2.1.6	0.8540					0.7684
Q2.1.1	0.8058					0.7588
Q2.1.2	0.7489					0.6778
Q.2.1.3	0.8515					0.7887
Q2.9		0.8342				0.8407
Q2.10		0.8590				0.7688
Q2.11		0.8846				0.7323
Q2.12		0.7949				0.7947
Q2.13.3			0.7912			0.5801
Q2.13.4			0.8892			0.5538
Q2.13.2				0.9000		0.4989
Q2.13.5				0.7805		0.6035
Q2.13.8					0.9296	0.6622
Bartlett test						0.000
Overall						0.7233

Table A10: EFA2 Perceived restaurant food environment			
	Availability and promotion healthy meals	**Availability and promotion unhealthy meals**	**KMO**
Q3.5.1	0.5655	-0.6030	0.7126
Q3.5.2	-0.5233	0.6151	0.7305
Q3.5.3	0.7556		0.7609
Q3.5.5	0.6733		0.7254
Q3.5.6		0.7770	0.6947
Q3.5.7		0.6994	0.6915
Q3.5.8	0.6905		0.7818
Bartlett test			0.000
Overall			0.7287

Table A11: EFA3 Home food environnent					
	White meat availability and accessibility	Junk food availability and accessibility	Legumes availability and accessibility	Dairy and eggs availability	KMO
Q1.5.14	0.5975				0.7851
Q1.5.3		0.5046			0.6659
Q1.5.4		0.7980			0.8256
Q1.5.10			0.7188		0.4387
Q1.5.16				0.5410	0.6688
Q1.5.17				0.5338	0.7011
Q1.6.4		0.7248			0.7369
Q1.6.5	0.7563				0.7851
Q1.6.6	0.6791				0.6208
Q1.6.7			0.6015		0.4031
Bartlett test					0.000
Overall					0.7050

Table A12: Results of cluster analysis using k ward method		
	Cluster 1 "Healthy food environments experience" (n=93)	Cluster 2 "Unhealthy food environments experience" (n=13)
Store food environment		
Store availability of plant- and animal-based food	0.1143	-0.1890
Price of different foods in the store	-0.8430	0.0966
Promotion or discount on fruit and vegetables and red meat	0.0095	-0.1065
Location in store	0.1328	-0.1144
Location in the store of unhealthy choice	0.0196	0.9269
Restaurant food environment		
Availability and promotion of healthy food	0.1807	-0.1019
Availability and promotion of unhealthy food	-1.2930	0.7295
Home food environment		
White Meat availability and accessibility	0.1287	-0.0630
Junk Food Availability and Accessibility	-0.9771	-0.0136
Legumes Availability and accessibility	0.0244	-0.0273
Dairy and Eggs Availability	0.4297	0.0038

Q1.2 Which of these appliances do you have in your home to cook or store food? (yes/no)

- Refrigerator
- Freezer (attached to refrigerator or stand-alone)
- Microwave oven
- Stove
- Oven
- Other countertop cooking appliance (rice cooker, bread machine, or electric grill) Q1.3 If you have a garden, do you grow your own food?
- I do not have a garden
- I have a garden, but do not grow food
- I have a garden and grow some food
- I have a garden and I produce most of the food that I need
- I have a garden and I'm self-sufficient

Display This Question:

If Q1.3 = 6

Or Q1.3 = 2

Or Q1.3= 7

Q1.4 Indicate the food categories that you produce: (never, sometimes, often, almost always)

- Potatoes
- Green vegetables
- Red and orange vegetables
- All kind of fruit
- Legumes
- Eggs
- Roots (onions, garlic, carrots, beets)
- Milk
- Dairy foods (hard cheese, butter)
- Dairy foods (yoghurt, soft cheese)

Q1.5 Please indicate whether each of these food items were available in your home in the past week (yes/no)

- Fruits
- Vegetables
- Sweets (cookies, pastries, baked goods)
- Snack chips (potato chips, corn chips, tortilla chips, etc.)
- Plant-based products (plant-based milk, vegan/vegetarian burgers...)
- Sugar-sweetened beverages (non-diet soft drinks/sodas, flavoured juice drinks)
- Whole grains (bread, rice, pasta, corn and other)
- Refined grains (Bread, polished rice, pasta, corn and other)
- Potatoes
- Legumes
- Frozen and fresh fish
- Red meat (beef, lamb, pork)
- Processed red meat (sausages, salami, etc)
- White meat (poultry)
- Processed fresh and frozen white meat (chicken nuggets, cutlet, sticks, etc.)
- Dairy products (milk or derivative equivalents)
- Eggs

- Tree nuts and peanuts
- Plant oils (olive oil, canola oil, palm oil)
- Dairy fat (animal fat: butter, lard, tallow, ghee)

Q1.6 In your home, how often do you...? (Never or rarely, sometimes, often, almost always)

- Have vegetables in the refrigerator/freezer
- Have vegetable in a bowl
- Have fruit available in a bowl or on the counter or in the refrigerator
- Have snack chips and sweets on the counter
- Have meat (pork, beef, chicken and other poultry) in the refrigerator/freezer
- Have fresh or frozen fish in the refrigerator/freezer
- Have dry/canned/ frozen legumes
- Have nuts (almond/ cashews/ pistachio/ macadamia nuts/ peanuts) on the counter
- Have whole-grain foods available to eat
- Have eggs in the refrigerator/ counter
- Have dairy products in the refrigerator/counter

Q1.7 How long does it take to cook your meals?

	Never or rarely (1)	Sometimes (2)	Often (3)	Almost Always (4)
<10 min (1)	•	•	•	•
10-20 min (2)	•	•	•	•
20-40 min (3)	•	•	•	•
40-60 min (4)	•	•	•	•
>60 min (5)	•	•	•	•

Food Shopping Questions

Q2.1 Please mark whether you agree or disagree with the following statements (Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree):

- It is easy to buy plant-based products (fruit, vegetables, legumes, oils) in my neighbourhood
- The plant-based products (fruit, vegetables, legumes, oils) in my neighbourhood are of high quality
- There is a large selection of plant-based products (fruit, vegetables, legumes, oils) in my neighbourhood
- It is easy to buy animal-based products (meat, eggs, dairy, product, fish) in my neighbourhood.
- The animal-based products in my neighbourhood are of high quality
- There is a large selection of animal-based product available in my neightbourhood

Q2.2 How often do you usually shop for food?

- (almost) every day
- Twice a week
- Once a week
- Once every 2 weeks
- Once a month
- Other (please specify):_____

Q2.3 Is there one store/market or more than one store/market where you do most of your food shopping?

- One store/market
- Two stores/ market
- More than two stores/ markets

Q2.4 What type of store is the store where you buy most of your food?

- Supermarket
- (street) market or grocery store
- Convenience store (minimarket)
- Farmers' market
- Other (please specify)
- _____

Q2.5 Thinking about the store where you buy most of your food, how do you usually travel to this store? (check all the apply)

- Walk
- Bicycle
- Bus or other public transportation
- Drive (car/scooter)
- Get a ride (someone else to drive you)
- Other (please specify)_____

Q2.6 About how long would it take to get from your home to the store where you buy most of your food, if you walked there?

- 10 minutes or less
- 11 to 20 minutes
- 21 to 30 minutes
- more than 30 minutes

Q2.7 How important are each of the following factors in your decision to shop at the store where you buy most of your food? (Not at all important, Slightly important, Moderately important, Very important)

- Near your home
- Near or on the way to other places where you spend time
- Your friend/relatives shop at this store
- Selection of foods (food variety)
- Quality of foods
- Prices of foods
- Access to public transportation
- Long opening hours

Q2.8 At the store where you buy most of your food, how hard or easy is it to get each of these types of foods?

(Very easy, Somewhat easy, Somewhat hard, Very hard)

- Fresh fruits and vegetables
- Canned or frozen fruits and vegetables
- Fresh fish and small fish
- Frozen fish and small fish (not processed)
- Candy and snack chips
- Whole grain products (bread, pasta, rice etc)
- Refined grain products (bread, pasta, rice etc)
- Sugary drinks
- Dry legumes (beans, lentils, peas etc.)
- Canned legumes
- Processed red meat (pork, beef, lamb, sausages, salami)
- Unprocessed red meat (pork, beef, lamb)

Q2.9 At the store/market where you buy most of your food, how would you rate the price of fish (fresh or frozen)?

- Very inexpensive
- Not expensive
- Somewhat expensive
- Very expensive

Q2.10 At the store/market where you buy most of your food, how would you rate the price of red meat (not processed)?

- Very inexpensive
- Not expensive
- Somewhat expensive
- Very expensive

Q2.11 At the store/market where you buy most of your food, how would you rate the price of white meat (not processed)?

- Very inexpensive
- Not expensive
- Somewhat expensive
- Very expensive

Q2.12 At the store/market where you buy most of your food, how would you rate the price of fruit and vegetables?

- Very inexpensive
- Not expensive
- Somewhat expensive
- Very expensive

Q2.13 Please mark whether you agree or disagree with the following statements for the store where you buy most of your food and your shopping habits at that store. Questions about unhealthy foods refer to those foods often considered to be high in sugar, salt, fat and calories, such as candy, chips, sugary cereals and

drinks, bakery desserts, and so on. (Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree)

- I notice signs that encourage me to purchase healthy foods.
- I often buy food items that are located near the cash register.
- There are discounts or promotions on fruits and vegetables
- There are discounts or promotions on red meat (pork, beef, lamb processed and not)
- I often buy items that are eye-level on the shelves.
- It is difficult to identify vegan/vegetarian food options (lack of clear labelling)
- I look at nutrition labels or nutrition information for most of the packed food I buy
- The foods near the cash register are mostly unhealthy choices.
- It`s easy to find the organic alternative for most of the food that you purchase
- It`s easy to find seasonal fruit and vegetables
- It`s easy to find different species of fish with the eco-label MSC (seafood from sustainable fishing)

Restaurant/Eating Out Questions

Q3.1 In an average week, how many times do you eat a meal away from home, or get take-out food, at a...

Fast food : _____
Restaurant : _____
Other type of restaurant (food truck, cafeteria,etc) : _____

Total : _____

Display This Question:

If Q3.1 [10] > 0

Q3.2 About how long would it take to get from your home to the fast-food where you go most often, if you walked there?

- 10 minutes or less
- 11 to 20 minutes
- 21 to 30 minutes
- More than 30 minutes

Display This Question:

If Q3.1 [11] > 0

Or Q3.1 [12] > 0

Q3.3 About how long would it take to get from your home to the restaurant where you go most often, if you walked there?

- 10 minutes or less
- 11 to 20 minutes
- 21 to 30 minutes
- More than 30 minutes

Q3.4 Please check the answer that best describes the restaurant where you go most often (including getting take-out if that applies to you) and your opinion about that restaurant.   Questions about healthy options mean choices that are low-fat, "heart healthy", small portions, fruits and vegetables, and so on.   Questions about unhealthy foods mean those foods that are high in fat, sugar, salt and calories, such as "super-sized" items, foods that are deep-fried, sweet desserts, and so on.

Q3.5 Please mark whether you agree or disagree with the following statements about the restaurant/ fast food/others where you go most often: (Strongly disagree, Somewhat disagree, Neither agree nor disagree , Somewhat agree, Strongly agree):

- There are many healthy menu options at the restaurant.
- It is hard to find a healthy option when eating out at the restaurant.
- It is easy to find vegan/vegetarian menu at the restaurant.
- It is important to me to be able to make a healthy food choice when eating out.
- The restaurant provides nutrition information (such as calorie content) on a menu board or on the menu.
- Signs and displays encourage overeating or choosing unhealthy foods from the menu.
- It costs more to buy the healthy options.
- The menu or menu board highlights and promotes the healthy options at the restaurant.
- When the food you have ordered is too much, take home what you have left on your plate

Q 3.6 How important are each of the following factors in your decision to eat at the restaurant where you eat most? (Not at all important, Slightly important, Moderately important, Very important)

- Near your home
- Near or on the way to other places where you spend time
- Your friend/relatives eat out at this restaurant
- Selection of foods (food variety)
- Quality of foods
- Prices of foods
- Access to public transportation
- Long opening hours

Start of Block: Your Thoughts and Habits about Food

Q4.1 How concerned are you about the nutritional content of the foods you eat?

- Not at all concerned
- Not too concerned
- Somewhat concerned
- Very concerned

Q4.2 When you shop for food, how important to you is... (Not at all important, Somewhat important, Very important)

- Taste
- Nutritional content
- Cost
- Convenience (food that no need a lot of time to be prepared, cooked and consumed)
- Sustainable production (no impact or as less as possible environment impact)

Q4.3 When you eat out at a restaurant or get take-out food, how important to you is...? (Not at all important, Somewhat important, Very important)

- Taste
- Nutrition
- Cost
- Convenience (no time to cook at home)
- Sustainable production (no impact or as less as possible environment impact)

Q4.4 How often does your family/roommates/colleagues eat evening meals together at home?

- I live alone
- Never
- Occasionally
- Sometimes
- Usually or always

Q4.5 How often does your family/roommates/colleagues/you eat meals in front of a screen (tv, laptop, etc.)?

- Never
- Occasionally
- Sometimes
- Usually or always

Q4.6 The next question asks about how often you eat certain foods. Think about what you usually eat, including all meals, snacks, and eating out

Q4.7 About how often do you usually eat or drink each of the following items? (Once a DAY, 2 or more times a DAY, 1-2 times per WEEK, 3-4 times per WEEK, 5-6 times per WEEK, 1-3 times per MONTH, Less than once a month or never):

- Fruit, not counting juice
- Fresh or frozen fish (not processed)
- Vegetables, not counting potatoes or salad
- Nuts (almond, pistachio, macadamia nuts etc.)
- Eggs
- White meat (poultry, processed and not)
- Legumes
- Dairy product (milk included)
- Red meat (processed and not)

General Household Questions

Q5.1 How many members does your household comprise?

Q5.2 How many of them work?

Display this Question only if the following condition is met:
QuestionQ5.1 How many people who lives in...Persons below 18 years old (Text Entry)Is Not Empty

Q5.3 Are there children in the household? Children are defined as those under 12 years of age

- If yes, how many? _____
- No

Background Questions

Q6.1 What gender do you identify with?

- Male
- Female
- Non-binary / third gender

Q6.2 Indicate your age, please

Q6.3 What is your zip code?

Q6.4 What is your highest level of education?

- No degree
- Primary school degree
- High school degree
- Vocational school degree
- Bachelor's degree
- Master's degree
- Doctoral degree
- Doctoral or equivalent level

Q6.5 How would you describe your current employment status?

- Full-time employment (30 + hours a week or more year-round)
- Part-time employment (15-29hrs/week)
- Part-time less than (15 hrs/week)
- Unemployed, actively seeking employment
- Temporary company leave (e.g. maternity, paternity leave or long-term sick leave)
- Apprentice/Trainee
- Currently not employed (e.g. student, military service, internship, voluntary work, retirement, early retirement...)

Q6.6 Please indicate your monthly net household income:

- €0-1,000
- €1,001-2,000
- €2,001-3,000
- €3,001-4,000
- €4,001-5,000
- €5,001-6,000
- €6,001-7,000
- Over 7,000
- Prefer not to say

Q6.7 Do you smoke cigarettes?

- Yes, I currently smoke
- No, but I used to smoke and quit
- No, I have never smoked

Q6.8 How would you describe your level of physical activity?

- Not at all active, mostly sedentary
- Moderately active
- Moderately to very active
- Very active (vigorous activity at least 5 days a week)

Q.6.9 In general, would you say your health is:

- Poor

- Fair
- Good
- Very good
- Excellent

Q6.9 Email address of the participant (optional)

Examining the food environment of single-parent families

Are you raising your child(ren) alone at least 50% of the time?

1. FOOD PROCUREMENT

1.1. Do you usually do separate large shopping? (Grocery shopping: when you buy everything in one, and between big groceries you buy only perishable food.)

1.2. How often do you buy food (regardless of quantity)?

1.3. Is online grocery shopping (excluding ready meals) relevant for your household?

1.4. How much do you agree with the following statements?

- I strongly disagree
- I'd rather disagree
- I am of neutral opinion
- I rather agree
- I totally agree

There is a shop within walking distance where I can buy at least some varieties of fresh fruits and vegetables.

Fresh fruits and vegetables within walking distance are of good quality.

There is a large selection of fresh fruits and vegetables in my area.

Within walking distance it is easy to buy products of animal origin (meat, meat products, eggs, dairy).

Products of animal origin within walking distance are of good quality.

Within walking distance there is a large selection of products of animal origin.

1.5. How important are the following factors for you when deciding what to buy?

- Not important at all
- Rather, it is not important
- I am of a neutral opinion
- Rather, it is important
- Very important

Taste associated with the product

The presence of certain components

Nutrient content (energy, protein, carbohydrate, fat or fibre)

Price

Favorite, well-known brand

Organic/organic origin

It should be a convenience food, it should be prepared quickly

It should be a product made in Hungary

It must be a product made by small producers

Be an eco-friendly (or packaging-free) product

It should be a durable, long-lasting product

1.6. How important are the following factors to you when deciding where to buy?

- Not important at all
- Less important
- Neutral
- Rather important
- Very important

It is close to where I live

On the way or close to other places where you spend time

My friends/relatives shop in this store

Choice of food

Food quality

General price level of foodstuffs

Public transport and accessibility

Long opening hours

Credit card can be used

There are regular promotions

Private label products are (also) available

I can buy a wide variety of products (not just food) in one place

1.7.   How many places (e.g. shops, markets, etc.) do you visit regularly?

1.8.   In which place do you buy the MOST groceries overall? (This isn't necessarily the same location where you shop most often.)

1.9. Please think about the store where you buy the MOST groceries overall. How do you usually get into this business?

1.10. Approximately how long would it take to get from home to the store where you buy the MOST groceries if you went ON FOOT?

1.11. In the place where you buy MOST food, how difficult or easy is it to obtain the following types of food (in terms of large selection, appropriate quality, etc.)?
- Very difficult
- Difficult
- Easy
- Very easy
- I don't know

Fresh fruits and vegetables

Canned or frozen fruits and vegetables

Fresh fish, fish fillets

Frozen fish, fish fillets and small fish

Candies and chips

Fine flour breads and bakers' wares

Products made from whole grains (bread, pasta, rice, etc.)

Sweetened beverages (fruit drinks, sports drinks, energy drinks, sweetened waters, and added

coffee and tea products containing sugar)

Dry legumes (beans, lentils, peas, etc.)

Canned legumes

Fresh red meats (pork, beef)

Meat products

Special foods (dietary, organic, etc.)

1.12. In the place where you buy MOST groceries, how would you rate the prices of the following products?
- Very cheap
- Not expensive
- Slightly expensive
- Very expensive

- I don't know

Fish (fresh or frozen)

Fresh red meats (pork, beef)

Fresh white meats (poultry)

Vegetables and fruits

Legumes

Dairy products

Breads (including pastries)

Eggs (not price capped)

1.13. How typical are the following statements for the location where you buy MOST food? (Unhealthy foods e.g. sweets, chips, sugary cereals and beverages, pastries, etc.)

- I strongly disagree
- I'd rather disagree
- I am of a neutral opinion
- I rather agree
- I totally agree

Ads and posters encouraging the purchase of healthy foods are exposed.

I often buy groceries that are near the cash register.

There are discounts or promotions on fruits and vegetables.

There are discounts or promotions on red meat (processed or fresh)

I often buy products that are at eye level on the shelves.

Difficulty identifying vegan/vegetarian foods (e.g. ambiguous labelling).

I pay attention to the nutrition labeling or composition of packaged foods.

Food near checkout is mostly unhealthy.

For most of the foods I buy, it would be easy to find an organic alternative within the store.

Easy to find unpackaged products (e.g. fresh fruits and vegetables, frozen fish, cereals and legumes, etc.)

Typically, I go shopping with a shopping list

1.14. Do you or your immediate family or friends grow food from which you benefit?

FOOD PRODUCTION

1.15. What of the following statements applies to you?

- I grow/receive some food, but I also have to shop regularly.

- There is a type of product from which I grow/receive most of my needs.

- There are types of products that I am self-sufficient in (or that I get enough to feed the household).

2. HOME ENVIRONMENT

2.1.   How often can the following foods be found in your home?

- Almost never
- Occurs occasionally (less often than weekly)
- Mostly at home (weekly)
- There is always some of it

Have vegetables exposed (in mind, within easy reach)

They are exposed to nuts

There are exposed snacks (sweets, biscuits, chips)

Have fresh vegetables in the fridge

There is fruit at home

We have dry/canned/frozen leguminous vegetables at home (green peas/beans/soybeans/lentils)

Do you have fresh or frozen white meat at home

Do you have fresh or frozen red meat at home

There are store-bought meat products at home

Do you have fresh or frozen fish at home

Are there dairy products at home

Do you have eggs at home

We have sweet/savory pastries at home

There are bread and pasta made from white flour at home

There are healthy alternative foods at home (e.g. whole grain, sugar-free,

reduced salinity, etc.)

Do you have cold-pressed oil at home

There are fats of animal origin (fat, butter) at home

There are comfort foods at home

Is there a vegetable drink at home

There are plant-based meat substitutes at home

Is there a dietary supplement at home

There are nuts in the cupboard/pantry (almonds/cashews/pistachios/macadamia nuts)

There are candied soft drinks, energy drinks, juices made from concentrate at home

There are sweets (candy, chocolate, sweet biscuits) in the cupboard/pantry

There are savory snacks (ropies, chips, tortillas, popcorn, crackers) in the cupboard/pantry;

2.2. How much time do you devote to preparing hot meals on an average weekday?

2.3. How much time do you spend preparing hot meals on a typical weekend day?

3. PURCHASE OF READY MEALS

3.1. How important are the following considerations to you when buying ready-to-eat meals?

- I don't buy ready meals
- Not important at all
- Somewhat important
- Very important

Taste

The presence of certain components

Nutrient content (energy, protein, carbohydrate, fat or fibre)

Price

Comfort (no time to cook at home)

Eco-friendly aspects (e.g. organic, meat-free, packaging-free, etc.)

3.2. Do you buy ready-to-eat meals online or in stores (occasionally or regularly)?

3.3. How often do you buy ready meals at the following locations?

- • -Weekdays
- - Several times a week
- - Once a week
- - A couple of times a month
- - Less often

Work in a dining room/canteen.

In café/bakery/snack bar.

Fast food (including pizza parlour, gyros).

3.4. How many times in a typical week do you buy ready-cooked food at the locations described in question 3.3?

(short text answer)

3.5. Please consider the location above (see question 3.3) where you MOST often buy ready meals. How much do you agree with the following statements about this location?

If you typically do not or rarely buy ready meals, please always select Don't know/not relevant.

- • Don't know/not relevant
- • I strongly disagree
- • I'd rather disagree
- • I am of a neutral opinion
- • I rather agree
- • I totally agree

It's easy to find healthy choices in this place.

It's easy to find vegetarian/vegan choices here.

Nutrition information (e.g. energy value) is available on the menu or on a sign.

Signs and displays encourage overeating or unhealthy food choices

It costs more to buy healthy options.

No problem if someone asks for tap water.

If you don't run out of food you ordered, it's easy to take away leftovers

3.6. How important are the following factors to you in relation to the place where you MOST often buy ready meals? (See question 3.3.)

If you typically do not or rarely buy ready meals, please always select Not relevant.

- • Not relevant
- • Not important at all
- • Less important
- • Neutral
- • Rather, it is important
- • Very important

It is close to where I live.

It's close to or on its way to other places where I spend time.

My friends/relatives shop in this store.

The choice of dishes.

The quality of food.

The size of portions.

The general price level of food.

Public transport and accessibility to the place.

Long opening hours.

It is important for me to be able to choose from healthy foods.

3.7. Approximately how long would it take to walk from home to the FAST FOOD (including pizza parlor, gyros) where you shop most often?

I don't typically go to fast food

10 minutes or less

11-20 minutes

21-30 minutes

More than 30 minutes

4. ATTITUDE TO NUTRITION

4.1. How interested are you in the nutrient content (energy, protein, carbohydrate, fat or fibre) of the food you eat?

- I don't care at all

- I don't really care

- I'm somewhat interested

- I'm very interested

4.2. How interested are you in the environmental impact (ecological footprint) of the food you eat?

- I don't care at all

- I don't really care

- I'm somewhat interested

- I'm very interested

4.3. How often does the family eat together in the evening?

-Never

- Occasionally (less often than weekly)

- Weekly

- Several times a week or always

4.4. How often does the family eat in front of the TV (tablet, any screen)?

- Never

- Occasionally (less often than weekly)

- Weekly

- Several times a week or always

4.5. How often do you consume the following foods?

- Several times a day
- Once a day

- Several times a week
- Once a week
- At least once a month
- less often

Fruit, other than fruit juices

Fresh or frozen fish

Vegetables, other than potatoes and leaf-greens (lettuces)

Nuts (almonds, pistachios, macadamia, etc.)

Egg

White meats (poultry)

Red meats (pork, beef)

Legumes

Dairy products (including milk)

Bread and cereals (pastry, muesli, rice, pasta, etc.)

4.6. Do you or your child(ren) follow any special diets (including vegetarian, vegan diets)?

- Yes, because of choice (vegetarian, vegan, paleo, ketogenic, etc.)

- Yes, due to a diagnosed health problem (food allergy, sugar balance problem, etc.)

-No

- I don't answer

4.7. What would you need to eat healthier? Multiple answers can be marked.

- I am satisfied with my meal

- More information

- More time

- More money

- More willpower

- More choice

4.8. How often in the last 12 months have you worried about whether you have enough money for nutritious meals?

- Never

- Several times

- It often occurs to me

- Almost constantly

- I don't answer

5. BACKGROUND

5.1.   Please indicate the answer option that best describes how you felt during the last 2 weeks.

Did you feel it during the last 2 weeks....

- Not at all typical
- Hardly typical
- Characteristic

- Fully characteristic

cheerful and cheerful?

calm and relaxed?

active and vibrant?

Do they feel fresh and rested when they wake up?

Were his days full of interesting things for him?

5.2. How many people does your household have?

Short text response

5.3. How many of these people work?

Short text response

5.4. How old is your child(ren)?

Short text response

5.5. Do you have children with long-term illnesses and/or special educational needs (excluding food allergies)?

-Yes

-No

- I don't answer

5.6. How long have you been raising your child(ren) alone? (Year since month)

Short text response

5.7. Who bears most of the expenses related to the child(ren) (food, clothing, education, etc.)?

- The other parent of the child(ren)

- Other (e.g. grandparent)

5.7. Please specify your gender.

- Man

- Woman

5.8. How old are you?

Short text response

5.9. Please enter the postal code of your residence.

Short text response

5.10. Please indicate your highest level of education.

- Less than 8 general

- 8 General

- trade school

- graduation

- Higher vocational qualification (e.g. OKJ)

- Higher education – bachelor's degree (3-4 years)

- Higher education – master's degree or higher (5+ years)

- PhD, DLA

5.11. What is your labour market situation?

- I work more than 30 hours a week.

- I work 15-30 hours a week.

- I work less than 15 hours a week.

- I am unemployed, actively looking for a job.

- I am on GYES, GYED, I am permanently absent

- I don't work

5.12. How would you describe your health status?

- Very bad

- Bad

- Corresponding

- Good

- Excellent

5.13. How much do you agree with the following statements?

- I'm not conscious at all

- I'm mostly not conscious

- I'm conscious and I'm not even conscious

- I am mostly conscious

- I'm very conscious

I am health conscious.

I am environmentally conscious.

5.14. Do you smoke?

- Yes, regularly

- Yes, occasionally

- No, I've already quit

- I've never smoked

5.15. How tall are you (in centimeters)?

Short text response

5.16. What is your weight (in kilograms)?

Short text response

5.17. What is characteristic of your physical activity?

- I am not active at all, I do mostly sedentary work.

- Moderately active.

- Relatively active (I do sports 1-2 times a week)

- I do a lot of sports intensively (at least 5 days a week)

5.18. What is your household's net monthly income?

- between 0-100 000 HUF

- between 100 000 – 200 000 HUF

- between 200 000 – 300 000 HUF

- between 300 000 – 400 000 HUF

- between 400 000 – 500 000 HUF

- between 500 000 – 1 000 000 HUF

- over 1 000 000 HUF

- I don't answer

5.19. Do you have any comments on this topic?

Long text response