National and Kapodistrian University of Athens

Interdepartmental Graduate Program "Science, Technology, Society—
Science and Technology Studies"

Department of History and Philosophy of Science

&

Department of Informatics and Telecommunications

MSc Thesis Title: Lay Perception of Food and Toxicity: A Social
Representations Approach

Name of Student: Karantzavelou Vasiliki

Registration Number: 10/220

Thesis Advisory Committee:
Efstathios Arapostathis, Associate Professor (advisor)
Aristotelis Tympas, Professor (member)
Konstantinos Vattes, Adjunct Faculty member (member)

Athens, 2021

Abstract

One of the current grand challenges in the EU but also globally involve the consumption of secure and healthy food and the development of social practices that re-conceptualize and redefine the relation between food and wellbeing. In this context, a matter of concern is the issue of toxicities and relevant risks that intervene in the food chain. While STS has focused on the entanglements of toxicities, food and environment, little attention has been placed on social representations of lay people about food. The aim of the thesis is to study the interface between food, environment and health through the lens of the social representation theory, which addresses the constitution of social realities, communication networks and the transformation of scientific concepts into common sense. Eleven focus groups were conducted for research purposes, and they were consisted of lay participants which self-defined in one of the three following categories: patients with chronic illnesses, individuals interested in the environment and individuals interested in fitness and exercising. The discussions were transcribed and analyzed using the software IRAMUTEQ, while discourse and thematic analysis techniques were used to examine the construction of representations about perceived food toxicity, practices related to food consumption, including organic products and superfoods, and notions about the perceptions of healthy body.

Keywords: *food toxicity, toxicity, risk, lay perception, lay knowledge, health*

Table of Content

Graphs

Introduction

Every society is facing severe challenges and shifts at a social and historical level and the dominant narrative of our times considers environmental issues to be a shared concern affecting everyone equally. STS has been vitally involved in topics regarding the environment, and a recent rise has been noted in food studies and the entanglement of external materialities in the food chain. Biosystems can be seen as interconnected spheres unable to be distinct from each other. One of the major themes concerning food chain and sustainability researchers is toxicity and its definition in a constantly evolving world. Recent references of problematic behaviors as toxic introduce a newly found life of toxicity in public discourse. However, this metaphorical concept cannot overthrow the dominance of toxicity perception as a detectable, material factor affecting the quality of products and living conditions. Toxicity is considered among the risks which communities need to face, as they are unwanted outcomes of extensive and rapid development.

Food has been a huge topic of research in many social sciences, which put stress on the importance of consumption and culture-related practices in everyday activities. From hunter-gatherer communities to today's post-industrial mass production, the relationship of people with food has been radically altered. STS has been dealing with the integration of individuals in the consumption and evaluation of technology and science, reaching to the undeniable observation that people are actively embedded in socio-technical regimes in complex ways. The recent explosion of information and digital literacy entwined with the emerging trend of wellbeing and the pursuit of a healthier, purer lifestyle has created a public interest in food chain and food production. Despite the emerging interest on food-related topics, the majority of research has been focusing on policy research and the entanglement of experts in the configuration of food networks, while the public portrayal is mostly limited to media analysis. As a result, we have been overlooking lay individuals' perception concerning one of the most common and vital practices: eating. The aim of this thesis is the exploration of lay perception of food toxicity based on social representations theory, which derives from the field of social psychology. The theory is applied in

accordance with the objectives of STS while adding additional value to the concept of perception, since it does not consider people as passive opinion bearers; on the contrary, both approaches see people as rational beings who construct functional theories and collective knowledge in their attempt to interpret and further explain the grinds of reality. This dynamic theory of social knowledge can contribute to the investigation of lay perception avoiding common drawbacks of "objective truth", which makes it an interesting contribution to the STS concept of examining how "science 'works' to produce and circulate knowledge about the world" (Goldman & Turner, 2011).

The method of focus groups was used for the exploration of the individuals' ordinary social knowledge, since it enables a discussion between the participants and, thus, a further deliberation of contrasting representations that lead to deeper insights. Three categories of lay individuals were shaped; one consists of people with health problems that are affected by food selection (vulnerable group), one consists of individuals who are actively engaged or interested in environmental issues (environmental group) and the final group consists of people interested in exercising and fitness (fitness group). A comparison between the different categories' focus groups illustrates different social representations and signal that food toxicity can be conceived in many ways, depending on the participants' group belongingness, ideology and prior experiences. Contradictions can also be a useful finding, indicating the pluralism of meanings that derives from lay understanding, including the perception of local food as quality food, while at the same time supporting an approach of measurable quality.

The importance of integrating lay knowledge in food studies is part of the field's examination of identity construction. However, the linkage of food to technoscience may seem vague. Growing food industrialization, rising demands and international trade are pushing agri-food systems towards acceleration and techno-science towards the engulfment of agricultural practices, landscapes, markets, consumption and knowledge. Imaginaries along with social, economic and political conditions, co-construct the facet of modern food, which is facing major crises; crises that demand solutions and transitions towards alternative models and conceptualizations of important aspects, including water, soil, energy, systems, human agency, knowledge, environment and food.

Several questions could occur from the previously discussed topics, however the main research questions are:

1. How do lay individuals perceive food toxicity?
2. Do lay individuals who belong in different groups perceive food toxicity differently?
3. Do non-experts define toxicity the same way with the definition provided by the literature?

Chapter 1. Theoretical framework

Risk, toxicities and lay perception

Even though it is a widely popular term in STS, risk still has a variety of significations and definitions, which makes it an abstract concept of multiple interpretations. Beck's work is considered game-changing for introducing a pessimistic future hypothesis that seems to be confirmed. Nonetheless, its very fundamentals can be found in late '60s, when the fear of a nuclear war was widespread and the discourse on technological safety was raised both in lay and scientific audiences. Starting with Starr (1969), who attempted to provide specialists with a tool for better decision-making on risk acceptance based on his analysis of risk-benefit relationships for the optimum result, and Douglas & Wildavsky, who focused on the cultural aspects that affect risk perceptions, thus the universal consent on acceptance (1982), distinct conceptualizations are expressed. Beck's seminal work "Risk Society" (1986) introduced a framing of modern industrialized society as producer of unknown and inescapable hazards, a catastrophic spiral that signifies the beginning of a new era where global concerns concentrate on the limitation of consequences originated from earlier risk acceptance or innovations.

The concept of risk society is widely appraised and popular, along with work influenced by it, like Gidden's take on uncertainty. However, it has been criticized by the field of STS for being frequently described as independent from social conditions and overlooking the lay dimension of risk perception, widening the gap between experts and the public (Wynne, 1996). Beck and Giddens have been accused of promoting a "universality" of risk, with global threats and dangers becoming the central point of social relations. Risk is discussed in terms of inherent qualities that are generalized and stable (Beck, 1996) and, as a result, risk is considered the core trait of societies, to which they are equally exposed and equally affected. Such a totalization in terms of both inescapability and omnipresence bears unhistorical elements, leaving out of the equation the local characteristics and subjective acts of signification. This approach's adherence to the European paradigm is problematic for the testing of this theory and, also, for the replication of his conceptualization in non-European societies. For example, work in Asia indicated no significant findings (Zhang, 2010; 2015).

Beck himself (1986) defines risk as the unintended consequences of the rapid development of science and technology in late modernity's societies, but it is neither the only nor the most prevalent one because there is not a commonly accepted definition of the term. A difficulty in defining risk might lead to distinct ways of related perceptions, and thus, to different views. From Giddens's "ontological insecurity" (1991) to the risk-benefit polarity of risk assessment, there is much ground to cover, through creating new boundaries for personal meaning-making and risk perception. Luhmann's (1993) distinction between risk and danger entails a significant difference on one key property: decision. Risk is considered a potential future loss because of a decision, while danger is defined as a potential loss resulting from an external factor. Luhmann's proposal may shed light on the all-embracing framework of risk but cannot include specific risk categories heavily alternating social conditions and penetrating every aspect of the human condition.

A major issue resulting from the extensive use of chemical substances to solve modern-time problems and create possibilities is the unexpected impact they have on the environment and human bodies (Shapiro & Kirskey, 2017). This results to the creation of a toxic "Chemical Age" consisted of unintended by-products (von Hippel, 2020). Toxicity suggests a wide conceptualization of environmental hazards that can be seen as a product of rapid industrial production in modern, risk-leaning societies. Exposure to waste, contamination from chemicals and proximity of manufacturing units to residential areas are only a few factors worsening living conditions of communities and individuals, posing a thrat to people's health and causing environmental degradation. All the above are aspects of toxicity, a condition that is usually defined if the four principles for assessment, as developed by the National Research Council (2014), become applicable: hazard identification, hazard characterization (including dose–response analysis), exposure assessment, and risk characterization. These grounded evaluation criteria are based on threshold limits and promote a duality doctrine of two states, toxic or non-toxic, creating a vague scenery of diffused latent toxicity that does not outreach the limits. Therefore, it is worth wondering whether we are living in a permanently polluted world (Liboiron, Tironi & Calvillo, 2018).

The concept of toxicity is widely used metaphorically when describing personality traits. The adjective "toxic" is borrowed from biology to describe speech

and concepts harmful to people who are exposed to it and it is proposed to take the following two routes: individual protection and collective action (Tirrell, 2018). Such a parallelism raises awareness on the impact that discursive practices might have, while at the same time oversimplifies and takes away the importance of real hazards.

Chemicals are often described and acted upon as isolated, definite entities that can be fully detected using specialized tools and analyses established on strong indicators. Contrariwise to this established approach, chemical concentrations are recurrently found exceeding the forms and quantities mentioned in risk assessments that aim to better address potential negative consequences. This divergence indicates the failure of the normative models of toxicity to fully capture and interpret this kind of exposure in everyday life (Fiske, 2020), making the reconfiguration of toxicity more than needed.

This kind of low-detected and low-level pollution establishes a continuity that could create "chemical legacies" persistent in near and broader timelines (Gray-Cosgrove et al., 2015), shaping a slowly deteriorating future. Demands for shifts in threshold limits that used to be measured by the effects on human bodies (Cram, 2016) are getting more attention. Nevertheless, the uneven distribution of discard and toxicants cannot be skipped.

As a result, the toxic politics approach is on the rise, moving away from the toxic–non-toxic evaluative duality induced by the focus on the molecular level. In contrast, these approaches view toxicity in terms of reproduction of power and justice (Liboiron, Tironi & Calvillo, 2018), since the embodied experience of toxicity creates new realities (Armiero et al., 2019) and lenses of perception.

The agri-food sector has been a battlefield of novelties for many years, from the very beginning of agriculture in prehistoric times to newly framed food risks, including the molecularization of toxicology (Shostak, 2005), genetic modifications and conflicts on the substantial equivalence of genetically modified and non-genetically modified crops (Levidow, Murphy & Carr, 2007). The vital role of this field in supporting and reinforcing societies in a lifelong timeline is further strengthened by novel challenges it comes to face, which highlight a great peak in risk production in nutrition, as well as production of food supplies. Some recent studies focus on the detection of heavy metals in soil (Alengebawy et al., 2021) and the

impact of pesticides on soil microorganisms (Stork, 2016), while the unwanted exposure of non-target organisms (such as bees) to toxics is also noteworthy (Naharki & Regmi, 2020). All of the above indicate that soil and crops received fortification through pesticides and herbicides that can indirectly affect the environmental sustainability and ecosystem order. Consequently, the agri-food field is not only susceptible through intended pollution and risk assessment but also risks could be posed by agricultural operations that can heavily degrade the ecosystem. As a result, an unwanted accumulation of a toxicity multitude can occur, and these distinct kinds of toxicity can pose severe threats to the human health, the agricultural production and its surroundings.

All molecular and substantial analyses taking place in labs are part of expert knowledge. Thus, information gathered using specialized materials and analyzed in terms of technical standards is strictly limited in a highly scientific environment. Subsequently, lay risk perception is significantly different partly because of a lack of certain information about hazards. However, a richness of concepts that are not usually taken into consideration by expert risk assessment could be included (Slovic, 1987). The anachronistic approaches of the deficit model that consider the public to be passive uninstructed consumers of a simplified version of scientific knowledge (Simis et al., 2016) result in the polarization of the expert-lay discrepancy (Hilgartner, 1990) that is now questioned by the need for public engagement in the evaluation of science and technology. Going back to Kallet and Schlink's seminal work *100,000,000 Guinea Pigs* (1933) is essential to fully unravel the fundamentals of consumers' movement towards opening the black box of mass production quality regulations.

The lay-expert distinction is grounded in power relations between the state authority and its subjects (Simmons, 1999) where established stereotypes about public indifference on scientific and technological matters is grounded. While scientists were presented as saints, the experts' detachment from the public was sharpened (Hollinger, 1984) and lay mistrust towards policy institutions was interpreted in terms of science skepticism and belief in anti-science; however, such mistrust crises can be seen through the lens of a contrarian stance in response to frequent institutional denial on many public concerns about extensively controversial issues (Wynne, 2002). This type of Victorian-like "sacralization of science" appears deeply embodied even in the

modern scientific constitution that legitimizes the monopoly of knowledge production, deliberation, risk and benefit management. The differences between experts and non-experts is a common theme in the discussion regarding the social construction of risk (Vaughan & Seifert, 1992; Kasperson & Kasperson, 1996, among others) as well as the cultural factor in risk perception. Such factors are usually hard to measure, but they can help us examine the active role of shared culture in defining risk processes (Douglas & Wildavsky, 1983). These cultural biases affecting risk attitudes are individualism, fatalism, hierarchism and egalitarianism (Douglas and Wildavsky, 1982). Such world views later extended to "risk culture", giving attributions of common sense to public preoccupations and collective risk perception (Cornia, Dressel & Pfeil, 2016).

Risk perception cannot be acknowledged static nor universal. Rather, it can be better understood in sociocultural terms of society and through authority and power relations. While risk is usually considered widespread, we propose the examination of lay perception, moving away from its consideration as relatively naive takes spurred by sensationalism. On the contrary, lay perception captures individual differences and reference group processes that are not portrayed in the media or accounted for policy. Lay perception indicates similarities to implicit theories, which are defined by Dweck (1995) as a framework of fundamental beliefs, on which judgments and emotions are placed as a means of constructing a coherent reality. Implicit theories are so named because the principles on which they are based are not often made explicit, or even conscious, by the individuals themselves; however, they do affect individuals and their worldview, as well as their definitions of risk.

Considering the diversity of expertise and the growing dynamic of the unofficial, noninstitutional one, it would be wise to remember Pidgeon's (1998) insightful comments on "safety culture". This concept is used as an attempt to focus on formal reliability and systems without investigating the ramifications of individual, social and psychological particularities. The continuation of this polarity in a variety of contexts, from organizational to the policy level, underlines an urge to connect different experiences of the individuals, resulting in knowledge production with risk assessment. Overall, a need to designate varying levels of expertise is indicated. Likewise, the accumulation of a chemical substance in the soil of a field might be

below the safety limit while local farmers experience unprecedented phenomena and behaviors that are not in line with the official statements.

The previously mentioned concepts highlighted the emerging need for citizen participation both in risk assessment and decision making, and they suit the pro-deliberative democracy demands (Chambers 2003). Citizen participation brings lay knowledge and claims from the public sphere in policy-making negotiations in response to rising demands for more democratic governance, information, legitimacy and epistemic justification of decision-making. Such a rising demand for public engagement and deliberation over novelties, giving merely as an example the debate over GMO agriculture (Gaskell, 2004) and food (Ferretti, 2007), derives in contrast to the dominant framing that accentuates the regulatory role of the industry as responsible for defining and managing food safety (Barling and Lang, 2003). Citizen-powered campaigns are emerging into promising fields for collective action mobilization, thanks to the current golden era of digital media, and they shed new light to citizen expertise and information dissemination, taking for example Foodwatch (Schneider et al., 2017). Digital technologies can pose threats for widening the gap between the poor and the rich. Nonetheless, under specific circumstances, they could be seen as factors of change towards a more democratic food system (Fraser, 2021).

The distinction between expert and lay perception can be seen as parallel to expert and lay knowledge. The exclusion of lay knowledge from regulatory science, as shown by Jasanoff (1990), and the authoritative ignorance in contrast to lay expertise (Wynne, 1996) keep lay risk perception out of deliberation and participation, constructing a white-collar, polished, expert-certified notion of risk. In contrast to the exclusive character of regulatory science, lay expertise is considered an emerging type of expertise, demanding involvement in risk decisions whilst conducting research via the use of technology and empowering the community (Grundmann, 2017). Toxicities are now part of modern communities, affecting the daily lives and the wellbeing of individuals. Along with the rising number of embodied feelings and experiences of distribution and circulation, toxicities can be faced as an already established risk. Toxicity is transcending the term of risk by shaping a new regime, like chemical (Murphy, 2008) and waste regimes (Gille, 2010), which is present in the form of slow deterioration. Such risks can be large-scale;

however they are unevenly produced and shared, creating zones of toxicity degrees. Institutional approaches on procedures and outcomes are different from experienced, embodied ones, creating different perceptions heavily based on the asymmetric relationships with toxic entanglements. Such a distinction between the institutional and the lay conceptualization of risk highlights the significance of different perceptions, which lead to a different understanding and, therefore, action.

Bottom-up pressure and criticism on the regulatory gaps and ambiguities of novelties are often mistakenly referred as "neo-luddism", blaming civilian attempts for biased or non-evidence-based claims. By contrast, for the better understanding of how the concept of toxicities is constructed and perceived, it is crucial to contemplate the distinction between experts and non-experts in terms of information, experience and legitimacy status. In the present study we attempt to combine the critical stances of STS towards the generalization of risk with the examination of lay perception, by employing micro-level lenses of subjective embodied realities of food toxicity. Our objective focuses on the understanding of laypersons' perception of what they consider toxic in food products and whether these conceptions resemble or differ from the conceptualization that is proposed by the literature on toxicity. Aiming at an investigation of how common sense about toxicity is derived from images and frames that are collectively validated, social representations theory is used to explore societally developed viewpoints.

Social representations theory

"Social representation" is a term found in interdisciplinary work, serving the purpose of meaning-making. Specifically, the commonly used social representations can be seen as a tool deriving from social psychology for the understanding and transformation of abstract concepts into concrete images their connection with pre-existing knowledge. In contrast to the dominant paradigm of individual psychology, the processing and production of concepts is collectively achieved, creating a common ground for a social group. The theory of social representations was developed by Serge Moscovici, inspired by the collective representations idea, as shared by Émile Durkheim (1898). Moscovici firstly introduced the concept in his thesis "Psychoanalysis: its image and its public" (1961/2008). The objective of this

fundamental work was to study the diffusion of a scientific theory into common sense and the transformation of a sophisticated and hardly accessible issue into a part of social reality, with the very first case study being the transformation and reconstruction of psychoanalysis in three distinct groups of French society. Subsequently, the foundations that were laid for the penetration of scientific theories into daily life and the discourse of individuals, and especially non-specialists, were strengthened by other researchers who studied both classic, timeless concerns and contemporary emerging issues, including topics regarding food and technology that will be further demonstrated in the subchapter "State of the Art".

Social representations allow us to appropriate and reconstruct the external world, to process it and consequently to change its texture. They compose an "entity", a psychological function, a form of knowledge that belongs to our society and that cannot be reduced to any other (Moscovici, 1961/2008). Moscovici himself mentions the rehabilitation of common knowledge as a major goal towards the greater purpose of defending his groundbreaking idea of rationally thinking individuals within society (Moscovici & Markova, 1998), in opposition to Le Bon's (1895) conceptualization of the unanimous, "illusion-driven" crowd. Thus, there lays the importance of exploring knowledge socialization in non-expert audiences when it comes to newly introduced fields. Such a type of common sense has a formative ability that can reshape the social meaning around the represented object, possibly resulting in an entirely different new object (Herzlich, 1973).

The dynamic deliberation of a socially and materially oriented reality by the individuals is achieved via the social representations, and this constant reconstruction makes the social representations theory appropriate for understanding the social image of both the social and the natural sciences (Wolpert, 1992). Scientific theories are not static time, but, rather, they are constantly evolving, following revisions and newer evidence. Correspondingly, social representations evolve because they are inextricably linked to contemporary reality, historical events and the social becoming, and they allow the observation of a phenomenon within the historical context in which it is developed (Mantoglou, 2013).

Overall, processing specialized knowledge is a demanding cognitive task for a non-expert, and it is needed to be integrated into existing knowledge in order to

decrease uncertainty under challenging risk conditions and make the physical and social reality understandable. The creative aspects of lay thinking can be considered "social thinking" because they initiate correlation between ideas that do not match accordingly, but their interaction and synthesis can help new systems of representations about scientific topics to emerge (Magioglou, 2008). This "network" of ideas, metaphors and images (Moscovici, 2000) is constituted through two main processes: anchoring and objectification. Initially, through objectification, an abstract concept is concretized and acquires certain basic characteristics, which are formed by prior knowledge individuals have about the object. These characteristics are cut off from their original context to function structurally in the establishment of the new representation (Jodelet, 1984). Framed and fragmentary elements form the virtual (or pictorial) shape, provide stability and coherence at the base of the representation (Abric, 1993) and, in the final phase of objectification, naturalization is achieved after finding correspondence in the real world; that way, the new object acquires a solid, reality-based, form is materialized, receiving concrete foundations (Jodelet, 1984).

The second process that leads to the formation of social representations is anchoring, through which an object is classified as new knowledge in the existing cognitive context, can be applied in a network of familiar categories, and, finally, attains a functional position (Hewstone, 2011). The new object is part of a reference system and is linked with already known concepts to make it easily understandable; it is a process of attaining familiarity with a concept. Taking a closer look at the present study on toxicity and agri-food, the process of anchoring functions as a mediator between advanced technoscientific matters and the social representations that individuals create about them. The technological and scientific structure and social practices might seem obscure to big parts of the public, making the need for their re-interpretation and re-adaptation according to existing mental constructions crucial for cognizance. In summation, objectification captures the figurative aspect of representation and translates it in comprehensible terms, whilst anchoring gives meaning to the representation.

Accordingly, social representations organize social relations, offering an orientation while prescribing behavior and practices that provide a regulatory reference knowledge, which can be values, ideologies or identities (Staerklé, 2011). Commonly shared ideas are parts of daily life, and they could facilitate the

individual's identification with the group they belong. The examination of this shared social code bridges social with psychological aspects, especially under threatening situations and obscure circumstances. The placement of the unknown event in a common network function in terms of direction and meaning making because it is interpreted in an already familiar pattern, reducing uncertainty. These characteristics also function as explanatory schemes for the public understanding of science and its dissemination and acceptance from a social group. The bottom-up approach of the emerging dialogue model (noting the various aspects of public perception and the utilization of science in everyday life) builds bridges with the constructive force of representations, supporting the need for public engagement of non-specialists in decision-making (Short, 2013).

So-called common sense should not be considered completely distinct from the institutional world of the lab, where actors also share common imperatives and motives with everyday life (Knorr-Cetina & Mulkay, 1983), along with similar practices and notions (Latour, 1987). A scientific principle that is now seen as undeniably true used to be treated as a threat to the established regime, resembling to Kuhn's idea of scientific revolutions (1962), which highlighted discontinuities as a necessity for scientific revolutions and "*paradigm change*". On his behalf, as seen in Markova (2017), Moscovici proposes "*knowledge surplus*" (1966), new fragments of truth created through the interaction of several social and cultural factors. These innovation vehicles are usually attributed to minorities, and they can initiate a psychologization witch-hunt in order to prove the bearers' ideological and psychological instability and, thus, their arguments' fallacy (Papastamou, 1986).

It is widely accepted that technology is a field of rapid changes and big challenges, introducing new systems that question current theoretical models and approaches with respect to new political, legal, psychological and societal realities (Kalampalikis, Bauer & Apostolidis, 2013). Dietary habits are an aspect of everyday life heavily affected by breakthroughs in food technology. The production has been intensified in order to meet higher global demand, the shelf life of products has been extended due to new preservation techniques and transportation technologies made it possible for western markets to devour the widest variety they have ever experienced, thanks to advanced refrigeration and distribution. The rising demand and production further empower the inter-connection of food systems and their interaction with

activities and actors that are not directly linked with agriculture or food (Pothukuchi & Kaufman, 2000), making the product on the shelf the visible side of a complex systems' integration.

Such diversity and the dynamic character of food systems adapt in the changeability of the modern food and nutrition regime, nevertheless they cause extended negative trans-systemic effects in terms of risk. Studies and analyses of the heavy effect of food externalities are on the rise along with an increasing interest in public deliberation, highlighting the need for further examination of how new risks are understood by ordinary people, the average consumers. On this note, Breakwell's (2014) social psychological framework for examining risk was enlighting, suggesting social representations theory as relevant for explaining mental models of newly identified hazards among lay individuals. These signification systems not only construct a guide for perceiving social reality that faces novel hazards and challenges, but they are also socially shaped and shared, incorporating the social relations that assisted in its creation, while redefining the individual's position in the group. Subsequently, the new object, the social representation, fits in a wide cultural and social context that, among others, places food and nutrition in the core of its prominent "themata".

SRT & STS: finding common ground

Science and technology studies has been interested in the actors' entanglement and evaluation of socio-technical regimes, from Latour's seminal anthropological observation *Science in Action* (1987) to more recent approaches. Individuals are no longer considered passive consumers of cutting-edge innovation, but their role is elevated. In contrast to the technological determinist approaches, Pinch and Bijker's (1984) contribution to the development of social construction of technology (SCOT) signified the beginning of a radical social constructionist concept supporting that technology is not developed autonomously nor as a linear structure following an "*orderly, rational path*" (Ferguson, 1974b). Instead, relevant social groups seem to play an important role in the shaping of artifacts, producing conflicts that affect the final design. A mutual influential relationship highlighted by the societal theory of

science and technology explores the social aspects that contribute to specific creations and the wider context as well. SCOT, along with social shaping of technology and actor-network theory (Latour, 1987) are widely praised for their analytic methodology of exploring how socio-technical systems emerge while focusing on the crucial role that individuals play, but they have also been criticized for overlooking power relations, social class and possible deeper cultural, intellectual or economic origins of social choices (Winner, 1993). Jasanoff's (2004) co-production idiom also discusses the simultaneous processes for societal understanding of science and technology, offering wider lenses of complex interconnections.

On the other hand, social representations theory focuses on the processes of knowledge, its creation and the forms new information can have without disrupting the existing body of knowledge, considering it a work of "co-creation". (Moscovici, 1974). The theory was later enriched by a wide body of work from all over the world, which supported the idea that the main cognitive aim of the individuals is the reduction of ambiguity, which is achieved by turning an abstract, unknown concept into a familiar shape (Wagner, 1996). Such engulfing of a new idea by a concrete mental construction is enforced by implicit theories, culturally shaped ideas and socially negotiated information about a certain object; as a result, an opinion about an artifact or situation is not shaped by rational and conscious processes. Instead, it is the outcome of a contentious negotiation. Such a procedure produces a conventional solution, a consensual type of knowledge-bridging existing knowledge and novelties, followed by ideas going far beyond the actual feature of the newly introduced concept. Consequently, knowledge appears to be socially shaped, showing the importance of communication and the rise of novelties from a static core because of anchoring. Public or group understanding of science under the scope of social representations theory exhibits several similarities to the concept of the social construction of technology and, in general, it is finely synchronized with major STS imperatives related to the notion of stakeholders and actors. Not only they shape their own reality, but this conception may be crucial for their actions in evaluating and perceiving technology and science. Taking into account the rising demand for public participation in techno-scientific decisions and the boost in networking, which helps in the constitution of new groups and identities, individuals cannot be overlooked and diminished into benighted consumers; instead, they are social and political actors who

play a vital role towards achieving responsible outcomes and in the acceptance and diffusion of novelty (da Silva et al., 2019; Ayuso, Angel Rodriguez & Enric Ricart, 2006).

An effort of public understanding and decision-making worth noting is framing theory, a concept which derives from communication but is widely used by STS scholars. This analytical tool is another means of meaning-making, a stable set of schemes used for simplification and better understanding of complex (or controversial) issues (Touri & Koteyko, 2015). Despite its pronounced contribution to the field, framing mostly serves as a tool for structure analysis, lacking focus on the content (Matthes & Kohring, 2008). Reyes-Sosa et al. (2019) propose the use of both framing and social representations, supporting that "*framing uncovers the structure/format and social representations explores the meanings*" ().

On our behalf, we claim that social representations theory can be a useful tool and context of interpretation in the STS framework, studying the transformation of scientific knowledge into common sense and vice versa, exploring how the universe of consensual meanings interacts with key technological breakthroughs, serving their greater purpose: an explanatory, coherent cognitive construction of meanings over and about technoscience that can be communicated and, finally, serve for agency and cooperation (Abric, 1987). Moving from the examination of historic conditions to a focus on personal cognitive routes, we can actively observe the construction of meanings and how they are affected by grounded regimes and imaginaries.

Chapter 2. State of the art

The theoretical foundations of this thesis are risk perception and, more specifically, lay perception of food toxicity, considering food toxicity as one of the most crucial risks in modern societies. Risk perception has been examined thoroughly by a wide literature body, starting from Starr's (1969) research (regarding the relation of cognitive factors to the perception of technological risk) to the cultural shift of Douglas & Wildavsky (1983) to Slovic's psychometrical approach (1987) and it has expanded to lay perception of risk which is distinguished from expert perception according to the "fact-value dichotomy" (Weber, 2008, pp.) and "objective-perceived risk dichotomy" (Bostrom, 1997). This distinction has yielded new topics of research related to laypersons' significations regarding both classic and emerging topics. The perception of health has been an intertemporal field of interest for social scientists interested in public attitudes, viewpoints and risk perception has been employed to yield patterns of thinking regarding key health challenges. We can look back to the work of Nicoll et al. (1993), Nzioka (1996) and Paicheler (1999) regarding lay perception on AIDS and they all traced beliefs on one of the biggest health crises faced by modern Western societies. Ever since ongoing research about novel health crises delineate the difference between officially defined risk and laypersons' perception (Krewski et al., 2006; Raude and Setbon, 2009), while transdisciplinary studies on lay perceptions on future health pose potential health threats (Swami et al., 2009). The current COVID-19 pandemic has also drawn extended interest from both European (Dias Neto et al., 2021), Asian (Tang, Wang & Liang, 2021; Zhang et al., 2021) and American researchers (Lugo-Gonzalez et al., 2020).

Risk perception has been also focusing on natural disasters and environmental hazards as important steps for policy designation. Wachinger and colleagues (2012) concluded that most societies tend to tolerate higher levels of natural hazard risk compared to technological or human-made hazards, raising a question worth considering: how do non-experts perceive toxicity? Studies on lay risk perception of toxicity can be traced back to Kraus and colleagues (1992), Neil, Malmfors & Slovic, (1994), Hollien, DeJong & Martin (1998) and MacGregor, Slovic & Malmfors (1999), who mostly highlighted the correlation between chemical components and perceived risk. Simultaneously, critical views on toxicity have emerged. These viewpoints reckon toxicity as a result of power relations, while facing the aftereffects

of widespread toxicity as invisible factors affecting human bodies and, subsequently, leading to health deterioration. The Wasteocene, as described by Armiero (2021), which signifies the construction of toxic ecologies made of contaminating substances, and Agard Jones' research on soil contamination (2013) suggest a shift towards invisible contamination and how it can influence the health of undermined communities. As a result, the topic of lay risk perception of food toxicities occurred as a promising field in order to examine what lay individuals perceive as toxic in food.

Interesting STS approaches on food have been developed in the field of politics and technology (food politics) (Leach et al., 2020), food regimes (McMichael, 2009) and nature and culture boundaries (Moragues-Faus & Marsden, 2017), revisiting food system transformations while examining alternative foodways. Food related risk perception has also been examined in studies regarding food hazards (Hansen et al., 2003), microbiological concerns (Miles, Braxton & Frewer, 1999), GMOs (Gaskell; Torgersen, 2004; Ghasemi et al., 2020), food safety (Redmond & Griffith, 2004; Miao, 2014), food poisoning (Zyoud et al., 2019), additives (Kaptan & Kayisoglu, 2015), novel trends (Huang et al., 2017) and abnormal shaping (Loebnitz & Grunert, 2017) among others. Food-related risk perception might differ from the risk perception of other hazards because of its great importance for development, life-sustaining and its cultural connotations (Kaptan et al., 2018). Risk analyses using the psychometric method that were introduced by Slovic, were performed by Sparks & Shepherd for the explanation of optimistic bias regarding perceived control over risk (1994); however, they did not include toxicity in any of the items and factors investigated. Connotations of toxic hazards in food might exist (Kher et al., 2011), however they lack clear address of toxicity in food.

Food and nutrition have also been major topics in the social representations literature, outlining themes of anthropological and psychological interest. Considering that food is deeply rooted in historical traditions and socially shared experiences, eating and drinking social practices are strongly connected with legitimation needs. Food and the body are socially and culturally constructed concepts that create social representations of great importance for the reference groups (Lo Monaco & Bonetto, 2018). Social representations theory is widely applied in the field of health psychology (Joffe, 2002; Galli & Fasanelli, 2020), thus there can be found many studies on the social representations of healthy body (de Souza et al., 2019; Camargo, Goetz & Justo,

2011; Stenzel, Saha & Guareschi, 2006), healthy and unhealthy food (Gaspar et al., 2020; Grabovschi & Campos, 2014; Melendrez-Ruiz et al., 2020), food trends (Pindado & Barrena, 2021), GMOs (Chen, 2018), children's complementary feeding (Brunet et al., 2021), food practices of chronic patients (Amorim et al., 2019) and ethical aspects of food consumption (Makiniemi, Pirttila-Backman & Pieri, 2011; Bartels & Onwezen, 2013). However, food toxicity is not among the topics studied, even though it is an emerging concept in environmental studies.

The initial goal of social representations theory was the examination of a new scientific theory's diffusion in society and what happens when this theory becomes common knowledge (Farr, 1993). Accordingly, it is assumed that the strong theoretical, conceptual and methodological richness of social representations can contribute to the exploration of laypersons' perception of pivotal modern challenges. Except from food-related topics, the theory is often used by researchers who wish a deeper, and, probably critical, stance on individuals' understanding —and misunderstanding—, of meaning-making processes of scientific theories. The opening to novel technology and innovations has been embraced by social psychology scholars (Bauer & Gaskell, 1999; Kalampalikis, Bauer & Apostolidis, 2013), while there have been noticed some attempts by the field of STS in adopting social representations theory (Levidow & Upham, 2017), where the representations of stakeholders were explored. On the contrary, this study aims to examine lay people's representations.

After thorough research, it was noticed that there were no articles or other kind of research discussing the lay perception of food toxicity, with the only exception of the work of Espeitx Bernat et al. (2013), which examines the social representations deriving from the correlation between toxicity and new food technologies under the anthropological scope. This thesis is expected to shed light on laypersons' perception on food toxicity with the assistance of social representations theory, which is a topic never studied before; in fact, the aims of this aspect of the present thesis are twofold: the examination of the previously described lay perception of individuals belonging in three different categories/groups and the comparison between them and the linkage of STS with social representations theory, in an attempt for a conceptual and methodological enrichment of both fields.

Chapter 3. Methodology

The main objective of this study is the in-depth examination of the social representations lay individuals have about toxicity in food, heavily based on their perception of what is toxic. The method of focus groups was chosen as the most suitable one for our research purposes because it focuses on an element that is central to the social representations theory: discourse. According to Billig (1991) social representations is a form of living everyday ideology heavily based on the interactive and dynamic nature of human communication. Participants discuss, express and negotiate common or distinct social representations in a group (Marková et al., 2007), which supports our belief that this method can answer this study's research questions more sufficiently. As presented in Wilkinson (1998), focus groups can serve as primary methods for examining individuals' understandings of wide concepts, as well as attitudes, stereotypes, knowledge and beliefs, among others, while accessing opinions of populations that are overlooked by research (Plaut et al., 1993), possibly those of underprivileged groups or views of individuals that are not the "average sample". Focus groups have been also applied in the field of biodiversity and conservation (O.Nyumba et al., 2018) and regarding ecological practices (Caillaud & Kalampalikis, 2013). Our perspective on lay people's perceptions of toxicity in food might not be in line with official explanations but their investigation is essential for social understanding and public deliberation.

Participants and focus group sessions

The first participants were recruited after responding to an invitation call for volunteers posted online via Facebook, while the rest was recruited through the snowball sampling, a nonprobability technique in which the individuals enrolled recruit new participants from among their acquaintances or suggest people with similar characteristics. Three categories were created during the research design, as an attempt to compare the social representations of food toxicity in three groups that self-define under the same identity: environmentally conscious individuals, people engaged in physical activities and fitness and people diagnosed with chronic illnesses or autoimmune diseases. Even though the groups were asked the same questions and followed the same guidelines, we expect them to express different representations,

according to the group's expectations and framing of objects (Moscovici, 2008; Rateau et al., 2011 as cited in Monaco & Bonetto, 2018).

As seen in Wilkinson (1998), small group discussions of people with shared interests can trigger collective sense-making of risk, while opinions can be altered and contradicted during the discussion. No incentive was given for participating in the focus groups.

Eleven focus groups were conducted from May 2021 to June 2021, consisting of three to five participants. A total of 44 individuals took part in the study (30 women and 14 men, M=30.93 years). Several authors indicate that the ideal number of participants in focus groups ranges from four to twelve (Krueger & Casey, 2009; Stewart, Shamdasani & Rook, 2007) and there are also indicators that the most sufficient communication between participants arises in small groups of five to seven participants (Krueger & Casey, 2009). Despite the rise in studies that conduct focus groups as part of their research design, sufficient guidance and explanation on the preferable number of focus group sessions and participants is still lacking (Carlsen & Glenton, 2011). The use of a single focus group session is strongly discouraged, and we decided to include fifteen (15) individuals from each category in three or four focus groups for each category. As a result, four focus groups were conducted with individuals who are interested in sports, fitness and exercising, four focus groups including people who engage in environmentally friendly actions and movements were conducted and, finally, three focus groups with people with chronic or autoimmune diseases took place. Aligning to Fern's notes (1982), we noticed that focus groups with less participants were more productive and yielded more information that could be further used. Furthermore, participants in smaller focus groups had more time to express their viewpoints and comment on ideas already shared. When in agreement, participants were reaching a consensual, shared idea, enriching it with more details and personal insights, while in conflict the participants were trying to strengthen and support their arguments. This highly dynamic aspect of focus groups conversations is extremely useful when studying social representations because they can raise issues that would not have been brought up in an interview and they incorporate aspects of the public life where they are constructed, since they can be visible even in such a micro-scale of communication.

The overrepresentation of female participants in the study can be considered a drawback, based on the gender bias hypothesis. It is also suggested by a body of work that women are more likely to participate in experimental procedures and surveys (Smith, 2008), even though no significant difference has been noticed between the responses of male and female participants. Smith (2008) also highlighted that young people tend to participate in that kind of research more often compared to middle-aged individuals, which is also replicated in our study, based on the mean values of participants' age. The participants voluntarily asked to take part after coming across calls for the research, and, as a result, we can assume that younger people were more available because of them regularly using social media (where the calls were posted), keeping in mind that most of the interviewees had received tertiary education, subsequently experience and interest in research.

Due to the COVID-19 pandemic, the meetings were conducted virtually on the platform Zoom. This shift from the usual design can be considered a drawback because the was no physical contact, limiting the interactions, as well as body language among the participants, aspects that are considered important for group dynamics (Smith, 1972). On a more positive note, people managed to feel more relaxed and casual during the sessions because they were participating from the comfort of their personal space, while individuals from different locations managed to get together and elaborate on toxicity issues with like-minded people they could not have met otherwise. Geographically dispersed groups and individuals with mobility issues participated in the meetings without facing significant difficulties, bringing their own viewpoints and representations. Cameras and microphones were used during the discussions, avoiding the negative aspects Sweet (2001) has highlighted about online group interactions in chatting interface. After receiving the permission of the participants, all focus group sessions were recorded to be transcribed and for further analysis.

Interview and word association

A method triangulation was attempted, in order to combine methodological approaches that are rather clearly distinct in their focus and in the data they provide

(Flick, 2009). The focus group method was enriched with semi-structured questions that were addressed to the participants, while thematic analysis was conducted. The semi-structured questions were addressed for discussion initiation, encouraging participants to discuss with each other rather than with the facilitator, and forcing them to explain their differing points of view (Kitzinger, 1995). Seven key questions regarding, indicating food toxicity-related themes were planned to be asked to the participants depending on the flow of the conversation, as a reminder of the main topic of the research. Surprisingly, most of the questions were not asked, since the interviewees included the topics in their discourse. A slideshow of photos showing food-related toxicity were projected at beginning of the conversation, serving as a stimulus for discussion initiation and topic introduction. Afterwards, the participants were introduced to the discussion topic, followed by a short self-introduction of each person. At the end of the session, all participants took part in a word association task, which constitutes one of the main methods for collecting the content of social representations (Dany et al., 2015; Lo Monaco et al. 2017). They were asked to name the first three words they think of when they hear "food toxicity". The results of the words association are further discussed in the Results chapter.

Data analysis

The audio files generated by the focus groups were transcribed using the open-source transcription software "o-Transcribe", producing an extended verbal text out of every focus group. The texts from each category were embedded in a single file that included all verbal texts produced from each category's participants. As a result, we created three large corpuses of transcribed material originating from the focus groups: a corpus for exercise-related participants, a corpus for environmentally conscious individuals and one consisting of material given by vulnerable individuals. Each one of the corpuses was analyzed using the software IRAMUTEQ (*Interface de R pour les Analyses Multimensionnelles de textes et de Questionnaires),* a free software that allows processes and statistical analysis of texts. The software was developed by Pierre Ratinaud (2009) in French and it is now available in several languages, including English, Portuguese and Greek (in experimental phase). The software is developed in the Python programming language and is based on the R statistical software. IRAMUTEQ can analyze texts, performing from simple lexical tasks, like

lemmatography and lexicographical analyses to more complex ones, such as factor correlation analysis, multivariable analysis and hierarchical automation analysis (Camargo & Justo, 2016).

For this study's purposes the method of descending hierarchical classification (DHC), based on Reinert's method (1983; 1990) was used, performing the analysis of the provided verbal material, which is classified into classes according to vocabulary similarities that is distinct from that of the other classes.

Reinert's approach, which was already implemented in Alceste (Ratinaud & Marchand, 2012a), views words as parts of underlying themes. As stated by Kalampalikis (2003), the objective of this method is not the calculation of meanings but the topical organization of discourse through the highlighting of "lexical worlds", indicating the most significant lexical traces to imprint meaning to the discursive content. Following this conceptualization, DHC breaks down the original text derived from the corpus in small segments, allowing both a sufficient lexical analysis and indicating sentences that would be used for a further thematic analysis. Classes are created based on words with the highest frequency within each text segments of each class, highlighting the use of multiple verbal options and the focus on different and specific concepts per class. The analysis method assists the clarification of the most important parts of the text per class, thus allowing the identification and analysis of each class separately. Therefore, each class can be broken down in widely used terms and text segments for a more efficient and detailed tracing of social representations.

The resulting classification is illustrated in the form of a dendrogram which reveals relationships, divisions and correlation between the classes by calculating the mostly used words of each class and the terms that efficiently characterize the whole class. These results are calculated using the chi-square value (χ^2) associated with each word, which was used to measure the strength of association between the active words and their respective class. As a result, the higher the value, the more likely the hypothesis of dependence between active words and class is. IRAMUTEQ also presents the *p*-value of every active word and text segment that was used for the class generation. *P*-value is a key indicator of statistical significance, describing how likely it is for the data to have occurred by chance, by defining the probability of observing the given value of the test statistic, or greater, under the null hypothesis (Ferreira &

Patino, 2015). Words indicating a *p*-value of "<.05" are statistically significant, providing evidence towards rejecting the null hypothesis that the data occurred by chance, therefore they were not randomly classified.

The Greek language dictionary was used for the purpose of the study, since all participants were Greek, the discussions were conducted in Greek and the material derived from the focus groups was also transcribed in Greek. Following the transcription, a revision of the files was conducted, correcting mistakes and adopting specific terms and words for a more consistent and efficient analysis. For example, in their attempt to talk about the dietary habits in the United States of America, the participants used many different words to refer to that country, from "America" to the "US" and "the States". To achieve better lemmatization, we decided to replace all previous mentions with "USA". The tables and word and text segment citations were translated from Greek to English

The DHC analysis via IRAMUTEQ is expected to yield the main themes of the lexical worlds represented by each word class, serving as a structural guide to the thematic analysis. Typical text segments are selected based on their chi-square values and they are in the initial transcription in order to fully understand the context and complementary connotations that contribute to the thematic analysis. The themes that emerged from the discussion of each category were codified, compared and linked to themes from the remaining category (Kitzinger et al., 2004), in an attempt to detect common and different conception of topics linked to food toxicity and the social representations deriving from them.

Finally, the words resulting from the word association task were combined in a text corpus and were analyzed through similarities analysis using IRAMUTEQ. The main aim of the task is the understanding of content communities, words creating groups of meaning and the elements that constitute socio-representational content. The similarities analysis is also used as a verification and the organization of the social representations that emerged from the extended analysis (Bouriche, 2003).

Chapter 4. Results analysis

Social representations of food toxicity in vulnerable lay people
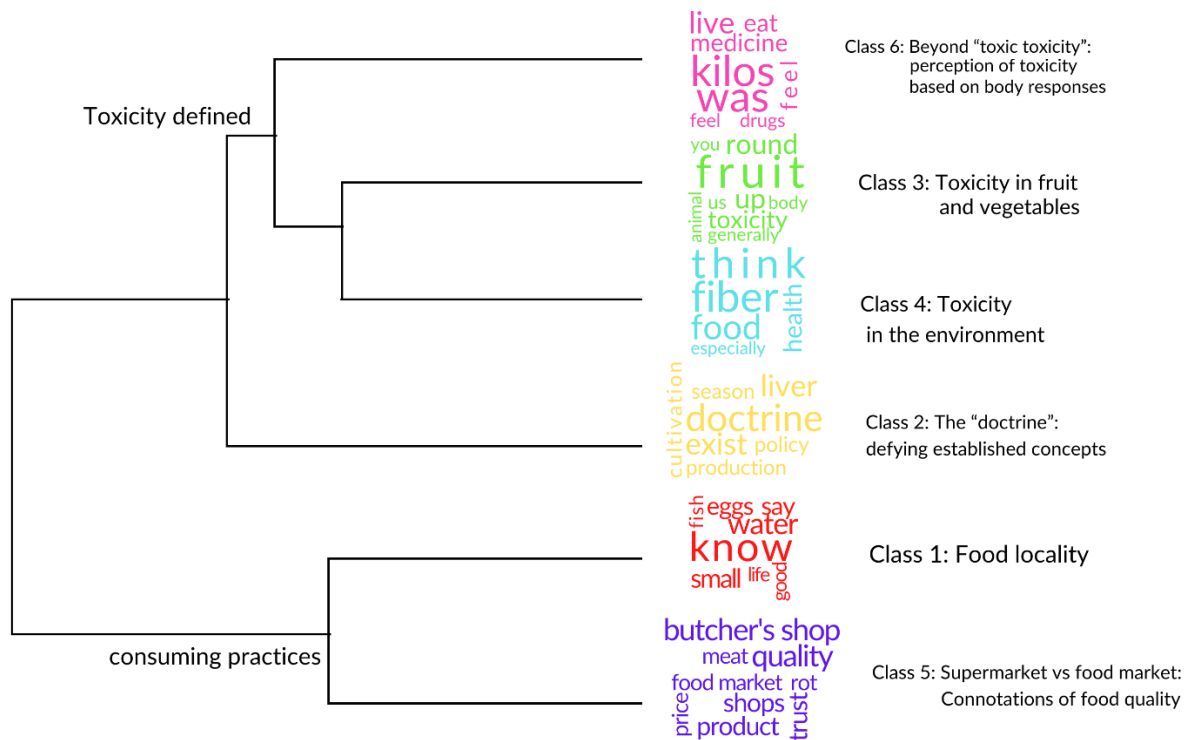
Dendrogram 1. Classes and words with the largest occurrence in vulnerable lay people category

      The first corpus of transcribed focus groups analyzed is the one constituted by the focus group discussions of individuals with chronic or autoimmune diseases. The participants self-declared their interest in participating and they were all holding diagnoses that are affected by their food selection. Some of the health problems and syndromes some participants had are the following: multiple sclerosis, diabetes, Hashimoto syndrome, lupus erythematosus, celiac disease, Chron's disease, rheumatoid arthritis and epilepsy, among others. A total of fifteen (15) people took part (12 women, 3 men, *M*=32.06 years), creating three focus groups. The full corpus contained 11,989 words, of which 2,604 were unique words. Specifically, the descending hierarchical analysis divided the corpus into 113 segments and 6 classes. The results of this analysis can be observed in Dendrogram 1 above. The words featured in the dendrogram were translated from Greek to English.

The results reveal two distinct branches, the main clusters of which will be further analyzed. The first branch is comprised of Class 5 (Supermarket versus food market) and Class 1 (local producers) and it can be labeled as "Consumer practices". The second branch is divided into two sub-branches, the one constituting Class 2 (The "doctrine"), one including Class 6 (Toxicity as body responses), and the division that creates a cluster composed of Class 4 (Toxicity in the environment) and Class 3 (Toxicity in fruit and vegetables).

Consuming practices

Class 1: Food locality

The first, and more distinct, in terms of content, branch is composed of two categorizations related to food consumption. Class 1 is linked to discourse about small producers, small farms, locality and the "Greekness" of preferred products. Indicatively, the words with the largest occurrence are mentioned below: know (χ^2=27.09, p<.0001), small (χ^2=20.23, p<.0001), Greek (χ^2=20.23, p<.0001), water (χ^2=20.13, p<.0001), however (χ^2=20.13, p<.0001), always (χ^2=20.13, p<.0001), afford (χ^2=20.13, p<.0001), producers (χ^2=9.92, p=.00163) and eggs (χ^2=9.92, p=.00163). The major themes can be noticed in the most characteristic text segments of this class:

"I prefer buying from small producers and small [production] units, not only for avoiding toxicity but I also show bigger trust to them. If you can afford it, it is better to support a small producer because you know what he is doing and how he is treating his products" (χ^2=167.63, woman, 41 years old);

"There are units with organic animals that you know they are treated nicely and they live well and they eat nutritious food, but I cannot always afford it, we are not all rich. However, I prefer buying these products, even in smaller quantity rather than buying a lot of low quality for a few cents" (χ^2=135.32, woman, 40 years old);

"I buy products from small producers and small units, for example I do not buy Feta cheese from big dairy companies, it is said that Feta in mass production industries is entirely chemically made, they use big amounts of chemical substances. I think that the cheese made in small units is less processed" (χ2=107.48, woman, 23 years old).

These segments emphasize on small producers and small production units that are part of the localized food production systems. The individuals acknowledge that the quality is better and more trustworthy, but they are discouraged by the cost and the availability. Surprisingly, they claim to be eager to add local products to their alimentary routine, even though this choice will be more expensive. These observations are aligned with Hasselbach and Roosen's (2015) findings because the participants justified their response as an attempt to consume "cleaner food, with less additives" (woman, 34 years old). Despite the rise in this kind of production, it still is limited, hard to find, or premium, and the participants are aware, as indicated by the extensive use of the conjunctive adverb "however". The fact that this small-scale type of cultivation is contrasted to the mass food industrialization, which is not "demonized" by the participants, raises though some suspicions. Most of the participants consented on their preference for Greek alimentary products, without de facto correlating this value with higher purity and better taste. As expressed by the participants, Greek food is not perceived as "authentic" as a general rule. This perception conflicts with attempts to demystify ideas about the superior quality of food grown in Greece, which were mainly expressed and disseminated for argumentation strengthening by groups promoting domestic consumption during the Greek crisis. Another noteworthy aspect is the ambiguity in defining "local".

Developing a robust definition of "local food" is a matter of intense deliberation between producers, consumers and policy-makers. In spite ofthe general discourse in search for "purer, gastronomic experiences" and a rise in promoting Greece as a destination for gastronomy travelers (Pavlidis & Markantonatou, 2020), lay people do not have a clear position on what should be called "local". Due to the nature of the research, which was based on semi-structured questions, allowing participants to elaborate on their views and expand it via group interactions, most participants prompted the topic of "Greekness" in food and it was not linked with locality. According to participants' discourse, domestic food production is not considered local ["They sell fish from Chalkida, not local" (woman, 34 years old)], but regional or geographical proximity resembles the concept of local food. It is interesting to trace the opinion of a participant living in Thessaloniki (a city in northern Greece), who identified fruit and vegetables grown in Bulgaria, near the Greek-Bulgarian borders, as "local", noting that "they are of excellent quality and

incredibly cheaper that domestic ones" (woman, 27 years old). The individuals interviewed attributed locality to products that are grown in specific rural regions ("far from the city centres"), while their distribution is closely related with what the participants perceive as "small supply chain", noting the absence (or limited involvement) of intermediaries. Intermediaries are linked to exports and competitiveness in foreign markets (Houjeir & Brennan, 2017; Lehtinen et al., 2016) and this representation is conflicting when it comes to local food. It is also noteworthy that corporate-branded products that use local products are not identified with locality. Paradoxically, despite their great interest in local vegetables and fruit (meat is also included), vulnerable individuals are not strictly committed to such practices, so it is safe to say that despite their willingness to consume local food, they do not share aspects that could be described as *locavorism* (Reich et al., 2018).

Class 5: Supermarket vs food market: connotations of food quality

The second half of the first branch is Class 5, which obviously incorporates the supermarket - food market distinction. The words with the largest occurrence are mentioned below: super (χ^2=95.97, p<.0001), market (χ^2=95.97, p<.0001), quality (χ^2=34.18, p<.0001), butcher (χ^2=27.09, p<.0001), food market (χ^2=20.23, p<.0001), stores (χ^2=20.13, p<.0001), quickly (χ^2=20.13, p<.0001) and trust (noun) (χ^2=20.13, p<.0001). Typical text segments incorporate the key concepts that are being discussed in Class 5.

"I shop fruit and vegetables from a small grocery store, and they deliver them to my house. I have noticed that the fruit get rotten easily, and I suppose they have no preservatives. I buy meat from the neighboring butcher's shop; in general, I trust products from local businesses more than the ones I find in the supermarket. Knowing the producer or the seller creates a trust relationship that is not superficial" (woman, 23 years old);

"There is a relationship of trust in small businesses and food markets, the products are good, they do not look processed. I do not prefer supermarket purchases, except from cleaning supplies. I used to go to the food market very often, every week but now I trust specific people, I get my eggs from a seller I know and I am very satisfied because I feel they are of good quality, this

high quality I experience makes me feel that I can trust him" (woman, 40 years old).

The contrast between the supermarket and the food [flea] market has a variety of connotations, ranging from an economical to a cultural level. According to Wang, Leung & Li (2014), better dietary quality is associated with higher socioeconomic status, underlying the need for healthy eating interventions (Escaron et al., 2013). The participants in the vulnerable individuals' focus groups mentioned difference in prices as a selection factor, but it was undermined by another key aspect; "quality".

"I prefer buying everything from a single place, a supermarket that has good quality in meat and vegetables and guaranteed quality; I trust it" (χ^2=333.79, woman, 57 years old);

"I try to get fat of animals coming from organic livestock farms; I usually find them at the butcher's shop, they are not even compared to conventional meat when it comes to taste and quality, not to mention the ones from the supermarket" (χ^2=329.95, woman, 29 years old).

There is a contradiction when it comes to the preferable alimentation source: on the one hand we have *"laïki agora"* ($\lambda\alpha\ddot{\iota}\kappa\dot{\eta}$ $\alpha\gamma\rho\rho\dot{\alpha}$), the food markets that facilitate both consuming and social needs. Most of the products sold in the markets are fresh and local, produced by family farms or home-made, without excluding the presence of big sellers. On the other hand, the supermarket is linked to the commercialization of food, but it also suggests a "guaranteed quality", because "the products are tested before they are placed on the shelves, a big brand is not going to take such a risk to offer something bad to the buyers" (χ^2=226.66, woman, 57 years old). That is the point where the first representation of the supermarket as a body of quality guarantee emerges. Social representations of supermarkets were traced by Lo Monaco et al. (2012), highlighting the importance of convenience, product variety and accessibility. Our findings are aligned with this direction, as people indicated convenience and abundance as the key reasons for choosing a supermarket for their groceries and meat purchases. On the contrary, food markets are considered more credible when it comes to quality because of their linkage with local production and smaller food systems. Class 5 is thematically closer to Class 1, explaining their distinction from the main body of the analysis.

Class 2: The "doctrine"—defying established concepts

The second bigger class is Class 2, since it constitutes 18.6% of the categorized text segments of the total corpus and its distance from the rest of the corpus is efficiently explained due to the themes it covers. The words with the largest occurrence are the following: production (χ^2=18.17, p<.0001), doctrine (χ^2=18.17, p<.0001), policy (χ^2=13.5, p=.00023), cultivation (χ^2=13.04, p<.00030), season (χ^2=13.04, p=.00030), correctly (χ^2=10.97, p=.00092) and system (χ^2=9.86, p=.00186).

The themes discussed in this class challenge some key narratives about food production, and the participants seem to propose unconventional ideas that are contrasted with the stereotype considering people with chronic and autoimmune illnesses more conservative by reducing their openness to experiences (Sutin et al., 2013) and susceptible in following official indications, showing unquestionable trust to systems, including the health care one (Calcan, Rowe & Entwistle, 2006; Gilson, 2006). The notion of toxicity is highly integrated in the discussions, even though it is not often mentioned as a term, but there are significant connotations related to the perception of a food as toxic.

> "If we could start with more sustainable cultivation, it would be a great win, because it would be a bigger area dedicated to farms rather than unit, which is a big factor of remediation. Right now, we are heading toward a whole new scale due to production intensification that is making everything worse" (χ^2=81.43, woman, 29 years old);

> "Smaller farming and animal units is the only viable solution. Mass production model must be abolished. But if there is no change in the society's mindset and consumer habits, it will be difficult to be established. Such efforts need to be boosted in a policy and institutional level" (χ2=101.81, woman, 35 years old).

The typical text segments cited above highlight one crucial demand expressed by the participants: the need for change, not only in terms of production of food products, but also in terms of mentality. A shift in personal stances appears to be

crucial, but it is recognized that it cannot be efficient if it is not supported by a policy framework.

"-Initiatives should be supported by policy and institutions, like the European Union, that is the only way it can be expanded using right tools to empower further development. I do not mean that bottom-up change is unattainable…" (woman, 32 years old)

"-A change in the doctrine is the only viable way. Deterring professionals from using chemical formulations and insecticides is a decision radically contrasted to what is happening today in professional practice. No institutional body is going to take this responsibility" (woman, 29 years old).

Participants often expressed partial consensus on topics, agreeing on the identification of the risk incorporated in practices but having different approaches regarding solutions. Every individual acknowledged that degrees of toxicity can derive from common practices, like littering, but they attribute the root cause to the macro-level (production intensification, mass farming production, monoculture), entangling social, industrial and economical systems. These systems, charged with different semantics and functions are seen by the participants as main regulators of the ramification deriving from their practices and they are heavily criticized for their management, as well as for the types of expertise they promote.

An interesting finding about the "medical" and "nutrition" doctrine is also dominant in Class 2. Vulnerable individuals who are (heavily or in a looser manner) related to expert opinions regarding medical treatment, medication, routines, laboratory diets are expected to fully trust the practitioners and official suggestions. However, their perception of the "doctrine" includes the established medical and nutrition-related suggestions. "You might trust the producer but not the system, they might be doing everything he has been told that is correct. Likewise, in medicine, only a few practitioners propose to avoid and supplement food depending on your disease. Trust the person, doubt the doctrine" (man, 26 years old). According to these segments, trust and mistrust are not solely towards health professionals, on the contrary to what the relevant health psychology and medical bibliography suggests (Goold, 2002; Thom, Hall & Pawlson, 2004; Robinson, 2016). Professionals are not judged for their ability to apply what they have been taught to do; instead, they are

represented as passive bearers, "servants" of the knowledge produced. Comparably, popular, and grounded suggestions by nutritionists are doubted. For example, the health benefits of the Mediterranean diet, a world-renowned culinary tradition (Lăcătuşu et al., 2019), are heavily disputed. Ultimately, a social representation of mistrust towards both the production and the medical establishment is emerging, since they are based on "*outdated knowledge*" that is currently challenged by new findings and personalized (or precision) medicine.

Toxicity defined

Class 3: Toxicity in fruit and vegetables

Two thematically related classes are Class 4 and Class 3. The words with the biggest occurrence are vegetables (χ^2=63.16, p<.0001), fruit (χ^2=62.5, p<.0001), round-up (χ^2=16.27, p<.0001), eat (χ^2=15.77, p=.00101), body (χ^2=10.8, p=.00101), for Class 3 and degree (χ^2=16.23, p<.0001), need (χ^2=16.23, p<.0001), affect (χ^2=12.06, p=.00051), fiber (χ^2=12.06, p=.00052), food (χ^2=10.64, p=.00110) and environment (χ^2=8.38, p=.00378) for Class 4. The similarities of these clusters are firstly noticed via their shared dendrogram branch, but a closer look can indicate that Class 3 fully addresses the participants' perception of toxicity in food while Class 4 focuses on the effects of perceived toxicity in both the body and the environment.

"I have reached the point of avoiding vegetables and fruit, they are the worse, so many studies have shown that. In the USA there are trials about farms and the use of glyphosate in Round-Up, it is everywhere, even in the oats that are considered to be healthy by the nutritionists; it's completely toxic" (χ^2=108.14, woman, 35 years old);

"We are being told to eat fruit and vegetables because they are healthy and we don't question it at all. Have we ever wondered about the concentration of pesticides and chemicals on them? Especially those that grow in the ground, not on trees. Is this healthy?" (χ^2=156.88, woman, 41 years old).

As seen in these segments, the participants perceive toxicity as "concentration of chemicals" in food, with fruit and vegetable being the most often mentioned, due to their exposure. When the individuals were asked to name the most "*burdened*" field in

terms of toxicity, having to choose between agriculture, animal farming and fishing, conflicting opinions emerged.

> "We are talking about the burden of these two fields [agriculture and animal farming] but what you say about meat affecting us more is wrong. The cow or the calf can metabolize whatever injections or hormones they are given at very high rates and, in the end, what ends up in our bodies is insignificant compared to what we take from vegetables and fruit, which we often eat raw" (woman, 41 years old).

Fruit and vegetables are considered toxic by the participants due to their direct exposure to chemical substances, like pollutants and the extensive use of pesticides. Concentration is perceived as possible to occur on parts of the plant or the fruit (on the skin or the outer leaves, for example) while it is noteworthy that such substances undergo biological concentration along the food chain, something that is gradual and unnoticed. The habit of eating vegetables and fresh products in their raw form is framed as a habit that increases risk (Lynch, Tauxe & Hedberg (2009). Mentions of controversial glyphosate (Tarazona et al., 2017) and Round-Up indicate a clear example of what participants consider toxic: "substances that disrupt enzymic pathways and the soil ecosystem" (woman, 29 years old). Surprisingly, the topic of naturally occurring food toxins was not brought up.

Class 4: Toxicity in body and environment

While Class 3 examined the perceptions of food toxicity, mostly regarding vegetables and fruit, Class 4 focuses on topics about the ramifications of food toxicity on both the body and the environment. The words with the largest occurrence are mentioned below: degree ($\chi2=179.9$, $p<.0001$), need ($\chi2=153.38$, $p<.0001$), affect ($\chi2=86.3$, $p<.0001$), fiber ($\chi2=53.66$, $p<.0001$), consider ($\chi2=53.15$, $p<.0001$), food ($\chi2=42.22$, $p<.0001$), environment ($\chi2=38.51$, $p<.0001$) and dairy ($\chi2=26.45$, $p<.0001$).

The interviewees provided their personal perception on toxicity, highlighting different aspects of what they perceive as toxic in food:

"The definition of toxicity is slightly subjective, it has to do with the tolerance level of each organism" (woman, 29 years old);

"Toxicity is not always a result of additives, it can be a result of processes, as well. The disruption of growth normality always has consequences, it might be unintentional, but it happens and affects everyone" (man, 26 years old).

The two classes are complementary: one suggests the bearers of toxicity and the other indicates their effects, without creating barriers between the human-environmental factors. Some foods are specifically mentioned among those negatively affecting human health, like processed food, snacks, fast food. A subjective perspective of what is toxic is noticed when discussing unique body responses to food or substances consumption ("it's not only the pollutants that cause toxicity, but there are also foods that affect some vulnerable organizations more, so they can be considered toxic. There is a degree of subjectivity when it comes to evaluating body toxicity" (man, 26 years old). The embodiment of toxicity is difficult in noticing because it is closely related to each person's physical condition and characteristics. In this Class, the participants appear willing to discuss their experienced sensations by exchanging opinions and takes on what they find disturbing. Taking into account that they were all chronic patients facing different health problems, they shape a distinct image on what an unpleasant feeling is. This personal perception might be partially seen as a drawback; however, it strengthens our main argument of anchoring an unfamiliar term ("toxicity") on experiences.

Class 6: Beyond "toxic toxicity": perception of toxicity based on body responses

Finally, Class 6 is connected to Class 3 and Class 4, introducing a different perspective of lay toxicity perception. The words with the biggest occurrence are kilos (weight) (χ^2=32.21, p<.0001), was (χ^2=27.35, p<.0001), discomfort (χ^2=22.92, p<.0001), drug (χ^2=18.17, p<.0001), autoimmune (χ^2=18.17, p<.0001) and swelling (χ^2=18.17, p<.0001).

In this class, individuals discuss toxicity definitions that are completely distinct from the molecular and chemical-based definition. The participants propose their personal takes on toxicity, based on personal experiences and body responses

that are not caused by toxic foods, but from "*conventional*" food that affected them negatively.

"Food is our health, we choose what to eat, everything starts from food" (χ^2=118.51, woman, 41 years old);

"When I had more weight this feeling of swelling was irritating, but food could satisfy me short-term. After a while, I felt worse. That's when the autoimmune disease appeared" (χ^2=155.1, woman, 31 years old);

"This is my perspective of what makes me feel bad, whatever has a negative effect on me, like carbohydrates and dairy products, even the more innocent ones. They cause me tremendous fluid retention. Some people don't mind, but we, people with health issues, know things about toxicity, we know what affects us negatively and what we should avoid, based on our illnesses" (χ^2=74.59, woman, 35 years old).

In this class, toxicity is traced in everyday food and alimentation products and is defined based on unwanted physical responses. The word "toxicity" is taken out of the scientific terminology, and it is placed in everyday life, in a lay audience. Individuals attempt to appropriate the concept they cannot fully understand by attributing distressing body reactions to a situation charged with disastrous connotations. Using this socio-cognitive mechanism, people go beyond the "*toxic toxicity*", to a personal and experiential subjective representation of toxicity in food.

Social representations of food toxicity in lay people interested in environmental issues
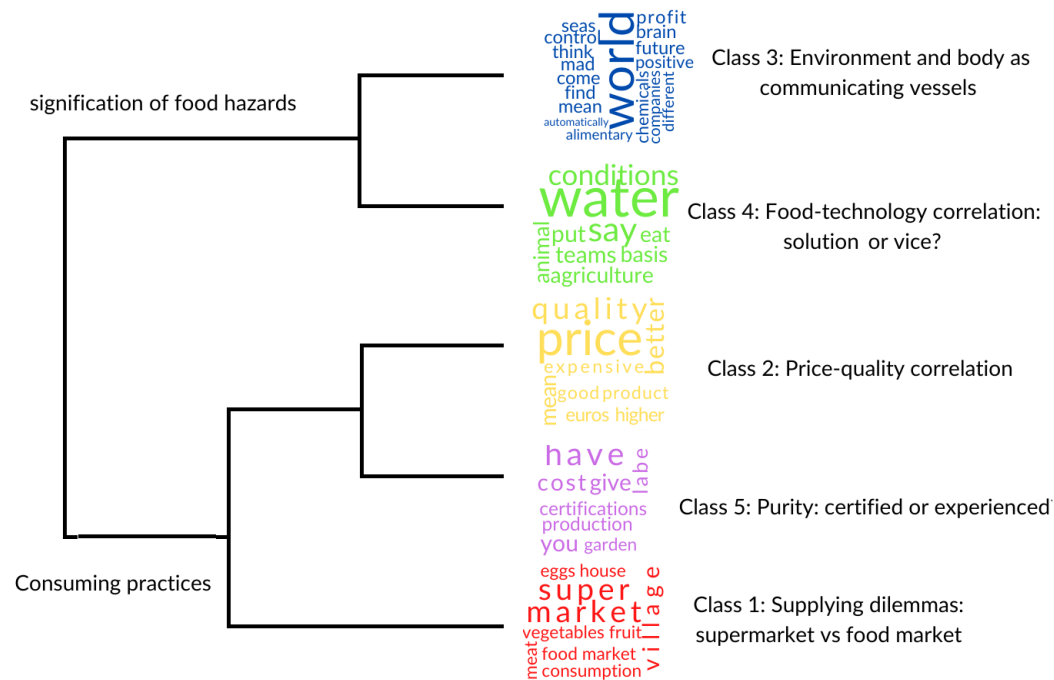
Dendrogram 2. Classes and words with the largest occurrence in environmentally-conscious lay people category

The first corpus analyzed is constituted by the focus group discussions of individuals who are engaged in environmental activism. The participants self-defined themselves as environmentally conscious and all of them stated they are involved in organizations or movements that support environmental causes, from participating in reforestations to expressing more radical viewpoints, like anti-speciesism and animal equality (Singer, 1995) and degrowth (D'Alisa, Demaria & Kallis, 2014). A total of fifteen (15) people participated (10 women, 5 men, *M*=31 years), comprising four focus groups. The full corpus contained 18,884 words, of which 3,337 were unique words. Specifically, the descending hierarchical analysis divided the corpus into 533 segments and 5 classes. The results of this analysis can be observed in the Dendrogram 2 above. The words featured in the dendrogram were translated from Greek to English.

Based on the analysis using Reinert's method, two distinct branches are created: The first branch indicates consuming practices, since it includes extended

discourse on the big or small supplier preferences of Class 1 (supplying dilemma: supermarket vs food market), and buying criteria are expanded in two clusters, Class 5 (purity: certified or experienced) and Class 2 (price–quality correlation). The second cluster is consisted of Class 4 (food–technology correlation) and Class 3 (the environment and human body as communicating vessels) and can be described as "acts of signification of food hazards".

Consuming practices

Class 2: Price-quality correlation

The first branch analyzed is the one containing the majority of the lexical material (44.2%), and it is comprised of two clusters, Class 5 and Class 2. These classes share similarities because they address two of the key selection criteria of consumers when it comes to their decisions regarding food. More specifically, Class 2 represents 22.8% of total lexical material, which obviously mirrors the quality–price correlation. the words with the largest occurrence are mentioned below: price (χ^2=87.73, p<.0001), quality (χ^2=50.41, p<.0001), expensive (χ^2=32.79, p<.0001), good (χ^2=26.82, p<.0001), better (χ^2=19.5, p<.0001), see (χ^2=17.2, p<.0001), euros (χ^2=17.2, p<.0001) and believe (χ^2=16.09, p<.0001).

Typical text segments incorporate the key concepts that are being discussed in Class 2:

"Quality and the relationship with the individuals, it's what I value. Some organic or free-range products have higher price, but it is not an indicator of better quality and an expensive product is not always better" (χ^2=252.94, woman, 31 years old);

"A product that is more expensive is not always good or ethically produced and ethically paid towards the employees and the production, that is why I don't link price to quality" (χ^2=228.74, woman, 41 years old);

"Let's take meat for example, I know that the one we find at the butcher's shop is better than the one in the supermarket. I judge based on my experience, from what I have tasted, so the price is not some sort of guarantee of better quality" (χ^2=209.48, woman, 39 years old).

The equation of higher prices with better quality is dominant in everyday life and has been a major subject in the literature of behavioral economics, judging by studies examining whether consumers may infer the quality of a product from its price (Scitovsky, 1945; Wolinsky, 1983; Riordan, 1991). That topic draws the attention of the participants, who perceive that there is a general notion of quality usually deriving from higher prices (Rao & Monroe, 1989), which are linked to better quality of raw materials, higher manufacturing cost, cutting-edge technological equipment, selective distribution and, thus, exclusivity. Deep-rooted cultural ideas should be also considered, or, quoting the words of an interviewee, "we were raised with the aphorism 'you get what you pay for', which is not true" (woman, 41 years old). This proverb was brought up by many participants when referring to the quality-price correlation, indicating that the interviewees were already familiar with this common belief.

There are numerous connotations related to quality, however, as it can be assumed from the segments cited before, the participants do not correlate higher price to better quality. On the contrary, such connections are seen as "marketing tricks":

"We must be insightful and understand what is really worth its price. Expensive brands and products are primarily based on marketing" ($\chi2$=190.21, man, 30 years old)

"I think it is falsely believed, thanks to marketing, that we consider a product to be better because its price is higher. We all have tasted cheaper food and crops that were superb." ($\chi2$=170.96, woman, 28 years old).

The participants appeared to disentangle higher prices from quality connotations, justifying their opinion with personal experiences, based on their consuming practices. Expensive products are considered "overpriced" and "overhyped", following established food and diet trends. Even though expensive products are positively evaluated under some circumstances, for example when referring to vegan-friendly products or fair trade, the participants' final decision is not affected, which is consistent with Hefftez and Shayo's (2009) findings.

Expensive products might not be preferred, but their significantly higher prices are explained or approached by the participants after taking several factors into account, including geographical distance ("the price of imported goods is obviously

higher: your fruit from Latin America, their price is higher because the cost of transportation and gas and all the taxes are included in the final price, χ^2=134.20, man, 45 years old), small scale production ("I try to buy objects I need in my daily life to support the local economy and small producers, in this case I do not really judge based on quality criteria" χ^2=76.03, woman, 25 years old) or seasonal crops. Despite this acknowledgment, the majority of participants agreed on choosing a mid-range price product. Factors that might be moderating the buying decision-making are brand loyalty and financial capacity. According to the interviewees who stated that they exclude "suspiciously low price" options from their dietary habits, their definition of quality in food products correlates with price, indicating the importance of other factors, including social responsibility, interpersonal trust and taste in order to make the final choice.

Class 5: Purity: certified or experienced?

The second half of the first branch is Class 5 and it is linked to discourse about certifications, organic food and definitions of authenticity. Indicatively, the words with the largest occurrence are mentioned below: have (χ^2=50.6, p<.0001), can (χ^2=25.55, p<.0001), cost (χ^2=22.35, p<.0001), certifications (χ^2=22.35, p<.0001), product (χ^2=14.82, p=.00011), state (χ^2=14.82, p=.00011), local (χ^2=11.09, p=.00086) and label (χ^2=10.32, p=.00131). An interpretation of the content based on the words with the highest reoccurrence would indicate the consumers' preferences for certified products as the major theme. However, a deeper examination of the typical text segments and the comparison with Class 2 highlight the crucial role that the state plays in the participants' opinions.

"The state should give incentives to local producers and farmers, not only as financial support but in terms of taxes, as well. If you have lower production cost, the consumer will finally choose you, it's the rule of the market. But this is something that can only be initiated by the state's incentives" (χ^2=162.97, woman, 26 years old);

"No one can sell crops to the farmer's market by having only a few tomato plants in his garden *watered by God*. It is possible but the production

won't be enough and surely not enough for him to sell (χ^2=90.32, woman, 41 years old);

"It's illegal to grow edible fruit and vegetables in your balcony in Germany and in Holland, you can get fined, but you have the right to grow whatever you want in small municipal urban gardens by paying some sort of rent" (χ^2=88.42, woman, 28 years old).

The segments cited above indicate state-induced criteria that affect the participants' selection. To begin with, the term "organic" is linked to organic agriculture, a sustainable agriculture approach including biodiversity, agro-ecosystemic health and soil activity while minimizing additives and pest control (Semos, 2002). Focus group participants associated organic food with healthier products, with lower accumulation of pesticides and chemical substances, thus, to "natural" processes. The perceived "purity" and possible positive health effects are considered more natural and are elements attributed to organic food. On the contrary, non-organic food is named "conventional" and is perceived as less pure, thus, of a lesser quality (Magnusson et al., 2003; Mondelaers, Verbeke & van Huylenbroeck, 2009). To quote a participant's words "The only reason we prefer them [organic food] is because we consider them to be cleaner, purer, not full of pesticides ... We have this impression, I do not know if it is the reality, I hope it is, we think that the soil they have grown in are cleaner, so they are cleaner and purer products" (woman, 39 years old). However, a significant proportion of the text segments refers to official definitions of organic food that are attributed through certifications approved by the Greek state for the validation of compliance with specific agricultural policy standards. The participants acknowledge the positive aspects of organic and "less processed" food but a duality of correlations with official standards and certifications is noticed. On the one hand, the interviewees consider organic certifications and labels to be credible, an index of "*guaranteed quality* ("when there is the organic label, I suppose that it has been checked someway to get certified, it is not easy at all to be placed in the organic shelf", χ^2=60.78, woman, 39 years old). The attribution of the certification is officially presented as limited and awarded only after thorough examination and, as a result, the product that goes under the "organic" description must have been approved by some basic controls, which fosters trust and confidence for the consumers (Hamzaoui-Essoussi & Zahaf, 2012).

On the other hand, the majority of the lexical material suggests that most participants put the certification's accuracy into question:

"You gamble with organic, they are more expensive but you don't know how the certifications are given" (χ^2=74.37, woman, 39 years old);

"`You pay for a label that does not respons to reality. I very much doubt what they say is organic really is", χ^2=81.14, woman, 26 years old;

"It's a type of marketing, the same as vegan food, a lot of things can be launched as organic, because this label justifies a higher price" (χ^2=54.79, man, 30 years old).

In the segments cited above, the participants acknowledge the commercialization of organic products or define the term "organic" as a medium for entering the new clean-eating market that is on the rise, considering them "unneeded". Despite the questioning tone, these remarks indicate the recognition of such a type of healthier products that is available for consumption, while there are participants who fully reject the "organic" label: "I think it is a commercial label for speculation. When I say organic, I think of my friend who has an olive mill and brought me organic oil, which she made out of olives her mother picked. This is organic in my own personal vocabulary. Organic qualities can be found only in products from self-employed or small producers. In the markets I get the cheapest cherry tomatoes, not the ones with the "bio" label on, they are not really organic, and I do not buy them" (woman, 28 years old); "It is not true that they do not use pesticides or hormones or various additives [in organic crops], they use them there but use either other formulations or in other dosages. But they are still in the food. We are talking about production, about people who aim to make a profit, so what will they do? You cannot play without pesticides to feed so many people." (man, 45 years old). In these participants' discourse "clean" and "commercial" are incompatible. A product's mass production and mass distribution contradict the advertised pure elements and profit is contrasted to natural processes. The representation produces indicates an interesting theme that could be further examined.

Finally, another interesting aspect is the comparison of international and European regulations of food to public policy and private actions. Several segments indicate trust in the interventions of the European Union in making quality products:

"Now that the NSRF [National Strategic Reference Framework] programs are implemented, which are very extensive, especially in olive oil production, things have changed. I examined it, it is very difficult to get away because you go through a lot of controls on whether you make organic olive oil, what olive oil you make, what acidity it has, where and how are the trees cultivated, a lot of detail to get the money from the NSRF. I do not know if this applies to all products, because olive oil is a special case, it is also PDO, it has a heavy history in Greek gastronomy and industry" (woman, 29 years old).

The European Union is presented as a supervisory body dictating the implementation of strict policies and standards. However, such control is positively evaluated, based on the European Union's "high quality standards" and common agricultural policy legislations ("In the European Union there are inspections or there are competent bodies, so I trust them. The limits in the European Union are not even that minimal, if you compare them to the rest of the world, like the USA, what its citizens consume and what chemicals can be used in the production process compared to Europe which has banned too many things, there are too many ISOs, there are chemicals that are actually forbidden to use, there are sanctions, it's hard to skip them", woman, 26 years old).

Class 1: Supplying dilemmas: supermarket vs food market

Class 1 is the one conceptually closer to the branch analyzed earlier and it incorporates discourse over markets and, more specifically, the supermarket-food market polarity. The words with the largest occurrence are mentioned below: super (χ^2=169.9, p<.0001), market (χ^2=163.31, p<.0001), know (χ^2=56.77, p<.0001), vegetables (χ^2=53.66, p<.0001), food market (χ^2=53.29, p<.0001), home (χ^2=39.22, p<.0001), benches (χ^2=34.33, p<.0001), fruit (χ^2=27.79, p<.0001) and try (verb) (χ^2=27.79, p<.0001).

The most significant text segments are the following:

"We first shop at small producers and then at supermarkets, it depends. Every Thursday we visit the food market to buy vegetables for a week and eggs" (χ^2=556.17, woman, 31 years old);

"At home we try to avoid buying meat and fish from the supermarket, we prefer local producers or relatives, for example my aunt breeds animals, so he supplies us with eggs and vegetables" (χ^2=513.28, woman, 24 years old);

"We prefer the food market, mostly for quality and ethical purposes, we prefer benches and producers, not intermediates" (χ^2=502.77, woman, 39 years old);

"Fruit and vegetables either from the organic food market or the local grocery store, the supermarket is the last choice, the only place where I can find selected imported goods I cannot find otherwise" (χ^2=480.62, man, 36 years old).

Almost all participants stated the food market ("*laiki agora" –«λαϊκή αγορά»*) as their primary food source. Their selections are based on price comparisons, perceived quality differences, better taste and interpersonal trust towards the seller/producer. The results resemble the social representations elicited from the vulnerable focus group, with two additions: the cultural and the ethical part.

As discussed earlier, food markets are considered more credible when it comes to quality because of their linkage with local production and smaller food systems. Their crops are seen as cleaner, less processed, thus, they are connected to natural processes of growing and accumulation, but they also highlight a social and cultural component: "When we are in Athens we go to the food market because... there are many reasons, but the main one is that you feel an immediacy with the product and that you can find the seller and discuss with. Not to mention the atmosphere, the crowd, this beautiful chaos, sellers hawking their wares, it is nice" (man, 45 years old); "I especially like the market in Kallidromiou street, I generally trust any food market. The products' taste is better and the quality is different, and people getting together, discussing, expressing opinions, shouting" (woman, 26 years old). The food market is a unique phenomenon in Greek culture, examined by ethnography and urban studies as a way of reinventing public space (Kouzas, 2009) that can be changed by societal emerging needs, like the recent crisis. (Anthopoulou & Petrou, 2016).

A second important aspect is the consideration of fair trade and ethical factors:

"In the farmer's market everything is organic, they could even go under the "super organic" label. When you see benches with grandpas selling only a few small vegetables you can tell they are from his own garden. They have no additives and I want to support them" (χ^2=328.21, woman, 24 years old)

"We support the idea of 'buy small', from local producers whose animals we can see, for both quality and support" (χ^2=110.59, woman, 31 years old).

For the environmentally conscious participants consumption is not solely for personal purposes but it is considered an indicator of shift from the large-scale food systems which equals to commercialization, industrialization and centralization of food production. The selection of a small producer not only enhances the consumers' well-being and health through cleaner products but also empowers the producer.

Participants are interested in ethical concerns regarding food production as part of the ethical consumerism movement, a type of shopping which is influenced by ethical criteria (Crane, 2001). As stated by Barnett et al. (2011), the vast majority of so-called ethical products focus on green and fair-trade principles, excluding practices deeply rooted in large-scale production within the capital system, like human exploitation and insufficient worker's protection. Some of the topics introduced by Delistavrou, Katrandjiev and Tilikidou (2017) regarding discursive ethical consumption were also brought up by the participants, with a focus on social practices. Examples of unethical production practices mentioned are the labor exploitation of cheap labor workers in Manolada strawberry production (Papadopoulos & Fratsea, 2017), overfishing and competition resulting to dolphin by-catching, killings and disappearance both in Greece (Bearzi et al., 2008) and the Pacific (Kirby, Visser & Hanich, 2014), the seed crisis in India (Thomas & DeTavernier, 2017) and the avocado regime of Central and South America (Serrano & Brooks, 2019), among others. Another interesting finding is linked to the participants' networking and communication with brands, businesses and small producers. Active networking and often engagement with the brands' or producers' social media appears to be a key feature for the assurance of ethical practices in companies adopting this characterization. As stated by a participant: "I follow

companies that I see being advertised, I see a little bit how they work, I send questions that I had and when I'm sure the product is made this way [ethically] I buy it, even though it can be a little expensive, I bought it, but mainly If I deal with pages it is when I follow a company, I follow many pages from which I have never bought anything simply because they usually share some facts that interest me so on this occasion I go and do research, I get educated a little more on this topic. They give knowledge, not only advertising, we, the followers, get something out of it" (woman, 25). Digital marketing and relevant content distribution is not only used for sales, but it also provides useful information to followers and fans.

Signification of food hazards

The remaining classes constitute a branch related to agri-food conceptualizations in contrast to previously examined consumer practices. Class 3, which is consisted of 24.1% of the categorized texts of the analysis corpus is the biggest one in terms of lexical material and refers to food toxicities definitions, while Class 4 discusses the correlation between food and technology.

Class 3: Environment and body as communicating vessels

To begin with Class 3, the indicative words with comparatively larger appearance within the specific class are the following: environment (χ^2=27.69, p<.0001), genetically modified (χ^2=27, p<.0001), problem (χ^2=25.78, p<.0001), toxicity (χ^2=21.19, p<.0001), water (χ^2=20.74, p<.0001), eat (χ^2=19.23, p<.0001), humans (χ^2=17.99, p<.0001) and agriculture (χ^2=15.98, p<.0001). The most typical text segments are mentioned below:

"There are many advantages from the use of genetically modified crops. There is always a negative use for the creation of endless monocultures or the acceleration of production, but the positive side is that they can feed many more people with a lower cost (χ^2=119.67, woman, 40 years old);

"Regarding the genetically modified [foods], they are a great option, they have bad reputation which is not true, simply because people cannot understand how they are created and how they work (χ^2=83,10, man, 30 years old);

"It's a complex topic, I am 100% against genetically modified foods, I understand there are positive effects from their use, but I do not really see their true usefulness" (χ^2=72.64, woman, 25 years old);

"Everything is somehow genetically modified and there are different definitions of it. When I was in high school, I was linking genetical modification to extreme cases like Chernobyl, but now I know that is not true. While growing up I realized that a genetically modified product is not necessarily carcinogenic or harmful (χ^2=70.75, woman, 26 years old);

"When I think of toxic food, I think of a food that could negatively affect my body, and since it affects my body it has affected the environment before me, we live in an environment full of toxicities" (χ^2=70.72, woman, 28 years old);

"Animal breeding has a great effect in the environment, because animals emit carbon dioxide through exhaling, so the bigger the meat production the more carbon emissions there are." (χ^2=68.70, man, 36 years old);

"As a first step I try to consume seasonal products, not the ones produced in green houses, as far as it is related to the environment and our food and the future of food production and consumption" (χ^2=68.00, man, 45 years old).

The emerging themes that derive from the text segments are three: genetically modified food, environmental toxicity and the correlation between the person and the environment.

To begin with the first major theme, the participants expressed mixed opinions about genetically modified food and crops, however not extremely negative or extremely positive, with most of the participants presenting slightly positive inclinations towards the positive aspects of GMOs. Most individuals note their lack of knowledge before expressing their opinions, linking them to personal ideas and experiences. The lack of information surrounding the GMOs topic is highly noticed in various segments ("I do not have a general opinion because I have not searched more about it", man, 36 years old; "I do not worry about genetically modified food, so far it

has not been proven that it's harmful, but I remain cautious", woman, 39 years old).
The participants did not present any examples or metaphors regarding negative effects
and the most negative stances were expressed by taking a distance from the issue
discussed. On the contrary, several positive aspects were discussed and proposed:

"I don't freak out when I hear genetically modified. I look at it, it
depends on the product and how it can be modified. I try to find, to ask the
opinion of an expert, what has happened, how it can affect us. So far, no
negatives are noticed, only opportunities for a better future", (man, 30 years
old)

"I believe that genetically modified is a tactic that has been followed
for a long time, it just becomes much more effective now, it is not something
particularly worrying, it can be used positively" (man, 35 years old)

"I do not have any objection to genetically modified food because we
do not have any official result that says that after twenty years you will
develop cancer, for example. There are various speculations, fears, doubts but
it has not been proven that they really do harm. But genetical modification is
a way to avoid the use of insecticides or to make foods preservable easily"
(woman, 40 years old)

Most participants reported slightly positive representations of genetical
modification in food, which is in an unexpected finding, considering the existing
literature and the long history of food debates (Lenzaun, 2004), food activism, non-
GMOs movements and NGOs-induced skepticism in the European Union (Kurzer &
Cooper, 2017) and in Greece (Georgiou, 2019; Kampili, 2017).

The second theme of this class is environmental toxicity, which is directly
linked to the correlation between human and environmental aspects, allowing us to
examine them together. All participants associated the word "toxicity" with types of
pollution or contamination:

"When I think of toxicity I think of pollution, sea, air or land
pollution, wherever it comes from it ends up in our plate, in the end it will
make us sick" (woman, 24 years old)

"I define toxicity as the harmful concentration of any substance in food or in what we consume. It could be plastic, heavy metals, generally anything that is in high concentration and can potentially do damage is toxic. I would say livestock is more burdened, considering that animals also consume plant that contain harmful substances and they are given antibiotics so they do not spread diseases to each other. The most toxic foods are animal products and shellfish, mussels, because I know they have a high concentration of heavy metals." (woman, 40 years old);

"The first thing I think about is the waste in the seas, it has a direct impact on what we eat, in the water, in everything, everywhere, it passes into our food in substance and respectively in the fish we consume. It passes to and through the water and it cannot be stopped, it is a growing circle." (woman, 31 years old);

"Food toxicity is a form of accumulation of banned substances. Slow poisoning. All the pesticides used in farming, the hormones used in animal breeding and chemicals which are biotechnology products, especially the ready meals, the snacks, the flavor enhancers, which are part of biotechnology, have nothing to do with the part of cultivation, it is not that we only get pesticides in our body. Toxicity is everywhere nowadays, and it ends up, after all, in our body, through food. Even the plastic we eat when we eat fish, taking for example the microplastics found in the seas and they are consumed by fish and we, by consuming fish, take in the toxicity of all of them." (man, 45 years old).

According to the interviewees' perception, food toxicity is a result of external factors, like chemical compounds, waste and plastic. The effect of human actions is widespread in the class, from a wider to a narrower level. Humans are to blame for ocean pollution and the addition of preservatives, artificial substances and modified chemical compounds in food. The holistic, non-anthropocentric way of thinking is noteworthy, since the participants do not focus exclusively on the negative effects on consumers, but they also consider the eco-systemic impact (Lewis & Maslin, 2015). The entire class is imbued with the interdependence between humankind and nature, reflecting the effects of various forms of mass production on the natural environment.

Nature is not seen as a tool in the hands of humans (Leopold, 1949), but rather as communicating vessels within the context of human-environment interactions (Harden, 2012). The most commonly used example of interconnecting eco-systems is water and the participants highlighted its importance in the circulation and contamination of hazardous substances. Water circularity accelerates the distribution of chemicals, while toxicity is incorporated in the most vital and unspoiled part of our alimentation, underlying the intrusive properties of toxicity in transparent and visible everyday aspects. Water contamination is one of the findings that engulf the social representations of environmentally conscious individuals on food toxicity: it is widespread, invisible and intrusive, reaching every aspect of human activities. It is widely used unintentionally, from hygiene purposes and alimentation to the watering of crops. The exploration of toxicities' understanding within group discussions was also fruitful because the participants were commenting on each other's opinions, shaping a central consensual approach towards toxicity in the interconnection of eco-systems. The participants' emphasis on water is a unique finding compared to all three categories and indicates the retrospective functionality of anchoring, in order to make a complex issue easier to understand through parallelization with familiar notions.

Class 4: Food-technology correlation: solution or vice?

The final category, Class 4, contains 16.67% of the encoded texts of the analysis corpus. Indicatively, the words indicating a higher frequency of reoccurrence are mentioned below: world (χ^2=46.1, p<.0001), alimentation (χ^2=46.1, p<.0001), technology (χ^2=32.63, p<.0001), remember (χ^2=29.52, p<.0001), affect (verb) (χ^2=25.34, p<.0001) and crisis (χ^2=20.21, p<.0001). This class revolves around the discourse regarding the intervention of technology in agri-food and alimentation and historic crises. These two subjects are seemingly unrelated or connected through considering innovations the cause of modern time alimentation crises. However, surprisingly, the focus groups' participants named cutting-edge technology as the only solution to crises, including the COVID-19 pandemic.

"Technology has certainly brought us to the point where we can feed 7.5 billion people, there wouldn't be so much food production without technology, from agricultural practices to transportation and maintenance, it plays a great role in all parts of agriculture and animal husbandry plays very

big role. Gardens cannot meet our food needs. So, it is positive that we are using technology to produce food." (woman, 40 years old);

"I am super pro-technology in general and in terms of food quality. They [scientists and experts] have discovered things that can affect food, some things that could not be treated before and the tree had to die are now being successfully treated. There are some negative parts, when it [technology] is used in such a way that bypasses natural steps for overproduction, but that is not the fault of technology, it is a matter of the use of technology. Intensification is shaped by some who want profitability, but we have the choice to decide which product to consume" (woman, 26 years old);

"Well, in general, technology can be used in a very positive way, but the fact that it is used for profit means that it is used in a negative way, a lot of what is happening could be used to do something good. Technology, through science, could have found ways to use less chemicals for the products we grow, but it does not. We prefer older techniques, which are more cost-effective but cost less than using a technique that is more expensive, may take longer but is safer for the environment and the product itself, and at the same time we use technology for better refrigerators in transportation. However, we have found ways not to put so many chemicals in the products, develop hydroponic cultivation, which are good and environmentally friendly and for mass production, it is not used because it is expensive" (woman, 28 years old);

"We live in capitalism, so whatever technology comes out comes from those who try to take advantage of it, it automatically goes towards one direction. But we can try to use it in a good way." (man, 30 years old).

The social representations of technology shape two categories: those placed in the first one derive from a positivistic point of view, since technological advance can provide solid solutions to crucial challenges, overlooking the negative aspects it can have. Technological neutrality seems to be a valid point for the participants who acknowledge that technological intervention has reshaped all aspects of modern-life, stating positive results of these applications. The participants see technology as value-

free, not related to power structures; in contrast, it is perceived as "a tool". The second half considers novelties a product of techno-capitalism, designed and shaped in such a way to serve its objectives and purposes. "Capitalism" was stated by the participants as the generator of technology, promoting modifications that are embedded to its initial purpose. Nonetheless, the complete lack of technophobic and conspiracy-inclined viewpoints is a significant indicator for further research.

Social Representations of Food Toxicity in lay people interested in fitness
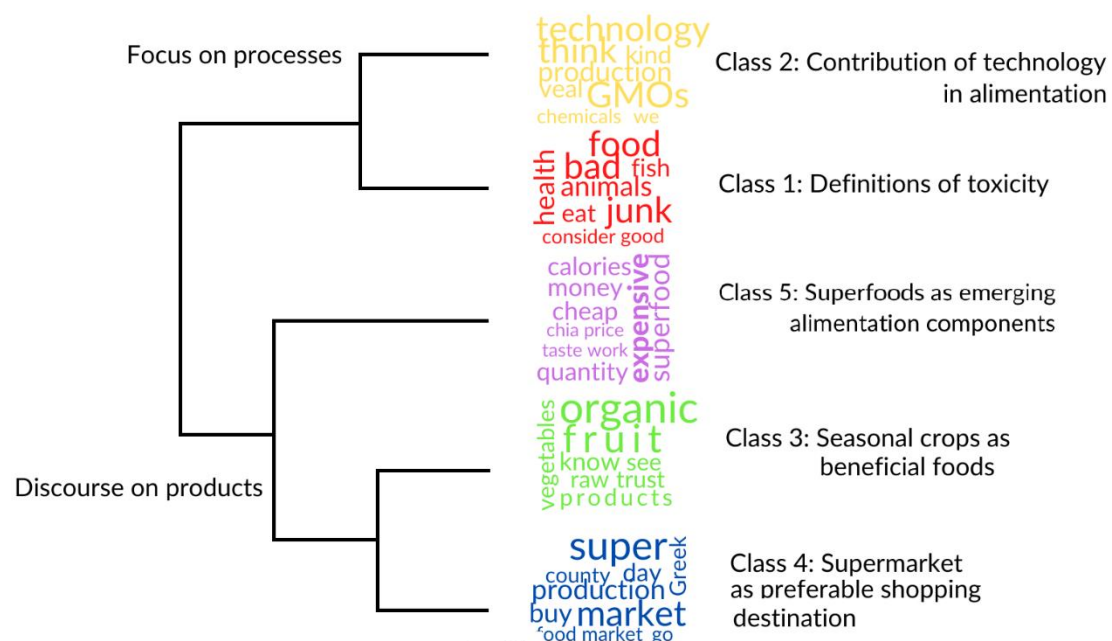
Dendrogram 3. Classes and words with the largest occurrence in fitness-related lay people category

The second corpus analyzed is the one constituted by the focus group discussions of individuals interested in fitness, exercise and sports. A total of fourteen (14) people took part (7 women, 7 men, *M*=29.2 years), creating four focus groups. The full corpus contained 13,223 words, of which 2,704 were unique words. Specifically, the descending hierarchical analysis divided the corpus into 372 segments and 5 classes. The results of this analysis can be observed in Dendogram 3.

The words featured in the dendrogram were translated from Greek to English as well as the segments presented below.

The codified lexical material is shaped in two branches, the first one indicating the discourse over the products while the second one is related to wider conceptual concerns regarding the processes. The second category breaks into two classes, Class 1, which deals with toxicity definitions, and Class 2, related to the intervention of technology in food, and especially genetically modified food. The wider branch breaks into Class 4 (shopping place) and Class 3 (food properties), which are semantically closer based on the content, and Class 5, which examines alimentary ingredients, elements and superfoods.

Focus on processes

Class 1: Definitions of toxicity

To begin with the branch related to conceptual concerns about food toxicity and technological intervention, we can take a closer look at Class 1, which is constituted of 22.9% of codified material. The words with the highest co-occurrence within the class are: alimentation (χ^2=32.83, p<.0001), animals (χ^2=25.94, p<.0001), bad (χ^2=24.17, p<.0001), junk [food] (χ^2=24.17, p<.0001), investigate (χ^2=20.64, p<.0001), toxic (χ^2=16.04, p<.0001), needs (noun) (χ^2=13.66, p<.0001) and hormones (χ^2=12.68, p<.0001).

The major themes can be noticed in the most characteristic text segments of this class:

"For me all the junk food create toxicity. I do consume them, I cannot lie, I'm not very consistent when it comes to the right alimentation" (χ^2=139.33, woman, 44 years old);

"I think toxic food is something that negatively affects my body, I take care of my eating habits and what I eat and how I eat it" (χ^2=101.03, man, 23 years old);

"For me, the Mediterranean diet is ideal, everything is in balance and the reduction of processed food and additives is essential for a healthy body" (χ^2=84.86, man, 26 years old).

"A product might not be toxic but the cooking process can alter that, for example fried food or products that are rich in saturated fats, junk food etc are toxic" (χ^2=70.85, woman, 26 years old).

All of the previously cited segments are related to the participants' representation on food toxicity. Most of the personal aspects expressed focused on the definition of food as "toxic", while investigating the inherent or acquired property of toxicity. As seen in the segments with the highest word co-occurrence and further noticed in the discussions' transcriptions, the participants related food rich in saturated, trans fats and sugar to toxicity. Their reference to specific types of food, with fast food (mostly mentioned as "junk food") being heavily highlighted as an indicator of their perception on toxicity. Moreover, most of the participants linked the consumption of fast food with negative physical responses and reduced physical performance during activities, including work-out. Two participants' opinions offer a better justification of their decision to refer to processed food as "toxic":

"For me, toxic is whatever affects me negatively, products that make me feel bad, for example fried potatoes. I have noticed that they disrupt the digestion and give me tachycardia, symptoms that follow me throughout the day and ruin everything" (man, 31 years old).

"I have given up on fried food, as they say, everything that tastes good is bad for your health. I have started using air frier because all the oil and fat made me feel sick, especially the day after when I had to go to work or go to the gym. It is very bad." (man, 26 years old).

This class brings out one of the most important findings of this research: the lay understanding of food toxicity is linked to the consumption of products that affect the body. This social representation emerging from Class 1 resembles to the characterization of food causing unwanted physical responses as "toxic" in the focus groups of vulnerable people. Toxicity is anchored in daily life and personal experiences and the adjective "toxic" is attributed to substances and products that have an immediate and harmful effect on people. Such transposition of toxicity to physical responses can be interpreted as a way of placing an unfamiliar term in an already known (and embodied) category connected to negative sensations on the body.

Class 2: Contribution of technology in alimentation

Class 2 is closely related to Class 1 in terms of content, since they both examine processes regarding food production and definition. The second class is constituted of 21.82% of codified material. The words with the highest co-occurrence within the class are: genetically (χ^2=35.89, p<.0001), modified (χ^2=33.34, p<.0001), think (verb) (χ^2=31.73, p<.0001), believe (verb) (χ^2=31.73, p<.0001), technology (χ^2=20.84, p<.0001), production (χ^2=20.59, p<.0001) and result (noun) (χ^2=15.54, p=.00013). The discourse revolves around two major themes that can be noticed in the most indicative (in terms of word co-occurrence) text:

"Genetically modified foods, the assisted production of crops and the testing of animals by vets, they all create a positive impact, they improve the overall food quality" (χ^2=149.81, woman, 30 years old);

"When it comes to genetically modified food, I don't know whether they are bad, I don't think they are carcinogenic, this is a technophobic theory, they are just novel" (χ^2=123.19, man, 31 years old);

"Genetically modified crops are made to get a large production from one species very quickly, which plants drown the surrounding flora, and so we have ended up with very few original seeds and reduced biodiversity" (χ^2=122.46, woman, 30 years old);

"I would not mind consuming something genetically modified. Genetical modification is taking place all these years from all producers, like selective breeding, these are ways of increasing the production" (χ^2=98.50, man, 26 years old)

"Most health problems occur because we went from the Mediterranean diet to a type of Western diet, not because genetically modified or organic food was introduced. Eating something, like a genetically modified fruit, cannot alter your DNA" (χ^2=85.35, woman, 26 years old).

The themes discussed in Class 2 are technological intervention in food and genetical modification. The participants appeared to be aware of genetically modified food and crops and most of them expressed that they are not hostile towards the consumption of these products. In contrast, some of the participants heavily praised

the positive outcomes of this technology, mentioning, among others, the acceleration and optimization of production, the possibility of removing unwanted properties from food, like allergy-related genomes and the development of drought-resistant plants. However, there was also a limited number of individuals who questioned the safety of genetically modified products and their long-term outcomes. As stated by an interviewee: "We do not have enough statistical results. There might be an increase in genetically modified foods and a simultaneous increase in cancer patients, they would correlate" (woman, 26 years old). This statement is part of underrepresented opinions that were expressed during the focus groups and it triggered further discussions on the topic. In a different focus group, an individual highlighted the mass use of genetically modified crops for profit reasons. These two remarks are interesting, however they are disentangled by the general idea expressed by the majority of participants on technological supremacy and significance in the improvement of the quality of life.

Genetical modification is not the only topic related to technology that was brought up in Class 2. Technology is considered among the main factors that shaped modern life, including food and alimentation. Positive attitudes on technology derive from the recognition of its impact in all stages of food production, from seeds dissemination, harvesting, breeding, slaughtering to preservation, food controls, chemical testing and development of materials suitable for food contact, to cite a few of the technological contributions that were mentioned during the focus group sessions. The participants were positively inclined towards food science and technology, acknowledging it as an inextricable part of alimentation, or, using the words of one of the interviewees, "Nowadays, alimentation is technology" (woman, 26 years old). Finally, the participants who are interested in fitness and exercising also referred to technology-assisted practices of creating products with higher nutritional value. This type of modified food products is further examined in the following subchapter by the name "superfoods", but its linkage to technological process is a notable element.

Discourse on products

Class 4: Supermarket as preferable shopping destination

The second branch resulted from the lexicographic analysis is consisted of Class 4 and Class 3. Their closeness in terms of content suggest bigger similarities compared to the wider discourse corpus. Class 4 corresponds to 25.4% of the total text segments and the indicative words are the following: supermarket (χ^2=84.06, p<.0001), food market (χ^2=38.52, p<.0001), buy (χ^2=31.4, p<.0001), go (χ^2=17.96, p<.0001), reasons (χ^2=17.96, p=.00013), eat (χ^2=13.75, p=.00020), prefer (χ^2=11.32, p=.00076), and small (χ^2=10.83, p=.00099). The typical text segments are the following:

"I shop exclusively from the supermarket, I try to buy Greek products but I have no problem to buy imported ones" (χ^2=272.52, man, 31 years old);

"I don't go to the food market because it's not convenient, I know that it is better to shop from small producers but I prefer the supermarket" (χ^2=261.18, woman, 26 years old);

"I only buy food from the supermarket because I don't know any producers and, as a result, I don't know how they produce or preserve their products" (χ^2=253.93, woman, 26 years old);

"I am a supermarket maniac, I never go to the food market because I don't have the time, they take place in the morning when I work" (χ^2=249.51, man, 30 years old)

This class focuses on the place of purchase and includes opinions about three popular shopping sources: the supermarket, the food market and small businesses. As seen in the previous analyses, most participants correlated the food market with higher quality and with the development of trust relationships with the vendors, however these findings are not replicated in this category. The participants declared their preference to the supermarket over the food market, justifying their decision on the convenience in terms of product availability and accessibility. The supermarkets are considered the "easy solution", as stated by one of the interviewees, due to their convenience, their omnipresence in urban areas, the extended working hours and the variety of products that can be found on the shelves. In contrast to the other categories, the interviewees highlighted the previously cited characteristics instead of

criteria related to food quality. According to their responses, most participants do not pay much attention to the product's origin. In fact, only two participants mentioned "Greekness" as a major selection factor, linking it to reduced use of preservatives and additives, due to the lessened distance from farm to fork. The consumption of locally grown and sold food is also seen as a means of supporting local economy and small producers. Nonetheless, the low frequency and the limited references indicate that such topics are not among the key selection criteria of the places of food purchase.

Moreover, most participants expressed their trust towards supermarket chains because of the extended outer controls and their financial and technical capability of ensuring the suitable conditions for the products' storage and preservation. As stated by an interviewee, independent sellers at the food market usually lack this capability:

"There are food market vendors who have their products exposed in the worst conditions possible. Let's take nuts, for example. They must be kept in specific temperature otherwise they get spoiled. Some sellers keep them in carts, exposed to direct sun heat, and this is a factor for the development of aflatoxins" (woman, 26 years old).

The strict controls undertaken by certification and auditing bodies are linked to the supermarkets' controls, that are perceived as often and thorough through all stages of food supply chains, leading to the emergence of a social representation considering the supermarket a place with products of guaranteed quality. This conclusion is also enforced by connotations associating the supermarket with a cleaner, more "sterilized" type of eating, adopting an expression used by one of the participants, which is closely related to urban dwellers' image of food.

Class 3: Seasonal crops as beneficial foods

Class 3 indicates similarities with Class 4, since they are places in the same dendrogram branch. Despite its relatively small size, corresponding to 13.82% of the categorized text segments of the total corpus, the constitution of a distinct class indicates a differentiation at a conceptual level. The words with the highest co-occurrence are the following: fruit (χ^2=47.19, p<.0001), organic (χ^2=33.39, p<.0001), trust (verb) (χ^2=31.76, p<.0001), vegetables (χ^2=26.09, p<.0001), possible (χ^2=25.32, p<.0001), time (χ^2=25.32, p<.0001) and seasonal (χ^2=24.89, p<.0001). Some typical text segments regarding this class are cited below:

"I don't trust organic food, not even those in the supermarket, you cannot be sure that the product under the "organic" label is actually organic. I believe that fruit and vegetables from local producers are more credible" (χ2=187.17, woman, 26 years old).

"I'm selective when it comes to fruit, vegetables and dairy products, some of the latter are P.D.O. (Protected Designations of Origin) products, so you know the quality. For fruit and vegetables, it's about organic and seasonal ones, they are better" (χ^2=153.91, man, 31 years old).

"Organic fruit is more important for me compared to organic legumes of beans. This label is an indicator of a specific growing process with less chemical additives. That's why I prefer buying seasonal fruit, I think they are all linked" (χ^2=127.37, woman, 30 years old).

As seen in the segments cited above, the lexical material of this class is related to food properties. The participants focused on organic labels and seasonal crops, two major selection factors. To begin with organic labels, the participants appeared informed about them, without having strong opinions neither in favor nor against them. Some participants expressed mistrust towards them, underlining their excessive prices and the lack of information about the crops growing as deterrent factors. As stated by an interviewee "How can we be sure that what we get is actually organic and additive-free? We have seen so much. What's the difference between a tomato from the supermarket and an organic tomato? It's a matter of definition" (χ^2=76.75, woman, 44 years old). The appropriate definition of organic products is questioned by a few participants, however it cannot be seen as a major theme in this class. In contrast, it is interesting to observe the participants' preference of seasonal fruit and vegetables since they widely stated their consuming decision to avoid greenhouse and out-of-season products. However, their responses to the question on the reasons they avoid such products focused on taste. Greenhouse products are considered "flat" and "plastic-like" when it comes to taste, since they are dissociated from the environment and the seasons, to paraphrase an interviewee's words. Such stances are consistent with Larson's findings (1997) on food seasonality.

The crops' chemical burden was mentioned by only three participants. Their decision to avoid such type of food derives from their perception that outer assistance

for the crop's development usually includes the use of chemical substances, pesticides and hormones in order to compensate for the absence of natural external conditions. However, most of the participants named taste as the main reason for selecting seasonal products, while the connotations imply an implicit association of quality with taste.

Class 5: Superfoods as emerging alimentation components

More extended perceptions related to quality can be traced in Class 5, which corresponds to 16% of the total text segments of the codified lexical material. The indicative words of this class are the following: expensive (χ^2=43.266, p<.0001), protein (χ^2=32.2, p<.0001), do (χ^2=26.74, p<.0001), good (χ^2=26.97, p<.0001), free-range (χ^2=21.31, p<.0001), pay (verb) (χ^2=21.31, p<.0001) and ingredients (χ^2=16.42 p<.0001). The most distinctive segments can be seen below:

"I prefer whole wheat pasta or pasta made of red lentils because they are richer in protein and iron. I might buy something more expensive if its ingredients indicate that it is superfood, something good for the body" (χ^2=143.65, woman, 30 years old);

"Sometimes you get what you pay for. The bread you buy from the supermarket is not the same with the one you buy at a bakery. The second one is more expensive, but way better" (χ^2=109.14, woman, 26 years old);

"When reading a product's label and see unknown words, it is probably processed, it may include toxic substances. But no one can be that thorough all the time, you must have a lot of money and time because free-range and organic food is more expensive than conventional one" (χ^2=79.47, woman, 26 years old);

"I prefer buying local when it comes to meat and animal protein, and free-range eggs, I hope they are a little better in terms of quality, or purer" (χ^2=79.47, man, 26 years old).

The major theme discussed in Class 5 is related to food prices and the price-quality linkage, while two unique themes derived from the participants' discourse: the prioritization of purchases and the topic of superfoods. In the first place, the participants interested in fitness and exercise indicated moderately low interest in

price research compared to the other categories, expressing established purchasing habits and specific demands. In contrast, they appear to prefer certain products without taking into account the cost. The participants' loyalty to specific brands can be associated to an implicit linkage of higher price to better condition and selected distribution. The trend of premium and limited goods is not stated directly by the participants' but it can be extracted from their prioritization of food consumption.

Most of the interviewees admitted to dieting plans with a fixed intake of macronutrients and trace minerals. The vast majority stated a strict commitment to their plan and to sequent habits deriving from this routine, mentioning calorie counting, macronutrients tracing and the adoption of specific sleeping patterns, among others. A macros-defined type of nutrition appears to disrupt the notion of food as pleasure, turning it into a way of enforcing the body by providing the essential for the organism needs, while "*biohacking*" the body towards achieving a better physical and mental state. The fact that participants did not focus on taste but on alimentary elements is interesting because it contradicts one of the widely accepted perceptions of food as pleasure. Good taste and purity do not appear to be the key factors that influence the consumers' decisions, but their nutritional value. This finding contradicts research on the general population suggesting that individuals focus on "tasty" rather than "healthy" labeling (Papies et al., 2017; Turnwald & Crum, 2019).

A diet that is essentially based on hitting goals, like achieving a specific intake of certain macros can be considered crucial for the popularity of so-called "superfoods", foods that are rich in compounds (such as antioxidants, fiber, or fatty acids) considered beneficial to a person's health, as seen in the Merriam-Webster dictionary (2022). Superfoods are shaping a rising billion-dollar industry, aiming at the individuals' increasing demands for healthy food suitable for incorporating a variety of nutrients needed for a fast-paced daily routine. Some of the answers best describing superfoods are the following:

> "In general, they [superfood-labeled berries] help with the toxins we get daily from food and our lifestyle. I do not know how to express it in a more scientific way... They are something that fills you, they have a lot of fiber and boost your energy, good quality energy in fact, I think they also contain carbohydrates, but they are better" (woman, 31 years old);

"They can be fast-release carbohydrates, they are complex and metabolized more slowly. Superfood is a bit of marketing, the "superfood" label appears in many products. Cereals with superfood, legumes with superfood, everything with superfood, what is a superfood? I consider it a food that has more than one basic ingredient, that is, not only carbohydrates, it also contains protein, but how much protein does it have? That's completely different. Chia seeds, for example, they contain calcium, magnesium, vitamins but these are also proportions per hundred grams, it is not possible to consume such a large amount to base your protein intake on chia seeds" (man, 26 years old);

"A superfood is what offers you more than one thing, it has many beneficial properties due to its composition, it is not as one-dimensional as a simple chicken breast or a potato can be." (man, 26 years old).

Through answers such as those cited above, it is clear that a superfood is conceived as a new addition to daily alimentation, a useful component for people living life in the fast lane, struggling to get a proper meal. Such additives help covering the needed nutritional intake by providing small portions of unique features, like protein, minerals or antioxidant micronutrients that can boost a diet and positively affect a person's health. This representation is aligned to academic attempts to define superfoods (Lunn, 2006; Wolfe, 2012), indicating sufficient knowledge of the interviewees on the topic. It is noteworthy that such types of food are considered supplementary, unable to substitute primary food sources and are heavily associated to demanding daily life obligations. However, superfoods were mentioned by all participants in every focus group of this category, indicating a wider awareness of the topic and deeper knowledge in some cases. Superfoods are increasingly consumed in Western societies, highlighting a promising field for further research on perception on superfoods as wellness boosters and how the high demand of these products is linked to smart food policies.

Similarities Analysis
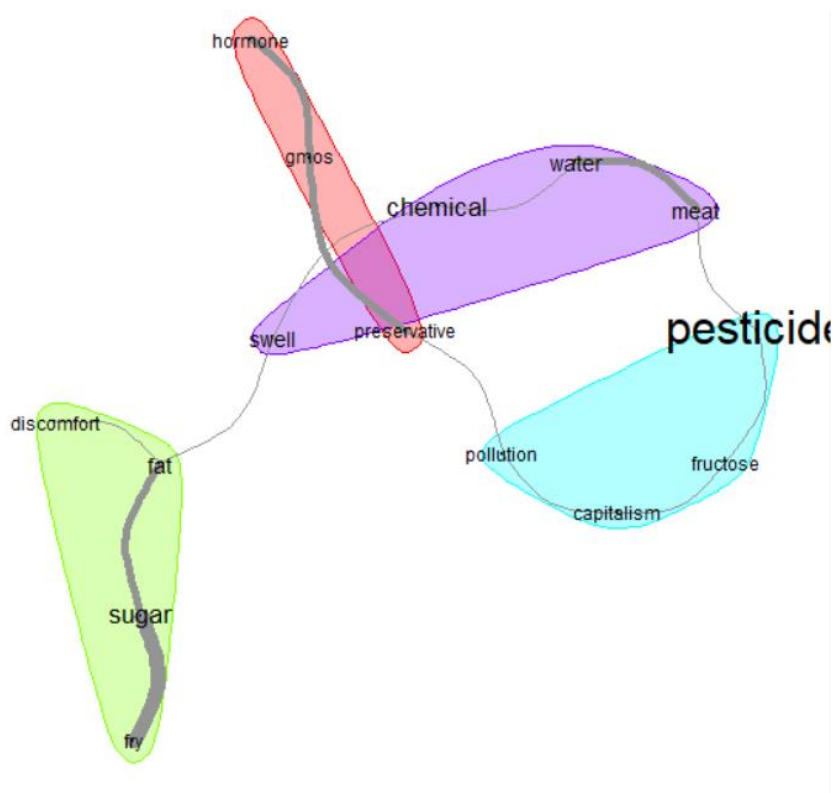
Diagram 1. Similarities Analysis of word association list on food toxicity

All (44) participants were asked open-ended questions to name the first three words they think of when hearing about food toxicity. This task is named "word association" and is widely used in social sciences and the field of marketing, while it is also applied in the study of social representations, according to the structural approach (Abric, 2001). The words were all added in a textual corpus and were analyzed using the Similarities Analysis tool of IRAMUTEQ. The graphic representation of the analysis' results can be seen below.

The most indicative words created distinct word communities, indicating a different theme. To begin with the one indicating a wider distance, thus less semantic resemblance with the remaining ones, is shaped by the words "discomfort", "fat", "sugar" and "fry". These words appear to be connected to the social representation of food toxicity that was noticed in the vulnerable and fitness-related focus groups and was described as "beyond toxic toxicity". Their limited correlation to the rest of the clusters and their content closely resembles a subjective, embodied perception of

toxicity that is expressed through abnormal physical responses, like discomfort and swell. Such findings highlight the difference in meaning between what is defined as food toxicity by the experts and what is perceived by individuals, who either pay close attention to symptoms or follow specific principles for attaining a healthier body.

This cluster is connected to the word "swell", which is part of the word community consisted of the words "swell", "chemical", water" and "meat". This cluster incorporates a semantic circle, including three words that were extensively discussed during the focus groups, especially in those of the environmentally interested focus groups. Meat and water present a significant correlation, introducing the idea of a causal concept, where water heavily affects the quality of meat. That could be interpreted as an idea incorporated in the wider concept of facing environment and body as entwined entities, closely related and interconnected to each other. Water serves as the chief signification of the circularity affecting every aspect of human activity, from meat, which is one of the most popular dieting components, to body reactions, like swelling. "Chemical" is a notion incorporated as a linkage of concepts, a connotation of toxicity seen in water and, as a result, in meat. These topics are related to what was discussed earlier for considering the environment and the human body as communicating vessels, noting that every form of environmental pollution will inevitably affect humans. This conceptualization was primarily underlined in the focus groups of individuals interested in environmental causes; however connotations can be traced in the two remaining categories as well.

The third cluster is consisted of "pesticide", "fructose", "capitalism" and "pollution" and is linked to the previous one through the word "pesticide". These words, even though they seem incompatible, can be examined under the theme emerged at the focus group sessions with vulnerable individuals, where the "doctrine" theme that emerged. All of the words above were mentioned during the discussions as system-induced toxicity factors; pesticides were accused for being normalized and overconsumed by farmers; fructose was brought up in the example of high-fructose corn syrup, a seemingly "innocent" component that is widely produced and consumed in the USA, while latest research suggests a strong correlation between high fructose corn syrup and obesity and other health effects; unattended pollution caused mainly by industrial units was mentioned as a factor affecting every aspect of the

environment, from air quality to water and soil, resulting to ramifications in farming and animal breeding. Finally, capitalism was mentioned as the main vice: an economic system that allows extended interventions. More terms, including "intensification", "commercialization" and "industrialization", among others, were also brought up by the participants, and they were incorporated in this theme. Subsequently, this cluster could be named "system-induced food toxicity", because its content examines the entrenchment of policy and various official bodies in the legitimization of contingent practices.

The final cluster incorporates "hormone", "GMOs" and "preservative", which provide quasi-expert definitions of food toxicity, focusing on three technological and scientific terms that have negative connotation. Growth hormones had been blamed for possible health risks in the focus groups, serving as a chief element causing toxicity to food. Preservatives were also attributed similar characteristics, based on the concerns about additives in general, including colorants, and artificial sweeteners, as they were expressed during the sessions. Finally, genetically modified foods (GMOs) were in the midst of deliberation during the focus groups, with some participants considering them dangerous, while others expressed their approval or neutrality, in looser terms, towards them. GMOs were discussed extensively in the wider analysis of the interviews' content. As a result, the fourth, and smaller, cluster could be named "controversial techno-science".

The above analysis aims in providing a structural depiction of the social representations that emerged during the discussions. Similarities analysis focuses on the properties of salience and high connexity, without determining the nature of the link (Lo Monaco et al., 2016). The representations' central nucleus cannot be easily traced by the analysis; however we can acquire a structural map for a better understanding of representational elements that occurred from the open-ended question the participants were asked.

Chapter 5. Discussion

This dissertation had two main aims: on the one hand, the identification of social representations of lay people regarding their perception of food toxicity, and secondly, the application of social representations yheory under the scope of STS. According to the research design, we chose three categories of lay individuals (people interested in fitness and exercising, people interested in environmental issues and people suffering from chronic conditions) and recruited participants that could participate in focus group discussions. All individuals self-positioned themselves in one of the categories and participated voluntarily. The material collected through focus groups was incorporated in a bigger text corpus consisted of the focus groups that were conducted for each category. Each one of the three corpuses was analyzed using the IRAMUTEQ software, assisting in the quantification of qualitative content. This transformation of the material with the use of statistical calculations on qualitative variables is a novel direction for verbal data and facilitated the identification of social representations by yielding a structural map according to semantic similarity.

The results indicate significant difference between the participants of each category when it comes to their perception of food toxicity. Participants from the fitness and vulnerable categories linked food toxicity with body responses, anchoring the unfamiliar term with familiar experiences of physical discomfort. On the contrary, participants who self-identified as environmentally concerned or pro-environment allies correlated food toxicity with the environment and associated it with a generic perception of toxicity, which is intrusive in ecosystems and widespread across the landscape. Consequently, this perception places humans in a holistic, communicating concept of environment, promoting a less anthropocentric approach, in which humans are simply seen as links of an extended chain. The other two categories adopt a humancentric viewpoint resulting from their deeply embodied representations of perceiving a product as toxic based on the physical reactions it might trigger.

A crucial inference is that participants misunderstood the term "toxic", and they associated it with generic, negatively charged, adjectives, like "bad", "annoying", "disturbing", "harmful", "dangerous" "less qualitative", among others. Toxicity is perceived as a connotation of negative, human-induced aspects and not as

a distinct property, or as the ultimate degree of hazardous, poisonous or deadly substance effects. The term is not solely misunderstood but it is also subsidized. This misconception is not a drawback; contrarily, it is an excellent opportunity to examine lay perception through the understanding that a social representation is not entirely shared, but it is partly distributed through communication. According to Moscovici (1994) "in real societies, people routinely understand some statements as agreeing with their social representation and others as conflicting with it". Even though participants were given a context that was assumed to be shared, due to the common stimulus presented at the beginning of every focus group, they appeared to anchor the term "toxicity" differently, based on familiar images.

Risk perception appears to vary based on group belongingness. Overall, critical topics that are studied in STS were brought up by the participants. GMOs were not considered hazardous or toxic, with the exception of three participants, but neither were accepted positively. We can suppose that a lack of information and — obviously — expertise held back the participants when it comes to evaluating risks, while the lack of wide discussions and deliberation regarding genetical modification, as noted in '00s and '10s Greece contributed to the participants' mild attitudes. The topic of technological interventions in food systems was perceived slightly positively from participants of all categories, with a wider acceptance being manifested at the focus groups with vulnerable individuals. Arguments about the technological possibilities of providing better quality food and products richer in terms of nutritional elements are accompanied by imaginaries of technological determinism, naming technology as the only viable solution for fighting past, present and future food crises. Negative aspects of technological applications are also named, for example the intensification of food production and mass breeding, but they are considered "negative individual cases" that cannot spoil the benefits of techno-science. There were only three participants who doubted the neutrality of technology, however their opinions were not developed sufficiently. The generalized techno-deterministic imaginary of technological assistance in food production can be seen as common ground between experts and laypersons.

The topic of organic food and the product certification was also discussed in all focus groups and it was characterized by mixed feelings. Participants in the fitness and vulnerable categories were positively inclined towards organic products, while

those who were self-defined as environmentally conscious were more critical towards the certification and control bodies and food safety authorities. While participants from the first two categories consider organic food as safer, environmentally-friendly individuals doubt the term "organic", criticizing them as another marketing trick for profit-making. Some of them also proposed alternative definitions of toxicity, mentioning small-scale production and lack of additives or pesticides as key factors, defying official labels and certifications. In terms of safety, the European Union was perceived as a constitution applying strict regulatory frameworks when it comes to food production, conservation, distribution and, in general, safety. In some manner, the European Union is considered a guarantee of good practices and fair quality by all categories. Greek control bodies were perceived as a guarantee of standard quality, due to the influence of the European Union, however they were faced with skepticism regarding the actual application of laws and production protocols.

The participants focused on consuming practices and openly discussed their shopping preferences. The participants mentioned both supermarkets and food markets as preferable places of supplying, stating different arguments. The supermarket was perceived as a place where all products meet specific quality criteria and is easily accessible, while the food market was mentioned as primary food supply option by interviewees who base their selection on interpersonal trust, locality and support to small producers. At this point lays a contradiction between preferences of local products and the perceived validity of European Union's guidelines: even though individuals acknowledge their trust in the Union's regulations ensuring food quality, they prefer buying locally grown products. The need for relationship establishment with food sellers also contradicts the general acceptance of quality controls as valid procedures; the placement of the trust relationship with the seller at the end of the shopping journey can be seen as a verification that all needed security controls were conducted: the personalization of a procedure strengthens trust.

The topic of locality was also highlighted, yielding an interesting social representation: "Greekness" does not equal better quality and greater purity. On the contrary, some participants highly criticized this opinion, linking it with personal experiences of bad resources management that resulted in crises that affected regional food networks (the environmental crisis of Asopos river was specifically stated as an example of bad practices). Another interesting representation derived from the

comparison between Greek and foreign food products, indicating that the preference for Greek products is not correlated to a perception of better quality but to the idea that imported products might have been enriched with preservatives or similar practices due to the longer distance to the consumers' table. The vast majority of participants declared a preference in local food, defining *local* in terms of geographical closeness to their area; as said by a participants living in Northern Greece "I consume products from Bulgaria, they are also local and tasty". Locality is not linked to national products, but it is perceived as closeness to consumption, a characteristic that make a product more familiar, graspable and controllable. Further research on the definition of locality could highlight more Greek consumers' perception of Greekness and locality in food.

On the same note, participants did not correlate higher practices to better quality, perceiving a product's price as a result of many different factors and not as quality indicator. As mentioned by participants, a product can be more expensive because of its limited production, production costs, import fees, packaging cost as well as for branding reasons. Nonetheless, a distinction between "suspiciously cheap" and "relatively cheap" was introduced by a focus group of environmentally conscious participants, suggesting that extremely low prices might be an indicator of poor quality raw materials, labor exploitation or inadequate safety controls.

To sum up with, participants from different categories provided different perceptions of toxicity, which is an indicator of distinct anchoring processes based on their prior experiences and familiar concepts. While similar topics were mentioned in most focus groups, each participants' category introduced a different theme that was not predicted while designing the questionnaire for the open questions. Vulnerable individuals presented a perception of embodied toxicity moving beyond official explanations, focused on physical responses. All participants were chronic patients paying close attention to their dietary habits and a disruption of their normal feeling or the exaggeration of a symptom might cause severe distress, leading them to a subjective conceptualization of toxicity. The attribution of toxic properties to foods that negatively affect bodily functions is an attempt to make sense of an unfamiliar term by comparing it to experienced conditions. This perception can be named "beyond toxic toxicity", as expressed by a participant who tried to distinguish actual, "official" (as stated) toxicity from experienced negative effects of foods that were

named "toxic". Taking into account declarations about doubting the "doctrine", as established practices and protocols are referred as, it can be said that we are witnessing individuals' attempts to create new definitions of toxicity and health, since they cannot identify with the existing "established" ones.

The findings from fit participants' focus groups were a surprise regarding their perception of toxicity which was similar to the vulnerable members, because of their focus on mentioning widely considered unhealthy food options as "toxic-like". However, the participants related to fitness discussed the topic of superfoods, right after talking about shopping preferences. Almost all participants stated that superfoods are a "marketing trick", but they acknowledged that they can have a positive impact in daily diet when used as complimentary elements. "You can find small amounts of several macro and micronutritians in only one bite", quoting an interviewee, and we can see it as a parallel to individuals' shopping preferences: getting what's needed just to get by, or just to reach daily macro goals. A goal-oriented model of wellness that turns discipline and dedication into its vital components could classify unwanted body sensations among disturbing experiences, thus there could be an anchoring of the scientific term in an established semantic universe of discomfort. This hypothesis occurred following the focus groups' conduction and it could be further examined, along with social representations of individuals on superfoods.

The final category is comprised of environmentally conscious participants who perceived toxicity in wider terms, as a widespread condition affecting both the environment and humans. This interconnection is extensively described through the metaphor of water circulation. Water is accompanied by connotations of vitality and purity and the attribution of toxic features underlines the intrusive nature of toxic substances. Metaphors have been employed for the investigation of social representations in the press (Christidou et al., 2004) and in lay discourse, and here they offer a fuller insight of the participants' perceived food toxicity. During the focus groups a metaphor from the nature is introduced in social life, serving purposes of both meaning-making and underlining the importance of toxicity's omnipresence. Even though the participants presented pessimistic aspects of toxicity's effect on food, some of them discussed the ethical aspects of consumption and proposed possible solutions that can occur from collective actions.

Finally, the similarities analysis specified four wide categories that occurred from the word association task and they assist in the better understanding of food toxicity perception: beyond toxic toxicity, describing toxicity as unwanted physical responses, controversial techno-science, questioning technological entrenchment in food toxicity, communicating entities describing the interconnection between the environment and the body, thus to the transfer of environmental toxicity to food and to the human organism and, conclusively, doubting the doctrine, which is consisted of system-induced toxicity factors.

Heading back to the initial questions, we can conclude that they were all answered, providing a useful starting point for a variety of themes that could be further explored. The participants of each category provided different definitions and connotations of toxicity, suggesting that the in-depth investigation of their perception could reveal more information and cognitive paths that led to this signification. Furthermore, the misconception of the term "toxicity" indicates a semantic gap between expert and lay definitions that could be further distinguished through science communication and citizen science initiatives.

Finally, one of the most critical points is the parallel examination of social representations theory and STS. The aim of this thesis is to integrate social representations as an integral part of the social studies of science. The first theory studies the pluralistic socio-cognitive pathways shaped through the interaction of individuals in the process of socialization and their integration in specific groups, thus in the microlevel. In science studies the framing theory has been used for the configuration of framing problems and solutions by experts as well as non-expert groups and, most importantly, in analyzing public discourses and the allocation of meaning through the press and journalistic activities. The frame theory tries to study the structures and the format of public discourses while the social representations approach stresses the shaping of meanings and the plurality of connotations the different groups can attribute to science and innovation. The two approaches can work synergistically, while the SR focuses on the networks of meanings and the framing theory enhances the understanding of public discourses and the structures/mechanisms that shape them. Particularly for the social studies of technoscientific risks and toxicities that the thesis is focusing on the social representations theory can provide both quantitatively and qualitatively a mapping of

the plurality of meanings by different social groups. In this context this analysis contributes a social study of science by stressing the configuration of meanings by different social groups and the plurality of public perceptions to affect social engagement. This imperative contributed by the thesis can be combined in the future with frame theory analysis for a more comprehensive understanding of the structures of public discourses and the diversity of meaning within social groups. Vice versa, social studies of science can provide a wider concept of socio-technical configurations constituting what is briefly called "science", which could be used by social representations scholars for a better understanding and analysis of the reified universe of science that is contemplated in order to become common sense.

References

Abric, J.C. (1993). Central System, Peripheral System: their Functions and Roles in the Dynamic of Social Representations. *Papers on Social Representations, 2*(2), 75-78.

Alengebawy, A., Abdelkhalek, S., Qureshi, S., Wang, M.-Q. (2021). Heavy Metals and Pesticides Toxicity in Agricultural Soil and Plants: Ecological Risks and Human Health Implications. *Toxics, 9*(42). DOI:10.3390/toxics9030042.

Agard-Jones, V. (2013). Bodies in the System. *Small Axe: A Caribbean Journal of Criticism, 17*(3), 182-192. DOI:10.1215/07990537-2378991

Amorim, M., Souza, A., Ramos, N., Gazzinelli, M. (2019). Social representations and food practices of people with Diabetes Mellitus Type 2. *Health and Primary Care, 3*. DOI:10.15761/HPC.1000162.

Anthopoulou T., Petrou M. (2016). The emergence of alternative agro-food networks in times of crisis. The blooming of without intermediaries markets in the metropolitan area of Athens, 7th International Conference on Localised Agri-food Systems (SYAL) on: "Challenges for the new rurality in a changing world, SYAL- Sodertorns University, Stockholm, Sweden, 08-10 May 2016.

Armiero, M., Andritsos, T., Barca, S., Bras, R., Cauyela, S.R, Dedeoglu, C., Di Perri, M., de Oliveira Fernandes, L., Gravagno, F., Greco, L., Greyl, L., Iengo, I., Lindblom, J., Milanez, F., Pedro, Se., Pappalardo, G., Petrillo, A., Portaluri, M., Privitera, E., Sari, A.C., & Velegrakis., G. (2019). Toxic Bios: Toxic Autobiographies - A Public Environmental Humanities Project. *Environmental Justice*. DOI:10.1089/env.2018.0019

Ayuso, S., Ángel Rodríguez, M., & Enric Ricart, J. (2006). Using stakeholder dialogue as a source for new ideas: a dynamic capability underlying sustainable innovation. *Corporate Governance: The International Journal of Business in Society, 6*(4), 475-490. DOI:10.1108/14720700610689586

Barling, D., & Lang, T. (2003). A Reluctant Food Policy? The First Five Years of Food Policy under Labour. *The Political Quarterly, 74*, 8-18. DOI: 10.1111/1467-923X.00507.

Bartels, J., Onwezen, M. C. (2013). Consumers' willingness to buy products with environmental and ethical claims: the roles of social representations and social identity. *International Journal of Consumer Studies, 38*(1), 82–89. DOI:10.1111/ijcs.12067

Bearzi, G., Agazzi, S., Gonzalvo, J., Costa, M., Bonizzoni, S., Politi, E., Piroddi, C., & Reeves, R. (2008). Overfishing and the disappearance of short-beaked common dolphins from western Greece. *Endangered Species Research, 5*, 1-12. DOI:10.3354/esr00103.

Beck, U. (1996). World Risk Society as Cosmopolitan Society? *Theory, Culture & Society, 13*(4), 1–32. DOI:10.1177/0263276496013004001

Bostrom, A. (1997). Risk Perception: "Experts" vs. "Lay People". *Duke Environmental Law & Policy Forum, 8* (101).

Bouriche, B. (2003). L'analyse de similitude. In: Abric, J.C. (Ed.), *Meethode d'etude des Representations sociales* (pp. 221-252). Eres.

Breakwell, G. M. (2014). *The Psychology of Risk*. Cambridge University Press.

Brunet, G., Vidal, L., Bove, I., Girona, A., Iragola, V., Ceriani, F., Rodríguez, R., Martínez, A., Fuletti, D., & Ares, G. (2021). The social representations of complementary feeding. *Appetite, 165*. DOI:10.1016/j.appet.2021.105324.

Caillaud, S., & Kalampalikis, N. (2013). Focus groups and ecological practices: a psychosocial approach. *Qualitative Research in Psychology, 10*(4).

Camargo, B.V., Goetz, E., Bousfield, A., & Justo, A. (2011). Social representations of body: aesthetic and health. *Temas psicol*, *19*(1), 257-268.

Camargo, B.V., & Justo, A.M. (2016). *IRaMuTeQ Tutorial*.

Chambers, S. (2003). Deliberative democratic theory. *Annual Review of Political Science, 6*, 307–326.

Chen, M.-F. (2018). Social representations of genetically modified foods and public willingness to consume such foods in Taiwan. *Journal of the Science of Food and Agriculture*. DOI:10.1002/jsfa.9086

Chen, M.-F. (2018). Social representations of genetically modified foods and public willingness to consume such foods in Taiwan. *Journal of the Science of Food and Agriculture, 98*(14), 5428-5434. doi:10.1002/jsfa.9086

Cornia, A., Dressel, K., & Pfeil, P. (2016). Risk cultures and dominant approaches towards disasters in seven European countries. *Journal of Risk Research, 19*(3), 288-304. DOI: 10.1080/13669877.2014.961520

Cram, S. (2016). Living in Dose: Nuclear Work and the Politics of Permissible Exposure. *Public Culture, 28*(3 80), 519-539.

D'Alisa, G. Demaria, F., & Kallis, G. (2014). *Degrowth. A vocabulary for a new paradigm*. Routledge-Earthscan.

Luhmann, N. (1993). *Risk. A sociological theory*. Walter de Gruyter.

Dany, L., Urdapilleta, I., & Lo Monaco, G. (2015). Free associations and social representations: Some reflections on rank-frequency and importance-frequency methods. *Quality & Quantity: International Journal of Methodology, 49*(2), 489-507.

Davis, T., LaCour, M., Beyer, E., Finck, J.L., & Miller, M.F. (2020). Neural correlates of attitudes and risk perception for food technology topics. *Food Quality and Preference, 80.* DOI:10.1016/j.foodqual.2019.10383.

De Moraes Prata Gaspar, M. C., Garcia, A. M., & Larrea-Killinger, C. (2020). How would you define healthy food? Social representations of Brazilian, French and Spanish dietitians and young laywomen. *Appetite, 153*, 104728. DOI:10.1016/j.appet.2020.104728

Dias Neto D., Nunes da Silva A., Roberto M.S., Lubenko J., Constantinou M., Nicolaou C., Lamnisos D., Papacostas S., Höfer S., Presti G., Squatrito V., Vasiliou V.S., McHugh L., Monestès J.-L., Baban A., Alvarez-Galvez J., Paez-Blarrina M., Montesinos F., Valdivia-Salas S., Ori D., Lappalainen R., Kleszcz B., Gloster A., Karekla M., & Kassianos A.P. (2021). Illness Perceptions of COVID-19 in Europe: Predictors, Impacts and Temporal Evolution. *Frontiers in Psychology*, *12*(640955). DOI: 10.3389/fpsyg.2021.640955

Engelmann, L., Arning, K., Linzenich, A., & Ziefle, M. (2020). Risk Assessment Regarding Perceived Toxicity and Acceptance of Carbon Dioxide-Based Fuel by Laypeople for

Its Use in Road Traffic and Aviation. *Frontiers in Energy Research, 23*. DOI:10.3389/fenrg.2020.579814

Espeitx, E., Medina, F. X., Abad, L.C., & Caceres Nevot, J. (2013). "To eat or not to eat": Social representations of toxicity and new food technologies. *Quaderns de l'Institut Catala d'Antropologia, 18*, 201-216.

Fern, E. (1982). The Use of Focus Groups for Idea Generation: The Effects of Group Size, Acquaintanceship, and Moderator on Response Quantity and Quality. *Journal of Marketing Research, 19*(1), 1-13. DOI:10.2307/3151525

Farr, R.M. (1993). Common sense, science and social representations. *Public Understanding of Science, 2*(3), 189-204. DOI:10.1088/0963-6625/2/3/001

Ferreira, J. C., & Patino, C. M. (2015). What does the p value really mean? *Jornal Brasileiro de Pneumologia, 41*(5), 485–485. DOI:10.1590/s1806-37132015000000215

Fiske, A. (2020). Naked in the face of contamination: Thinking models and metaphors of toxicity together. *Catalyst: Feminism*, *Theory, Technoscience, 6*(1), 1-30.

Flick, U. (2009). *An introduction to qualitative research* (4th ed.). Sage Publications Ltd.

Galli, I., & Fasanelli, R. (2020). Public understanding of science and common sense: Social representations of the human microbiome among the expert and non-expert public. *Health Psychology Open*. DOI: 10.1177/2055102920913239

Gaskell G. (2004). Science policy and society: the British debate over GM agriculture. *Current Opinion in Biotechnology, 15*(3), 241-5. DOI: 10.1016/j.copbio.2004.04.008.

Gille, Z. (2010). Actor Networks, Modes of Production, and Waste Regimes: Reassembling the Macro-Social. *Environment and Planning A: Economy and Space, 42*(5), 1049–1064. DOI:10.1068/a42122

Goldman, M.J. & Turner, M.D. (2011). "Introduction." In Goldman, M.J., Nadasdy, P., & Turner, M.D. (Eds.), *Knowing Nature: Conversations and the Intersection of Political Ecology and Science Studies* (pp. 1-23). The University of Chicago Press.

Goold, S. D. (2002). Trust, distrust and trustworthiness. *Journal of General Internal Medicine, 17*(1), 79–81. DOI:10.1046/j.1525-1497.2002.11132.x

Grabovschi, C., & Campos, M. (2014). Social representations of healthy and unhealthy food built by Romanian and Canadian children. *British Food Journal, 116*(12), 1931-1941. DOI:10.1108/BFJ-04-2013-0087

Gray-Cosgrove, C., Liboiron, M., & Lepawsky, J. (2015). The Challenges of Temporality to Depollution & Remediation. *SAPIENS, 8*(1).

Gruev-Vintila, A., & Rouquette, M. (2007). Social Thinking about Collective Risk: How Do Risk-related Practice and Personal Involvement Impact Its Social Representations? *Journal of Risk Research, 10*(4), 555-581. DOI:10.1080/13669870701338064

Grundmann, R. (2017). The Problem of Expertise in Knowledge Societies. *Minerva, 55*, 25–48. DOI:10.1007/s11024-016-9308-7

Hansen, J., Holm, L., Frewer, L., Robinson, P., & Sandøe, P. (2003). Beyond the knowledge deficit: recent research into lay and expert attitudes to food risks. *Appetite*, *41*(2), 111-121. DOI:10.1016/s0195-6663(03)00079-5

Herzlich, C. (1973). *Health and illness: A social psychological analysis*. (Trans. D. Graham). Academic Press.

Hollien, H., DeJong, G., & Martin, C.A. (1998). Production of intoxication states by actors: perception by lay listeners. *Journal of forensic sciences, 43*(6), 1153-1162.

Hollinger. D. A. (1984). Inquiry and uplift: Inquiry and uplift: Late nineteenth-century American academics and the moral efficacy of scientific practice. *The authority of experts: Studies in history and theory,* 142-156.

Jasanoff, S. (2004). *States of Knowledge: The Co-Production of Science and the Social Order*. Abingdon, Routledge.

Jodelet, D. (1984). Représentations sociales: phénomènes, concepts et théorie. In: Moscovici, S. (Ed) *Psychologie sociale*. PUF, pp. 357-378.

Joffe, H. (2002). Social Representations and Health Psychology. *Social Science Information, 41*(4), 559–580. DOI:10.1177/0539018402041004004

Joffe, H. (2003). Risk: From perception to social representation. *British Journal of Social Psychology, 42*(1), 55–73. DOI:10.1348/014466603763276126

Kalampalikis, N. (2005). L'apport de la méthode Alceste dans l'analyse des représentations sociales. In Jean-Claude Abric (éd.) *Méthodes d'étude des représentations sociales*. Érès. 147-163. https://doi.org/10.3917/eres.abric.2003.01.0147

Kalampalikis, N., Bauer, M., & Apostolidis, T. (2013). Science, technologie et société: l'approche des représentations sociales. *International Review of Social Psychology, 26*, 5-9.

Kallet, A., & Schlink, F.J. (1933). *100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics.* Vanguard Press.

Kampili, E.P. (2017). *Biotechnology, Genetically Modified Organisms and Bioethical dilemmas*. (Graduate Thesis. National Kapodistrian University of Athens). Retrieved from https://pergamos.lib.uoa.gr/uoa/dl/frontend/file/lib/default/data/1704430/theFile

Kaptan, B., & Kayisoglu, S. (2015). Consumers' Attitude towards Food Additives. *American Journal of Food Science and Nutrition Research, 2*, 21-25.

Kasperson, R. E., & Kasperson, J. X. (1996). The Social Amplification and Attenuation of Risk. *The Annals of the American Academy of Political and Social Science, 545*(1), 95-105. DOI:10.1177/0002716296545001010

Kirby, D. S., Visser, C., & Hanich, Q. (2014). Assessment of eco-labelling schemes for Pacific tuna fisheries. *Marine Policy, 43*, 132–142. DOI:10.1016/j.marpol.2013.05.004

Kitzinger, J. (1995). Qualitative Research: Introducing Focus Groups. *BMJ, 311*, 299-302. DOI:10.1136/bmj.311.7000.299.

Kitzinger, J., Markova, I., & Kalampalikis, N. (2004). Qu'est-ce que les focus groups? *Bulletin de psychologie, 57*, 237-243.

Knorr-Cetina K., & Mulkay M.J. (1983). *Science observed: perspectives on the social study of science*. Sage Publications Ltd.

Kraus, N., Malmfors, T., & Slovic, P. (1992). Intuitive toxicology: Expert and lay judgments of chemical risks. *Risk Analysis, 12*(2), 215-232. DOI:10.1111/j.1539-6924.1992.tb00669.x

Krewski, D., Lemyre, L., Turner, M., Lee, J., Dallaire, C., Bouchard, L., Brand, K., & Mercier, P. (2006). Public Perception of Population Health Risks in Canada: Health Hazards and Sources of Information. *Human and Ecological Risk Assessment*, *12*, 626-644. DOI: 10.1080/10807030600561832.

Krueger, R., & Casey, M. (2009). *Focus Groups: A Practical Guide for Applied Research*. Sage Publications Ltd.

Kurzer, P., & Cooper, A. (2007). Consumer Activism, EU Institutions and Global Markets: The Struggle over Biotech Foods. *Journal of Public Policy, 27*(2), 103-128.

Kuhn, T. S. (1962). *The structure of scientific revolutions*. University of Chicago Press.

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Open University Press.

Le Bon, G. (1895). *The Crowd: A Study of the Popular Mind*. Transaction.

Leach, M., Nisbett, N., Cabral, L., Harris, J., Hossain, N., & Thompson, J. (2020). Food politics and development. *World Development, 134*. DOI:10.1016/j.worlddev.2020.10502

Levidow, L., & Upham, P. (2017). Linking the multi-level perspective with social representations theory: Gasifiers as a niche innovation reinforcing the energy-from-waste (EfW) regime. *Technological Forecasting and Social Change, 120*, 1-13. DOI:10.1016/j.techfore.2017.03.028.

Levidow, L., Murphy, J., & Carr, S. (2007). Recasting "Substantial Equivalence": Transatlantic Governance of GM Food'. *Science, Technology & Human Values, 32*(1), 26-64.

Lezaun, J. (2004). Subjects of Knowledge: Epistemologies of the Consumer in the GM Food Debate," in Stehr, N. (Ed.) *The Governance of Knowledge*. Transaction.

Liboiron, M., Tironi, M., & Calvillo, N. (2018). Toxic politics: Acting in a permanently polluted world. *Social Studies of Science, 48*(3), 331–349. DOI:10.1177/0306312718783087

Lo Monaco, G., Piermatteo, A., Rateau, P., & Tavani, J.T. (2016). Methods for Studying the Structure of Social Representations: A Critical Review and Agenda for Future

Research. *Journal for the Theory of Social Behaviour, 47*(3), 306–331. DOI:10.1111/jtsb.12124

Loebnitz, N., & Grunert, K.G. (2018). The impact of abnormally shaped vegetables on consumers' risk perception. *Food Quality and Preference, 63*, 80-87. DOI:10.1016/j.foodqual.2017.08.00

Lugo-González I. V., Fernández-Vega, M., Reynoso-Erazo, L., Becerra-Gálvez, A. L., & Pérez-Bautista, Y. Y. (2020). COVID-19 perception and preventive behaviors: A descriptive, comparative study by severity and perceived risk. *Salud Mental,* 43(6), 285-292.

MacGregor, D.G., Slovic, P., & Malmfors, T. (1999). "How exposed is exposed enough?" Lay inferences about chemical exposure. *Risk analysis: an official publication of the Society for Risk Analysis, 19*(4), 649-659. DOI:10.1023/a:1007033619806

Magioglou, T. (2008). The creative dimension of lay thinking in the case of the representation of democracy for Greek youth. *Culture & Psychology, 14*(4), 442–466. DOI:10.1177/1354067X08096510

Magnusson, M.K., Arvola, A., Hursti, U.K.K., Åberg, L., & Sjödén, P.O. (2003). Choice of organic foods is related to perceived consequences for human health and to environmentally friendly behaviour. *Appetite, 40*(2), 109–117.

Mäkiniemi, J.-P., Pirttilä-Backman, A.-M., & Pieri, M. (2011). Ethical and unethical food. Social representations among Finnish, Danish and Italian students. *Appetite, 56*(2), 495–502. DOI:10.1016/j.appet.2011.01.023

Marková, I. (2017). The making of the theory of social representations. *Cadernos de Pesquisa, 47*(163), 358-375. ISSN: 0100-1574

Matthes, J., & Kohring, M. (2008). The Content Analysis of Media Frames: Toward Improving Reliability and Validity. *Journal of Communication. 58*(2), 258-279. DOI:10.1111/j.1460-2466.2008.00384.x.

McMichael, P. (2009). A food regime genealogy. *The Journal of Peasant Studies*, *36*(1), 139-169. DOI:10.1080/03066150902820354

Melendrez-Ruiz, J., Arvisenet, G., Laugel, V., Chambaron, S., & Monnery-Patris, S. (2020). Do French Consumers Have the Same Social Representations of Pulses as Food Industry Professionals?. *Foods, 9*(2), 147. DOI:10.3390/foods9020147.

Merriam-Webster. (n.d.). Diet. In *Merriam-Webster.com dictionary*. Retrieved May 3, 2022, from https://www.merriam-webster.com/dictionary/diet

Miao, W. (2014). *Risk perception of food safety and behavioral intentions to read food safety labels*. (Graduate thesis. Iowa State University). Retrieved from https://lib.dr.iastate.edu/etd/14211

Miles, S., Braxton, D., & Frewer, L. (1999_. Public perceptions about. microbiological hazards in food. *British Food Journal, 101*(10), 744-762. DOI: 10.1108/00070709910293670

Monaco, G. L., & Bonetto, E. (2018). Social representations and culture in food studies. *Food Research International*. DOI:10.1016/j.foodres.2018.10.029

Mondelaers, K., Verbeke, W., & van Huylenbroeck, G. (2009). Importance of health and environment as quality traits in the buying decision of organic products. *British Food Journal, 111*(10), 1120–1139.

Moragues-Faus, A., & Marsden, T. (2017). The political ecology of food: Carving 'spaces of possibility' in a new research agenda. *Journal of Rural Studies, 55*, 275-288.

Moscovici, S. (2008). *Psychoanalysis: Its image and its public*. (translated by G. Duveen.) Polity. (the original work was published in 1961)

Moscovici, S., & Markova, I. (1998). Presenting Social Representations: A Conversation. *Culture & Psychology, 4*, 371-410. DOI:10.1177/1354067X9800400305.

Murphy, M. (2008). Chemical Regimes of Living. *Environmental History, 13*(4), 695-703.

Naharki, K., & Regmi, S. (2020). Risk Assessment of Pesticidal Toxicity and Threats on Pollinators: A Review on Honey Bee. *Turkish Journal of Agriculture - Food Science and Technology, 8*(12), 2556-2561. DOI: 10.24925/turjaf.v8i12.2556-2561.3681

Nicoll A, Laukamm-Josten U, Mwizarubi B, Mayala C, Mkuye M, Nyembela G, & Grosskurth H. (1993). Lay health beliefs concerning HIV and AIDS - a barrier for

control programmes. *AIDS Care, 5*(2), 231-241. DOI: 10.1080/09540129308258604. PMID: 8329487.

Nzioka, C. (1996). Lay perceptions of risk of HIV infection and the social construction of safer sex: Some experiences from Kenya. *AIDS Care, 8*(5), 565–580. doi:10.1080/09540129650125524

O.Nyumba, T., Wilson, K., Derrick, C. J., & Mukherjee, N. (2018). The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and Evolution, 9*(1), 20-32. DOI:10.1111/2041-210x.12860

Paicheler, G.)1999). Perception of HIV Risk and Preventive Strategies: A Dynamic Analysis. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine, 3*(1), 47–70. DOI:10.1177/136345939900300103.

Papastamou, S. (1986). Psychologization and processes of minority and majority influence. *European Journal of Social Psychology*, *16*(2), 165-180. DOI: 10.1002/ejsp.2420160205

Pidgeon, N. (1998). Safety culture: Key theoretical issues. *Work & Stress, 12*(3), 202–216. DOI:10.1080/02678379808256862

Pinch, T.J., & Bijker, W.E. (1984). The Social Construction of Facts and Artefacts: or How the Sociology of Science and the Sociology of Technology might Benefit Each Other. *Social Studies of Science, 14*(3), 399-441. DOI:https://doi.org/10.1177/030631284014003004

Pindano, E., & Barreno, R. (2020). Using Twitter to explore consumers' sentiments and their social representations towards new food trends. *British Food Journal, 123*(3), 1060-1082. DOI: 10.1108/BFJ-03-2020-0192.

Pothukuchi, K., & Kaufman, J. (2000). The Food System. *Journal of the American Planning Association, 66*, 113-124. DOI:10.1080/01944360008976093.

Raja, S., Ma, C., & Yadav, P. (2008). Beyond Food Deserts: Measuring and Mapping Racial Disparities in Neighborhood Food Environments. *Journal of Planning Education and Research, 27*(4), 469-482.

Ratinaud, P., & Marchand, P. (2012). Application de la méthode ALCESTE à de "gros" corpus et stabilité des "mondes lexicaux"?: analyse du "CableGate" avec IRaMuTeQ.

Actes des 11eme Journées internationales d'Analyse statistique des Données Textuelles (JADT 2012), Liège, Belgium. 835-844.

Raude, J., & Setbon, M. (2009). Lay perceptions of the pandemic influenza threat. *European Journal of Epidemiology, 24*(7), 339-342. DOI:10.1007/s10654-009-9351-x

Redmond, E.C., & Griffith, C.J. (2004). Consumer Perceptions of Food Safety Risk, Control and Responsibility. *Appetite, 43*, 309-313.

Reich, B. J., Beck, J. T., & Price, J. (2018). Food as Ideology: Measurement and Validation of Locavorism. *Journal of Consumer Research, 45,* 849-868. DOI:10.1093/jcr/ucy027

Reyes-Sosa, H., Egilegor, M. L., Dos Santos, T., Perez-Marin, L., & Alvarez-Montero, F. (2019). Press Ideology as an Epistemological Connector between Framing Theory and Social Representations Theory: An Analysis of Violence and Drug Trafficking in the Mexican Press. *Integrative Psychological and Behavioral Science*. DOI:10.1007/s12124-019-09498-z

Robinson, C. A. (2016). Trust, Health Care Relationships, and Chronic Illness. *Global Qualitative Nursing Research, 3*. DOI:10.1177/2333393616664823

Schneider, T., Eli, K., McLennan, A., Dolan, C., Lezaun, J., & Ulijaszek, S. (2017). Governance by campaign: the co-constitution of food issues, publics and expertise through new information and communication technologies. *Information, Communication & Society, 22*(2), 1–21. DOI:10.1080/1369118x.2017.1363264

Semos, A. (2002). Organic farming in the European Union under Common Agricultural Policy. *Quarterly Journal of International Agriculture, 41*(3), 207- 224.

Serrano, A., & Brooks, A. (2019). Who is left behind in global food systems? Local farmers failed by Colombia's avocado boom. *Environment and Planning E: Nature and Space, 2*(2), 348-367. DOI:10.1177/2514848619838195

Shapiro, N., & Kirksey, E. (2017). Chemo-Ethnography: An Introduction. Cultural Anthropology, *32*(4), 481–493. DOI:10.14506/ca32.4.01.

Shostak, S. (2005). The Emergence of Toxicogenomics: A Case Study of Molecularization. *Social Studies of Science, 35*(3), 367-403. DOI:10.1177/0306312705049882

Silva, L.M.D., Bitencourt, C.C., Faccin, K., & Iakovleva, T. (2019). The role of stakeholders in the context of responsible innovation: A meta-synthesis of the article. *Sustainability, 11*, 1766.

Simis, M. J., Madden, H., Cacciatore, M. A., & Yeo, S. K. (2016). The lure of rationality: Why does the deficit model persist in science communication? *Public Understanding of Science, 25*(4), 400-414. DOI:10.1177/0963662516629749

Singer, P. (1995). *Animal liberation*. Random House.

Staerklé, C. (2011). Back to new roots: Societal psychology and social representations. In Valentim, J. (Ed) *Societal approaches in social psychology* (pp. 81-106). Peter Lang AG.

Starr, C. (1969). Social Benefit versus Technological Risk. *Science, 165*(3899), 1232-1238. DOI:10.1126/science.165.3899.1232

Stenzel, L., Saha, L., & Guareschi, P. (2006). To be fat or thin? Social representations of the body among adolescent female students in Brazil1. *International Education Journal, 7*.

Stewart, D.W., Shamdasani, P.N., & Rook, D.W. (2007). *Focus groups: Theory and practice* (2nd ed.). Sage Publications Ltd. DOI: [10.4135/9781412991841](10.4135/9781412991841)

Storck, V. (2016*). Assessment of the environmental fate of pesticides and their ecotoxicological impact on soil microorganisms: the case of chlorpyrifos, isoproturon and tebuconazole*. (Doctoral dissertation, Université de Bourgogne).

Sutin, A. R., Zonderman, A. B., Ferrucci, L., & Terracciano, A. (2013). Personality Traits and Chronic Disease: Implications for Adult Personality Development. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 68*(6), 912-920. DOI:10.1093/geronb/gbt036

Tang Y, Wang Y, & Liang Y. (2021). Lay People's View and Responses to the Pandemic: Perceptions of COVID-19 and Personal Health Responses in China. *Asia Pacific Journal of Public Health, 33*(4), 445-447. DOI: 10.1177/10105395211001652.

Thom, D. H., Hall, M. A., & Pawlson, L. G. (2004). Measuring Patients' Trust In Physicians When Assessing Quality Of Care. *Health Affairs, 23*(4), 124-132. DOI:10.1377/hlthaff.23.4.124.

Thomas, G., & De Tavernier, J. (2017). Farmer-suicide in India: debating the role of biotechnology. *Life Sciences, Society and Policy, 13*(1). DOI:10.1186/s40504-017-0052-z

Tirrell, L. (2018). Toxic Speech: Inoculations and Antidotes. *The Southern Journal of Philosophy, 56*, 116-144. DOI:10.1111/sjp.12297

Torgersen, H. (2004). The real and perceived risks of genetically modified organisms. *EMBO reports*. 5 Spec No. S17-21. DOI:10.1038/sj.embor.7400231.

Touri, M., & Koteyko, N. (2014). Using corpus linguistic software in the extraction of news frames: towards a dynamic process of frame analysis in journalistic texts. *International Journal of Social Research Methodology, 18*(6), 601-616. DOI:10.1080/13645579.2014.929878

Vaughan, E., & Seifert, M. (1992). Variability in the framing of risk issues. *Journal of Social Issues, 48*(4), 119-135. DOI:10.1111/j.1540-4560.1992.tb01948.x

von Hippel. (2020). *Chemical Age: How Chemists Fought Famine and Disease, Killed Millions, and Changed Our Relationship with the Earth*. Chicago: The University of Chicago Press.

Vuillot, C., Mathevet, R., & Sirami, C. (2020). Comparing social representations of the landscape: a methodology. *Ecology and Society, 25*(2). DOI: 10.5751/ES-11636-250228.

Wachinger, G., Renn, O., Bianchizza, C., Coates, T., De Marchi, B., Domenech, L., Jakobson, I., Kuhlicke, C., Lemkow, L., Pellizzoni, L., Piriz, A., Saurí, D., Scolobig, A., Steinführer, A., Supramaniam, M., & Whittle, R. (2010). Risk perception of natural hazards. *CapHaz-Net WP3 Report*, DIALOGIK Non-Profit Institute for Communication and Cooperative Research, Stuttgart (available at: http://caphaz-net.org/outcomes-results/CapHaz-Net_WP3_Risk-Perception.pdf).

Wagner, W. (1996). The Social Representation Paradigm. The Japanese Journal of Experimental Social Psychology, *35*(3), 247-255. DOI:10.2130/jjesp.35.247.

Weber, G. (2017). The Fact-Value Dichotomy: A New Light on an Old Problem. *Sociology Mind, 7*(4), 154-170. DOI:10.4236/sm.2017.74011.

Wilkinson, S. (1998). Focus group methodology: a review. *International Journal of Social Research Methodology, 1*(3), 181–203. DOI:10.1080/13645579.1998.1084687

Winner, L. (1993). Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology. *Science, Technology, & Human Values, 18*(3), 362-378.

Winskell, K. (2020). Social Representations Theory and young Africans' creative narratives about human immunodeficiency virus/acquired immune deficiency syndrome, 1997–2014. *Journal for the Theory of Social Behaviour, 51*, 164-182. DOI: 10.1111/jtsb.12270

Wynne, B. (1996). May the Sheep Safely Graze? In Lash, S., Szerszynski, B. & Wynne, B. (Eds.), *Risk, Environment and Modernity: Towards a New Ecology* (pp. 44-83). Sage Publications Ltd.

Wynne, B. (2002). Risk and Environment as Legitimatory Discourses of Technology: Reflexivity Inside Out? Current Sociology, *50*(3), 459–477. DOI:10.1177/0011392102050003010

Zhang, J.Y. (2010). Is the Cosmopolitanization of Science Emerging in China? *Études Internationales, 41*, 571-595.

Zhang, J.Y. (2015). Cosmopolitan Risk Community and China's Climate Governance. *European Journal of Social Theory, 18*(3), 327-342.

Zyoud, S., Shalabi, J., Imran, K., Ayaseh, L., Radwany, N., Salameh, R., Sa'dalden, Z., Sharif, L., Sweileh, W., Awang, R., & Al-Jabi, S. (2019) Knowledge, attitude and practices among parents regarding food poisoning: a cross-sectional study from Palestine. *BMC Public Health, 19* (586). DOI:10.1186/s12889-019-6955-2