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Does packaging influence the perception of healthy food?

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Contents

Introduction

The following study proposes an analysis of consumer buying behaviors, trying to understand what aspects of sustainable packaging affect the perception of healthy food.

Most food products are packaged for sale and their environmental footprint therefore depends not only on the product itself but also on its package. In order to reduce the environmental footprint of a product, you can modify both intrinsic attributes and extrinsic attributes of the product.

Most products are packaged in an attractive casing, often to attract consumers' attention, indispensable to store and protect a product and to ensure its hygiene. At the same time, the container informs the consumer about the product's characteristics and prevents the content from coming into unwanted contact. Often, however, packaging is only noticed at the end of life, when it is transformed into waste to be disposed of once their contents are used. Packaging is considered by companies of any type of merchandise to be a fundamental element for the perception of the brand by consumers, with a positive impact on its value and its recognizability. Its function goes beyond the purely practical aspect of protecting and transporting the product. It has the task of differentiating it on the shelf of shops and, above all, of large distribution, where the shape, material and overall graphic element must be highly attractive.

Sustainability can also be communicated through labels, logos and therefore packaging (all extrinsic attributes); these attributes can therefore be ways to represent sustainability and healthiness of the product. The sustainability of packaging is defined as an effort to reduce the product waste by modifying the packaging of the product, for example using more recyclable materials. Consumers could then change the perception of food that they will buy. Assessing this effect is of great importance because packaging composition could affect the value propositions of product. Since more people become health conscious, health food industry is looking for better and innovative ways to package health food, so the analysis of sustainable packaging can provide interesting insights for managers.

Companies are increasingly focusing on the design of their product containers in all sectors, but especially in the food sector. The design of the packaging must therefore be rethought at all levels, as is already happening, to avoid waste and unnecessary use of materials, albeit recyclable. The phenomenon has taken on a primary importance in packaging strategies. The

change is also partly driven by consumer attitudes and a global attitude towards sustainability and healthy food.

The remainder of this thesis is organized as follows: the first chapter explores the concept of sustainable packaging, healthy food and new trends in consumer purchasing choices and behaviors. In the second chapter scientific evidence, with international papers, is provided on how sustainable packaging influences consumer perception of healthy food purchases.

Chapter I

1.1 Sustainable consumption and healthy food

Sustainability is the characteristic of a process or state that can be maintained at a certain level indefinitely. In the environmental, economic and social spheres, it is the process of change in which the exploitation of resources, the investment plan, the orientation of technological development and institutional changes are all in tune and enhance the current and future potential in order to meet human needs and aspirations (World Commission on Environment). The concept of sustainability is becoming increasingly complex as it is applied in an increasingly large multidisciplinary field. Barbier (1987) was one of the first scholars to support the multidimensional character of the concept of sustainable development. Another possible definition is Blewitt (2012): "Sustainable development is a process that requires us to view our lives as elements of a larger entity. It requires a holistic way of looking at the world and human life. It requires a recognition that other people may not see things like this at all and will have different perceptions, values, philosophies, aims and ambitions. It requires an understanding that the world is multi-faceted, fragmented and complete."

Sustainability has been recognized as a multidimensional character because it embraces human life in its entirety, including the environment, the economic system and the social and cultural structure in which we live. Even in the field of food, sustainability intersects these three dimensions, in fact it concerns both land use and the protection of agri-food biodiversity, energy consumption and the price of food products, up to the right nutrition and the value of gastronomic diversity and local identities.

The issue of food sustainability is increasingly central, as the act of feeding directly involves people's health and survival. The importance of food for the lives of individuals is a fact, eating is an essential physiological need for the human being. In the same way, natural elements are essential requirements for man and there is no substitute for them (Hills, 1982). Consequently, in order to be able to meet the needs of present and future generations, the food system must not damage or deplete these natural resources, nor rely solely on non-renewable resources.

Given future forecasts of global population growth, we will have to deal with the damage of natural resources and the scarcity of energy resources, and the whole system will be at risk of collapse; what is consumed is greater than you can regenerate. In fact, it has been estimated

that, in order to continue to lead the current way of life we would need one and a half more planet, in 2050 it would take as many as 3 (BCFN 2012). In fact, to date 20% of the world's population consumes about 80% of the available resources, so if everyone were to make the request to consume to the same extent, that claim would be untenable from the point of view of resources and ecological balance.

To date, the distribution of food is unequal both internationally among the more or less economically disadvantaged countries, and within individual nations among the social groups of the population. In today's era we speak of "food paradox":

1. One part of the planet is overfed and suffers from problems related to food abuse, while the other half is undernourished and the lack of food leads to illness and death.

2. Most food production is not intended to feed humans, but to become feed for livestock. Similarly, a growing share of farmland is aimed at the production of biofuel for automobiles. Natural and food resources are then directed to other scopes rather than humans.

3. Food waste has reached paradoxical proportions: a third of the world's annual food production ends up in the still perfectly edible garbage.

Over the last century, historical, technological and social transformations, combined with the logic of mass production and consumption, have led to profound changes in the entire food system that are threatening the sustainability of both the ecosystem and the human life. In particular, according to Solomon (2006), the changes have produced:

- An industrialized food system, which generated foods stored and packaged on a large scale and spread globally.
- Standardization of food products as well as nutritional tastes and habits, putting agro-food biodiversity at risk.
- A de-localization of food: in the industrial and global age, food can be produced regardless of geographical context and climatic conditions.
- A de-structuring of eating habits. In fact, the rhythms of life and work commitments of contemporary life leads individuals to eat alone, faster, at different times, in a disorderly way and in extra-domestic places.
- An increase in waste. For market or expiry issues a lot of food is thrown from supermarkets and shops without being sold or consumed.

In addition to the need for nutritional sustenance, food sustainability covers a wide spectrum of aspects of people's lives, which includes issues that affect the protection of the

environment, the well-being and the health of man himself. It is therefore possible to present a possible summary of what are the central points that can promote sustainability in the food field and what is meant by "sustainable food". A sustainable food approach is:

- Centered on people
- Holistic
- Differentiated
- Multi-level
- Builds partnerships
- Dynamic
- Sustainable in an ecological, environmental, social, cultural and institutional sense

We can therefore sum up in a few words that fully sustainable food is good for the environment (ecological), good for society (right and supportive), good for human health (healthy).

1.1.1 The modern food system and the food industry

The food system has undergone fundamental transformations throughout history. In this regard, Beardsworth and Keil (2009) highlight the differences between the traditional and modern food system. The traditional food system was characterized by small-scale local production models, the abundance of which was determined by harvest and seasonality; the distribution and consumption of products were linked to local boundaries and social and injecting relationships. Inequalities in the type of nutrition that can be pursued depended largely on social status, but for all types of consumers the choice was determined by seasonal and local food availability. The modern system, on the other hand, provides for large-scale a highly specialized type of production mainly of an industrial type, the distribution takes place through a specific commercial market; A wide range of food products, both as a variety and quantity, is also possible, as the global food market crosses local and national borders.

The transition from the first system to the second was mainly determined by the process of industrialization and the progress in the techno-scientific area, which gave rise to the food industry of large retailers.

1.1.2 Towards the formation of sustainable food

The industrial food system through biotechnology should overcome natural limits such as the seasonality of crops or the fertility of certain soils, limiting the risks of infestations and therefore crop scarcity and pumping production to levels never achieved in pre-industrial history. Despite this, hunger in the world is still an increasing problem today. This stems from the fact that Western society conceived this issue on the basis of a mental scheme in which resource scarcity was the key problem. Yet, what is happening today is not a lack of food, but unequal access to it and mismanagement of trade and consumption practices.

It is therefore necessary to introduce the concept of sustainable consumption. This can be defined as the use of goods and services that meet basic needs and lead to an improvement in the quality of life, whereas at the same time minimizing the use of natural resources, toxic materials, emissions of substances. In the food sector, the same principle applies that the environmental impact of food throughout its life cycle and the food practices implemented by individuals must be considered. As regards the environmental pressure of a product, it should be remembered that the stages of production, transport, distribution and sales have an overall impact on sustainability and depend on the demand that households make of that good. Consumption of food has a profound indirect impact on the environment, as environmental pressures come most from the production, processing, transporting of food and disposal of its waste. The origin of food, the method of production and distribution and the seasonality of food, are all elements that affect environmental sustainability.

An environmentally sustainable food must: have certain characteristics of production, distribution and consumption, which allow a low impact on the environment and the territory; must be produced with the least amount of energy resources; must generate little waste. At all stages of the production cycle, it must meet the sustainability criteria:

- Proven: local products are preferred or otherwise produced as close as possible to reduce energy consumption and the emission of exhaust caused by transport.
- Seasonality: seasonal fruits and vegetables are preferred, to avoid energy consumption due to greenhouse cultivation, freezing or transport from other countries.
- Cultivation method: organic products are preferred, which guarantee respect for the land where they are grown.

- Energy source: heating and energy production systems using renewable energy, such as biomass, solar and wind energy, are preferred.
- Commodities: products made with highly polluting or rare raw materials (e.g. tropical wood from primary forests) are avoided, and products based on recycled materials or whose renewal is guaranteed are preferred.
- Production cycle: products whose production requires large energy consumption or is highly polluting are avoided. The assessment also applies to packaging.
- Energy consumption: preferred household appliances, lighting systems and other energy-efficient electrical equipment to reduce energy consumption.
- Packaging: products are preferred on tap, bulk, or at least with a few packaging, to reduce the consumption of resources used to produce them and avoid waste production.
- Environmental impact: biodegradable or environmentally friendly products are preferred, for example for household hygiene and cleaning products.

In order to define sustainable food, both ecological aspects and those related to the economic-social structure and culture must be considered.

With a more complete vision, we can say that sustainable food is: healthy, social, ecological. The types of food that are generally considered sustainable meet at least one of these requirements, and we can thus identify them: local zero kilometer, traditional/typical, short, seasonal, fresh, with few packaging, organic/biodynamic and fair trade.

1.1.3 Sustainable diet

To meet the nutritional needs of a more urbanized and growing population, food system needs to be changed in favor of sustainable food production and consumption patterns that enable more efficient use of resources – energy and natural - and healthier and fairer food consumption. The international community, the institutions of various nations and civil society are moving to promote “sustainable diets”, thus encouraging the implementation of food practices that involve a low environmental impact. First of all, to give a definition of "sustainable diet", this term appeared already in the 1980s and was expanded and articulated by Fao in 2010. The definition presented is the following: "Sustainable diets are diets with low environmental impact that contribute to food and nutrition security, as well as healthy lives for present and future generations. Sustainable diets contribute to the protection and

respect of biodiversity and ecosystems, are culturally acceptable, economically fair and accessible, adequate, institutionally safe and healthy and, at the same time, optimize natural and human resources" (FAO 2010).

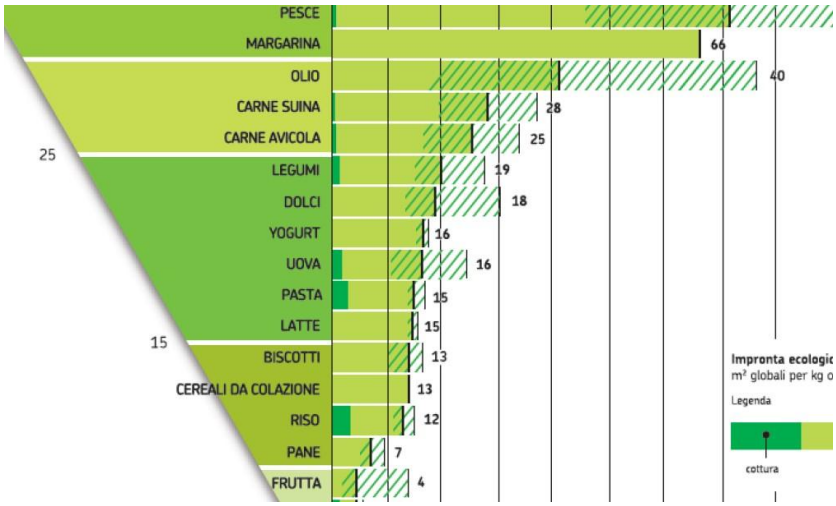
To establish comprehensively what a sustainable diet is, one of the most widely used approaches is "Life Cycle Assessment (LCA)", which considers the energy and environmental loads related to the entire chain process food: cultivation, processing, packaging, transport, cooking.

In particular, environmental impact indicators were identified, based on the type of resource and environmental load considered:

- The Carbon Footprint considers the consumption of energy and fossil resources, and in particular the consequent greenhouse gas emissions produced, as responsible for climate change. It is measured in the amount of CO2 generated.
- The Water Footprint considers the quantity and mode of the water resource used. It is measured in the volume of water used.
- The Ecological Footprint measures the occupation of the territory, that is, the amount of biologically productive land (or sea) is necessary to provide the resources, and to absorb the resulting environmental impacts.
- The Nitrogen Footprint measures the release of nitrogen during agricultural activities.

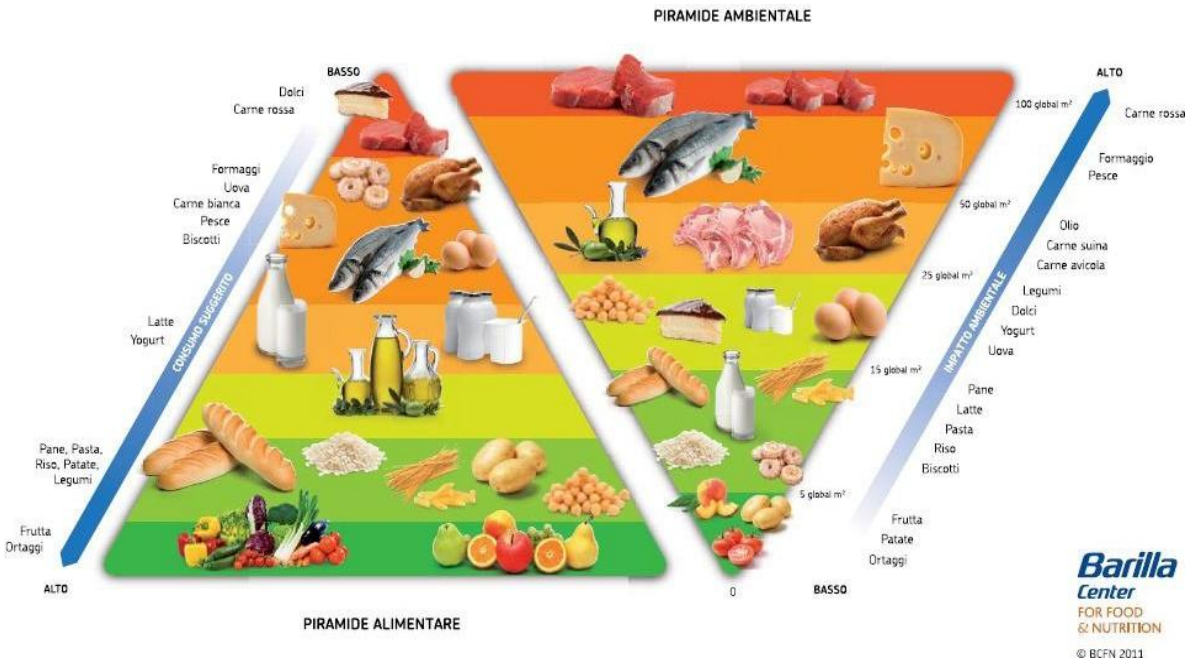
These indicators allow us to define a rather precise picture of the overall impact of the food production process on the ecosystem, in addition, they can be used to identify which foods to consume and in what proportions, to implement a diet low environmental impact. In particular, the Ecological Footprint was used to create a pyramid in which foods are shown graphically from the most environmentally friendly (at the base) to the least sustainable for the environment (at the top) (Fig.1).

Figure 1. Pyramid of ecological foods made with the Ecological Footprint (Source: BCFN 2012).



Approaching this pyramid with the one that highlights the "good for health" foods of man, you get the pyramid "Food-Environmental", called "Double Pyramid" by the BCFN (Barilla Center for Food and Nutrition), in which it is particularly evident as the foods that are good for the Planet are also the most recommended for the well-being of the human body and vice versa (Fig.2). This shows how, at the base of sustainability, lies a balanced and harmonious human-nature relationship, so there is an interdependence between human health and ecosystem health.

Figure 2. The double food-environmental pyramid (Source: BCFN 2011).



In particular, FAO considered as an example of a sustainable diet the "Mediterranean Diet" as it guarantees the nutritional quality of food and biodiversity thanks to: a wide variety of foods that allow a diet varies both by type of food and by the range of flavors; variety also in the techniques of preparation, storage and shared consumption of food; the use of foods with a high nutritional and beneficial value (such as olive oil, vegetables, etc.); a strong connection with local culture and traditions; respect for nature and seasonality; rooted with the territory and the natural landscapes (Padilla et al. 2010).

1.1.4 Sustainable consumption and lifestyles

Responsible consumption can become a real way of life that extends to all aspects of daily life and the activities that are carried out. The same mechanism relates to sustainable consumption because it is a set of nutritional practices that could be better assimilated by individuals, if incorporated into daily life. It is therefore necessary to clarify the concept of "lifestyle" in order to better understand the link between the meanings that individuals apply to products and the ways of consumption and the actual behavior that they are then able to implement in the lives of all days. Lifestyle is understood as a social form, it is a set of practices, which presents itself as a distinctive and shared model within a community, without having its generative element nor in a pre-existing cognitive-value framework or in a predetermined socio-structural condition, although it may be affected. For a long time, lifestyles have been associated with the processes of social distinction related to the possession of private goods and to their consumption, so what you buy and how you use what you have bought becomes a mirror of society and indicator of social identity homogeneous consumer group (Vallette-Florence, Gallino 2000). Many classics of sociology have identified a direct relationship between lifestyles and social stratification, whereby lifestyles derive from a certain social class and are an expression of the prestige of a social class (Weber 1921). This process of differentiation and typing takes place because lifestyles are connoted to personal meanings and values, and thus allow you to assert your personality and function as tools of identity. A further theoretical strand shifts the focus more from collective determination to individual determination, focusing more on personality traits, objectives, attitudes that the individual applies in his own action practices. According to this perspective, rather than the social class of belonging, the cultural models that are at the heart of the daily action and sensibilities of individuals must be taken into account. Lifestyles are a cultural construction and depend on selective and independent choices, such as self-choosing life projects; lifestyles are ways of

life and thought produced by a dynamic process in which they affect: personal motivations, living conditions and profession, opinions, attitudes and languages, and practical forms of behavior such as consumption (Cathelat 1990).

Lifestyles are therefore systems of shared identities, tastes and common interests, which are aggregated through communication, but are also negotiated roles or staged personalities. In today's consumer society, lifestyles perform four functions:

- give meaning to one's own existence;
- identify landmarks to act;
- finding social meanings;
- feel part of a larger group.

The discourse on lifestyles is closely linked to the concept of sustainability, because on several fronts we talk about the need to promote and implement sustainable lifestyles as a key element of sustainable development. This is because it is in the small gestures of everyday life that we build our environmental and social impact. Lifestyles help to fulfill our needs, aspirations and functions as "social conversations" through which we communicate our social position in society and our likes and dislikes to others. Much of this communication is mediated by the products we consume, the services we use and the possessions we keep. Therefore, lifestyles have tremendous impact on the flow of goods and services in society and are closely linked to production and consumption patterns and resource consumption in our societies (Spread, 2012). However, our lifestyles and consumption today are non-sustainable, which is why it is becoming increasingly important to study how we transform our everyday behaviors into responsible practices. In fact, the new trends on sustainable development tend to shift the emphasis to personal responsibility for the activities we practice as having a direct impact on the environment and society; this individualistic turn leads to the privatization of ecological action and integration into everyday life.

The Department for Environment Food and Rural Affairs (DEFRA) in Great Britain has identified some particularly influential behaviors in making our lifestyles unsustainable; they are summarized in nine key points (Fig 3):

1. Eco-improving your home (retrofitting)

2. Using energy & water wisely

3. Extending the life of things (to minimize waste)

4. Cooking and managing a sustainable & healthier diet

5. Choosing eco-products & services

6. Travelling sustainably

7. Setting up & using resources in your community

8. Using & future proofing outdoor spaces

9. Being part of improving the environment

Policy makers must therefore be provided with information about the nature and structure of environmental action, what influences it and who are the participants involved in. The change in behavior also depends on the processes of social inclusion, which therefore take into question the cultural and institutional context. In particular, there are three factors:

1. Contextual circumstances: social composition, demographic profile, structural characteristics and situational factors;

2. Socio-cultural values, in particular, focus on issues relating to the environment and sustainability;

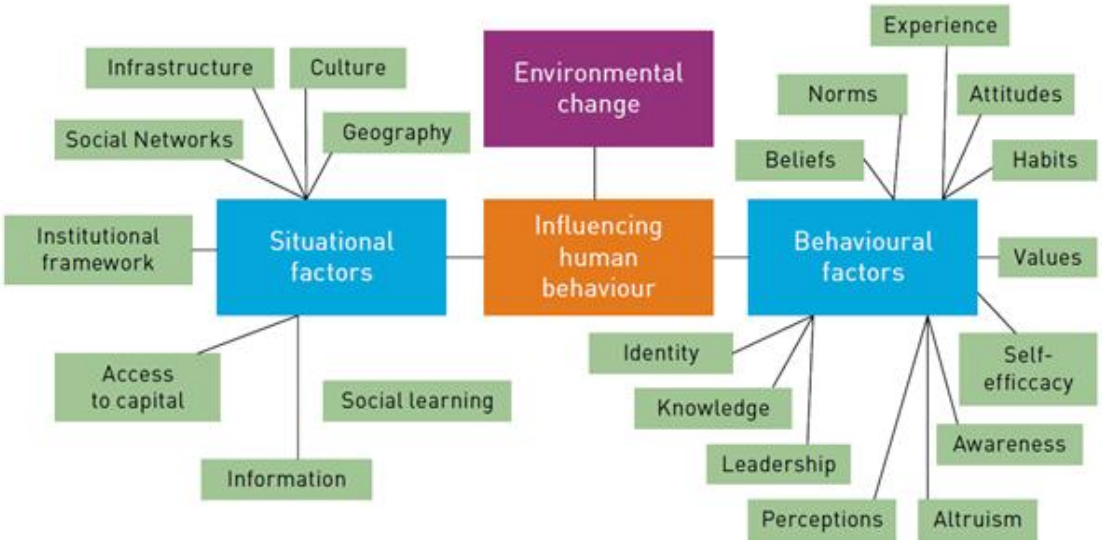
3. Attitudes towards specific behaviors, for example, considering the motivations inherent in actions and the satisfaction that comes from their fulfillment.

In addition to these elements, which mainly affect the individual sphere, it is necessary to consider the external factors that make it possible for people to implement a certain practice; that is:

- logistical elements (such as time and convenience);

- the role of individuals in their social networks (friends, relatives, colleagues, etc.), which are crucial especially with regard to visible activities such as consumer activities.

Fig.3 – Framework of the elements that contribute to forming a sustainable lifestyle (Source: Defra, Sustainable Lifestyles Framework 2011).



1.1.5 The search for well-being in healthy eating

One of the most common definitions of "Healthy Eating" is to consume the right amounts of food of all existing categories, so that you can ensure that your body is properly fed and functions at its best; this also depends on the lifestyle and level of activity. Still, eating healthy is equivalent to reducing and avoiding processed sugars, white and fatty meats, in favor of a balanced diet that includes all the main types of food, accompanied by adequate hydration. The definitions are countless but, very often, "healthy" is a subjectively definable term, since it encompasses different meanings from person to person and, above all, from culture to culture. Healthy food is no longer just something to do with the general consumption of fruits and vegetables, with the numerous diets that prohibit the consumption of carbohydrates, with the elimination of sugars rather than seasonings; healthy eating, on the other hand, is a balanced diet. In addition, the balance we are talking about concerns, in turn, not only what is related to nutrition, but also physical activity, hydration and strong respect for ourselves, for others and for the environment in which we live.

Research conducted by Nielsen in 2017 provided evidence that consumers are increasingly attentive to what they eat, who are in favor of discovering new products and maintaining

proper nutrition in their lifestyle. In this study, about one in two consumers said they follow a well-controlled and non-random diet. Increasingly, consumption is growing in line with lifestyles with specific dietary, health, physical efficiency and social responsibility needs, with a focus on the products they show on their packaging peculiarities and differentiating elements (BIO, Rich in..., Without..., Veg).

One of the reasons for the development of this trend and people's interest in themselves and their health are the significant increase in diseases, allergies and food intolerances. These combined with growth disorders in children and rising rates of obesity, which have never reached such alarming levels, drive the market towards a marked change. As the Barilla Center for Food & Nutrition states, the current diet style in Europe is too high in fat, excessive calories, sugars and salt, and the European Commission itself, which deals with the following issues, is committed to this line to incentive for a healthy lifestyle. There is therefore a real revolution in the food market. Today we find, more and more often, brands that launch products in different versions, with natural ingredients, light, specific to food intolerances and allergies.

1.1.6 Perceptions of Healthy Food consumption

Different studies converge on the idea that the psychological associations that are created with food determine consumption choices. For example, it has been shown that, in the search for a real pleasure for the palate, healthy food is very often capable of possessing only one of these two qualities: "healthy" or "tasty"; the two elements hardly coexist in the minds of this category of consumers, for whom, often, what is called healthy, can not be good or appetizing. Other studies have focused their attention on the relationship between healthy food and satiety. The data showed that by emphasizing the healthiness characteristic of a product, the so-called "Healthy Halo Effect" can be generated: this effect is to perceive a healthy food much more than it actually is, thus causing it to overeat. If fatty or high-sugar foods, which are therefore perceived as unhealthy, are associated with the idea of moderate and low consumption, as a result people tend to associate higher amounts of consumption with healthy food. However, these dynamics are very useful to explain the paradox that we are experiencing in recent years: although there is a significant increase in the consumption choices of healthy foods and benefits, at the same time there is an increase in the rate of obesity. It is therefore important to pass on to consumers the right information, to incentivize

and provide, as well as useful practices for the consumption of foods functional to our well-being, also guidance on responsible use of quantities.

A multidisciplinary perspective must be adopted and dialogue and collaboration between multiple actors, academics, policy makers and stakeholders (producers, consumers, civil society, etc.), in particular, a new multifactorial approach to the themes of food system and nutritional culture must consider six action directions: quality, environment, health, sociality, economy, governance (Lang 2010).

The reasons for consumption depend on a number of factors that affect the social and historical context, even the current economic crisis (and social and environmental) has led to profound changes in people's consumption and lifestyles making consumers more attentive and fostering the adoption of ethical and responsible attitudes. In particular, we find:

- a stronger rejection of excesses, the superfluous and the unnecessarily expensive;
- a recovery of the founding values;
- the desire for a form of simplification of habits and re-evaluation of the intangible;
- environmental sensitivity no longer connoted by guilt, but by greater awareness and information.

The process of food choice assumes a great communicative and functional value. In fact, in the practices of food consumption, an action of attribution of meaning of both private and public value comes into play, which contributes to the construction of the personal identity of the consumer. In sustainable consumption, personal attitudes and principles of life are of great importance in guiding behavioral decisions and therefore also the practices of buying and consuming food. The personal values and motivations that are linked to sustainable food consumption are:

1. the development of deep knowledge and awareness in the field of food consumption;

2. the search for flavors and the value of taste in the processes of food choice, combined with a new conception of "goodness" understood as a "polysensory" process. In addition to taste, all the senses are involved in the experience of food;

3. the research into health and well-being are the basis of food consumption processes. This involves a more careful and careful daily choice of quality products, inevitably also affecting habits and lifestyle;

4. the rediscovery of the value of naturalness, and therefore of the genuineness of raw materials and techniques of production, transformation and conservation. In this trend it explains the success of organic and the demand for the "freshness" of the products;

5. the rediscovery of the culinary tradition, leads to the search for ancient flavors and traditional culinary practices. In addition, it supports the value of cultural and gastronomic specificities, tying itself to the phenomenon of ethnic food, as a request of the new and the unusual, but also stories, values, traditions, etc.

6. the value of sociality linked to food consumption practices, which leads to preferring situations in which one eats together with other people, preferably those with whom they exchange emotional bonds;

7. the attention to quality of service and packaging.

1.1.7 Information and sustainable nutrition

It was found that the consumer buys both utilitarian reasons and emotional and personal elements (Codeluppi 2005); This is why we talk about "irrationality of choice" as certain psychological and social stresses which influence decision-making. There is great complexity of the decision-making process and the strong impact that external information can have on consumption, for example communication conveyed through the media and advertising, which operates on the emotional and psychological context potential consumers. In addition, the consumer is in an asymmetrical position with regard to the manufacturer, as he often does not have the opportunity to experiment and know neither the quality of the goods available, nor the quality of the sellers. This facilitates some marketing mechanisms for some products over others, often on the basis of external factors such as advertising, the aesthetic aspect of packaging, price, product placement on the supermarket shelf, etc., rather than on the basis of a real awareness of the quality of the product and its nutritional aspect. This inductive process to purchase is also valid, and especially with regard to foodstuffs, as essential goods and related to certain instinctive physiological processes that affect consumption. In today's distribution and consumption system, natural decision-making is no longer feasible because the purchase is conditioned by some "unnatural" situations, such as packaging, plasticization, sterilization of products that prevent recognition of the quality of food. In addition to the sensory characteristics of the products, consumer choice is also driven by other factors,

related to communication, such as: the perceived quality of the product and its brand, beliefs and opinions, the perception of risk.

Knowledge plays an important role in people's food practices; it affects daily food choices and is a key factor in fostering critical consumption and adoption of sustainable eating styles. Communication on food sustainability is still lacking, both nationally and internationally, in terms of the breadth of attendance, effectiveness and communication strategy. This leads to a situation in which people have a suboptimal level of knowledge about: sustainability issues, the correctness of information, the degree of awareness of the social and environmental impact of their consumption, the ability to sustainable products.

1.2 Sustainable packaging

The word packaging means not only packaging in the strict sense in its materiality: in fact, the word packaging takes on a complex and broader meaning, referring to all aspects, even intangible, of the production process, industrial and aesthetic. It is reductive to define packaging as a mere package that serves as a container: for all intents and purposes, it manages to communicate an object with a subject, creating a point of contact between product and consumer. Therefore, it can be concluded that packaging is the physical and cognitive interface between the product it contains and its surroundings.

The history of food packaging has its roots in ancient times. Although food was once readily consumed immediately after production or harvest, man has always felt the need to protect with containers the products of the earth and, more generally, food. Since ancient times, in fact, the biggest problem related to food (in addition to procuring it) was related to its preservation and transport. The first evidence of proto-packaging dates back to prehistory; during archaeological excavations in Emilia-Romagna were found iconic vessels of Neolithic age that, served to contain milk during all stages of dairy processing, still typical of this region. Moving chronologically and geographically on the banks of the Tigris and the Euphrates, with the development of the Mesopotamian civilization it is interesting to dwell on the importance of the manufacture of the object container and the packaging for transport in regions where the warm climate affects the natural state of the world's food and products.

Packaging has always been a fundamental element of the socio-economic organization of every civilization, with which the Western world awoke from the barbaric invasions. For several centuries, amphorae and barrels, leather and wood containers, ceramics and, in a partial way, glass objects were the main packaging materials used to store food.

1.2.1 Food packaging functions

Food packaging is not simply product containers, this role remains and is still essential and, in some cases, far from trivial importance for some foods or ingredients. In addition to the containment role, the second typical function of food packaging is the protective one: the packaging must be calibrated in relation to the specific needs of the food and its distribution cycle, fulfilling a barrier role from any external contamination to ensure the original quality of the food. Another function is the conservative one: the packaging must preserve the food even in unfavorable and adverse environmental conditions for the expected duration between packaging and consumption. Among the most "modern" functions of packaging is convenience, a term that can be translated into Italian with the word *practicality*: packaging that gives convenience of use and is increasingly common on the shelves of shops and supermarkets, such as easily opening cans or valves to allow perception of the smell of the product. It is a series of measures, in the physical structure of the packaging, that facilitate the perception and use of the same product contained within the package.

The information function is essential: in fact, the packaging must provide mandatory information visible on the appropriate label or on the packaging itself such as ingredients, expiration date, etc., and optional information about quality, consistency and product characteristics. Another complementary, but at the same time indispensable task is communication and presentation of the product. Also in the food sector, packaging has the task of raising the communicative impact as much as possible, creating those verbal references. The determinants behind this phenomenon are due more to the fact that packaging is the main tool capable of conveying to the consumer the factors of both innovation and product differentiation. Since it is difficult for consumers to be able to assess the food in practice at the level of intrinsic dimensions (quality of raw materials, safety in production processes, etc.), it is the result that purchasing choices are more dependent on extrinsic quality factors (the appearance of the product that is represented with images and specifications) transmitted largely through packaging. Thus, the shape, color and appearance of a packaging are factors that can contribute greatly to the commercial success of a product also in the food

field. Finally, a number of objectives of the packaging operation can be traced back to the logistical purpose of facilitating the flow of products and, with them, the economic value they represent.

Therefore, from this overview of the main functions of food packaging, it is clear that packaging never only offers commercial information about the product, but also a real utility for the consumer. In fact, on the packaging there are the most varied communications, from nutritional indications to advice of use, even passing through recipes. In addition, packaging also provides regulatory compliance updates through trademarks. So, the main purpose of food packaging is, on the one hand, to obtain the maximum degree of protection and storage for products in order to prevent them from being affected by risky alterations or harmful to consumers' health and, on the other hand, the promotion of the same product to the consumer.

1.2.2 The functions of packaging in relation to the concept of sustainability

In relation to food purchasing habits, the criteria mainly used during the purchase relate to: the way a product is stored; the hygienic conditions of processing and storage; the use of a production process environmentally friendly; organic raw materials; ethical issues such as sustainability and respect for the environment. These studies are based on the assumption that the consumer considers all these attributes of a product as means of achieving specific goals and acquiring certain values (Dalli and Romans, 2009). On the basis of these concepts and in relation to the topics introduced in the first chapter, concerning increasing consumer interest in consumer choices much more attentive to the environment in which we live, and therefore to the planet, packaging plays a key role both for companies and for the sustainable development of markets. Most studies on the level of sustainability of a packaging have initially focused on economic and environmental elements (Nordin and Selke, 2010), however over time consumer preferences in this area have also become the main element behind studies and research. Studies that have classified the functions of packaging are numerous in the literature, for example according to Selk (1994), this has three main functions:

- Protection function: the packaging must protect the product inside it, preventing it from being damaged or damaged.

- Communication function: being the first element that the consumer sees, it is the means of communication of a product and has a strong influence on the perceptions and evaluations of

individuals. It contains a lot of information regarding the specifications of the products inside, such as nutritional values, provenance, ingredients, etc.

- Convenience function: a pack can offer convenience to both distributors and end consumers, facilitating their travel or, for example, making it easier to use.

In addition to these functions, it is important to highlight how over time the packaging of a product has become increasingly important, especially in relation to its ability to attract the customer and determine their purchase. The characteristics that the packaging obtains can emphasize the originality or uniqueness of a product, its usefulness, as well as its beauty (Silayoi and Speece, 2004). The studies of Ampuero and Vila (2006) on consumer perceptions of packaging, have also shown that different combinations of graphic elements, such as colors, writings, shapes and more, allow a pack, and therefore the product, to position themselves in the consumer's mind in different ways. It is important to point out that, generally speaking, it has been shown that the color of a package influences not only perceptions and attitudes of consumers, but also what concerns the taste, quality, purchase intention and general evaluation of the product (Magnier and Crié, 2015). As for the sustainability of a packaging and the recognition features that this may have, research is not yet so numerous, but it increases considerably. Starting from the basis that the elements of a packaging are all that information found on it, as well as its visual and structure properties, these elements, are usually divided into different categories:

- Visual elements (graphic design, font, aesthetics, colors, shapes and sizes)
- Structural elements (materials, ecological sustainability, durability and ergonomics)
- Informational elements (name, brand, manufacturer, country of origin, instructions and product information)

1.2.3 Existing research on criteria for defining and recognizing "sustainable packaging"

The main studies that focused on sustainability, both from a business and consumer perspective, proposed results that could help create and identify sustainable packaging properties. What needs to be evaluated is first of all the complete cycle from production to the spread of the pack itself (lifecycle). In this way, a number of benefits can be revealed: there is a greater chance of ensuring that elements harmful to the environment are actually reduced or eliminated and not only hidden or translated; interactions between a pack and the product

contained in it can be taken into account in order to consider the overall environmental impact.

The Sustainable Packaging Coalition (2011) also studied important guidelines and, based on research, defined a "sustainable packaging" as "beneficial, safe and healthy for individuals and communities throughout its lifecycle; meets market criteria for performance and costs; it is generated, produced, transported and recycled using renewable energy; optimizes the use of recycled source material; it is produced using clean production technologies; it is made from healthy materials throughout the life cycle; It is physically designed to optimize materials and energy; and is effectively recovered and used in closed-loop biological and/or industrial cycles" (Magnier and Crié, 2015). An important result comes from the Rokka and Uusitalo (2008) studies, which tested, through a conjoint analysis, whether sustainable packaging is capable of influencing the purchasing choices of a product. They have shown that, for consumers, this is indeed an important attribute.

Other results highlight how the perception of ecological signals, such as labels, information or logos, has a positive effect on people's confidence in a brand that uses sustainable packs; these elements act as signs of recognition and certification. Although packaging is generally identified as an extrinsic attribute of a product, other experts have shown that in some cases it is the pack itself that can be observed in relation to intrinsic ecological clues or extrinsic to the product or pack itself. This means that these clues can refer both to the product contained in it, and to what concerns the eco-sustainability of a food (e.g. it does not contain palm oil), but also to intrinsic signals to packaging, such as seals of approval and logos (biodegradable, recyclable). This evidence comes from a study conducted by Magnier and Crié (2015), which, thanks to the results produced by eight in-depth interviews and other specific analyses, have divided the ecological signals of a pack, identified by consumers, into 3 main categories:

- Ecological structural signals: refer to the structure of the pack in terms of size and material. In such cases, the responses record that individuals' focus is on avoiding waste and reducing waste, increasing material recyclability and/or reducing pack sizes.
- Ecological graphical signals: refer to graphics or logos/icons on the pack that evoke the sustainability feature. People focus attention and associate this characteristic, usually, with the opaque colors of a package, which are usually green, brown, and white.
- Ecological information signals: refer to information presented and written on the packaging that show, for example, a brand's licensing agreements with environmental

organizations. They can also refer to pedagogical information to educate consumers about "sustainable behavior", general or ethical environmental statements related to environmentally friendly behaviors.

1.2.4 The main variables related to the purchase of sustainable packaging

Packaging is the first element with which the consumer comes into contact, plays a fundamental role in the positioning and perception of attributes related to the product of food. In this regard, numerous researches have examined how sustainable packaging can affect the perceived quality of the product contained within it. Market evidence shows that, since the quality defined on the basis of "perceived superiority and excellence in a product's performance over competing alternatives" (Garvin, 1988), the sustainability feature can generally have a positive impact on that variable, as a differentiator. Moreover, this link is often strongly associated with a greater willingness to pay by individuals. Since we have already anticipated that quality is a variable strongly linked to the willingness of consumers to pay a premium price, the studies just mentioned show that this is also the case when sustainability signals are associated with the pack. This is automatically due to a higher quality perception of the products). Consumers are therefore willing to pay a premium price in the presence of sustainable packaging.

In addition, packaging can be considered as a tool capable of also influencing the variables related to the taste of a product and the satiety that it can make. We observe that a packaging with angular and well-squared shapes can convey perceptions of energy and strength, whereas rounded shapes, perceptions of friendliness and harmony. Following the same line, other research has been carried out on the size of packaging and the condition that leads individuals to excessive consumption of the food contained within it. Since larger packages usually have a lower unit price, in such cases the consumer receives a higher overall value than the product itself, and companies can also use lower production costs. This explains the results obtained from some studies; larger containers stimulate higher food intake rather than when, the same amount of food, is presented in smaller containers.

Consumer purchasing decisions depend on different factors and, if we consider those related to concern for the environment and the excessive amount of pollution and waste produced, also the purchase intention in this type of consumer choices is affected. In fact, the increase in

the purchase intention of such products is strongly influenced by consumers' environmental concern.

Over time, the factor of healthiness has become increasingly important in the style of nutrition, not only falling among the most decisive factors, but becoming one of the main ones. Precisely because consumers pay much more attention to the nutrition, health and quality of the food they consume, they no longer only look at the "guaranteed safety" of a food, but also at the beneficial properties and the degree to which food is promoting a positive influence on people's health in overall terms.

The important thing is that, to date, it is crucial for many consumers to perceive the food products they buy as healthy products, and that naturalness, low level of processing and low-fat content are the typical signs that consumers use to assess the healthiness of a product. These concepts can be demonstrated in many researches. It has been studied that the name associated with a food (whether of the brand or generic category), as well as the description that accompanies it, can significantly influence people's expectations about the health of a product, not entirely (Oakes, 2006).

The concept of healthy food is a very broad concept and that has an innumerable amount of perspectives, starting from the medical and nutritional, to the social and psychological. The most important studies for this research, however, focus their attention on the consumer's point of view and his perceptions. Surely the risks associated with the health that the consumer perceives are a strong determinant of food choices; however, in general, no one is able to assess the benefits that a food brings to their body immediately. For these reasons, on the basis of this, it was studied how individuals perceive the quality of healthy food products.

There are four main assertions to which they have come:

1. Healthiness is definitely an important element in the quality perception of a food and its purchase, but often this importance can be considered on par, if not superior, of taste and convenience.
2. Since people became more and more conscious about their health, they aim at defining their own style of food consumption, and because consumers themselves are not experts in nutritional or medical matters, there is a strong tendency to set personal and subjective health indicators.
3. Quality can be considered an invisible element when linked to health, since, as anticipated, it is not possible to immediately associate the benefits that a certain high-quality food consumption brings. Communication plays a key role in these processes,

whereby consumers perceive a certain level of quality associated with a product and their health.

4. Ultimately, it has often been noted that taste and healthiness can be perceived as conflicting elements. According to this concept, in fact, the presence of one of these, for some people, excludes the presence of the other by disclosing the belief that a healthy food cannot be even good.

The theme of environmental sustainability and the development of a much healthier food consumption find a meeting point in what can be called a "sustainable diet", in which the term diet finds association with the concept of healthy, and the term sustainable with the concept of environmentally friendly packaging. Despite the strong interconnection between these elements, studies on this are still limited and, in existence, it is mostly concerned with examining the two issues separately, focusing only on a few points of encounter between the concepts.

The graphic elements of a pack can have an impact on consumer perceptions related to food, in fact the graphic elements that point upwards, such as arrows or other shapes, are often associated with the characteristics of greater freshness and naturalness. It is clear that therefore all these elements and others, such as layout, use of white spaces and colors, typeface, signs and materials can contribute to the perception of the healthiness of a product; although even the sustainability characteristics of a packaging, as we have seen, are often strongly linked to the use of these elements, it is easier to understand that there is a link between the two concepts and that sustainable packaging may be able to amplify the healthiness of a food product. Sustainable packaging is usually associated, as we have observed in the first studies, mostly to colors such as green or white, soft colors, the same attributes that consumers associate with the naturalness and healthiness of a food. Similarly, a store whose packaging attracts a strong character of environmental sustainability as well as healthiness of the products stored, can generate a strengthening effect on the assessment that people make not only for their health but environment in which they live.

The sustainability of a packaging is able to increase the perception of quality linked to a product. If we consider that, generally, healthy food is associated with types of foods of higher quality, as they are less harmful to one's health and more carefully prepared, this variable can play a key role in a diet both healthy and environmentally friendly. However, this research has shown how the two elements balance each other: if the product already has "sustainable" attributes in itself, the sustainability of the pack will consistently complement the product, but it will not increase the perceived quality of the product. On the contrary, if we

look at the extrinsic attributes of sustainable packaging, and in the absence of similar attributes related to food, these can have a strong influence on the perception of quality of a product.

So, let's see why, speaking of these two strong market trends, we can talk about two-way bonding. These effects, moreover, are explained even better, integrating between the sustainability of a packaging and the healthiness of a food, a new variable: the perceived naturalness. In fact, there is a strong relationship between these elements, and it turns out that the characteristic of "sustainability" leads to a greater perception of the naturalness of the products.

Today, food packaging is ubiquitous and essential; it surrounds, protects and improves the goods that we buy, from production, through large-scale distribution, to retail. In other words, and metaphorically, food packaging represents the skin that envelops the increasingly complex body of the modern food industry.

1.3 Intertwining of health and environment

What we eat affects not only our health, but also the environment in which we live. If we consider that food production is the cause of about 30% of global greenhouse gas emissions, which requires about 70% of the water used by people and that about a third of food is lost into waste, it is already clear how much food consumption habits can have a strong impact on the environment in which we live. Biodiversity, the essential and primary service that our ecosystem offers, is disappearing and this is caused by the overexploitation of the resources provided by our planet. As recent studies state:

"The food system from agricultural production, processing, packaging, distribution and sale, produces not only food for consumption, but also generates output that is returned to the natural environment, including greenhouse gases, food waste and packaging. Each of these outputs contributes to the degradation of the environment, the magnitude of which depends on the inputs (land, water, energy) and the production processes applied" (Friel et all 2013).

One can think of sustainable nutrition in several cases: for example, when, in defense of deforestation, the consumption of meat or palm oil is reduced; the elimination of foods whose production processes cause chemicals to be dispersed in the air; to a diet whose goal

is the reuse of resources, with reference to the importance that has separate collection for the recycling of food and packaging. Therefore, there are different actions that can be taken in favor of the environment in which we live, both on the part of consumers and companies. In fact, considering that the latter are socio-economic entities that operate with the aim of meeting the needs of consumers, they cannot be expected to remain impassive to the increase in *environmental awareness* and food *awareness* of consumers. 95% of European consumers agree that companies should take action and take more initiatives to reduce plastic waste and increase recycling, and according to Nielsen data, 66% of consumers are willing to pay a higher price for products healthy and environmentally friendly. Increased awareness of environmental issues and the pursuit of one's well-being, brings changes in consumer styles and consequently market demand. The green consumer is generally defined as "that consumer who adopts environmentally friendly behavior and/or who buys green products, compared to standard ones". Post-purchase waste reduction is also an important point to refer to in the analysis. Given the protection function that must have a packaging in fact, very often excessive use is made (this phenomenon is very widespread in e-commerce). However, these actions can be detrimental to a company's reputation, especially when it comes to non-recyclable and polluting materials. For these reasons, brands look for all kinds of opportunities to improve their performance and to position their pro-environment image well; there are many cases in which food packaging is being modified.

It is important to point out that there is a link between nutrition and the two-way environment. Because the two parties are capable of influencing each other, they can determine each other's health. Protecting the environment and preventing the loss of plant biodiversity is, in turn, vital to ensure that we can acquire the necessary nutritional values provided to us by food.

Damaging vegetation can be lethal for food and its nutrients, especially given how important it is, in general, the consumption of fruits and vegetables in *health diets.* There is therefore a strong link between a healthy *lifestyle* and sustainable consumption. To link us to the elements of packaging, health, well-being and sustainability, there are some criteria that are shaping the modern packaging landscape. One of the most important examples of this two-way relationship between environment and nutrition is the increase in water consumption for personal hydration, in fact drinking at least two liters of water a day is a *must* present in any diet or food consumption aimed at personal well-being. There are many initiatives taken to protect the environment and reduce plastic pollution. Leading companies are developing new technologies to use biodegradable materials with totally natural ingredients, such as algae and fungi. Bottled water, therefore, is one of the industry's greatest growth opportunities.

Yogurt is also an increasingly sought-after food associated with the adjective *healthy*, in fact thin plastic containers, cone shaped cartons for liquid products and glass containers, register a strong growth and a great improvement in the environmental impact they produce. Finally, another interesting fact is that the strong demand for a sustainable pack is present especially in mature markets such as Europe, North America, Asia; For example, in Western Europe, industries prefer to provide sustainable packs both to reduce costs and to meet the demands of those families looking for small products in small non-cluttered packages.

1.3.1 The meeting between healthy and environmentally friendly food choices

Sustainable diets have been defined as "those diets with low environmental impact that contribute to food and nutrition security and the conduct of a healthy lifestyle, for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, and affordable, fair and affordable; adequate, safe and healthy nutrition, optimizing natural and human resources". Most of the environmental problems related to the food industry are related to the management of production processes: the use of non-renewable energy, transport methods, water consumption and packaging waste. As a result, with the pressure underway for a more sustainable economy, there is a strong consumer awareness. The simultaneous development of interest in healthy eating and care for the planet generates matches that, based on recent studies, have different effects in terms of perceptions and purchases. Studies that observe how the aesthetics of a packaging can affect the evaluation of the product are numerous, as are those related to the labels that indicate its sustainable derivation. However, researches that specifically observes how visual elements of a sustainable pack influence the perception of *healthiness* of a product contained within it, has only received attention in recent years.

For example, labels on sustainable products are much more effective on people who only occasionally buy foods that are "health and environmental-conscious", while the group that makes them a much more informed consumer is much more skeptical about what they read about a product. For this reason, on more experienced consumers, it is much more difficult for the vision of a sustainable pack to have a relevant persuasion effect. However, some research shows that a product contained in a packaging *environmentally friendly,* is perceived as healthier than when, the exact same product, is presented in a *non-environmentally friendly* packaging. Given the strong link between the product and the

environment in which it is viewed or consumed, it is worth specifying that the purchasing context is a very important variable. In a supermarket that sells different types of products and therefore offers different options on the shelves, the *healthiness* rating of a product in sustainable packaging, for example, is much higher. On the contrary, in a specific *store* that, basically, provides green *products,* the perception of *healthiness* of a sustainable pack food is not higher than the other products.

Chapter II

Overview Literature and Empirical Evidence of sustainable packaging on healthy food consumption

In this chapter, scientific evidence is provided on how sustainable packaging influences consumer perception of healthy food purchases. To support this thesis, some of the most recent scientific papers published in international journals are analyzed, with the aim of understanding what characteristics of packaging influence the perception of healthy food and defining the management and policy implications for regulators.

The first paper considered is by Thu et all, 2019; the aim is to examine the consumer perceptions of "eco-friendly" packaging in the context of packaged food products by addressing the following research questions: When do consumers consider packaging sustainable? What dimensions of ecological packaging are important to consumers when it comes to buying behavior? Consumers are increasingly concerned about the environmental consequences of packaging and what they perceive to be sustainable packaging is still unclear. The study offers new insights into consumer perception on sustainable packaging, with a focus on packaging materials and market appeal. Following Lindh et al., 2016 and Wikström et al., 2018, it can be said that sustainable packaging has contributed to the development of food sustainability supply chain, so it is a topic of political and social interest. When buying food, consumers follow different criteria such as: label information (Coulson, 2000), whereas others focus on the eco-friendly characteristics of packaging (Rokka and Uusitalo, 2008), others may assume that overpackaging is a waste and therefore negatively evaluates the product (Roper and Parker, 2013). So, what consumers perceive as environmentally friendly packaging is an important question to address before companies can successfully implement packaging strategies.

The authors point out that the most important dimension of consumer packaging is packaging materials. Most participants were aware of environmentally friendly packaging and stated that environmentally friendly packaging was not as abundantly available on the market as they expected, despite the media's focus on plastic packaging and plastic waste. Participants also described eco-friendly packaging as non-toxic, easily decomposed at disposal, and best if biodegradable. Consumers evaluated packaging materials during purchases based on material guidance. Previous studies have also indicated that consumers rely heavily on suggestions for making judgments on packaging eco-compatibility (Lindh et al., 2016; Magnier and Crié, 2015). The possibility of recycling is another important purchasing criterion. The participants

stated that they wanted to reuse food packaging for other purposes. In consumer view, eco-friendly packaging should come from an eco-friendly manufacturing process, and favorably from the use of natural and organic sources of raw materials. Consumer concerns about the raw materials used to produce packaging are in line with the results of Palombini et al. (2017), which showed that packaging materials are often associated with environmental problems. In the study, participants stated that the products should be visually appealing. Most participants said that, regardless of whether the packaging was environmentally friendly, it should be designed in an attractive way. Many pointed out that they made purchase decisions in stores based on the appearance of the packaging, so the eye-catching design of the packaging in the form of graphic images was highly appreciated by participants. As far as materials are concerned, according to consumer perceptions, environmentally friendly, biodegradable or paper-based packaging was considered to be of lower quality than plastic. As reported by Magnier and Crié (2015), ecological packaging is often perceived as less attractive to consumers, due to its simplicity and lack of color. In addition to the eye-catching graphic design, participants highlighted the brand as another defining attribute. As for the price, most participants insisted very much that green packaging should be reasonably priced, as ecological packaging has been perceived as more expensive. Previous studies have also shown that environmentally friendly packaging is perceived by consumers as more expensive and therefore consumers are not willing to pay a plus (Magnier and Crié, 2015).

A special attention is therefore given to products that attract children in the study by Pires and Agante 2011. The purpose of Pires and Agante's work (2011) is to understand how children can be affected by attractive packaging and whether such stimuli can influence their buying attitude towards healthy foods. The most obvious marketing technique used to attract children are promotions, prize competitions and collections. Package size is also a crucial part of the pricing strategy: large packages, for example, often have lower unit prices than smaller ones, with the intention of giving parents the impression of good value. But the size of the package can also be small to directly attract children. Forms of comfortable or fun packaging can also be used to attract children, as well as so-called "packaging technology", such as applying straws on packs of small juices. Parents can also be encouraged to buy products for their children with technologies that make the product easier to handle, such as the ease of opening and closing snacks on the go. The importance of typing, color and other visuals to attract children was highlighted by a recent Canadian study. The study found out that the food packages examined were dominated by four colors: blue, yellow, red and green (Elliott C 2008). In another Canadian study, focus groups were used to identify how children respond to food packaging. The study indicates that children are influenced by the appearance of food

packages and promotions on the package (Elliott C. 2009). Another study from the US looked at how packaging affects taste perception (Robinson et al. 2007). Specifically, 63 children between the ages of 3 and 5 were given five pairs of identical McDonalds foods and drinks, some food packaging was branded McDonald's, and the rest was brandless. Children preferred the taste of food in the branded box, even if it was exactly the same as the food in the normal packaging.

Packaging information about food production methods is increasingly relevant to consumers who want to distinguish between conventional products and products with distinctive benefits in terms of sustainable consumption (Caswell, 1997). To develop and understand the potential impact of different labels on more sustainable food choice, the study designed experiments in which realistic circumstances are combined with insights based on theory information processing and decision-making. The study by Hoogland at al. 2007 focuses on product transparency, a highly sustainability relevant attribute. Traditionally, transparency is a particularly important attribute for perishable foods, such as meat and fish. The authors then included meat and fish in the experiment and added milk as the third product for comparison reasons. The labels to compare on the products are of two types.

The first shows a logo and detailed information on organic production standards, and the second a label with only the logo. To find out how much consumers are willing to pay, we have created two experimental conditions in which organic products are displayed with or without detailed packaging information related to animal welfare standards. Numerous studies have shown that consumers of organic foods tend to pay particular attention to the potential negative influences on their well-being; they want to avoid health risks (Schifferstein and Oude Kamphuis, 1998) and prefer a good conscience (Magnusson, et al. 2003). In summary, the impacts of contrasting degrees of transparency can be assessed by considering profiles of perceived product attributes, purchasing intentions and value priorities.

The research hypothesis is that the two information conditions on the product are formally equivalent. The question is whether they are also equivalent in the eyes of consumers, as reflected in the perceived attributes of the product. The results of the experiment show that the biological logo was very familiar to consumers and generated perceived product attribute profiles that were quite favorable for organic products compared to logoless products. The product**s** with logo and details was considered more expensive, although the prices were indeed similar. Since participants have never been able to compare prices directly, their own associations and inferences must have shaped their assessments, in particular the inferences on positive correlations between quality and price (e.g. Kardes et al. 2004). It seems that the logo alone does not help consumers to understand the characteristics of the products. Detailed

information on the animal welfare standards package led to over-generalizations based on associations between animal welfare, environmental issues, safety and expected prices. As a result, consumers tended to overestimate the premium price of the corresponding products. This type of behavior can occur because current food production standards are not transparent, and consumers are not well informed about conventional and organic agriculture. Greater transparency in food can be beneficial for consumers and society in general, as it affects price-value exchanges.

In the article by Van Birgelen et all 2009, the authors analyze how ecological considerations relate to product purchase and disposal decisions, focusing on a specific type of product, namely beverages. The study considers the following research questions: to what extent do consumers consider the environmental compatibility of packaging to be important in relation to other product characteristics such as price, convenience or functional characteristics? What factors relate to consumer decisions to buy beverages with environmentally friendly packaging? What are the factors relating to consumer waste decisions on empty beverage packaging? Ecological characteristics are therefore considered an important issue in consumer choice and decision-making (Bem 1967). The first hypothesis to be tested is to understand what characteristics of the product should be reflected on packaging for the consumer to consider the product sustainable.

It can be assumed that consumers who buy environmentally friendly packaged products will also be those who consider it important to recycle used packages. The same can be said on the contrary: consumers who consider it important to dispose of their used packages correctly, may find it essential to buy packaged beverages with respect for the environment. Therefore, the second hypothesis to test is that consumers, who behave sustainably compared to their purchasing decisions, are more likely to behave sustainably than their disposal decisions and vice versa. Consumers who show higher levels of environmental awareness make more "green" choices than those who show low levels. This idea may be linked to the positive spillover effect (Nisbett & Wilson, 1977). Consistent with Smallbone (2005), it can be assumed that consumers with knowledge and information about environmental values are more likely to show respect for the environment in their purchasing and disposal decisions. Therefore, the following two hypotheses are added: Hypothesis 3a: consumers, who show a greater awareness of environmental problems, are more likely to behave in a "green" way than their purchasing decisions; Hypothesis 3b: consumers, who show a greater awareness of environmental problems, are more likely to behave in a "green" way than their disposal decisions.

The purpose of the study conducted by Koo and Suk (2016) is to demonstrate how package shape influences consumers' calorie estimation. Health and physical image are fundamental aspects in today's society, and for that reason calories estimation has become a significant concern in the purchasing process of food. Since consumers obtain most of the information about calories from food packages, their purchasing behaviors are certainly influenced by packages design. According to Koo and Suk (2016), consumers perceive a food product in elongated container to have less calories than an identical food in wider containers of equal capacity. It is interesting to observe that their hypothesis is completely against the elongation bias in volume perception, in which tall packages are perceived as having more volume than less elongated containers (Holmberg, 1975; Krider et al., 2001; Krishna, 2006; Piaget, 1968;). Consequently, since it is believed that calorie is a direct function of volume, food products contained in elongated packages will be estimated to have more calories than food in wider containers. This counterintuitive effect derives from two different psychological mechanisms underlying volume estimation and calorie estimation:

- A bottom-up process influenced by package's geometric attributes is involved in the volume perception;
- A top-down process influenced by the nature characteristics of the food product, such as food types and nutrition labels, is involved in the calorie estimation (Carels et al., 2007; Chandon, 2013).

Based on these two psychological processes, Koo and Suk (2016) assumed that the perceived nature of food has a greater influence on calorie estimation, compared to the size of the food. Their assumption is supported by the study results of Chenev and Gal (2010), who proved the influence of food category on calorie estimation through an experiment: they offered two identical hamburgers to a group of people, one with salad and one without, and asked them to estimate the calories of both food. The participants estimated that the calories of the hamburger without salad (761 kcal) were higher that the calories of the hamburger with salad (665), even though the former's size was smaller than the latter. This result shows how people's calorie perception of food is influenced by the healthiness of the food. In fact, previous researches suggested that high-fat foods are considered being more hedonic than low-fat foods (Wertenbroch, 1998) and that leads consumers to purchase more low-fat foods, underestimating the food calories. A similar effect is given by restaurants' heath claims: high-calories side dishes are consumed more at "healthy food" restaurants, because caloric amount of main foods is underestimated by consumers (Chandon & Wansink, 2007). Moreover, in their study Koo and Suk (2016) explain that packaging shape can be a cue for the kind of food contained inside the container. Earlier studies have shown how an object's shape stimulates

emotional responses (Pavlova et al. 2005) and based on this assumption Koo and Suk (2016) suggested that the shape of the container influences calorie estimation due to conceptual association activated by different shape. So, they contend that taller packages activate the concept of slimness, whereas shorter and wider packages activate the concept of fatness. For that reason, sliminess concept leads to an underestimation of calories, whereas fatness concept leads to overestimation of calories. Thus, in order to demonstrate the influence and effects of packaging shape on the estimation of calories and volume, the authors tested the hypotheses that: food in taller container are perceived by consumers as having less calories than food in shorter containers with same volume; they demonstrated that container shape has opposite effect on volume and calorie estimation, since food product in elongated packages seems to have less calorie content than food in less elongated packages; they gave extra evidence of the differences between the calorie and volume estimation process, by manipulating the tasks order and in conclusion they showed that food inside taller packages is consumed more than food inside wider packages, when consumers are calorie conscious.

Following Festila and Chrysochou 2018, packaging has the crucial role to transmit the uniqueness of the product, in order to attract consumers' attention and influence their purchasing decisions. Thus, it is necessary for companies, especially in food sector, to create impressive packages design that could communicate the product healthfulness and that could convey the brand values (Orth & Malkewitz, 2008). But, how do marketers use container design to transmit food product healthfulness? The study carried out by Festila and Chrysochou (2018) aims at answering to this question. In particular, they analyzed the most common implicit package design elements used by companies for their healthy food products through a study across two different countries (Denmark and Unites States), with 12 food product categories, and found out that: there exist differences in the use of implicit packaging design elements, such as color, imagery, material and shape, between health-positioned food products and in regular food products; those differences are country and product category specific.

Then, as reported by their study results on the use of color, they have observed that light and faded colors are predominant in Denmark for health products package design, whereas balanced tones such as white, green, yellow and brown are frequently used in United States; furthermore, dark colors are used in both countries for regular product package design, and in United States black color is mostly used for containers of regular products. Strategically speaking, the choice of those tones is not accidental, of course, since earlier researches have demonstrated that the use of light colors on containers transmit the perception of a healthy

product (Karnal et al., 2016), whereas saturated tones communicate the intensity of the product taste (Becker et al., 2011). Moreover, Fastila and Chrysochou have found out that nature images are significantly used in the package design of health products in Denmark, but not in United States. However, United States seem to use the majority of health-related images for health products container design. According to previous studies, natural images on packages leads consumers perceive food as healthier (Chrysochou & Grunert, 2014; Gvili et al., 2015) and as having less calorie content. For what concerns the package shape, study results suggested that angular shapes are used both in Denmark and United States for health products. This type of shape is considered to affect consumers' perception of the product as healthier (Fenko et al. 2016); whereas, rounded shapes are used in both countries for regular products. Furthermore, they recognized that paper and plastic were the most used materials in Denmark for health products, whereas only paper was intensely used in United States, and plastic was used in a smaller proportion. Certainly, the use of plastic for health product is not an effective strategy, since it goes against the concept of environmental care and protection. On the contrary, the use of paper could strategically transmit healthfulness and environmental messages to conscious consumers, even though researches have not entirely proved the effectiveness of this strategy.

Matte packages, which are defined as not shiny, not glossy and not luster surfaces, are becoming a strong trend nowadays. The aim of the study conducted by Marckhgott and Kamleitner 2019, is to show that matte packaging increases consumers' perception of the food product naturalness, contrary to glossy packages. What is really interesting to notice, is that matte surfaces' naturalness effect only holds for food which are perceived as artificial. Moreover, if a product is perceived as natural, consumers expect it to be tastier and are more likely to purchase it. According to packaging literature, packaging has many attributes that can influence the perception of the food inside the package, such as: the shape, which affect the product quantity perception (Folkes and Matta, 2004) and the calorie perception (Koo and Suk, 2016); the size, which serves as a quality cue (Yan et al., 2014). But, packaging surface has never received significant attention in previous researches. In their study, Marckhgott E. and Kamleitner B. (2019), focused on emphasizing the importance of package surfaces as a cue for product naturalness. If on one hand, Meert et al. (2014) propose that glossy surfaces can evoke nature images or thoughts, since they are associated with wetness (Coss, 1990) and thus psychologically inducing to water necessity, on the other hand matte surfaces influence the product naturalness perception, arousing organic materials images. However, product naturalness perception depends on how it reflects light: glossy

appearance is the result of specular reflections on smooth surfaces; matte appearance is given by the diffuse reflections on rough surfaces (Nayar and Oren, 1995, p. 1153). Although, both glossy and matte surfaces communicate naturalness, Marckhgott E. and Kamleitner B. (2019) assumed that mattedness prevails, since it elicits nature imagery through direct reference to the packaging material, whereas glossy surface does so trough water associations. Furthermore, there still is an open debate on whether or not matte surfaces' effect on food naturalness holds if other significant natural cues are present on the package. In line with c.f. Kamins and Gupta (1994), surface affects food naturalness only without the presence of further natural characteristics; whereas, c.f. Kamins and Gupta (1994) declare that package effect can be greater with additional naturalness attributes present on the container. In order to prove that package surface affects the naturalness of the product, three studies have been made by Marckhgott E. and Kamleitner B. (2019):

- Study 1: participants were asked to establish which between a ketchup in a matte package and an equal ketchup in a glossy package was more natural, both looking and touching the two products. The study was conducted in a laboratory setting and in point of sale situations.

  Results indicated that participants' naturalness perception of ketchup in matte container was greater than the one of ketchup in glossy package.

  Moreover, they observed the high naturalness perception of food was related to high tastiness expectation.
- Study 2a: they examined if matte surface's effect on perception of food products naturalness could hold even for products perceived as natural. Also, this experiment was made in a laboratory setting and in point of sale situations. They compared two drinks (soda and tea), contained in matte and glossy packages. In this case results determined that matte surfaces increased naturalness perception of the product, enhancing consumers' tastiness and consumption intentions. In particular, soda (perceived slightly more artificial than tea) in matte package was perceived as being more natural than soda in glossy container, whereas matte package did not increase tea naturalness perception.
- Study 2b: in this last study, Marckhgott E. and Kamleitner B. (2019) examined if a naturalness claim on both matte and glossy packages could affect the natural perception of protein bars in online shopping situations. Findings suggested that protein bars without claim on matte containers were perceived as having more natural content than the glossy ones without claim, that were expected to be tastier and that consumers were more likely to buy them.

Then, once claims were added on packages this effect disappeared and consumers did not recognize any difference between matte and glossy containers.

The study made by Magnier, L., Schoormans, J. and Mugge, R. (2016) attempts to provide a better understanding of how packaging sustainability can influence consumers' perception of food quality. Previous researches demonstrated that the effect of product sustainability on consumers' perception of product quality is mainly positive (Lee & Yun, 2015; McEachern & McClean, 2002), and that organic food products are related to higher quality perceptions, since they are perceived as being healthier and to taste better (Johansson et al. 1999; Lee & Yun, 2015; Lee et al., 2013;). A sustainable package definition is given by Magnier and Crié (2015):

"a sustainable or eco-friendly package can be defined as a package design that explicitly or implicitly evokes the eco-friendliness of the packaging via its structure, its graphical or iconographic elements and its informational element".

Moreover, through package design, consumers can make inferences about the product itself and the brand. Magnier, L., Schoormans, J. and Mugge, R. (2016) conducted two studies in France, in which they demonstrate that: quality perception of food is more positive when the product is packed in sustainable containers rather than in regular packages; sustainable packaging will lead to higher quality perception when product sustainability indicators are not available; naturalness perception of the product explains the influence of product and packaging sustainability on the perception of the food quality.

In the first study, they tested two snacks products (raisins and chocolate bars), both in sustainable (recycled cardboard) and regular containers (plastic), of two brands which have never been sold in France (*Sun-Maid Raisins* for raisins and *Halter* for chocolate bars). The study was conducted online, and first, French participants were asked whether or not they knew the brand; second, they had to identify which between the two goods, in the different packages, they perceived as being more sustainable. Results suggested that all participants did not know the brands, so they were not influenced by the brand name, and that recycled cardboard packaging was perceived to be more sustainable. Moreover, they observed that participants classified both chocolate bars and raisins in sustainable containers as having better quality. Then, in the second study Magnier et al. (2016) examined conventional and organic coffee in both aluminum and in sustainable recycled packages. They also manipulated package sustainability putting an AB *(agriculture biologique)* logo only on the organic coffee

packages. Even in this case, coffee's brand (*Tully's coffee*) has never been sold in France, so brand knowledge did not influence French participants' choices.

They were asked to estimate, in an online questionnaire, their perception on both quality and naturalness of coffee. Findings detected that coffee quality perception was higher for coffee in sustainable containers; that participants perceived organic coffee as having a better quality; that product sustainability moderates the relationship between container sustainability and product quality perception. Furthermore, it resulted that perceived naturalness of the product was higher for coffee in sustainable packaging and when coffee was organic, and that perceived naturalness acts as a mediator between the effect of package and product sustainability and the quality perception of the product. So, package sustainability has a positive effect on the perception of food quality, and product sustainability has the role to moderate this effect. Moreover, packaging sustainability does not have any significant influence on product quality perception, when intrinsic characteristics of the product are sustainable, and perceived naturalness mediates between product and package sustainability interaction effect and perceived quality of food product.

2.1 Policy implication, limits and future research

Thu et all's study, 2019 highlights three key dimensions in consumer choice for products with sustainable packaging. The first is the material, the second is how companies produce packaging, and the third is the market appeal of a product. This article helps to increase the information present in the literature on purchasing behaviors for sustainable packaging, A product must not only be sustainable for materials but also for its aesthetics accompanied by a reasonable price. Managers can use the key dimensions identified in this paper as input to their packaging design strategy. Future studies could focus on products with a higher price/quality. Further research into consumer perceptions of green packaging, may also take into account the effects of the brand image.

In Pieres and Agante's (2001) papers, it has been shown that children are guided by fun packaging and this can help to overcome resistance to healthy food. If marketers want to promote healthy foods for children, they can do so by redesigning packaging to make them more fun. The addition of the funny compound to packaging has the power to influence children's perception of healthy food, so the authors, as in the previous case, conclude that

there should be restrictions on the use of such techniques to promote less healthy products. Packaging can mislead children and parents into thinking that the product is "healthy" when it is not. Policy makers should therefore act to reduce the amount of marketing of unhealthy foods for children. The problem is that packaging is not subject to any regulatory approach to the commercialization of baby food. Through packaging a message is transmitted, changing the packaging is essentially reformulating the product, so changing the packaging would not only change the way the product is marketed, but the entire essence of the product. That makes intervening in packaging a politically difficult game, compared to the regulation of advertising, but potentially more effective. One of the limitations of this work is that this research has only evaluated children's opinions and purchasing intentions without actually experimenting with the product. Further research could assess whether children would buy or continue to buy healthy products with this type of packaging after trying it for the first time. Finally, this research used unknown brands, so it would be interesting to also study the influence of well-known brands on healthy products using the same fun techniques that are used in fewer healthy products.

An important lesson from Hoogland et al. 2007, is that an information panel will not uniformly trigger changes in purchasing beliefs and intentions among consumers with divergent value priorities, especially if there are also interfering beliefs about higher prices. In addition, outside the context of an experiment, consumers have less time to read and interpret information and can rely even more on associations. Another methodological problem is that all participants were recruited in the context of an urban supermarket. Therefore, the results cannot be generalized to consumers using other outlets, such as specialty stores. Some fish consumers, for example, may prefer unpackaged fish.

The results of the study by Van Birgelen et al. 2009, can be exploited by companies. Providing additional motivation to buy, as an advantage related to the ecological package, can positively influence consumption decisions, thus companies may be able to create a competitive advantage. Furthermore, this study supports previous studies by demonstrating that most consumers do seem to care about the environment (Bech-Larsen, 1996). More public education to generate more positive environmental attitudes seems justified in creating a "greener" mentality (Pooley & O'Connor, 2000).

The results of first hypothesis by Van Birgelen et al. 2009 suggest that consumer attitudes tend to change over time: respondents are willing to exchange various product attributes in favor of environmentally friendly beverage packaging, for exception of taste and price. Testing the second hypothesis shows a high correlation between environmentally friendly purchasing and disposal decisions, providing further support to Bem's self-perception theory

(1967). Results suggest that environmental purchasing and disposal decisions depend primarily on consumer environmental awareness and ecological attitudes. In addition, behavior in ecological consumption appears to be strongly correlated to the opinion of contant people such as family and friends.

The research made by Koo and Suk (2016) demonstrates that the physical characteristics of food packages affect consumers' calorie perception. It explained how the image of package shape can lead to a calorie estimation bias and how also irrelevant characteristics can influence calorie estimation through associations related to the food product nature. A potential direction for future studies could be to verify how other packages attributes affect consumers' calorie perception, since also color and material, for example, can affect calorie estimation, and not only package shape. Research findings by Fastila and Chrysochou have also highlighted possible implications for both public policy makers and managers. In order to increase food product's health image, experts should use package design for heath-positioned products within the specific category and cultural context. It is also important to report that explicit package design (nutritional claims, health claims, nutritional labels) play a fundamental role in conveying food healthiness. In fact, according to previous literature, explicit package design elements have a significant impact on calorie estimation (Chandon & Wansik, 2007), health-related inferences, consumption guilt (Mohr et al., 2012), food choice, and consumption. Although explicit package design elements are indispensable to communicate with the consumer at the time of purchase and to transmit product healthfulness, implicit ones further affect consumers' healthiness inferences about the food product. Certainly, content analysis is useful in order to identify types of marketing communications, but it has also limitations: it does not provide evidence of consumers' effective response to the communication nor of communicator's reasons. Consequently, future research is encouraged by Fastila and Chrysochou to analyze how implicit package elements affect consumers' response. Then, their research examined the effect of implicit package design elements separately, with the awareness though, that the interaction between elements affect consumers' response. In this regard, Festila and Chrysochou suggested some questionings: how do implicit and explicit elements interact? How do different implicit elements interact between themselves? Which individual and contextual factors shape consumers' response to this information? Then, future studies should also determine further implicit package design elements and how they are combined. Finally, the study conducted by Festila and Chrysochou does not take into account brands' market share, which are important for what consumers are exposed to. So, future researches could focus on this topic.

These results of the study by Magnier et all (2016) show that there is a strong connection between sustainability and naturalness in food product context (Verhoog, et al. 2003): sustainability perception is linked to a higher food product naturalness perception. Then, packaging and brand managers of food companies can only positively influence the quality perception of their products, by designing packages which express sustainability concepts. But that is not the same for managers of organic food products, since sustainable packaging seems as not having a great effect on organic products. In other words, organic food contained in sustainable containers do not appear as being more natural or as having better quality. If on one hand this research contributed on the literature, on the other hand it still has different limitations. Firstly, Magnier, et all. (2016) analyzed packages in which sustainability attributes were explicitly evident, thus future researches are suggested to test whether sustainable packages, in which sustainability is not so noticeable, could lead to high quality perception of products. Secondly, future studies could investigate if also other extrinsic attributes can influence food quality perception. Third, since sustainable packages do not have great influence on organic food quality perception, future research should study if sustainable packaging does not have further effect also on quality perception of food products obtaining other sustainability attributes. Fourth, future studies could also verify if higher perception of food quality, derived by sustainable packaging effect, is related to a better taste perception of the product. Last, future research could examine how changes in product quality perception influences consumers' purchasing behavior and their choices.

The research by Marckhgott E. and Kamleitner B. (2019) demonstrated that: packages surfaces can affect food naturalness perception, especially food in matte containers are perceived being more natural than food in glossy packages; consumers' perception of product naturalness is influenced by packages only when there are not stronger additional signals of naturalness on the container; naturalness perception induced by packages increases consumers' expected tastiness of the food and rises their willingness to buy the product. That aspect seems to be in contrast with previous studies on product healthiness, which are associated to a reduction in taste expectations (Mai et al., 2016; Raghunathan et al., 2006).

In this regard, future studies could analyze the interaction between taste expectations and perceived naturalness of the product. Moreover, future researches should investigate if surface's effects hold also for other packaged products.

Conclusion

It is crucial for many consumers to perceive the food they buy as healthy products and that naturalness, low processing and low fat are the typical signals that consumers use to assess the healthiness of a product. Research on this issue, however, has developed especially in recent years, when the choice of food to be consumed has taken a leading role in people's lives and health, as a determinant not only of the need for satiety, but above all of personal well-being. From the beginning, research in the food field has very often focused on the determinants of food consumption choices and, in most cases, have found that these factors mostly correspond to taste, cost, convenience, satiety, pleasure and weight control. However, the role of food packaging has become increasingly important. Packaging is a strategic element that can have a decisive impact on a company's image and therefore competitiveness. If, in fact, until recently what was purchased was the content, now the choice is increasingly conditioned by its envelope and the values it transmits. Packaging is considered by companies of any type of merchandise to be an important element for consumers' perception of the brand with a positive impact on its value and its recognizability. Its function goes beyond the purely practical aspect of protecting and transporting the product. It has the task of differentiating it on the shelf of shops and, above all, of large retailers, where the shape, the material and the element are free. Overall must be highly attractive, but the sustainability of packaging influences the perception of food health. The critical and increasingly sensitive attitude of people on the social and environmental effects of the entire product life cycle therefore also extends to packaging which is often the first and most obvious element and is fundamental in the decision-making process of purchase. Consumers' perceptions and evaluation processes regarding healthy and sustainable food consumption are perhaps the most complex and difficult to understand, which is why, to date, they form a major part of all marketing studies and Packaging.

In conclusion, this thesis offers an overview of the existing scientific literature trying to understand what factors of packaging transmit to the consumer the perception of food. This thesis paves the way for future studies on the relative importance of different policy instruments in addressing societal challenges of sustainable packaging.

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