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The Healthiness and Sustainability Trade-off: How Packaging and Food-Related Self-Control Influence Our Choices

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Introduction

People make 35.000 decisions every day, 226.7 just about food[1].

These two huge numbers make us think about how many options we face every day and, the evaluation of several attributes of them that we consider before to take a choice. Often the option selected is not suitable for us, but it has the enough characteristics that makes it better than others. So, each decision creates a trade-off between attributes that people decide to accept.

The trade-off, we would like to analyze in this study, wants to treat the sustainability theme and the healthiness one in food purchase intention.

In fact, the presence of both these attributes, environmentally friendly and healthy, cannot be taken for granted, especially when we speak about healthiness from a quantitative point of view.

How many times we decided to buy or not buy a product instead of a similar one for the package size, and we prefer a product more sustainable - thanks to a smaller use of plastic - rather than an healthier one - with single-serving packaging for control the quantity intake - or vice versa? Even if it is not conscious, we often did it without considering negative environmental or health consequences.

In a historical moment like this one, where both human and Planet health are at risk, we decide to investigate food packaging effect on purchase intention hoping to see an effect. In fact, observing consumers' influences by packaging we could define different solutions to solve the food-related trade-off between suitability and healthiness and shift it to a synergy.

Moreover, to have a deeper investigation on the theme, we decided to introduce a personal ability which can or not help consumers in food decisions: food-related self-control.

Particularly, this study is divided in three chapters that wants to illustrate, from both a practical and theoretical views, if and how shifting packaging size can affect people purchase intention, always taking in consideration individuals' health consciousness, food-related self-control, and environmental concern. More specifically, in the first chapter we will illustrate an overview concerning the impact that unsustainable and unhealthy choices had on human and our Planet.

Then, in the second chapter, through a literature review about our variables it will be explained how we structured our theoretical model.

Finally, in the last chapter, our results and conclusions, with some managerial and marketing implications, will be shown.

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[1] Robert Wesleyan College. 35,000 Decisions: The Great Choices of Strategic Leaders, updated 2020. https://go.roberts.edu/leadingedge/the-great-choices-of-strategic-leaders

Chapter 1- Healthy and Sustainability in food consumption

1.1 The importance of a sustainable healthy diet

During these days, personal wellbeing is acquiring importance and people are becoming more conscious regarding self-care and healthiness. A balanced diet is the base for health and correct nutrition. However, eating healthy is not enough. A diet has to follow healthy and sustainable requirements.

"*Sustainable Healthy Diets are dietary patterns that promote all dimensions of individuals' health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable.*"

These diets look at several aims. Regarding the healthiness, a diet should permit the growth and development of physical, mental, and social wellbeing of individuals in all the different stages of life; it has to contribute to prevent food-related diseases. From the sustainable point of view, a diet should preserve the biodiversity and planet health[2].

This shift from a healthy diet to a both sustainable and healthy one is essential for human future. Indeed, according to the *UN Sustainable Development Goals and the Paris Agreement*, people should change these habits by 2050. Without achieving that, future generations will receive a degraded planet and the number of food-related diseases will dramatically increase.

In fact, if a lever that can optimize both human and planet health exists, this will be definitely food. The food industry requires a huge number of resources and, at the same time, it permits human to survive and being well. However, nowadays food is having a negative impact both on Earth and humans. From the health point of view, the world is divided in two parts: the first one in which people are affected by related-food diseases for an excess food and unbalanced diets; the second one where the majority of populations suffers from malnutrition, namely, where more than 820 billion people has not sufficient food to live. Furthermore, regarding the sustainable aspect, food system represents one of the largest causes of environmental degradation.

[2] FAO and WHO (2019). *Sustainable Healthy Diets Guiding Principles*. http://www.fao.org/3/ca6640en/ca6640en.pdf

More specifically, according to several scientists, a change should be the increase of the consumption of vegetables, fruits, and legumes, instead of red meat and added sugar. It would be beneficial for both people and environment: this is called a "win-win" solution[3].

Other two issues that affect the food system are food waste and food loss. Often confused, food waste and food loss should be differentiated by who makes the choice. In fact, food waste is defined as the decrease in food quantity or quality chosen by retailers, food providers and consumers. Conversely, food loss is a decrease in quality or quantity of food follow-on a decision made by suppliers in the chain, excluding retailers. Regarding food waste, a more efficient use of land, resources as water and in general positive impacts would be generated just reducing it[4].

Concerns about food loss, this is due to production process, packaging and transportation; for instance, an inadequate packaging could lead to a food loss during the transportation phase. So, a more controlled and homologated industries would reduce food losses[5].

Moreover, packaging is one of the dangerous factors that affect our environment and, consequently, one of the changes requested in the 2019 *Sustainable Healthy Diets Guiding Principles* published by FAO and WHO[6]. Indeed, according to the 2019 ING report, the quantity of plastic used for food packaging is increasing over the years, following the world population growth. Even through, there is a common knowledge regarding the plastic impact on our planet, the use of such materials is considered essential. Since in the food system safety standards are very restricting, plastic is preferred in comparison with other materials by producers. Additionally, due to those legislation requirements, recyclized plastic cannot be used for food products: this re-used plastic has often an unknown origin and thus it is not approved.

[3] EAT Lancet Commission (2019). *Healthy Diets from a Sustainable Food System*. https://eatforum.org/content/uploads/2019/01/EAT-Lancet_Commission_Summary_Report.pdf
[4] FAO. *Food Loss and Food Waste*, update 2020. http://www.fao.org/food-loss-and-food-waste/en/
[5] Frontiers. *Food Security, Safety, and Sustainability – Getting the trade-off right*, update Feb. 21, 2020. https://www.frontiersin.org/articles/10.3389/fsufs.2020.00016/full
[6] FAO and WHO (2019). *Sustainable Healthy Diets Guiding Principles*. http://www.fao.org/3/ca6640en/ca6640en.pdf

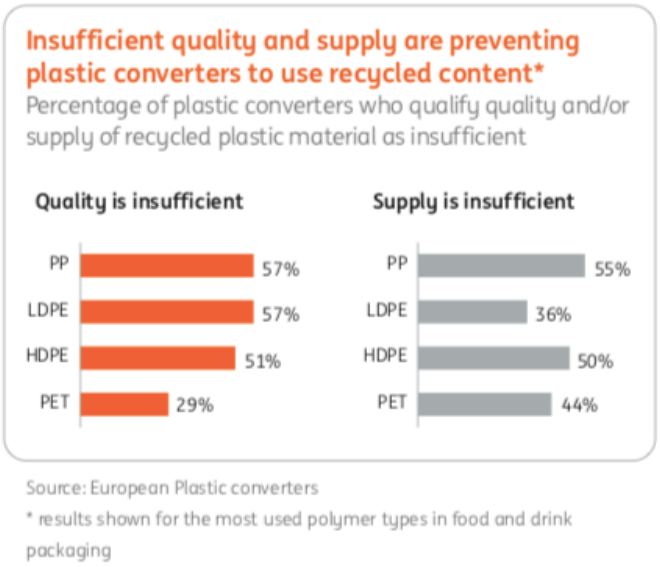

Figure 1. Percentage of plastic converters who qualify quality and/or supply of recycled plastic material as insufficient.

Source: ING, https://think.ing.com/uploads/reports/ING_-_The_plastic_puzzle_-_December_2019_%28003%29.pdf

Nonetheless, consumer behaviors are leading to this trend of plastic packaging. Following customers attitudes, producers supply product with wrapped with a big quantity of plastic[7]. People prefer single-serving packaging rather than family size packs to help their food-related self-control, or for reasons related to their busy life.

In fact, if people have to choose between two packaging with healthiness (represented by eating less thanks to the packaging) and sustainability trade-off, they always will prefer the heathier option than the more sustainable one. It happens because when individuals face two options, where the first one has self-centred benefits (commonly the healthy one) and the second one in favor of society (environmentally friendly choice), in the majority of the cases they will choose the first one. Since people won't see the synergy between healthiness and sustainability, and they will continue to choose the first instead of the second one, the environmental problems will persist affecting human health too[8].

In order to solve the trade-off between healthiness and sustainability, a global common view of healthy and sustainable diet, that still not exist, is needed. However, sustainable perspectives differ across European countries and there is not an integrated assessment of sustainability performance that

[7] ING (2019). *Plastic packaging in the food sector*. https://think.ing.com/uploads/reports/ING_-_The_plastic_puzzle_-_December_2019_%28003%29.pdf
[8] Food Navigator. *Health and Sustainability goals entail trade-offs*, update Dec. 1, 2014. https://www.foodnavigator.com/Article/2014/12/01/Health-and-sustainability-goals-entail-trade-offs

considers at the same time health, nutrition, social, and economic spheres. Even though Europe (EU) is in the first places in global ranks for technological efficiency in food sector, the environmental impact that EU generates is still too huge. In fact, EU diets are far from sustainable and health one. Achieving a common idea and creating an action plan, people will be able to manage the trade-off and turn it in a driver of changes. However, to do that, EU and all the other countries will need a transformation in food production, distribution, and consumption process.

The introduction of innovative strategies and reformulations of food sector could be good entry points for a trend of healthier and more sustainable food consumption. With a reformulation of food - that means a reduction of added sugar, fat, salt- and the use of less plastic and more recyclable materials for packaging - the human and the planet health will have an improvement. Meanwhile companies are ready for this transformation, some consumers are not: for instance, customers associate healthy food with not tasty one and, consequently, reduce the positive effects of industries changes.

To solve this issue a policy mix, which introduces changes in both supply and demand, is required. After defining price-based policies and introducing marketing standards, a direct intervention on the range of food choices to consumers need to be evaluated[9].

According to that, this research will be focus on the single-serving packaging role in purchase intention, considering the possible influence food-related self-control of individuals and how packaging can be used to solve the health and sustainability trade-off.

1.2 The self-control and its influence on food-related choices

Self-control is the human ability which permits to reach long-term objects soothing competing emotions, behaviours and impulses, that would interfere giving an immediate gratification. The capacity to exercise self-control is related to willpower: the power of staying focus on should make us behave notwithstanding the presence of conflicting temptations[10].
Moreover, scientists consider self-control one of the factors that lead people to achieve a more successful and satisfying life[11], as it was proved by one of the most famous self-control experiments: "the marshmallow test". During the experiment it was asked to some children to stay alone in a room

[9] SUSFANS (2019). *Turning sustainability trade-offs in the food system into opportunities*. https://www.wur.nl/upload_mm/e/f/d/7857997b-ac02-4027-a037-6a3a2b393478_SUSFANS%20policy%20brief_draft%203%20for%20LNV.pdf

[10] Psychology Today. *Self-Control*, update 2020. https://www.psychologytoday.com/intl/basics/self-control

[11] American Express. *8 Easy Ways To Increase Your Self-Control*, update Aug. 22, 2013. https://www.americanexpress.com/en-us/business/trends-and-insights/articles/8-easy-ways-to-increase-your-self-control/

with a marshmallow on a plate and to do not eat it, if they would like to eat two marshmallows later. This test shown that children who were able to hold out, having more self-control, have had higher academic grades than kids who did not resist[12].

Everyday there are several occasions in which self-control is tested. Just think to the common indecision between duty and pleasure, e.g. stay on social media rather than studying or working, procrastination or the continuous temptation of junk foods. Unfortunately, self-control is not unlimited and affects the quality of our choices. Indeed, a research on judges in court verdicts demonstrates that the last judgments of the day were poorer than the others of the same day.[13]

If people exercise self-control to turn down a temptation, it will be more difficult for them trying to resist to the next conflict. For instance, in a study published by the journal Psychological Science, some researchers tested individuals' self-control trough an experiment. In this investigation were asked to participants to think about a gourmet restaurant waiter who could not taste all the delicious foods that he served. Some responders tried to figure out him and have a real empathy with the position in which the waiter was. Subsequently, it was asked to all participants to see photos of expensive objects and asked if they wanted to be the owner of some of them. Different reactions were observed: the individuals that had more empathy for the waiter had less self-control and they declared to want the stuff without thinking about the price, rather than the other respondents, that were more conscious and reflexive, asked for the of products. Thanks to this study, it is proved that just identifying yourself in a person that has to maintain self-control, your willpower can decrease. Consequently, facing constantly different choices, people start to use less self-control on decisions with "low importance", like what eating[14].

In fact, a strategy often used to maintain self-control for important choices is to put less effort for secondary decisions or completely avoid them. Even the ex-president of US, Barack Obama, affirmed to use this strategy: "*I'm trying to pare down decisions. I don't want to make decisions about what I'm eating or wearing. Because I have too many other decisions to make...You need to focus your decision-making energy*"[15].

Furthermore, new research proposes rewards, routine, and willpower exercises as other possible instruments to increase self-control and, thus, health and life quality[16].

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[12] Psychology Today. *Self-Control*, update 2020. https://www.psychologytoday.com/intl/basics/self-control

[13] Forbes. *The Science Of Winning The Battle For Self-Control*, update Feb. 21, 2019. https://www.forbes.com/sites/carleysime/2019/02/21/the-science-of-winning-the-battle-for-self-control/#3640b66c4229

[14] Life Science. Losing it: Why Self-Control is Not Natural, update Apr. 10, 2009. https://www.livescience.com/3483-losing-control-natural.html

[15] American Express. *8 Easy Ways To Increase Your Self-Control*, update Aug. 22, 2013. https://www.americanexpress.com/en-us/business/trends-and-insights/articles/8-easy-ways-to-increase-your-self-control/

[16] Psychology Today. *Self-Control*, update 2020. https://www.psychologytoday.com/intl/basics/self-control

According to that, some devices were created to help people to exercise their self-control skills. For instance, some apps track and help to do not miss the daily workout or some Apple functionalities permit to block the apps to which owner is addicted.

Psychologies have discovered that individuals judge themselves based on their actions and behaviors, e.g. if someone is a volunteer or donates money, he/she will feel as a good person that care about others. Following that, researchers have noticed that people who have routine or ritual as a habit feeling conscious and able to use self-control and, consequently, use more that in their decisions[17].

Self-control is often associated by people more to food than to other choices. Probably because, as said before, it is one of the daily secondary decisions.

Additionally, self-control is also considered related to food, due to the fact that eating is considered as a consolation for people. This happens because when individuals try to maintain self-control, their brains burn glucose; once bloody sugar is low, a person will be less able to exercise self-control and he/she will search something to eat. Candies and high sugar foods are assimilated more faster and for this reason are considered more appetizing in a moment where self-control is required, but they are also more quickly to consume and will lead the individual to the point of start[18].

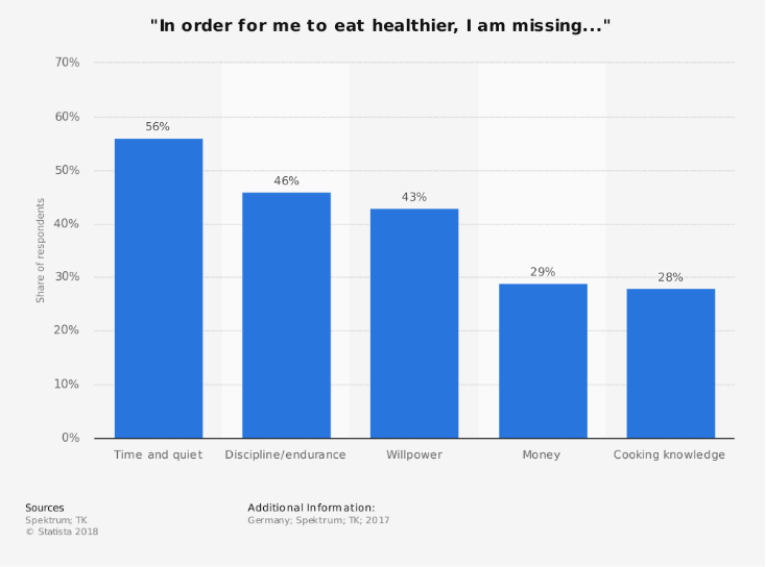

Figure 2. Share of people not eating healthier in Germany in 2017, by reasons.

Source: Statista, https://www.statista.com/statistics/825955/reasons-for-not-eating-healthier-germany/

[17] Scientific American. *Need More Self-Control? Try Simple Ritual*, update Aug. 21, 2018. https://www.scientificamerican.com/article/need-more-self-control-try-a-simple-ritual/

[18] Forbes. The Six Secrets Of Self-Control, update Sept. 17, 2012. https://www.forbes.com/sites/travisbradberry/2012/09/17/the-six-secrets-of-self-control/#7812da0042d4

Also, how shown in the graph, a lack of endurance and willpower -which are strongly related to self-control- are two of factors that influence more a healthy diet[19].
Focusing on food related self-control, many studies were done and one of them was led by researchers from the McGill University's Montreal Neurological Institute of Canada. In this research the link between weight loss and self-control has been investigated. In order to do that, researchers asked to participants to follow a diet to lose weight and then, one month later, they shown some pictures of tasty foods monitoring their brain activity. This test demonstrates that people who lose more weight had more activity on the self-control part of their brain. It means there is a real connection between food intake and self-control. So, improving or helping those skills can lead people to have a healthier life.

However, the same scientists came to another conclusion: there are many factors in the life of people that can modify their attitudes. In fact, individuals who during the experiment lose less weight could have more stressing situations than the others[20]. Indeed, researchers from the Laboratory for Social and Neural Systems Research of Zurich demonstrated that stressing stimuli lead people to eat junk food. For this experiment individuals with healthy lifestyle were chosen in order to see how stress can influence who normally does not eat junk snacks. Participants were divided in two groups: the first one was tested at a stress stimulus – by putting their hands-on cold water for three minutes- and then reunited with the second one. After the proof of the first one, were asked to both groups to choose a snack. People who tired the stress stimulus preferred more junk foods than the others. This study demonstrates that stress influences people self-control ability, even if their tendencies are normally healthy[21].

In line with that, losing weight and following a healthy diet should be associated with treatments that support self-control. For instance, as when they try to stop smoking, people started to think about when they need to smoke and if there is something in common in those occasions. This approach could be done also to reduce overeating and changing habits: *"I know when I'm stressed, I eat junk food, so I'm going to have another plan. Whenever I'm stressed and I have a craving for junk food,*

[19] Statista. *Share of people not eating healthier in Germany in 2017, by reasons*, Apr. 12, 2018. https://www.statista.com/statistics/825955/reasons-for-not-eating-healthier-germany/
[20] WebMD. *Self-Control Key to Weight Loss, Brain Scan Show*, HealthDay News, update Oct. 18, 2018. https://www.webmd.com/diet/news/20181018/self-control-key-to-weight-loss-success-brain-scans-show#1
[21] Focus. Salute: stress sabota cervello, addio self-control e ci si sfoga sul cibo, update Aug. 6, 2015. https://www.focus.it/scienza/salute/salute-stress-sabota-cervello-addio-self-control-e-ci-si-sfoga-sul-cibo

I'm going to have a healthy snack instead. You can actually train people to automatically enact those sorts of plans."[22]

Being conscious about when a person is not able to exercise food related self-control is a good start point for change. For instance, who know that cannot resist to a snack often buy a small pack instead of a big one, to have control of his indulgence.

According to that, a research from the University of Tennessee shows how using single-serving packed foods reduces the amount of food intake on subjects overweight, so with problem of food related self-control.

In particular, the study consisted to give to half of contributors twenty single pack of pretzels and to the others a normal pack of the same pretzels. Participants had to take pretzel and to eat a quantity of pretzels that they want during the next four days, and then return the part remaining. How hypnotized, the results shown that people who had the bigger pack ate more than others. This is due to the fact that when individuals are more served, they intake bigger portion. In fact, single-serving pack are good instrument to control quantity eaten and train people to heat less and healthier[23].

1.3 The acquired importance of quality food

Living in a world where there is an abundancy of food choices, especially in the Occidental Countries, makes following a healthy diet more complex. The reason why this happens is the possibility for people to have food wherever they want thanks to the spread number of supermarkets, restaurants, and food delivery services. Furthermore, the food packaging and the bombarding advertising lead to a continuous temptation for customers who change their habits from eating for nutrition to eating for pleasure[24].

Eating habits are among the major causes of healthy problems and diseases. The majority of the countries suffers from issues of malnutrition, by default or by excess[25].

[22] WebMD. *Self-Control Key to Weight Loss, Brain Scan Show*, HealthDay News, update Oct. 18, 2018. https://www.webmd.com/diet/news/20181018/self-control-key-to-weight-loss-success-brain-scans-show#1
[23] HUFFPOST. *Want to Eat Less? Choose Single-Serving Packages*, update June 3, 2014. https://www.huffpost.com/entry/single-serving_b_5078044
[24] Virtual Health Report. *Developing Food Awareness,* update 2017. http://www.virtualhealthresort.com/developing-food-awareness/
[25] CREA (2017), *Linee Guida per una Sana Alimentazione*, Roma. https://www.crea.gov.it/web/alimenti-e-nutrizione/-/dossier-scientifico-linee-guida-per-una-sana-alimentazione-2018

In the last 40 years, all the OECD, EU28 and G20 countries have been facing the increasing of overweight levels. Just think that the global level of obesity from the 1980 to the 2014 is duplicated[26]. In fact, according to *The Heavy burden of Obesity* report, three in five citizens of these countries have problem of overweight. Specifically, 40% of these overweight individuals is affected by obesity and the last 60% is in the pre-obesity stage. Considering Italy, in the 2018, the percentage of adults affected by obesity or pre-obesity was near or higher than 50%.

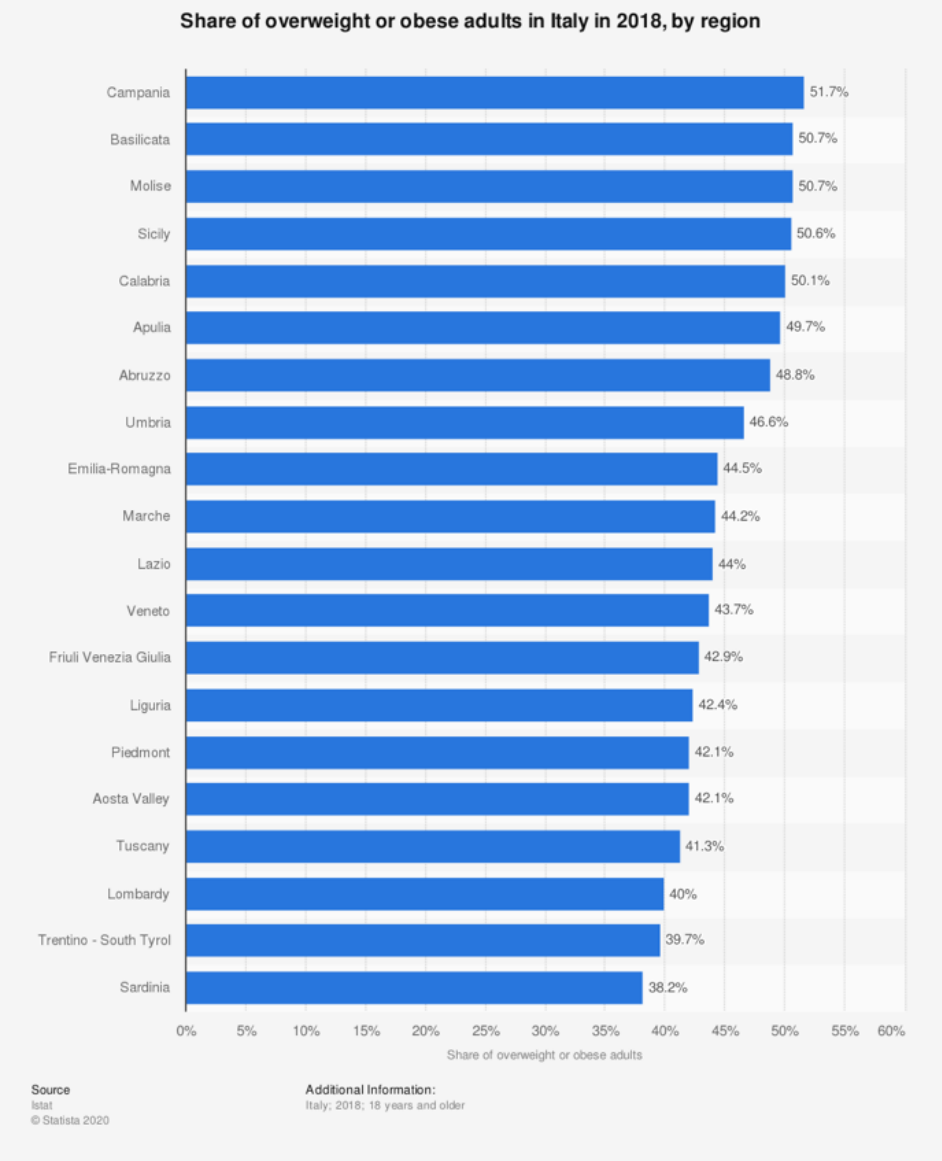

Figure 3. Share of overweight or obesity adult in Italy in 2018, by region.

Source: Statista, https://www.statista.com/statistics/794633/overweight-and-obesity-among-adults-by-region-in-italy/

[26] Ministero Della Salute. *L'obesità, uno dei principali problemi di salute pubblica, è causata nella maggior parte dei casi da stili di vita; e quindi una condizione ampiamente prevenibile,* update Apr. 10, 2014. http://www.salute.gov.it/portale/salute/p1_5.jsp?area=Malattie_endocrine_e_metaboliche&id=175

However, the obesity and, in general the diseases food and lifestyle related, are not something new, and all the countries are continually introducing and adopting new policy to solve this issue.

For instance , World Health Organization[27] published the *European Food and Nutrition Action Plan 2015-2020*, a report which defines the guidelines to achieve a specific goal: the reduction of all the preventable diet-related noncommunicable diseases and malnutrition – considering obesity and overweight – and the adoption of an healthy diet in the lifestyle of each European citizen. Furthermore, the report underlines the urgency of the overweight resolution taking into account the social class, as in the recommendation number 35, where it is clearly suggested to give to citizens the ability to make healthy choices considering socio-cultural and demographic characteristics. Moreover, considering that food-related diseases are even more commonly in the youngest ages, the Action Plan delineates specific recommendations dedicated to children. Such as in the guideline number 29, which proposes an introduction of rules regarding all forms of marketing that influences children to eat foods with high values of fats, energy, sugar, and salt.

Additionally, the World Health Organization provides practical advices to monitor healthy diet and suggests actions that Governments should implement. For instance, each country should encourage consumers' demand of healthy food through policies regarding the "correct" food behaviour or by increasing information in point of sales to increase awareness[28].

Even in Italy, CREA (*Consiglio per la Ricerca in Agricoltura e l'analisi dell'Economia Agraria*) in the 2003, and then in the 2018, had introduced the "*Linee Guida per una sana alimentazione*"[29], through which it tries to educate and support people in the lifestyle choices and to prevent food-related issues. This dossier, as well as giving statistics regarding the Italians' diet consumption - e.g. the frequency with fruits and vegetables are eaten -, defines some strategies to increase the consumption of healthy products and to reduce the eating of unhealthy ones.

In order to demonstrate how the Government and Nongovernment organizations care to a healthy nutrition, the Italian Ministry of Health issued a specific Ministerial Decree[30]. The purposes of this Decree are two: i) the creation of a "*Working table for the prevention and contrast of overweight and*

[27] World Health Organization (2014), *European Food and Nutrition Action Plan 2014-2020*, Copenhagen. http://www.euro.who.int/__data/assets/pdf_file/0008/253727/64wd14e_FoodNutAP_140426.pdf?ua=1
[28] World Health Organization. *Healthy Diet*, update Oct. 23, 2018. https://www.who.int/news-room/fact-sheets/detail/healthy-diet
[29] CREA (2017), *Linee Guida per una Sana Alimentazione*, Roma. https://www.crea.gov.it/web/alimenti-e-nutrizione/-/dossier-scientifico-linee-guida-per-una-sana-alimentazione-2018
[30] Ministro della Salute. *Tavola di lavoro per la prevenzione e il contrasto del sovrappeso e dell'obesità*, Jan. 18, 2019. http://www.trovanorme.salute.gov.it/norme/renderNormsanPdf?anno=2019&codLeg=69528&parte=1%20&serie=null

obesity" and ii) the realization of the *EU Action Plan Childhood Obesity 2014-2020*, which proposes recommendations specifically to children, in line with the previous mentioned "*European Food and Nutrition Action Plan 2015-2020*". It is important to underline that not only recommendations were widespread in Italy. In addition, some taxes have also been proposed such as the *Sugar Tax* by 2020 to incentivise buyers to purchase natural and healthy food.

Governments' actions are supporting the increase of healthy lifestyle trend, even if these are not the only ones. On the supply side, for instance, new innovative companies are entering in the food and beverage sectors introducing healthier products; on the other hand, old companies are trying to reinvent themselves and their products to compete. While on the demand side, consumers are becoming more educated and aware regarding health and wellness. Customers are starting to ask for more transparency regarding products' origins and ingredients. People care about the quality of what they eat, and they do not like product with artificial components which try to recreate natural flavours[31].

In fact, the report of The International Food Information Council Foundation, published in 2019, tell us that in 2018 43% of survey participants affirmed to look for "always" healthy food option, 52% "sometimes", and only 5% "never" [32]. Additionally, seven in ten individuals are willing to pay 50% more for a product with no artificial ingredient, rather than article of the same category to which they are familiar with[33].

Furthermore, even if sometimes busy life makes eating well complicate, a study of American Heart Association and Aramark shows a trend to a willingness to eat healthier. More than nine in ten (91%) employees are interesting to have a healthier workday lunch even though 56% are struggled when they are in on-site canteen or in front of vending machine. This is important because, how the same study indicates, for 77% of workers there is more probability to take healthy food decisions in the day if the lunch was healthful. So, according to the report, if people started to have healthy lunch as a habit, they would take more wholesome choices in general[34].

[31] Forbes. *Top Trends Driving Change In The Food Industry*, update Feb. 16, 2019. https://www.forbes.com/sites/juliabolayanju/2019/02/16/top-trends-driving-change-in-the-food-industry/#57bc93786063

[32] The International Food Information Council Foundation (2019). *Food Labeling Survey*, American Heart Association. https://foodinsight.org/wp-content/uploads/2019/01/IFIC-FDN-AHA-Report.pdf

[33] The International Food Information Council Foundation (2018). *Food and Health Survey*. https://foodinsight.org/wp-content/uploads/2018/05/2018-FHS-Report-FINAL.pdf

[34] American Heart Association and Aramark (2019). Building Healthy Lunch Habits at Work. https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics/healthy-work-lunch-choices

Finally, Millennials are also credited for the change of lifestyle habits of these last years, even if, according to a study of the University of Arkansas, the percentage of consumers who eat out has increased to 43.5% in the last years from 25.9% registered in 1970 (this trend on outside consumption is due to many factors that affect customers routine, such as a busier life than in the past). In facts, Millennials are one of the generations that dining out more, but they are pushing for an explosion of fast-casual chain, which use the same principles of fast food, except for the typology and quality of foods. While they are accused to do not eat well considering that they go out, 52% of organic consumers are Millennials and 52% of them consumes more vegetables than other generations. This healthier approach is based on the period in which they are burned, an era where the level of overweight is very high and there are easier opportunities to be informed and educated[35].

However, considering only the quality of food intake is not enough, people should combine an attention to a healthy quality of food to a quantity one too.

1.4 The control of food quantity intake and the single-serving packaging role

While in the past, people tried to reduce the number of calories daily intake, now they are focused more on the type of food eaten, e.g. "anti-sugar" and "anti-added sugar"[36]. This happened because during these last years, researchers have discovered that people should pay attention more on quality than quantity if they would like to lose weight and to have a healthy lifestyle[37]. The several standard diets that evaluate only calories have given way to personalized nutrition programs: nutritionists and new business, thanks to the technology assistance, offer these personalized nutrition programs that suggest which type of food intake, asking for only a bloody sample to the customer. Indeed, thanks to the DNA information it is possible to understand the tolerance of each individual to all food categories[38].

Focusing on quality product, consumers started to lose the control of quantity, justifying one-self with the healthy food nature. Moreover, the lower care regarding portion is moderated by prepacked food: when people started to ask a healthy and balanced meal, brands answered with adjusted portion size

[35] Forbes. *Food Leaders Take Notice: How Millennials Are Change The Way We Eat*, update Aug. 26, 2017. https://www.forbes.com/sites/deeppatel/2017/08/26/food-leaders-take-notice-how-millennials-are-changing-the-way-we-eat/#538eadab7175
[36] KIND (2019). *Healthy Snacking Trend Report*. http://kindassets.kindsnacks.com/KINDHealthySnackingTrendreport.pdf
[37] The New York Times. *The Key of Diet Loss is Diet Quality, not Quantity, a New Study Finds*, update Feb. 20, 2018. https://www.nytimes.com/2018/02/20/well/eat/counting-calories-weight-loss-diet-dieting-low-carb-low-fat.html
[38] Food Business News. *The personalized nutrition trend is rapidly emerging*, update Jan 23, 2018. https://www.foodbusinessnews.net/articles/11244-the-personalized-nutrition-trend-is-rapidly-emerging

through packaging[39]. In fact, many companies introduced food in single-serving pack according to the wellness goals of buyers. Consequently, consumers think that if a product is wrapped with a single-serving size, it would be the right quantity to eat. However, this is sometimes not true: a research of Boston University and Tufts University has shown that in several American fast-food chains portion sizes are becoming bigger and, consequently, different from the right quantity to intake[40].

Nevertheless, individuals continue to appreciate the single-serving packed foods. An evidence is given by the annual report of the famous snack company Mondelēz, in which 71% of respondents of an international survey consumes snack because this helps them to control their hungry and the quantity of calories intake in a day. Additionally, 66% of adults likes snacking for their portioning and 59% prefers to have more small snacks during the day, rather than few large ones[41]. In accordance to that, the Mintel's Snacking Motivations and Attitudes dossier reports that 5% of American adult consumes a snack per day and 70% two or more daily. According to this, the snacking business is increasing more and more every day: in 2019 it was valued $87 billion. With the growth of this business, the single-serving packaging is also become a norm like the traditional "family size" one[42].

In line with these two tendencies – quality related healthy diet and food quantity controlled through packaging – people are becoming more willing to pay attention on which type of food they buy. As shown in Figure 4, when individuals are buying snacks, they consider the portion size and the quantity of sugar, fat and energy that the product provides. Moreover, 40% of buyers are willing to pay more for heathy and functional snacks[43].

[39] PreventPack. *Individual Packaging grows in Importance*, update 2020. http://www.preventpack.be/dossier/individual-packaging-grows-importance
[40] Forbes. *Despite Consumers' Shift Towards Healthier Food, Study Finds Fast-Food Portions Are Only Getting Larger*, update Mar. 6, 2019. https://www.forbes.com/sites/garystern/2019/03/06/new-study-reveals-more-calories-and-larger-portions-served-at-fast-food-restaurants/#5bce7f483c17
[41] Mondelēz and The Harris Poll (2019). *State of Snacking, Global Consumer Snacking Trends Study.* https://www.stateofsnacking.com/wp-content/uploads/2019/11/2019_MDLZ_stateofsnacking_report_GLOBAL_EN.pdf
[42] Viking Masek. *Snack food industry trends: Small is the new big in snack packaging*, update Nov. 21, 2019. https://vikingmasek.com/packaging-machine-resources/packaging-machine-blog/how-snackification-is-shrinking-food-packaging
[43] Nielsen (2018). The Power of Snacking: Welcome to the Snacking Revolution. https://www.nielsen.com/wp-content/uploads/sites/3/2019/04/welcome-to-the-snacking-revolution.pdf

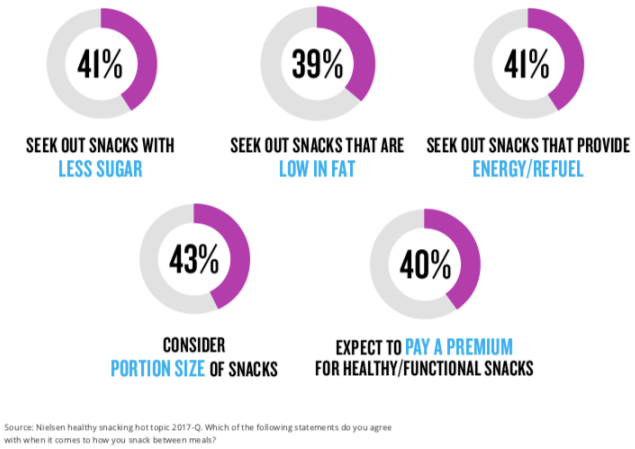

Figure 4. Shoppers seek healthy snack: health trends evident in snacking with sugar, fat and portion sizes among top concerns.

Source: Nielsen (2018), https://www.nielsen.com/wp-content/uploads/sites/3/2019/04/welcome-to-the-snacking-revolution.pdf

Finally, it is important to underline that the tendency to buy prepacked food is not only for snacking and for dining out. In fact, people buy prepacked products also for eating at home. This is evident just watching how supermarkets, like Carrefour, decided to create different prepacked sizes for the same product, even if this latter is thought for cooking and eating at home[44].

1.5 Different reasons why people buy food in single-serve packaging

In 2018 Technavio, a market research company, analyzed the market size of single-serve packaging and estimated the grow during the 2018 -2022 period (without considering the Covid-19 pandemic). This analysis shown an increasing of size by over 30.5 billion of American dollar[45].

This is a clear evidence that the tendency of consumers to buy food in single-serving packaging is rising and there might be several causes.

As said before, consumers' healthy awareness and portion control are two of the bigger causes of this trend: buyers, especially Millennials, want to know how many calories are intaking and with single pack is easier being aware of it. Secondly, even if people can be influenced by their indulgent and decide to eat something sweet or "not healthy", small size and single-serving packaging permit them

[44]PreventPack. *Product that better meet the needs of customers*, update 2020. http://www.preventpack.be/examples/products-better-meet-needs-consumers

[45] Technavio (2018). *Global Single-Serve Packaging Market 2018-2022*. https://www.technavio.com/report/global-single-serve-packaging-market-analysis-share-2018?tnplus

to buy the product and feel less guilty. Smaller pack is a perfect balance for people who want to allow themselves a junk food, without becoming over control[46].

However, the socio-demographic changes of these last years are other factors which lead to food in single-serving pack consumption.

Firstly, the frenetic life of everyone is reducing the time to spent for cooking, going to shop food, and having a meal at home. Just thinking to the number of people that eat breakfast while they are going to work. Moreover, women are busier than in the past – due to their work and social life – but they are continuing to be the family component more dedicated to the household activities. Since women has less time to do everything, they started to buy prepacked foods with the right portions, in order to reduce the cooking time[47].

Additionally, the family composition is changed: people are more often living alone or in a smaller household than in the past. For instance, between 1960 and 2018 the American population has been increasing gradually with two effects: i) the households' number is risen from 53 million to 128 million and ii) its composition is changed.

In 2019 U.S. single-person households was the second larger component of households' population, about 28%. Since single households has been rising from 1970 to 2019, the households composed by two parents and one child are decreased from 56% to 40% during these years[48].

In order to buy the right quantity of foods for this smaller family, consumers buy products with smaller packaging than in the past. A good example could be a pack of cookies: the number of cookies eaten by a family composed by one or two individuals will likely be smaller than a bigger one. Consequently, the cookies pack will keep open for a longer time and, due to the loss of their flavor and freshness, cookies would become garbage[49].

In fact, another reason why people decide to purchase single-serving packaging is to reduce the food waste and trying to be more sustainable. Conversely, the quantity of plastic and other materials, used to produce single-serving pack, is bigger than the quantity used for big packs.

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[46] Packaging Strategies. *Five trends pushing snack food packaging*, update Nov. 8, 2018. https://www.packagingstrategies.com/articles/90757-trends-pushing-snack-food-packaging
[47] PreventPack. *Individual Packaging grows in Importance*, update 2020. http://www.preventpack.be/dossier/individual-packaging-grows-importance
[48] Statista. The average number of people per household in the United States from 1960 to 2019, update Nov.28, 2019. https://www.statista.com/statistics/183648/average-size-of-households-in-the-us/
[49] PreventPack. *Individual Packaging grows in Importance*, update 2020. http://www.preventpack.be/dossier/individual-packaging-grows-importance

According to that, as long as people continue to buy single-serving packaging they will prevent food waste, but they increase the plastic impact on our environment and, consequently, their choices couldn't be defined sustainable.

1.6 The impact of packaging on human and our planet health

In the last few years, the theme of sustainability has been increasing in popularity. People are more conscious regarding the impacts of humans' actions; they are trying to reduce them and to change their habits towards more ecofriendly ones.

However, there is not a unique definition of environmental sustainability. In fact, Government, companies, organization non-profits and environmental agencies define this concept in a similar but not identical way.

For instance, the United Nations World Commission on Environment and Development describes the sustainability with a long-term prospective and thinking about future generations: *"sustainability is the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs".*

Another definition comes from an environmentalist, Paul Hawken, who explains the sustainability as an issue that can permit to stabilize the existing disruptive relationship between humans and the Earth.

Lastly, the International Union for Conservation of Nature (IUCN) defines the sustainability as the capacity of humans to improve the quality of their life without consuming more than the capacity of the Earth. Indeed, IUCN underlines that the World population is constantly increasing and, if they will continue to consume this huge quantity of resources, they will early finish them[50].

From a practical point of view, sustainability is not just about environment, it regards human health and society considering the long-term implications of the past and the present actions. Moreover, the concept of sustainability is referred to several spheres of human life like transportation, nutrition and, consumption[51].

[50] The balance small business. *What is environmental sustainability?* Update Aug. 11, 2019. https://www.thebalancesmb.com/what-is-sustainability-3157876
[51] Environmental Society. *What is sustainability and why is important?* Update 2020. https://www.environmentalscience.org/sustainability

Regarding nutrition, from 2012 to 2018, the IFIC *Foundation's annual Food and Health Survey* reported an increase, from 35% to 41%, of sustainability importance as one of the factors which influence food and beverage buyers' decisions.

However, in 2019 Survey the number of consumers who considers environmental sustainability an important factor is decreased to 27%. This happened because people knowledge regarding environmental sustainability grew over time and they are more conscious about what is sustainability and what is not. Without having the right quantity of information, buyers cannot base their choices on environmental factors considering they do not know if the product is actually sustainable. In fact, 63% of 2019 respondents said that it is difficult to understand if a food decision is environmentally sustainable. Additionally, two-thirds members of this group affirm if they had product information more easily, the sustainability would be a more relevant factor of decision made.

According to 2019 *Food and Health Survey*, youngers, especially Millennials, are more environmentally sustainable educate than older adults: 49% of respondents between 18 and 34 years old have an aware diet, in contrast with only 27% of over 50 respondents. This is also evident from how older consumers are more influenced by the trust in a brand than younger: 85% of over 65 years old consumers said the brand has an impact on their food and beverage purchases, in contrast with a lower 66% of young buyers.

Furthermore, 63% of consumers recognizes the importance of ingredients as purchase decision factor: food and beverage labels are acquiring weight on buyers' choices[52].

An issue of the food and beverage sectors that must be solved is huge consumption of packaging - "*the technology and material for enclosing or protecting products for distribution, storage, sale, and use"* (Soroka, 2002) - which have a strong impact on environment[53].

Indeed, according to 2019 report of PlasticsEurope, one of the biggest trade association in Europe, in 2018 the plastic industry turnover in the country was more than 360 billion euros. In particular, packaging, with 39.9%, represented the largest end-use market of plastic in the same year[54].

[52] International Food Information Council Foundation. *Food Trends to Watch in 2020*, update Jan 6, 2020. https://foodinsight.org/2020-trends/
[53] FAO (2011). *Appropriate food packaging solutions for developing countries*. http://www.fao.org/3/a-i3684e.pdf
[54] PlasticsEurope (2019). *Plastics – the Facts*. https://www.plasticseurope.org/application/files/9715/7129/9584/FINAL_web_version_Plastics_the_facts2019_14102019.pdf

In agree with what already said, in a 2019 survey of Ipsos, 15% of respondents identify overpackaging of consumption good one of the most important environmental issues[55].

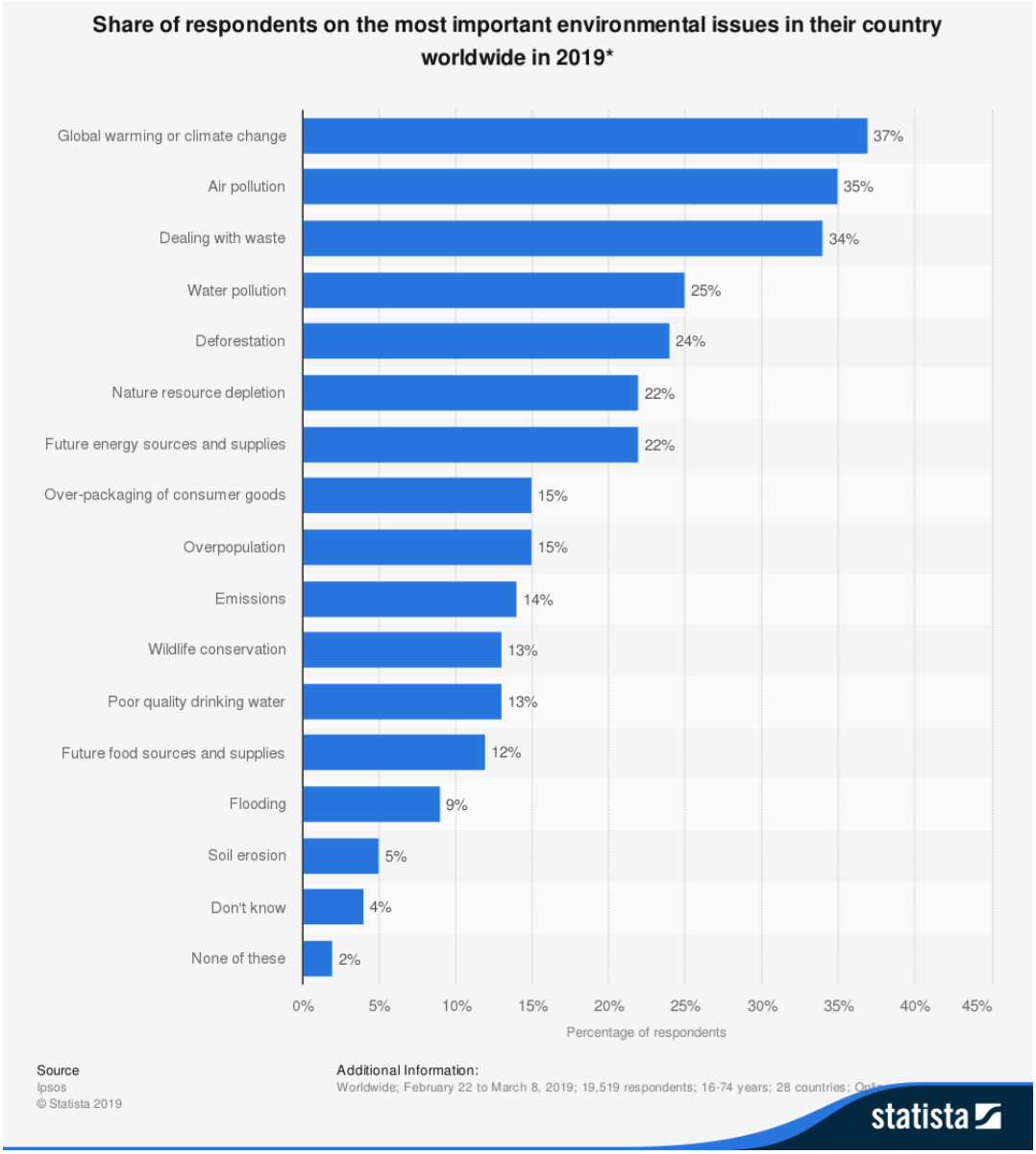

Figure 5. Share of respondent on the most important environmental issues in their country worldwide in 2019.

Source: Statista, https://www.statista.com/statistics/895943/important-environmental-issues-globally/

Just looking at the average cart of supermarket, it is notable why plastics and other materials of packaging are one of the largest contributors of pollution. In fact, the World Economic Forum said if we will continue to use this quantity of plastic for wrapping products, there will be more plastic than

[55] Statista. Share of respondents on the most important environmental issues in their country worldwide in 2019, update Apr. 29, 2019. https://www.statista.com/statistics/895943/important-environmental-issues-globally/

fish in the ocean by 2050. Furthermore, scientists affirm that this increasing use of plastic will lead to, not only ecological, but also health issues[56].

Packaging of a product is the first thing that buyers see, and it is one, sometimes the only one, element which influences consumers' decision making. For this reason, investing in branding and packaging is very important for companies. However, this necessity to make the packaging attractive and the cost to do that are more important than making it recyclable.

Even if consumers are more responsible and growing technologies are helping to reduce environmental impact, many companies continue doing packaging mistakes. Two common examples are the overpacked products for delivering and the single-serving packaging size[57].

Regarding delivered food, as said before, people have not much time to cook and often they prefer order food. The delivery food is a $1.2 billion market, which is expected to quadruple in the next three years. But, this quantity of money is also accompanied by ultra-packaged meal-kit that are hard to recycle or non-recyclable. An industry research shown just 23 recyclable plastic packaging for delivery meals, in a total of 72. This means a huge quantity of unrecyclable materials with a strong impact on environment[58].

Single-serving packaging size is a big problem: the greater is the mix of materials used, the less recyclable they are. The small size of packaging makes them difficult to be resold to recycler companies. One solution might be use biodegradable packaging, though they require higher cost of energy and more consumption of resources as water[59].

The issue of plastic waste is evident and being aware is not enough, solving the problem step by step is what our planet needs. In fact, Governments are introducing laws to reduce plastic consumptions. In October 2018, the European Parliament decided to ban ten typologies of plastic by 2020. Moreover, they expect to reduce 25% of plastics not recyclable and to recycle 90% of beverage bottles by 2050.

[56] FoodTank. *Rethinking Food Packaging May Address the Plastic Crisis*, update Aug. 2019. https://foodtank.com/news/2019/08/rethinking-food-packaging-may-address-the-plastic-crisis/
[57] The Guardian. *Good product, bad packaging: top sustainable packaging mistakes*, Jul. 18, 2014. https://www.theguardian.com/sustainable-business/2014/jul/18/good-product-bad-package-plastic-recycle-mistakes
[58] National Geographic. *Eat your food, and the package too*, update Aug. 2019. https://www.nationalgeographic.com/environment/future-of-food/food-packaging-plastics-recycle-solutions/
[59] The Guardian. *Good product, bad packaging: top sustainable packaging mistakes*, Jul. 18, 2014. https://www.theguardian.com/sustainable-business/2014/jul/18/good-product-bad-package-plastic-recycle-mistakes

Nonetheless, companies, as Unilever and Nestlé, are improving their technologies to create sustainable and recyclable packaging[60].

This sustainable trend it is followed by consumers too. According to a research in the Italian market, 49% of consumer stop to purchase products with unsustainable packaging, 89% prefers cardboard packaging instead of plastic one and, 55% of respondents in a rage of 19 and 29 years old affirms to have changed brand due to packaging reasons[61].

Even if there are initial effort to reduce plastic waste, some issues need to be still solved. In fact, if people are not educated or make mistakes in recycling materials, all the companies' energies are worthless. According to an American study conducted in 2018, just 9% of plastic in the world is recycled. It is important that companies invest in new technologies for recycling and alternatives materials to use instead of plastic. People should reduce single-use plastic and all the other types of packaging to not just decrease the negative impact but, have a positive one[62].

[60] FoodTank. *Rethinking Food Packaging May Address the Plastic Crisis*, update Aug. 2019. https://foodtank.com/news/2019/08/rethinking-food-packaging-may-address-the-plastic-crisis/
[61] Converter. *Italian consumers vote against unsustainable packaging*, update June 12, 2019. https://www.converter.it/en/italian-consumers-vote-against-unsustainable-packaging/
[62] Mintel (2020). *Global Packaging Trends 2020.*

Chapter 2- Literary Review

2.1 Healthiness and sustainability in food: trade-off or synergy?

United Nations defined sustainable production and consumption as "doing more and better with less" (UN,2017). However, we cannot forget the reason why people produce and consume foods: satisfying consumers' needs.

Production and consumption spend energies and resources, consequently they have a higher or lower impact on environment according to the way in which they are done (*S. Coderoni et al., 2020*).

In particular, focusing on the food sector, the methods used to produce and consume products have a very huge impact on environment. It is estimated that 25% of greenhouse gas are caused by food production and, 40% of environmental damages are derivate from consumer household purchases. To solve, or at least reduce, this trend, a shift to a production that excludes toxic materials and pollution emissions and a consumption without waste are necessary. The aim of companies and consumers should be a shift on the circular economy, which would lead to a more efficient use of resources and energies without negatively affect the environment (*T. Laureti et al., 2018*). However, this goal could be achieved only when it will be completely understood by both offer and demand sides of all the countries (*J. Aschemann-Witzel, 2015*).

Even if the food industry has an important part of responsibility on pollution and resources waste, its environmental impact is often not considered or underestimated. This is evident from a lack of knowledge regarding energy and resource consumption in the sector: many consumers consider food waste as an unused product only, without reflecting on all the production stages needed to make it, just thinking to the waste of energies for transporting and producing a product not consumed (*A.C. Hoek et al., 2017*).

Joyce et al. (2008) asked to customers what they think when a conversation theme is "environmentally friendly" or "environmental sustainability" and, in line with as said above, the answers were mostly related on non-food stuffs e.g. alternatives way to produce electricity. In addition, when *A.C. Hoek et al*. (2017) propose to respondents some foods that were both eco-friendly and healthy, people perceived these two attributes, but only because said by researchers: "I would assume products can be both healthy and environmentally friendly, yes ... but only because you just mentioned it". These are other clear evidences of consumers distance from food environmental impact and its industry chain (*A.C. Hoek et al., 2017*).

In order to understand why people are so distance from sustainable foods or, even if they are aware, they do not behave consistently, a step by step analysis will be done starting from the previous literature. Additionally, the synergy, often saw as trade-off, between health and sustainability will be addressed and contextualized with the Theory of Planned Behavior (*Ajzen, 1988, 1991*).

Starting from the beginning, a definition of "green food" is essential: a food is called "green" when it satisfies the characteristics to be organic, or it is a pesticide free product, local or it is produced following integrated-pest-management practices (*E. C. Ricci et al., 2018*).

According to *Goetzke et al.* (2014) *Hemmerling et al.* (2016) and *Lee and Yun* (2015), this type of products are seen less processed, more natural, and healthier than conventional ones (*E. C. Ricci et al., 2018*). However, even if it is demonstrated that organic food production does not generate greater risk than conventional one, many studies evaluated some risks from green food, as Salmonella or the presence of mycotoxins on free pesticide cereals, that could lead to an absence of consumers' trust (*J. Aschemann-Witzel, 2015*).

Furthermore, in previous studies there is a common base used to analyze which variables influence people in the purchase intention of green food, and more in general on eco-friendly product: The Theory of Planned Behavior.

This theory evaluates specific antecedents that drive human behaviors. Specifically, the Theory of Planned Behavior (TPB) identifies three variables that affect consumers' behavior: *subjective norm,* defined as social pressure or reference individuals' expectations; *attitude,* which refers to the evaluations of possible consequences related to a specific behavior; and *perception of behavioral control*, expressed as personal perception to be able to behave. Regarding the last variable, the perception of control on behavior is affected its turn by individual features -e.g. money possibility or physical effort- and external circumstances, as product availability, which were added at the framework in some studies. In fact, during the years this model has been modified adding new drivers or focusing on specific ones to better understand the several influences which affect consumers' behavior regarding eco-friendly products.

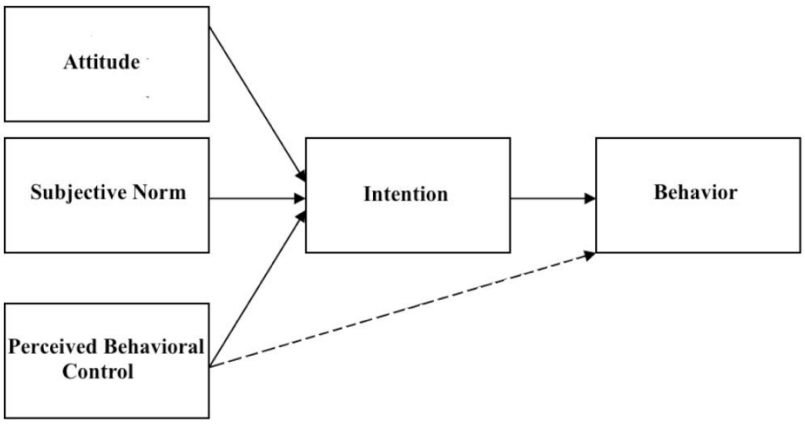

Figure 6. Theory of Planned Behavior framework (Ajzen, 1988)

For instance, *Aertsens et al.* (2009) demonstrated, through a variant of the TPB model, the effect of *product availability* on eco-friendly food purchase intention: smaller is the product availability, smaller will be the intention to buy green food. According to *A.C. Hoek et al.* (2017), who observed, discussing on healthy and eco-friendly food, that product availability in a supermarket is the base of people buying decisions. In fact, product availability is defined as a deterrent of purchasing green products and it is associated to the "attitude-behavior gap" (*E. C. Ricci et al., 2018),* expressed as the gap between claimed behavior and actual one that often lead to a discrepancy between studies and reality. Indeed, according to *F.A. Yamoah et al.* (2019), the favorable consumer attitudes regarding sustainable products have been overestimated due to respondents answers different from how they actual act -attitude-behavior gap-, that makes the study and the Theory of Planned Behavior more difficult to apply and less representative. However, it is demonstrated that these psychological variables are more powerful predictors of environmental-related purchase intention than demographic factors. For this reason, the TPB is considered a pillar of environmental behavior research (*A. Worsley et al., 2015*).

Moreover, other researches had analyzed possible factors that affect the three original ones (social norm, attitude, and perceived behavioral control). As in the case of *T. Laureti et al.* (2018) who, following the intuition of other authors, added the variable *environmental concern* in the TPB model to investigate on the purchase intention of organic products. Indeed, *T. Laureti et al.* (2018) observed that the degree of environmental concern, defined as how much individuals care about safeguarding the environment, affects behavior of eco-friendly consumers: individuals more concerned about environment are more likely to buy green products than others. Additionally, other researches demonstrated that purchase and consumption of eco-friendly food is positively correlated to other sustainable behaviors as recycling, energy saving, and using alternative transportation (e.g. bike or

public transport rather than car): another evidence in favor of the positive effect of environmental concern on green product purchase (*T. Laureti et al., 2018*).

In general, people make decision regarding what they want to buy on the basis of product attributes and the importance that they give to them. These attributes are characterized by two dimensions: social orientation and the time perspective. Social orientation sees on one hand pro-self-orientation and, on the other hand, pro-social – defined also as altruistic and ethical- motives. Time is referred to the moment in which the action consequences will happen in long or short term (immediately).

Referring to food choices, consumers are very influenced by price, taste and healthiness of the food, rather than sustainability which is often considered less important. However, food purchase intention is not just influenced by attributes, but by the extent to which food has the specific attribute according to buyers: the relationship between abstract consumer values and concrete product perceptions is moderated by motives and attributes (*Brunsø et al., 2004*).

Previous researches observed among a specific consumer segment the perceptions of health and sustainability high related each other. According to that, between these two attributes there is a synergy based on several reasons. First of all, some behaviors, as buying green foods, can be saw as both healthy and eco-friendly. Moreover, healthy and sustainable attributes needed motivation and willpower to resist to temptations and choose product with long run benefits (both of them does not show immediate repayments). Finally, being both long term benefits attributes, they not giving direct tangible evidences and so, they are based on credence, that its turn implies trust and confidence on such attributes (*M. C.D. Verain et al., 2016*).

Specifically, *M. C.D. Verain et al.* (2016) evaluated among different food categories the attribute perceptions (taste, price, healthiness, and sustainability) of three consumers' clusters. The groups were made following participants responds to some question regarding the importance of food attributes, according to that the clusters are conscious (pro-social), average, and pro-self. After separating people in groups, researchers asked to evaluate on a seven-point Likert scale the value of each attribute perceived in several foods of four categories (meat, fish, vegetables, and dairy). In line with previous studies, with this experiment it was demonstrated that taste and price had the higher scores for pro-self cluster, and the lower for conscious one. Moreover, the opposite was for sustainability that showed higher score in the conscious group rather than pro-self one. Concerning healthiness, its trend is similar to the sustainable one, even if the difference between conscious and average scores is not significant. Furthermore, the perception of healthiness-sustainability synergy is

higher for the conscious cluster than the average one, and the pro-selves did not perceive it: for this last group there is not a real difference of healthiness level between regular and sustainable foods, even if the environmental perception did not differ among the three clusters for the majority of food categories.

The synergy perceived by conscious and average consumers could be explained by the halo effect. In fact, this bias, occurs when a people evaluating a product perceived an attribute (in this case healthiness) based on another perceived characteristic (sustainability) that is not related to the first one (*Vega-Zamora, 2013*). So, in this case, a food seemed as eco-friendly it is seen as healthy too (*M. C.D. Verain et al., 2016*). And at the same time, a reason why individuals decided to buy green product is healthiness. More in detail, *health conscious* is a motive for green purchase (*F.A. Yamoah et al., 2019*): another evidence that a synergy between these two attributes exists. Furthermore, the perception of both these attributes from consumers does not mean a certain purchase, in fact *Van Dam & Van Trijp* (2013) observed that the purchase intention, linked to healthiness and environmental friendliness, is not always translated in actual behavior, as said before regarding the attitude behavior gap (*A.C. Hoek et al., 2017*).

Summarizing, food-related healthiness and sustainability have more in common and more a consumer perceives eco-friendly attributes important, more understood the healthiness-sustainability synergy (*M. C.D. Verain et al., 2016*). However, there is something that lead customers to choose between health and sustainable food. Indeed, a trade-off exists: when people face of two product, one eco-friendly and one healthy, they will choose the second one. It happens because what distinguishes these two attributes is the social orientation dimension, called also motivational level. Health food lead to personal benefit, even if through long term, in contrast with environmental product which are more related to social aspects and, consequently, to weaker motivations (*A.C. Hoek et al., 2017*).

A strong motivation, regarding health, that lead people to buy some foods instead of others is the diet they are following or in general to avoid eating too much. In fact, lose or maintain weight is very important for individuals who carry to this aspect when they purchase at the supermarket. Probably, the reason why consumers take care of how much they eat is because loss or gain weight is consequence evidence in the short run respect to other health effects (*A.C. Hoek et al., 2017*). Moreover, to achieve this personal interest individuals overpass environmental issues. For instance, a good instrument to control the quantity of food intake is using single-serving packaging, which at the same time increase the quantity of pack materials end up on waste (*J. Aschemann-Witzel, 2015*).

Analyzing the influence of packaging on purchase intention it will be shown as this variable is important for consumers' judgment on product and consequently purchase.

2.2 The influence of Food Packaging on Consumers

When we speak about food package, we commonly thinking it as "the container that holds, protects, preserves and identifies the product, and which also facilitates its handling, storage and commercialization" (*Rodríguez Tarango, 2003*). However, packaging is not just a logistic tool: It is a powerful behavior driver which should require the same attention of others marketing instruments (*G. Simmonds et al., 2017*).

Even if consumers do not know, packaging has the essential role of attracting them and encouraging their purchase behavior. Especially in a self-service retailing environment, in which food packaging can influence buyers before the brand selection (*G. Ares et al., 2010*). Just thinking that over three-quarters of purchase decisions regarding food or drink are made at the supermarket, 90% of buyers evaluate only the front pack before purchasing, and 85% of them make a choice without considering other alternatives. So, the point of purchase and the packaging attractiveness are essential for a product to be part of the annual 0,7% of foods bought towards the 3.000 alternatives in a point of sales (*G. Simmonds et al., 2017*).

One issue of consumers, who face indecision between two or more foods, is the impossibility to try them before the purchase. As a result, customers decide to buy or not a product based on its packaging. In fact, packaging has the capacity to influence buyer expectations, and for this reason it is important to match the real characteristics of the product with the expectation created by the pack. In fact, when a consumer is attracted by a packaging and decide to buy and taste the product, he/she has probably high expectation and if they won't correspond with the reality, he/she will never buy those (*G. Ares et al., 2010*).

Understating the importance and power of packaging effect on purchase intention, several researchers has decided to study it, considering the different attributes of package and their combination that can affect consumers' perceptions.

Concerning color, in general human brain associates them to moods: warm colors (e.g. yellow, orange and red) connote excitement, rather than cool colors (e.g. green and blue) which trigger association with relax. Being perceived as calm colors, cool tonalities on food packaging are also associated to healthier and more natural products. Indeed, for this reason several companies that want to show their

green and healthy product modified their labeling, as Coca-Cola who differentiates Coca-Cola life (in which ingredients there is stevia instead of sugar) from the traditional one with a green packaging to give immediately the perception of a more natural product.

According to that, *T. J.L. van Rompay et al.* (2016) observed the effect of these different colors on yoghurt packaging and how it was perceived by consumers. Their study shown that people perceived yoghurt package with cool color healthier than the warm colors one and, additionally, the packaging had an influence on the taste. Indeed, respondents evaluated, after tasting the product, the yoghurt from green and blue package healthier than the other one even if there were the same milk in different boxes.

Figure 7. The two variants of packaging (healthy versus unhealthy) used in the experiment of T.J.L. van Rompay et al. (2016).

Moreover, other studies examined the effect of package colors on consumers, and more in detail on their willingness to purchase. As *G. Ares et al.* (2010), who demonstrates, using the word association, how colors influence the purchase intention. World association is a psychological and sociological methodology that consists on asking to individuals to write the first association that comes to their minds. In this way, it is possible to understand what is relevant for consumers in the purchase phase. In this case, word association was used to ask people what thought regarding several packages of milk desserts that differs for colors and shapes. Thanks to this experiment, it is demonstrated that colors packaging recalls the flavors of food contained and, consequently, affects purchase intention. Indeed, in this study respondents prefers packaging with colors trigger associations with sweet and vanilla (*G. Ares et al., 2010*).

Figure 8. Two examples of milk dessert packaging used in the experiment of G. Ares et al. (2010).

As said above, the impossibility to taste foods before bought them is a problem for consumers, who try to solve evaluating packaging. In this sense, another strategy used by marketers, to help consumers making evaluation through packaging, is inserting the image of food contained or making the box transparent: two different ways that permit at least to know the visual aspect of products. Even if it can be apparently seemed as a little help to buy, actually it is a method to companies to increase purchase intention. In fact, it was observed that showing pictures of food solicit human salivation and increase hanger and, consequently, the willingness to purchase (*G. Simmonds et al., 2017*).

Furthermore, considering the kind of image to use on packaging is not enough. An experiment conducted by *Gofman et al.* (2009) not only found that using a picture of the product on the box, in particular a bottle of wine on a box of it, increase purchase intention, but also that changing the color of such image has an effect. Indeed, they shown that using a purple wine bottle graphic instead of a green identical one has a higher positive effect on purchase intention. In addition, *Piqueras- Fiszman et al.* (2013) tested the impact difference between food-related information in the form of text or images. According to their study, it is evident that shifting from textual information regarding food ingredients and flavor to images referred to them increase willingness to try and purchase intention of buyers. Other evidences of the importance of packaging for customers (*G. Simmonds et al., 2017)*.

Even if, in general, pictures are more immediate and effective than text on packaging food (*G. Simmonds et al., 2017*), during these last years it was growing a literature regarding food labeling and how labels can affect customers' behavior. It happens because people not only want to be attracted by packaging, but they use it to be informed regarding what they are buying, especially when consumers are aware of sustainable and healthy themes (*R. Aitken et al., 2020*). In fact, environmental and health conscious people are less vulnerable to visual packaging attraction because more skeptical regarding the real level of healthiness of green product and with a higher food-related knowledge than traditional consumers. It is evident from the experiment of *T. J. L. van Rompay et al.* (2016) that

presenting the same box of yoghurt– considered also above for the color experiment - in a green supermarket and in a discount one, noticed that customers from the first place perceived the product more healthy because influenced by packaging and purchase environment than the second ones. However, on the other hand, consumers are used to purchase on green supermarket are more critical than others and, thus less influenceable by images and more careful to labeling.

Labels are the only tool that permit consumers to know if a product is an organic or a convectional one. According to that, when people see a clear, honest and transparent food label (a foundation for consumers' choice) they perceived more behavioral control. Indeed, thanks to the labelling buyers can be more informed regarding healthy, sustainable and social benefits that they can achieve buying such product. It leads to an increase on personal relevance and importance of decision, and consequently a higher level of purchase intention (*R. Aitken et al., 2020*).

Finally, marketers use shape as a packaging attribute that can affect consumers' purchase intention and consumption too. In fact, considering the growth of food-related healthiness importance in these years, the package shape has increasing its role as a trigger. For instance, *Koo & Suk* (2016) observed that packaging can evoke healthiness thanks to shape, and not only colors as said before. It is demonstrated that, when consumers seek health products, slim and tall packaging shape are more appreciated because the product is perceived healthier than another one with wide and thick package. It happens for a simple reason: when people face a food-related choice, if they want to buy health product, probably their goal is maintaining or losing their weight and trying to eat and be a healthy person. In line with that, they probably would like their bodies seem good, like slim and tall, and then they prefer packaging with these characteristics. Indeed, *N. Yarara et al.* (2019) shown that people are particularly influenced by humanoid body shape of packaging for a self-referring effect, as with advertising acted by beautiful individuals. Especially, women with a normal or high IBM are subjected to a self-referring effect: they would like to have a slimmer body and so they buy food with slim and tall humanoid shape packaging.

Figure 9. Packaging used as stimuli in the experiments of N. Yarara et al. (2019)

However, the preferences for slim and tall food package is seem demonstrate only when people are searching a health product. So, marketers should consider the effect that they want to elicit on consumers and choosing the corresponding packaging cues (*I. van Ooijen et al., 2017*).

For instance, when people considering healthiness, from the quantity and calories intake point of view, they try to buy single-serving packaging.

For instance, regarding environmental concern people, they considering packaging not only to indirectly evaluate food, but as something that as an impact on the environment. Accordingly, *M. van Birgelen et al.* (2009) demonstrate that consumers aware of effect of their actions on environment are willing to trade off some attributes of product in favor of buying one with a more sustainable packaging. In line with that, this study provides a partial support to the Theory of Planned Behavior because observed an eco-friendly intention and action (buying eco-friendly product), but an intention-action gap regarding a sustainable disposal of packaging.

In conclusion, we can affirm that packaging is a powerful tool that affect both consumers' purchase intention and consumption. Therefore, other researches should be done considering different variables that can increase or decrease these relationships. However, these studies cannot ignore the environmental and healthy perspectives which nowadays are essential in both consumers and companies point of views.

2.3 From Self-Control to Food-related Self-Control

Everyday people face situation in which they have to take decisions that, even if small, can affect their life. Usually these choices give two possibilities: the first impulsive with a short-term aim (e.g. temptation), and the second one more rational and with a long run goal. What people decide depends on which force, between self-control and impulse, wins the conflict. More in detail, this conflict is called Self-Control Dilemma and it is deep studied by psychologist and behavioral researchers. However, before analyzing the dilemma a better overview regarding impulse and self-control is needed (*W. Hofmann et al., 2009*).

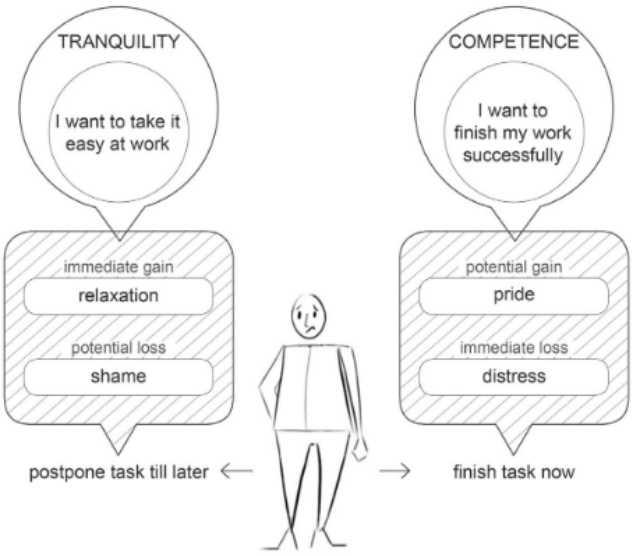

Figure 10. The Self-Control Dilemma in a work context, in which impulsive choice (temptation) is represented by tranquility and reflective one by competence (D. Ozkaramanli et al., 2017).

Starting with impulse, it can be defined considering its four characteristics. Firstly, impulse is specific: it takes place when a general motivation (e.g. hunger) encounters a stimulus present in the environment in which the individual is located (e.g. a bar of chocolate in the kitchen after a stressful day) (*Baumeister & Heatherton, 1996*). In line with that, impulse is characterized by an immediate sense from both temporal and spatial points of view – it leads to a short run goal – and its value decrease with an increasing of spatial or temporal distances (*Ainslie, 1975*). Thirdly, impulse is based on a primitive hedonic response to a temptation; it owns a strong power and incentive value that lead people to follow it (*Loewenstein, 1996; Metcalfe & Mischel, 1999*). Finally, an impulse influences people to act with a certain behavior in favor of the temptation or desire. Indeed, when individuals act impulsively, they do not think too much and sometimes they are not even aware of what they are doing before the end of the action. According to this, impulsive acting is perceived natural and simple. However, if people just follow their instinct and impulse, they won't never achieve long-term goals

(*Bogg & Roberts, 2004; Freud, 1930; Tangney et al., 2004*). Thus, the force that help human to resist to temptations is self-control, which is defined as "the capacity to override or inhibit undesired behavioral tendencies (such as impulses) and to refrain from acting on them'' (*Tangney et al., 2004; W. Hofmann et al., 2009*).

Since the ancient Greece, the conflict between self-control and impulse was studied, even if the forces were known with different label: passion and reason. In fact, Aristotle and Socrates already spoke regarding the people weakness of following passion instead of reason. Moreover, Aristotle assumed that it can happen that individuals do not act with judgment because they are overpowered by their passion (*W. Hofmann et al., 2009*).

This theme was expensively analyzed by pioneers of psychology, as William James (1980-1950) who identified two forms of will: a healthy and an unhealthy one. The first will defined by a perfect balance between impulses and ideal motives; the unhealthy one defined as an explosive will that does not permit to inhibitions to arise (*W. Hofmann et al., 2009*).

Furthermore, Sigmund Freud (1933-1949) was the first at studying human behavior considering the conflict between interior forces. In fact, he defined three principles: id, super-ego and ego. The id expressed as desirers and impulses driver in contrast with the Super-ego saw as the moral and rational part of humans. Finally, the ego which permit to maintain in balance the other two forces and oriented to the reality (*W. Hofmann et al., 2009*).

However, Baumeister and his collaborators who analyzed deeper the human self-control and its consequences. They defined it as a skill with limited resource that, as a muscle, needs energies to work (*Baumeister & Heatherton, 1996; Baumeister et al., 1994*). For this reason, other researchers studied how train self-control and several strategies to empower and maintain it (*W. Hofmann et al., 2009*).

Even if several scholars had observed and defined different theories regarding the Self-Control Dilemma, all of them are agree regarding the presence of two systems, impulsive versus reflective, that influence human behavior.

When people follow impulses, they associate stimuli in the environment with clusters in the long-term memory and their corresponding behaviors. For instance, if individual sees a candy, he/she will start to think about the past experiences that he/she had with candies and the feelings and sensations that he/she proved. According to that sensations and feelings he/she will have internal triggering

conditions - as hunger – and he/she will react with a certain behavior (e.g. eating the candy and enjoying it). Over time cluster associations become stronger and individual will react more quickly to stimuli through automatic triggers and impulsive behavior: when she/he will see again a candy he/she will spontaneously eat it (*Seibt, Ha¨fner, & Deutsch, 2007*).

Referring to reflective system, it has the function of leading people to achieve long-term goal. Moreover, its role is to make deliberate judgements and strategy of actions and inhibiting behavioral responses (as impulses). Rather than the impulsive system, the reflective one is slower and needed more energies to work. Indeed, this system is dependent of control resources, control necessary to stop human to impulsively act. So, a reflective system flexible and able to mental transformations needs a higher level of control to not fails in quickly rejection of triggers comes from stimuli in the environment (*W. Hofmann et al., 2009*).

To sum up, in front of a choice people have two possibilities to behave, the way that they will decide depends on an internal struggle between reflective and impulsive systems also called The Self-Control Dilemma. When a stimulus is perceived by human, several behavioral schemas are made by the different systems. Which behavioral schema will be activated will be chosen by a competitive winner-takes-all process. In fact, the two system use different processes to activate behavioral schemas and the winner is the only one followed by individual. However, the possibility to be activated depends on process used, environmental circumstances, and the strength of two systems (*W. Hofmann et al., 2009*).

According to this theory, *M. Gillebaart et al.* (2015) observed different reaction of people with different train self-control (low versus high) in front of decisional conflict. They decided to explore such effect following past research of *Hofmann et al.* (2012) in which it was hypothesized why people with high self-control are better in solving dilemmas. *Hofmann et al.* (2012) affirmed that individuals with high self-control solve easier conflicts than others only because they perceived less desire and value of impulse behavior. Even if there are not empirical evidences regarding *Hofmann et al.* (2012) hypothesis, *M. Gillebaart et al*. (2015) demonstrated that the possible reason why persons with high self-control have better chance to not fall into temptation is based on their resolution strategy. Indeed, high trait self-control is quicker in solving self-control dilemmas than low one, and it is not because the conflict is perceived smaller, but for a more effective strategy of self-control dilemma resolution (*M. Gillebaart et al.; 2015*).

Therefore, as said above, internal and external circumstances affect people choices. For instance, there is a specific condition that lead persons to be less strong regarding reflective decisions: the ego depletion condition. In fact, under ego depletion people are not capable or motivated to use their self-control and evaluate pros and cons of each options. Consequently, individuals will be easier inclined to temptation and impulsive behavior. In particular, researches regarding ego depletion condition are done especially with food-related choice. Indeed, when people are under ego depletion condition, they follow their food-related temptations without fighting with their self-control (*E. De Vet et al., 2015*).

E. De Vet et al. (2015) also demonstrated that consumers under ego depletion are easier influenceable by heuristics than people with high level of self-control. Where heuristics means simple decision rules that can affect human decision-making process focusing on only some information instead of all and so, conserving self-control resources. Specifically, in this case it was examined the effect of social proof, a heuristic that consists on the people tendency to follow and imitate choices of others. Referring to food, an example could be the labeling "best-seller" used to influence consumers to buy a product.

The effect of social proof heuristics on people under ego depletion was observed thanks to an experiment. In this study it was ask to respondents, both with high and low self-control, to choose a cheese between several options during their grocery. Additionally, to see the effect of the heuristic, participants were divided in two groups, one subjected to social proof heuristic based on a low-fat cheese identified as the best-seller, and the second one without manipulation. Ego-depletion was evaluated by a self-reported questioner.

The results shown that people in low self-control condition are more affected by heuristics than high self-control consumers in which the social proof effect was not significant. In fact, in the heuristic condition low self-control respondents bought the best-seller product in contrast with high self-control individuals, who did not modify their decision-making process (*E. De Vet et al., 2015*).

In line with that, Fay C.M. Geisler et al. (2016) observed that also on people, who usual train their self-control through restrained eating, it is common to see a change in decision intake under ego depletion condition. Restrained eating refers to dieting rules that drive individuals to exercise their self-control regrding eating behaviors. Specifically, when a person self-imposes to follow a restrained diet, he/she eats controlling the food intake instead of eating when he/she is hungry (*Herman & Polivy, 1980*). So, every time that people following this diet and he/she need to eat, he/she face a

food-related self-control dilemma defined by The Goal Conflict Model of Eating Behavior (*Stroebe et al. 2013*). According to this model and the Self-Control Dilemma, hunger individuals are motivated by two conflicting goals: enjoying delicious food (and satisfying short-term objectives) and trying to maintain control on their weight (long-term objective).

In front of a palatable dish people are tempted to change their motives from controlling their weight to eat in unhealthily but satisfying way. In fact, several mechanisms started in human mind: firstly, increase the power of the enjoyment motive with a decreasing of the controlling one, then the attention on the dish growth and people start to consider enjoyment instead of weight control stimulus cues, finally they teat.

In accordance with The Goal Conflict Model of Eating Behavior restrained eaters are better in maintaining self-control and focusing on long-term goals for a simple reason. An exposition of delicious dish in restrained eaters activates not only enjoyment, but weight control cues too, and so successful restrain eating persons solves the self-control dilemma considering the long run goal more important and valuable than the short run one (*G. M. van Koningsbruggen et al., 2011*). However, under ego depletion also them need more effort to maintain their eating habits and not shift their motivation to unhealthy eating, it leads to higher mental fatigue (*F.C.M. Geisler et al., 2016*).

In fact, on dieter palatable food cues trigger hedonic judgements focusing their attention on them and making enjoyment goal more important than weight control one. As demonstrated by *Veltkamp et al.* (2008), who asked to respondent to evaluate items size and observing that people perceived bigger objects useful for their need. In particular, they shown pictures of a glass of water, an item always not considered very valuable, and they noticed that thirsty respondents saw it higher than others and the reality. Moreover, this phenomenon is visible for both successful and unsuccessful dieters. Therefore, even though people are equally stimulated by environmental cues, their self-control can change the behavior taken (*G. M. van Koningsbruggen et al., 2011*).

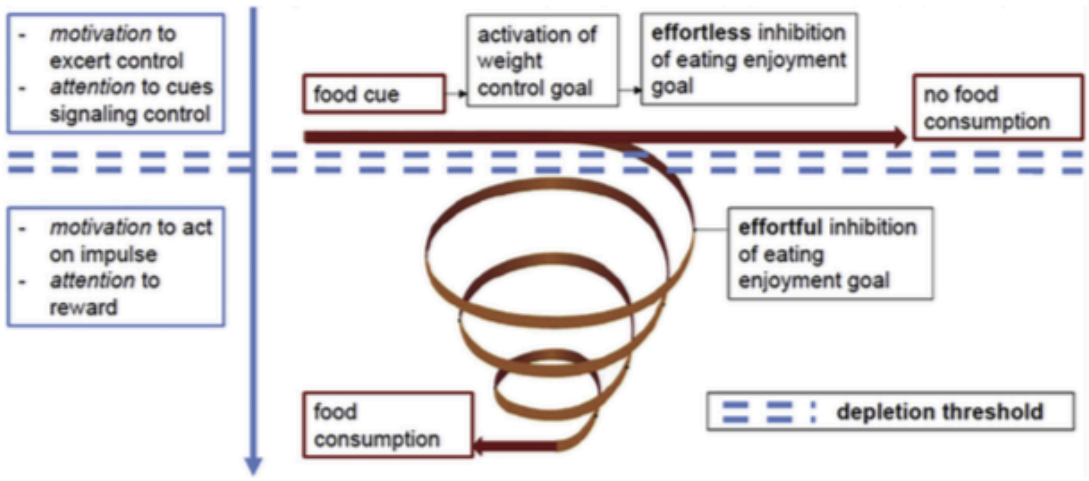

Figure 11. The figure, mde by a combination of Process Model of Ego Depletion (Inzlicht & Schmeichel, 2012) and the Goal Conflict Model of Eating Behavior (Stroebe et al., 2013), shows how in a situation of Ego-Depletion people's motivations and attentions shift from long-term goals to short-term ones. And it means a shift from no food consumption to food consumption through the downward spiral of restrained eating (F.C.M. Geisler et al., 2016).

The impulsive-reflective dual system was also used by *P. Honkanen et al.* (2012) to investigate a possible moderating effect of food-related self-control on unhealthy snack consumption. Indeed, thanks to their study it is demonstrated that there are positive relations between snack consumption and attitudes towards unhealthy snacking (that represent reflective process) and impulse snack buying tendency (as impulsive route). In addition, through a moderated regression analysis they confirmed that there is a moderation effect of food related self-control for these relationships. When the effect of attitude is strong, the self-control effect is strong too, consequently there is a positive interaction between food-related self-control and attitude on consumption. While, when tendency of impulse snack buying is strong, food-related self-control is weak, that means a negative interaction between these two variables about consumption.

Thus, attitudes towards unhealthy snacking and impulse snack buying tendency are positively associated to consumption of sweet. Moreover, the research found that there is a moderating effect of self-control on the relationship between behavior and both attitude and impulsive snack buying tendency. So, if individuals have low level of food related self-control, they possibility to fall in temptation and eat unhealthy snack depends more on individual impulsivity than attitudes, which do not have a high weight in the decision (*P. Honkanen et al.; 2012*).

Thanks to *P. Honkanen et al.* (2012), it is possible to say that high self-control is not necessary means healthy food-related decisions: even though people have high self-control, if they own positive attitude about sweet, they won't not able to avoid the temptation eating the snack.

However, self-control absence is one of the biggest causes of overeating. Therefore, scholars investigated some tools that can improve or help it. For instance, some studies identified self-affirmation as an instrument to empower self-control. According to the Self-Affirmation Theory, people become able to control outcomes maintaining a sense of self-integrity, being coherent and morally adequate (*Steele, 1988*). Self-affirmation can be expressed through thought and action about important domain from the personal point of view. It is evident that people engaged in self-affirmation activities are more capable to maintain self-regularity resources and increase self-control focusing on long-term goals, instead of immediate temptations. In fact, in experiment conducted by *S. Churchill et al.* (2018), it was observed that self-affirmation can increase self-control, in particular on people with low eating self-efficacy (defined by *Ames et al.*(2012) as personal beliefs in being able to manage healthy eating in stressful situations) (*S. Churchill et al., 2018*).

In addition, other studies investigated methods to help people with low food-related self-control and tools to reduce the self-control dilemma. For example, *D. Weathers et al.* (2017) discovered that using a clicker counter for tracking all the bites of food intake can help individuals without food-related self-control. In particular, controlling food eaten by clicker counter those achieve faster satiation as high self-control persons without perceiving the self-control dilemma (enjoyment versus healthiness). Moreover, during social events (e.g. meal with friends) tools like the clicker counter for tracking are more effective in monitoring self-control than in lonely moment in which people can better focus their energy on self-control. Indeed, during a social event people have to be focus on conversation and on giving the right impression to others, consequently several mental energies are used to these activities instead of food-related self-control and a bite tracker help them on it (*D. Weathers et al., 2017*).

Furthermore, when people care about the quantity of food intake, they can control that through food packaging. In fact, according to many studies, controlling food portions influences significantly the quantity of food eaten. In line with that, food companies started to produce smaller packaging to support people in food-related self-control application (*Hannum et al., 2004; Hollands et al., 2015; Rolls, 2003; Rolls et al. 2002; Wansink, 1996; Young & Nestle, 2003*). However, a study analyzing the effect of food-related self-control on single-serving packaging buyers is not done yet.

2.4 Literature gaps

Prior researches about the themes above analyzed – trade-off between healthiness and sustainability, packaging attributes and purchase intention, food-related self-control – are already conducted, but there is not a study, according to our knowledge, that considers all of them in the same experiment.

Starting from the trade-off, academics as Hoek had largely observed what people think about healthy and sustainable foods and why they often prefer to buy and consume product with the first attributes (*A.C. Hoek et al., 2017*). However, the theme of healthiness is always seems from a quality point of view; for instance observing consumers attitude regarding organic food or the shifting of animal meat with the clean one (noted also as in vitro meat, animal meat grown using bioreactors instead of animals (*Bekker G.A., Fischer A.R.H., et al., 2017*)).

For this reason, a research about food sustainability and the quantity aspect of healthiness should be evaluated. In fact, according to many studies, size, packaging, and portion of food can affect significantly the quantity of food intake (*M. L. Scott et al., 2008*). In particular, focusing on packaging, *Rolls et al.* (2004) found that people eat more food when it is given in a large package instead of in a small one. They tested how many chips people eat in a small and in a large bag and they demonstrate that chips from the large ones were significantly more eaten than in the small package.

While packaging dimension has a positive effect on people healthiness (*M. L. Scott et al., 2008*), it negatively affects environment. As demonstrated by *U. Fresán et al.* (2019), who detected about GHG emissions produced by different packaging sizes (single packaged serving and two options of multi-serving packages). According with their analysis, comparing with single-serving packaging, multi-serving ones are responsible for less quantity of GHG emissions. Thus, when people prefer single-serving packaging than multi-serving they prefer food with healthiness attributes rather than sustainable product.

Moreover, how shown before, packaging attributes can affect consumers purchase intention, but past research did not consider the possible influence of environmental concern and conscious healthiness of people. In fact, a deeper evaluation of packaging attribute with environmental and healthy background should be done. As packaging size affects the quantity of food intake, it could be a cause of some purchase choices by consumers.

Finally, food-related self-control is commonly studied regarding the quantity of food eaten and so, related to the consumption moment. Though, there are not present studies that investigate the presence

or not of a self-control effect on the relationship between food packaging - used as a self-control tool (*Hannum et al., 2004; Hollands et al., 2015; Rolls, 2003; Rolls et al. 2002; Wansink, 1996; Young & Nestle, 2003*)– and purchase intention.

In conclusion, the aim of this thesis is to understand the possible effect of different typologies of packaging on consumers' purchase intention, considering the influence of food-related self-control. Nonetheless bearing in mind the trade-off consumers face when they need to choose product based on healthiness (form the quantity point of view, as avoiding overconsumption) and sustainability.

Chapter 3 – Marketing Analysis

3.1 Theoretical framework and hypotheses generation

During the first two chapters of this thesis it was explored, firstly from a practical point of view and then from a more theoretical one, the impact that food-related choices have on people and on the environment. Moreover, the relative issues – food overconsumption and environmental impact of food industry - have been explained and analyzed through evidences and previous literature.

However, arrived at this point, other variables that can affect consumers' purchase intention should be combined with the healthiness and sustainability trade-off framework. In accordance to that, in this chapter research, that tried to implement on the structure considering individuals' food-related self-control, will be illustrated. In particular, in this chapter will be practically presented how the experiment was conducted and what its results had highlighted.

Thus, to achieve this aim, two hypotheses were tested:

H1: Consumers' purchase intention is more likely to be positively affected by a large package containing single-serving ones than a large package containing unwrapped food portions.

H2: The purchase intention of a large food package containing smaller ones will be higher for consumers with high food-related self-control, while the purchase intention of a large food package containing unwrapped portions will be higher for consumers with low food-related self-control.

The model used to test these hypotheses is a 2x2 with Packaging Typology as independent variable, Purchase Intention as dependent and Food-related Self-Control as moderator. Nonetheless, Health Consciousness is present in the model as control variable, and people Environmental Concern was present in the questionnaire but analyzed, as second moderator, in a separate study.

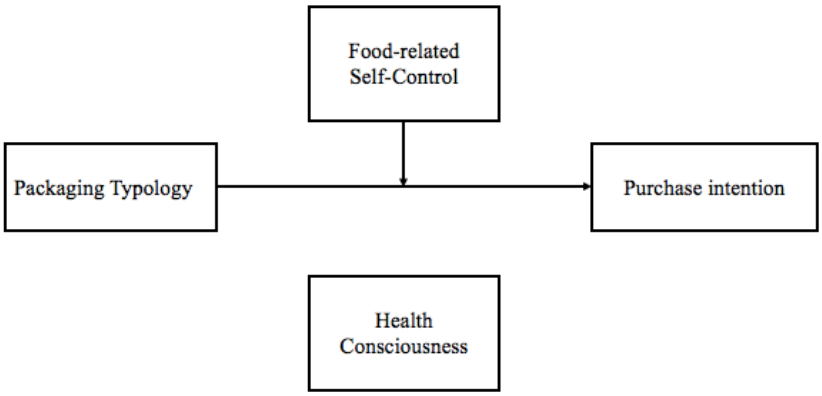

Figure 32. Model used in the study that sees: Packaging Typology as independent variable, Purchase Intention as dependent variable, Food-related Self-Control as moderator, and Health Consciousness as control variable.

3.2 Methodology

3.2.1 Participants

The research has been conducted through an online questionnaire (see Appendix) created on Qualtrics MX platform and sent by social networks. We were able to include 269 respondents in our experiment and we did not give them any reward for their participation. The average age was 33.26 years old and females constituted the 65.8% of the sample. More than half of the sample was well educated since 59.8% had a university degree. The questionnaire has been distributed online in Italian mainly through social networks, since the sample was entirely made up by Italians.

3.2.2 Experimental Design and Stimuli

The original idea for this experiment was conducted it on field, but for the moment in which the research has been conducted – during the Corona virus pandemic and the country lockdown - an online questionnaire was the best choice.

According to that, three different stimuli were created to test the Packaging Typology impact on Purchase Intention. But, also in this case, a change during the work was done.

Initially, the idea was to create three different packages of cookies as stimuli: a large package without information regarding the portion size, a large package with single-serving ones inside, and a third large package with portion size. We considered the first one as control because it is the more common

in a real supermarket environment. Thus, the model thought was a 3 (Packaging Typology: large without portion size information, large with inside single-serving packages, and large with portion size information) x 2 (Food-related Self-Control: high versus low). However, through a pretest it was observed that the differences between the first and the third Packaging Typology stimuli were not enough to be completely perceived by participants: sign that labels still not enough considered or read carefully.

Accordantly, we decided to shift from a 3x2 to a 2 (Packaging Typology: large without portion size information as control and large with inside single-serving packages) x 2 (Food-related Self-Control: high versus low) model. In the questionnaire there is the third stimuli too, but the answers related to such scenario are not considered in the results.

Moreover, we decided to use three images of packages created by us to not use branded packaging that could affect respondents' purchase intention.

Figure 13. Large Package without portion size information used as control

Figure 14. Large package with single-serving packages

Figure15. Large package with portion size information, stimulus not used in in the questionnaire

3.2.3 Procedure

As a between-subject study, each respondent was randomly assigned to one of the third, after became two, conditions. Below the stimulus they faced some questions regarding: Purchase Intention, Food-related Self-Control, Health Consciousness, and Environmental Concern. Also, the order of each group of questions related to the variables were presented with different order randomly assigned without considering the scenario.

The presence of diverse scenarios is fundamental to see the difference impact that packaging has on consumers' purchase intention. Moreover, the decision of randomizing also the variables' sections order was thought to do not create bias on the mind of respondents. In fact, for instance, if all the participants would face Environmental Concern as first section, rather than another variable, they could give more attention to such variable instead of others and being influence by it.

For all the respondents the questionnaire starts with a short introduction where it is presented to participants the creators of the questionnaire and the aim of it: "Dear respondent, thank you in advance for the participation and the attention. We are conducting a market research regarding all the items that affect consumers' food purchase choices. There are not correct or incorrect answers. All the answers are anonymous, and they will be used for the research only." (Gentile rispondente, ti ringraziamo in anticipo per la partecipazione e l'attenzione dedicataci. Stiamo conducendo una ricerca di mercato in merito alle priorità che influenzano il consumatore nelle sue scelte di acquisto in ambito alimentare. Ti ricordiamo che non esistono risposte giuste o sbagliate. Le risposte sono anonime e verranno usate solo a fini di ricerca).

Purchase Intention has been measured by three sentences that participants have to evaluate on 7 points Likert scales from "Totally disagree" (totalmente disaccordo) to "Totally agree" (totalmente d'accordo): "I would purchase the showed product" (Comprerei il prodotto illustrato); "I would consider buying the showed product (Prenderei in considerazione l'acquisto del prodotto illustrato); "The probability that I would consider buying the showed product is high" (La probabilità che prenderei in considerazione l'acquisto del prodotto illustrato è alta) (Haws K.L., et al., 2014).

For the purpose of our moderation analysis, the level of Food-related Self-Control has been evaluated by other three sentences to which respondents has to weigh on 7 points Likert scales from "Totally disagree" (totalmente disaccordo) to "Totally agree" (totalmente d'accordo): "I have a hard time breaking bad food habits" (Faccio fatica a evitare le cattive abitudini alimentari); "I wish I had more self-discipline" (Vorrei avere più autodisciplina); "Sometimes I can't stop myself from eating" (A volte non riesco a smettere di mangiare) (Pirjo Honkanen et al., 2012).

Three sentences to evaluate, also with 7 points Likert scales, has been used to analyze the level of Health Consciousness, which represents the health interest of participants: "I chose food carefully to ensure the good health" (Scelgo attentamente il cibo per garantire la mia buona salute); "I didn't consider myself as health conscious consumer" (Non mi considero un consumatore attento alla

salute); “I think often about health related issues” (Penso spesso a problemi relativi alla salute) (Rambalak Yadav et al., 2016).

Moreover, it has been asked to respondents to give an valuation of how much they agree to six sentences regarding Environmental Concern (always considering a 7 points Likert scales) to evaluate how carrying about environment can affect consumers’ choices: “It is important to me that the products I use do not harm the environment” (È importante per me che il prodotto che utilizzo non danneggi l'ambiente); “I consider the potential environmental impact of my actions when making many of my decisions” (Considero il potenziale impatto ambientale delle mie azioni quando prendo molte delle mie decisioni); “My purchase habits are affected by my concern for our environment” (Le mie abitudini d'acquisto sono influenzate dalla mia attenzione per l'ambiente); “I am concerned about wasting the resources of our planet” (Sono preoccupato in merito allo spreco delle risorse del nostro pianeta); “I would describe myself as environmentally responsible” (Mi descrivo come una persona responsabile verso l'ambiente); “I am willing to be inconvenienced in order to take actions that are more environmentally friendly” (Sono disposto a impegnarmi per intraprendere azioni più rispettose per l'ambiente) (Haws K.L., et al., 2014).

Then, it was asked a question with the aim of verifying whether participants clearly understood the typology of package they had seen at the beginning of the survey.

Demographic section has been developed through five question related to sex, age, annual income, profession, and education qualification.

At the conclusion of the questionnaire a thank you note was displayed.

3.3 Results

3.3.1 Preliminary analysis

All the results were exported from Qualtrics MX to the software SPSS (version 25th) to be analyzed. Before the analysis, a cleaning of the data was done to avoid all possible alterations of results.

The cleaning phase consisted on the exclusion of participants with uncompleted answers, responses with a duration excessive shorter or longer than the time mean, who fault the attention check (indicating which image he/she saw), and respondents that gave contrasting answers.

Then, we started the analysis with a reliability check through the Cronbach's α for the variables Purchase Intention (α=0.942), Food-related Self-Control (α=0.780), and Health Consciousness (α=0.705). Being all the Cronbach's α higher than 0.6, we can confirm the reliability to all the variables. Regarding the validity, it is proof thanks to the sources from which we took the scales of each variable (see References).

Statistiche di affidabilità

Alpha di Cronbach	Alpha di Cronbach basata su elementi standardizzati	N. di elementi
,942	,942	3

Figure 16. Output SPSS: Cronbach's α for the Purchase Intention

Statistiche di affidabilità

Alpha di Cronbach	Alpha di Cronbach basata su elementi standardizzati	N. di elementi
,780	,781	3

Figure 17. Output SPSS: Cronbach'sα for the Food-related Self-Control

Statistiche di affidabilità

Alpha di Cronbach	Alpha di Cronbach basata su elementi standardizzati	N. di elementi
,705	,713	3

Figure 18. Output SPSS: Cronbach'sα for the Health Consciousness variable

As last step before the main and moderating effect analyses, we decide to run a Levine's test to see if the error variances of the two sample groups – defined based on which stimuli was shown – was equal. According to the Levine's test (p (=0.092)> 0.05) we can confirm that the variances are homoscedastic, and consequently the sample could be considered adequate.

Test di Levene di eguaglianza delle varianze dell'errore[a]

Variabile dipendente: PurchaseIntention_mean

F	gl1	gl2	Sign.
2,179	3	184	,092

Verifica l'ipotesi nulla che la varianza dell'errore della variabile dipendente sia uguale tra i gruppi.

Figure 19. Output SPSS: Levine's test of the research model

3.3.2 Analysis

With the first Hypothesis we would like to demonstrate the relationship between Packaging Typology and Purchase Intention. Particularly, we hypothesized that consumers in front of a cookies' large package containing single-serving packets they will have a high purchase intention more likely than in front of a large package with unwrapped food portions.

To test such relationship, we evaluated how the multi-item scales average scores obtained for the Purchase Intention variable across the two scenarios (large package with single-serving ones as 0 versus large package as 1). If we compare the purchase intention mean for the control (large package) and the large package containing single-serving ones, we can see an increase of value from 3.65 to 4.18. Thus, in accordance with our prediction: different Packaging Typologies had a different impact on consumers' Purchase Intention.

Furthermore, to have a deeper analyzes we calculated the ANOVA.

Test di effetti tra soggetti

Variabile dipendente: PurchaseIntention_mean

Origine	Somma dei quadrati di tipo III	gl	Media quadratica	F	Sign.	Eta quadrato parziale	Parametro di non centralità	Potenza osservata[b]
Modello corretto	20,321[a]	4	5,080	1,745	,142	,037	6,978	,526
Intercetta	1078,970	1	1078,970	370,527	,000	,669	370,527	1,000
HC_Dico	2,691	1	2,691	,924	,338	,005	,924	,160
SC_Dico	3,563	1	3,563	1,224	,270	,007	1,224	,196
STIMOLO_1_2	11,665	1	11,665	4,006	,047	,021	4,006	,512
SC_Dico * STIMOLO_1_2	1,522	1	1,522	,523	,471	,003	,523	,111
Errore	532,893	183	2,912					
Totale	3502,833	188						
Totale corretto	553,214	187						

a. R-quadrato = ,037 (R-quadrato adattato = ,016)

b. Calcolato utilizzando alfa = ,05

Figure 20. Output SPSS: ANOVA analysis

Accordingly, we found significant differences on Purchase Intention (F (1;183) =4.006; p=0.047). So, we can affirm that our Hypothesis 1 (H1) has been supported.

Then, the next step to check the moderator (Food-related Self-Control) has occurred consisted on running a Two-way ANOVA. The results showed that Food-related Self-Control has not a significant effect on the relationship between Packaging Typology and Purchase Intention (F (1;183) =0.523; p>0.05). According to this result, we cannot say that Food-related Self-Control is a moderator and, how hypothesized by the second hypothesis, that people with low Food-related Self-Control are more likely to buy large cookies' packages containing single-serving one, while people with high Food-related Self-Control are more likely to buy large cookies' packages. Our Hypothesis 2 (H2) has been rejected.

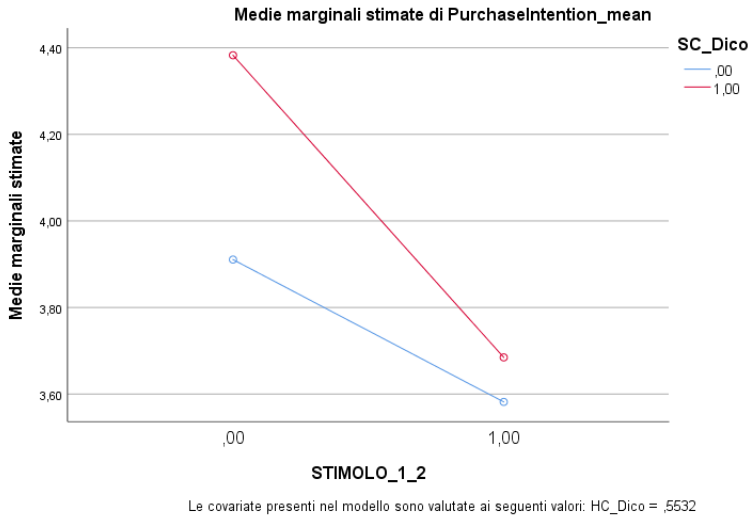

Figure 21. Graph of Food-related Self-Control: it is visual proved the non-intersection of the two line and so and effect of the moderator on the model.

3.4 Discussion

The findings previously illustrated are very significant in terms of managerial and theoretical implications.

We would like to show all the possible suggestions, that this study can apport, dividing them for different subjects (consumers, companies, and policy makers).

As already mentioned in the first and second chapters, the trade-off between sustainability and healthiness that consumers face whether they had to buy food product is something real and with both personal and social consequences. In fact, many companies are trying to reduce this trade-off producing health products in eco-friendly packaging (for example reducing packaging or producing

100% recyclable boxes). However, consumers' preferences still own the largest part power on firms changing.

According to that, creating a base of knowledge regarding food-related sustainable and healthy problems could drive people to more conscious purchase and diet habits.

From the companies' point of view, there are already some initial steps that they are doing to help consumers in both healthy and sustainable lifestyle. Though, still many changes should be implemented in food production chains for becoming a circular economy and have a valued beneficial impact on environment.

Nonetheless, companies – particularly their marketing department – should find a solution to communicate effectively the right portion of food that should be intake by consumers. In fact, even if already exist boxes and packaging with information referring a balanced single portion, people are not nudged enough by them and continues to eat excessive quantity of food (just see the global percentage of people affected by obesity or food-related diseases). Thus, the initial third stimuli of this research (cookies large package with portion size information) has been deleted because it was not perceived different from the control one (large package without information).

Even if in our study it was not demonstrated a significant moderating effect of Food-related Self-Control in the Packaging Typology-Purchase Intention relationship, self-control affects people quantity of food intake - as confirmed by many past researches - and using food packages could be a tool to influence them.

For instance, using suggestion like " you can eat 4 cookies instead of 2, but if you practice for an hour jogging!", rather than read the right portion in grams, or other measure units often not completely understood, could be tested to see if it helps consumers to realize the right quantity of food intake and the exercise needed to have a correct lifestyle and to burn the excess of calories intake. Indeed, if an effect of such suggestions would help people to reduce consumption, it would be avoided the use of single-serving packaging and, consequently, plastic usage would be reduced.

Finally, a big impact could be made by policy makers. For instance, introducing rules that limited the use of some materials, as plastic, for packaging and some ingredients for food they may reduce environment issues and unhealthy food consume. A suggestion could be the use of a sugar tax, already used in some countries, and similar tax on plastic usage.

Moreover, social marketing campaigns should be made by Government to increase citizens' knowledge of food production chain, food impact on environment and human health.

3.5 Limitation and future research

While the sample is limited to 269 Italian participants -also for the decision to reduce the stimulus from three to two-, we cannot consider the study completely representative: a more accurate research with a larger and more heterogenous cluster should be done.

Accordantly, some limitations have been highlighted during the study. Firstly, the original idea was to conduct an experiment in field, which could reduce the intinction-action gap that probably affects our responses and shall be perceived more real from participants' point of view.

Additionally, the images used are unbranded and self-made to not affect participants by own taste and loyalty to already known products. However, this choice has perhaps led to another issue: the packaging will be perceived not enough real and consequently the purchase intention mean score was 4.18 on a 7 points Likers scale for the single-serving package stimuli, and 3.65 for the control one. Future research could investigate the main and the moderation effect of our variables considering a field experiment or using more attractive and better perceived stimuli.

Finally, the Covid-19 pandemic and its consequences were not been considered and, reflecting about the changes that it apported to our normality, this exclusion from the study can be considered a big limit of that.

Indeed, during the last years eco-friendly food packaging was taking hold as a trend: people preferred to buy a product rather than another only for buying a more sustainable package. However, Corona virus pandemic has introduced more hygienic and safe habits in people's life. Even restaurants and bars that used to use more sustainable solution as reusable items take a step back to disposable ones to reduce the risk of contagious[63].

The current situation we are living has highlighted how the trade-off concerning sustainability and healthiness is increasing for a necessity that puts some attributes, as hygienics and healthiness, at the first place during the consumers' consideration choice. For this reason, future research should investigate in how the sustainability-healthiness trade-off is changing and how it will impact on humans and Planet health.

[63]Packaging Europe. *How will the COVID-19 crisis impact the packaging sector?* Apr. 22, 2020. https://packagingeurope.com/how-will-the-covid-19-crisis-impact-the-packaging-sector/

Conclusion

The aim of this thesis was to have a more in-depth knowledge of the trade-off between health - especially from the quantity perspective - and sustainability in the food sector. To do so, we started with an investigation regarding the relevance of the argument from the practical point of view. How shown on the first chapter, both unsustainable and health food choices are big issues that could early have negative impact on individual and society in general. Many processes are already done for both, but more connected solutions should be searched and implemented. In fact, the presence of several solutions that consider only a problem instead of the other (for instance the reduction of plastic for food packaging that lead people to buy big bags and eat more) puts people in front of a decision: which issue has the priority?

In this situation individuals would probably choose the health choice rather than the environmental friendly one for benefit reasons: Preferring an health solution they would think about future personal benefits, as loss weight; while thinking about sustainable solution they would have in mind "just" social benefits that won't have an apparently direct impact on their life. So, individuals would probably choose the health option, and since there won't exist a unique solution, the environment would be badly affected.

To investigate on this trade-off, we decided to focus on packaging typologies, which differ for size and consequently usage of plastic, and purchase intention of consumers, that represent how individuals take a decision and define which product prefer and they would like to buy. Particularly, we hypothesized and proved that, considering individuals' health consciousness level, different packaging typologies of the same product could influence the intention to purchase such product: the probability that a package containing single-serving doses is higher than the likelihood to buy a large one containing the same product (H1).

Moreover, to investigate in how the sustainability-health trade-off could be influenced by personal aspect of people, we introduced the food-related self-control as a moderator. We decided to do so basing on a past study, which provided that people who had bigger package of food eat more than someone with the same product in a smaller one (Haire C., & Raynor H.A., 2014). However, the results of our experiment didn't provide sufficient evidence to confirm the moderating effect hypothesized, so the second Hypothesis (H2) was rejected.

We leave to future research the possibility to find and examine in another context a possible effect of food-related self-control, considering this study limitations and the new reality introduced by Covid-19.

In conclusion, we can say, even if our results are not completely in accordance to what we hypothesized, that the marketplace should strongly consider even the hypothesis of enacting other nudges through packaging that should not consider the use of single-serving packages. All small progress, like this one, could lead to shift the relationship of environment and healthiness from trade-off to synergy.

Appendix

Gentile rispondente, ti ringraziamo in anticipo per la partecipazione e l'attenzione dedicataci. Stiamo conducendo una ricerca di mercato in merito alle priorità che influenzano il consumatore nelle sue scelte di acquisto in ambito alimentare. Ti ricordiamo che non esistono risposte giuste o sbagliate. Le risposte sono anonime e verranno usate solo a fini di ricerca.

Per favore **guarda attentamente** questa immagine e rispondi alle seguenti domande

Quanto sei d'accordo con le seguenti affermazioni considerando una scala da 1 (totalmente in disaccordo) a 7 (totalmente d'accordo)?

	1	2	3	4	5	6	7
Comprerei il prodotto illustrato:	○	○	○	○	○	○	○
Prenderei in considerazione l'acquisto del prodotto illustrato:	○	○	○	○	○	○	○
La probabilità che prenderei in considerazione l'acquisto del prodotto illustrato è alta:	○	○	○	○	○	○	○

Quanto sei d'accordo con le seguenti affermazioni considerando una scala da 1 (totalmente in disaccordo) a 7 (totalmente d'accordo)?

	1	2	3	4	5	6	7
Scelgo attentamente il cibo per garantire la mia buona salute:	○	○	○	○	○	○	○
Non mi considero un consumatore attento alla salute:	○	○	○	○	○	○	○
Penso spesso a problemi relativi alla salute:	○	○	○	○	○	○	○

Quanto sei d'accordo con le seguenti affermazioni considerando una scala da 1 (totalmente in disaccordo) a 7 (totalmente d'accordo)?

	1	2	3	4	5	6	7
È importante per me che il prodotto che utilizzo non danneggi l'ambiente:	○	○	○	○	○	○	○
Considero il potenziale impatto ambientale delle mie azioni quando prendo molte delle mie decisioni:	○	○	○	○	○	○	○

Le mie abitudini d'acquisto sono influenzate dalla mia attenzione per l'ambiente:	○	○	○	○	○	○	○
Sono preoccupato in merito allo spreco delle risorse del nostro pianeta:	○	○	○	○	○	○	○
Mi descrivo come una persona responsabile verso l'ambiente:	○	○	○	○	○	○	○
Sono disposto ad impegnarmi per intraprendere azioni più rispettose per l'ambiente:	○	○	○	○	○	○	○

Quanto sei d'accordo con le seguenti affermazioni considerando una scala da 1 (totalmente in disaccordo) a 7 (totalmente d'accordo)?

	1	2	3	4	5	6	7
Faccio fatica a evitare le cattive abitudini alimentari:	○	○	○	○	○	○	○
Vorrei avere più autodisciplina:	○	○	○	○	○	○	○
A volte non riesco a smettere di mangiare:	○	○	○	○	○	○	○

L'immagine che hai visto in precedenza raffigura:

- ○ Una confezione di biscotti con all'interno 7 porzioni da 4 biscotti.
- ○ Una confezione di biscotti sfusi senza indicazioni sulla porzione consigliata.
- ○ Una confezione di biscotti sfusi con indicazioni sulla porzione consigliata.

Sesso:

- ○ Maschile
- ○ Femminile

Età:

_____

Guadagno annuale:

- ○ Meno di 15000€
- ○ Tra i 15000€ e i 40000€
- ○ Più di 40000€

Indica la tua occupazione:

- ○ Studente
- ○ Libero professionista
- ○ Impiegato
- ○ Disoccupato
- ○ Altro

Titolo di studio:

- ○ Diploma di scuola secondaria superiore
- ○ Laurea triennale
- ○ Laurea Specialistica
- ○ Altro

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SUMMARY

Food industry requires a huge number of resources and, at the same time, it permits human to survive and being well. However, nowadays food is having a negative impact both on Earth and humans. From the health point of view, the world is divided in two parts: the first one in which people are affected by related-food diseases for an excess food and unbalanced diets; the second one where the majority of populations suffers from malnutrition, namely, where more than 820 billion people has not sufficient food to live. Furthermore, regarding the sustainable aspect, food system represents one of the largest causes of environmental degradation.

However, people are not conscious about the big part of responsibility that food has on pollution and resources waste. This is evident from a lack of knowledge regarding energy and resource consumption in the sector: many consumers consider food waste as an unused product only, without reflecting on all the production stages needed to make it, just thinking to the waste of energies for transporting and producing a product not consumed (*A.C. Hoek et al., 2017*).

Additionally, food packaging is one of the dangerous factors that affect our environment and, consequently, one of the changes requested in the 2019 *Sustainable Healthy Diets Guiding Principles* published by FAO and WHO. Indeed, according to the 2019 ING report, the quantity of plastic used for food packaging is increasing over the years, following the world population growth. Even though there is a common knowledge regarding the plastic impact on our planet, the use of such materials is considered essential. Since in the food system safety standards are very restricting, plastic is preferred in comparison with other materials by producers. Furthermore, due to legislation requirements, recyclized plastic cannot be used for food products: this re-used plastic has often an unknown origin and thus it is not approved.

According with what said above, individuals should choose food based on sustainable and health attributes, but even if exist a synergy between those, people do not perceive that and often buy product considering only their health and overpassing the environment. It happens because what distinguishes these two attributes is the social orientation dimension, called also motivational level. Health food lead to personal benefit (e.g. losing or maintaining weight), even if through long term, in contrast with environmental product which are more related to social aspects and, consequently, to weaker motivations (*A.C. Hoek et al., 2017*). For instance, instead of buying a large packaging of food and try to eat less, people prefer to purchase single-serving packaging to control the quantity of food intake, which at the same time increase the quantity of pack materials end up on waste (*J. Aschemann-Witzel, 2015*).

In fact, one of the reasons why people often prefer to buy single-serving packages it is the level of their self-control that influence the quantity of food intake by them.
Self-control is the human ability which permits to reach long-term objects smoothing competing emotions, behaviours and impulses, that would interfere giving an immediate gratification. The capacity to exercise self-control is related to willpower: the power of staying focus on should make us behave notwithstanding the presence of conflicting temptations.

Self-control is often related to food, due to the fact that eating is considered as a consolation for people. This happens because when individuals try to maintain self-control, their brains burn glucose; once bloody sugar is low, a person will be less able to exercise self-control and he/she will search something to eat. For instance, candies and high sugar foods are assimilated more faster and for this reason are considered more appetizing than another health food in a moment where self-control is required.

Being conscious about when a person is not able to exercise food related self-control is a good start point for change and trying to maintain our self-control. For instance, who know that cannot resist to a snack usually buy a small pack instead of a big one, to have control of his indulgence. In fact, as demonstrated also by a research from the University of Tennessee, using single-serving packed foods reduces the amount of food intake on subjects overweight and problem of food related self-control.

Therefore, internal and external circumstances affect people choices. Indeed, there is a specific condition that lead persons to be less strong regarding reflective decisions: the ego depletion condition. Under ego depletion people are not capable or motivated to use their self-control and evaluate pros and cons of each options. Consequently, individuals will be easier inclined to temptation and impulsive behavior. In particular, researches regarding ego depletion condition are done especially with food-related choice because it was discovered that, when people are under ego depletion condition, they follow their food-related temptations without fighting with their self-control (*E. De Vet et al., 2015*).

The Impulsive-Reflective Dual System was used by *P. Honkanen et al.* (2012) to investigate a possible moderating effect of food-related self-control on unhealthy snack consumption. Indeed, thanks to their study it is demonstrated that there is a positive relationship between snack consumption and attitudes towards unhealthy snacking (that represent reflective process) and impulse snack buying tendency (as impulsive route). In addition, through a moderated regression analysis they confirmed that there is a moderation effect of food related self-control for these relationships. When the effect

of attitude is strong, the self-control effect is strong too, consequently there is a positive interaction between food-related self-control and attitude on consumption. While, when tendency of impulse snack buying is strong, food-related self-control is weak, that means a negative interaction between these two variables about consumption.

Thus, attitudes towards unhealthy snacking and impulse snack buying tendency are positively associated to consumption of sweet. Moreover, the research found that there is a moderating effect of self-control on the relationship between behavior and both attitude and impulsive snack buying tendency. So, if individuals have low level of food related self-control, they possibility to fall in temptation and eat unhealthy snack depends more on individual impulsivity than attitudes, which do not have a high weight in the decision (*P. Honkanen et al.; 2012*).

Thanks to *P. Honkanen et al.* (2012), it is possible to say that high self-control is not necessary means healthy food-related decisions: even though people have high self-control, if they own positive attitude about sweet, they won't not able to avoid the temptation eating the snack.

However, self-control absence is one of the biggest causes of overeating, past studies investigated methods to help people with low food-related self-control and tools to reduce the self-control dilemma. For example, *D. Weathers et al.* (2017) discovered that using a clicker counter for tracking all the bites of food intake can help individuals without food-related self-control. In particular, controlling food eaten by clicker counter, people achieve faster satiation as high self-control persons without perceiving the self-control dilemma (enjoyment versus healthiness). Moreover, during social events (e.g. meal with friends) tools like the clicker counter for tracking are more effective in monitoring self-control than in lonely moment in which people can better focus their energy on self-control. Indeed, during a social event, people tend to be more focus on conversation and on giving the right impression to others, consequently several mental energies are used to these activities instead of food-related self-control and a bite tracker could help them on it (*D. Weathers et al., 2017*).

Furthermore, when people care about the quantity of food intake, they can control that through packaging. In fact, according to many studies, controlling food portions influences significantly the quantity of food eaten. In line with that, food companies started to produce smaller packaging to support people in food-related self-control application (*Hannum et al., 2004; Hollands et al., 2015; Rolls, 2003; Rolls et al. 2002; Wansink, 1996; Young & Nestle, 2003*). However, a study analyzing the effect of food-related self-control on single-serving packaging buyers is not done yet.

Prior researches about trade-off between healthiness and sustainability, packaging attributes-purchase intention relationship, and food-related self-control are already conducted, but there is not a study, according to our knowledge, that considers all of them in the same experiment.

Starting from the trade-off, academics as Hoek had largely observed what people think about healthy and sustainable foods and why they often prefer to buy and consume product with the first attributes (*A.C. Hoek et al., 2017*). However, the theme of healthiness is always seemed from a quality point of view. For instance, observing consumers attitude regarding organic food or the shifting of animal meat with the clean one (noted also as in vitro meat, animal meat grown using bioreactors instead of animals (*Bekker G.A., Fischer A.R.H., et al., 2017*)).

For this reason, a research about food sustainability and the quantity aspect of healthiness should be evaluated. In fact, according to many studies, size, packaging, and portion of food can affect significantly the quantity of food intake (*M. L. Scott et al., 2008*). In particular, focusing on packaging, *Rolls et al.* (2004) found that people eat more food when it is given in a large package instead of given in a small one. They tested how many chips people eat in a small and in a large bag and they demonstrate that chips from the large ones were significantly more eaten than in the small package.

While packaging dimension has a positive effect on people healthiness (*M. L. Scott et al., 2008*), it negatively affects environment. As demonstrated by *U. Fresán et al.* (2019), who detected about GHG emissions produced by different packaging sizes (single packaged serving and two options of multi-serving packages). According with their analysis, comparing with single-serving packaging, multi-serving ones are responsible for less quantity of GHG emissions. Thus, when people prefer single-serving packaging than multi-serving they prefer food with healthiness attributes rather than sustainable product.

Moreover, packaging attributes can affect consumers purchase intention, but past research did not consider the possible influence of environmental concern and conscious healthiness of people. In fact, a deeper evaluation of packaging attribute with environmental and healthy background should be done. As packaging size affects the quantity of food intake, it could be a cause of some purchase choices by consumers.

Finally, food-related self-control is commonly studied regarding the quantity of food eaten and so, related to the consumption moment. Though, there are not present studies that investigate the presence or not of a self-control effect on the relationship between food packaging - used as a self-control tool

(*Hannum et al., 2004; Hollands et al., 2015; Rolls, 2003; Rolls et al. 2002; Wansink, 1996; Young & Nestle, 2003*)– and purchase intention.

In accordance with that, the aim of this thesis is to understand the possible effect of different typologies of packaging on consumers' purchase intention, considering the influence of food-related self-control. Nonetheless bearing in mind the trade-off consumers face when they need to choose product based on healthiness (form the quantity point of view, as avoiding overconsumption) and sustainability.

Thus, to achieve this aim, two hypotheses were tested:

H1: Consumers' purchase intention is more likely to be positively affected by a large package containing single-serving ones than a large package containing unwrapped food portions.

H2: The purchase intention of a large food package containing smaller ones will be higher for consumers with high food-related self-control, while the purchase intention of a large food package containing unwrapped portions will be higher for consumers with low food-related self-control.

The model used to test these hypotheses is a 2x2 with Packaging Typology as independent variable, Purchase Intention as dependent and Food-related Self-Control as moderator. Nonetheless, Health Consciousness is present in the model as control variable, and people Environmental Concern was present in the questionnaire but analyzed, as second moderator, in a separate study.

The research has been conducted through an online questionnaire created on Qualtrics MX platform and sent by social networks. We were able to include 269 respondents in our experiment and we did not give them any reward for their participation. The average age was 33.26 years old and females constituted the 65.8% of the sample. More than half of the sample was well educated since 59.8% had a university degree. The questionnaire has been distributed online in Italian mainly through social networks, since the sample was entirely made up by Italians.

The original idea for this experiment was conducted it on field, but for the moment in which the research has been conducted – during the Corona virus pandemic and the country lockdown - an online questionnaire was the best choice.

Initially, we created three different packages of cookies as stimuli: a large package without information regarding the portion size, a large package with single-serving ones inside, and a third large package with portion size. We considered the first one as control because it is the more common

in a real supermarket environment. Thus, the model thought was a 3 (Packaging Typology: large without portion size information, large with inside single-serving packages, and large with portion size information) x 2 (Food-related Self-Control: high versus low). However, through a pretest it was observed that the differences between the first and the third Packaging Typology stimuli were not enough to be completely perceived by participants: sign that labels still not enough considered or read carefully.

Accordantly, we decided to shift from a 3x2 to a 2 (Packaging Typology: large without portion size information as control and large with inside single-serving packages) x 2 (Food-related Self-Control: high versus low) model. In the questionnaire there is the third stimuli too, but the answers related to such scenario are not considered in the results.

Moreover, we decided to use three images of packages created by us to not use branded packaging that could affect respondents' purchase intention.

Figure 4. Large Package without portion size information used as control

Figure 5. Large package with single-serving packages

Figure 6. Large package with portion size information, stimulus not used in in the questionnaire

As a between-subject study, each respondent was randomly assigned to one of the third, after became two, conditions. Below the stimulus they faced some questions regarding: Purchase Intention, Food-related Self-Control, Health Consciousness, and Environmental Concern. Also, the order of each group of questions related to the variables were presented with different order randomly assigned without considering the scenario.

The presence of diverse scenarios is fundamental to see the difference impact that packaging has on consumers' purchase intention. Moreover, the decision of randomizing also the variables' sections

order was thought to do not create bias on the mind of respondents. In fact, for instance, if all the participants would face Environmental Concern as first section, rather than another variable, they could give more attention to such variable instead of others and being influence by it.

All the results were exported from Qualtrics MX to the software SPSS (version 25th) to be analyzed. Before the analysis, a cleaning of the data was done to avoid all possible alterations of results.

The cleaning phase consisted on the exclusion of participants with uncompleted answers, responses with a duration excessive shorter or longer than the time mean, who fault the attention check (indicating which image he/she saw), and respondents that gave contrasting answers.

Then, we started the analysis with a reliability check through the Cronbach's α for the variables Purchase Intention (α=0.942), Food-related Self-Control (α=0.780), and Health Consciousness (α=0.705). Being all the Cronbach's α higher than 0.6, we can confirm the reliability to all the variables. Regarding the validity, it is proof thanks to the sources from which we took the scales of each variable.

As last step before the main and moderating effect analyses, we decide to run a Levine's test to see if the error variances of the two sample groups – defined based on which stimuli was shown – was equal. According to the Levine's test (p (=0.092)> 0.05) we can confirm that the variances are homoscedastic, and consequently the sample could be considered adequate.

With the first Hypothesis we would like to demonstrate the relationship between Packaging Typology and Purchase Intention. Particularly, we hypothesized that consumers in front of a cookies' large package containing single-serving packets they will have a high purchase intention more likely than in front of a large package with unwrapped food portions.

To test such relationship, we evaluated how the multi-item scales average scores obtained for the Purchase Intention variable across the two scenarios (large package with single-serving ones as 0 versus large package as 1).

Analyzing the data with ANOVA, we found significant differences on Purchase Intention (F (1;183) =1.224; p>0.05). So, we can affirm that our Hypothesis 1 (H1) has been supported.

Then, the next step to check the moderator (Food-related Self-Control) has occurred consisted on running a Two-way ANOVA. The results showed that Food-related Self-Control has not a significant

effect on the relationship between Packaging Typology and Purchase Intention (F (1;183) =4.006; p=0.047). According to this result, we cannot say that Food-related Self-Control is a moderator and, how hypothesized by the second hypothesis, that people with low Food-related Self-Control are more likely to buy large cookies' packages containing single-serving one, while people with high Food-related Self-Control are more likely to buy small cookies' packages. Our Hypothesis 2 (H2) has been rejected.

The findings previously illustrated are very significant in terms of managerial and theoretical implications.

We would like to show all the possible suggestions, that this study can apport, dividing them for different subjects (consumers, companies, and policy makers).

As already mentioned, the trade-off between sustainability and healthiness that consumers face whether they had to buy food product is something real and with both personal and social consequences. In fact, many companies are trying to reduce this trade-off producing health products in eco-friendly packaging (for example reducing packaging or producing 100% recyclable boxes). However, consumers' preferences still own the largest part power on firms changing.

According to that, creating a base of knowledge regarding food-related sustainable and healthy problems could drive people to more conscious purchase and diet habits.

From the companies' point of view, there are already some initial steps that they are doing to help consumers in both healthy and sustainable lifestyle. Though, still many changes should be implemented in food production chains for becoming a circular economy and have a valued beneficial impact on environment.

Nonetheless, companies – particularly their marketing department – should find a solution to communicate effectively the right portion of food that should be intake by consumers. In fact, even if already exist boxes and packaging with information referring a balanced single portion, people are not nudged enough by them and continues to eat excessive quantity of food (just see the global percentage of people affected by obesity or food-related diseases). Thus, the initial third stimuli of this research (cookies large package with portion size information) has been deleted because it was not perceived different from the control one (large package without information).

Even if in our study it was not demonstrated a significant moderating effect of Food-related Self-Control in the Packaging Typology-Purchase Intention relationship, self-control affects people quantity of food intake - as confirmed by many past researches - and using food packages could be a tool to influence them.

For instance, using suggestion like " you can eat 4 cookies instead of 2, but if you practice for an hour jogging!", rather than read the right portion in grams, or other measure units often not completely understood, could be tested to see if it helps consumers to realize the right quantity of food intake and the exercise needed to have a correct lifestyle and to burn the excess of calories intake. Indeed, if an effect of such suggestions would help people to reduce consumption, it would be avoided the use of single-serving packaging and, consequently, plastic usage would be reduced.

Finally, a big impact could be made by policy makers. For instance, introducing rules that limited the use of some materials, as plastic, for packaging and some ingredients for food they may reduce environment issues and unhealthy food consume. A suggestion could be the use of a sugar tax, already used in some countries, and similar tax on plastic usage.
Moreover, social marketing campaigns should be made by Government to increase citizens' knowledge of food production chain, food impact on environment and human health.

While the sample is limited to 269 Italian participants -also for the decision to reduce the stimulus from three to two-, we cannot consider the study completely representative: a more accurate research with a larger and more heterogenous cluster should be done.
Accordantly, some limitations have been highlighted during the study. Firstly, the original idea was to conduct an experiment in field, which could reduce the intinction-action gap that probably affects our responses and shall be perceived more real from participants' point of view.
Additionally, the images used are unbranded and self-made to not affect participants by own taste and loyalty to already known products. However, this choice has perhaps led to another issue: the packaging will be perceived not enough real and consequently the purchase intention mean score was 4.18 on a 7 points Likers scale for the single-serving package stimuli, and 3.65 for the control one. Future research could investigate the main and the moderation effect of our variables considering a field experiment or using more attractive and better perceived stimuli.
Finally, the Covid-19 pandemic and its consequences were not been considered and, reflecting about the changes that it apported to our normality, this exclusion from the study can be considered a big limit of that.
Indeed, during the last years eco-friendly food packaging was taking hold as a trend: people preferred to buy a product rather than another only for buying a more sustainable package. However, Corona virus pandemic has introduced more hygienic and safe habits in people's life. Even restaurants and bars that used to use more sustainable solution as reusable items take a step back to disposable ones to reduce the risk of contagious.

The current situation we are living has highlighted how the trade-off concerning sustainability and healthiness is increasing for a necessity that puts some attributes, as hygienics and healthiness, at the first place during the consumers' consideration choice. For this reason, we leave to future research the possibility to find and examine in another context a possible effect of food-related self-control, considering this study limitations and the new reality introduced by Covid-19.

In conclusion, we can say, even if our results are not completely in accordance to what we hypothesized, that the marketplace should strongly consider even the hypothesis of enacting other nudges through packaging that should not consider the use of single-serving packages. All small progress, like this one, could lead to shift the relationship of environment and healthiness from trade-off to synergy.