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MASTER THESIS IN FOOD SAFETY LAW

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BEYOND LABELLING THROUGH INFORMATION DISCLOSURE: SUGAR CONTENT INFORMATION WITHIN THE LEGISLATIVE FRAMEWORK OF THE EU

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Abstract

Food law has gained its importance over the past decade. Significant achievements have been noted especially with regard to providing food information to consumers. In the European Union (EU), the introduction of the Reg. 1169/2011 on the provision of the food information to consumers has been marked as a significant development in food law. Thanks to such development, food labelling in the EU is now harmonized to the maximum level. Effective food labelling receives even more importance when it is related to the protection of human health. Sugar has been only recently associated with the onset and further development of diseases such as diabetes, obesity, cardiovascular disease, cancer and other. Such findings provoke the discussion concerning the actual safety of sugar. The study analyses the ways in which sugar labelling, in particular, could be improved in order to effectively inform consumers about the amount of sugar contained in a food product. Current mandatory labelling, as required by the food information regulation (FIR) is rather complex, focused on the presentation of technical terms, and numbers in a table of a particular format, which, as suggested by empirical research, are aspects that are not comprehended well by consumers. Such labelling system has been developed on the basis of several assumptions, which do not seem to hold, once psychological insights are incorporated into the field of law.

Psychological research provides valuable, and highly relevant insights into why the current means of providing information to consumers might not be as effective as previously thought. The research combines relevant insights from the academic field of psychology with the insights from behavioral economics and behavioral science. The latter two fields have already been discussed in relation to law, nevertheless, the psychological insights incorporated in the mentioned academic fields do not provide a sufficient scientific basis for the evaluation of current FIR, especially when it comes to consumers' behavior. The application of empirical insights from the three fields onto the FIR has provided a strong framework on the basis of which the current labelling system is critically evaluated, and recommendations for effective labelling of the sugar content in a food product, are presented. The research findings indicate that the most important factors enabling consumer to understand information provided to them are vividness, simplicity, and familiarity of the information given, whereas complexity and quantification are factors associated with the confusion of consumers.

Abbreviations

AH	Albert Heijn
AHA	American Heart Association
Art.	Article
BA	Behavioral approach
BE	Behavioral Economics
BI	Behavioral insights
BII	Behaviorally Informed Intervention
BS	Behavioral science
CHV	Consumer health vocabulary
CJEU	European Court of Justice
Dir.	Directive
DRV	Daily reference value
EC	European Commission
EFSA	European Food Safety Authority
EU	European Union
FBO	Food business operator
FDA	Food and Drug Administration
FIR	Food Information Regulation
FSA	Food Standards Agency
GDA	Guideline daily amount
HFCR	High fructose corn syrup
JRC	Joint research centre
OECD	Organization for Economic Co-operation and Development
Reg.	Regulation
RTE	Ready-to-eat
UK	The United Kingdom
US	The United States
VI	Vivid Information
WHO	World Health Organization

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1. Introduction

The food market has expanded significantly during the past century, and so has globally expanded the food choice in supermarkets. Consumers are offered a variety of products of different brands and quality, therefore such a variation enables them to choose a product they prefer. With the expansion of the food market, there has been an increased need for regulation. The existing regulation on the European Union (EU) level with regard to food targets two major issues within the realm of food law: *food safety* and *food information*, the two pillars. Consumers expect food to be safe, as well as they do have the right to be well-informed about the food they purchase. In 2002, the General Food Law, more specifically, Reg. 178/2002, was introduced in order to ensure that the food products placed on the market are not unsafe. Later on, other regulations were introduced, which would enhance consumer protection. The Reg. 1169/2011 concerning food information to consumers, also referred to as, food information regulation (FIR), was introduced, although not all provisions entered into force during the same year. These two mentioned regulations have provided a solid basis for consumer protection within the EU, however, there might be imperfections in the food law regulatory framework, especially when it comes to the way information is communicated to consumers via food labels.

This issue becomes particularly important when considering potentially harmful nutrients, such as sugar, fat, or salt. Nowadays, people worldwide suffer from diseases such as obesity, diabetes, fatty liver disease, and other, which are linked to increased calorie consumption. Although there has not been much research done in terms of adverse health effects of sugar consumption in the past, some of the recent studies suggest that high sugar consumption contributes to several diseases. [1] Also, recent research points towards the addictive properties of sugar, and that is why the term 'sugar addiction' has been introduced.[2] Although there have been limits set for the maximum sugar daily intake, and food business operators (FBOs) have the obligation to provide information concerning the ingredient and nutrient content, the problem has its roots in the way such information is communicated, by using words and numbers, and such means might not be the effective ones. As a result, consumers are being bombarded with information, which they might not read, or in case they do, they are unable to understand it. Often, the ingredient lists on food packages are long and complex, and some substances are labelled by their scientific names, which many consumers would not understand. Moreover, as far as sugar, especially added sugar, is concerned, consumers' perception becomes of importance. Often, people do not expect salty food to contain added sugars. Yet, many savory ready-to-eat (RTE) foods do contain added sugar.

Therefore, the aim of this study is to critically review the existing FIR, as well as to analyze how the sugar content information could be communicated in a more comprehensible way to

[1] Malik, V.S., Popkin, B.M., Bray, G.A., Despres, J-P., Hu, F.B., 2010.
[2] Roumeliotou, 2013.

consumers' so that it will enable them to make a well-informed choice, which could potentially result in consumers making healthier food choices. In order to achieve these goals, firstly, the background information concerning sugar, increasing sugar consumption, trends, and potential adverse health effects, is presented (Chapter 2). Secondly, the Reg. 1169/2011 on food information, is described in a structured manner in order to note how sugar content information is currently regulated within the scope of the EU regulation (Chapter 3). Moreover, the field of behavioral economics (BE) is explored, as such, as well as in a relation to its application on law, and food law in particular, in order to provide a deeper insight into the consumer perception, decision-making, and choice. In addition to behavioral economics, the psychological theories, perspectives and their application are discussed and evaluated, as complementary tools to investigate consumers' behavior and perception in terms of information processing and subsequent food choices (Chapter 5). Furthermore, debates within the EU suggest that the fields of behavioral economics and psychology have been merging into one field called behavioral science, therefore these new developments are also addressed (Chapter 6). Additionally, after discussion of the relevant insights from psychology and behavioral economics, the application of relevant empirical findings, from the mentioned fields onto the food information law, is presented (Chapter7).

In addition to the theoretical analysis, a number of EU court cases, are reviewed analyzed. These are hoped to provide a deeper insight into the practical issues dealt with, as far as food information and consumer behavior are concerned. The cases deal particularly with the notion of the 'average consumer' (Chapter 8). Subsequently, the discussion and overall analysis of the presented areas is presented in order to pinpoint the imperfections of the current food information legislation, and to demonstrate ways in which consumers' understanding of food information, especially sugar, could be improved on the basis of this academic multilevel analysis.[3] Eventually, the study ends with conclusive remarks, and possible future implications for the field of food (information) law.

1.1. Research question(s)

The main (central) research question of this research is:

How (by what means) could the information with regard to the sugar content in a food product be effectively communicated to consumers within the EU legislative framework?

Besides the main research question, a few sub-questions have been formulated in order to guide the research:

I. How is the information concerning food products currently regulated within the EU?
II. On what considerations/assumptions is the current EU food information law based on?
III. To what extent can the 'average consumer' process information given?

[3]Subchapter 1.2 and 1.3 explain the thesis approach and methodology.

IV. Based on the findings, would it be possible to regulate other forms of expression to effectively convey food information to consumers within the EU food information law (FIR)?

1.2. Approach and methodology

The approach of this research can be described as multidimensional, as it is based on the analysis of multiple fields which influence each other. Even though the main field of the research is law, more specifically, food information law, other fields have direct and indirect influence on food law. As it can be seen in figure 1, the field of *food, technology and nutrition* is placed in the centre of the illustration. Information from this field if of importance, since the case study of *sugar consumption* is used as an illustration of the main argument of this research. In order to understand why *sugar labelling* is of importance, it is necessary to have basic knowledge about what sugar is, and what (if any) *effect* it has on the human body. Once such knowledge is gained, the importance of sugar labelling can be established. Afterwards, the research is extended beyond the sphere of law. Insights from psychology, behavioral economics and science are to be analyzed in order to establish how insights from these fields could inform FIR, and how these insights could enhance the effectiveness of the current regulation, when it comes to maximization of consumer protection. There is an emerging trend of moving away from the discussion of *psychology* and *behavioral economics* as separate fields, as far as food law is discussed. The recent discussion indicate that the field of behavioral science is growing, which is a field that blends *psychology* and *behavioral economics* together.

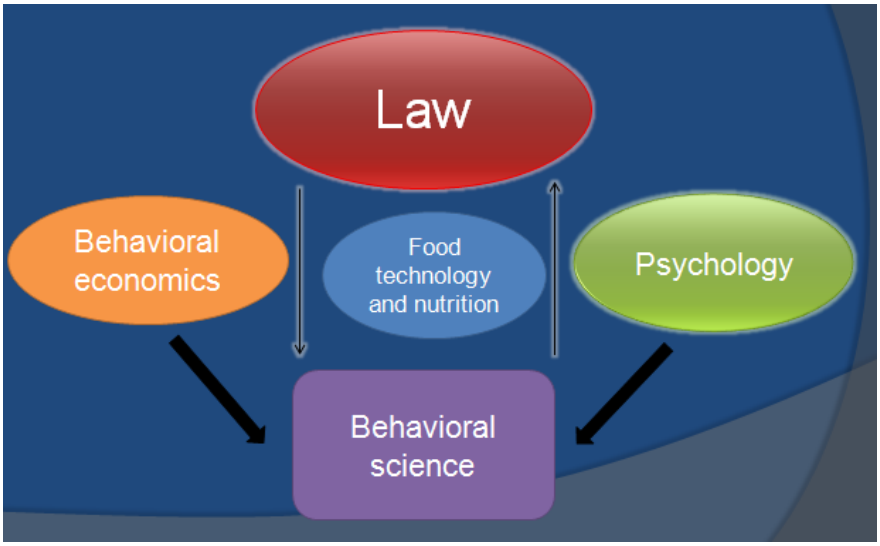

Figure 1: Illustration to the approach to research[4]

The methodology encompasses three main steps of the research. Firstly, the theoretical framework is presented. The theoretical framework consists of background information about sugar, and its effects on human body, then the provisions of the EU FIR are discussed in a structured manner. Afterwards, the research continues with the analysis of the empirical studies

[4]Adapted from the personal thesis colloqium presentation from May, 27 2015.

from the fields of psychology, behavioral economics and science. Secondly, the research reviews relevant case law, which illustrates how the notion of 'average consumer' is being applied to real life cases. Eventually, the empirical analysis is combined with the analysis of FIR, while the insights gained from the empirical analysis are applied to food law. Such an analysis can provide an insight into how the findings from the mentioned fields can be beneficial for improving the way information is currently communicated to consumers.

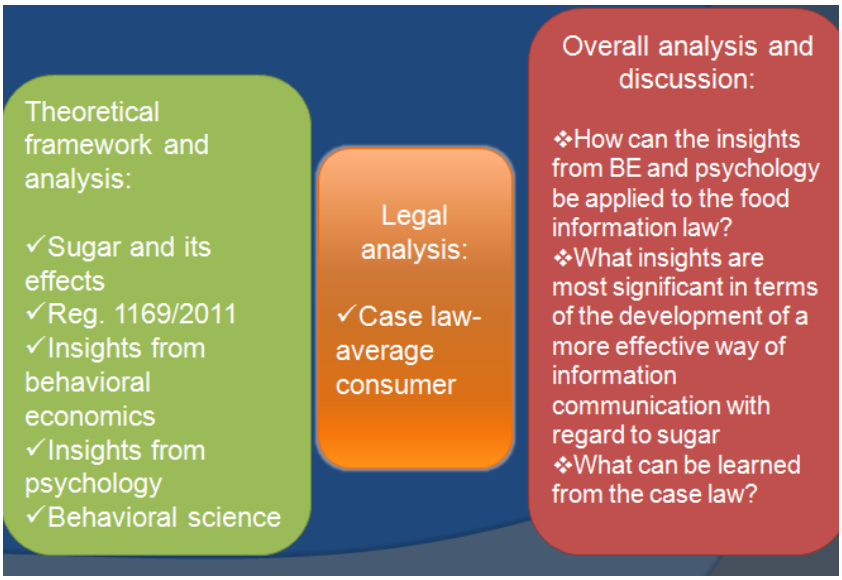

Figure 2: Illustration of methodology[5]

1.3. Importance of the issue

Everyone makes food choices on a daily basis. If consumers make well-informed choices, if they actually understand what kind of product they purchase, their decisions may have implications on their overall health. Therefore, an analysis of consumers' understanding of food information, and their subsequent choices could have important public health implications, in the long run. Of course, these are, so far, only hypothetical considerations, as more practical research concerning consumer choices would be needed after the suggestions from this research concerning adaptations of the way information is communicated. Yet, this research could serve as a theoretical foundation on which other scholars could build. So far, there has been no research of this kind conducted, as this research questions the very assumptions on which the foundations of food law were built. This theoretical research connects a legal analysis with the empirical findings from behavioral economics and psychology in order to bring in new insights into the ways through which a sugar content of a food product could be communicated more effectively than it is the case at the moment. Moreover, this research challenges the current perception of food safety, and emphasizes the need for a clear sugar labelling, as sugar can pose greater danger to human health than ever thought.

[5]IBID.

2. Sugar consumption and public health implications

2.1. Recent trends and current issues

In the 20th century, the consumption of sugar expanded significantly. The highest total sugar consumption has been recorded in North and South America, as well as in Europe (see figure 3). In Europe one person consumes 36,7kg of sugar per year, which means that a person consumes approximately 100g extra sugar a day.[6] Such statistics are alarming. Sugar is contained in fruits and vegetables, but it is also added to food products, whether they are savory or sweet. Nowadays, the market offers a variety of foodstuffs which are complex due to the great amount of various ingredients, which have different technological functions. Sugar is often hidden in products which the public might perceive as healthy, yet, when one takes a detailed look at the ingredient list, one might find out that sugar is hidden in products under different names. Unfortunately, the public might not be able to recognize all scientific names and forms of sugar, which means that a person is unable to make an informed choice if they do not understand the amount of sugar contained in a product. Therefore, consumers' understanding and sugar labelling and two intertwined concepts which need to be addressed. Consumers are offered a variety of products packed with sugar, however, they might be unaware of the fact that almost all food products in supermarkets contain great amounts of sugar. While there have been debates about high fat consumption being detrimental to human health, the seriousness of adverse effects of sugar has not sufficiently been addressed, and that is why it is necessary to discuss why *high sugar consumption* presents a danger to human health, as well as what actions can be taken to effectively inform the public about the sugar contained in food products. Therefore, the following subchapters deal with the question of what sugar is, and what forms of sugars exist, to which kinds of products sugar is added, as well as how the sugar content is labelled. Secondly, this chapter offers a discussion of recent research illustrating the dangers of sugar to human health. Eventually, the importance of an effective labelling system with regard to sugar is elaborated on.

[6] "World sugar consumption," n.d.

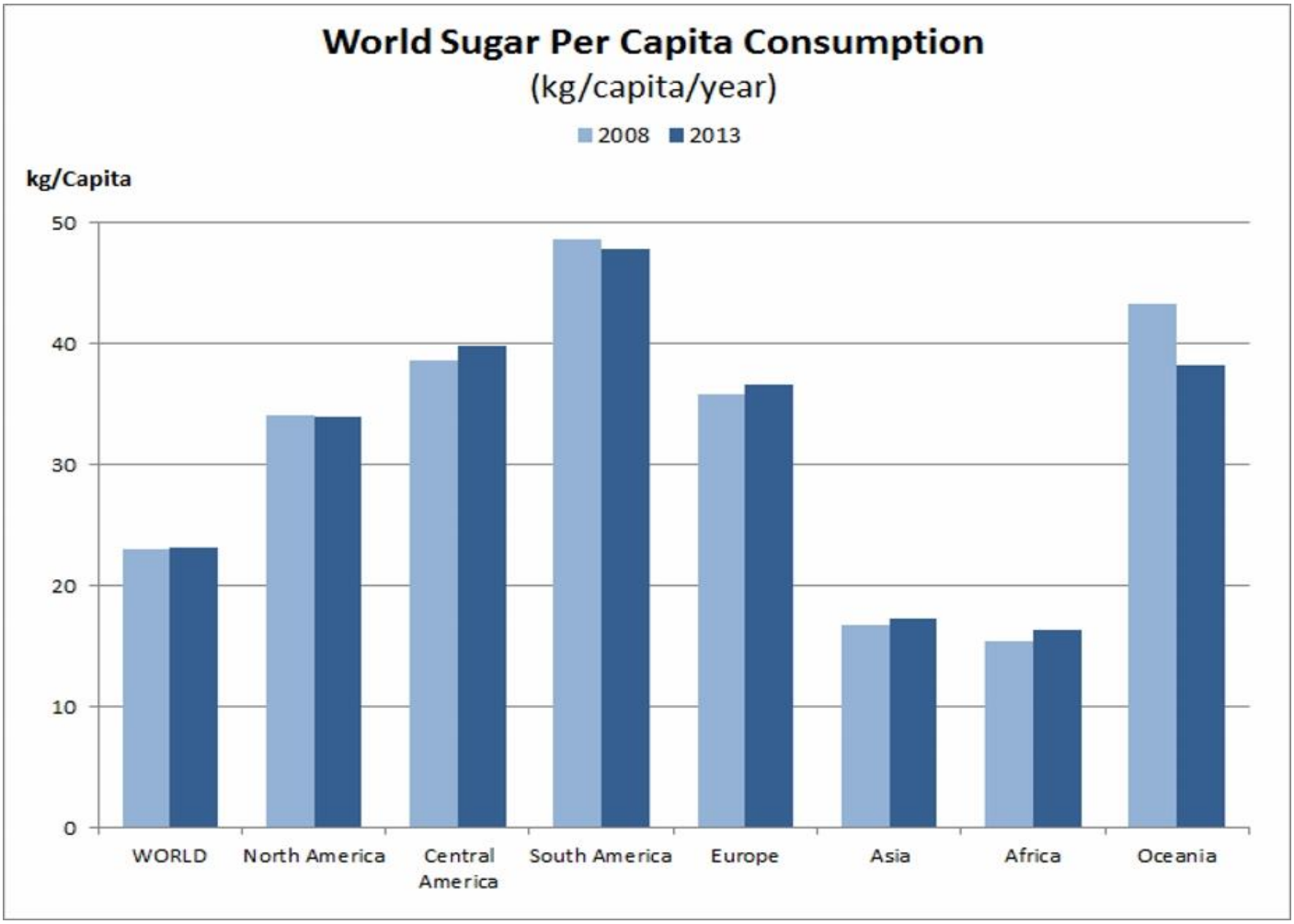

Figure 3: World sugar consumption per capita per year[7]

2.2. What is sugar?

Sugar is a nutrient which is commonly known as an ingredient which gives a sweet taste to food. Although it is referred to as nutrient, sugar does not, in fact, have any nutritional value, besides the fact that it is a source of energy (see figure 4). Sugar belongs to a greater nutrition group called carbohydrates. Sugar, as well as other carbohydrates naturally occurs in fruit, vegetables, grains and dairy, however, sugar is often being added to food products, either because it has a technological function and/or, to add taste to a product.[8] There are various kinds of sugar, which are classified by scientists according to the chemical structure of sugar. Monosaccharides are simple sugars which are made up of single sugar molecules. Glucose, fructose and galactose belong to this group of sugars. Another group of sugars are disaccharides. The most generally known sugar is the table sugar, also called sucrose. From a chemical point of view, sucrose is a disaccharide, because it is made up from to simple sugars, which are, in this case, glucose and

[7]IBID.
[8]"Background on carbohydrates and sugars," (n.d.)

fructose. Sucrose is the sweetest disccharadide. *Sucrose* is isolated from the roots of a sugar beet or from sugar cane.[9] Other disaccharides are lactose[10] and maltose.[11] Besides the mentioned sugars, corn syrup and high fructose corn syrup are sweeteners which are added to many products nowadays. Corn syrup is made of corn and it contains 100% glucose, whereas high fructose corn syrup (HFCS) contains 55% of fructose and 45% of glucose. All these sugars, when taken in an adequate amount, might not pose a danger to human health. Yet, too much sugar (table sugar, syrups..etc) can seriously affect human health. The next subchapter explains which products contain added sugar, and what specific kinds of sugars do to the human body, and how an increased consumption of various forms of sugars can impair human health.

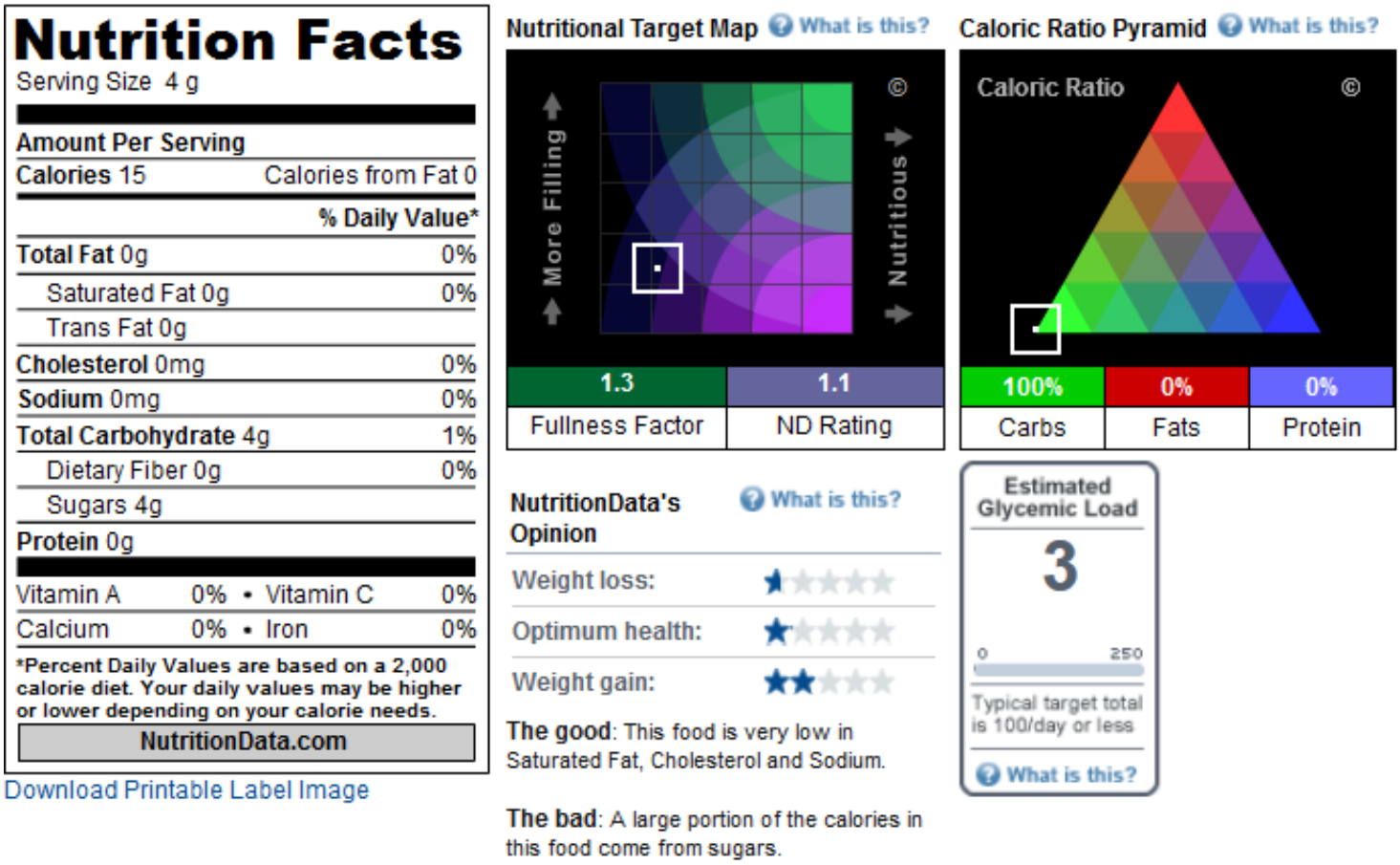

Figure 4: Nutrition facts for 4gr of sugar (1 teaspoon)

[9]Campbell-Platt, 2009.
[10]Lactose is made up of two monosaccharides, galactose and glucose. Lactose is found in milk.
[11]Maltose is made up of two monosaccharides, two units of glucose. Maltose is found in molasses and it is used in the fermentation process.

2.3. The dangers of sugar consumption

2.3.1. Products high in sugar

Nowadays, products on the market contain big quantities of sugar. Most of the time, a product does not only contain sucrose, but also HFCS, and possibly other sugars. When these all sugars add up, one can note that the total sugar in a product can be quite high. An example of this are complex sweet products, such as chocolate chip cookies, sold by the Dutch supermarket Albert Heijn (AH) (see figure 5). The cookies contain in total 40g of sugar per 100g of the product, which means that **40%** of the product is sugar. As it can be noted in figure 5, the cookies contain all kinds of sugar types, such as glucose syrup, lactose, and also glucose-fructose syrup (high fructose corn syrup). The total package contains 225g of cookies, which means that a package of AH chocolate chip cookies contains 90g of sugar. 1 teaspoon (tsp) of sugar equals approximately 4g,therefore, such a package of cookies contains **22,5 tsp** of sugar, which means that the sugar concentration in this product is rather high, especially, when taking into account the recent recommendations of the World Health Organization (WHO), in terms of daily maximum added sugar intake.

The WHO published a guideline entitled *Sugar intake for adults and children.* In this guideline, which is based on scientific research, a daily maximum recommended intake of sugar has been specified. The WHO recommends that the added sugar intake of adults and children creates less than **10%** of their total energy intake. Moreover, the guideline points out that reducing the sugar intake to only **5%** of the total energy intake can bring additional health benefits. 5% of sugar intake roughly translates into 25g or approximately **6tsp.**[12] Having considered this fact, the AH chocolate chip cookies contain almost **4 times** more sugar than the recommended daily (added)sugar intake. Furthermore, when analyzing the nutritional label below, the carbohydrates contained in the cookies are the major compounds, which cause the high calorie content of the product. As indicated in figure 5, 100g of the product contains 500kcal. The package weighs 225g, which translates into **1125kcal.** The total daily recommended energy intake is 2,500kcal for men and 2,000kcal for women.[13] Such a package of cookies amounts to almost (for men) and more than (for women) **50%** of the total daily calorie intake. Even though one might not consume the whole package at once, the product is dangerously high in sugar, and such sugar concentration rises the total calories intake significantly.

[12] "Guideline: Sugars intake for adults and children," 2015.
[13] "What should my daily intake of calories be?," 2014.

Productinformatie

Beschrijving
Koekjes met stukjes pure- en melkchocolade. Chocolate Chip Cookies.

Inhoud en gewicht
225 Gram. 19 gram eenheid/eenheden. 12 portie(s).

Ingrediënten
Ingrediënten: 29% pure chocolade [suiker, cacaomassa, cacaoboter, glucosestroop, emulgator (lecithine (**SOJA**))], tarwebloem (GLUTEN), suiker, 11% melkchocolade [suiker, cacaoboter, volle melkpoeder (**LACTOSE**, **MELKEIWIT**), cacaomassa, magere melkpoeder (**LACTOSE**, **MELKEIWIT**), emulgator (lecithine (**SOJA**))], plantaardige olie (palm, zonnebloem), haverbloem (GLUTEN), roomboter (**LACTOSE**, **MELKEIWIT**), rijsmiddel (E450, E500), glucose-fructosestroop, scharreleipoeder (EI), **lactose** (**LACTOSE**, **MELKEIWIT**), zout, natuurlijk aroma, karamel (gekarameliseerde suikerstroop, water). Gemaakt in een bedrijf waar ook noten worden verwerkt.

Allergie-informatie
Bevat ei. Bevat lactose. Bevat melk. Bevat haver. Bevat soja. Bevat tarwe. Bevat glutenbevattende granen.

Voedingswaarden

Deze waarden gelden voor het onbereide product.

	Per 100 Gram.	ADH*
Energie	2090 kJ	
Energie	500 kcal	
Vet	25 g	
Waarvan verzadigd	14 g	
Waarvan enkelvoudig onverzadigd	9 g	
Waarvan meervoudig onverzadigd	2,5 g	
Koolhydraten	61 g	
Waarvan suikers	40 g	
Voedingsvezel	3,5 g	
Eiwitten	5 g	

* aanbevolen dagelijkse hoeveelheid (Referentie-inname van een gemiddelde volwassene is 8400 kJ / 2000 kcal per dag.)

Figure 5: Chocolate chip cookies from Albert Heijn, the ingredient list and the nutritional information

2.3.2. Savoryproducts also contain sugar

Cookies, as well as other generally known sweet products are not the only products that contain sugar of all kinds. What consumers might realize less is the fact that sugar is being commonly added to various savory products. In fact, it is rather difficult to find food products in supermarkets, which do not contain added sugars. AH offers a variety of savory products which contain sugar. One examples is pizza. AH pizza with cheese and onion (300g package) contains 4,5g of sugar per 100g, which means that the whole pizza contains **13,5g** of sugar which translates into more than **3tsp** of sugar.[14] The 3tsp of sugar might not seem much, yet, it already creates **50%** of, by the WHO, recommended ideal daily added sugar intake, which is 6g. Also, a pizza from Dr. Oetker, 'Big Americans BBQ chicken pizza (455g package) contains not only table sugar (sucrose), but also caramelized sugar syrup and dextrose. The total sugar content of pizza is 4,3g per 100g, which means **19,57g** or (almost 5tsp) of sugar in the whole pizza, and that

[14] "AH Pizza kaas-tomaat," n.d.

is approximately **80%** of the daily total added sugar intake recommended by the WHO.[15] Moreover, other RTE foods also contain sugar. For example, AH spaghetti bolognese (500g) contain 3g of sugar per 100g. The whole meal, meant for 1 person, contains **15g** (equal to almost 4tsp) of sugar.[16] Also, fresh AH pasta with chicken and mascarpone (450g) contains also 3g per 100g, thus the portion contains **13,5g** of sugar which is approximately 3tsp of sugar. Yet, this RTE pasta contains not only table sugar, but also maltodextrine, dextrose and glucose syrup.[17] These examples show that not only clearly sweet products contain quite a significant amount of sugar. The following subchapter discusses what sugar consumption means for human health.

2.3.3. Does sugar pose a danger to one's health?

Recent research suggests that many diseases are caused by the modern diet which is high in fats and sugars. Yet, from the resent research it appears that the negative effects of sugar on human health have been underestimated. Sugar has been linked, besides less serious issues, also with various types of diseases such as obesity, diabetes, cardiovascular disease[18], and even cancer.[19] The main reason why sugar is unhealthy for human beings lies in the way human body is able to metabolize different sugars.[20] The following lines explain how the human body deals with various kinds of sugar, and how it leads to diseases.

I. **Dental decay:** Dental decay can be said to be one of the less serious health problems associated with sugar consumption. Sugar, while having 'empty' calories does affect the mouth flora. It feeds the bacteria in the mouth which subsequently causes their growth. Science has established a direct link between dental caries and sugar consumption. Sugars are being hydrolyzed by salivary amylase, feed oral bacteria, and lower salivary pH. This starts off a tooth demineralization process.[21]

II. **Fatty liver disease:** The cause of the non-alcoholic fatty liver disease is rooted in the way our body metabolizes sugar. Before sugar enters a bloodstream, it is broken into fructose and glucose. There is a difference between these two sugars. Glucose is contained in every living cell, and the human body produces it on its own when needed. Yet, fructose is not produced in great amounts since it is not needed in such amounts for human physiological functions. Fructose can be metabolized by liver, where it is also stored as glycogen, till it is needed as a source of energy. However, when there is too much of it stored in the liver, it is transformed into fat.[22] Sugar is also often said to be a toxin, even in moderate amount.[23] Repeated sugar

[15]"Dr. Oetker Big Americans pizza BBQ chicken," n.d.
[16]"AH Basic spaghetti bolognese," n.d.
[17]"AH verse pasta kip-mascarpone," n.d.
[18]Malik, V.S., Popkin, B.M., Bray, G.A., Despres, J-P., Hu, F.B., 2010.
[19]Penson, 2009 and Walston, n.d.
[20]Bocarsly, Powell, Avena, Hoebell, 2010.
[21]Touger-Decker, van Loveren, 2003.
[22]Gunnars, 2015.
[23]Mercola, 2015.

consumption can lead to fatty liver as well as other problems, such as metabolic syndrome, cardiovascular disease and diabetes.[24]

III. **Insulin resistance and diabetes:** If one consumes a lot of sugar, there is a high probability that one develops insulin resistance. The body tries to control the sugar levels by the production of insulin, however, the body has also its limits. As the insulin resistance becomes worse, a lot of demand is put on pancreas which cannot produce such high amounts of insulin in order to keep the sugar levels down.[25] Diabetes is diagnosed when the sugar levels peek and cannot be brought down since insufficient amount of insulin in made. That is why sugar has been marked as a reason for type II diabetes.[26]

IV. **Cancer:** Many scientists have believed that having constantly elevated insulin levels can enhance the growth of the cancer cells. High insulin levels are also linked with obesity and metabolic syndrome.[27] Also, metabolic problems which are associated with sugar consumption[28] are a driving force for developing carcinogenic cells.[29] Furthermore, another report points out that sugar spikes insulin, and causes metabolic problems, and these factors can fuel cancer.[30] Biochemical studies have analyzed metabolic profiles of cancer cells, and those have shown high glucose content. Although glucose, as such, might not be the cause of cancer, it does feed the cells, and ensures their survival. It has also been shown on the PET scan (which detects glucose consumption by cells) that the higher the accumulation of glucose, the more aggressive the tumor is. Cancer cells consume 10-50 times more glucose than healthy body cells. These findings suggests that controlling blood sugar can influence the development of cancer. Healthy blood sugar levels can create anti-carcinogenic environment which could prevent and even eliminate cancer.[31]

V. **Obesity:** A study, of which the focus was HFCS has linked the consumption of this type of sugar with obesity. The study explored the effects of short-term and long-term HFCS consumption. An experiment with rats suggests that the consumption of HFCS causes an increase of the body weight. More specifically, the abdominal fat was mainly gained after the consumption of HFCS over a course of 6 - 7 months.[32] Moreover, another study has established a clear link between the consumption of sugar-sweetened drinks and child obesity. This is believed to be due to the energy from sugar being unused and stored as fat instead.[33]Also, the sugar contained in sweetened beverages was examined in a relation to Body Mass Index (BMI), and the study

[24]Stanhope, Schwarz and Havel, 2013.
[25]Gunnars, 2015.
[26]Basu, Yoffe,Hills, Lustig, 2013.
[27]Boyd, 2003.
[28]Stanhope, Schwarz and Havel, 2013.
[29]Arcidiacono et al, 2012.
[30]Penson, 2009.
[31] Walston, n.d.
[32]Bocarsly, Powell, Avena, Hoebell, 2010.
[33]Gillis and Bar-Or, 2003.

examined when one could have a genetic predisposition to obesity. The greater the sugar intake from the beverages, the more pronounced was the genetic association with obesity.[34] Such results suggest that the genetic predisposition to obesity can be strengthened or weakened by the sugar intake.

VI. **Cardiovascular disease:** Sugar intake, more specifically, sweets have caused women to reach high glucose levels. The subjects studied with higher glycemic intake have been at a higher risk of the coronary heart disease. Also, a diet rich in sucrose is associated with elevated plasma triglyceride concentrations, which is a risk factor for a heart disease.[35] Moreover, an epidemiological study, the *Farminghem heart study*, has indicated that individuals who consume more than one or more drinks a day is at risk of high blood pressure, which can lead to a heart disease.[36]

VII. **Addiction:** Neurological research shows that food can also become an addiction. Dr. Avena, from the department of psychiatry at the University of Florida has, together with her colleagues, argued that sugar consumption does not only influence the brain function and behavior but also brings about withdrawal syndromes, those which drugs also do. They argues that sugar causes addition on the biochemical and neurological level. [37] Sugar releases opioids as well as dopamine, the happiness hormone, just as drugs do.[38] Another study researched the effect of high glycemic food on brain. The MRI brain scan has indicted that brain regions associated with cravings and reward were stimulated. When one eats a high glycemic meal, the sugar spikes quickly and then it drops fast as well. The brain fMRI scan has illustrated that this fast sugar drop has activated a brain region (nucleus accumbens) which is associated with addictive behavior. This brain region is a region of pleasure. If a long stimulation of the pleasure centre takes place, then addiction occurs. When a substance causing addition is consumed, drugs or sugar, dopamine hormone is received by the pleasure centre, and this way one experiences pleasure. Prolonged consumption of an addictive substance leads to tolerance therefore one will continue consuming more of the substance to achieve the same 'pleasurable effect.' If one suddenly cuts the consumption of the substance, withdrawal symptoms occur. Withdrawal and tolerance equal to addiction.[39]

2.4. Is sugar safe?

Scientific research has indicated that sugar can be detrimental to human health. Because of the discussed negative effects of sugar on the human body, it is necessary to critically evaluate the excessive use of sugar in food products. Sugar is currently being perceived as a nutrient (despite the fact that it does not possess any nutritional value) within the realm of the Reg. 1169/2011,

[34]QI et al, 2012.
[35]Howard and Wylie-Rosett, 2002.
[36]Johnson et al, 2009.
[37]Roumeliotou, 2013.
[38]Avena, Rada, and Hoebel,
[39]Mercola, 2013.

and it is labelled together with other nutrients by the use of a nutritional label.[40] Nevertheless, the question is whether the standardized labelling system, regulated by the FIR, is effective enough when it comes to informing consumers about the high sugar content in products they purchase. The extent to which the importance of creating an effective labelling system is discussed, is determined by the extent to which food safety, as such, could be reconsidered. Sugar consumption has not yet been linked with the concept of food safety, yet, it has become clear that it does cause adverse health effects, and these cannot be ignored. Food safety concept, on the EU level regulated by Reg. 178/2002. Art. 14 of the regulation explains that food is unsafe when it is: (a) Injurious to health, (b) unfit for human consumption.[41] The regulation also specifies what factors determine whether food is injurious to health. According to Art. 14(4), when determining whether food is injurious to health, attention shall be paid:

> "(a) not only to the probable immediate and/or short-term and/or long-term effects of that food on the health of a person consuming it, but also on subsequent generations;
> (b) to the probable cumulative toxic effects."[42]

Based on the abovementioned specific factors determining whether food can be deemed injurious to health or not, sugar could be classified as a substance which is injurious to health. Research discussed in chapter 2.3.3. points to a variety of long-term, chronic diseases which are clearly linked to sugar consumption. Moreover, sugar has been also referred to as being a toxin due to the effects it has on human liver and the development of other diseases. Yet, in practice, it appears that too much attention is paid to short-term safety issues. The focus of the analysis of food safety issues is mainly concentrated on the microbiological safety. Food is perceived to be unsafe when a person suffers from food poisoning or food intoxication. In other words, food is unsafe when serious short-term effects are noted, such as getting a disease of which consequences can be seen in a relatively short time. Such safety issues are mirrored in the EU case law. Recent EU case law deals with the following issues:

I. Failure to comply with microbiological criteria, in which there was a threat of Salmonella,[43]
II. Placing novel foods on market where the safety assessment is needed to rule of the presence of residues of transgenic protein,[44]
III. The issue of detecting lipophilic toxins in bivalve molluscs,[45]
IV. Hygiene concerning meat preparation in order to avoid presence of transmissible spongiform encephalopathies[46]

After the analysis and evaluation of sugar safety, it has become clear that consumers have to

[40]Nutrition labelling, regulated by Reg. 1169/2011, is further explained in chapter 3.
[41]Art. 14(2) of the Reg. 178/2002.
[42]Art. 14(4)(a)(b) of the Reg. 178/2002.
[43]Case C-433-13: Ute Reindl v Bezirkshauptmannschaft Innsbruck
[44]Case C-236-01: Monsanto Agricoltura Italia SpA v Presidenza del Consiglio dei Ministri
[45]Case T-204/11: Spain v Commission
[46]Case C-453-13: Newby Foods Ltd v Food Standards Agency

understand how much sugar is contained in food products. Is the current sugar labelling effective in terms of consumers' understanding of labels? What are the exact labelling requirements to which the food business operators have to adhere? The next chapter provides a detailed description of Reg. 1169/2011, by which the food labelling is regulated on the EU level.

3. Sugar content information with the EU legislative framework

3.1. EU Labelling regulation: Reg. 1169/2011 (FIR regulation)

As far as information with regard to sugar content in food products is concerned, Reg. 1169/2011 on the provision of food information to consumers is of relevance. This is the very first regulation which outlines harmonized labelling rules on the EU level, when it comes to food products placed on market. The regulation merged two already existing directives, Dir. 2000/13/EC on foodstuffs labelling and Dir. 90/496/EEC on nutritional labelling. The purpose of this regulation is to provide comprehensible information about food products via food labels to consumers in order for them to make a well-informed choice. As referred to in Art. 1(1) of the regulation, the main aim of the regulation is to achieve high level of consumer protection in terms of food information, while ensuring the functioning of the internal market. Thus, although the regulation is aimed at consumer protection, the functioning internal market is an equally important aspect.

This regulation lists all the requirements related to food information, as well as it provides the means which can guarantee the right for consumers to food information, while providing flexibility to respond to future developments and new information requirements (Art.1(2)). Such elasticity gives space for possible future adjustments in terms of regulation of providing information concerning food to consumers, when there is a need to do so. Moreover, food business operators are obliged to adhere to the provisions of this regulation as far as food information is concerned (Art. 1(3)).

3.1.1. Relevant legal definitions: FIR

Before discussing the provisions relating to information about the sugar content in a product, a few definitions have to be provided. First of all, *food information* is to be understand as "information concerning a food and made available to the final consumer by means of a label, other accompanying material, or any other means including modern technology tools or verbal communication," (Art. 2(2)(a)).

Secondly, *food information law* is defined as "the Union provisions governing the food information, and in particular labelling, including rules of a general nature applicable to all foods in particular circumstances or to certain categories of foods and rules which apply only to specific foods," (Art. 2(2)(b)).

Thirdly, the regulation makes a distinction between mandatory and voluntary information to be provided to consumers. *Mandatory food information* is to be understood as "the particulars that are required to be provided to the final consumer by Union provisions," (Art. 2(2)(c)).

Voluntary food information is not explicitly defined in the regulation, however, it is self-explicatory. It is the information that food business operators can communicate to the consumers, however, it is a voluntary addition to the mandatory food information, therefore, such information is not required by any legal provisions.

Furthermore, the terms label as well as labelling are relevant to this analysis and thus need to be defined. These two terms might sounds similar, yet, there is a distinction is the meaning of the two terms. *Label* is defined as "any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to the packaging or container of food," (Art. 2(2)(i). On the other hand, *labelling* is to be understood as "any words, particulars, trademarks, brand name, pictorial mater or symbol relating to a food and placed on any packaging, document, notice, label, ring or collar accompanying or referring to such food,"(Art. 2(2)(j)).

Moreover, the regulation considers legibility of food information as an important aspect in communication of information to consumers. Legibility is to be understood as "the physical appearance of information, by means of which the information is visually accessible to the general population and which is determined by various elements, inter alia, font, size, letter spacing, spacing between lines, stroke width, type colour, typeface, width-height ration of the letters, the surface of the material and significant contrast between the print and the background,"(Art. 2(2)(m)).

Eventually, a definition of an ingredient, as well as the one of a nutrient, is of importance. An ingredient is described as: "any substance or product, including flavourings, food additives and food enzymes, and any constituent of a compound ingredient, used in the manufacture or preparation of a food and still present in the finished product, even if in an altered form; residues shall not be considered as 'ingredients,'" (Art. 2(2)(f)). Lastly, the regulation defines a nutrient as: "protein, carbohydrate, far, fibre, sodium, vitamins and minerals listed in point 1 of Part A of Annex XIII to this Regulation, and substances which belong to or are components of one of those categories," (Art. 2(2)(s)).

3.1.2. Structure and the relevant provisions of the Reg. 1169/2011

The regulation provides detailed provisions concerning information about food products placed on market, to which FBO must adhere. When a closer look is taken at the structure of the regulation one can notice that it consists of two main elements:

I. *General provisions*, which contain the scope, definitions and general objectives and aims (Chapter 1-2 of the regulation).
II. *Specific provisions* concerning mandatory and voluntary information, the presentation of information, fair information practices, EFSA consultation, as well as responsibilities of FBOs (Chapter 3-6; Section 2-3).

3.1.2.1. General provisions

In terms of the general provisions regulating food information provided to consumers, much emphasis is put on *consumers' health* in the provisions of chapter 2. According to Art. 3(1), "the provision of food information shall pursue a high level of protection of consumers' health and

interests by providing a basis for final consumer to make informed choices and to make safe use of food, with particular regard to health […] considerations." In addition, the heath aspect is underlined in the principles of mandatory food information. When mandatory information is required by law, it concerns information about the protection of the health of consumers, and the safe use of food (Art. (4)(1)(b)). More specifically, it shall concern the information with regard to the health impact, together with the risks and consequences related to harmful and hazardous consumption of food (Art. 4(1)(b)(iii)). Also, information concerning nutritional characteristics shall be provided, in order for consumers to make informed choices (Art. (4)(1)(c).

3.1.2.2. Specific provisions

Mandatory particulars

The second specified group of provisions outlined in the regulation provides more detailed information about the *mandatory particulars,* thus the mandatory information that is required to be labelled on a food product by FBOs. Mandatory information includes the following particulars:

(a) the name of food
(b) the list of ingredients
(c) an ingredient or processing aid causing allergies or intolerances (listed in Annex II)
(d) the quantity of ingredients or ingredient categories
(e) the net quantity of food
(f) date of minimum durability
(g) special storage conditions and/or conditions of use
(h) the (business) name and the address of FBO
(i) the country of origin
(j) instructions for use when it is difficult to know how to prepare the food otherwise
(k) alcohol content for beverages with the alcohol content higher than 1.2%
(l) a nutrition declaration.[47]

In addition to the duty of FBOs to mention the mandatory particulars, the way and means through which this information is expressed is also regulated. The mandatory particulars are to be expressed primarily by words and numbers, however, they may also be complemented by another form of expression. As stated in Art. 9(2), the particulars: "[m]ay *additionally* be expressed by means of pictograms and symbols." Thus, although FBOs are allowed to use pictograms and symbols to express the mandatory information, these means are only additional expressions, thus such means become voluntary expression means, while words and numbers remain obligatory means of expression. Having stated that, there are situations in which the information can be expressed by pictograms and symbols instead of words and numbers. This is possible when Commission adopts delegated and implementing acts referred to in Art. 9.[48] Art.

[47]Art. 9(1) of the Reg. 1169/2011.
[48]Art. 9(3) of the Reg. 1169/2011.

(9)(3) provides an explanation of situations in which words and numbers, as expression means, can be replaced by pictograms and symbols:

"In order to ensure that consumers benefit from other means of expression of the mandatory food information than words and numbers, and provided that the same level of information as with words and numbers is ensured, the Commission, taking into account the evidence of uniform consumer understanding, may establish, by means of delegated acts, […], the criteria subject to which one or more [mandatory] particulars may be expressed in pictograms or symbols instead of words or numbers."[49]

To ensure uniform implementation of the delegated acts, the Commission may adopt the implementing acts relating to the application of the criteria, which have to be defined in accordance with paragraph 3, to express some particulars in pictograms or symbols rather than words and/or numbers. The implementing acts have to be in accordance with the examination procedure[50] referred to in Art . 48(2).[51] Therefore, although is it possible for FBOs to use pictograms and symbols as a means of expression of the mandatory particulars within the realm of Art. 9 of the regulation, for such means of expression to be accepted, a whole legal procedure has to take place, which can be a lengthy process. The emphasis is put on the burden of evidence on the basis of which it can be proven that a consumers can actually benefit from other means of expression than just words and numbers.

Furthermore, *list of ingredients* is a piece of information that belongs to the mandatory information to be labelled on a food package. As far as the regulation of ingredients is concerned, the most attention is paid to the *wording* and *weight*. All ingredients of a particular food product and their weight shall be mentioned, (Art. 18(1)), and the ingredients shall be referred to by their specific name (Art. 18(2)).

Moreover, when analyzing sugar content information, the *nutrition information* is of importance. The mandatory nutritional declaration, to be placed on a food product, shall include the following aspects: (a) energy value (b) the amount of fat, carbohydrates, saturates, *sugars*, protein and salt.[52] The nutritional declaration can be complemented by information about other nutrients such as mono-saturates, polyunsaturates, polyols, starch, fiber, other vitamins and minerals,[53] however these are not mandatory, thus, they remain supplementary (Art. 30(2)). The energy value and the nutrients shall be expressed pre 100g or per 100ml (Art. 32(2)). However, the energy value and the nutrients can be expressed per portion and/or per consumption unit, which is easily recognizable for a consumer, provided that the portion or the unit is quantified on

[49]Art. 9(3) of the Reg. 1169/2011.
[50]The procedure is laid down under Art. 5 of the Reg. 182/2011. During this procedure it is the task of the Committee to deliver its opinion by the majority laid down in Article 16(4) and (5) of the Treaty on European Union and, if applicable, Article 238(3) TFEU, for acts to be adopted on the basis of a proposal from the Commission. The votes of the representatives of the Member States within the committee shall be weighted in the way set out in the mentioned articles.
[51]Art. 9(4) of the Reg. 1169/2011.
[52]Art. 30 (1) of the Reg. 1169/2011.
[53]These vitamins and minerals in question are listed in Part A of Annex XIII of the Reg. 1169/2011.

the label, and that such expression is an additional form of expression to the per 100g or 100ml (Art. 33(1)). Such provisions show that as far as the regulation of nutritional declaration is concerned, the attention is paid to the expression of the quantification of the nutrients.

Eventually, the regulation gives space for an adaptation of national measures when it comes to mandatory food information. EU member states may adopt additional mandatory particulars for types of foods or food categories if they are justified on the grounds of protection of public health, the protection of consumers, the prevention of fraud, the protection of industrial and commercial property rights, indications of provenance, registered designation of origin and the prevention of unfair competition (Art. 39(1)).

Voluntary food information

Besides the above discussed mandatory particulars, the FBO can provide more information to the consumers about food products if they wish to. Despite such information being voluntary and supplementary, there are specific requirements which have to be adhered to when a FBO wishes to include extra information on a food package (Art. 36(1)). Information which is provided on voluntary basis shall not mislead the consumer, it shall not be ambiguous or confusing for the consumer, and it shall be based on relevant scientific data (Art. 36(2)). The Commission has the right to adopt implementing acts concerning the application of the requirements mentioned above (Art. 36(3)). Also, the Commission may, by the means of delegated acts, provide for additional cases of provision of voluntary food information to the ones which are referred to in Art. 36 (3), in case the voluntary information provided on a divergent basis by FBO might mislead or confuse the consumer (Art. 36(4)). Such a provision gives the Commission the freedom and power to judge the voluntary information in order to achieve that consumers are 'appropriately informed,' as described in Art. 36(4)).

Presentation of information

The way information on food products is presented is also closely regulated. In terms of the regulation of the presentation of food information, a distinction can be made between the mandatory presentation elements and voluntary/complementary presentation means. The mandatory presentation means are described in a relation to mandatory food information and nutritional declaration, and the other, complementary presentation means are described generally, without a particular reference to any aspect of the food information.

Firstly, there are specific requirements when it comes to the presentation of mandatory food information. The attention is especially paid to the legibility of information. The information printed on a food package has to be legible. It is indicated that the x-height has to be equal to or greater than 1.2mm (Art. 13(2)). Yet, packages with area of less than 80m2, the x-height shall be equal to or greater than 0.9mm (Art. 13(3)). Rules for legibility are established by the means of Commission's delegated acts (Art. 13(4)). Non-mandatory information or voluntary information shall be presented to the detriment of the space which is available for mandatory information (Art. 37).

Secondly, the nutritional declaration is to be presented in a particular format. The nutrition information described in Art. 30(1) and (2) shall be presented in tabular format with the aligned numbers. In case the space does not allow it, the declaration shall be presented in a linear

format (Art. 34(2)). The particulars of nutritional declaration shall be presented in a principal field of vision, and using a font size in accordance with Art. 13(2)[54] (Art. 34(3)).

Besides the mentioned ways of presentation of different pieces of information, there are additional forms of expression and presentation which can be used by FBOs. Yet, these additional forms are to be seen as complementary means of presentation to the mandatory means of presentation. The energy value and the amount of nutrients can also be presented using graphical forms or symbols in addition to words or numbers if the requirements listed below are met:

(a) [these expressions] are based on scientifically valid consumer research
(b) their development is based on a consultation of various stakeholders
(c) they aim to facilitate consumer understanding of the importance of the food to the energy and nutrient content of a diet
(d) they are supported by scientifically valid evidence of understanding of such forms of expression of presentation by the average consumer
(e) other forms of expressions are based on the harmonized intakes set out in Annex XIII, or on generally accepted scientific advice on intakes for energy or nutrients
(f) they are objective and non-discriminatory
(g) their application does not create obstacles to the free movement of goods[55]

After having considered the two groups of provisions relating to the presentation of food products, one can note that the mandatory presentation elements/requirements are set for the nutritional declaration and mandatory food information as primary forms of expressions required by law, which can be only supplemented by other forms of expression such as graphical representations and symbols, if the conditioned mentioned above are met. Thus, it appears that the regulation only regulates the presentation of food information via words and numbers, where the other voluntary means of presentation are secondary.

Fair information practices

Fair information practices also fall within the scope of the regulation and are applicable to all kinds of food information. Food information shall not be misleading for consumers in terms of food characteristics, especially, the nature, identity, properties, composition, quantity, durability, etc. (Art. 7(1)(a)). Moreover, food information shall be accurate, clear, and easy to understand for consumers (Art. 7(2)). These provisions apply also to advertising and the presentation of foods, their shape, appearance of packaging and packaging materials, the way they are arranged and the setting in which they are displayed (Art.7(4)).

[54]Art. 13(2) of Reg. 1169/2011: "Without prejudice to specific Union provisions applicable to particular foods, when appearing on the package or on the label attached thereto, the mandatory particulars listed in Article 9(1) shall be printed on the package or on the label in such a way as to ensure clear legibility, in characters using a font size where the x-height,[…] is equal to or greater than 1,2mm."
[55]Art. 35(1) of the Reg. 1169/2011.

EFSA (European Food Safety Authority) consultation

The regulation provides space to consult EFSA under certain circumstances. Any EU measures in the field of food information law which is likely to affect public health, shall be adopted after having consulted EFSA (Art. 5). Yet, such a provision seems rather broad, and sometimes it might be rather difficult to state what has an effect on public health and what does not. A careful evaluation of the issue in question might be necessary in such cases.

Responsibilities of FBOs

FBOs are responsible for the information that is put on a food package in several ways. FBOs have to adhere to the following responsibilities:

1. FBOs shall ensure the presence and accuracy of the food information in accordance with the applicable food information law, as well as national provisions (Art. 8(2)).
2. If FBOs who know or presume that information on a food package is non-compliant with the food law and national provisions, they shall not supply such food (Art. 8(3)).
3. Within the business under the control of FBOs, FBOs cannot modify food information if this might mislead the consumer and so the level of consumer protection and the possibility to make an informed choice, would be reduced. FBOs are responsible for any changes they make in terms of food information (Art. 8(4)).
4. FBOs, within the business under their control, shall ensure the compliance with the food law requirements and relevant national provisions, and also verify that these requirements are met (Art. 8(5)).

Chapter/Section	Article	Subject
Chapter 1	Art. 1	Subject matter and scope
Chapter 1	Art. 2	Definitions
Chapter 2	Art. 3	General objectives- aims of the food information regulation
Chapter 2	Art. 4	Mandatory food information - principles
Chapter 2	Art. 5	Consultation of EFSA
Chapter 3	Art. 7	Fair information practices
Chapter 3	Art. 8	Responsibilities of FBOs
Chapter 4	Art. 9	List of mandatory particulars
Chapter 4	Art. 10	Additional mandatory particulars for specific types or categories of foods
Chapter 4	Art. 12	Availability and placement of mandatory food information
Chapter 4	Art. 13	Presentation of mandatory particulars
Section 2	Art. 18	List of ingredients
Section 2	Art. 22	Quantitative indication of ingredients
Section 3	-	Nutrition declaration
Section 3	Art. 30	Content - Mandatory nutrition declaration
Section 3	Art. 32	Expression per 100g or per 100ml
Section 3	Art. 33	Expression on a per portion basis or per consumption unit
Section 3	Art. 34	Presentation - nutrition declaration
Section 3	Art. 35	Additional forms of expression and presentation
Chapter 5	-	Voluntary food information
Chapter 5	Art. 36	Applicable requirements
Chapter 5	Art. 37	Presentation - voluntary food information
Chapter 6	-	National measures
Chapter 6	Art. 39	National measures with regard to mandatory particulars

Table 1: Simplification of the Reg. 1169/2011[56]

The FIR information regulation provides a detailed set of rules which have to be followed by the FBOs in the EU. Yet, these rules are based on a variety of assumptions, especially assumptions concerning the character of consumers. While the regulation provides a legal food labelling framework which ensures consumers' protection, the lawmakers do not appear to have considered consumers' real life behaviour. An insight into how real consumers behave can lead to creating more effective means through which information is communicated. The next chapter therefore presents a newly emerging approach to law, which engages psychology in the field of law and economics, in order to understand the consumers and their buying behaviour.

[56]Adapted from Reg. 1169/2011.

4. Consumer behavior and perception: Insights from behavioral economics

4.1. Insights from behavioral economics

Behavioral economics (BE)[57] is a growing field of expertise which can provide insights into the reasons why consumers choose particular products. Up until today, it appears that the insights from BE have been used by companies in order for them to gain an understanding of people's choice so that they are able to maximize their profits. Thus, the focus has been put more on the economics than consumer protection, when it comes to academic discussions with regard to BE. However, insights from behavioral economics can contribute to improvements in legislation, particularly with regard to sugar content information. Because sugar consumption can be seen as a food safety issue, effective sugar labelling becomes even of greater importance. BE could contribute to the stronger consumer protection, as BE insights can be used for the development of effective labelling tools which ensure that sugar content information is communicated in a way understandable to consumers. There are several questions to be asked. First of all, could the information regarding sugar content information, be communicated better to the consumers so that they could easily understand it, and make a well-informed choice? How can insights from behavioral economics be applied to the framework of food information law in a way that these contribute to the protection of consumer, as they would easily be able to understand the means through which the information is given to them? The following chapters explain what behavioral economics is, the relevant theories and how insights from BE can contribute to improvements in the legislation when it comes to food information for consumers, more specifically, the sugar content information.

4.1.1. What is behavioral economics?

There are many writers who define and describe behavioral economics in various ways, thus no generally agreed upon definition exists. BE is a field of expertise which applies insights from psychology as well as other social sciences to economics so that it is possible to understand people's economic behavior. Such insights can contribute to a widened understanding of the functioning of the *standard economic model*,[58] as well as point out the flaws of this system.[59] Thus, BE can contribute to improvements in the field of economics in terms of generating new theoretical insights, but also proposing new, improved policy.[60] In addition, BE approach can be used to improve the consumers' position in the market. BE looks into the behavior of market

[57] Behaviour economics – abb. BE – this abbreviation should from now on be used in this analysis
[58] *Standard economic model* is a model of how consumers are expected to behave. Rational consumers deal with risky decisions by weighting possible outcomes with their occurrence probability. These rational consumers are assumed to ignore information which is relevant to their salaries, and the consistency in their approach to discounting is over time is also expected. The theory of predicting how 'rational' consumers should behave is called expected utility theory (Mehta, 2013).
[59] Cartwright, 2014.
[60] Camerer et. al., 2004.

participants, considers their cognitive limits, and examines how they deal with the received information. BE takes into account the power of defaults and the influence of environment.[61]

4.1.2. How did behavioral economics emerge as a field?

Although it is difficult to pinpoint exact time when the concept of behavioral economics emerged, the very first foundations of this concept are believed to be provided by Adam Smith, as early as in 1750s. In his book, *The theory of moral sentiment*, published in 1759, Smith explains that people are not motivated by self-interest, but also feel sympathy for others. In this book, Smith deals with topics which have been major issues, such as i.e. reward, punishment, custom, and fashion, in behavioral economics during the past three decades. Thus, it is clear that insights from psychology were used in economics already a long time ago, as economists took into account emotions, impulses and morals, for instance.

The shift took place at the beginning of 20th century when Vilfredo Pareto, an Italian economist and sociologist, whose interest was to eliminate any psychological considerations from the field of economics. Instead of looking at why people behave as they do, Pareto argued that it is enough to know what they do. Thus, the focus is on choice not desire. Such approach allowed him to develop a mathematical *theory of rational choice.* He argued that people, if rational, will reveal their desires via their choices.[62] Nevertheless, the rational choice theory has received a lot of criticism in the late 1950s and early 1960s. The classical concept of rationality was criticized by many sociologists, among which was also Herbert Simon. With his work he significantly contributed to the evolution of the field.[63] Simon argued that the reason why normative macroeconomists are not concerned with human behavior is due to two factors:

1. they think that humans are rational beings
2. they assume competition, with the implication that only the rational actor survives.[64]

His work is seen as rather influential. He noted that human beings do not behave according to assumptions of the standard model of rationality, which illustrates how people are expected to behave in situations such as decision-making. Simon pointed out that real world is so complex that the theory of utility maximization is almost irrelevant to real choices people make. Additionally, he proposed that the theory of decision-making should be grounded in the theory of choice while focusing on the way people process information provided to them.[65] He pointed out that there is a lack of evidence suggesting that in actual situations in which humans take decisions of different levels of complexity, humans can perform computations, as suggested by Pareto. Simon emphasized that there may be limits to the computation abilities human possess. Such consideration marked the birth of the new term bounded rationality.[66]

[61]Micklitz et al., 2011.
[62]Cartwright, 2014.
[63]Mehta, 2013.
[64]Simon, 1959.
[65]Mehta, 2013.
[66]Cartwright, 2014.

Bounded rationality is one of the three bounds which are of significance when analyzing the implications of behavioral economics for law. Through the discussion of the three bounds: 1. bounded rationality, 2. bounded willpower, and 3. bounded self-interest, the distinction between 'real people' and 'homo economicus'[67] can be made. Simply put, the three bounds are three important ways in which real people deviate from the standard economic model.[68] Through these bounds, the central ideology of rational expectations, stable preferences, utility maximization, and optimal information processing, are drawn into question.[69]

4.1.3. Bounded rationality (decision-making)

In the mid 1950s, Simon proposed the concept of bounded rationality. The purpose was not to oppose the classical economist view, but to connect rationality with psychology to explain human behavior.[70] Simply put, bounded rationality means limited rationality. According to Simon: "the term of bounded rationality is used to designate the rational choice that takes into account the cognitive limitations of a decision-maker - limitations of both knowledge and computational capacity."[71] Bounded rationality serves as the means to understand how people take decisions without any calculations of utilities and probabilities, thus without optimization.[72] Although there is no unified theory of bounded rationality, there are three classes of processes which are specified by the models of bounded rationality:

1. Simple search rules - step by step procedure in which information is gained or an adjustment is made
2. Simple stopping rules - the search is terminated by the first object which satisfies aspiration level[73]
3. Simple decision rules- simple decision is applied - choice of an object which is reasoned by the most important reason.[74]

Satisficing

Simon can be referred to as the advocate of the normative decision-making thanks to the introduction of the terms 'satisficing' and 'an administrative man.' When people take a decision that satisfies and suffices for a certain purpose, then people 'satisfice.' This means that the decision taken is good enough, although it might not be the best decision that could be taken. Thus, Simon describes his administrative theory, which is the theory of bounded rationality, as theory which concerns humans who 'satisfice' because of their inability to maximize.[75]

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[67]Homo economicus is a term used to describe humans as rational beings.
[68]Mullainathan and Thaler, 2000.
[69]Misklitz et al., 2011.
[70]Gigerenzer and Selten, 2002.
[71]Simon, 1997.
[72]Gigerenzer and Selten, 2002.
[73]Aspiration level is a level reached when at least 1 alternative is satisfied. This means that an individual does not necessary weigh all alternatives before taking a decision.
[74]Gigerenzer and Selten, 2002.
[75]Brown, 2004.

Economic vs. administrative man

Simon makes a clear distinction between an 'economic man' and an 'administrative man.' The main difference between an economic and administrative man is that the economic man, 'homo economicus,' considers and weighs *all* alternatives, whereas the administrative man does not. From all the alternatives available to them, an economic man maximizes, thus, chooses the best alternative. On the other hand, administrative man choose a satisfactory alternative, which is the simplified model of the real world, as Simon named it. Administrative man takes into account only factors which they regard as most relevant and crucial, and takes a decision accordingly.[76]

4.1.4. Bounded willpower

Bounded willpower is a term which in practice means that humans sometimes take decisions which they might not favor in the future, thus in a longer term.[7778] Posner (2007) referred to bounded willpower as to the 'weakness of will.' For example, instead of saving money people tend to spend it, instead of eating healthy people choose sweets, smoking, etc. Although they do realize that it is bad for them (eg: smoking is unhealthy), and that they might not be satisfied with their choice later, they still do it.[79] Because people do realize their 'weakness' of willpower, they take actions so that they eliminate the effect of the 'bad' decision taken due to their weak willpower. A person who wants to go on a diet purposely throws all the junk food out of the house so that there is no temptation. From a rational point of view, or traditional economics point of view, such behavior is seen as irrational. There is no danger even if the junk food remains in the house, because a rational person can decide not to consume it although it is there.[80]

4.1.5. Bounded self-interest

On the contrary to the traditional economics viewpoint, people are not only self oriented but they care about both, giving but also receiving fair treatment.[8182] According to bounded self-interest concept, people depart from the notion of material self-interest maximization. For instance, there is empirical evidence that employees work hard if they receive fair wages. Thus, human behavior is context-dependent, as previous research has already indicated.[83] In some situations and settings people show they care about others. Yet, bounded self-interest is not to be mistaken for altruism, which was also addressed by economists (as far as bequest decisions were concerned). The concept of bounded self-interest goes beyond the altruistic behavior. Jolls et. al (n.d.) explains: "Self-interest is bounded in a much broader range of settings than conventional economics assumes, and the bound operates in ways different from what the conventional understanding suggests." For instance, in bargaining settings, people do care about fairness, thus people treat others fairly but they also expect other to treat them fairly. Unfair behavior is not

[76]IBID.
[77]Jolls et al.,1998.
[78]Mullainathan and Thaler, 2000.
[79]Jolls, 2007; Haas; 2006 and Diamond and Vartiainen, 2007.
[80]IBID.
[81]Jolls, 2007.
[82]Diamond and Vartiainen, 2007.
[83]Shafir, 2013.

accepted, and so punished.[84] Thus, according to the bounded self interest notion, people can be motivated by other aspects than profit maximization or career advancement.[85]

In contrast to such opinions, Brown et. al (2012) questions the care-giving and argues that the presence of the care-giving behavior and one's self interest and willingness for maximization is not mutually exclusive. Brown et. al (2012) explains: "[A]acknowledging that people are motivated to care for and help others does not imply that they are not self-interested or motivated to maximize pleasure. Rather it suggests that as humans we are pluralistic, navigating between our interests and interests of others."[86]

4.1.6. BE in relation to law

Economics and law are interrelated fields are often discussed as if being one field, especially, when it comes to the discussions concerning behavioral economics, as a new approach to law. In order to state if a particular law is 'good' or 'bad' it is necessary to consider the effects law has on people, and society, as such. Economics has always been used as a tool to analyze the effects of law and the desirability of rules. However, applying the traditional economic rules to law can lead to mis-prediction of human behavior, due to unrealistic assumptions about human behavior.[87]

The concept of BE in relation to law is often concerned with questions such as: How does less rational behavior in the legal process affect legislators, lawyers, defendants and judges? A large part of the research of BE in relation to law is concerned with questions such as the abovementioned one. Focus is put on how the legal process unfolds, how the judges, defendants, lawyers perceive the situation and what biases they are influenced by.[88] Yet, the insights of BE are very relevant to a recently born legal area, which is the area of food law. The application of BE insights onto food law is of importance, especially when it comes to information provided to consumers, and the choices they make.

4.1.7. Food law and BE

Central to the analysis of BE in relation to food law, is the concept of one of the bounds - boudned rationality, as it has become clear that EU food law is based on the assumption of consumer rationality. According to the provisions of EU legislation concerning food information, consumers have the right to be informed about the products on market, in order to make an informed choice. This is to ensure consumer protection, which is one of the main aims of EU food law.[89] Such considerations are rooted in the concept of traditional economics, which assumes human rationality. The food information law is based on the assumption of an 'economic man' who, when well-informed, will contribute to, or even improve the market competition.[90] This viewpoint thus favors businesses, that is why it appears that the consumer protection, as described in the EU FIR, is to be understood within the realm of internal market

[84]Jolls, 1998.
[85]Kolb, 2008.
[86]Brown et. al, 2012.
[87]Jolls, 2009.
[88]IBID.
[89]For more details, see the food information regulation - Reg. 1169/2011 discussed In chapter 2.
[90]Howells, 2005.

functioning. In other words, the motivation to protect the consumer goes as far as it contributes to, or at least does not intervene with, the optimal functioning of the internal market. Yet, the application of BE insights to food information law gives rise to questions concerning the assumed 'rational' consumer, traditional, economically motivated concept of consumer protection, and the way information is processed by 'real' people. The next chapter presents psychological insights which could enrich the discussion of characteristics of real consumers and their behavior.

5. Consumer perception and behavior: Insights from psychology

Studying psychology of human behavior is very relevant to the field of food law. The application of several insights from psychology, such as the one related to psychology of human evaluation of situations, judgment, information processing, decision-making, and choice can enhance an understanding of the consumer perception and behavior. Moreover, these insights definitely can enrich the field of behavioral economics, which already considers a few psychological mechanisms of human cognition. Since this research explores how information is currently communicated and looks for the ways to improve it, the central idea of the following paragraphs is information processing. Yet, there are other concepts with which the issue of information processing is linked, therefore multiple concepts which are connected with this issue are discussed in a systematic way. In order to gain an understanding of how people process information, it is essential to consider multiple factors, such as peoples' evaluation of a situation and their judgment. Therefore, the main purpose of the following analysis is to present the most relevant psychological insights linked to information processing, such as:

A. Reason vs. intuitive judgment (system 1 vs. system 2)
B. Availability and processability of information.

The analysis of such insights can provide a valuable contribution to food information law, as these insights can deepen an understanding of the consumers' behavior in terms of information utilization and processing.

5.1. Information processing: general cognition - System 1 vs. system 2[91]

How people process information depends on their cognition. The following paragraphs concern human cognition, more specifically, different cognitive processes which apply to all human beings. The discussion of these cognitive processes provides an insight into differences in human thinking patterns which can contribute to the understanding of how people react to information, how they judge it, and further process it.

Cognitive processes can be divided into two subgroups or concepts, intuition and reason.[92] This division has existed for a few centuries, however, such considerations are nowadays discussed within the scope of the dual-process theories. These theories created the

[91]Figure 6 provides a detailed overview illustrating the differences between system 1 and 2.
[92]Kahneman, 2003.

basis for later developments in terms of the distinction in the cognitive operations of human mind.[93] An influential psychologist Daniel Kahneman has identified different patterns in human thinking. In his book, *Thinking fast and slow (2011),* Kahneman has widely discussed and analyzed a dichotomy of the two thinking models - so called, fast and slow models.[94] System 1 of thinking is the intuitive, fast, effortless, and instinctive system, in which emotions play a role, whereas system 2 of thinking is a rather slow system, reflective and effortful system, which is logical with reasoning as a central feature (See figure 6).[95] Systems 1 causes one to make automatic associations, whereas system 2 causes one to make deductions, while applying rules and reasoning.[96] System 1 is also referred to as 'experimental' and system 2 as the 'rational' system.[97]

5.1.1. Intuition vs. reasoning

Intuition is one of the most significant characteristics of system 1. This thinking pattern is associated with biases such as *intuitive judgment*. Automatic and effortless thinking process, thus system 1, can generate impressions and tentative (intuitive) judgments which can be accepted or blocked by a controlled process, which is generated through system 2 thinking.[98] This means that although the fast thinking system is responsible for humans making fast and uncontrolled associations, these can be reconsidered and reasoned, which means that system 2 will be activated. Yet, the system 1 is faster and thus human mind will make fast associations before it switches to system 2. Thus, system 1 is responsible for making representations in one's mind, however it does not have the capability for rule-based computations, which is a complex thinking process (system 2).[99] Additionally, Kahneman and Frederick found out that intuition is a significant factor when it comes to making judgments. Kahneman and Fredercik (2002) proposed a model of judgment heuristics, in which the two following ideas are central:

1. most judgments and choices are made intuitively
2. rules governing intuition are similar to the rules of perception.

Intuitive thoughts come spontaneously to one's mind, without any computations, or conscious realization. Intuitive judgments are judgments which directly reflect one's impressions. Systematic research and some observations have indicated that most of the thoughts are intuitive.[100]

In contrast to system 1, the main characteristic of system 2 is reasoning, which is the opposite to intuition. System 2, the reasoning system, can also be referred to as being the rational system or the logic-based reasoning system.[101] Humans use reasoning to explain situations, to fill

[93]Kahneman and Frederick, 2001.
[94]Kahneman, 2012.
[95]Kahneman and Frederick, 2001.
[96]Kahneman, 2012.
[97]Millon et al., 2003.
[98]Morewedge and Kahneman, 2010.
[99]Morewedge and Kahneman, 2010.
[100]Kahneman, 2003.
[101]De Neys, 2006.

in forms with information, or to make calculations. Reasoning is deliberate and it costs effort.[102] The 'effortfulness' factor is especially important for system two, as it is one of the main factors distinguishing system 1 and 2. The analytical reasoning process puts a lot of demand on one's computational resources which differ from person to person. [103] Also, the analytic system 2 can 'evaluate' biases generated by system 1, and in this way such biases can be overridden. However, this also applies to a reversed situation. Heuristics can bias a reasoning process in situation which require a more thoughtful and analytical thinking. Therefore, it can be stated that these systems mutually affect each other.[104]

5.1.2. Human behavior

Automatic system 1 not only influences one's thoughts, and judgments, but more importantly human behavior. The experiential system 1 is to a great extent responsible for one's behavior. Chaiken and Trope (1999) explains: "In most situations, the automatic processing of the experiential system is the major determinant of behavior because it is more rapid, less effortful, and accordingly more efficient than the rational system."[105] Besides, some argue that most of human behavior is controlled by system 1.[106] Although Kahneman gives credit to the analytical function of system 2, he points out that intuition appears to be a stronger, and thus the decisive factor when it comes to how people behave. He believes that human behavior is not guided by computations but much more by intuition. Kahneman (2003) explains that the central characteristic of human beings is not that: "*they reason poorly but that they often act intuitively. And the behavior of these agents is not guided by what they are able to compute, but by what they happen to see at a given moment."*[107] In relation to such considerations, he also emphasized that accessibility[108] is context-dependent, which means that the kind of intuitive thoughts that enter one's mind depend strongly on the given context (See figure 7). Thus it becomes clear that system 1 generates a quick response/ automatic reaction to different stimuli depending on a setting, which significantly influences the way humans act, while the ability to reason is secondary. Due to the reaction being automatic, it can be argued that this fast response or one's behavior is irrational, since there is no reasoning taking place at this first stage of cognition.

5.1.3. Cognitive (un)consciousness

Another important characteristic and an important difference between system 1 and 2 is the cognitive (un)consciousness. System 1 functioning is also defined by the concept of cognitive unconsciousness. The term 'cognitive unconscious' was introduced by Kihlstrom (1987).[109] The unconscious can also be described as a quality that affects one's conscious thoughts and behavior, without being conscious itself. Thus, humans may realize their behavior and thoughts,

[102]Kahneman, 2003.
[103]De Neys, 2006.
[104]De Neys, 2006.
[105]Chaiken and Trope, 1999.
[106]Evans, 2008.
[107]Kahneman, 2003, p .1469.
[108]Accessability can be defined as intuitive thoughts that come to one's mind spontaneously (Kahneman, 2003, p. 1452).
[109]Hassin et al., 2005.

yet, these are influenced by the unconscious system 1 process. The unconscious thinking process happens fast whereas, in contrast, the conscious process (system 2) is slow. Many researchers argue that the unconscious thinking process might control human behavior (as described above) without them realizing it, while system 2 functions as a tool which is used by the brain to explain/reason the subsequent behavior.[110]

In addition, the concept of consciousness of system 2 is often being discussed together with the concept of 'controlled process.' Controlled process involves conscious thought. First, one makes an observation, secondly, they think about what they observe. With an absence of conscious thought, an apparent mental causation cannot be inferred. Besides, intention is also an important factor linked to consciousness, because it is a conscious preview of the action that often happens to be consistent with the action that is observed shortly after.[111] Controlled cognitive process involves active realization, and it allows one's mind to generate future considerations. Conscious thinking allows humans to deal with complex situations, weigh and evaluate alternatives, which, however, does not necessary mean that system 2 is superior to system 1, or that conscious thinking allows humans to make best possible (optimal) choice.[112]

5.1.4. General intelligence

Humans beings' general intelligence is another interesting characteristic, relevant to the analysis of information processing. When considering the two systems in relation to the general intelligence of people, there are major difference. System 1 functioning is totally independent of general intelligence, whereas system 2 is very much linked to one's general intelligence (See table 2). Such findings suggest that once system 2 starts to analyze one's behavior and thoughts, and one considers options and evaluates different scenarios, the quality of such an evaluation depends on one's intelligence. On the other hand, fast non-analytical associative thinking does not depend on one's analytical abilities which are influenced by one's intelligence, as there is no time for any deliberate considerations. An experiment according to which the differences in intelligence of an individual are differences in the one's system 2 thinking capacity is also interesting to consider. Frankish (2010) explains the experiment as follows:

"Numerous studies of reasoning and judgment show that when a task requires abstract reasoning to determine the normatively correct response, performance correlates positively with intelligence, as measured by SAT scores. But when the correct response can be determined by contextualised processes, drawing on background knowledge, this effect largely disappears; participants of low and high intelligence do equally well."[113]

[110]Evans, 2008.
[111]Hassin et al., 2005.
[112]For more details see the section about 'Bounded Rationality' (Chapter 4), in which the concept of optimal decision is explained.
[113]Frankish, 2010, p. 920.

System 1	System 2
Cluster 1 (Consciousness)	
Unconscious (preconscious)	Conscious
Implicit	Explicit
Automatic	Controlled
Low effort	High effort
Rapid	Slow
High capacity	Low capacity
Default process	Inhibitory
Holistic, perceptual	Analytic, reflective
Cluster 2 (Evolution)	
Evolutionarily old	Evolutionarily recent
Evolutionary rationality	Individual rationality
Shared with animals	Uniquely human
Nonverbal	Linked to language
Modular cognition	Fluid intelligence
Cluster 3 (Functional characteristics)	
Associative	Rule based
Domain specific	Domain general
Contextualized	Abstract
Pragmatic	Logical
Parallel	Sequential
Stereotypical	Egalitarian
Cluster 4 (Individual differences)	
Universal	Heritable
Independent of general intelligence	Linked to general intelligence
Independent of working memory	Limited by working memory capacity

Figure 6: Juxtaposing two distinct systems of human thinking[114]

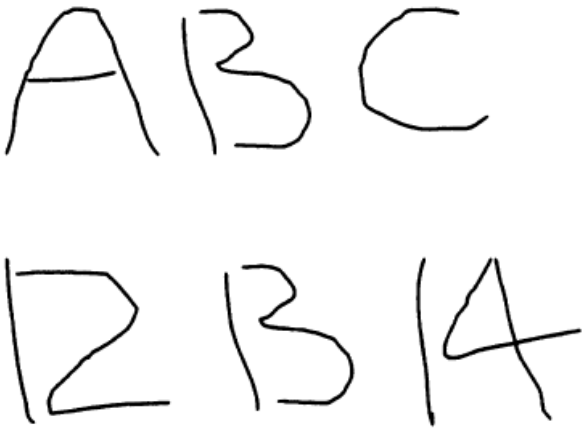

Figure 7: Context-dependent accessability[115]

[114]Evans, 2008, p. 275.
[115]Adapted from: Kahneman, 2003, p. 1454.

5.2. Information processing: availability and 'processability'

After having examined the dual system cognition, the following paragraphs offer an insight from consumer research which has identified key psychological concepts which play a significant role in the way information is processed by an individual. Therefore, the information processing is analyzed by examining the following concepts of *availability* and *'processability.'*[116] The second term can be referred to as an umbrella term for the concepts of simplicity vs. complexity (of information). More specifically, factors such as, presentation format, quantitative task, complexity of language, contextualization, information overload, and a group of six factors: search, exposure, perception, liking, understanding, and use, are all explored in order to provide an insight into the field of information processing and utilization by consumers.

5.2.1. Presentation and format

Past research has identified multiple factors which relate to information utilization and processing. The two valuable factors that are relevant to information processing are availability and *'processability.'* Firstly, in order for a consumer to process information, the information has to be made available to them. Yet, there is a difference between providing information and providing data. According to Russo (1975), testable, objective facts about a particular product are the only relevant pieces of information - data. However, such pieces of information might mean nothing to a consumer, and they will not be considered useful unless the data is presented in a format which is comprehensible.[117] Thus, it is not only important that the information is available, but the means through which pieces of information are put together, put forward or presented to the consumer matters. How information is presented affects the actual information utilization by consumers. As it is described in the article of Scammon (1977):

"The method of presentation, or format of the information, appears to significantly affect consumers' reliance on information by affecting their ability to understand and utilize the information. Simple information, which appears to be easier to absorb and remember, may be utilized more than complex information."[118]

In addition, the results of the nutritional labelling research of Scammon (1997) suggest that a judgment of product nutrition with a format (of nutrition labelling) containing simplified information is more accurate than a format providing nutrition facts through complex information. Another research shows that consumers prefer information provided through simplified formats.[119] Also, consumers often report that they use the food labels, however, the actual use is low due to the complexity of information provided, which is confusing for consumers. There is a need for interpretational aids, such as signposting, which consumers appreciate.[120] Thus, availability of information and the 'processability' appear to be interrelated

[116]Scammon, 1977.
[117]Scammon, 1977.
[118]Scammon, 1977, p. 150.
[119]Grunert and Wills, 2007.
[120]IBID.

concepts. As suggested, besides making information available through comprehensible presentation means, the information should be easy to process, thus it should be simple, and not complex. If these requirements are met, the chance that the information provided will have a greater effect on consumers is likely to increase.

5.2.2. Quantitative tasks

Furthermore, *processability* of information depends also on the necessity of a consumer to perform quantitative tasks. Information which requires a consumer to make calculations is not likely to be utilized well since some consumers are unable to perform particular calculations. This applies, for example, to providing nutritional information. Levy (1998) explains: "When they [consumers] calculated the quantitative contribution of a product's nutrient level to a dietary recommendation, they were successful only 20% of the time."[121] Nowadays, a product has to contain information with regard to dietary references values (DRV), which provides a set of nutrient recommendations and reference values (i.e.: reference intakes).[122] Yet, consumers are still likely to misjudge serving sizes. In general, consumers are likely to perform simple tasks such as making judgments whether a product contains high or low level of various nutrients, yet these judgments are often inaccurate. Consumers do want to be provided with information, nevertheless they often find it hard to actually utilize information available to them.[123]

The WHO,[124] as well as the American Heart Association (AHA)[125] in their reports and articles concerning health recommendations tend to convert grams into teaspoons, especially when explaining how much sugar people should consume. Michigan State University has published an article explaining why teaspoon is a more effective measurement tool than grams. Rellinger (2015) explains that 4g equals 1 teaspoon, and states why such conversion is useful: "This conversion helps visualize how many teaspoons of sugar are actually being consumed or drank and helps guide overall food choices and serving sizes."[126] Teaspoon appear to be a useful measurement unit, as consumers are able to visualize how a teaspoon looks like, thus that enables them to imagine how much sugar, for example, they consume. Grams, although it is a generally agreed upon unit, might be abstract for consumers, and they might be unable to imagine how much 8g is. Quantification through the use of the gram unit seem thus less effective.

5.2.3. Complexity of language - the use of scientific terminology

Another factor which enhances the complexity, and eventually processability of the current system of nutrition labelling, for instance, is caused by the complex language (terminology) which is often misunderstood by consumers, as well as the relationship between specific nutrients and their influence on one's overall health. In some studies, consumers indicated that

[121]Levy, 1998, p.213.
[122]"Dietary reference values and dietary guidelines," 2014.
[123]Levy, 1998.
[124]"WHO calls on countries to reduce sugars intake among adults and children," 2015.
[125]"Added sugar in the diet," 2015.
[126]Rellinger, 2013.

they found the nutrition labelling confusing especially in terms of the numerical and technical information. While they did comprehend the terms such as 'calories,' 'fat' and 'sugar,' which are generally recognizable terms, they had difficulties understanding the relationship between 'sodium' and 'salt' and 'carbohydrates' and 'sugar,' and 'calories' and 'energy.' Despite being provided technical and numerical nutrition information, they were unable to understand the role these nutrients played in their diet. [127] Thus, they were not able to utilize such information, and take a decision on the basis of provided labelling. The technical and numerical information seems to be disregarded since consumers are unable to make sense of it. Such presentation of nutrition information remains plain data, which is unutilized. Highlighting the most important information, decreasing the cognitive burden through an easy presentation techniques, enhances consumers' understanding, which allows them to take a better informed decision.[128]

5.2.4. Understanding, contextualization through pictorial representations and graphics

Eventually, the processability of information seems to depend on the ability of a consumer to understand and contextualize[129] the information given. This can be achieved by clear expression of nutrients per serving or even more ideally, per product, which is highly valued by consumers as it enables them to put information presented to them into context, and thus be easily utilized.[130] Also, the ability of consumer to understand and contextualize the information given could be enhanced by additional simple, pictorial representations, which conveys the information in a comprehensible way. Research suggests that graphics affect on people's beliefs and judgment about a product. There are two main arguments concerning the effect of graphics on people's judgment:

1. Vividness argument
2. Confirmatory bias argument

According to the first argument, graphics are more vivid which can differentially impact the consumers' product judgment. Graphics are likely to attract consumers, and get more attention than solely verbally communicated information. Vivid information can influence consumers' judgements in miscellaneous ways:

1. Vivid information (VI) contributes to easier retrieval of information and the volume of information recalled at the time of the formation of judgments
2. VI can increases imagery processing which enables people to encode the information
3. If VI is emotionally appealing it is retrieved more easily because of its affective properties[131]

[127] Cowburn and Stockley, 2004.
[128] Peters et al., 2007.
[129] Contextualize (definition): "To consider something in relation to the situation in which it happens," (Hornby, 2000, p. 248).
[130] Shannon, 1994.
[131] Bone & France, 2001.

All the above factors contribute to more accessibility of VI, when a consumer makes a judgment. The VI can be a distracting element, especially when it comes to colors. Colors other than black and white are vivid and catch attention. Thus, one needs to be careful with what is 'vividly' expressed so that the attention is placed on important information.[132]

Secondly, the confirmatory bias occurs if people adhere to their initial judgments although new, disconfirming information is presented. Earlier information, for instance, from advertisements, can influence how people judge a product later on, despite the presence of the information on the package.[133] Pictures are powerful means of communication because they are perceived prior to verbal information. In a study of Kisielius and Sternthal (1984), pictorial representation had been examined by the study subjects before the attention was paid to any verbal information on the package. It is then the choice of consumers if they decide to study the verbal information or not, nevertheless, the primary judgment of a product by consumers is very much influenced by the graphics used on the package.[134] The study of Grunert and Wills (2007) has examined different means of conveying information. Generally, the consumers liked simple representations, such as logos, although their liking depended on the logo type.[135] However, this was a conscious evaluation by consumers who, despite their conscious liking or not of a product, are all influenced by the graphics as the other research indicates. Therefore, pictorial representations consistent with the verbal information on a package can serve as an additional, simplified, yet clear and comprehensible tool which enables consumers to understand the information within a short period of time, and thus to make a better choice. Yet, due to the great influence graphics have on consumers, such representations should be chosen carefully, and be consistent with the verbal information, since they can be misleading, even in the presence of accurate verbal information.[136]

5.2.5. Information overload

Besides the above discussed factors, the amount of information presented can have a more negative impact on consumers, and it can lead to confusion, not clarification. Providing information to consumers is important, however, sometimes too much information can lead to *information overload.* The concept of information overload is defined as follows: "the amount of data a person must process per unit of time."[137] Information overload can lead to more dissatisfaction and uncertainty. In one study, respondents who received more information were uncertain and dissatisfied.[138] The reason for this can be the lack of understanding. Several studies suggest that the majority of consumers neither comprehend nor use the information available to

[132] IBID.
[133] When earlier information presented has a greater influence on the later judgment on a product, in psychology this is called *primacy* (Bone and France, 2001).
[134] Bone and France, 2001.
[135] Grunert and Wills, 2007.
[136] Bone and France, 2001.
[137] Wright, 1975, p. 62.
[138] Wright, 1975.

them.[139] Also, although there can be a difference between more educated and less educated people in terms of reading the information given, the limitations of cognitive functioning of human mind apply to all humans, despite their education and intelligence.[140]

5.2.6. Search, exposure, perception, liking, understanding, and use

How information is processed is closely linked to attitude formation and change, and consumer decision-making. Grunert and Wills (2007) constructed a theoretical framework in order to explore the effects of nutrition information on consumers. The framework consists of following six factors which are of relevance: Search, exposure, perception, liking, understanding, and use,[141] (see figure 8). The likelihood that any labels or generally, information, has an influence on a consumer increases if one decides to search for particular information. Grunert and Wills (2007) concluded that: "When consumers engage in effortful search, then the subsequent processing of the information will be more in-depth and chances of the information actually affecting food choices are higher."[142] However, the exposure can also be accidental. Once one is exposed to the information, one can perceive the information. Exposure has an effect on behavior only if perception takes place. Perception can be conscious as well as subconscious, yet, conscious perception has a stronger effect on one's behavior. In an experimental situation with a Dutch supermarket, it was found that only 25% of the consumers noticed the labels. However, consumers liked the idea of simplified information (i.e.: logos, signposting) which saves their time, and does not require any or minor cognitive performance. Liking is an important factor as it determines whether a label is perceived or not in many cases. Easily interpretable logos and color coding appear to be popular among consumers.[143]

When a consumer attaches a meaning to what they perceive, then they show understanding of what is perceived. There are two types of understanding, which need to be distinguished.[144] Grunert and Wills (2007) explain:

"Subjective understanding is the meaning the consumer attaches to the perceived label information and covers also the extent to which consumers believe they have "understood" what is being communicated. Objective understanding is whether the meaning the consumer has attached to the label information is compatible with the meaning that the sender of the label information intended to communicate."[145]

Research suggests that consumers understand nutrition labeling better if the color-coded GDA is used instead of the one without any colors. Generally, study participants rated products to be healthier when a product contained a health logo. Moreover, the study also noted that different

[139] Jacoby et. al, 1983.
[140] IBID.
[141] Grunert and Wills, 2007.
[142] Grunert and Wills, 2007, p.390.
[143] Grunert and Wills, 2007.
[144] IBID.
[145] Grunert and Wills, 2007, p .387.

formats facilitate processing of information in different ways. In various other studies, such as a study of the FSA, subjects had to evaluate whether the product was high or low in certain nutrients. Subjects arrived at a correct conclusion when information was presented by the use of the traffic light system. [146]

In terms of the utilization of information, a French study indicated that only 24% of consumers use such information. The respondents speculated about the different systems of conveying information, and they thought that the color-coding is more difficult to ignore, and that they would have a great influence on their purchase. In a Dutch study, subjects stated that health logos can help to make a decision when in doubt about the product overall healthiness. In addition, a few studies also examined consumers' buying intentions. Such studies came to the conclusion that consumers would not buy less healthy products if they contained a logo or a signpost. Also, generally, people do not check the labels if they consider products to be perceived as a generally healthy product by definition, such as, for example, a yoghurt. Grunert and Wills (2007) explain: "[F]or both ready meals and sandwiches choices were determined by appearance, expected taste and convenience, and nutrition information played almost no role."[147] Based on the experimental studies it seems that consumers use information provided sometimes, yet, the use of information seems to depend on their ability to understand it. Nevertheless, there is little know about how people use the information is real life, thus there is a need for further research in this area.

The psychological research provides valuable insights into information processing, human cognition and behavior. The purpose of the next chapter is to present the latest developments in terms of the application of the psychological insights to EU law, while combining such insights with the findings of behavioral economics research. Merging fields can provide even a strong empirical basis which is likely to have an influence on the EU law, in general.

[146] Grunert and Wills, 2007.
[147] Grunert and Wills, 2007, p. 394-395.

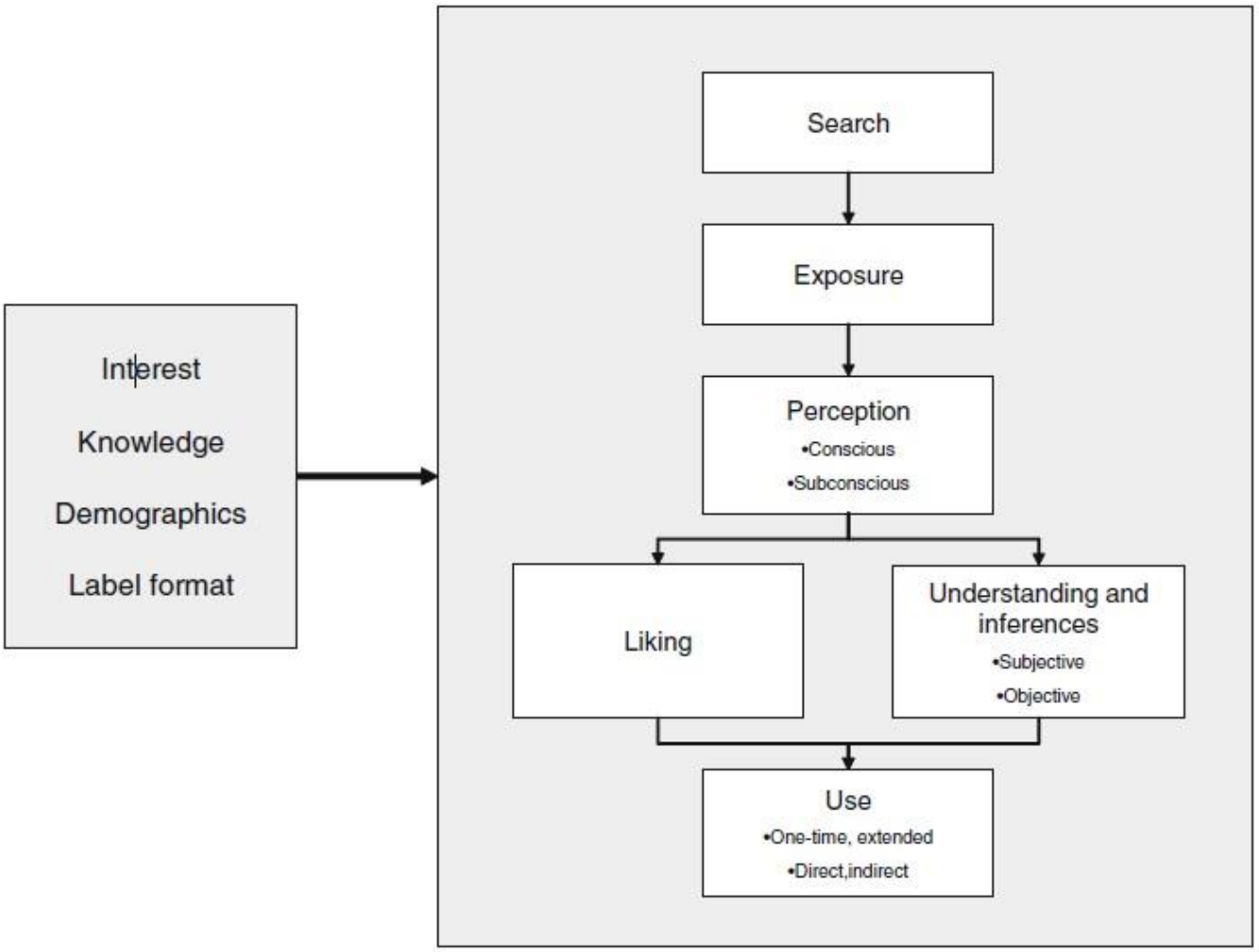

Figure 8: Step-by-step theoretical structure - based on the structure of consumer decision-making[148]

[148] Taken from Grunert and Wills, 2007, p. 387.

6. Behavioral law and economics, psychology and behavioral science: The hot debate

6.1. Merging fields for greater effectiveness

Previous chapters discussed the fields of behavioral economics and psychology as two distinct fragments and fields. Although behavioral economics is based on insights from psychology, there are various aspects which are not currently being addressed within the scope of behavioral economics, when it comes to the application of behavioral economics to food information law. Yet, nowadays, it appears that within the EU, the term used when discussing the field of behavioral economics and law and its application, is not behavioral economics and psychology, but rather *behavioral science (BS).* Thus, there is a development towards looking for ways to apply insights from BS to food law, which means that there seems to be a trend of merging the fields together rather than applying insights from separate fields. Nevertheless, the field of behavioral science and law, as referred to by legal scholars such as Anne-Lise Sibony and Alberto Alemanno, is only at an early stage of development within the EU. In their paper entitled *The emergence of law and behavioral science*, Sibony and Alemanno point out the fact that the behavioral economics considers only a few psychological insights, however, there is enough empirical evidence from psychological research which explain people's biases, and cognition, and such insights are highly applicable to law. Such a direct application of relevant psychological insights could enhance the effectiveness of current law system, when it comes to conveying food information,[149] instead of considering insights from behavioral economics only. In addition, the above presented analysis concerning BE and psychology clearly illustrates that these fields are interrelated and therefore, merging of the two fields can function as a powerful tool in order to improve the policy-making as well as, in the bigger picture, current legal system of food information law within the EU.

6.2. Behaviorally-informed intervention (BII)[150] and 'nudging'

The term behaviorally-informed intervention is a recently introduced term which is to describe how and when behavioral insights can be accommodated in the current legal system.[151] One of the biggest advantages of using empirical evidence of behavioral science as a tool to enhance the effectiveness of law, is the fact that it is a 'minimally burdensome, low-cost, and choice-preserving mechanism.'[152] If considering specifically the food information law, there is a remarkable difference between this newly emerging behavioral approach, and the current approach to law. The new approach is not centered around the accuracy and information provided, but more importantly, about the usefulness and meaningfulness of the information provided, as perceived by consumers. Alemanno and Spina (2014) elaborated on this difference: "Policy makers increasingly have made use of mandatory disclosure of information to consumers

[149] Alemanno and Sibony, 2015.
[150] Behaviorally-informed intervention - abb. BII - hereinafter only the abbreviation shall be used.
[151] IBID.
[152] Alemanno and Spina, 2014, p. 438.

as a regulatory tool (labeling, rating, name and shame, etc.). Yet, today, a behaviorally informed disclosure scheme is not only about mandating the provision of information, but must be designed so as to be helpful and informative rather than unintelligible or meaningless."[153] Thus, the behavioral approach moves away from the focus on the information disclosure as the main goal, rather it offers insights into how the information can be presented to be useful.

On a global level, the synonym for the term behaviorally-informed intervention is also called 'nudging.' The 'nudge' concept became of interest after a publication of Thaler and Sunstein's famous book entitled *Nudge*, in which authors defend libertarian paternalism and choice architecture.[154] This means that policy makers act as choice architects since they arrange context and environment in which individuals make decisions.[155] Thaler and Sunstein (2008) describe the term nudge as: "any aspect of the choice architecture that alters people's behaviour in a predictable way, without forbidding any options or significantly changing their economic incentives."[156] The 'nudging' can be also described as an intervention mechanism which aims at changing people's behavior while allowing them to make their choice independently[157]. Thus nudging can be said to steer people's behavior in a certain way.[158] Nudging has two defining characteristics: the authority does not prevent a choice of people's suboptimal options, and behavioral insights alter choice architecture in order to make preferred decisions more likely.[159]

Nevertheless, 'nudging' is not a precise synonym of a behaviorally-informed intervention as the term 'nudging' does not capture the whole reality of behavioral action.[160] Alemanno and Sibony explain the difference between the two terms: *"[E]mpirically informed intervention, even though it is indifferently referred to as nudging, behaviourally informed regulation or evidence-based policy making, consists essentially in the application of behavioural insights to policymaking."*[161] Moreover, nudging might give a rather negative connotation and it might seem as a forced mechanism which limits people's freedom. Subsequently, some critics might question the applicability of the behavioral approach, as such approach can be perceived as a way to 'command' people to behave in a certain way, instead of only guiding them. Such considerations and discussions are centered mainly around administrative law.[162] Thus the reason why the behavioral approach has received criticism, appears to be due to the fact that the distinction between the two terms, behaviorally-informed intervention or rulemaking is not being clearly addressed.

[153] Alemanno and Spina, 2014, p. 437.
[154] Thaler and Sunstein, 2008.
[155] DiDonato, 2014.
[156] Thaler and Sunstein, 2008, p.6.
[157] DiDonato, 2014.
[158] Alemanno and Sibony, 2014.
[159] IBID.
[160] Alemanno and Sibony, 2014.
[161] Alemanno and Sibony, 2014. p.5.
[162] Alemanno and Sibony, 2014.

6.3. Usefulness and application of BII within the EU

Furthermore, recent discussions concerning the usefulness of the behaviorally-informed intervention approach offer examples of situations or condition when such an intervention would be meaningful. Behavioral approach should be applied in policies when there is a behavioral element to them. Behavioral approach can help not only to improve the imperfections of old policies but also, behavioral insights can serve as a tool to design new, effective policies. The following situations are examples of situations with a behavioral element:

I. Behavior change is the main goal (e.g.: It is desirable that people waste less food or stop smoking)
II. People's behavioral response affects the effectiveness of the policy, although the policy itself is not aimed at changing one's behavior (This is an example of consumer protection policies - consumer is to be protected from an abuse by industry)
III. Policy making process (Policy makers are also vulnerable to biases and heuristics).[163]

However, because the field of behavioral science and its application to law is only emerging, in practice, policy makers are only getting familiar with the ways to incorporate these insights into the current system.[164] Because there is not much literature concerning this issue, the next important step is to create a guideline which can explain how to use the behavioral insights in practice as a tool to improve the current legal system, more specifically, the food information law, which is in the interest of this analysis.

6.3.1. Tools fitting existing legal toolboxes

Designing tools is likely to make the application of behavioral insights into law easier for many policy makers. Legal scholars have been wondering how such tools could fit already existing legal toolboxes.[165] Alemanno and Spina (2014) go beyond the imperfect 'nudge' concept and refer to work which has identified a set of operational regulatory approaches which, by empirical findings related to human behavior promote regulatory goals, while maintaining individual control, authority and ownership. These tools have been proposed by a scholar, Cass Sunstein.[166] Such a set of 'behavioral' regulatory tools is also referred to as *empirically enforced regulation*, and it consists of the following three categories: disclosure requirements, default rules and simplification.

Disclosure requirements prevalent in legal systems are ineffective. BA can help to explain why such a system is ineffective. BA can help design new disclosure requirements based on the findings linked to the way people process information. A disclosure requirement can be referred to be 'smart' if it is meaningful, adequate and useful within certain context and while taking account the processing capabilities of individuals. In terms of providing information in the context of EU law, no major changes would have to take place. The technique of providing information does not need to change, it is only the content that is to be adapted on the basis of

[163] van Bavel et al., 2013.
[164] Alemanno and Spina, 2014.
[165] Alemanno and Sibony, 2014.
[166] IBID.

behavioral insights. Therefore, there are two simple actions that can be taken within the realm of the existing legal toolbox. Alemanno and Sibony (2014) explain:
"Behavioural suggestions translate as either repeal of existing regulation or changes in the content of mandates."[167] Policy makers are encouraged to base new disclosure requirements on an understanding of how people process information, in order for this regulatory tool to be maximized.[168]

Furthermore, *default rules* are another category of the set of behavioral tools. Defaults are predominant is various kinds of law. They induce individuals to make a predetermined choice. Defaults can be an alternative to restrictions and bans. Yet, there are drawbacks of defaults which the behavioral approach addresses. Firstly, active choices such as, asking people to make their choice, when the target group is too diverse and the domain is familiar, can be a more sensible option, than default rules. Secondly, some corporate actors, such as bank representatives, can nudge consumers to opt out of the defaults set by law (e.g.: when opening a bank account, banks give a specific form to clients to sign, and thus mandating an informed consent becomes meaningless).[169]

The third category address by Sunstein is simplification. Simplification is to be understood as making participation of individuals easier by providing clearer messages. The concept of simplification is fundamental and central to the behavioral approach. The positive aspect of simplification method is that it does not require any novel legal tools. Through simplification, the information overload can be reduced by the disclosure of pieces of information which are useful and meaningful. It is essential to pinpoint the fact that incorporating the behaviorally informed intervention into law does not mean reconstructing already existing legal toolbox. Simplification, as a behavioral tool, can bring in changes in the content, while the structure is kept.[170]

6.4. Growing global interest: Recent growing developments worldwide and within the EU

6.4.1. Worldwide call for the application of behaviorally informed intervention

The proof that the field of behavioral science is expanding is the initiatives taken within the EU but also worldwide. The World bank has introduced a publication entitled *World Development Report 2015: Mind, Society, and Behavior.* The document includes not only includes insights about how people make decisions but it also provides a framework for governments to apply such insights into the development policy. The world bank has created an infographic depicting some essential findings from behavioral science, from which three main findings are important to point out: People think automatically, people think socially, and they do so with the help of mental models (See Figure 5). Additionally, the report points out the importance of framing, as it

[167] Alemanno and Sibony, 2014, p.14.
[168] Alemanno and Spina, 2014.
[169] IBID.
[170] IBID.

is argued that it can significant improve outcomes, when this approach is used together with already existing approaches. The report emphasizes the importance on understanding human cognition, as it has a profound effect on many aspects of human behavior, such as decision-making.[171] In fact, thorough understanding of human decision-making is not only relevant to the development policies, but also to food information law.

Furthermore, the OECD has also expressed the interest in the development of behavioral informed policies. OECD wants to use this approach to study economic activity of OECD countries to shape their policies on the basis of actual people's behavior, not their assumed unreal behavior.[172] The published OECD book by Pete Lunn[173] entitled *Regulatory Policy and Behavioral Economics* offers an international review which focuses on the application of behavioral science on, besides other, regulatory policies. More specifically, the book provides 60 examples of policies which are informed by behavioral insights in various countries, of which the UK and the US appear to be the most influenced at this moment. Especially in the US, the attention is mainly paid to the simplification and standardization of the consumer information, instead of creating stronger regulatory framework.[174] Within the UK, some initiatives have been developed by the government, such as the recruitment of The Behavioral Insights team (UKBIT) which acts as internal consultancy body for policy makers in the UK. As described on the UKBIT website, the company is: "a world-leading social purpose company whose mission is to help organizations in the UK and overseas to apply behavioral insights in support of social purpose goals."[175] Besides addressing the UK developments in particular, the book provides insights into the developments within the EU in general, referring to actions recently taken by the European Commission (EU).[176]

In addition to this book, OECD has organized an event[177] to share the knowledge with regard to behaviorally informed policy making and regulation, and to discuss the developments and achievements within this field.[178] There are several key messages concerning the application of behavioral insights (BI) in governments and regulatory agencies, that were the result of this seminar:

I. Behavioral insights are used to enhance the effectiveness of government intervention
II. Behavioral insights use empirical evidence to figure out how behavior is influenced by context

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[171] "World Development Report 2015: Mind, Society, and Behavior,"2014.
[172] "Regulatory policy and behavioural economics,"2015.
[173] Pete Lunn is an economist originally trained in neuroscience, in which he has received his PhD. His primary interests certain around economic decision making ("Behavioural insights and new approaches do policy design," 2014).
[174] "World Development Report: Mind, Society, and Behavior,"2015.
[175] "The behavioural insights team," (2014).
[176] "World Development Report: Mind, Society, and Behavior,"2015.
[177] The workshop took place on January 23, 2014, there was a workshop organized at the OECD conference centre in Paris. The workshop was entitled *Behavioral Insights and new approaches to policy design.* Different speakers addressed issue relating to behavioral insights as policy tools, the application of these tools, the general idea of new thinking brought into institutions, the impact of applying behavioral economics, methods for the support of behavioral insights to economic challenges and nudging.
[178] "Behavioural insights and new approaches do policy design," 2014.

III. Behavioral insights are about 'factoring in' behaviors and incorporating experimentation as a part of regulating in order to find the optimal governmental intervention

IV. There must be trust among regulators in the behavioral science[179]

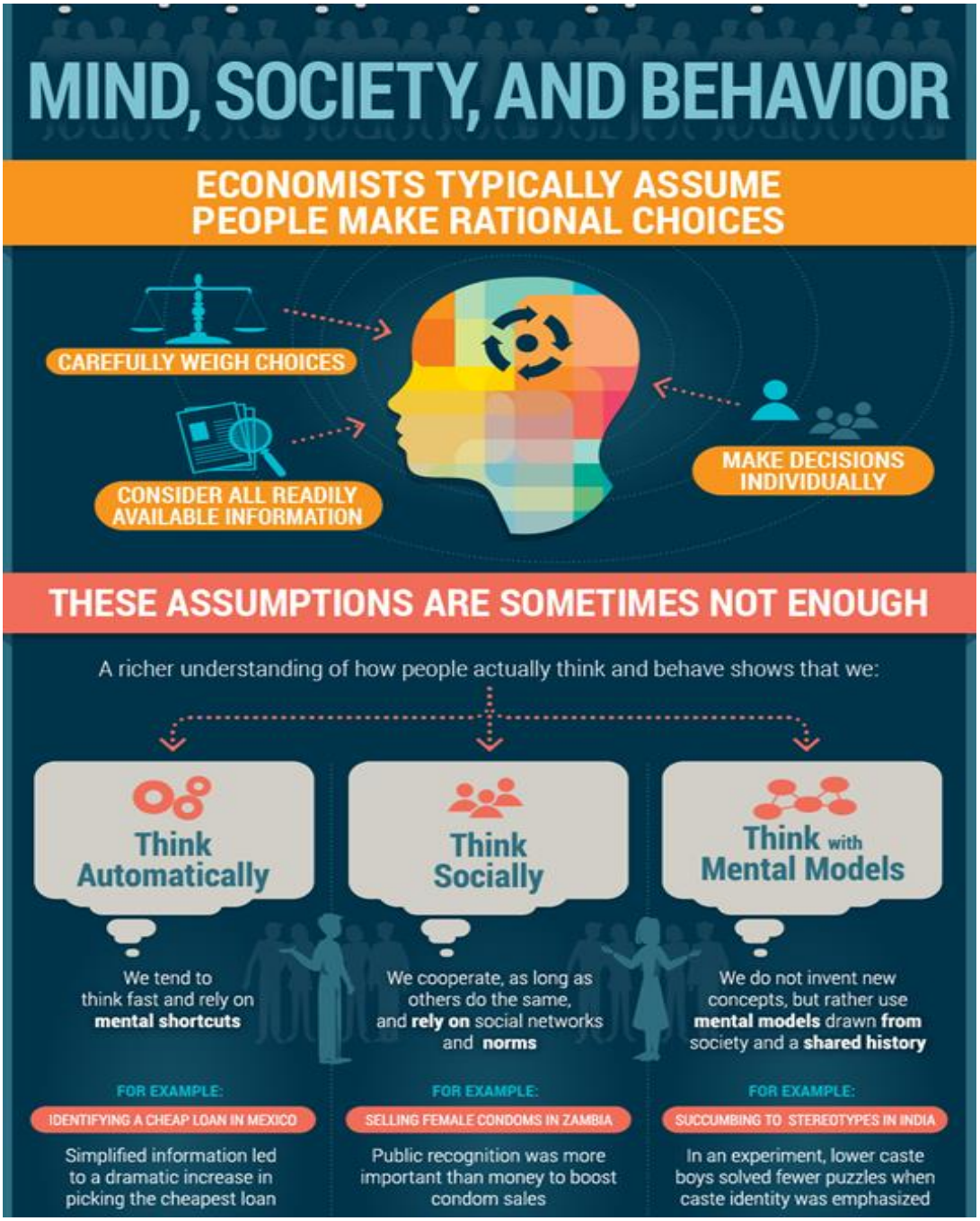

Figure 5: Infographic adapted from the *World Development Report 2015: Mind, Society, and Behavior* report.[180]

[179] "Behavioral insights and new approaches to policy design,"2015, p.5.
[180] "World Development Report: Mind, Society, and Behavior,"2015.s

6.4.2. The EU initiatives

The EU has also expressed interest in the behaviorally informed rule and policy making. Besides conferences organized, there have been also a few reports published concerning the importance of the incorporation of behavioral insights into the current legal system.[181] The EC has incorporated behavioral economics insights mainly into the sphere of consumer protection. Within the section of consumer research listed on the website of the EC, behavioral economics in terms of its application to policies, can be applied when it is meant to enhance policies' effectiveness. It is stated that: "Behavioral Economics may be applied to any policy where individuals' response to it helps determine its effectiveness."[182] It is recommended that behavioral insights are applied in areas of labeling and information processing. There are several specific initiatives in which behavioral insights are applied to the legal issues. The EC lists the following:

I. The inclusion of a ban on pre-checked boxes in the proposal for the Consumer Rights Directive (Art. 31.3) based on the evidence from behavioral research.
II. A behaviorally informed study entitled *Consumer Decision-Making in Retail Investment Services: A Behavioral Economics Perspective* (2010).
III. A conference entitled How behavioural economics can improve policies affecting consumers (November 2008).
IV. A conference entitled Behavioural economics, so what: should policy-makers care (Novemeber 2010).
V. A report from a conference, entitled Applying Behavioral Sciences to EU policy-making (2013).[183]

One of the biggest achievements in terms of the application of behavioral insights into the legal sphere within the EU can be said to be in the sphere of consumer information is the digital market (CIDOM). The pre-ticked boxes in online sales have been banned. Such action was taken based on the behavioral empirical finding that defaults have a strong effect on people's choices.[184] To replace the defaults, there are efforts of DGJUST to create consumer information model for online markets. Such a model should be a complementary mechanism to the already existing Consumer rights directive, in which changes in terms of legislative basis for consumer information have been recently incorporated. Research in terms of literature review as well as laboratory experiments have been conducted in order to identify policy options.[185]

Furthermore, another initiative was developed due to the ineffectiveness of the current legal safeguards, such as informed consent, related to the digital world. The project entitled Behavioural Responses to Privacy Visceral Notices (BREVE) project is a project uses behavioral insides in the issue of digital privacy. More specifically, it explores how nudges can change one's

[181] Tor, 2015.
[182] "Behavioural Economics," 2014.
[183] "Behavioural Economics,"2014 and "Consumer Decision-Making in Retail Investment Services: A Behavioural Economics Perspective." 2010.
[184] Lunn, 2014.
[185] "Behavioural Economics," n.d.

behavior in the field of digital privacy. Some studies show that although people are concerned about their privacy, yet, they often disclose more information as they do not read the privacy notices. From behavioral research it is know that people are influenced by framing, thus how the information is presented to them. Therefore, the aim of the project is to make a design which would help people understand the information better and thus make better choices. The nudging should be a complementary measure to the traditional 'notice and choice' option.[186]

Moreover, the very first behavioral study concerning consumers' decision making in retail investment services was conducted in 2010. The study entitled *Consumer Decision-Making in Retail Investment Services: A Behavioral Economics Perspective*, supports the main argument of behavioral studies, and that is that simpler and standardized product information does improve the decisions of people, in this case, investors. The study found that consumers struggle to make simple investment choices, even when dealing with very simple investment tasks. The study has also identified behavioral traits as well as external factors that influenced investors' decision-making process.[187]

Additionally, the first behaviorally informed conference entitled 'How behavioural economics can improve policies affecting consumers?,' took place in November 2008. With the concept of consumer protection and empowerment in mind, the main aim of the conference was to explore considerations such as: "If individuals are not perfectly rational and time-consistent, what are the implications for consumer-related policies?"[188] Among the participants of this conference were researchers, policy-makers as well as stakeholders, in order to explore various challenges and also to increase the relevance of the research to the current problems in terms of policies.[189]

Another conference entitled *Behavioural economics, so what: should policy-makers care* took place in November 2010. The main aim of this conference was to explore how the behavioral insights could be used in regulatory sphere so that it benefit consumers. Since this is a second 'behaviorally informed' conference, there were considerations that the insights from the first study could serve as a basis for creating a framework to conduct behavioral experiments to test regulatory or policy remedies. Besides this, the idea was to discuss how behavioral approach is used by national and international institutions to inform policy making.[190]

Eventually, an important body of the EU which explores the application of behavioral science within the legal sphere is the Joint Research Centre (JRC) is the EU commission's

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[186] IBID.

[187] "Simpler and standardised product information could greatly improve EU consumers' investment decisions, behavioural study find." (2010).

[188] "How Can Behavioural Economics Improve Policies Affecting Consumers?," 2008.

[189] Discussions have generated multiple questions, listed below:

"1. Do the insights from behavioural economics call for a more or less interventionist policy to influence consumer behaviour?

2. Are modern, ever more complex markets generating more choice that consumers can cope with?

3. Should policy aim to protect consumers against their own behavioural biases?

4. Are behavioural biases more significant in service markets, especially financial services?"

[190] "Behavioural Economics, so What: Should Policy-Makers Care?," 2010.

science service conducting research to provide scientific advice and to support EU policies.[191] This centre addresses the question of the application of behavioral studies to various policy areas through conducting empirical behavioral studies. The European Commission (EC) has set up the *Framework Contract for the Provision of Behavioural Studies* (*FCPBS*) of which the purpose was to facilitate the administration of studies in support of the EU policy making. The Commission has provided technical advice in terms of conception, design and execution of such studies. Such a cooperation between JRC and DG SANCO, also referred to as *Behavioural Studies for European Policies (BESTEP).* Also, within the FCPBS, a set of reports entitled *Applying Behavioral Sciences to EU policy-making*, which introduces behavioral science into policy-making, was published.[192]

6.4.3. Importance of behavioral science within the sphere of consumer law

The traditional approach to law assumes implicit human rationality. Yet, such an approach cannot be effective as it disregards the complexity of actual human behavior. This 'blindness of the law' is mirrored in the consumer law within the EU. There are two main issues which illustrate why the behavioral science is relevant to the legal field, especially when it comes to consumer protection.

The current consumer law rests on so called 'information paradigm.' Focus is put on providing all the relevant information with regards to products to consumers, as if they had a unlimited processing capacity. If consumer actually did read all the information provided to them and rely on that information, then it could be argued that the law is effective. Nevertheless, this is not the case, as it is know from behavioral research. EU laws are drafted with the assumption that scarcity of information is the main issue to be tackled. Yet, the problem is not in the amount of information, but on attention.[193] The focus during the past 4 years, since the introduction of FIR, has been put on increasing information available to consumers, but the way it is communicated has not gone through any major changes. Thus, even though information should be provided to consumers, such information availability can be referred to as excessive and unnecessary, as it is confusing and misleading for consumers. Instead of focusing on increasing the availability of detailed information, the emphasis should be placed on improving the means of conveying information more effectively.

The second main issue concerning a different approach of law when it comes to consumer protection is the fact that the notion of 'average consumer' is a baseline, which does not appear to be representative. Average consumers are 'reasonably well-informed and reasonably observant and circumspect.'[194] Such a definition is similar to the one of homo economicus. Sibony (2015) explains what is wrong with using the idea of 'average consumer' as a baseline: "Using such a heroic consumer as a standard for the appraisal of unfair practices makes sense if the aim is to unify the internal market. To traders, national provisions protecting

[191] "Joint Research Center,"2015.
[192] "Behavioural Economics," n.d.
[193] Sibony, 2015.
[194] The origin of such a description is rooted in CJEU case from 16 July 1998, Case C-210/96, *ECR* 1998, p. I-4657 (*Gut Springenheide*). The 'average consumer' and its treatment in the CJEU is discussed in chapter8.

consumers often represent obstacles to trade. […]. If less restrictive measures can achieve the stated [domestic policy] goal, the national measure is incompatible with the internal market."[195] To illustrate this point, Sibony (2015) describes the example of margarine. When it was required by Belgian law to packing it into a cubic form in order to avoid confusion among consumers in terms of what is butter and what is margarine, margarine producers of other member states would also have to repackage the margarine, if they wanted to be able to market it in Belgium. In such a situation, the CJEU has to decide between, on one hand, free movement and on the other hand, domestic goals. With the aid of the proportionality test the court is to asses if the national measures is suitable to achieve its goal and if it is necessary to take such a measure. The Court needed a standard to assess when it is necessary to take a measure to protect consumers. Thus, the answer was that it is only needed in a case that an 'average consumer' needs it.[196] Sibony (2015) describes the real average consumer as 'reasonably overwhelmed, distracted and impatient.'[197]

Furthermore, there must be a balance in the level of protection of consumers. If it comes to overprotection, the notion of people being 'idiots' can be an illustrative figure, as suggested by Sibony. According to the author, behavioral insights proof that we are all 'idiots,' in other words, everyone can be easily fooled, even if we do not consider ourselves to be idiots. Behavioral studies can be a powerful tool to critique the notion of 'average consumer.' When confronted with behavioral science, the traditional assumptions on which consumer law is built up do not hold. If behavioral insights are well applied, then legitimacy and effectiveness of the consumer law can be challenged. The law cannot ignore existing science concerning the actual human behavior.[198] It appears that the consumer protection law (FIR) functions on unrealistic expectations of how consumers behave, which does go hand in hand with the internal market functioning, yet, it does not truly appear to fulfil the true purpose of consumer protection in itself. The following chapter takes a closer look at how these valuable insights and the insights from psychology could be incorporated into the FIR, and how, on the basis of the analysis of empirical findings, the regulation could be evaluated, in order to establish how food labelling could become more useful for 'real consumers.'

[195]Sibony, 2015. p. 72-73.
[196]Sibony, 2015.
[197]Sibony, 2015, p. 73.
[198]Sibony, 2015.

7. The application of relevant insights from behavioral economics and psychology on the EU food law

The findings from behavioral economics and psychology complement each other and together create a powerful framework of a newly emerging field of behavioral science which is highly applicable to the field of food information law. The following paragraphs provide an analysis of how the presented insights from BS inform the food information law. More specifically, the analysis is centered around pinpointing the imperfections of the food information regulation, Reg. 1169/2011, based on the empirical findings from behavioral economics and psychology of human cognition and behavior. The following analysis refers to particular concepts such as information utilization and processability in relation to cognitive systems 1 and 2, information overload and information presentation, as well as the three bounds. As the previous analysis suggests, these concepts appear to be most relevant to the food information law, and therefore it is of importance to apply these in the field of food law in order to achieve improvements in the way information concerning food is currently communicated.

One of the biggest issues when critically evaluating the FIR is the assumptions on which the regulation is based on. Consumers are assumed to be rational human beings, of a homo-economicus kind, who weigh all options to choose the best one. Such considerations, rooted in economics, have informed law to a great extent. On one hand, it is clear that economics and law are interrelated fields, and both of these fields are equally important. Within the EU, functioning of the internal market is crucial and a good functioning of the internal market should be stimulated. On the other hand, when the very specific field of law, such as food law, is discussed, consumer protection becomes an equally important issue. Therefore, there is a need for a balance between maintaining optimal functioning of the internal market and ensuring high consumer protection. When such considerations are taken into account, it is understandable why the FIR is based on assumptions from the field of traditional economics. However, when it comes to food information law, some of the fundamental assumptions on which the Reg. 1169/2011 is based on do not hold and should thus be reconsidered, in order to create an effective legal framework concerning providing information to consumers in a useful manner.

7.1. The average consumer - system 2 consumer vs. the 'real consumer'[199]

Firstly, one of the most important assumption influencing the whole content, structure and general formulation of provisions of the FIR is the notion of *average consumer*. An average consumer is a rational consumer who is "reasonably well-informed and reasonably observant and circumspect."[200] Average consumer is based on the homo-economicus figure who maximizes their options and chooses the best alternative. The European Court of Justice uses this notion of a consumer as a benchmark. Yet, it is questionable if the 'average consumer' as created by the court is a realistic figure which exists in real life. The consumer shall be seen and treated as an

[199]The term 'real consumer' has been formulated by the author and shall be understood as the opposite to the notion of the average consumer, as defined by the European Court of Justice.
[200]CJEU 16 July 1998, Case C-210/96, *ECR* 1998, p. I-4657 (*Gut Springenheide*).

'administrative man,' who satisfices, thus a man who considers aspects most important to them, and chooses a satisfying alternative, thus not the most optimal alternative,[201] as it is the case with the economic man, or so called, homo-economicus, which does not appear to be a realistic representation of the real consumer.

The psychological research of Kahneman and other distinguished psychologists clearly indicates that what all human beings have in common is the two cognitive systems - system 1 and 2.[202] System 1 being intuitive and irrational does not seem to be compatible with the notion of average consumer. Thus, it appears that the average consumer is a system 2 consumer, who processes information, interprets it, thus thinks about it, and on such basis takes a decision if they want to purchase a product or not. Therefore, it is assumed that consumers are system 2 beings who take rational decisions. Yet, research shows that this is not the case. The majority take decisions intuitively, which means that system 1 is activated and influences one's judgment and decisions to a great extent. The psychological insights discussed in previous chapters clearly illustrate that every human being has a 'two stage' cognitive functioning. At the first stage, system 1, the intuitive system is activated, and at the second stage, system 2 can be activated. Yet, system 1 is always activated first, as it is fast, effortless, and automatic process.[203] Having stated this, a consumer is a human being with intuitive thinking, which is unable to evaluate information given at the very first stage of cognition. Also, research has indicated that the majority of consumers do not read the food information provided to them. Therefore, such findings show the importance of creating effective means through which the information is communicated. If a consumer decides to read the food information concerning a product, it is because they are interested in finding out what the particular product contains, therefore, they are in *search* of information, as described by Grunert and Wills (2007). Thus, rather than defying a benchmark of an unrealistic rational average consumer, it is essential to focus on how to convey the information which is noted by the majority of the consumers. Thus, instead of focusing on what information has to be conveyed to the consumers, the presentation of information is crucial and should be a point of focus when it comes to food information law. It depends on the presentation of information whether the majority of the people will notice it or not. Pictorial representations, graphics and logos are very likely to catch consumers' attention,[204] thus they notice it, as a result of system 1 being activated.

Another reason why the application of the two systems concept to food law is of importance is the fact that system 1 thinking does not depend on one's intelligence or knowledge, as psychological research indicates.[205] Therefore, the chances that even consumers who do not normally read food labels and are not interested in the information concerning a food product, will note the information, can be increased, and thus also the chance that more people will make a well-informed choice is also likely to increase. In addition, because the majority of the real consumers do not find time to read labels, research clearly shows that simplified information,

[201]Brown, 2004.
[202]Kahneman and Frederick, 2001.
[203]Kahneman, 2003.
[204]Grunert and Wills, 2007.
[205]Evans, 2008 and Frankish, 2010.

which does not create a cognitive burden (system 2 functioning- evaluation and analysis) is much appreciated. The FIR contains detailed provisions referring to mandatory and voluntary particulars, information to be communicated to consumers. When considering the mandatory particulars, described in chapter 3.1.2.2, it appears that a great amount of information is required to be communicated to the consumers. This creates also a burden for FBO to disclose all such information. An assumption with which the mandatory information disclosure was formulated is the consumers' consideration and evaluation of all the information provided, based on which consumers are enabled to make an informed choice. Yet, such consideration requires stage two cognitive functioning, which takes time and effort, and a 'real consumer,' which is not the system 2 consumer as defined and considered by the court, does not take the time and effort to analyze information given.[206] If people do read the information given, research indicates that some people can understand such information on a package, however, their understanding of such information will defer on the basis of their previous knowledge.[207] Due to the scientific terminology used (eg.: sodium), specific kind of knowledge is required therefore not everyone will understand such terms.[208] Therefore, mentioning all the mandatory particulars, which are the name of the food, ingredients, quantity of ingredients, the net quantity of food, date of minimum durability, storage conditions, the business name, the country of origin, instructions for use, and alcohol content[209] can be useful information only if a consumer actually is interested in the information and searches for it. Yet, the 'real consumer,' based on psychological findings, would not utilize the complex information given to them.

7.2. Information disclosure: words, and numbers vs. pictorial representations

According to the provisions in the food information regulation, mandatory information placed on food products is to be expressed through, obligatory means of expression and through voluntary, complementary ones. The obligatory means can also be referred to as primary means of disclosing information, because all FBO are required to disclose them through this manner, which is through words and numbers. Art. 9 of the regulation additionally mentions that information disclosed by the abovementioned means can be supplemented by other forms of expression, such as pictograms and logos. Thus, the expression other than words and numbers, can only be complementary to the required form of expression explained in Art. 9 of the regulation. The focus is clearly put on the words and numbers, while the power of pictorial representations is being underestimated, when it comes to conveying information to consumers.

7.2.1. The complexity in the presentation of nutrient information

The provisions of the regulation do focus on presentation of food information (Art. 13), however, the power of pictorial representations is rather underestimated, while the focus on words and

[206]The court shall hierin be understood as the European Court of Justice unless indicated otherwise.
[207]Frankish, 2010.
[208]Cowburn and Stockley, 2004.
[209]Art. 9(1) of the Reg. 1169/2011.

numbers appears to be overestimated. Especially, presentation of nutrients, as it is currently required by FIR, could be done in a more effective way. The main issue concerning the nutrient information is the complexity in the overall presentation of nutrients. Figure 9 shows the presentation format which is required to be used by FBOs to convey nutrition information. Although it is expected that the generally recognized 'average consumer' is provided all the necessary information to make an informed choice, the complexity of such information is mirrored by several factors, which can hinder consumers' understanding of such information and their subsequent use of it.

The current obligatory presentation format contains two kinds of complexities. The complexity of language on one hand, and the overall information disclosure complexity. The complexity of language cannot be denied. Using the terminology such as saturates, mono-unstaturates, polyols, etc. are all scientific terms which are required to be all listed in the nutritional table. Presenting a table with the exhaustive nutrient list containing nutrients referred to by their technical names might not necessarily be an effective way to achieve consumer protection through such information disclosure. Information might remain unutilized if it is not understood. As Scammon (1977) argued, information which is not utilized remains data. Therefore, one's understanding of information is crucial in order for it to be utilized by consumers. Their understanding depends very much on the way information is presented. Based on such considerations, it seems that the current regulation appear to regulate the disclosure of complex data, as most of the information remains unutilized by most of the consumers. Research shows that graphics are means which attract people's attention more than words. Also, simplified information presented in a simple format appears to be appreciated and thus utilized more by consumers. Therefore, to enhance the effectiveness of the regulation, it is necessary to consider simplifications of the format, as well as technical names, terminology, of the nutrients in order for them to be useful to consumers.

Secondly, besides the language complexity, the overall information disclosure complexity has to be addressed too. Not only the technical terms make the nutritional table complex, it is also the exhaustive information disclosure expressed by words and numbers. Although it is important to provide information, however, too much information leads to information overload. The research of Wright (1975) and Jacoby et al. (1983) both point out the negative effects of too much information disclosed. More information can contribute to dissatisfaction and confusion, therefore, providing an exhausting list containing all kinds of information might confuse consumers more. Thus, the complexity of the current nutrition labelling is complex because it concentrated around the idea of information disclosure, as such, instead of focusing the presentation of the most crucial information when it comes to consumers' health. Since most consumers do not use the food information,[210] as faulty assumed by the court, ways of conveying information to catch consumers' attention must be explored. FIR regulates verbal information as primary forms of expression. As it can be seen in figure 9, there are two columns which list the nutrients, and the amount of them in grams. Such information is only expressed in words and numbers. Such information format is likely to be taken into account by

[210]Jacoby et. al, 1983.

the average, system 2 consumer who is interested in such information and thus searches for it. Yet, how about consumers who do not search for the information? The effects of graphics and pictures have already been addressed. Besides these means, another factor to be addressed is the vividness of information. The more vivid the information, the more likely it is to attract consumers' attention, as the vividness activates their cognitive system 1. Also, vividly expressed information, for example by using colors can be a powerful technique, as it can increase imagery processing and thanks to that consumers are able to encode the information well. Moreover, vivid information is emotionally appealing. General vividness of information can be increased by the use of colors[211], but also other graphical means, which are vivid, since such means appear to be more effective than verbal expressions.

EXPRESSION AND PRESENTATION OF NUTRITION DECLARATION

The units of measurement to be used in the nutrition declaration for energy (kilojoules (kJ) and kilocalories (kcal)) and mass (grams (g), milligrams (mg) or micrograms (µg)) and the order of presentation of the information, as appropriate, shall be the following:

energy	kJ/kcal
fat	g
of which	
— saturates,	g
— mono-unsaturates,	g
— polyunsaturates,	g
carbohydrate	g
of which	
— sugars,	g
— polyols,	g
— starch,	g
fibre	g
protein	g
salt	g
vitamins and minerals	the units specified in point 1 of Part A of Annex XIII

Figure 9: Expression and presentation of the nutritional information as required by the FIR[212]

[211]Bone and France, 2001.
[212]Taken from Annex XV of Reg. 1169/2011.

7.2.2. How does the 'real consumer' deal with quantification?

The FIR focuses on quantification to a great extent. It is necessary to state the weight of the product, but also a precise amount of nutrients contained in a product, as well as expression of calories per serving. However these are the aspects which can be beneficial to consumers who search for detailed food information. A 'real consumer,' whose judgment is greatly influenced by their cognitive system 1, does not search for information, but their attention might be drawn to particular information. Research has showed that the ability for a consumer to process information given depends on their ability to perform computational tasks. This means that expressing amount of nutrients per 100g/ml or per serving might not be useful for the consumer since they do not take the effort to make calculations. Also, even though the FBO have to state the calorie intake per serving, the serving size expressed in grams, as generally recognized unit, such information is not being understood well among consumers. In other words, consumers tend to misjudge the serving size. In general, consumers judge better if a product is high or low in a specific nutrient, for example.[213] Simpler forms of information presentation are appreciated among the real consumers. Also, even though grams are perceived a recognized unit in Europe, and therefore it is used to express weight of food components, the issue of using grams to express certain aspects, such as nutrients within a food product requires a deeper consideration. Despite the fact that a gram as a unit is widely recognized, is it also well-understood among the 'real consumers'? It is not about understanding what the concept of a gram as a unit, but about comprehending the concept in a particular context, in this case, in the context of purchasing a food product, knowing how much of certain nutrients a product actually contains. In other words, does a consumer understand how much of sugar does he actually take in when it is expressed in grams?

To deal with this question, psychological insights are of high relevance. Two concepts from psychology come into picture. The concept of accessibility and contextualization, which are interrelated concepts. Based on the concept of accessibility, thus, the occurrence of certain, at that moment accessible thoughts within a given context (see figure 6), expressing information in a particular context could enhance consumers' understanding of the nutrient content. For example, it might be useful for consumers when information concerning the amount of a specific nutrient, such as sugar for example, would be expressed by means which enhance the flow of spontaneous thoughts into one's mind and make associations, in such a way that they immediately comprehend the information given. Thus, practical familiarity with the means of expression plays a role. The expression is grams does not appear to be effective because it only quantitatively expresses the amount of nutrients in grams, yet, such expression requires computations, and it makes accessibility difficult mainly because grams is just a unit, and it is difficult to imagine how much in practice 1gram is. There is a need for developing expression means to which consumers can relate based on their real life experiences, a form of expression thanks to which it would be possible to contextualize the information, and make associations between what one knows and what is presented to them. A recently presented example for a different expression of amounts is an example of a spoon. One can visualize what a teaspoon

[213] Levy, 1988.

looks like. In 2014, in the US there was a petition that requested the FDA to change the sugar labeling. The requirement was to express sugar content in teaspoons instead of grams.[214] Tim Ryan, the US representative, began the petition in order to enhance consumers' understanding of the amount of sugar they consumer on daily basis, often without their realization. Ryan explains: "Most processed foods include a large amount of sugar, but the average consumer would never know by the nutrition label because it shows the amount of sugar in grams, which can be difficult to conceptualize. […] That is why I called on the FDA to change sugar measurements from grams to the more commonly understood teaspoon."[215] Teaspoon as an expression means seems to be a promising expression tool since it is easily understood by consumers. Thus the information concerning sugar content presented in teaspoons can allow consumers to contextualize it, and this can enhance their understanding of how much sugar they consume from a particular product, because a teaspoon is widely used in western households.

When taking a look into the FIR, the findings above challenge the usefulness of the expression of nutrients generally in grams, per 100g/ml as well as per serving, since the information might not be understood in practice by real consumers. Besides, such considerations that require translating the information into what it means for the person, and calculating, are again effortful cognitive tasks which are usually in practice are not performed by ´real consumers.´ Yet, this does not mean that consumers shall not appreciate the information given. As Shannon (1994) argued, consumers value a clear expression of nutrients per product, as long as they understand it, they are able to contextualize it, and utilize it. The question is thus not whether the nutrition information should or should not be disclosed, but how it can be disclosed in order to achieve its utilization by the consumers.

7.2.3. Graphics and imagery as complementary forms of presentation

Having considered the consumer research, and targeted the main challenge in terms of the nutrient information and the expression of calories, it is essential to point out that Reg. 1169/2011 appears to consider information disclosure through other than verbal means, yet, the FIR allows the use of such expressions to be only complementary means which are required to be accompanied by the mandatory means of expression. Also, specific conditions (listed in chapter 3.1.2.2) have to be met in order for such graphical expressions to be approved. Behavioral science can be seen as an empirical tool thanks to which the points could be justified not only in particular situations, thus in several cases, but the points below can be justified in all cases. Graphical representations, as additional means of conveying information to consumers can be justified if specific conditions are met.

The first requirement is that such expressions must be "based on scientifically valid consumer research."[216] The use of graphics to convey information is supported by several consumer studies. The research concerning the effects of graphics on people done by Bone and France (2001) suggests that graphics affect people's believes and judgments about a product. They argued that graphics catch people's attention more than verbally communicated

[214]Shreevs, 2014.
[215]Ryan, 2014.
[216]Art. 35(1) of the Reg. 1169/2011.

information. Imagery enables people to easily encode specific information. In addition, in a study of Kisielius and Sternthal (1984), consumers examined pictorial representation before they paid attention to verbal information listed on a package. Moreover, the study of Grunert and Wills (2007) has illustrated how various means of expressions, such as logos, were noted and appreciated by consumers, although their liking of different logos differed. Yet, the fact that the logo caught their attention proves that logos are generally vivid and catchy means of communicating information to consumers. Thus, there is sufficient consumer research which illustrates the powerful effects of imagery and graphics in terms of conveying information. Such studies can justify the very first requirement, which has to be met in order for graphical representations to be used as additional means of information communication.

Secondly, the second condition to be met for a graphical representation to be used as a complementary tool to convey information is a requirement that such a representation is aimed "to facilitate consumer understanding of the importance of the food to the energy and nutrient content of a diet."[217] Such a requirement shows that the lawmakers do consider consumers' understanding of the information provided to be an important aspect when it comes to information disclosure. The research shows that information can be simplified by graphical and pictorial representations. Simplification is an important aspect in how the information is communicated to consumers. Scammon (1997) concluded that consumers judge products with a format with simplified nutrition information more accurate than a format with more complex information. Another research also found that consumers do prefer information provided through simplified formats. Simplification appears to be a significant factor as far as consumers' understanding of information is concerned. A simple but clear image can be a more effective way of information disclosure than a lengthy verbal expression. Moreover, the graphics are likely to catch consumers' attention, therefore, a product with a logo could draw attention to any nutrient, for example, sugar. The power of images was investigated by Kisielius and Sternthal (1984) who pointed out that primary judgment of a product is influenced by graphics to a great extent. Therefore, a logo with a clear indication of sugar (in case of a product with high sugar content) can be an example of a non-verbal representation which can be used to lead consumers' attention to that nutrient in a fast and comprehensible way, which does not require any computational skills or analysis. Thus, this way a consumer is (effortlessly) informed about the high sugar content, for example.

Thirdly, another requirement to be met is that graphical representations have to be "supported by scientifically valid evidence of understanding of such forms of expression of presentation by the average consumer."[218] This requirement points out the importance of consumers' understanding, more specifically the understanding of the 'average consumer' as understood by the court. The understanding of graphics and imagery by consumers, real people, is supported by behavioral and psychological research, thus the requirement could be reconsidered, as the 'average consumer' does not seem to be a realistic baseline. Sibony (2015) described the 'real average consumer' as being "reasonably overwhelmed, distracted and

[217]Art. 35(1) of the Reg. 1169/2011.
[218]IBID.

impatient,'[219] which is contradictory to the official legal definition of 'average consumer.' The main difference between the real consumer and the average consumer is that the real consumer does not take the time and effort to read the food information, as research of Howells (2005) shows, however, the idealistic 'average consumer' is assumed to be considerable and to be in search for information, in order to weigh their options and make and the most optimal choice. Of course, as human beings understand written information because in the western world literacy is widespread, therefore, written information is a form of communication. Yet, when it comes to food choices, and the question of how to find the best, thus effective, way of conveying information to consumers, this requirement that 'average consumers' have to understand the means of communication has flaws. In fact, it is the 'real consumer' who has to understand the information conveyed. If the use of graphics is proven to be more catchy than verbal means of expression, this requirement in FIR shall be reconsidered. Based on the psychological insights and the behavioral ones, this requirement for the use of graphics shall be stated as follows: Graphical representations shall be used if these can be justified by scientifically valid evidence of understanding of such forms of expression of presentation by the 'real consumer.' Yet, before possible amendments can be made, there is a necessity to firstly reconsider the notion of the 'average consumer' and its use as a baseline, in order to specify a new notion of an average consumer, which could be a more realistic theoretical baseline figure, thanks to which law can be applied to real life situations, which is not based on faulty assumptions. As it has been illustrated, behavioral science provides sufficient scientific research to create a new baseline in food information law.

7.2.4. Fairness and information disclosure

The main issue discussed in terms of the fair information practices is the information practices being possibly misleading. In terms of conveying information to consumers in a fair way, there are two requirements. First of all, as indicated by Art. 7(1)(a) food information conveyed to consumers shall not be misleading in terms of various food characteristics (as described in chapter 3.1.2.2.). Secondly, information shall be easy to understand by consumers (Art. 7 (2)).

The information how it is currently being communicated can be said to be misleading due to the terminology to describe the food composition. Due to the fact that only some consumers comprehend the scientific terminology of various food elements, the technical information for the consumers who do not understand the scientific terminology becomes of no value. Zeng (2006) has pointed out that consumers have a 'knowledge and vocabulary gap' in terms of the 'professional' language used to convey food information. The professional, 'semantic, lexical and explanatory' language does not match the language/terminology commonly used by consumers, therefore there is a clear mismatch. Because of this gap, there have been efforts to eliminate this gap. Zeng (2006) argues that there is a necessity to develop 'consumer health vocabulary' (CHV) in order to create tools thanks to which the information presented to consumers would be easily understood. Zheg (2006) explains: "CHV development is practical and necessary for extending research on informatics-based tools to facilitate consumer health information seeking, retrieval,

[219] Sibony, 2015, p. 73.

and understanding."[220] Also, some consumers think they understand but they might be unsure, therefore there is uncertainty. Although in theory and scientifically speaking, the information given is to be accurate, in practice it might not be clear to the consumer what kind of ingredient the particular food contains. If a consumer is confused about what the food contains, it is difficult for them to make a well-informed choice. Therefore, the use of such highly scientific terminology, such as sodium, saturates, etc., can be in practice classified as a misleading practice, even though it might not appear so in theory.

8. The 'average consumer' in CJEU case law

In order to understand how the 'average consumer' is dealt with in practice, it is necessary to take a look at case law. However, prior to an analysis of case law which deals with the 'average consumer,' it is of importance to understand how the idea of developing a benchmark of the 'average consumer' has evolved, and what exactly were the considerations which the notion of 'average consumer' was built on. Therefore, this chapter deals with two major segments. Firstly, the benchmark of the 'average consumer' as its roots in case law is discussed. Secondly, the specific court cases dealt with at CJEU are analyzed. These are the cases which address the average consumer and consumer protection. The issue of consumer protection is closely connected to the issue of providing information in an effective way to consumers. If the way information is provided is not effective, then the consumer protection can be questioned. Although the case law does not directly deal with the means information is provided to consumers, it does deal with issues concerning providing information in general. The analysis of the case law can provide an insight into the practical questions concerning providing information when it comes to real court cases, as dealt with at CJEU. The practical examples bring more insight into how the court interprets the 'average consumer,' and how it applies it to particular real life cases. Such insights can have important implications onto the food information law, more specifically it can bring insights into what expectations CJEU has in terms of 'the average consumer' and their behavior.

8.1. The 'average consumer' benchmark, its roots and flaws

The origin of the 'average consumer' benchmark is traced to the case law concerning free movement of goods. The average consumer benchmark was for the first time introduced in 1998 in the case of 'Gut Springenheide.'[221] The benchmark was created with the purpose to tackle the national rules of particular countries which were regarded as over-protective. These laws were related to unfair commercial practices. Many cases that discuss the average consumer benchmark are cases related to the issues of infringements of the principle of the free movement of goods.[222] Yet, before analyzing the case law of CJEU, there are multiple problematic

[220]Zeng, 2006, p. 24.
[221] CJEU 16 July 1998, Case C-210/96, *ECR* 1998, p. I-4657 (*Gut Springenheide*). This case is discussed in chapter 8.1.1 to a greater extent.
[222]Duivenwoorde, 2015.

assumptions on which the benchmark of the 'average consumer' is built on. Therefore, the following sections firstly deal with the origin of the average consumer benchmark, which lies in the case of Gut Springenheide. Secondly, the problematic assumptions on which the benchmark is based on are closely considered. Eventually, two more cases brought before CJEU are analyzed in order to understand the application of the 'average consumer' in practice, as well as to evaluate the legitimacy of the use of such a benchmark.

8.1.1. Gut Springenheide case[223]

In the case of Gut Springenheide in 1998, the CJEU has identified what kind of consumer is to be taken as a benchmark when dealing with particular cases. Prior to this case there have been a few cases in which the court had to deal with free movement of goods on one hand and the consumer protection on the other. Eventually, the Gut Springenheide case is the remarkable case in which the court has established the average consumer benchmark. The establishment of this benchmark took place in the relation to misleading or potentially misleading marketing communication. The case dealt with the packaging, labelling and selling of eggs. Gut Springenheide was a company which sold eggs. The eggs were sold under the following name: '6-Korn—10 frische Eier' which when translated means 'six-grain—10 fresh eggs.' The office for supervision of food stuff argued that the information provided, as well as the name were misleading elements. The German administrative court turned to the CJEU with the question of what kind of a consumer should be in this case applied in order to assess whether the information was misleading. The CJEU, in its judgment, has also referred to past cases connected to misleading commercial communication, which were cases similar to this German one, in its nature. The following segment of the judgment in the case of Gut Springenheide explains how the notion of the 'average consumer' was born:

"[I]n order to determine whether the description, trade mark or promotional description or statement in question was liable to mislead the purchaser, the Court took into account the presumed expectations of an average consumer who is reasonably wellinformed and reasonably observant and circumspect, without ordering an expert's report or commissioning a consumer research poll."[224]

On the basis of such a benchmark, the countries are expected to be able to easily assess what is a misleading practice for an average consumer as established by the CJEU. While such a benchmark might be beneficial in the process of an assessment of multiple court cases, this benchmark might not be a benchmark which reflects the 'real consumer' type. There is no doubt that consumers should not be completely ignorant to information provided to them. In the cases of misleading commercial practices, and free movements of goods such a benchmark could be useful, however, when it comes to the analysis of how the mandatory information is conveyed, thus information presentation through information techniques and means, then the well-established average consumer benchmark might not be an appropriate benchmark. The following

[223]CJEU 16 July 1998, Case C-210/96, *ECR* 1998, p. I-4657 (*Gut Springenheide*).
[224]Paragraphs 30–32 of the judgment in Case C-210/96, *ECR* 1998, p. I-4657 (*Gut Springenheide*).

subchapter discusses assumptions on which the benchmark is currently based on and explains its flaws.

8.1.2. Questionable assumptions

Firstly, the CJEU has defined the 'average consumer' is defined as 'reasonably observant and circumspect.' Yet, various factors show that this might not be the case in practice, and that there might be a difference between the 'average consumer,' as defined by the CJEU, and the 'real consumer.' The 'average consumer' benchmark is based on a rather unrealistic image, when it comes to people's cognitive abilities. Average consumer, as perceived by CJEU, is a rational consumer who processes all information and critically evaluates practices which might be unfair. Research has shown that people have difficulties with processing a lot and complex information, and also struggle to make decisions because of various psychological biases.[225] Based on these considerations, it might seem that the average consumer is protected, yet in reality, it appears that the majority of the consumers, thus what has also been referred to as 'real consumers,' do not behave according to the standard economic rational model, as it is falsely assumed by the CJEU. As Duivenwoorde (2015) put it: "The average consumer benchmark places a strong responsibility on the side of the consumer not to be mislead, rather than on the trader not to mislead."[226]

Secondly, another significant and fundamental assumption is the assumption that consumers are not easily mislead.[227] This assumption is particularly important since it puts a lot of responsibility onto the consumer and its abilities to optimally process all the information given, and to critically evaluate possible misleading marketing practices. Duivenwoorde (2015) in his book described the issue of misleading marketing practices. In the 'Purely Creative' case, there was an issue concerning winning a prize. It was argued that most consumers are aware of the fact that winning a prize does not come without costs. The High Court in England found that such commercial practices were unfair because they were designed with the purpose to mislead the consumer. However, the majority of consumers expect that there might be costs associated with a sudden winning of a prize. Thus, from a strict viewpoint the average consumer is not mislead, therefore such a practice is not prohibited. However, as argued by Duivenwoorde, many people would find such a practice unfair since the practice is designed to mislead. Therefore, he concluded that when taking into account consumer protection, consumers should be protected from practices which are, without a doubt, designed to mislead.[228]

Thirdly, the average consumer benchmark is based on the assumption that there the average consumer demonstrates 'typical' behavioral. In other words, one kind of behavior constant among consumers is assumed. There are many factors such as personality, earlier experiences of consumers, cultural background and knowledge, which influence the decision-making process. The businesses make use of such differences in consumers' behavior based on these factors. Some consumers are more knowledgeable, than others. Some consumers read the

[225]IBID.
[226]IBID.
[227]IBID.
[228]Duivenvoorde, 2015, p. 198.

information provided, but some do not. Cognitive abilities also differ among consumers.[229] That is why a typical behavior of an average consumer cannot be taken as an assumption as people demonstrate different behavior when it comes to decision-making. Because of all such assumptions, only the ideal 'average consumer' as defined and referred to by CJEU is protected by the current legislation, yet, this ideal average consumer does not seem to mirror the 'real consumer' which has rather different characteristics than those of this ideal notion applied by the CJEU.

8.2. Strawberry jam case: Adolf Darbo[230]

The average consumer benchmark was highly applicable and thus useful in the jam case of Adolf Darbo. The court has applied the characteristics of a consumer being informed and observant to this case.[231] The jam which was manufactured and sold under the name 'd'Arbo Naturrein,' it was a product which was sold in Germany, although it was manufactured in Austria. The product contained the mandatory information which was expressed as follows: "*Made from at least 50 g of fruit per 100 g. Total sugar content 60 g per 100 g. Keep cool after opening. Ingredients: strawberries, sugar, lemon juice concentrate,*
pectin gelling agent."[232] The product name 'Naturrein' was criticized by the German consumer organization because the jam contained an additive (pectine), as well as some residues of soil pollution.[233] The use of the name was requested to be prohibited, as it would be contrary to German law, more specifically, Art. 17(1)(4) and (5) of the LMBG,[234] for the following reasons:

1. The pectin gelling agent is an additive, which consumers do not expect to find in the jam in question because of the description 'naturrein'
2.The latter term is likely to mislead consumers in a sense that the air or the land from which the fruit used in the jam originates are contaminated by pollution,
3. In view of the residues of lead, cadmium and pesticide in the jam, the product cannot be referred to as 'naturally pure'.[235]

Darbo presented two main arguments. Firstly, Darbo stated that pectine is a common ingredient used to make a jam. Secondly, he stated that a consumer was aware of possible residues in a product such as a jam, because they are aware air and land pollution.[236] The CJEU in its ruling stated that a consumer was not mislead since pectin was labelled on the product. In this case, the court considered that the average consumers reads labels before purchasing a product:

[229]Duivenvoorde, 2015, p. 199.
[230]CJEU 4 April 2000, Case C-465/98, *ECR* 2000, p. I-2297 (*Adolf Darbo*).
[231]Duivenvoorde, 2015, p. 47.
[232]Paragraph 11 of the judgment (Case C-465/98).
[233]Duivenvoorde, 2015 & paragraph 13 of the judgment (Case C-465/98).
[234]Lebensmittel- und Bedarfgegenständegesetz – German Act for Food Processing and Commodities.
[235]Paragraph 14 of the judgment (Case C-465/98).
[236]Paragraph 15 of the judgment (Case C-465/98).

*"[C]onsumers whose purchasing **decisions depend on the composition** of the products in question will first read the list of ingredients, the display of which is required by Article 6 of the Directive. In those circumstances, **an average consumer who is reasonably well informed and reasonably observant and circumspect** could not be misled by the term 'naturally pure' used on the label simply because the jam contains pectin gelling agent whose presence is duly indicated on the list of its ingredients."*[237]

Additionally, the Advocate General Leger referred to the 'average consumer' in relation to the information concerning pectin, the gelling agent:

*"In this particular case, an average consumer who is reasonably well-informed and reasonably observant, who **looks** at the list of ingredients is immediately informed of the presence of the pectin gelling agent in*
*d'arbo jam. The labelling in question therefore enables consumers to make their purchasing decision in full knowledge of the facts and, if appropriate, **to assess** the exact scope of the description 'naturally pure."*[238]

In the case of the consumer who deliberately was concerned about the presence of pectine, such argumentation appears logical. The consumer was concerned about pectin, yet, the producer has adequately labeled this information, therefore such information was well-communicated. In this specific case, the notion of 'average consumer' does match the consumer in question.

Furthermore, in terms of the residues, the court has based its argument on the 'common sense' which consumers are expected to use. It has argued that consumers are generally aware of the fact that jam is made of fruit and fruits come from nature therefore soil or other residues are likely to be present.[239] Moreover, the argument that the name is misleading because of the naturally occurring impurities being present in the jam[240] cannot be substantiated because it is inevitable that some natural pollution can enter a product. As explained by Advocate General Leger in his judgment:

"It is common ground that lead and cadmium are present in the natural environment as a result, in particular, of air pollution and pollution of the aquatic environment. […]. Since garden fruit is grown in an environment of that kind, it is inevitably exposed to the pollutants present in it."[241]

Eventually, the court in its judgment considered the potential risk. Because the risk was so small (due to the presence of pollutants) such a barrier to the free movement of goods could not be justified.[242]

[237]Paragraph 22 of the judgment (Case C-465/98).
[238]Paragraph 39 of the judgment (Case C-465/98).
[239]CJEU 4 April 2000, Case C-465/98, *ECR* 2000, p. I-2297 (*Adolf Darbo*)
[240]Paragraph 26 of the judgment (Case C-465/98).
[241]Paragraph 27 of the judgment (Case C-465/98).

In conclusion, the court found no reason why the jam should be re-named on the basis of the argument that the name was misleading. Naturally occurring pollution cannot be avoided, and the pectin is an ingredient to make jam, which was labeled in accordance with the Reg. 1169/2011.

In this case, the benchmark appears to be a useful tool as the complaint of the consumer organization does not seem reasonable. Consumers cannot be assumed to be completely ignorant, especially if they are aware of the fact that they have problems with the presence of a particular additive. This in itself already suggests that such a consumer, *'whose decision depend on the composition of the products,'*[243] is not completely ignorant, and generally is interested in the information provided. Although the fact that not everyone might have the knowledge about the technological function and necessity of pectin for jam production, this additive was stated in the ingredient list, and therefore if a consumer generally minds pectin being present, they are expected to check whether the product contains it or not. Pectin is an additive, not a nutrient, such as fat or sugar which can be hazardous to one's health, thus it can be argued that the standardized labeling, as required by Reg. 1169/2011 should be a sufficient way to convey information about the presence of such an additive. Nevertheless, it must be pointed out that consumers who have knowledge about certain additives, and have a certain opinion about them, or think critically about them (activated analytical cognitive system 2), are not the majority of consumers. Thus, in the Darbo case, the consumer in question might not be the 'real consumer,' yet, they might match the definition of the 'average consumer' as defined by CJEU.

8.3. The coffee case: Douwe Egberts v Westrom Pharma

The case of Douwe Egberts v Westrom Pharma is particularly interesting in terms of the expectation of the 'average consumer' with regard to their behavior. The case brings up an issue of the actual vs. expected behavior of the 'average consumer.' Wetrom Pharma is a company which specializes in coffee production. It was claimed that the coffee is 'an absolute breakthrough in weight control' and through claims consumers were also promised general slimming and 'slowing down excess fat deposits.' Douwe Egberts has filed a complaint that such advertising is not allowed under the Belgium law, since that prohibits 'slimming' and to 'medical recommendations, attestations, declarations or statements of approval' in the presentation and labelling of food. Yet, the CJEU has ruled that based on the Belgium food law, no general prohibition of such advertising is permissible under the EU food law. More specifically, the prohibition would not be in line with the Dir. 2000/13/EC, nor under the free movement of goods principle.[244] The court has referred to Art. 18(1) and (2) of the directive:

*"**Article 18(1) and (2)** of Directive 2000/13 on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs **precludes** national legislation which prohibits references to 'slimming' and to 'medical recommendations,*

[242]Paragraph 28 of the judgment (Case C-465/98).
[243]Paragraph 22 of the judgment (Case C-465/98).
[244]Duivenvoorde, 2015, p. 48.

attestations, declarations or statements of approval' in the labelling and presentation of foodstuffs."[245]

Therefore, according to the line of reasoning of the court, the prohibition of such advertising practices is not justified by the Belgium food law. Instead of the prohibition, the possible fraudulent nature of some marketing practices shall be dealt with on a case-to-case basis.[246] Every single case should be evaluated. In recital 46 of the judgment, this practice is described in a greater detail, while referring to necessity to apply the notion of the 'average consumer:

"[A]s regards the possible difficulty of establishing in certain cases the fraudulent nature of a certain statement, it should be recalled that it is for the national courts in all doubtful situations to form a view, taking into account the ***presumed expectations*** *of an average consumer who is* ***reasonably well informed and reasonably observant and circumspect****."*[247]

Thus, in particular situations national courts should consider the 'presumed expectations' of an average consumer. Such considerations show that the court might not be applying the average consumer figure to cases, but a figure of an average consumer which is expected to behave in a particular way, yet, this might not mirror the consumers' actual behavior. Such a consideration is a slippery slope. The usefulness of such an imaginary figure can be questioned as it appears to be an abstract figure based on expectations.

Moreover, the proportionality principle is mirrored also in the case of Egberts v Westorm Pharma. There needs to be a balance between the consumer protection on one hand and the free movement of good on the other. This consideration is reflected in the judgment, while referring to recital 8 of the Dir. 2000/13/EC:

"Detailed labelling, in particular giving the exact nature and characteristics of the product which enables the consumer to make his choice in full knowledge of the facts, is the most appropriate since it creates fewest obstacles to free trade.' (recital 8- dir 2000/13) - judgment."[248]

This statement reflects the fact that consumer protection dealt with by CJEU is to be understood in relation to free trade. Thus, providing 'detailed' information to consumers makes them knowledgeable in terms of all possible facts relating to a particular product, is an appropriate method because it does not create obstacles to trade. In other words, based on these considerations the FBOs are allowed to use various marketing techniques, and make claims, which can potentially mislead consumers, since consumers are provided exhaustive lists of information, and thus the burden to process the information is put on consumers. This way all the responsibility moves to the consumer in order to enhance the optimal functioning of the internal

[245]CJEU 15 July 2004, The summary of Case C-239/02, *ECR* 2004, p. I-7007 (*Douwe Egberts v Westrom Pharma*)
[246]Paragraph 43 of the judgment (Case C-239/02).
[247]Paragraph 46 of the judgment (Case C-239/02).
[248]Paragraph 6 of the judgment (Case C-239/02).

market. In addition to this, knowing the facts does not automatically imply one's understanding of such information. The recital 8 of the directive illustrates the idea that plain providing information to consumers is enough in order to achieve the consumer protection. This can be true if the consumers were rational actors making optimal decisions, as faulty assumed, yet, it is questionable if consumers are sufficiently protected from various problematic marketing practices. The burden which is put onto the consumer based on the assumption that the consumer reads labels before purchasing a product is mirrored in the Opinion of Advocate General Geelhoed:

"[W]hen assessing whether or not product information is misleading, the Court takes as its point of reference the presumed expectations of an average consumer who is reasonably well informed and reasonably observant and circumspect. This ***presupposes*** *that, before acquiring a given product (for the first time), a consumer will always* ***take note*** *of the information on the label and that he is also* ***able to assess the value*** *of that information. It seems to me that a consumer is sufficiently protected if he is safeguarded from misleading information on products and that he does not need to be shielded from information whose usefulness with regard to the acquisition and use of a product he can himself appraise."*[249]

Also, this case shows that the average consumer has the ability to realize in what situations they can potentially be mislead and to deal with it optimally, which means that they consider the information given and take an adequate decision. In paragraph 79, the Adovacate General Geelhoed explains his opinion as follows:

"[T]he consumer has ***an interest in not being misled****. So long as the information concerned is correct, it must be assumed that the average consumer who is reasonably well informed and reasonably observant and circumspect* ***will be capable of forming an opinion*** *on the products advertised without his economic and health interests being harmed.[…]. To put it in stronger terms, those interests might well be harmed if information on the properties of a product that contribute to slimming was not obtained."*

'An interest in not being mislead' is quite unlikely since a human being can easily be mislead. This is a subconscious process which happens automatically (due to activation of cognitive system 1). Psychological research however clearly shows that most decisions and judgments are intuitive, and intuition belongs to the fast and associative system 1 which means that it takes place without any reasoning and evaluation (system 2). Moreover, such an opinion shows expectations of how one should be able to behave, thus critically evaluate the information, since they consciously are interested in not being mislead. As Duivenvoorde (2015) explains: *" the interpretation of the average consumer by Geelhoed seems to reflect desired consumer behaviour, irrespective of how the average consumer actually behaves."*[250]

[249]Paragraph 54 of the opinion (Case C-239/02).
[250]Duivenvoorde, 2015, p. 50

Eventually, another piece of Geelhoed's opinion shows that the scientific validity of the statements used to advertize the coffee kind in question can be challenged, since it has not been scientifically tested that all the statements advertized are scientifically sound. Besides, such piece of opinion shows that the focus remains to be placed on solely on the truthfulness and precision of the information provided to consumers. The following paragraph reflects these considerations:

*"What must not be precluded is **the possibility** that such statements are scientifically responsible and that again, provided they are not misleading, they may represent relevant information for the consumer when he comes to decide whether or not to purchase the product concerned."*[251]

There is a possibility that the statements are sounds, however, this might also not be so. Yet, even if these statements were substantiated by sound science, the focus is again placed on providing relevant information to consumers, which can result in information overload, as discussed earlier. By focusing on providing information, the question how the information is conveyed is not being addressed. This is a rather relevant question in this case because often, claims are expressed in a more expressive way than mandatory food information. Based on psychological research, vivid information catches more attention than non-vivid information. The claims on the product are probably expressed vividly, and on the front of the package, while the mandatory information is placed usually at the back of the package, and it uses the minimum possible letter size as established by Art. 13 of the Reg. 1169/2011. Based on such consideration, it becomes clear that although the claims might be scientifically sound, they might still be interpreted as misleading, based on the way they are expressed, not based on their actual content. It is possible to steer consumers' attention to what information one wants them to pay attention to.[252] That is why the presentation means are of great importance, and cannot be ignored.

The CJEU case law has provided multiple illustrations with regard to what consumer is being protected in real life situations. The case law analysis has illustrated the need for reconsideration of the character of consumers and their behavior in order for them to be effectively protected. Based on the insights gain from the previous chapters, the following chapter applies such insights to the case study of sugar consumption, and provides recommendations in terms of more effective sugar labelling techniques which have been developed on the basis of the empirical findings of the fields of psychology, behavioural economics and science.

[251]Paragraph 53 of the opinion (Case C-239/02).
[252]Bone and France, 2001.

9. Discussion & recommendations: The question of sugar labelling

Behavioral science together with the field of psychology, and also the analysis of the relevant court cases appear to create a strong foundation for possible improvements in the field of food information law. After the legal analysis of the Reg. 1169/2011, and the court cases, it becomes clear that the most attention has been paid to information disclosure in order to achieve high level of consumer protection. Nevertheless, the thorough analysis of behavioral science and relevant psychological insights points out imperfections in the general view of consumer protection, and more specifically, in the way certain information is communicated. Sugar is a nutrient, which can be hazardous when consumed in greater amounts. Based on the previous analysis, this chapter discusses the most crucial findings which can inform sugar labelling. What are the main features on which the sugar labelling should be based on? How would this information by perceived by the 'real consumers'? This chapter therefore attempts to bring together the most relevant insights on which particular proposals for sugar labelling could be based on.

9.1. Crucial considerations when rethinking sugar labelling[253]

9.1.1. Intuition vs. reason & rationality

Human beings are intuitive beings, who do not usually make rational decisions. Consumers mostly act intuitively, their judgments and decision-making process is based on their intuition. If a consumer comes across a product they choose to buy or not buy it is not based on the reasoning, comparing and evaluating information (system 2), but on the basis of their intuition. Because the majority of consumers are irrational beings, who prefer not to invest effort (system 2) when purchasing products, the most fundamental assumption on which the 'average consumer' is based on has to be disregarded. Before considering other factors related to information processing, the fact that consumers are intuitive beings has to be kept in mind. In terms of providing mandatory information this means that most consumers will not carefully asses information in order to take an optimal decision. Therefore, there is a need to move away from the rational assumption, and consider other factors, which could make a difference in whether, and if so, how the consumer could take a decision based on information.

9.1.2. Empirical evidence based consumer vs assumption based consumer

The case law has brought an understanding of the elements the 'average consumer' is based on. While the figure of 'real consumer' is based on empirical studies, which reflect actual consumer behavior, the notion of 'average consumer' as defined by CJEU is an idealistic figure based on multiple assumptions solely based on the standard economic model. Main assumptions summarized on the basis of the analyzed case law are the following:

1. Average consumer is a rational consumer who critically evaluates information
2. Average consumer is not easily mislead
3. Average consumer demonstrates 'typical' behavior (personal differences are ignored)

[253]These are summarized and juxtaposed in figure 10.

9.1.3. Visualization of information vs. information disclosure

If consumers are not rational beings, then plain information disclosure is not going to be enough since there might be too much information to pay attention too (information overload) which can create confusion. Instead of focusing on written information, words and numbers, which is regarded as the main obligatory method to convey information (by Reg. 1169/2011), the use of pictures and symbols contributes to a better visualization. The use of symbols to convey information, automatically, will result in simplicity of information provided. Also, thanks to symbols, consumers' attention can be steered to the most important information. Words and numbers require effort in order to be translated into what it actually means for the consumers, yet, a visual representation, of sugar content information in this case, requires low effort, due to its graphical nature. Thus, even if consumer is completely ignorant, the chance that it catches their attention increases with the use of graphics since these more appealing than words and numbers.

9.1.4. Vividness vs. dullness

Vividness is an important factor in how a particular pictorial or graphical representation catches one's attention. The power of vivid imagery is substantiated by psychological research. Graphics, and logos are catchy presentation means, yet, the chance that a logo or picture catches consumers' attention lies in the vividness of the particular logo or symbol. Vividness can be enhanced by colors, which are a strong factor in terms of catching attention. On the other hand, if a logo is dull, which can mean color-free for example, a consumer might overlook the logo. Graphics and imagery are powerful to the extent that consumers' attention can be steered to any information, by using such means. Therefore, in the case of sugar, if sugar is vividly labelled, then the consumer is likely to be aware of the sugar content. If, for example, fat is labelled in a catchy way, the consumers will be aware of the fat content more.

9.1.5. Simplicity vs. complexity

Simplicity is one of the most important factor when conveying information. Simplicity should be achieved in two ways: Firstly, in terms of the format, and secondly, in terms of the language. The recommended format to point towards the danger of a single nutrient, is a pictorial representation such as a logo. However, the second requirement which determines the simplicity of the means to convey information is the language used. Thus, the information should be expressed by simple vocabulary, instead of the technical one, which is not understood well by the majority. For example sugar is to be labelled as sugar. Even though the sugar it labelled currently as sugar and salt as salt, the issue is that the total information conveyed contains more than just an indication of salt, fats and sugar. The ingredient list contains a detailed list of ingredients, which mentions sugar, but also dextrose, glucose syrup, etc. These are all forms of sugar but maybe not everyone has such knowledge. Thus, the complexity is created by placing an exhaustive list of information, such as the ingredient list and the nutritional information, and non of such information is expressed in a vivid way. By reducing the amount of information or by putting emphasis on particular information through expressing it by a simple graphical format, a consumer can understand the product easier. Significant amount of sugar is being added to food such as RTE pastas, and sauces which are perceived to be salty (see chapter 2), therefore a clear

indication of the presence of the sugar content can be beneficial to the consumer who might not be aware of it. Also, consumers differ in knowledge, therefore the more complex the information, the less people are likely to comprehend it.

9.1.6. Familiarity and associations vs. quantification (g)

To express how much sugar a product contains in the generally accepted unit, grams (g), might not be the effective way of indication of a nutrient content. People make associations, based on their automatic thinking and past experiences. The same applies familiarity. Therefore, the proposal of Tim Ryan that a teaspoon is a unit which is practically used by people on daily basis, therefore, the requirement of familiarity is present in this example. Teaspoon is being used regularly by consumers, and therefore they can create an image in their mind in terms of how much 1 teaspoon can be. Consumers have demonstrated confusion when confronted with grams. Again, it requires considerations and calculations which are effortful processes and require knowledge. Thus, the 'average consumer' defined by CJEU will not demonstrate the same understanding of the common gram unit, because every consumer defers in their cognitive abilities (system 2). Thus a simple, familiar illustration can effectively indicate the amount of sugar present in a product, no matter what the intelligence of a particular consumer is. The use of such a tablespoon, as a commonly recognized and understood unit tackles the associative system 1 of human cognition.

9.1.7. Nudging vs bans

Nudging is also a highly applicable method in terms of conveying information about sugar. A logo, which expresses a certain kind of emotion, could be designed. The use of emoticons can be an effective way to catch consumer's attention and in this way steer their subsequent behavior. The emotional appeal is a powerful factor (this is also discussed in vividness argument), thus a sad emoticon placed on a product with added sugar could contribute to consumers making a notice of this information, and this could potentially lead to consumers making a healthier choice. Such a mechanism might be criticized by businesses due to producing a negative imagine of a particular product, which could result in the decrease in sales. Yet, there is a potential of a public health implication, since emoticons are powerful means of expression, as the research has indicated. Adding sugar to products cannot be banned as that would limit the fundamental market freedom. However, if it is allowed to let the businesses add extra sugar, the consumer should have a right to be informed about such practice in a way which is comprehensible to them.

The 'average consumer'[254]	The 'real consumer'[255]
reason	intuition
based on assumptions	based on empirical evidence
complexity	simplicity
information disclosure	visualization of information
quantification	familiarity and associations
dullness	vividness
bans	nudging
traditional economic assumptions and free market considerations	empirical findings from behavioral and psychological research

Figure 10: Juxtaposing characteristics of, by the CJEU established, 'average consumer' and the 'real consumer' as designed by the author based on the empirical evidence of this study.

9.2. Recommendations

On the basis of the presented analysis, means through which information with regard to sugar content could be effectively conveyed is presented in this subchapter. The use of a vivid logo appears to be one possible and effective way to inform consumers about the amount of sugar in a particular product. The use of the red color[256] could result in the logo being catchy, thus it can easily attract consumers. The amount of sugar is to be expressed by a teaspoon instead of grams.

Kellog's cereals (see figure 11) are an example of food which is marketed as a healthy choice. Many consume such cereals without realizing the amount of sugar these actually contain. Per 100g the cereals contain 29.03g of sugar. Daily recommended sugar consumption is 25gr or 6 tsp.1tsp is equivalent to approximately 4gr. The package 300g package of Kellog's contain 29.03*3= **87.09g** of sugar.[257] Thus in the whole package there is more than **three** times more sugar than it is recommended to consumer daily. Of course it is not assumed that consumers consume 300gr of cereals at once, yet, one portion of these cereals already contain 9gr of sugar which constitutes already **36%** of recommended daily sugar intake. Still, the whole product contains **21tsp** of sugar, which is equivalent to **87.09g** of sugar. Such an information could be conveyed by the illustrative logo projected below (see figure 12). In order to increase the effectiveness of the logo, the sad face (emoticon) could be also placed on a product containing a significant amount of sugar (see figure 13).

[254]The 'average consumer' as understood and applied by CJEU
[255]The 'real consumer' as designed by the author based on empirical findings from psychology and behavioral science.
[256]The logo is not ideally presented due to technical difficulties. However, the entire logo is meant to be in the red color.
[257]The full nutrition information of the Kellog's cereals can be find in Appendix I.

Figure 11: Kellogs cereals[258]

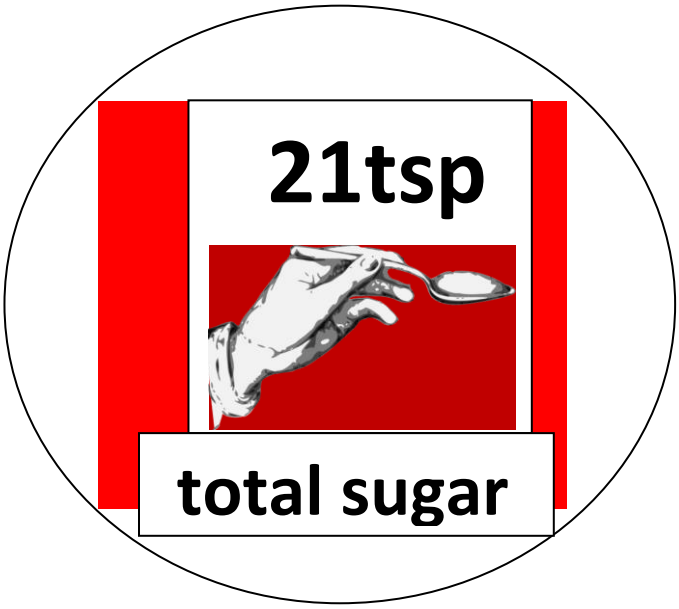

Figure 12: Example of a sugar information logo

[258]The image retrieved from: http://www.livingrichwithcoupons.com/2013/02/kelloggs-recall-kelloggs-special-k-red-berries-cereal.html.

Figure 13: Emoticons

10. Conclusive remarks and suggestions

Consumer protection is one of the two most important aspects on which food law, as such, is based. Protected consumer is a well informed consumer. Yet, the question is whether the consumer understands what he is being informed about. Current FIR regulation lays down detailed provisions concerning voluntary (Art. 36 and 37), as well as mandatory information that has to be labelled on food products by FBO. The mandatory particulars, listed in Art. 9 require FBOs to provide, besides others, nutrition information of food products. The specifications of the nutrition information can be found in Art. 30 of the regulation. The regulation also regulates the way information is presented. It specifies how information (mandatory and voluntary) should be presented (Art. 13, 34, 35, 37). Furthermore, FIR requires an expression of quantification of ingredients contained in a product (Art.22), as well as an expression of nutrition per 100ml (Art.32) and also an expression of nutrition per portion (Art. 33). Nevertheless, even though the regulation harmonized food labelling in the EU, and it has definitely provided a structured framework which has to be adhered to by FBOs within the EU, it does have drawbacks which cause that the bridge between the food information provisions, and consumers' actual understanding of the information as regulated by the respective regulation, is rather weak. The legal provisions were formulated in order to provide information concerning a food product to consumers, which was assumed to lead to the maximum level of consumer protection. Yet, there are drawbacks which have caused that FIR does not protect consumers as effectively as thought. As empirical research suggests, the weakness of FIR lies in *two* main aspects: strong focus on *information disclosure* and the unrealistic assumption of consumers being *rational actors*.

The lawmakers of FIR placed too much focus on *information disclosure*, which has lead to focusing on *the amount* of information conveyed to the consumer while disregarding whether the consumer is able to contextualize the information, and use it adequately so that it enables them to make an informed choice. Research has also illustrated that consumers cannot deal well with complex information. *Complexity* leads to confusion, therefore the more focus is placed on the amount of information, the more complex the food labelling becomes, which consequently results in consumers' disregarding the information. Moreover, although the FIR provides provisions concerning the presentation of food information, the focus is put on formatting (field of vision, letter size, etc), instead evaluating the importance of pieces of information, and attempting to present the most important information in a simplified way, comprehensible to all consumers. Empirical research highlights the importance of *simplification* of information, which enhances consumers' understanding. Instead of conveying more information, the focus should be placed on information simplification, as well as the development of simple, yet comprehensible, presentation means which would enable consumers to be informed, without having the skills to decode the complex information provided on food packages, as it is the case at the moment.

The second aspect which weakens the effectiveness of FIR is the fact it is based on a rather unrealistic assumption with regard to the *character* of consumer. After the introduction of the

notion of 'average consumer,' consumers began to be treated as *rational actions*, which is mirrored in the EU case law analyzed in this study (See chapter 8). Strong empirical evidence clearly illustrates the need for reconsideration of the practical application of the abstract notion of the 'average consumer' to real life situations. While setting such a benchmark is a useful tool in court cases in order to set a reasonable standard of consumer in order to be able to assess or define 'normal' or 'reasonable' consumer behavior, the notion of the 'average consumer,' thus a consumer who weighs all options, and chooses the best alternative, does not match the 'real consumer.' The real consumer is a consumer who is irrational, does not weigh all alternatives before taking a decision, who is easily distracted, confused and mislead, whose decisions are taken often intuitively, and whose system 1 (fast cognitive system) causes a person to make fast associations with regard to what they see.

Moreover, although human beings are literate and are able to read and analyze information, research shows that such processes are effortful and time-consuming. Based on this it appears that system 1 has much more influence on peoples' buying choices, when it comes to food. The current regulation considers human beings to be system 2 consumers, analytical and rational beings, while in real life consumers are spontaneous, intuitive beings influenced by mood and emotions. Having considered the power of system 1 with regard to decision-making, knowledge, as research also indicates, will not have much influence on consumers' purchasing decisions. Utilization of knowledge does not happen spontaneously, it is effortful and therefore, such behavior cannot be expected from the majority of consumers. The empirical findings should inform the food information law, as they provide a deep insight into a complex cognitive system of human mind. These findings should not be ignored, as they provide a solid empirical framework based on which more effective means of providing information can be developed. Knowing how and why human beings think, perceive, behave, what they pay attention to, and what they do not, is crucial for creating a strong legal framework for assurance of maximum consumer protection through food information law.

However, how could the mentioned findings be incorporated into the current legislative framework? The example of excessive sugar consumption has been used as a case study to illustrate how the empirical findings from psychology, and behavioral science can be translated into food information law, without changing any legal provisions of the FIR. The issue of excessive sugar consumption has gained attention during the past decade, as it has been associated with adverse health effects. As research has illustrated, the consumption of sugar is getting out of control, and it does have a great impact on human health. That is why changes in the way sugar is labelled could have a positive impact on consumers' behavior. Making information simple, vivid, familiar, and visual (see chapter 9.2) has the potential to catch consumers' attention, and also enhance their understanding without the need for any complex analysis. The red logo suggested in the analysis has been developed on the basis of the presented empirical research, as it employs all aspects which have been proven to be effective in terms of not only consumers' perception of information, but also their ability to understand, and therefore use the information given. Such alternative ways of labelling are compatible with the provisions

of the FIR. Nevertheless, currently, within the legislative framework of the FIR, these alternatives could only be applied by FBOs on voluntary basis, as additional forms of information presentation. The effectiveness of a new labelling system depends also on the possibility to amend the labelling provisions concerning mandatory particulars, as FBOs might not be in favor of such labelling being mandatory, as they might fear that their sales of certain food products would drop. Yet, the fundamental purpose of the FIR remains the consumer protection, which can only be ensured if the information concerning food products is presented effectively, however, not in the way it would be presented to the abstract 'average consumer,' as it is currently the case, but to a real consumer, who is the exact opposite of the abstract notion.

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11.2.2. Case law

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Case C-239/02: *Douwe Egberts v Westrom Pharma* [2004]

Case C-433-13: *Ute Reindl v Bezirkshauptmannschaft Innsbruck* [2014]

Case C-465/98: *Adolf Darbo* [2000]

Case C-453-13: *Newby Foods Ltd v Food Standards Agency* [2014]

12. Appendix

Nutrition Facts

Serving Size 1 Cup (31g)

Amount Per Serving	Cereal	with ½ cup skim milk
Calories	110	150
Calories from Fat	0	0
	% Daily Value* **	
Total Fat 0g*	**0%**	**0%**
Saturated Fat 0g	**0%**	**0%**
Trans Fat 0g		
Polyunsaturated Fat 0g		
Monounsaturated Fat 0g		
Cholesterol 0mg	**0%**	**0%**
Sodium 190mg	**8%**	**11%**
Potassium 70mg	**2%**	**8%**
Total Carbohydrate 27g	**9%**	**11%**
Dietary Fiber 3g	**10%**	**10%**
Sugars 9g		

Figure 14: Nutrition information of Kellog's - Red berries