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VULNERABLE CONSUMERS: A PERSPECTIVE ON CONSUMERS' BEHAVIOR TO
FOOD LABELS AND PRODUCTS CHOICES

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Abstract

This research aims to understand how vulnerability affects the way people process nutrition information and their behavior. Based on the literature review four hypotheses were constructed. The experimental research was evaluated through an online questionnaire, with primary data and quantitative research, being completed by 207 participants. The main results suggest that non-vulnerable people retain information on the back-of-pack and vulnerable people do not retain, understand, and change their behavior with the information provided on labels. Concluding, consumers might not be paying attention to information on labels so companies should find ways to help consumers finding and understanding their nutritional information.

Keywords: vulnerability; nutritional labels; food; consumer behavior

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1. Introduction

The impact that food habits have on illnesses and wellbeing is a concern that is gaining relevance over time. Consumers are getting more aware of the risks that negative food habits can have, increasing their concern in adopting healthy food habits, privileging some healthy attributes when making food choices, such as nutrition, health properties, and environmental aspects. (Bazzani et al. 2020) A way to help consumers to make informed decisions about food products is by informing them about the foods' nutritional information. (DGS and ISAMB 2019)

According to Regulation (EU) 1169/2011, it is mandatory to have nutritional information on the labels, to support consumers having access to information about food products allowing them to make informed and conscient choices. This regulation serves to guarantee consumers' defense regarding food products and establishes obligations and responsibilities to orient labeling in food products in the European Union. (Associação Portuguesa dos Nutricionistas 2017) Information provided in the back-of-pack of the labels, which includes nutrition tables and a list of ingredients, is mandatory to prepackaged food products according to EU legislation. This transparency to consumers aims to guarantee their protection regarding health and helps them make informed decisions. (The European Parliament and the Council of the European Union 2011) In addition, the legislation allows companies to add voluntary and regulated presentation of supplementary information on front-of-pack (commonly showed in claims). (DGS and ISAMB 2019)

To deliver consumers' preferences, brands are adopting ways to gain a competitive advantage and to make consumers choose their products. As such, packaging and its content contributes to product differentiation, in which information provided on the labels has a critical role. For this reason, in addition to the mandatory information on the back-of-pack (nutrition tables

and list of ingredients), brands are using voluntary presentation of nutrition highlights on the front-of-pack (showed as claims) presenting a product as being healthy, whether it is or not, sometimes inducing consumers to believe they are purchasing a healthy product. (Wang 2017)

Even though label information is mandatory in the EU, often consumers do not pay attention to nutritional information on the back-of-pack. (DGS and ISAMB 2019) In addition, consumers might get distracted by information on the front-of-pack that highlights one or few key nutritional aspects of the product and might mislead consumers to perceive products as healthy whereas, in fact, the overall nutritional value is worse than perceived. (Bazzani et al. 2020)

Whenever that does not correspond to the essence of the food product, this may be particularly harmful to vulnerable consumers since they tend to change their attention, to be influenced and to believe in the given information once they have limited ability to process information and also have less control. (Lee and Soberon-Ferrer 1997) Besides, the choice of products that are perceived as healthy, but in reality are not, can have a negative influence on consumers' health. (Spink 2019) For instance, consumers that find a product with a claim saying it is “light”, might perceive the product as being healthy, when in fact can be unhealthy. This can be negative for vulnerable consumers since they have less control (Cutright 2012), possibly consuming this product without quantity constraints, creating a harmful impact on their health. In this matter, it is interesting to understand if vulnerability influences consumers' attention to food labels and in their behavior towards food products. In this thesis, I focus on a specific vulnerability state: physical weakness. This question is important because consumers make food choices concerning many aspects, including diets and habits, and very often they make these decisions when they are in a state of physical weakness (vulnerability). Moreover, there are many consumer

categories that might be more vulnerable – for instance, elderly people – than others, and this might affect the way in which they process nutritional information and behave towards that.

In addition, this subject is important because, despite the importance that brands give to communicate their products as being healthy and nutritionally balanced, some products are nutritionally negative, probably having a negative impact on consumers' health. (Spink 2019) Vulnerable consumers can be easily influenced to buy products with labels that induce that are good, even if they are not. (Barrere et al. 2020) The misinterpretation of food labels can lead to bad food habits which can lead to a public health problem since can increase illness. (Spink 2019) In this subject, there is little research on how vulnerability influences the attention of labels and consumer behavior. This is crucial to initiate a reflection on how the information provided on labels is important and its interpretation can differ, considering vulnerable consumers and how important it can be to companies and legislators. This may help companies to define ways to show the nutrition information on the labels in a way that can be easily and transparently interpreted by consumers.

1.1 Problem Stating

In this thesis, I am interested in studying whether a state of perceived vulnerability (and more specifically, physical weakness) affects the way people process label information. It is important to study this because it is relevant to understand how vulnerable (or non-vulnerable) consumers react to the information provided on food labels and how companies and legislators can improve label information and segmenting towards that.

Vulnerable individuals are the ones that are disproportionately exposed to risk and the state of vulnerability can change dynamically. The term "vulnerability" has different definitions but, in general terms, it can be determined as a physical attribute that increases susceptibility to a given

hazard. (Barrere et al. 2020) This state can be induced by different factors, such as health, age, external conditions (such as the Covid-19 pandemic). Vulnerable people are then a target of actions such as fraud or scams since have limited ability to process information, increasing the probability of these attempts. (Lee and Soberon-Ferrer 1997) In this matter, vulnerable consumers might have different ways to see, believe, and understand labels and to consume food products.

In this research, I focus on physical weakness and strength, since it is difficult to study the chronically vulnerable people because it is a population that is not accessible for me, especially in these pandemic times. Nevertheless, I expect physical strength to play a similar role and to lead to similar effects, even probably being less extreme and intense.

Physical strength is to some extent observable in certain consumer segments (e.g. fitness-oriented customers are stronger, and elderly are weaker). Indeed, studying this variable might be interesting to understand how these groups see and understand label information and for companies and legislators for segmenting and communication purposes.

1.2 Aim of the study

This study aims to determine if vulnerable consumers pay different attention to the information given on food labels and if, because of that, have different interpretations of the overall healthiness of the food products. Understanding vulnerability and how it affects their attention and understanding of labels and their behavior can be a way to help companies to deal with this condition and to make them aware that the information they put on the labels influences vulnerable consumers. Vulnerability and feeling vulnerable (as in the Covid-19 pandemic, in which people might feel temporarily vulnerable), can affect information processing and therefore affect how they process and understand labels. To evaluate this, I focus on physical strength, which is the easiest way to collect information about vulnerability. Having companies' multiple consumers -

with different perspectives, preferences, and choices -, brands need to know how to behave in different circumstances, such as when their clients are more vulnerable.

2. Literature Review

2.1 Food labels

Since 2016, according to Regulation (EU) 1169/2011, it is mandatory to have food labeling on prepackaged food products, to support costumers in having a more conscient and secure purchase. (The European Parliment and the Council of the European Union 2011) Food labeling is a joint of mentions and indications referred to a food product that includes nutrition labels. Nutrition labels joint the nutritional information of the product and have an important role to inform consumers about the nutritional composition and it also supports consumers to make more informed decisions. (Associação Portuguesa dos Nutricionistas 2017)

Nutrition labels provide information on the point of purchase about the nutritional content of prepackaged foods. This is located on the nutrition panels (nutritional tables and list of ingredients), usually found on the back-of-pack of food products' labels, and it is mandatory for prepackaged food products. Sometimes, and not being mandatory, some nutrition attributes are also presented as claims (symbols referent to a specific nutritional characteristic), usually found on the front-of-pack.¹ (Kerr, McCann, and Livingstone 2015)

Factors as nutrition, price, convenience, and taste have a great role in determining food choices. (DGS and ISAMB 2019) The use of nutrition labels is affected by many factors, such as the following: individual characteristics, health concerns, need for information, nutrition knowledge, lifestyle, product involvement, economic conditions, and time constraints. (Silayoi and Speece 2004)

¹ From now on, every time I mention "back-of-pack" I am referring to nutritional panel and "front-of-pack" I am referring to claims

Nutrition labels are one key communication channel between the food industry and consumers, so this industry is under pressure since needs to guarantee that complies with several legal obligations while producing appealing food products, at the same time that needs to communicate their products as being safe, healthy and environmental. (Sørensen, Clement, and Gabrielsen 2012)

Packaging has great relevance in marketing and that is why it is a significant factor in purchase decisions. (Campbell 1995) However, as consumers' trends in nutrition are increasing, packaging is becoming more challenging, (Estiri et al. 2010), as consumers are more willing to buy healthy foods and are more interested in the information on the nutrition labels on the package. At the same time that complies with the mandatory information on nutrition labels, it is normal that companies establish tactics to get consumers' attention on their packaging, with positive, easy, and quick information in nutritional claims on the front-of-pack, to make customers perceive their products as healthy. (Sanco 2001) Nutrition claims (front-of-pack) are easier to understand than nutrition panels (back-of-pack), which have more information. (DGS and ISAMB 2019)

Food products that have claims are recognized as having health and nutritional advantages comparing to products to which claims are not added to the label. (Council of the European Union 2005) Claims are strong tools to communicate with consumers, as contain little information about food characteristics and health benefits. Sometimes, claims have marketing tactics, that have low value to consumers and the potential to mislead them. (Leathwood et al. 2007) For this reason, nutrition labels can be used to induce fraud, including claims, misrepresentation of compounds of the product, functionality, or the undeclared existence of contaminants. (Barrere et al. 2020) Food fraud is a premeditated action of misrepresentation of food and it is expected to maintain unnoticed

by the consumer. Misleading consumers about nutritional composition can represent a public health risk, causing negative effects on consumers. (Spink 2019)

Companies have a great impact on producing healthy products as well as reliable and truthful information about them. This may be a way for companies to show their Corporate Social Responsibility, which besides contributing to consumer interests also guarantees other benefits, such as financial, human resources, and reputation. (Albert and Merunka 2013)

2.2 Vulnerability

The concept of vulnerability has a large range of interpretations; however, some authors define it as being the degree to which a system can react to a hazardous effect (Devine and Lawlis 2019); others consider it as a state of susceptibility to powerlessness, damage, and instability of physical, social and economical systems. (Proag 2014) Vulnerability is also a physical attribute that increases susceptibility to a given hazard. (Barrere et al. 2020) It is a dynamic state that can affect many people since it can change over time and situations. (Devine and Lawlis 2019). This concept is multi-dimensional since it can be related to human, physical, social, economic, environmental, and institutional factors. (Brown, Ecclestone, and Emmel 2017)

In this thesis, physical weakness is the focus as it is a specific instance of vulnerability: the stronger an individual is, the more dominant he is and less vulnerable. Actually, it seems that individuals who have higher strength perceive themselves as stronger, having more control and a greater function in dominant roles. (Lukaszewski et al. 2016) This is interesting since it can have a great impact on the control of the information seen on labels, since having more control, stronger individuals might also want to have more control over their choices of food products, having more interest in the information provided on the back-of-pack. On the contrary, vulnerable people have less control and have a lack of power, differently from stronger individuals. (Proag 2014) This can

also have an impact on the control of the information seen on labels, since may not control information, being more aware of easy and quick information, provided on the front-of-pack.

2.3 Vulnerability and information processing

Vulnerable individuals might have higher levels of alertness to dangers because the risk of injury can be greater than for stronger individuals. Environmental factors or individual characteristics that make people more vulnerable to dangers increase their sensitivity to risk and make them feel like the world is unsafe. This state of alertness might affect information processing of vulnerable individuals or individuals that feel temporarily vulnerable. (Eibach and Mock 2011)

At the same time, vulnerable individuals do not have the “self-protective” attentional capacity as stronger individuals. (Gotlib Elena Krasnoperova and Gotlib 1998) While being more aware of dangers, they also have a lower capacity to process deeper information, paying more attention to quick and instant information that is highlighted and that is related to the attribute that contributes to their “danger” (Fuchs 2013). In this sense, they are more aware of highlighted information as believing in their effectiveness. Strong messages on claims, may be sufficient for them to feel safer and make them believe in products’ benefits. (McNaughton and Corr 2004)

Vulnerable individuals have less control, having difficulties to overtake unexpected events and a disorganized life, being more susceptible to believe in the given information. (Cutright 2012) When vulnerable people are in an unusual situation, they feel the necessity to adjust their decisions, as they have a “compromised” ability to process information, are more susceptible to be deceived by the information that can take advantage of their state. (Yoon, Cole, and Lee 2009)

In contrast, individuals that have more control (which is a predictor of people with physical strength), react positively to unexpected events and have more capacity to understand information. (Cutright 2012) The behavior of consumers with more control is less influenced by images and

visual responses, and these consumers usually need more information to consider buying a product. (Silayoi and Speece 2004) Stronger individuals produce more conscient thoughts, have more ability to think, and make more informed decisions in comparison to vulnerable people. (Petty, Briñol, and Tormala 2002) When strong consumers find products that are considered healthy but, in reality, are unhealthy, they can decrease the selection of the product, feeling disappointed and manipulated. (Ni Mhurchu et al. 2018)

With the literature review made above, it is interesting to establish the following question:

Does vulnerability of consumers influence their attention to food labels and their behavior?

While consumers' behavior and motivation to purchase food products is a subject that is gaining some weight, there are few comprehensive studies regarding how states of vulnerability affect attention to food labels and consumers' behavior towards that. This study aims at forming a better comprehension of the connection between vulnerability and interpretation and retention of information from labels and to understand consumer behaviors with the information on food labels. The main objective is to analyze if vulnerable consumers pay different attention to information on the labels and if change their interpretations and behaviors towards that.

In this study, I investigate the role of perceived vulnerability in the form of perceived weakness, on people's processing of label information and subsequent perceptions of product healthiness and consumption intentions. Indeed, the literature suggests that vulnerability might affect the way in which people process this information. I unpack these predictions below.

Despite nutritional information on the back-of-pack being mandatory, it may be difficult to read it, especially for those consumers who have a lower capacity to process deeper information and more difficulties in interpreting, understanding, and using information - the weaker (or vulnerable) consumers. These consumers, that have lower motivation and capacity to process

information but are also attentive to dangers and to find ways to reestablish their health welfare, might believe more in highlighted information and to be influenced by instant and quick information, such as claims of the front-of-pack, than stronger individuals. Moreover, vulnerable individuals, as being more influenced by instant and quick information by front-of-pack information, usually shown as positive and healthy, might be more willing to perceive a product as being healthier than it actually may be. In addition, as they may have less control and more disorganized thoughts, they may also have lower control over the quantities of food ingestion, eating more quantities of food.

On the other side, stronger individuals, as having more control and higher capacity to process deeper information, have also control over the whole information of food products being interested in the complete information on the back-of-pack, not being influenced by highlighted information. Furthermore, as they might have more capacity to understand information and to control their actions, and as seeing more the back-of-pack information, have more realistic opinions about the healthiness of a product, as having more conscience, establishing conscience thoughts, also have realistic perception if a product is healthy or not. In addition, as they have more control over their action, they also may have more control over the quantity of food eaten.

With these predictions, I propose four hypotheses:

H1: Strong individuals notice the information on the back-of-pack more than weak individuals.

H2: Weak individuals notice the information on the front-of-pack more than strong individuals.

H3: Strong individuals understand better the health quality of a product as compared to weaker individuals.

H4: Weak people intend to eat more quantities of a food product than strong individuals.

3. Method

3.1 Introduction to the study

The main purpose of the study was to evaluate if vulnerability of consumers has an influence on the attention of food labels and in their behavior toward food products. To develop knowledge and predictions, I developed basic research using online resources. After rising the hypotheses, I conducted an experiment to test them. All stimuli and questions were administered through an online questionnaire with primary data and with quantitative research method and the data were analyzed statistically. The experiment occurred from October 5th to November 6th 2020.

The questionnaire began with a manipulation, participants were randomly assigned to one of two conditions, in which they wrote about one time in which they felt weak or strong, respectively. This measure was a manipulation to make participants feel weak or strong, depending on the condition attributed, and to feel the condition while answering the survey. By these means, the participants that were assigned with “weak” feeling, will be considered as “weak” participants on the analysis. After, the participants responded to a task about consumers' choices concerning a supposedly healthy product.

On the task about consumers' choices, the participants were impacted with one label of a supposedly healthy product, but that was unhealthy, with a clear excessive quantity of sugar (unhealthy element). They would only see one of three types of labels: one with information on the front-of-pack, the other with information on the front and back-of-pack, and another one with information only on the back-of-pack. (Appendix 1)

After seeing the label, the participants were asked to answer some questions about it, one of which regarding the existence of sugar information on the label, important to analyze H1 (“Strong individuals notice the information on the back-of-pack more than weak individuals.”) and

H2 (“Weak individuals notice the information on the front-of-pack more than strong individuals”). If H1 is correct, my predictions are that those participants in the strength condition will notice the existence of sugar while seeing the back-of-pack, as compared to their counterparts in the other conditions, evaluated on H2. I predict this because stronger individuals, as having more control and higher capacity to process deeper information, are also more interested in the information of products being concerned in the complete information on the back-of-pack. In contrast, I predict that participants in the weakness condition, will not notice the existence of sugar on the label, since being more aware of the information of the front-of-pack (that does not have sugar information), once they process better instant and quick information, that is shown as claims on the front-of-pack.

After, participants were asked questions regarding the overall opinion of the label saw. To evaluate H3 there was one specific question regarding participants’ perception of the product’s healthiness. If H3 (“Strong individuals understand better the health quality of a product as compared to weaker individuals”) is correct, I predict that participants in the strength condition and that saw the back-of-pack, will respond that the product is unhealthy. On the contrary, I predict that participants in the weakness condition and that saw the front-of-pack information, will respond that the product is healthy.

After, participants were asked the quantity willing to eat of the product seen. The responses to this question served to analyze H4 (“Weak people intend to eat more quantities of a food product than strong individuals”). I predict that participants in the strength condition will respond that are willing to eat a low quantity of the product, since having more control over the quantity eaten. I also predict that participants in the weakness condition and that saw front-of-pack information, will want to eat more quantities since they have less control.

To understand the self-perceived state of vulnerability and strength, participants were asked to respond on a scale about how they perceived themselves as having these feelings, serving as a comparison to the manipulation of strength and weakness condition. I predict that participants with high scores for vulnerability will have the same conclusions to the hypotheses of weak status mentioned above. I also predict that participants with high scores to strength will have the same conclusions to hypotheses of strong status mentioned above.²

3.2 Participants

The 15-minutes online survey was anonymous and for respondents over 18 years old. The questionnaire was filled by 511 respondents, however, only 207 questionnaires were complete (63,8% female, 33,3% male, 2,9% preferred not to say), aged 18 to 71 (M=33,7, SD = 12,4).

3.3 Procedure

The online questionnaire (Appendix 2) was constructed on the Qualtrics program and was distributed among a convenience sample of personal contacts older than 18. First, participants were randomly assigned to one of two conditions – strength or weakness. Namely, participants wrote about a situation in which they felt physically weak or strong, and how they felt in that situation (1 = extremely weak, 7 = extremely strong). This condition was randomly assigned. Participants were asked to spend some time thinking about the task, enhancing the attributed condition. This task was essential to complete the following questions, as this manipulation contributed to understand how a strong or weak individual reacts.

In the second section, participants were asked to imagine a situation as they were in a supermarket and were considering buying a package of cookies. While searching for this product, they find one specific “Healthy Cookies” and are considering buying it. After showing this story,

² These variables were statistically analysed, although they are not presented on the “Results” section since they had no relevant conclusions, and since they were not primary issues at this work

they find one of three labels of those “Healthy Cookies”. The labels shown were randomly assigned. Participants in the “front label only” condition, saw only the front-of-pack label, with claims regarding the product (“fiber source”, “less 33% fat”, “gluten-free”). In the “back label only” condition, participants saw only the back-of-pack information, with the accurate nutritional table and list of ingredients, with excessive quantities of sugar clearly stated. Finally, participants in the “both front and back” condition saw both the front-of-pack and the back-of-pack. Then they were asked 6 questions regarding the labels they saw, to evaluate which information they could gather and interpret on the label. The answers were on a scale of “True”, “False” and “Neither true nor false”. One question was regarding the existence of sugar (“These cookies have high amount of sugar”) in the label they saw. This question verifies the retention of the sugar information provided on the labels, by the participants. Next, they were asked to respond to questions regarding what they thought about the product’s tastiness, healthiness, willingness to eat, to buy, and willing quantity to eat the product, in 7 points of the Likert scale (e.g. “How healthy do you think this product is?” 1 = Unhealthy; 7= Very healthy; “If you bought these cookies and were hungry, how many cookies would you eat at once?” 1= None; 7= All of them). Next, in this section, participants were asked to respond to some questions regarding the use of the label. Within the 7 points of the Likert scale (1= strongly disagree; 7= strongly agree), were asked to say if they paid attention to the label, if they understood it, if the information provided was enough, and if the participant purchases according to the nutritional label. Next, they were asked to identify, on a 5-Likert scale the preference of one product according to a specific characteristic (tastiness, easiness to prepare, price) (1= definitely prefer a “tasty” product, 5= definitely prefer a healthy product).

In the third section, participants answered in a Likert-scale (1= Never; 7= Always) to the 10-item International Positive and Negative Affect Schedule (PANAS) Short Form (I-PANAS-SF) by Thompson (2007) and other feelings, as strength and vulnerability, about how they felt

(“Regarding the last months of Covid-19 pandemic, to what extent did you feel: Vulnerable”) and how much their food habits changed with the pandemic.

In the fourth section, participants were asked to evaluate some personality and other traits, according to the Ten-Item Personality Inventory (TIPI), from Gosling (2003), on a 1-7 Likert scale (1= Totally disagree; 7= Totally agree). However, this section was only to distract participants, and would not contribute to the results. At the end of the survey, respondents were asked about gender and age.

The questionnaire was written in English, to ensure it had a large and heterogeneous sample, and to make it suitable to international and national people.

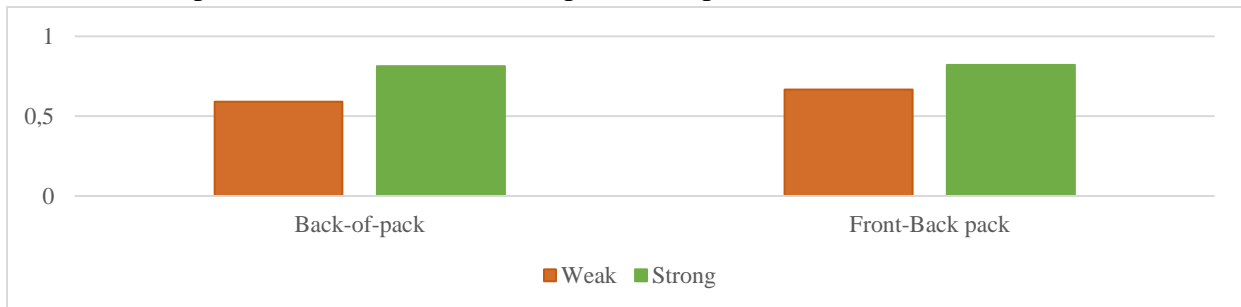
4. Results

The analysis was conducted in SPSS Statistics 27.

Hypothesis 1 and 2 – Nutrition information retention (sugar information)

To evaluate H1 and H2 I examined participants’ responses to the existence of sugar on the labels saw. The correct and incorrect answers to this question served as a statistic evaluation to analyze the hypotheses. These hypotheses were evaluated in a logistical regression with support of the Model 1 from the Process of Hayes (2012), having label as the independent variable, condition of strength (or weakness) as moderator, and sugar as the dependent variable. To analyze H1, if stronger people see sugar information back-of-pack, was included the back-of-pack dummy, and the baseline level was the front-of-pack condition. The results showed that the difference between the back-of-pack and front level condition was not significantly different depending on participants’ strength; the interaction was not significant ($B = - 0,2705$, $z (131) = - 0,3282$, $p = 0,7428$). On the other hand, this analysis showed a significance on strength ($B= 1,1034$, $z (131) = 1,97783$, $p = 0,04979$), suggesting that the stronger people are, the more they notice the sugar

information on the back-of-pack label, regardless of whether this information was presented in isolation or in conjunction with the front label (front-back pack). In sum, stronger people have more probability to recall this information correctly than weaker people, regardless of the label (81,25% front-of-pack and 82,14% front-back pack) (Graph 1).



Graph 1: Probability of sugar visualization by weak and strong on the back-of-pack label and front-back-pack label

To evaluate H2, using the front-of-pack and to evaluate if there is any relationship between weakness and sugar information, the analysis was conducted including the front-of-pack dummy, and the baseline level was the back-of-pack condition. The results showed that there was no significance between the interaction of the variables ($B = 1,0888$; $z(132) = 0,9693$, $p = 0,3324$), however, were observed a significance on the front and front-back label ($B = -2,0477$; $z(132) = -0,2708$; $p = 0,0115$) suggesting that people see less sugar in the front-of-pack than in the back-of-pack condition, regardless of the level of vulnerability, also suggesting that people only see sugar when there is information on labels comparing with having no information on the labels. It was important to test this, to exclude the possibility that consumers see sugar when there is no sugar information.

The results reject H1, having no significance in the interaction between the variables but accepting that stronger people retain back information more. The results reject H2, since having no significance between the variables. Nevertheless, the significant variables allow saying that stronger people (vs. weaker) are more likely to see sugar information (metaphorically to other relevant nutrition information) when they find such information, while weaker individuals do not

see such information. This is interesting for policymakers to sensitize them to show nutrition information differently and prominently because weaker people, as not seeing front-of-pack information and also as not seeing the back-of-pack information, may not understand the food products composition and there might have vulnerable categories who feel weak who are not noticing important information for their health.

Hypothesis 3 – Perception of Healthiness

To evaluate H3 I examined participants' perception of product healthiness. This hypothesis was evaluated in a linear regression with support of the Model 1 from the Process of Hayes (2012), having label as the independent variable, condition of strength (or weakness) as moderator, and perception of healthiness as the dependent variable. To analyze if stronger people have a better perception of healthiness when seeing back-of-pack, I included the back-of-pack dummy, and the baseline level was the front-of-pack condition. The results showed that the difference between the back-of-pack and front level condition was not significantly different depending on participants' strength; the interaction was not significant ($B = 0,1777$, $t(131) = 0,2848$; $p = 0,7762$), suggesting that respondents, independently from the condition, do not notice if the product is healthy or unhealthy, which means that even if people notice information in the back-of-pack (as confirmed by stronger people seeing more sugar), they do not know how to interpret it. Although the interaction is not significant, it is observed a slight difference between both strength conditions - stronger people perceive the product as less healthy when they see back-of-pack. This is consistent with the previous analysis that indicates that stronger people notice sugar information more. This indicates that in the back-of-pack condition, stronger people correctly see the product as less healthy, as compared to weaker people, even though having low significance.

To evaluate these results using the front-of-pack and to evaluate the relationship between the condition of strength and perception of healthiness, the analysis was conducted including the front-of-pack dummy, and the baseline level was the back-of-pack condition. The results showed that there was no significance between the interaction of the variables; the interaction was not significant ($B = -0,6633$; $t(132) = -1,2222$; $p=0,2238$), suggesting that information on the front-of-pack, does not influence the perception of healthiness, independently from the state of vulnerability.

The analysis rejects H3. Although there is not verified significance on the results, it is stated that stronger people perceive a product as being less healthy than weaker, which is interesting as it is consistent with the predictions that stronger people have more conscience over the reality of a product, not being influenced or distracted by other information. On the other side, as not having significant results, the healthiness is not well perceived, neither for being healthy or unhealthy.

Hypothesis 4 – Intention to eat (cookies ingestion)

To evaluate H4, I examined the quantities of cookies that the respondents intended to eat. This hypothesis was evaluated in a linear regression with support of the Model 1 from the Process of Hayes (2012), having label as the independent variable, condition of strength (or weakness) as moderator, and willingness to eat as the dependent variable. To analyze if stronger people have more control eating seeing back-of-pack was included the back-of-pack dummy, and the baseline level was the front-of-pack condition. The results showed that the difference between the back-of-pack and front level condition was not significantly different depending on participants' strength; the interaction was not significant ($B = 0,1212$; $t(131) = 0,2030$; $p=0,8395$), suggesting that neither weak nor strong individuals changed their intention to eat more if seen any product with nutrition

information on the back-of-pack. To evaluate these results using the front-of-pack and to evaluate if there is any relationship between the strength condition and willingness to eat, the analysis was conducted including the front-of-pack dummy, and the baseline level was the back-of-pack condition. The results also showed that there was no significance between the interaction of the variables; the interaction was not significant ($B = 0.1771$; $t(132) = 0.2851$; $p = 0.7760$).

This analysis refutes H4, as the states of strength (or weakness) do not have any relation to the intention to eat quantities of cookies. This can also be related to other factors such as the state of hungry, preference or not per cookies, among others. This may help to conclude that vulnerability does not have a relationship with the amount of food eaten.

5. Discussion

The present study was based on four main hypotheses: (1) Strong individuals notice the information on the back-of-pack more than weak individuals; (2) Weak individuals notice the information on the front-of-pack more than strong individuals; (3) Strong individuals understand better the health quality of a product as compared to weaker individuals; (4) Weak individuals intend to eat more than strong individuals.

5.1 *Nutrition information retention*

The results suggest that stronger people retain more information, in this case, sugar, when seeing back-of-pack and that the stronger people are, the more aware they will be of nutrition information provided in the back-of-pack, independently from the information given in the front-of-pack. This suggests that the stronger the consumers are, the more aware and more interested they will be in the complete nutrition information provided on the back-of-pack. This is consistent with the literature, which states that stronger people have the ability to reflect, to understand, to have a consistent process of decision, and have more control over their actions. On the other hand,

independently from being weak or strong, consumers do not retain a lot of information while seeing front-of-pack, showed with claims. This may be interesting as vulnerable individuals, do not retain important information for their health provided on the labels, as they cannot retain it and they supposedly should. This is not consistent with the predictions as vulnerable people are more confused, do not have structured thinking, and believe more in the "easy" information provided on labels, as the claims. This is not confirmed by this analysis which may be explained mainly by one reason: the information highlighted on the claims was not relevant to the respondents since they have no illnesses nor other “dangers”, that could be relevant for them and, consequently, to retain the information provided on the claims of these labels.

By these findings, it is important that companies understand how their consumers behave and what information they retain in order to segment their target and to develop specific marketing actions directly to them. It is also important that companies adopt easier ways to facilitate consumers' interpretation of their labels, independently from their state of vulnerability. There already exist models outside Europe that have better performances in comparison with the EU's mandatory information on the back-of-pack. In Europe, it is being highly suggested (although still having great resistance) to companies adopt the Nutri-Score tool - a graphical colored representation with the nutritional profile of food products into 5 categories, represented by letters and colors. (DGS and ISAMB 2019) This supports consumers to effectively classify a product according to nutritional characteristics even by consumers that do not have nutritional knowledge. (Herberg et al., 2019) Besides, brands could also motivate consumers to read nutritional labels, wherever they are. This way, all consumers would at least intend to see nutritional information and be more informed.

5.2 *Perception of healthiness*

Even strong individuals retaining more nutrition information from the back-of-pack and knowing that the product has high quantities of an unhealthy item (in this case, sugar), it is not sufficient to distinguish stronger and weaker people and their perception of the healthiness. Although stronger people perceive the product as being slightly less healthy than weaker people, when seeing back-of-pack information, this is not sufficient to conclude that they perceive the product's healthiness. The (slight) fact stronger people perceive the product as being less healthy can be somehow, even not significantly, congruent with the predictions, that stronger people have more awareness of the surroundings, have more structured thinking, and are more capable of interpreting a product as it is. (Petty, Briñol and Tormala, 2002) On the other side, in theory, weaker people are more influenced by given information and can easily interpret a product as brands want to (such as healthy, while it is not). (Barrere et al., 2020) In this study this is not confirmed, which can be explained by several factors: respondents have low nutrition knowledge, being difficult to understand the nutrition information provided on the labels, even if they retain the information, confirmed by H1; there is not enough information on the labels, that make consumers know more or less of a product, such as brand or the color of the label; the sample used is not sufficient in size to conclude about this hypothesis.

By these findings, it is important that companies increase consumers' literacy on nutrition, investing in actions that help consumers making conscient and informed decisions. It is also important that companies use easy to interpret tools, to simplify the interpretation of a product, as mentioned before, the Nutri-Score, which classifies the overall healthiness of a food product by one letter and color. (Herberg et al., 2019) This tool aims to describe the nutritional quality of a food product and promote an easy and quick interpretation by consumers, classifying products' quality and healthiness. This tool, as having a score of the overall nutritional information, shows

the true healthiness of a product, supporting consumers making conscient decisions and encouraging companies to reformulate their products, to provide better products. By changing this, companies can modify the public perception of their brands, changing products that were perceived as nutritionally bad into good, which can be a great marketing opportunity. (DGS and ISAMB 2019) In addition, it is advisable for companies to show on their labels information that is congruent and truthful about products' composition, making them gain a competitive advantage, by the trust they provide while giving reliable information. Otherwise, consumers feel manipulated, and lose trust in a company, which can be negative to a business. (Campbell 1995) This can happen for many reasons, but one of them is due to word of mouth. Since consumers feel manipulated, they need to repose their loss of control with compensatory behaviors, doing negative critics, influencing people around them. (Consiglio, De Angelis, and Costabile 2018)

5.3 *Intention of consumption*

The analysis shows that there is no relation between the willing quantity to eat and the states of strength (or weakness), which is not congruent with the predictions, that states that vulnerable people have less control and have more disorganized lives (Cutright, 2012), which could lead to less control while eating and in the quantity eaten, ingesting a high quantity of food. Also, was predicted that stronger people, as having more control in their lives, (Cutright, 2012) would also have more control over the quantity eaten. This is not verified in this study, which can be explained by several factors: the labels showed on the survey did not have an image of the product, making respondents unsure on the quantities willing to eat due to not knowing the aspect of it; the labels were not appealing, making difficult to the respondents to feel attracted by the product; the product "healthy cookies", was not an appreciated product from all the respondents.

By these findings, companies should have a conscience that not all food products are equal nor have the same quality. Thus, companies must know that even though their goal is to get sales

with their products, the over ingestion of some products might have a negative impact on consumers' health, probably creating a public health problem as can increase chronic diseases. (Spink 2019) This can have an impact on companies' revenues since can decrease the number of consumers. On the other hand, if companies suggest a healthy quantity of their products' consumption, they would show a real concern over their consumers, increasing their loyalty to the brand. This way, consumers would assume the product as being honest and reliable and that the brand can meet their expectations. (Albert and Merunka 2013) Above all, companies have the Corporate Social Responsibility to safeguard the welfare of their consumers. Having this in mind, brands could opt to suggest a maximum amount of ingestion per product. By this, consumers would be more conscious about the ingestion of a product and would consume it wisely.

5.4 Limitations and Future Research

The present study is composed of some limitations. Firstly, the sample of the questionnaire was small. Secondly, as the questionnaire was shared exclusively online, it was not possible to select a specific target due to the difficulty of finding vulnerable people. To identify more vulnerable people, it would be needed a larger sample and balance the digital and non-digital distribution of the questionnaire (e.g. presential at the point of purchase).

Future research should focus on identifying more accurately vulnerable people and observe their behavior at the point of purchase, evaluating which information they see and what they consider as important characteristics to influence the purchase and their behavior after it. A follow up of the consumer should help to understand the behavior towards the food product chosen.

It would be interesting to study the influence of other packaging issues (material, shape, color) on the purchase choices of vulnerable (or non-vulnerable) consumers.

Finally, future research should develop the reflection on how these issues (consistent, transparent and consumer-oriented nutritional information on labels) impact the Corporate Social

Responsibility in food companies as they have a direct impact on the individual, community, and social health.

6. Conclusion

The present study is focused on studying the states of vulnerability and its influence on their attention to food labels and consumers' behavior. The main findings suggest that, although non-vulnerable (strong) people retain more nutritional information, on the other side, vulnerable, do not retain much information from the labels, do not understand products' true healthiness, and do not have a difference in the intention to ingest food. In this sense, the information that is shown on labels is not passing sufficient information for people to retain and to stay well informed. So, companies should feel responsible to help all consumers (independently of their vulnerability) to select products with complete, true, clear, and easy nutritional information, used not only in back-of-pack but in front-of-pack as well, with tools easy to help consumers on the point-of-purchase.

In conclusion, all food products should have reliable, consistent, and appealing nutritional information both on the back and front-of-pack so that consumers (in whatever and whenever the state of vulnerability) have good elements to decide on the right food consumption and correct purchase decision.

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Appendix

Appendix 1 – Labels



Figure 1: “Front label only” condition with nutrition information on front-of-pack



Figure 2: “Back label only” condition with nutrition information on back-of-pack



Figure 3: “Both front and back” condition with nutrition information on back-of-pack and on the front-of-pack

Appendix 2 - Questionnaire

Direct Research Project

Purpose of the study: I am studying the influence of contextual factors and traits on food purchases. The data will be used for the purpose of a Master’s thesis and the final results might be published in scientific articles.

Age requirement: You must have at least 18 years old to complete this survey.

Participation: Your participation is completely voluntary, there is no penalty for not participating.

Anonymity: Your answers are anonymous and will never be judged. We will analyze the data in aggregate form, we will publish summary results, and your answers will never be identified.

Risks and benefits: There are no risks nor benefits participating in this survey. You are free to quit this survey at any time, without penalty to you.

In case of you have questions or comments about this research, please reach:

Rosário Ataíde
41538@novasbe.pt

- I confirm that I am 18 years old or older and that I want to participate in this research

- I do not want to participate or I am not eligible

Section 1

Write about one time you felt physically strong and describe one situation in which you felt this way, in as much detail as possible (what happened, what you felt, etc.)

In the situation I have just described I felt:

- Extremely strong
- Moderately strong
- Slightly strong
- Neither strong nor weak
- Slightly weak
- Moderately weak
- Extremely weak

Write about one time you felt physically weak and describe one situation in which you felt this way, in as much detail as possible (what happened, what you felt, etc.)

In the situation I have just described I felt:

- Extremely strong
- Moderately strong
- Slightly strong
- Neither strong nor weak

- Slightly weak
- Moderately weak
- Extremely weak

Section 2

Imagine yourself as vividly as possible in the following situation:

Imagine you are in a supermarket and you are considering buying cookies. You find some that attract your attention.

Please take some time to view the product packaging on the following page. Try to really imagine you are at the supermarket and that as if you found these cookies among others on the shelf of the cookie aisle. Imagine yourself as you go through the decision whether or not to put this product in your basket.

a) Front-of-pack



b) Front-Back pack



Fiber Source



Less 33% Fat



Gluten Free

NUTRITION INFORMATION	Per cookie (20,5g)
Sugars	10g
Fat	5,2g
Fiber	1,8g
Gluten	0g

Ingredients: Sucrose*, Palm Oil, Maltodextrin*, Fat Cocoa Powder, Starch*, Lactose*, Glucose-Fructose Syrup*, Milk Fat.

*added sugars



c) Back-of-pack



NUTRITION INFORMATION	Per cookie (20,5g)
Sugars	10g
Fat	5,2g
Fiber	1,8g
Gluten	0g

Ingredients: Sucrose*, Palm Oil, Maltodextrin*, Fat Cocoa Powder, Starch*, Lactose*, Glucose-Fructose Syrup*, Milk Fat.

*added sugars



These cookies have 33% less fat

True

- Neither true nor false
- False

These cookies are gluten free

- True
- Neither true nor false
- False

These cookies have high amount of sugar

- True
- Neither true nor false
- False

These cookies do not have fiber

- True
- Neither true nor false
- False

These cookies are low on saturated fat

- True
- Neither true nor false
- False

These cookies have low calories

- True
- Neither true nor false
- False

How tasty do you think this product is?

Tasteless

Very Tasty

How healthy do you think this product is?

Unhealthy

Very healthy

To what extent would you like to eat this product?

Dislike

Like

Would you put these cookies in your basket?

Definitely not

Definitely yes

If you bought these cookies and were hungry, how many cookies would you eat at once?

None

All of them

Regarding the nutritional information on the packaging you saw, please answer the following questions:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I paid attention to the nutritional information on the packaging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understood the nutritional information on the packaging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The packaging provided sufficient nutritional information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would have liked to have more nutritional information to inform my purchase	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, I make my food purchases based on the nutritional information on the packaging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, when buying food products, if you have to choose between...

... a healthy but less tasty food and a tasty food that is less healthy:

- Definitely prefer a healthy product
- Probably prefer a healthy product
- Undecided
- Probably prefer a tasty product
- Definitely prefer a tasty product

... a healthy food but difficult to prepare and an easy to prepare food that is less healthy:

- Definitely prefer a healthy product
- Probably prefer a healthy product
- Undecided

- Probably prefer an easy to prepare product
- Definitely prefer an easy to prepare product

... a healthy but expensive food and a cheap food but less healthy:

- Definitely prefer a healthy product
- Probably prefer a healthy product
- Undecided
- Probably prefer a cheaper product
- Definitely prefer a cheaper product

Section 3

Regarding the last months of Covid-19 pandemic, to what extent did you feel:

(Please answer as honestly as possible)

	Never	Almost never	Rarely	Unsure	Often	Very Often	Always
Loss of control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Anxious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ashamed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guilty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vulnerable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During Covid-19, my food habits changed and now I'm healthier

- Strongly agree
- Agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Disagree
- Strongly disagree

During Covid-19, I have started choosing food products according to their nutritional information

- Strongly agree
- Agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Disagree
- Strongly disagree

During Covid-19, I felt I got more critical and judgmental about the impact of food on my health

- Strongly agree
- Agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Disagree
- Strongly disagree

Section 4

Here are a number of personality traits that may or may not apply to you. Please rate the extent to which you agree with the following statements:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Extrovert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-disciplined	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anxious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Open to new experiences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reserved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disorganized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Healthy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In control of my health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>