

FUTURE OF THE TRADITIONAL DIETS

EDUCATING CONSUMERS THROUGH FOOD LABELING SYSTEMS



INDEX

3 INTRODUCTION

7 WELCOMING REMARKS AMBASSADOR ALDO AMATI

10 POSITIVE NUTRITION AND TRADITIONAL DIETS
(LUCA PIRETTA)

16 FOOD LABELING AND NUTRITIONAL EDUCATION
(MARCO SILANO)

22 ATTITUDES OF POLISH CONSUMERS TOWARDS TRADITIONAL FOOD
(KRYSTYNA GUTKOWSKA)

26 EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND
LIKING OF FRONT-OF-PACK NUTRITION LABELS: A STUDY ON POLISH CONSUMERS
(MARCO FRANCESCO MAZZÙ, SIMONA ROMANI, ANGELO BACCELLONI,
EVA SIMONETTI. LUISS GUIDO CARLI UNIVERSITY)

INTRODUCTION

Already in the 20th century, most nutritionists focused their attention on the whole diet rather than on individual nutrients, on the basis that no food can be regarded as healthy or unhealthy if not put in the context of the general daily diet. However, in the last 20 years a reductionist tendency has emerged, which led scientists to focus on individual nutrients and their potential specific relationships with some chronic diseases. Although this approach has generated a big number of widely popular hypotheses about such relationships, most of them have not proven to be scientifically acceptable when studied in randomized clinical trials of the single nutrient in question. There is now a renewed growing appreciation among nutritionists that, since people eat foods and not nutrients, the main focus should be brought back to the patterns of the various foods consumed in the context of the whole diet, combined with other important factors such as one's lifestyle, environment, culture and so on. In other words, we have now travelled "Back to the Future", where research on dietary patterns and lifestyles proved to be more useful and relevant than uncertain theories about the relationship between individual foods and disease prevention.

The concept of Positive Nutrition shows that in order to achieve a healthy diet, rather than trying to discourage the consumption of certain nutrients, it is far more effective to focus on the beneficial dietary components, encouraging healthy lifestyle and nutritional education. Widely regarded as the healthiest model of nutrition, the Mediterranean diet is an example of a Positive Nutrition approach. Foods like cereals, fruits, vegetables, legumes, nuts, olive oil, dairy and fish remain the vital ingredients of this diet, which strikes an excellent balance between all food groups.

The same can be said about most Traditional diets, as the populations gradually adapted to a dietary pattern developed around local resources and traditions. According to scientific studies, the Mediterranean diet and also other Traditional diets are associated with positive effects on public health.

These diets are healthy even though they include many products rich in fats or carbohydrates. Despite the attempts to demonize some nutrients, increasing consumption of fat-reduced products or following diets high in proteins did not result in improved health, nor in reduced body mass among societies in Western world. The approach based on discouraging consumption of individual nutrients led to highly misleading nutritional labeling schemes. Traffic-light schemes marking alleged healthy products with green lights and unhealthy ones with red showed unintended negative consequences, in particular a widespread confusion among consumers on what it makes a healthy diet.

Several studies showed that front-of-pack labeling can be a useful tool to promote consumers' food education and responsible choices. However, the approach should be brought back to the whole diet and the beneficial effects of foods rather than preventing the consumption of some nutrients. A good labeling system should therefore be based on scientifically valid up-to-date evidence and aimed at providing clear and reliable information to consumers in order to help them follow a balanced diet. Discussing informative components of currently existing Front-of-Pack might bring clarity essential for debunking nutritional misconceptions. The demonization of some food groups does not lead either to consumers' education or to healthy outcomes. Instead, Positive Nutrition and Traditional diets not only could be presented as an example of a healthy way of eating but also as healthy lifestyles. In this case, the Mediterranean diet is one of the possibilities for achieving balanced nutrition without unnecessary restrictions which might impact also social and cultural aspects of individual's life.



INTRODUCTION

Therefore, one of the aims for this conference is to promote an approach to nutrition that moves away from blaming individual nutrients and focuses on the whole lifestyle, including physical activity. This approach regards dietary patterns as the main agents responsible for health maintenance. Finally, empowering consumers to follow healthy, balanced and varied diets with clear and transparent information on food nutritional values is one of the main tools to improve public health and to prevent obesity and others non-communicable diseases. Proper, balanced nutrition is equivalent to care for own health and a balanced diet helps to prevent many diseases. Traditional nutrition models, such as the Mediterranean diet, are necessary elements in fighting obesity and civilization diseases. Promotion of balanced nutrition properly marked products and healthy lifestyles in the long run guarantee better results than the exclusion of some food components from the diet. In this context, the Italian Embassy in Warsaw on March 4th this year held a debate with the participation of experts from Italy and Poland titled “Future of the traditional diets – educating consumers through food labeling systems.”

The event was officially opened by Aldo Amati, the Ambassador of Italy in Warsaw. The debate was attended by:

- Prof. Luca Piretta, MD

Professor Gastroenterologist and Doctor in Nutrition
SANUM, Università Campus Biomedico – Rome, Italy
SISA (Società Italiana Scienza Alimentazione)

- Prof. Marco Silano, MD

Senior Scientist and Head – Unit of Human Nutrition and Health
Department of Food Safety, Nutrition and Veterinary Public Health
Istituto Superiore di Sanità – Italian National Institute of Health

- Prof. Marco Francesco Mazzù

Professor of Practice, Marketing LUISS University, Rome Italy

- Prof. Simona Romani

Full Professor of Consumer Behaviour, LUISS University - Rome, Italy

- Prof. Krystyna Gutkowska

Director of the Institute of Human Nutrition Sciences
Food technology and nutrition
Department of Food Market and Consumer Research
Warsaw University of Life Science (SGGW)



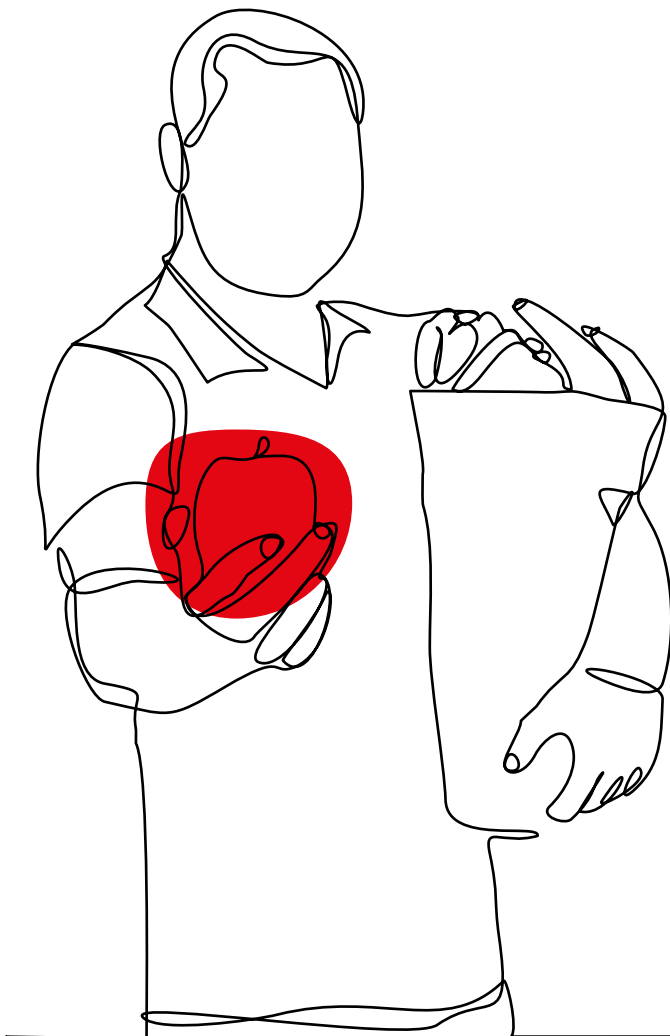
INTRODUCTION

In recent years Poland has deployed several educational programs stressing the significance of a balanced diet and healthy lifestyles in combating civilization diseases. Leading institutions concerned with preventive medicine have performed several campaigns educating Poles on how to read food product labels and apply a proper and balanced diet on this basis.

However, all those efforts can be undermined if misleading food markings are introduced. As experts stress, a healthy diet should be individually matched to each human being, with due account taken of their needs related to nutritional preferences, age, sex, health condition, taken medicines and physical activity level.

Many studies showed that clear food labeling on the front of pack can be a useful tool for the promotion of consumer education and can lead to making of responsible shopping decisions. However, education through good labeling should holistically refer to the nutrition model and consequently encourage for use of a balanced diet, rather than suggest avoiding certain nutritional ingredients.

The legal state presently in place in the European Union states envisages that any packaged food marketed in the EU and intended for consumers has to be provided with information on nutritional values, or so-called label. On the EU market there are six product marking patterns but a few European countries support introduction of the French Nutri-Score system as a uniform one and binding across the entire EU.



However, the said system arouses many controversies among experts. The system is based on a five-level scale (from letter A – most valuable products, to E – unhealthy products) evaluating food goods from the viewpoint of their quality and impact on human health. Unfortunately, although simple, the system can mislead consumers and exclude from their diet some healthy and valuable products. According to experts of the Cegielski Analysis Center, application of the algorithm underlying the **Nutri-Score system frequently leads to paradoxical results.** - **“Many highly-processed food products are often awarded with higher grades than specialties made with the use of traditional methods. As an example, diet soft drink was recognized as being healthier than olive oil.** As a consequence, this shapes up one-sided consumer habits and translates into discrimination against producers of the food goods that were assessed negatively” - **we can read in the experts’ analysis.**

INTRODUCTION

As an alternative to the French system, they propose the Italian Nutrinform system (so-called battery). Under that system, one can find on the product's label the symbol of a battery showing the percentage to which a given food product satisfies daily demand for energy, fatty acids, saturated fatty acids, sugars and salt. This helps consumers to assess on their own a given product's quality and value and make a decision whether they should include such product in their daily diet. As experts point out, the Italian system is thus conducive for shaping up of high consumer awareness and does not discriminate against any food producer.

The Mediterranean Model and Traditional diets as role model to health.

According to experts, there are no good or bad foods, there are only good or bad nutrition methods. A secret of a balanced diet is comprised by proper management of the diversity and amount of consumed food; therefore, the portions and information about nutritional value play an important role. Proper nutrition helps people to stay physically and mentally fit for longer. Under the Mediterranean model, the nutritional culture is based on education rather than prohibitions. It is largely owing to this and to the richness of nutritional ingredients comprising it that the Italian diet is associated with long life and excellent health.

Once announced as the healthiest model of nutrition, the Mediterranean diet and the Traditional Polish one are examples of a Positive Nutrition approach. The most typical components of these diets, such as cereals, as the main characteristic food and ingredient (corn, rice, wheat and oats), as well as fruits, vegetables with potatoes, legumes, nuts, olive oil and other vegetable oils, dairy or fish remain the vital ingredients of any balanced diet. According to some studies, the Mediterranean diet and also Traditional diets may be associated with decreased risk of Cardiovascular Diseases or Type II Diabetes.

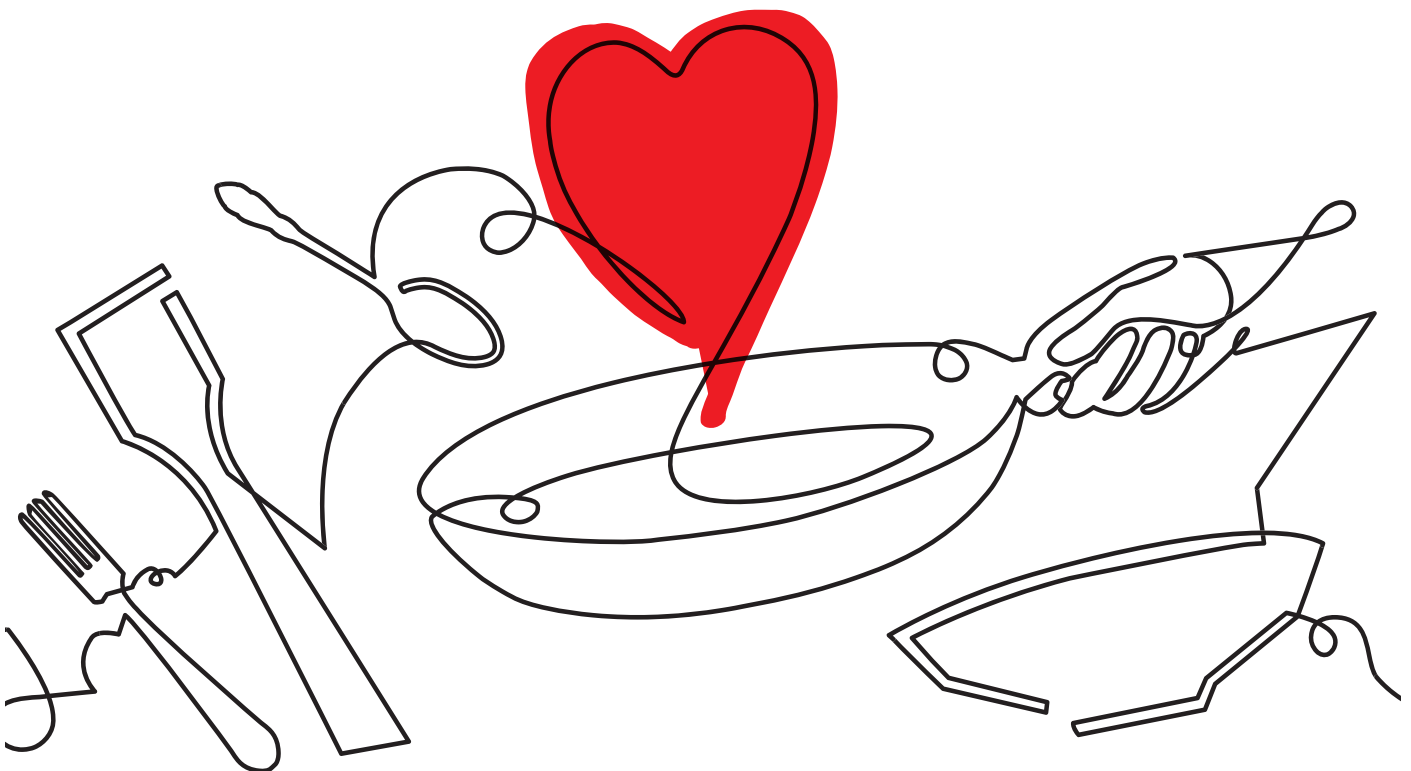


WELCOMING REMARKS BY AMBASSADOR ALDO AMATI

Globalization has brought about a large increase in the food supply, but at the same time it has caused a standardization of eating habits in the world. This puts at risk traditional diets, with their excellent typical products based on local agricultural raw materials, which over the centuries have guaranteed health and well-being to the populations, becoming an important component of the social fabric and cultural identity of many countries. Traditional diets have also been put in jeopardy by the typical unhealthy habits of advanced societies, where meals are increasingly faster and less complete, while automation, either at work or in the private life, has led to a serious reduction of physical activity. These unhealthy habits have contributed to the increase of many of diseases, such as obesity, diabetes and cardiovascular disorders. It therefore appears necessary bringing consumers back to responsible consumption, through public information and education campaigns on healthy diets and lifestyles. An important role in informing consumers is nutritional labels in food products.

Italy is a country with very strong food traditions and in line with this millenary culture it has a positive approach to nutrition. It is not in our DNA to discourage consumers or direct their preferences through traffic-light labels, such as Nutriscore. For this reason, in Italy, public and scientific institutions have developed a front-of-pack labelling system, the Nutrinform, where the quantity of nutrients contained in a portion of the product is related to the general daily diet, so that consumers can follow a healthy and balanced diet every day.

Preserve traditional diets, empower the consumer, promote healthy lifestyles. These are the foundations of “Positive Nutrition”, whose purpose is to improve not only the nutrition of citizens but also their quality of life, because a healthy diet can and must coincide with the pleasure and conviviality of meals.



KEYNOTE ADDRESSES



LUCA PIRETTA

POSITIVE NUTRITION AND TRADITIONAL DIETS

Thank you for inviting me here today. I am very pleased and honored to participate in this meeting, unfortunately remotely rather than in person.

I am also very pleased, and very honored, to begin to discuss this topic, introducing a key concept which gave rise to the issue of the eventual need to label foods and pre-packaged products, a process which has occurred all around the world over the last 40 years, as we have seen figures for global obesity and overweight triple.

You can see that the problem does not exist to the same extent in all countries. The ambassador previously mentioned Italy's position in this ranking of obesity rates, and you can see that the figure for Italy sits at around 10% of the population, so compared to the United States, at 40% for example, there are clearly very different proportions and significant differences. We see Poland here at 16.7%.

This however only regards obesity, and if we also consider overweight, that is to say people that have an above-normal weight but who are not classified as obese, in Italy we reach a figure of around 48-49%, so the portion of the population affected is very large.

Why is obesity so worrying? Obesity, measured as increased body mass index, is the primary risk factor for all of the diseases and fatal conditions in Western countries, and therefore not only in Europe but also in American countries, the main global cause of disease and fatality is closely linked to obesity.

Obesity can be very simply defined as an imbalance between the calories entering the body and those which we utilize. In these terms it seems very simple, we eat too much, and we move too little, and this leads to storage of calories that we take in, and these stored calories are deposited in the form of fat.

It seems very simple when explained in this way, but in reality this implies very strongly rooted cultural and social habits in Western countries, characterized by foods with an excessive calorific content and a social life that lacks movement.

The Covid-19 pandemic has accentuated this problem of inactivity, just as we are meeting remotely today, and therefore daily activity has been reduced to the minimum energy expenditure.

But the situation is not so simple, this is not the only factor, and genetics also play a role. It is not enough to act by controlling calories and reducing weight.

This is a classic example: let us consider Winston Churchill, who was obese, smoked heavily, was very inactive, and had a very poor lifestyle, and let us compare him with James Fixx, I'm not sure if everybody knows of him, but in the '80s he was the first real promoter of physical exercise as a tool for health and he wrote many books on jogging.

Well, Winston Churchill lived to 90 years old and James Fixx died at 52 of a heart attack. The point I want to make is that it is not only positive behaviour and physical activity that determine a person's state of health, but genetic factors are also very important.

And there is another factor to consider in this interpretation of healthy living, a factor that has gained prominence in recent years, which is the presence of intestinal microbiota. The bacteria that live in our intestine have been identified and demonstrated as being responsible for all aspects of our state of health, including obesity.

Our microbiota, like the rest of our organism, is directly linked to what we eat. So, when we talk about nutrition, as you can see, it is not enough to say "eat this food that is good for you and don't eat that one because it is bad for you", rather, there is a combination of factors that need to be analysed, in which the diet plays a dominant role.

The consequences of diet, in fact, are not strictly linked only to fats, sugars and proteins as we tend to think, speaking about low-fat or low-carb diets, and saying "Eliminate fats, eliminate sugars". There needs to be a comprehensive consideration of everything that we put into our mouths when we eat, because we don't only eat for our organism but, as I have mentioned, the role of the intestinal microbiota is also important.



LUCA PIRETTA

POSITIVE NUTRITION AND TRADITIONAL DIETS

In recent years, all of this has collided with a conflict between information and disinformation, which sometimes sees articles published or articles taken into consideration that may also be scientifically validated but which are not scientifically credible.

Consider this example, which is almost funny, presenting how the rate of divorce in Maine correlates exactly with a reduction in the consumption per capita of margarine, or how the age of Miss America correlates with the number of homicides using hot objects or hot vapors.

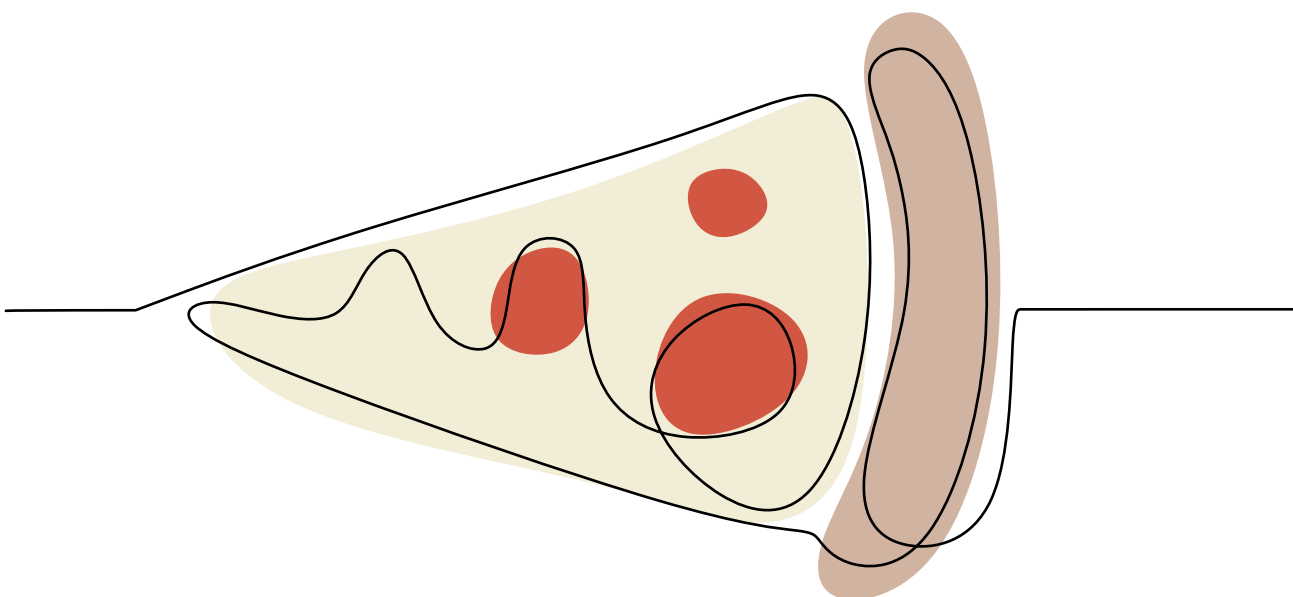
These rather comical examples serve to demonstrate how analysis of scientific data cannot be left to those with limited expertise, because it is possible to conclude anything and its exact opposite, backed up by one or two scientific studies. But if these studies have been poorly designed, poorly conducted or included in publications that do not consider the statistical validity or scientific credibility of the data, we risk these kinds of assertions. Now, the same approach has nearly always been taken to the obesity epidemic, which is that of reducing intake of sugars and carbohydrates. "If we eliminate carbohydrates, we reduce obesity".

This simplification has led to highly fashionable diets that have seen great popularity in the last 30–40 years of history of nutritional habits, from the Atkins diet to the Zone diet and from the Dukan diet to the Paleo diet: all of those diets that have penalised and demonised sugars or fats, instead promoting exaggerated consumption of protein.

Well, these habits, these diets, only consider one factor, i.e. weight loss. But we need to be careful because losing weight does not necessarily mean slimming; if we sew our mouth closed, we will be slimmer but this is not a good idea in terms of our health.

Slimming means losing fat mass. Losing weight at any cost, losing any type of tissue or organ does not promote health. There is also the risk of normal-weight obesity. This seems to be a contradiction in terms, but there are people who have reached a weight which they consider ideal, and perhaps is also ideal in terms of body mass index, but which is not optimal in terms of composition of the organism. These people are a normal weight in terms of kilograms but are obese in terms of body composition.

Let us not forget that every single macro-nutrient performs an important role in nutrition: carbohydrates have an energy function, proteins serve a plastic and functional purpose, and we cannot swap one with another or remove one to increase the others simply in order to reach an overall total in terms of the number of calories that satisfy us.



LUCA PIRETTA

POSITIVE NUTRITION AND TRADITIONAL DIETS

Carbohydrates have a fundamental role in our nutrition, above all complex carbohydrates, and we must remember that the Italian recommended levels of nutrients indicate that a healthy diet, on the basis of all available scientific data, must include 45–60% of total calories precisely from carbohydrates, 25–30% of calories from fats and, consider this, only 10–12% from proteins.

So, when we discuss sugars, carbohydrates and fats, we must not approach nutrition with this fear and this demonization, because all nutrients, in the right quantities, are essential.

Fats and sugars make an important contribution. We must not have excessive quantities of them, but to say that we must stop eating fats and demonize a single foodstuff because it contains fat or because it contains sugar, ignoring the other nutrients that it may offer, is a huge error in terms of education, and promoting this way of thinking means going against the concept of a healthy nutritional model.

So, we ask ourselves: “Which model should we follow?”

Well, let us consider a few points. We should avoid focusing on a single nutrient contained in a food, because a food is not made of polyphenols, it is not made of sugars, but it has multiple components.

A person eats a food, they eat pasta, not sugar, they eat meat, not protein.

Therefore, evaluating a single nutrient as a solution for good health is a huge error, also because it is not certain that the result of the overall diet simply corresponds to the sum of the effects of each individual nutritional element.

There is far more complex interaction between nutrients and between foods, also in terms of the psychology of the person eating them, and we cannot therefore focus on analysis of the individual nutrient.

Furthermore, the psychological aspect and the role of tradition in a diet is far broader than the scope of the individual nutrient that we consume. And just as we have seen the importance of genetics, we must not forget that the traditional diet of a country and its population is closely linked to the natural selection that took place in that country over the course of hundreds of years.

Therefore, people with a certain natural habit are selected to live better, therefore also eating local foods in a better way. This makes it difficult to extrapolate a habit and to replace it with another one, and this is why we speak about the Mediterranean diet and not the diet of an individual country.

The sum of everything eaten is what matters, and it is no coincidence that the Mediterranean diet is recognised by UNESCO as Intangible Cultural Heritage of Humanity, precisely because it is not a “diet”.

This concept was mentioned at the beginning, the moderator referred to how in Poland the word “diet” is associated with slimming, and unfortunately this is not only true in Poland but also in Italy and in all countries. When we use the term “diet” we automatically think of slimming, yet the word “diet” in the broadest sense means a lot more than this, referring also to lifestyle. The Greek word for “diet” means “lifestyle”.

This is why the food pyramid, which is the pyramid of the modern Mediterranean diet, as you can see, does not rely solely on the proportions of nutrients on the basis that some foods are eaten more than once a day, those at the base of the pyramid, including pasta, cereals, fruit, vegetables, legumes and so on, moving upwards, milk and dairy products, white meat and red meat in moderation and even an occasional intake of desserts, but also taking into account all other aspects, for example physical activity and rest.

You never hear people speak about rest, but rest has an essential role in the psychological/physical and nutritional balance of a population.

Here at the bottom, we have the concept of conviviality, as you can see, everybody sitting around the table. This highlights tradition, sharing and conviviality as crucial to nutrition.

And the way foods are cooked is also a key aspect. We cannot take a food and cook it in any way we please, because the consequences can vary greatly.



LUCA PIRETTA

POSITIVE NUTRITION AND TRADITIONAL DIETS

At the same time, you can see that the pyramid, on this side, gives us an idea of the environmental sustainability of what we eat. The food pyramid inspired by the Mediterranean diet presents the foods we should eat more of at the bottom, which are those that have a lower impact in terms of their ecological footprint and water usage; so not only reduced land use and production of CO₂ but also lower consumption of water for production.

These are not merely hypotheses, and I will present an example without getting too lost in the detail. This is a meta-analysis, which has a great advantage from a statistical perspective, pooling many different studies together to greatly broaden the initial sample.

This meta-analysis tells us that improving by just two points on a specific score for following the Mediterranean diet reduces mortality risk by 9%, and more specifically, it reduces the mortality risk associated with heart disease by 9%, with a 6% reduction in mortality from or incidence of cancers, and a 13% reduction in the risk of suffering from Alzheimer's disease or Parkinson's disease.

And there are many other studies that demonstrate how the Mediterranean diet improves metabolic syndrome, reduces the incidence of cancers of the colon, and above all improves quality of life, and this is a fundamental aspect. Unfortunately, this study shows us how over the last 50 years, the countries in the Mediterranean basin have moved away from the Mediterranean diet and have lost points.

Look at Albania, Turkey, Spain, Portugal, ex-Yugoslavia and Tunisia, for example. All of the countries, including Italy, in the Mediterranean basin. Paradoxically, English-speaking countries have realized the importance of the Mediterranean diet and have moved a little closer towards this model.

All of our efforts should be aimed at returning to the Mediterranean diet, not getting tied up considering individual nutrients and demonizing foods which contain certain components or nutrients that we consider to be responsible for obesity, to the point where we no longer consume them and thus also lose all their benefits. One example is oil, which has a lot of fats but also lots of polyphenols, so we must not turn away from it, we must understand how and how much of it to eat. And this applies to all foods. It is wrong to get tied up with individual foods, instead the key is to consider the complete picture, not just of the foods but of how they are consumed.

This brings us to another very crucial point. We need to ask ourselves not only "what should we eat?" and "how should we eat?", we have seen how cooking methods are very important, but it is essential to also ask ourselves "when should we eat?", because it has been demonstrated by many recent studies into chrono-nutrition that timing is also essential. Chrono-nutrition studies have taught us that eating in the morning is not the same as eating in the evening.

This is why traditional diets have such an important role to play, because of the farming traditions we come from, a farming society that has since changed of course. However, our body, our organism is set-up for certain rules, to follow specific time patterns, sleeping at night and eating during the day.



LUCA PIRETTA

POSITIVE NUTRITION AND TRADITIONAL DIETS

If we do the opposite, as we have unfortunately ended up doing in order to keep up with modern life, eating late in the evening, often at night, and often skipping breakfast because we leave our home in a rush, or drinking a coffee and nothing else. Well, this has led to a phenomenon called “chrono-disruption”.

Chrono-disruption is the loss of alignment of these biological clocks that are so important for our state of health. The concept of lifestyle must not only take into account what we eat but also how we eat it and when we eat it.

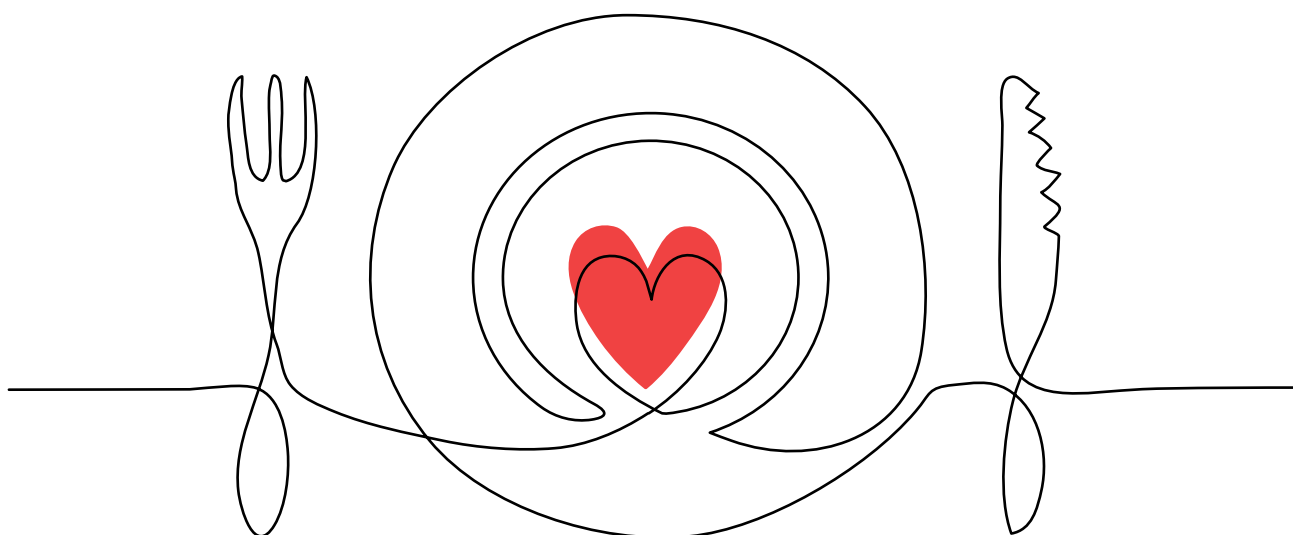
We have biological clocks in our intestine that function better and make our organism work better if we eat at certain times instead of others. Our biological clocks expect food at certain times and not at others, and we are therefore more efficient at absorbing and metabolizing individual nutrients at certain times of the day and not at others.

There are very interesting studies demonstrating how for obese people put on a diet with the same calories and the same foods, the outcome of the study changes enormously depending on whether they eat these foods in the first part of the day or the second. They lose more weight and lose it more easily if they eat during the first part of the day and leave just a few calories for the evening.

It is time for some conclusions. Let us remember that the day/night cycle, light and dark, conditions our most important biological clock, which we refer to as the “master clock”, located in the hypothalamus, and in turn the timing of meals, i.e. when we eat, synchronizes the biological clocks in our intestine.

But we mustn't forget that the master clock, which is linked to the sleeping/waking and day/night cycle, in turn regulates the intestinal biological clocks. It is therefore essential not to end up with chrono-disruption, i.e. this loss of alignment of the biological clocks, because this loss of alignment is associated with conditions including not only obesity but also affecting the heart, metabolism and gastrointestinal system.

The final message then, is that obesity has increased around the world and continues to do so. The strategies to reduce this epidemic are essentially linked to diet understood not only as nutrition but in terms of lifestyle. Unfortunately, disinformation is one of the main enemies of nutritional education, and the Mediterranean model is the only one which has a vast wealth of scientific documentation behind it that has been validated and that tells us how important it is not only for losing weight but above all to maintain good health and prevent disease. Coercive systems that impede the consumption of certain foods or promote others do not represent the correct route in terms of education in order to win this fight against the obesity epidemic. **Thank you.**



MARCO SILANO

FOOD LABELING AND NUTRITIONAL EDUCATION

Good morning Ambassador, good morning to my colleagues. First of all, I would like to thank you for inviting me to such an important event, although we are not able to be there in person, and I hope that this situation is soon resolved.

I will follow on from what my colleague and friend Luca Piretta said, because labeling is an essential element in order to follow a varied and balanced diet.

Food labeling represents the food's "identity card". It contains all of the information not only of a nutritional nature, which is what we will discuss today, but also regarding the characteristics of the food, allowing European consumers, as these are harmonized European regulations, to make informed choices.

I think this is the most important point to highlight, that it is the consumer who should be guided to make informed choices, presented with all of the available information and educated in order to understand — as the previous speaker explained very clearly — which are the lifestyles that are good for them, not diet alone but the overall lifestyle, and therefore to choose what is best for them and their health in an informed way.

The applicable European Regulation that dictates the rules at country level within the European Union regarding food labeling and the information for consumers found on food labels is Regulation 1169/2011. This establishes that it is mandatory, and therefore must be included on all food packaging, a nutritional declaration.

This is commonly referred to as the "back of package" because it is usually found in a position that is not always easily accessible, i.e. on the back of the packaging, meaning that we have to take the product from the shelf and turn it around to find this information.

And the label with the "back of package" nutritional declaration introduces seven mandatory elements that you can see listed on this slide. Fiber, in yellow, is not a mandatory element according to Regulation 1169/2011, but the fiber content is now considered so important that more than 90% of foods on the shelf include fiber content, in addition to the seven mandatory values that you can see on the slide, which I won't bore you with by listing.

The nutritional content and values must be expressed per 100 g of product, which is a fixed unit of measurement, and if the manufacturer or distributor wishes, they can also indicate values per serving, i.e. per portion or unit. Naturally, this is a parameter that we have adopted in the battery label and also harmonized, a parameter however that is extremely important for the consumer because whilst indication of the values per 100 g requires further calculation, as naturally we do not eat 100 g of all products (e.g. a portion of olive oil is 5 g, cheese is between 5 g and 20 g) and therefore it is necessary to perform calculations which the consumer, also due to time constraints, may not always be able to perform at the moment of purchase, indication of the nutritional values per portion, unit of sale or unit of consumption is extremely useful in making choices and informed purchases far more quickly.

I must note, however, that this label, in addition to being difficult to access, is also very small, even though the font is defined by law, because the regulation establishes the dimensions, colours and fonts to be used for the nutritional declaration. However, for smaller labels it is permitted for this text to be even smaller, so particularly for persons with eyesight difficulties, those who wear glasses to read, this information is not always easily accessible.

For this reason, the same Regulation 1169 establishes that on a voluntary basis, so this is not mandatory but voluntary, manufacturers or distributors may provide a simplified form of the nutritional declaration in a more accessible position, on the "front of package", containing the same information but in a format which is easier first of all to read, and also to understand for the consumer.

To make this information easier to understand and more accessible, the front-of-pack labeling might utilise colours, shapes and graphic elements so that the values become images, and Regulation 1169 also defines the colours, although we will see that has great limitations.



MARCO SILANO

FOOD LABELING AND NUTRITIONAL EDUCATION

Article 35 of Regulation 1169, which I have already cited several times, indicates all the characteristics required for this form of additional information for the consumer.

In particular, I would like to draw your attention to paragraph c, which states that these forms must facilitate the understanding by the consumer of the energy content in the context of the diet and of certain components, which must be easy to understand for the average consumer. Therefore, in order to understand them the consumer must not require further or more detailed information than those that we may expect the general population to possess, and above all information must be objective and not discriminatory.

As we will go on to see, some Member State has developed a form of “front of package labeling” at European level, and we will go on to see which have been submitted to the European Commission.

In reality, the FOP is not an information-labeling method exclusive to Europe, even though Regulation 1169 structures it and harmonizes it at European level, but as you can see practically all countries in the world have implemented their own form of “front of package labeling”, precisely because there is a need to provide information to the consumer but without losing the information that is important for informed choices.

In any case, nearly all states around the world have identified the need to simplify the methods used to present nutritional declarations on labels.

This is naturally just to give you an overview, and a few months ago, in May 2019, the WHO attempted to summarize, rather too schematically in my opinion, the characteristics that “front of package labeling” must have to promote a healthy and balanced diet.

In any case, the WHO has also attempted to identify strategies to at least provide common characteristics on the “front of package” at a global level, precisely because of this strong need to clearly and simply indicate the nutritional content of foods.

This is also very significant, because Regulation 1169, when it speaks about the FOP, does not refer to the effects that a food must have on the health, but simply to the nutritional composition, and therefore the WHO has taken a step beyond Regulation 1169, speaking about a “healthy diet”.

Therefore, while the WHO links the FOP to effects on health, Regulation 1169, i.e. the law that the Member States must follow, links the FOP simply to the nutritional content of the product.

Regarding the European Union, a few months ago, the Commission prepared and published the strategy in the field of nutrition for the coming years, which you can read in this document entitled “Farm to Fork Strategy”, in which it also approaches the problem of the FOP, affirming that the Commission’s intention is to achieve a single harmonized “front of package labeling” in Europe across all Member States by the end of 2022.

Making this statement, the Farm to Fork strategy cites a report by JRC, a research bodies of the European Commission that at the end of 2020 reviewed all of the “front of package” label models present in Europe and that the Member States submitted to the European Commission.

These are all of the FOP models submitted at the end of 2020 to the Commission by the Member States.

The first, as it was introduced in the United Kingdom back in the ‘90s, is that commonly recognized as the “traffic light system”, which indicated the content of energy and the main nutrients, e.g. simple sugars, salt and saturated fats, i.e. the quantity that a portion of the food provides relative to the required amount.

Certain thresholds have also been identified relative to the colours, and when a portion of the food exceeds the thresholds, there is coloured wording ranging from orange for the average requirement of a healthy person to red when the warning thresholds established by regulations have been exceeded.

As you can see, there are many, extremely varied, FOP models that have been submitted.



MARCO SILANO

FOOD LABELING AND NUTRITIONAL EDUCATION

They can be divided, as JRC has done, into two main groups: those with nutrient-specific labeling expressing the specific content in grams or a percentage relative to the average calorific requirement of a healthy individual that does a normal amount of physical activity, or summary labels, that instead labels provide an overall judgement on a food.

This judgement may be a graduated judgement with a series of coloured indicators or letters, such as the Nutriscore which I will return to in subsequent slides, or it may be a complex index based on food profiles, such as the Keyhole system, which uses green for products which according to the developers are particularly healthy because they meet the requirements of the local diet, in this case the Scandinavian diet, as this label was submitted by Scandinavian countries, Sweden and Denmark in particular.

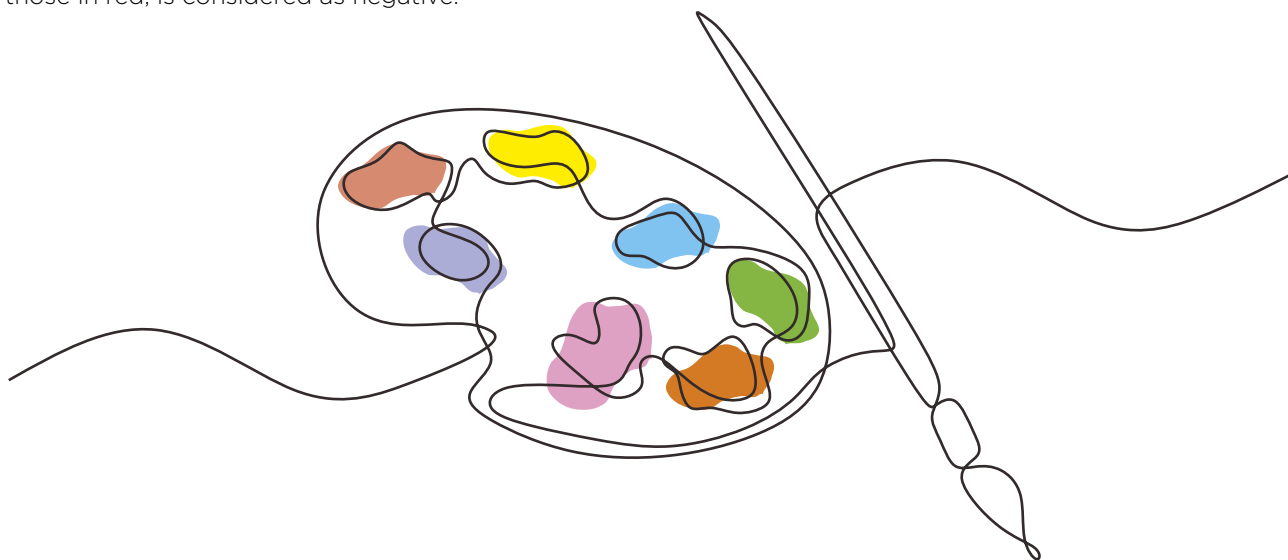
Therefore, in this case the products that are particularly well aligned with the traditional Nordic diet carry this green Keyhole which indicates a healthy product, on the basis of the concept of “healthy” and “unhealthy” food products previously illustrated.

So, there are different approaches regarding how to represent the nutritional declaration in a simplified form on the front of package labeling.

This is just to show you which have been adopted in America. In the United States, they are very neutral, simply indicating the content in grams of these nutrients that the legislation permits to be include on the FOP. Meanwhile, in Chile there is a black label that is extremely directive and also rather unscientific, if you like, which indicates “high content of calories, sodium, saturated fats or sugars” for foods that exceed levels defined by law. These levels of content are not scientifically established because, as previously stated by Luca Piretta, a food cannot be defined in terms of how good or bad it is, so these are maximum levels of consumption defined by law. At the moment, this is probably the FOP most widely used around the world, because in Europe there are already five states that have adopted it or which allow its voluntary application on products and another couple that are preparing to do so.

This is an extremely selective and extremely directive type of labeling, as it provides a judgement associated with a colour and a letter that ranges from dark green to dark red: dark green is used for healthier foods and dark red for less healthy foods.

The colour and letter are assigned to the food through a complex algorithm, which we will summarize without going into detail. This takes into account certain parameters of the composition that are considered positive, and I must say this is rather arbitrary, such as the presence of protein, while the presence of other elements, those in red, is considered as negative.



MARCO SILANO

FOOD LABELING AND NUTRITIONAL EDUCATION

A score is assigned on the basis of the content and the presence of each of these nutrients. The scores are then added and subtracted according to whether they are positive or negative, and the result is a number that is translated into a colour or letter. The consumer finds a letter or colour on the label of that food without knowing, however, exactly how that letter or colour was established.

For example, a product may have a letter E because it is very high in salt or because it has a very high sugar content. Naturally, for the consumer the choice is less informed because they recognize that a food has the same colour and therefore the same level of recommendation for health effects, regardless of whether it contains a lot of sugars, salt or saturated fats.

In my opinion this label is highly directive, but above all it does not inform the consumer, as intended by Regulation 1169. The Nutriscore also has the theoretical risk of unbalancing the diet towards all green products and away from orange or red products that must in any case form part of the food pyramid, as we have seen in the previous presentation, because the consumers are attracted by the colour green as they think that green corresponds to “good” and those products can be eaten as desired.

This is the Italian proposal, called the “battery label”, which has three key differences compared to the Nutriscore and other directive models, as you can see.

First of all, it is monochrome because here the choice is not guided but informed.

Secondly, as you can see at the top, while the Nutriscore expresses the content of nutrients included in the algorithm in 100 grams of product, the battery indicates the energy content and total fats, saturated fats, simple sugars and salt per portion, so that the consumer knows exactly how much they will eat not in relation to a hypothetical quantity of 100 grams but in a real portion, with products often pre-portioned within the package. I will return to the portion at the end of this slide, as the battery-label also indicates the portion size.

But the most important aspect of the battery label is certainly this percentage that you can see halfway. This is the percentage of energy of each of the nutrients that the portion of this food offers relative to the total daily requirement of a healthy adult without illnesses, who does not follow special diets and does a normal amount of physical activity, therefore walking around 10,000 steps or half an hour of walking every two days, as recommended by the WHO.

Therefore, when consumers read the battery label because they are about to buy the product, they know precisely that the product, in this case, provides 6% of salt relative to the daily requirement. If they were to purchase or decided they wanted to consume on that day, for example, a product that theoretically provides 70% of their salt requirement, consumers are informed that said product can be eaten without consequences for their health, but within that 24-hour period they must purchase and consume products for which the salt battery icon indicates a very low figure, let's say below 5%, and the same applies for sugars.

One of the observations made by the Commission and certain Member States when Italy submitted the battery label for the first time was that in reality there are no fixed portions and manufacturers may impose portions or units of sale that are smaller in order to achieve a more favourable battery label.

We overcame this problem, because alongside the battery there is an indication of the portion size in grams for all portions for all packaged products. Thus, the battery level and the manufacturer cannot indicate a serving or a portion on their own initiative, but on the basis of the commercial category they must consult the manual for the battery-label and indicate what the product contains as per the manual.

For example, a portion of mozzarella is 100 grams, therefore independent of the quantity contained in the package or any internal portioning, battery labels referring to mozzarella must indicate the content for these nutrients and energy relative to 100 grams, also allowing the consumer to compare two different mozzarellas.



MARCO SILANO

FOOD LABELING AND NUTRITIONAL EDUCATION

Well, mozzarella perhaps isn't the clearest example, but if we consider two brands of breakfast cereal, it is possible to see which contains less salt within a portion because, for a number of different reasons, the consumer may wish to consume less salt or less sugar or less saturated fats.

I will conclude by presenting an experiment that we conducted with colleagues at the CREA - AN in Rome, who will speak after me about awareness and the information that the battery label offers consumers compared to the Nutriscore system.

Trained researchers visited the homes of three groups of Italian consumers, each composed of 100 families, stratified for composition and the products they purchased were labelled. This slide shows which products were chosen and labelled for this study.

In the homes of one group, the products were labelled with the real Nutriscore, in the homes of another group of 100 families the same products were labelled with the real battery label, and for the third group of 100 families neither of the two FOP labels were used, instead applying a blank, white sticker as a negative control. We interviewed the members of the families at the start and end of the study, i.e. on the day the labels were applied to their products and then four weeks later, after they could reasonably have been expected to have consumed the shopping.



The interview was based on a questionnaire evaluating nutritional knowledge, entitled the "Nutrition Knowledge Questionnaire", and the score of the questionnaire ranges from 0 to 45, for 45 questions.

As you can see, what we found very interesting in this study is not only the total score achieved by the families in relation to the questionnaire, but also the fact that the families that had products labelled with the battery label increased their nutritional knowledge, that is, how to eat well, the right frequencies for consumption of different foods, which foods should be consumed in moderation, which foods should be consumed a little more often... they demonstrated an important increase.

This may not seem like a lot, but in reality it is statistically significant, and corresponds to an increase of four correct answers, which is a lot in terms of the Nutrition Knowledge Questionnaire.

Therefore, having the battery label on products in the home leads families to seek out information on the Internet, in books and from other sources.

On the other hand, those that had the Nutriscore label had a score that, it must be said, was a little higher, but remained basically unchanged and was in any case lower than the final score for families with the battery label, because the Nutriscore does not prompt people to inform themselves and study available information, because it simply says "this is green, eat more of it, this is red eat it in extreme moderation or even avoid buying it".

According to this study, the battery label certainly serves the purpose of informing consumers and, as indicated by Regulation 1169, prompting them to make informed choices.

Thank you for listening and thank you for your time.



KRYSTYNA GUTKOWSKA

ATTITUDES OF POLISH CONSUMERS TOWARDS TRADITIONAL FOOD

Ladies and Gentlemen. I would like to express my great joy in being here as the only speaker from Poland. It has been good to listen to all presentations, as they are extremely interesting, particularly the last one demonstrating the results of studies carried out among Polish consumers. It is clear that combating obesity and its health-related consequences is a paramount challenge and top priority in global aspect, also in Poland, as - unfortunately - we have not been recording here any positive trends as concerns obesity issue. Obviously, educating consumers as regards promotion of rational and responsible buying decisions is the key to coping with this problem. In this respect, any help, such as e.g. markings on food packaging, is a highly valuable effort - here I am referring to what previous speakers said - placement of various methods of informing consumers on what their choices are. From the viewpoint of nutritional value, placement of such information on packaging front is a more proper method than its placement at the back of the packaging. As various results of studies carried out among Polish consumers demonstrate, the „best before date” is the piece of information they look for. From the viewpoint of rational nutritional choices, such piece of information is definitely highly relevant as it minimizes the risk of buying food past its sell-by date, but in a broader perspective of healthiness of specified food products it is less relevant. In the introduction to my presentation, which slightly departs from previous speeches, which mainly showed the essence of various methods of informing consumers about nutritional and health-related value of products, I would like to say a few words about the trends I have observed among Polish consumers in relation to various food products.

Here I will focus on the main topic of today’s debate, namely – how consumers approach traditional products. And here we can also refer to the main thread - traditional diets. By the way, traditional Polish diet is something different than Mediterranean diet, which is treated as cultural heritage; something Italians have the right to be proud of. Popularization of rational eating habits, or health-promoting lifestyles, refers to Mediterranean diet. For Poles, traditional diet means pork chop and sauerkraut, which definitely departs from the models we want to promote to achieve robust health-enhancing effects. Nevertheless – what we should draw attention to and what is clearly visible in many results of studies on eating behaviours of Poles - is definitely a growth in the importance of the quality of food products. Consumers rate prices in relation to quality and they are willing to pay more for better product quality. Price ceases to be the main determinant in food choices. It is also worthwhile to stress the fact that nutritional value enjoys a growing importance. This gives the green light to introduction of food markings on the front part of the label, and also of the so-called functional composition on select foods. Consumers appreciate the fact that foods of various composition can be more or less proper for them from the viewpoint of diseases they suffer from (dedicated not only to selected consumers groups, but also on a more mass scale). From the viewpoint of the recorded study results, it is worthwhile to mention that although the taste of food is still the dominant determinant of choices being made, health attributes are becoming increasingly important. Here one can speak of the so-called healthy hedonism. Food has always been a source of pleasure for humans and consumers look for those hedonistic aspects in food. Therefore, it is not easy to convince those who were used to certain nutrition style but were forced to change it due to the ailments they suffer from. High quality, associated by consumers with naturalness, absence of artificial colorants, or preservatives, is important from the viewpoint of promoting traditional food. This creates a lot of opportunities to popularize ecological products, which in Poland are still in the initial stage of presence in the shopping baskets of average Poles. Nevertheless, those elements will certainly have impact upon the prospects of food market development. As I said in the beginning, the issue of food quality as an important determinant underlying consumer choices, is related to many components because quality viewed from consumers’ perspective is linked to multiple designations of such quality.



KRYSTYNA GUTKOWSKA

ATTITUDES OF POLISH CONSUMERS TOWARDS TRADITIONAL FOOD

In this slide, look at traditional and regional products. Those are usually high quality products, which consumers not only know but also most frequently buy. The blue chart shows a clear domination of traditional products as concerns the relationship with high quality products. Although consumers declare they know and buy traditional food, please take attention that the marking determining traditional origins of products is declared to be known by a very small number of consumers. Much more widely known are such markings as e.g.: „Teraz Polska” [It's Poland now], „Produkt Polski” [Polish product] or „Poznaj polską żywność” [Get to know Polish food']. This also shows the huge scope for exerting influence - through education and dissemination of information in this regard. Let us now proceed to traditional products and their presence. As regards certain association with traditional products, which are generally perceived positively, the most important associations with traditional products include: traditional production methods, naturalness, history, no additives, tried and proven recipes. All those features are preferred by Polish consumers in the aspects of the food they would like to buy and consume most often. Now as concerns familiarity with Polish traditional products, oscypek (Highlander smoked ewe's milk cheese) wins here probably because of its omnipresence regardless of the region in Poland. If we take into account familiarity with traditional products - not spontaneous recognition but when respondents are shown a list - you can see that the number of products consumers declare as known to them increases. Nevertheless, oscypek still remains an absolute leader.

In a moment I will talk about the reasons underlying such situation. Some diversification following from social and demographic variables, which may impact familiarity with the marking system, has been already mentioned. Those social and demographic variables have also a significant impact upon consumer behaviours on food market. It is increasingly pointed out that given such situation one should take into account a set of certain factors, and not individual factors. Nevertheless, in the research carried out by Polańczyk in 2018, which I quote, education background is a variable having impact upon declared knowledge of traditional products, as well as upon the declared level of consent with the statement that traditional products rightly cost more as they are made on a smaller scale, are dedicated to a certain group of consumers, are not mass products. Better educated consumers agreed more often with the opinion that traditional products have a higher nutritional value than products in the same category made on mass scale. So on the one hand we have the health-promoting aspect through a higher nutritional value, and on the other hand we have the taste, which also - as can be seen here - is declared to be better for traditional products than for mass-scale products in the same category. Consumers with higher education relatively often agree with the statement that traditional products are chosen to support local and domestic entrepreneurs. This very closely works with the consumer ethnocentrism, which - as is pointed out in many studies carried out by our team - is very clear as concerns behaviours towards food. Much lower levels of ethnocentrism are seen in relation to other products. A study carried out by a colleague from our chair also took into account the issue of a certain profile of traditional and regional products, as consumers very often identify those two categories.

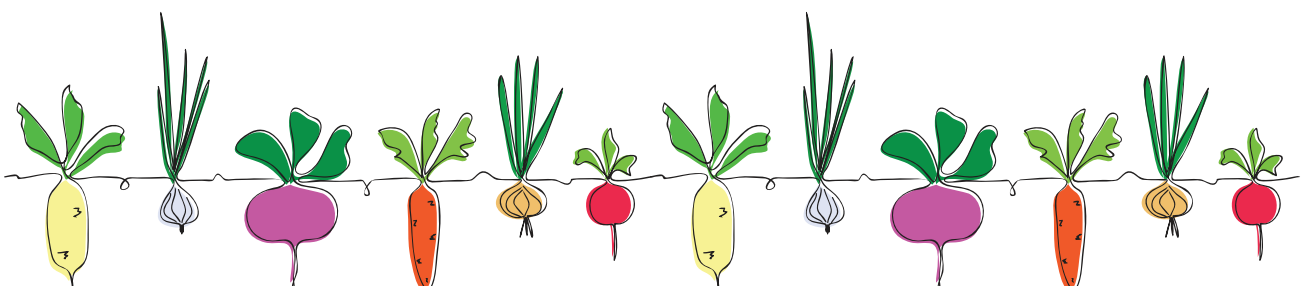


KRYSTYNA GUTKOWSKA

ATTITUDES OF THE POLISH CONSUMERS TOWARDS TRADITIONAL FOOD

First of all, it is thought that traditional products are elements of cultural heritage, elements of social identity, of a local community. Those products have extraordinary features and properties, they represent high value and - which I have already mentioned before - they are made using traditional methods and their composition has not changed for years, and this is what characterizes them. This also somehow refers to a European project I had a pleasure to participate in several years ago. The said project became a basis for formulation of a definition of traditional products, and also provided an opportunity to introduce innovation.

What innovations can be introduced into traditional products, while at the same time they can still maintain the character of traditional products? This is relevant from the viewpoint of reformulation to which those products can be subjected, for example to create a more health-promoting profile. Now, as concerns characteristic consumers who display a greater interest in traditional products than average consumers; for me it is highly significant that those are increasingly young people with higher level of education. And here I am already referring to the national studies published in Consumer Trends of 2017. Typical, main sources of information about traditional food include Internet, but also friends, family, regional food fairs, television and first of all stores specializing in the sale of this type of food. The importance of product certificate in the buying process is declared as highly relevant, as more than 85 percent of consumers display it. In recapitulation, the main motivation underlying purchases of traditional food includes: quality, tradition, willingness to support local producers, influence of friends and taste characteristics. Consumers do not buy traditional products because they do not know where to buy them; for some they are too expensive, or owing to other preferences or because they do not know those products. According to results of studies on traditional products, at least one in three consumers buy them (according to results of the research by Wilczyńska of 2017). To sum up my presentation - it is worthwhile to stress that traditional products are increasingly present on the tables of Polish consumers. This is because they are perceived as being natural and health-promoting - which is a very important choice factor. I also mentioned healthy hedonism, i.e. combination of care for health with pleasure-enhancing aspect related to food consumption. There are very clear indications that it is necessary to set up a dedicated marketing strategy aimed to increase the presence of traditional food and traditional diets in our nutrition styles. We need to create well-chosen marketing strategies using those features consumers attach attention to when choosing traditional products: quality, tradition and references to long-standing recipes and taste characteristics. Food consumers both in Poland and all over the world are under influence of such mega trends as: freshness, naturalness, health, authenticity and customisation. These are the mega trends in the first decades of the 21st century. Presently, there is a visible growth in the awareness of the link between consumed food and health. This is why food labeling from the viewpoint of health profile is very important. The phenomena that provides a counterbalance to mass products, perceived as disadvantageous both for consumers and environment from the viewpoint of leaving a huge environmental footprint, are a springboard for enhanced interest in traditional products. Traditional food is generally perceived very positively, both from the viewpoint of quality, and society's cultural identity. **Thank you for your attention.**



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

In the last decade we have witnessed a sharp increase in food-related diseases, to the point that according to some studies half of the world population could be obese as early as 2030. This phenomenon has led many governments to undertake policies aimed at combating obesity. Among the measures implemented, one that has been much discussed in the last few years is that of front-of-pack nutritional labeling, which aims at inducing consumers to follow healthier and more balanced diets.

With this study, we tested the potential effectiveness of the new labeling scheme promoted by Italy, the Nutrinform Battery, on the Polish market. In fact, Poland represents a country that has several ideal characteristics for this study: it is a large country, the fifth of the European Union by population; has a rate of food-related noncommunicable diseases similar to that of the rest of Europe and has already introduced some measures to reduce obesity levels. Among these, there is also a nutritional front-of-pack label (Healthy Choice), which, however, has not been widely used. With 23%, Poland is the eleventh country in the European Union for obesity in the adult population.

Our research compared Nutrinform, which provides specific data on the main nutrients, with Nutriscore, a system that offers a summary assessment of a product's healthiness.

The study was carried out on a representative sample of Polish consumers, who found some typical food products of the country labelled with the two systems.

The results of the experiment rewarded the Nutrinform Battery, preferred by consumers for liking, complexity and help-to-shop. The Italian system resulted to be more educational than the Nutriscore, as shown by the questionnaires filled in by the participants before and after the tests. Finally, the effects of Nutrinform Battery were less variable depending on income and age.

We believe that this study can contribute to the current debate on front-of-pack labeling in Poland, as it is the first specifically dedicated to Polish consumers.

They explained in details the following study:

Front-of-Pack (FOP) nutritional labels have the objective to increase consumers' awareness on food nutritional quality towards healthier and balanced dietary choices and limit the tendency towards overweight and obesity. Limited amount of research has been dedicated in the past to Poland, the fifth largest EU country, with a presence of non-communicable diseases connected, as in other European countries, to unhealthy dietary behaviors. In a context where among main barriers to healthier food choices appear to be perceived higher prices and a limited awareness of nutrition guidelines, a number of measures to reduce diet-related diseases have been introduced.

This study explores the impact of the new enriched informative label NutriInform Battery as potential alternative to summary label on subjective comprehension and liking across 424 respondents in Poland, while exploring the impact of age, income and education as main socio-demographic variables.

Findings confirm that NutriInform Battery can better help consumers in understanding information, obtaining the highest performance on subjective understanding, while neutralizing the effects of education and income on the dependent variables. As regards the liking, the two labels show no significant difference.

This study therefore extends the current research on subjective understanding and liking with a specific view on Poland and on the positive effects of the NutriInform Battery on subjective understanding, deep-diving the impact on different socio-demo characteristics.



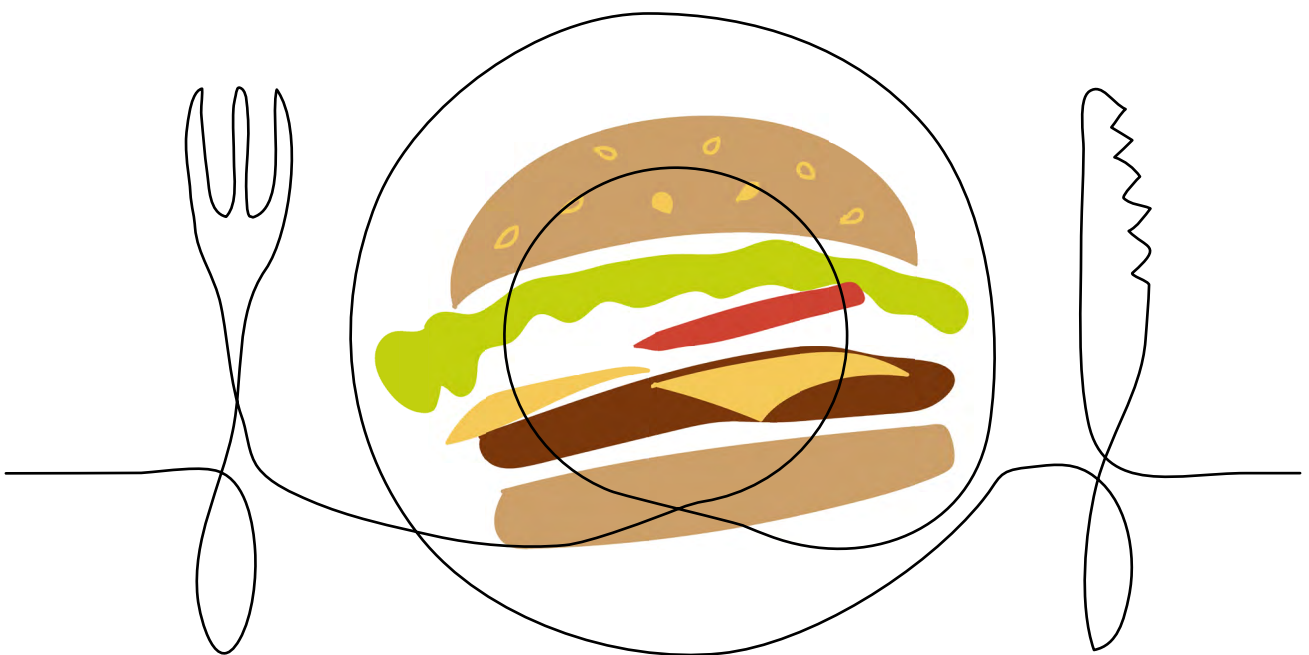
MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

Introduction

In the last decade the world has witnessed an obesity epidemic, due to excessive consumption of high-calorie foods, saturated fats, sugars and salt. Indeed, the entire world population is moving towards a worsening condition linked to diet-related diseases. As shown by several studies, by 2030 more than half of the world's population could be obese (Finkelstein et al., 2012) and, specifically, by 2025 obesity will increase in at least 44 countries (Pineda et al., 2018). According to the World Health Organization, from 1975 to 2016 the obesity of the world's population almost tripled, as a result of increased intake of high calorie foods and reduced physical activity, probably due to the increasingly sedentary nature of most forms of work (WHO, 2020). However, by taking effective measures at individual, social and governmental level, obesity can be prevented and thus reduced (WHO, 2020).

This study focuses on Poland, a high-burden country for non-communicable diseases (Alwan, A., et al. 2010), where the issue of diet-related diseases might be of interest. With a 23.1% rate of obesity among the adult population, Poland is the eleventh most obese country among the EU Member States (CIA, 2018). According to the European Commission Poland State of Health (2019), the level of childhood obesity has more than doubled since 2001. According to the International Diabetes Federation, diabetes has in Poland an incidence among adults of 8.1%, comparing to the average of the whole European Region equal to 8.9% (IDF, 2020). In the area of cardiovascular diseases (CVDs), in 2016 the percentage of deaths caused by CVDs in Poland is 45%, compared to a European average of 36% (EC, 2019). As a matter of fact, European Commission Poland State of Health (2019) states that 47% of deaths in Poland are caused by behavioural risk factors, mainly related to dietary risks, but also to smoking, alcohol and low physical activity. The above suggests that the prevention of problems connected to incorrect nutrition and/or to unconscious food consumption could be of relevance.

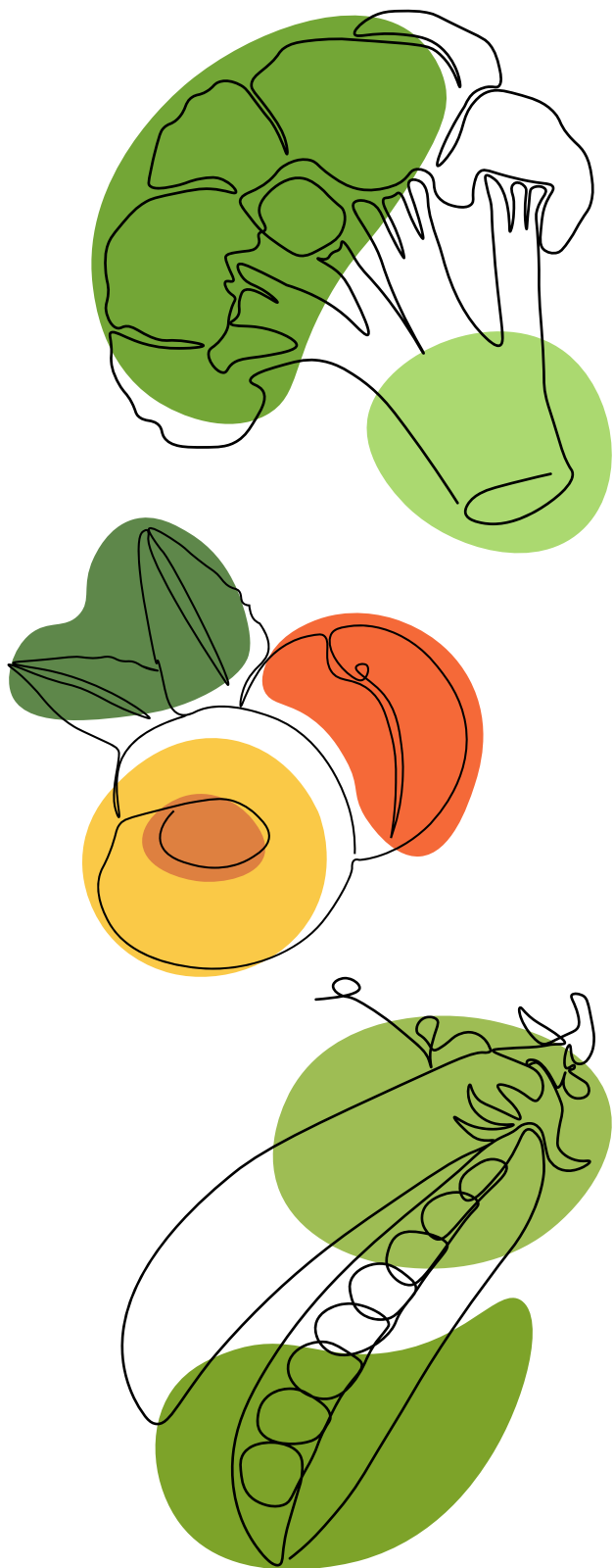


¹Calculated among people aged between 20 and 79 years' old



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS



In this sense, encouraging consumers to make healthier food choices has become a priority for governments and authorities, which have taken several initiatives, with the aim of protecting consumer health and ensuring the fairness of food trade practices. Among the solutions designed to reduce obesity and prevent other diseases caused by unbalanced nutrition, there are those concerning food labeling. In addition to the widely used, as well as mandatory in most countries, Nutrient Facts Panels labels, generally placed on the back of the pack, there is an increase in the adoption of Front-Of-Pack labels (FOP labels, FOPLs), with the double objective of providing additional information to consumers in order to guide them towards healthier food choices and encouraging companies to produce healthier foods. Consequently, FOP labels are increasingly seen as a tool to support strategies aimed at preventing obesity and other diet-related diseases (EC, 2020). According to the latest EU taxonomy, FOPLs can be distinguished between Summary Labels and Nutrient Specific Labels (European Parliaments and the Council, 2020). The labels belonging to the first category aim at guiding the consumer towards a more conscious food choice, summarizing what is indicated on the back of pack label. These in turn can be distinguished into two subcategories: the “Positive logos”, as the Keyhole, Heart/Health logos or the Healthy Choice and the “Graded Indicators”, as the widely known Nutri-Score. The second category instead concerns all those FOP labels that have the simple purpose of clearly reporting relevant information about the nutritional values of the food. These can also be divided into two subcategories: the “Numerical”, as the widely used Reference Intake, or the newly proposed NutrInform Battery, and the “Colour coded”, as the British Multiple-Traffic Light, or other traffic-light labels.

¹Calculated among people aged between 20 and 79 years' old



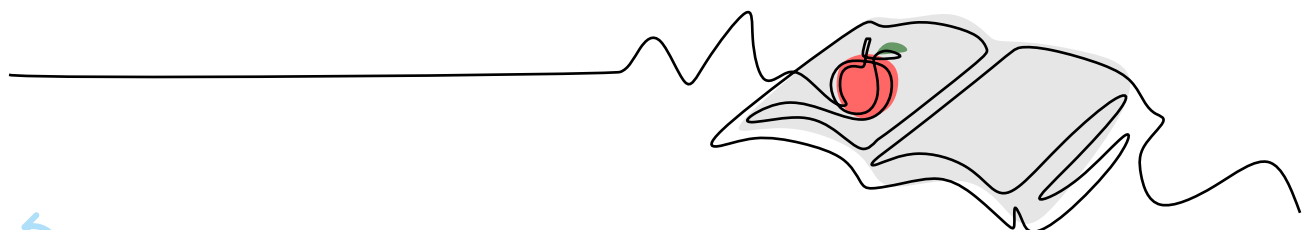
MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

Poland has already taken a number of measures to reduce diet-related diseases, such as in 2015 the ban of selling in schools unhealthy products like fast foods or products with added sugars and salt, or in 2017 the establishment of a centre dedicated to healthy eating and the promotion of physical activity (EC, 2019), the voluntary use of the Healthy Choice logo (European Parliaments and the Council, 2020), a directive, evaluative Summary Label, with “Positive Endorsement”, a front-of-pack system that identifies healthier options within food groups, where companies pay a membership fee to use the logo on eligible products. However, current level of penetration of the Health Choice Logo still appears limited.

Historically, the understanding of a GDA label by Polish consumers is lower compared to that of other European countries (Grunert, 2009). The same is also true for other types of FOPLs, probably because none of these schemes is widely used in Poland (Hodgkins, 2012). According to previous literature, one of the barriers to healthier food choices in Poland is the perceived higher price and, in second place, the insufficient consumer awareness of nutrition guidelines (Bryla, 2016; Grzybowska-Brzezinska, 2017; Jarczok-Guzy, 2018). These two elements could be the relevant factors in affecting the purchasing behaviour of consumers, although there are additional motives for them to buy healthier products, such as the ecological and the healthy aspect itself (Bryla, 2016). Actually, Polish consumers are interested in healthy food consumption as shown by the Jakubowska study (2019) on a sample of Polish students, compared to a sample of Czech students. However, the cost element remains of fundamental importance even though Poland has proved to be one of the richest countries in the European Union (CIA, 2020), and the percentage of the population living below the poverty line is comparable with the European average. Previous studies on poverty and healthy food choices show that poverty and low education often drive consumers to make less healthy choices (Zukiewicz-Sobczak et al., 2014). The inability to buy food that is acceptable from a health point of view due to a lack of money is known as food insecurity (Hofferth, 2005), a condition that can lead to the consumption of low-quality foods, which are rich in fat and calories, or to binge eating which in turn leads to an obesity condition (Hofferth, 2005). Inappropriate nutrition within the household, due to lack of proteins or low consumption of fruit and vegetables, can also lead to a deterioration in children's physical and mental condition (Zukiewicz-Sobczak et al., 2014). Low level of income means not only the purchase of unhealthy food, but also a low level of expenditure on services: families with low income display lower healthy habits, such as personal care and adequate level of exercise. Therefore, lack of healthy practices and smoking or alcoholism can lead to multiple diseases (Zukiewicz-Sobczak et al., 2014). In the richest countries of northern and western Europe, obesity rates are significantly lower than in the less affluent countries of eastern Europe or the Mediterranean countries (Zukiewicz-Sobczak et al., 2014). In Poland, a study carried out on the obesity rate of the poorest families from the city and the poorest families from the countryside highlighted that families in the countryside can produce healthier foods themselves, but they will still eat more fatty foods because they might be unsure on when the next meal will be available (Zukiewicz-Sobczak et al., 2014).

The main aim of this research is to understand if, among Polish customers, Nutrient-Specific Labels, such as the new non-directive FOPL NutriInform Battery, can contribute in a positive way to inform consumers towards healthier food choices, when compared to Summary Labels, as the Nutri-Score, with specific attention on differential effects among age, education, and income tiers.



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

Conceptual framework

To explore this situation, we leverage the framework developed by Grunert and Wills (2007), which keeps in consideration the following phases: exposure, perception, understanding, and liking of consumers exposed to FOP labels, to understand whether these elements could change consumers' decision-making process. This framework also introduces two different types of understanding, namely the subjective one and the objective one. The subjective understanding represents the meanings that consumers derive from the perceived label information and the extent to which consumers think they have understood the communication in an efficient way. The objective understanding instead represents whether the meaning the consumer has attached to the FOPL is consistent with the meaning that the sender of the FOPL wanted to communicate.

In this study, we focus on subjective understanding as an important element to provide information for appropriate nutritional trade-offs, of relevance also in cases with perceived higher product prices.

Material and Methods

The **research design** follows the ones of previous literature (Mazzù et al. 2020; 2021), analysing the effect of two FOPLs in 4 food categories on subjective understanding and liking, and resulting in a **between-subject study**, with two different conditions as stimuli: condition (1) with NutrInform Battery FOPL and condition (2) with Nutri-Score FOPL.

The **two types of front-of-pack labels** were selected at the opposite extreme of the existing categorization of FOPLs (European Parliaments and the Council, 2020), namely NutrInform Battery, for Nutrient Specific FOP, and Nutri-Score, for Summary Labels. The recently conceived NutrInform Battery label was chosen since there is little reference literature to date, and represents the intention of enabling consumers towards well-thought and balanced food choices, by making them more aware of the nutritional values of the product they are buying. As far as Nutri-Score, which communicates information about the healthiness of the product through the use of an algorithm synthesized in terms of communication by colours and letters, it was chosen since it is one of the most widely used FOP in Europe, and it is one of the most tested Summary Labels in the literature (Egnell et al., 2018; Talati et al., 2019).

We utilized **mock products** of the four food categories, in order to avoid exposure to brands and additional information that could influence consumers' perceptions (Egnell et al., 2018); in each treatment and in each product category, each single FOPL occupies the same area on the package. An additional enlarged version of FOPL was also provided to respondents in order to clearly read the information provided.

The **questionnaire** was translated from English to Polish with the support of a native speaker translator and prepared using Qualtrics tool. It was then administered to 424 Polish respondents, through Qualtrics platform. Randomly selected Polish **participants** were exposed to a randomized condition, i.e. a single product stickered with one of the two labels above mentioned.

After collecting socio-demographic information, respondents were then asked to assess their evaluation on all sub-dimensions of subjective understanding, i.e. (a) comprehensibility design, (b) help-to-shop, (c) complexity, and a specific set of measures for (d) liking. Items tested were in line with past researches (Mazzù et al., 2020; 2021), derived from extant literature, and pre-validated in terms of reliability also for this study.



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

Specifically:

- Comprehensibility items, rated through (Moser et al., 2010): “I feel well informed by the food label”, “This label is believable and trustworthy” and “This label is easy to interpret”;
- Help-to-shop items, rated through (Moser et al., 2010): “This label helps me to understand the product composition”, “This label helps me to understand different nutritional values”, “This label makes it easier to choose food”;
- Complexity items, rated through (Moser et al., 2010): “The food label is rather extensive”, “Using this food label to choose food is better than just relying on my own knowledge about what is in them”;
- Liking, measured asking participants (Allen and Janiszewski, 1989): “How do you evaluate the label?”. Respondents expressed their opinion answering to the following scales: “bad/good”, “unfavourable/favourable” and “negative/positive”.

In addition, to deepen the results of previous research (Talati et al., 2019; Mazzù et al., 2021), a set of relevant **socio-demographic variables** - e.g., income, level of education and age -, have been explored and investigated through a multiple linear regression, (a) to understand the relationship between the dependent variables and the perception of the two FOPL shown, and (b) to assess whether the presence of the new *Nutrient Specific Label* NutrInform Battery confirms previous results or generates different insights from past literature.

Previous research, in fact, highlights that lower **income levels** are positively correlated with an increasing preference for more evaluative/directive labels (Vargas-Meza et al., 2019, Ducrot et al., 2015a) and lower level of use of nutritional information (Grunert et al., 2010).

Moreover, the decoding of nutritional information is a function of the **education**, thus affecting the FOPL's comprehension, where lower education level negatively impacts FOPL understanding, especially noticeable in some nutrient-based FOPL as Reference Intake, characterized by more articulated information (Grunert et al., 2010; Grunert and Wills, 2010; Hersey et al., 2013; Méjean et al., 2013; Ducrot et al., 2015a; Ducrot et al., 2015b; Egnell et al., 2018).

Age also seems to have an impact on FOPL understanding and liking, where children have a higher preference towards Summary Labels (Talati et al., 2016), and elderly people are generally less inclined to collect new information from FOPL and to use it to improve their knowledge (Thiene et al., 2018).

Finally, we clustered our sample in tiers, to deep-dive whether either of the stratum presents a different evaluation of FOPL effectiveness in terms of understanding and liking, also grounding on some evidences of past Polish-specific's literature.

Specifically, **income** was classified as per Grunert et al. (2010), in “higher” and “lower”, assuming a dividing threshold of 20,000 Euro; **education**, in “higher” vs “lower”, assuming a dividing threshold at “Diploma” level; and age in three tiers (Talati et al., 2019), with dividing thresholds at 34 and 65 years.



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

Results

1) Descriptive statistics

Data were analysed using the IBM SPSS statistical software, with sample description presented in Table 1. An equal number of participants (n=212) was assigned to the two treatments (n=424).

Table 1 - *Descriptive statistics*

Variables	Poland	
	NutriInform Battery (n=212) (%)	Nutri-Score (n=212) (%)
Age		
18-24	10,4	9,4
25-34	18,9	18,9
35-49	17,5	24,5
50-64	17,5	15,1
65+	35,7	32,1
Gender		
Men	49,5	48,1
Women	50,5	51,9
Education		
Lower than diploma	3,8	3,3
Diploma	56,6	47,6
Bachelor's degree	11,8	14,6
Master's degree	20,7	29,7
PhD	7,1	4,8
Occupation		
Full-time job	47,6	49,1
Part-time job	8,5	4,7
Unemployed	5,7	7,1
Student	5,7	5,7
Retired	18,4	17,0
Housewife	2,4	1,9
Self-employed	9,9	13,1
Unable to work	1,8	1,4
Income		
<20,000	67,9	67,0
20,000-40,000	20,8	21,7
41,000-60,000	6,1	5,2
61,000-80,000	1,4	4,7
81,000-100,000	1,4	0,9
>100,000	2,4	0,5



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

2) Overall results

Reliability of the scales was performed through Cronbach's Alpha test, with comprehensibility ($\alpha = 0.889$), help-to-shop ($\alpha = 0.912$), complexity ($\alpha = 0.872$), and liking ($\alpha = 0.943$).

Afterwards, in a series of multiple linear regressions, we explored the direct effects of FOPL (NutriInform Battery and Nutri-Score) and socio-demographic variables (income level, education and age) on the comprehensibility, help-to-shop, complexity and liking.

The analysis revealed significant main effects of FOPL, Income, Education and Age. As regards the comprehensibility, the results of the regression indicated the four predictors explained 98.0% of the variance ($R^2 = .090$, $F(4,419) = 11.414$, $p = 0.000$). It was found that FOPL significantly predicted the individuals' comprehensibility ($\beta = -.258$, $p = 0.00$), as did Income status ($\beta = .102$, $p = 0.038$) and Age ($\beta = .154$, $p = 0.001$). Contrarily, the main effect of Education has not been found significant ($\beta = -.034$, $p = 0.479$). Object of measurement decreased by 0.258 when the sample change exposure from NutriInform Battery to Nutri-Score, increased by 0.038 in the case of higher incomes (coded as 1 vs. lower incomes coded as 0) and increased by 0.154 according to the age brackets change. It suggests a higher comprehension of nutritional-related information when the respondents are exposed to the NutriInform Battery rather than the Nutri-Score, in the case of higher incomes and age brackets.

As regards the help-to-shop, the predictors also explained a significant proportion of variance ($R^2 = .085$, $F(4,419) = 10.775$, $p = 0.000$). The FOPL significantly predicted the DV ($\beta = -.25$, $p = 0.00$), as the Income ($\beta = .127$, $p = 0.01$) and the Age ($\beta = .125$, $p = 0.008$). As for the previous model, the Education did not predict the help-to-shop ($\beta = -.066$, $p = 0.174$). The DV decreases by 0.25 when individuals are exposed to Nutri-Score, increases by 0.127 when respondents are affluent and by 0.125 according to higher ages. The results show the higher effectiveness of the NutriInform Battery in supporting individuals in the comprehension of different nutritional values, food choices and in the understanding of the product composition.

Also, results of the multiple linear regression indicated that there was a collective significant effect between the FOPL, Education and Age on the complexity, which reflects the consumers' perception of the label's extensiveness and clearness ($F(4, 419) = 10.301$, $p = 0.000$). The individual predictors were examined further and indicated that FOPL ($\beta = -.261$, $p = 0.00$), Education ($\beta = -.064$, $p = 0.019$) and Age ($\beta = .11$, $p = 0.021$) were significant predictors in the model, while the Income ($b = .08$, $p = 0.102$) was not found significant. Accordingly, being exposed to Nutri-Score implies a decrease of 0.261 in the case of complexity, while the DV increases by 0.11 when individuals refer to higher age tiers.

Furthermore, a regression was calculated to predict liking towards the label based on the aforementioned IV. A significant regression equation was found ($F(4, 419) = 2.902$, $p = 0.02$) with an $R^2 = 0.27$. Within the predictors only Age was found to be a significant predictor of the DV ($\beta = .143$, $p = 0.004$) indicating higher degrees of liking in the case of tiers 35-64 and 65+.

Table 2 - Results of multiple regression analysis

Effect	Comprehensibility				elp-to-shop				Complexity				Liking					
	Estimate	SE	95% CI LL UL	p	Estimate	SE	95% CI LL UL	p	Estimate	SE	95% CI LL UL	p	Estimate	SE	95% CI LL UL	p		
Fixed effects																		
Front-of-pack labels	-0,258	0,147	-1,104 -0,525	0-	0,25	0,159-	1,162- 0,5370		-0,261	0,165	-1,248 -0,597	0-	0,0660	,133	-0,443	0,08	0,172	
Income status0	,102	0,165	0,02 0,6670	,0380	,127	0,1780	,112 0,8110	,010	,080	,185	-0,061 0,6670	,102	0,06	0,149-	0,1170	,468	0,238	
Education status	-0,0340	,154	-0,413 0,1940	,479	-0,066	0,167-	0,5550 ,101	0,174-	0,0640	,174	-0,569 0,113	0,19	-0,0360	,139-	0,374	0,1740	,475	
Age0	,154	0,094	0,1240 ,493	0,0010	,125	0,1010	,069 0,4670	,008	0,11	0,105	0,0380	,452	0,0210	,143	0,0850	,081	0,4140	,004



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

3) Analysis of the impact of Income, Education and Age tiers on subjective understanding and liking by FOPL

A further analysis was performed to check whether among Polish individuals, results from extant literature holds, where higher income, higher education and higher age influence the capability of customers to understand the messages delivered by FOPLs, and, in addition, if this is independent of the type of FOPL utilized. We divided the analysis in two parts. First, multiple regression analysis was run to assess whether the two FOPL have a different impact according to the income, education and age brackets.

Subsequently, a regression analysis was carried out to assess the differences of each label, in terms of comprehensibility, help-to-shop, complexity and liking according to two income levels, Higher (i.e. above 20,000 euros per year) vs. Lower (i.e. below 20,000 euros per year), two education levels, Higher (i.e. qualification equal or higher than a bachelor's degree) and Lower (i.e. qualification lower than a bachelor's degree) and three age brackets (i.e. 18-34,35-64 and 65+). Regression analysis aimed at evaluating whether the effect of each dependent variable is equal across levels of the categorical independent variables which are income status, education level and age as a continuous variable.

Table 3 - Results of the regression analysis by NutrInform Battery

Effect	ComprehensibilityH				elp-to-shopC				complexityL				liking							
	Estimate	SE	95% CI9		Estimate	SE	5% CI9		Estimate	SE	5% CI9		Estimate	SE	5% CI		p			
			LL	UL			LL	UL			LL	UL			LL	UL				
Fixed effects																				
Income status0	,025	0,195	-0,316	0,4530	,726	0,067	0,209-	0,2150	,611	0,345-	0,01	0,225	-0,477	0,4120	,886	-0,002	0,201-	0,4010	,392	0,982
Education status	-0,038	0,185	-0,466	0,2630	,584	-0,068	0,198-	0,5840	,198	0,332-	0,10	,214	-0,725	0,1180	,157	-0,018	0,19	-0,422	0,3280	,804
Age0	,235	0,11	0,1640	,597	0,0010	,205	0,1180	,121	0,5860	,003	0,1430	,127	0,013	0,5130	,040	,167	0,1130	,051	0,4970	,016

Delving into the outputs, the values show a significant main effect of the **Age** on the comprehensibility (b=.235; p=0.001), help-to-shop (b=.205; p=0.003), and complexity (b=.143; p=0.04) except for liking (b=.167; p=0.016), indicating that the mean score significantly differs for the NutrInform Battery according to the age brackets to which the individual belong.

For **income and Education** (Table 3), the effects are not statistically significant for all the DVs. The results suggest that the understanding, which reflects the ability of the system to provide individuals with more clear, extensive and detailed information, and liking toward the NutrInform Battery is irrespective of the income and education level.

Table 4 - Results of the regression analysis by Nutri-Score

Effect	ComprehensibilityH				elp-to-shopC				complexity				Liking							
	Estimate	SE	95% CI9		Estimate	SE	5% CI9		Estimate	SE	5% CI9		Estimate	SE	5% CI		p			
			LL	UL			LL	UL			LL	UL			LL	UL				
Fixed effects																				
Income status0	,168	0,266	0,09	1,1410	,022	0,182	0,2890	,152	1,2910	,013	0,1580	,295	0,055	1,2160	,032	0,1190	,221	-0,075	0,7950	,105
Education status	-0,038	0,247	-0,617	0,3580	,6	-0,073	0,268-	0,80	,257	0,313-	0,0460	,273	-0,715	0,3630	,521	-0,057	0,205-	0,5660	,242	0,431
Age0	,107	0,153	-0,066	0,5380	,125	0,075	0,166-	0,1460	,509	0,2770	,094	0,169	-0,106	0,5620	,179	0,1230	,127	-0,026	0,474	0,079

The aforementioned results reflect a pattern which appears to be different for the Nutri-Score label and in line with the extant literature (Talati et al., 2019) that highlights significant mean differences according to the analyzed income status. For the comprehensibility, the Nutri-Score is significantly predicted by income status (b=.168, p=0.022), indicating a different degree of the DV according to the tier to which the individuals belong. Specifically, being a higher income's individual increases of 0.168 the DV, suggesting a higher capability of affluent respondents to comprehend the label. Similarly, these results are highlighted for help-to-shop (b=.182, p=0.013) and complexity (b=.158, p=0.032). In the case of liking towards the Nutri-Score, the effect of Income status is not significant (b=.119, p=0.105). Moreover, the outputs indicate there is not a significant effect of Education status and Age on all the DVs (Table 3).



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

Discussion

The aim of this research was to carry out a comparative study on the perceptions of two different types of FOPL, NutrInform Battery and Nutri-Score, representing polarizing systems in the taxonomy of FOPLs, in a sample of Polish individuals, adding to previous research on subjective understanding and liking, while assessing the effect of socio-demographic variables. It served also to further test the reliability of previous findings in extant cross-country analysis. Research on Poland, the fifth largest EU country, with a presence of non-communicable diseases connected, as in other European countries, to unhealthy dietary behaviors is then of interest to complete the perspective on most relevant countries, and because of the presence of specific barriers to healthier food choices (e.g., perceived higher prices, insufficient awareness of nutrition guidelines).

Regarding subjective understanding and liking, results among Polish individuals show that NutrInform Battery, a FOPL representing non-directive “Nutrient-Specific” labels, is more effective in terms of comprehensibility, help-to-shop and complexity perceived by the consumer than the Nutri-Score, one of the most widely spread types of “Summary” label.

The research conducted among Polish individuals provided evidence of the positive performance of the NutrInform Battery label with regard to subjective understanding, highlighting the real efficiency of this type of label in being perceived as informative and helpful in making people understand the composition of the product.

Further, the current research advances the previous literature confirming results obtained by Talati et al. (2019) while introducing new insights about the effectiveness of the NutrInform Battery according to different socio-demographic variables.

Specifically, NutrInform Battery performance, differently from Nutri-Score, does not show significant variation on comprehensibility, help-to-shop and complexity, depending on different income level, thus signaling a more even effect on all subjective understanding parameters and a higher degree of adaptation and universality in informing consumers about the food they are buying. Regarding liking, the two FOPLs present a similar behavior, with no different impact on the dissimilar income levels.

In terms of **education** level, the two FOPL behave similarly, with no difference in terms of subjective understanding and liking for different education level, and consistently higher means for different education level, of NutrInform Battery vs. Nutri-Score.

Age is a significant predictor of NutrInform Battery’s subjective understanding and liking: the more it increases, the better the results, with a plateauing level for elder individuals.

Therefore, this study extends previous literature concerning FOPLs by (a) widening cross-country results on the comparative effectiveness of Nutrient Specific (NutrInform Battery) vs. Summary (Nutri-Score) Labels on subjective understanding and liking, and (b) adding new insights on specific socio-demographic variables.



MARCO MAZZÙ, SIMONA ROMANI ANGELO BACCELLONI & EVA SIMONETTI

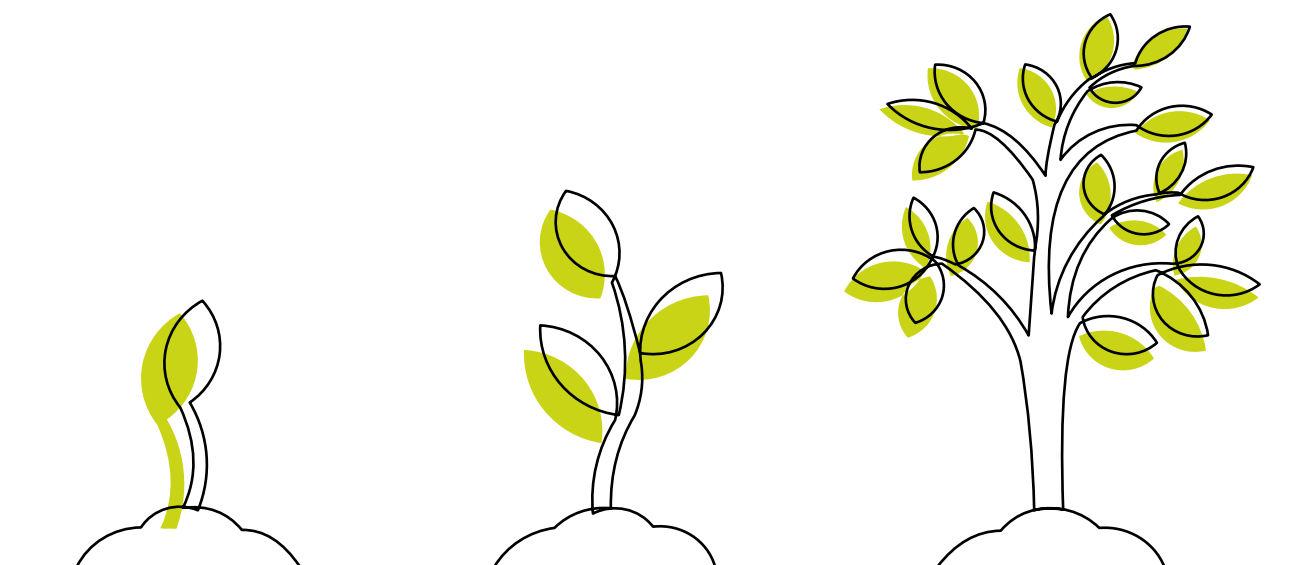
EFFECTS ON CONSUMERS' SUBJECTIVE UNDERSTANDING AND LIKING OF FRONT-PACK NUTRITIONAL LABELS: A STUDY ON POLISH CONSUMERS

In terms of potential managerial implications, the results of this research can be considered when assessing which of the different labels proposed are most suitable for a broader adoption, contributing to the current European debate. Furthermore, they can be included in the assessment of which label should be used to support consumers, especially those with lower income and education levels, in making healthier food choices. Even if this choice is currently voluntary, the European Commission has proposed to make it compulsory, in the future, after a careful evaluation of all existing labels (EC, 2020).

Nevertheless, this study also has several limitations, which may be a potential focus for future research. First of all, it only focuses on the subjective understanding and liking aspect, despite the fact that a consumer's decision-making process is characterised by multiple stages. Therefore, future research could focus on all other aspects, exploring the impact of labels, and specifically the NutriInform Battery, on nutritional knowledge, evaluation, food choices and consumption in order to analyse its effects throughout the whole process. Furthermore, future research could explore the effects of the NutriInform Battery in comparison to other FOP labels in order to explore more deeply the different impacts on consumer perceptions.

In addition, with regard to the specific case of Poland, there are other interesting aspects that arose from the review of the previous literature that could be taken into consideration for future research. Such as any difference that might emerge between those living in the countryside and those living in the city, as suggested by Zukiewicz-Sobczak et al. (2014) or taking into explicit consideration the mediating effect of FOPL on price-perception. Furthermore, it could be explored whether Polish consumers are actually interested in the environmentally friendly and healthy aspect of the food they consume and how FOPL might influence such elements.

Finally, we have focused on the impact that certain food choices have on NCDs. However, it might be of value to investigate the effect that different FOP labels may have on other types of illnesses, such as eating disorders. Therefore, future research could also explore this aspect more closely to see whether the use of FOPLs may have additional effects in this area.



REFERENCES

- Allen, CT., Janiszewski, CA. (1989). Assessing the Role of Contingency Awareness in Attitudinal Conditioning with Implications for Advertising Research. *Journal of Marketing Research*, 26, 30-43.
- Alwan, A., et al. (2010) Monitoring and surveillance of chronic non-communicable diseases: progress and capacity in high-burden countries. *Lancet*, 376: 1861-1868.
- Bryla, P. (2016). Organic Food Consumption in Poland: Motives and barriers. *Appetite*, 105, 737-746.
- Ducrot, P., et al. (2015). Objective Understanding of Front-of-Package Nutrition Labels among Nutritionally At-Risk Individuals. *Nutrients*, 7, 7106-7125.
- Egnell, M., Talati, Z., Hercberg, S., Pettigrew, S., & Julia, C. (2018). Objective Understanding of Front-of- Package Nutrition Labels: An International Comparative Experimental Study across 12 Countries. *Nutrients*, 10(10).
- European Commission, State of Health in the EU - Poland - Country Health Profile (2019)
- European Parliament and the Council. (2020b). REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL regarding the use of additional forms of expression and presentation of the nutrition declaration. *Journal of Chemical Information and Modeling* (retrieved from https://ec.europa.eu/food/sites/food/files/safety/docs/labelling-nutrition_fop-report-2020-207_en.pdf)
- Finkelstein, E. A., Khavjou, O. A., Thompson, H., Trogon, J. G., Pan, L., Sherry, B., & Dietz, W. (2012). Obesity and severe obesity forecasts through 2030. *American Journal of Preventive Medicine*, 42(6), 563- 570.
- Grunert KG, Wills JM. (2007). A review of European research on consumer response to nutrition information on food labels. *J Public Health*. 15(5):385-399.
- Grunert, KG, Fernandez-Celemin, L., Wills, JM. (2009) Use and understanding of nutrition information on food labels in six European countries. *J Public Health*, 18: 261-277.
- Grunert, K. G., Wills, J. M., Fernandez-Celemin, L. (2010). Nutrition knowledge, and use and understanding of nutrition information on food labels among consumers in the UK. *Appetite*, 55, 177-189.
- Grunert, K. G., et al. (2010) Use and understanding of nutrition information on food labels in six European countries. *J Public Health*, 18, 261-277
- Grzybowska-Brzezinska, M. et al. (2017) Organic Food Attributes Determining Consumer Choices. *European Research Studies Journal*, XX, 2A, 164-176.
- Hersey, J. C., et al. (2013) Effects of front-of-package and shelf nutrition labeling systems on consumers. *Nutrition Reviews*, 71(1), 1-14
- Hodgkins, C., Barnett, J., Wasowicz-Kirylo, G. (2012). Understanding how consumers categorise nutritional labels: A consumer derived typology for front-of-pack nutrition labelling. *Appetite*, 59, 806-817.



REFERENCES

- Hofferth, S. L., Curtin, S. (2005). Poverty, Food Programs, and Children Obesity. *Journal of Policy Analysis and Management*, Vol. 24, No. 4, 703-726.
- Jakubowska, D., Radzimska, M. (2019). Health and environmental attitudes and values in food choices: a comparative study for Poland and Czech Republic. *Oeconomia Copernicana*, 10(3), 433-452.
- Jarczok-Guzy, M. (2018). Obstacles to the development of the organic food market in Poland and the possible directions of growth. *Food Science & Nutrition*, 6, 1462-1472
- Mazzù MF, Romani S, Gambicorti A. Effects on consumers' subjective understanding of a new front-of-pack nutritional label: a study on Italian consumers. *Int J Food Sci Nutr*. 2020 Aug 4:1-10. doi: 10.1080/09637486.2020.1796932
- Méjean, C., et al. (2012) Perception of front-of-pack labels according to social characteristics, nutritional knowledge and food purchasing habits. *Public Health Nutrition*, 16(3), 392-402
- Moser A, Hoefkens C, Van Camp J, Verbeke W. 2010. Simplified nutrient labelling: consumers' perceptions in Germany and Belgium. *J Verbr Lebensm*. 5(2):169-180.
- NutrInform Battery: Firmato il decreto che introduce il logo del modello di etichettatura volontaria italiana. Bellanova: "Poniamo al centro il consumatore e i principi della dieta mediterranea", accessed December 15th, 2020, <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/16147>
- "Obesity and overweight", accessed November 29th, 2020, <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
- "Obesity - adult prevalence rate", accessed November 28th, 2020, <https://www.cia.gov/library/publications/resources/the-world-factbook/fields/367.html>
- Pineda, E., Sanchez-Romero, L. M., Brown, M., Jaccard, A., Jewell, J., Galea, G., Webber, L., Breda, J. (2018). Forecasting Future Trends in Obesity across Europe: The Value of Improving Surveillance. *Obesity Facts*, 11(5), 360-371.
- "Poland", accessed December 3rd, 2020, <https://www.cia.gov/library/publications/the-world-factbook/geos/pl.html>
- Talati, Z., et al. (2016) Consumers' responses to front-of-pack labels that vary by interpretative content. *Appetite*, 101, 205-213.
- Talati, Z., Egnell, M., Hercberg, S., Julia, C., & Pettigrew, S. (2019). Consumers' Perceptions of Five Front-of-Package Nutrition Labels: An Experimental Study Across 12 Countries. *Nutrients*, 11(8).
- Vargas-Meza, J., et al. (2019). Front-of-pack nutritional labels: Understanding by low- and middle-income Mexican consumers. *Plos One*, 14(11)



REFERENCES

- Zukiewicz-Sobczak W., et al. (2014). Obesity and poverty paradox in developed countries. *Annals of Agricultural and Environmental Medicine*, 21 (3), 590-594
- <https://www.idf.org/our-network/regions-members/europe/members/152-poland.html>, accessed December 2nd, 2020
- <https://ec.europa.eu/eurostat/documents/2995521/11081093/3-10072020-AP-EN.pdf/d2f799bf-4412-05cc-a357-7b49b93615f1>, accessed January 2nd, 2021
- <https://epha.org/living-environments-mapping-food-environments-fop/>, accessed January 2nd , 2021



