

OBESITY: A NEW PARADIGM OF SUSTAINABLE CONSUMPTION?

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Abstract

The obesity pandemic is a problem of modern society. The aim of the study is to establish an operational conceptualization of human biological needs in terms of obesity and to examine the correlations between obesity and education. Using data provided by WHO between 1975-2016, we measured the evolution of overweight and obesity across 32 countries from Europe. Unsustainable consumption generates for many individuals an unhealthy lifestyle in itself, which requires a paradigm shift in terms of lifestyle. We propose the orientation towards "the pleasure of living", through sustainable consumption and substantiate over this trend.

Keywords: *obesity, consumption, Romania, lifestyle, education*

JEL classification: *I12, E21, O52*

1. Introduction

Humans, like most other creatures, have a deep self-preservation instinct. This idea can also be seen at a macro level, as i.e. Georgescu-Roegen (1979) consider that the purpose of economic activity is the self-preservation of the human species. Over time, our evolution has undergone many biological and cultural changes. The forms of organization and the environment in which people live have evolved. Initially, people were hunters and gatherers and lived in small groups, surrounded by virgin nature. Today, people live in

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skyscrapers built in metropolises with millions of inhabitants. The change in the environment in which they live has also generated changes in human behavior in different aspects and different forms. Threats from the natural environment, such as wild animals, lack of food, severe climate, have produced an adaptive evolution for survival. Hunter-gatherers were looking for food necessary for survival, sometimes over considerable distances. Their bodies were adapted to perform these activities. Today, in civilized countries, there are food stores everywhere. The effort to procure food is no longer a physical one (which depends on the physical capacities, the tools, or the strategies adopted), but on the disposable income. The man of the 21st century who lives in civilized societies is not in the same context of survival as homo sapiens of thousands of years ago. For survival, respectively for food procurement, homo sapiens went hunting, fishing, or picking fruit. The surrounding nature gave him the resources. Today, man is surrounded by private or state property, and for this reason the food resources available on the lands are no longer accessible as in the past. In general, the options that allow him to procure food are related to the income obtained and participation in economic life through work or entrepreneurship and under specific social norms and morality. To rob or another type of misbehavior invariably leads to violating social and legal standards specific to civilized states. Threats from the natural environment (wild animals, rain, cold) have become manageable by humans in the civilized world.

People should aim to maintain health as a condition for survival. However, it can be seen that some human behaviors lead to improved health and others to its destruction. Health is vital for human activity and implicitly for economic activity. In contrast, economic behavior is the actual manifestation of the individual that ensures his survival in the context of a global economy. The aim of the present study is an operational conceptualization of the human biological needs viewed through the lens of obesity, to examine the evolution of obesity in 32 states in Europe, as well as the possible relationship between the education level of the population and obesity in Romania and other European countries.

2. Biological needs, survival and conservation of the human species

Human beings need energy for basal metabolism, for the metabolic response to food, for physical activity (mandatory and discretionary), the

growth process, and periods of pregnancy and lactation in women. Primarily through their social nature and living in society, people carry out activities that involve energy consumption. The energy balance must be viewed through a dynamic perspective that follows mainly two factors: constant adaptation and time. The time factor counts because the energy consumption depends on the duration of the activities carried out and the intensity of the effort necessary for their development. It can be appreciated that the critical time is the time limit until which the dynamic balance ensures survival. Dynamic energy balance is the state of relative energy imbalance, as it is kept in a critical interval and in a critical time interval that allows survival. However, the prolonged state of energy imbalance leads to a deterioration of health and the appearance of diseases. Therefore, a state of dynamic energy equilibrium is present when energy intake and total energy expenditure are in a state of equilibrium that does not affect the normal state of health without reaching critical time. Complex neural systems of the human body activate homeostatic control mechanisms to maintain balance and thus life. The energy imbalances that appear in daily life produce the activation of such mechanisms at the physiological level.

Physiological hunger is the feeling of activating the need for adequate nutrient intake and avoiding the critical area of energy balance. The concept of human need has a long and tumultuous history. There are numerous approaches to the concept in research by philosophers, psychologists, physicians, economists and sociologists. It can be seen that even today there is no clear understanding of the concept, being a vaguely defined and used concept differently depending on the context. Murray (1938) appreciated that the state of need is a force whose physical-chemical nature is not known. Hunger is generally perceived as a state of deprivation, it is a need for deficiency. In addition to nutrition, the human body can also generate the feeling of activation of the need for water and heat, thirst and cold being deficient in the needs of existence, but the intensity of the perceived feeling depends on many factors. In general, taxonomies of human needs distinguish biological needs as necessities of existence, the satisfaction of which is necessary for human survival. Survival needs are absolute necessities of existence (McLeod (2014)). McLeod considers that biological needs are objective and emphasizes that the need for nutrition is objective, as it does not ontologically depend on the psychological factors of the individual.

As it is known, food is essential for survival, and energy intake is achieved through the consumption of food. The state of health depends on the action of feeding. We will discuss the consumption, and in particular, the consumption of food based on human needs.

3. An operational conceptualization of biological human needs

The literature on human needs advances in the paradigm of satisfying needs. Since survival is characteristic of the animal kingdom (including humans) and is related to what an organism needs to be, it does not contain value (McLeod (2014)). Therefore, the mentioned paradigm does not make sense if we look at satisfaction from the practical perspective, as it should be loaded with value resulted from subjective evaluations of individuals. Biological needs are absolute (McLeod (2014)) - we cannot question their existence, but we can put into a fresh perspective their status in the individual's consciousness. People are used to identifying problems and generally looking to solve them. Considering that the need is associated with a problem that arises, people seek to solve the problem.

Solving the need becomes an end goal. So, from the individual's orientation towards solving problems, biological needs are not satisfied but solved. The current approach considers the theory of problem-solving behavior developed by Tallman et al. (1993) even if it can be interpreted that biological needs do not meet all the axioms and theorems of the idea. In this approach, solving needs occurs or not. Looking at the need for nutrition, the homeostatic mechanism unfolds according to its laws without objectively allowing the individual to evaluate when the energy balance is restored; in other words, one cannot be aware of the moment when the food process must be stopped. So, there can be no measurement of this need - only its status can be ascertained. The manifestation of the homeostatic mechanism is transposed in the activation of the need or its passivation. Without a pathology of the body with implications for some dysfunctions directly related to biological needs, they will exist as long as the individual lives. In conclusion, in biological needs, "need solving" seems a more appropriate terminology and can replace "need satisfaction".

4. Human behavior, consumption and obesity

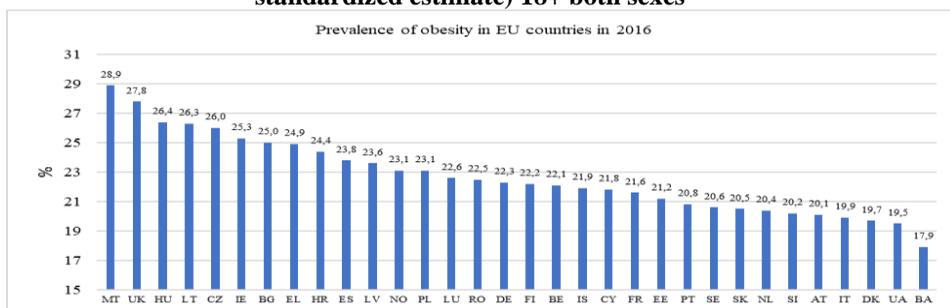
Health must be maintained both from the bio-functional perspective of the body and from a mental standpoint, and it must be a goal for every individual. People are aware that health is a condition for survival and that health is vital to man, and that it influences the current life of the individual. At the same time, illness generates personal and social limitations (Bowling (1996)). Marks (2015) considers that good health is assessed by four main types of homeostasis (biochemical, physiological, psychological, and social). However, the obesity epidemic has spread to the list of chronic noncommunicable diseases. Obesity is, in a simplistic definition, an excess of body fat, but nowadays, it is measured by using the body mass index (BMI). Keys et al. (2014) popularized the Quetelet Index in population-based studies, and BMI was also taken over by the World Health Organization (WHO). BMI is the ratio of body weight to a square of an individual's height. For most countries, obese people are those with a BMI over 30. People with a BMI between 25 and 30 are called overweight. The World Health Organization (WHO) produces annual reports on obesity and overweight. Doctors estimate that an increase in body weight leads to an increased risk of health problems, which are often associated with obesity, such as cardiovascular disease, heart failure, hypertension, myocardial infarction, some types of diabetes and cancer, brain strokes, and others. There is a strong association between health and body weight. It is estimated that maintaining a weight that corresponds to a BMI between 18.5 and 25 ensures the premises of a low risk of disease. BMI has become an interesting topic for many researchers. Increased BMI contributes to decreased life expectancy (Preston et al. (2017)). However, at least an intuitive analysis of how BMI is calculated leads to body harmony rather than the percentage of body fat associated with the risk of disease. There are also criticisms of BMI (Nuttall (2015)), which focuses on uneven adipose tissue deposits. Obesity is an essential factor concerning early death and is associated with increased mortality (Greenberg (2013)). Obesity has grown steadily in recent decades, which is relevant to numerous studies. Diouf et al. (2010)) show an increase in the prevalence of obesity in France between 1997 and 2006. Obesity is complex. According to Affenito et al. (2012) excessive food consumption and reduced physical activity contribute to weight gain. Obesity and higher body weight are strongly associated with a sedentary lifestyle and lack of physical activity in the adult population of the European

Union (Martínez-González et al. (1999)). The prevalence of sedentary lifestyles in the EU is high, especially among some Mediterranean countries, less educated people, and active smokers (Varo et al. (2013)). Kazi et al. (2014) show that there are significant positive associations between sitting time and body mass index.

5. The evolution of obesity in Europe and the expansion trend in Romania

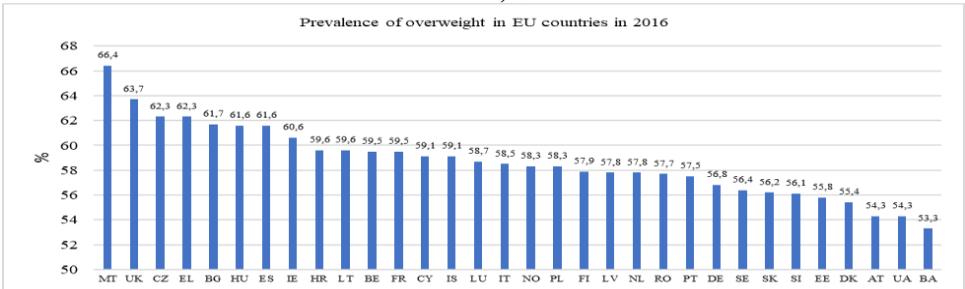
According to WHO, there is a worrying increase in obesity, which has almost tripled since 1975, with more than 650 million obese in 2016. They represented 13% of the world's population, and other 39% of adults were overweight. There are numerous studies worldwide of the effects produced by the sharp increase in obesity, but a fairly small number of researches in this direction on the Romanian population. In the figures below we can see an increased rate of obesity and overweight (Fig.1 and Fig.2) and the evolution between the years 1975-2016 in 32 European countries (Fig.3 and Fig.4). Using the regression statistical method, we estimate the proportions of overweight and obese people from Romania up to year 2050, based on the identified extrapolative models (Fig.5). We used data provided by WHO.

Figure 1: Prevalence of obesity among adults, BMI Greater Equal 30 (age-standardized estimate) 18+ both sexes



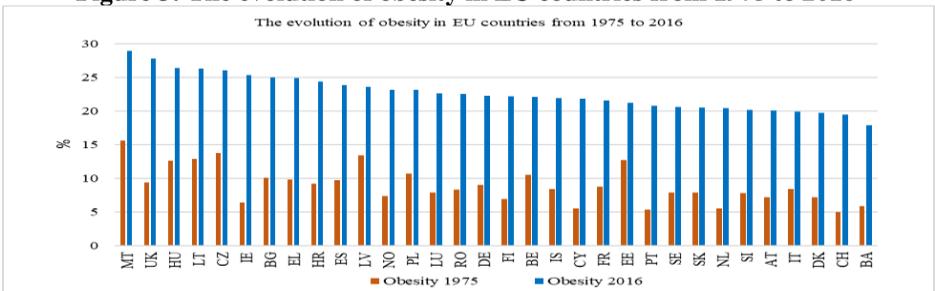
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Figure 2: Prevalence of overweight among adults, BMI Greater Equal 25 (age-standardized estimate) 18+ both sexes



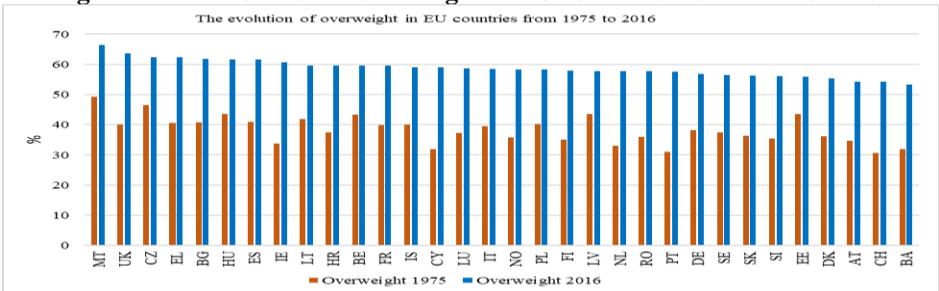
Source: [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi--30-\(age-standardized-estimate\)-\(-\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi--30-(age-standardized-estimate)-(-))

Figure 3: The evolution of obesity in EU countries from 1975 to 2016



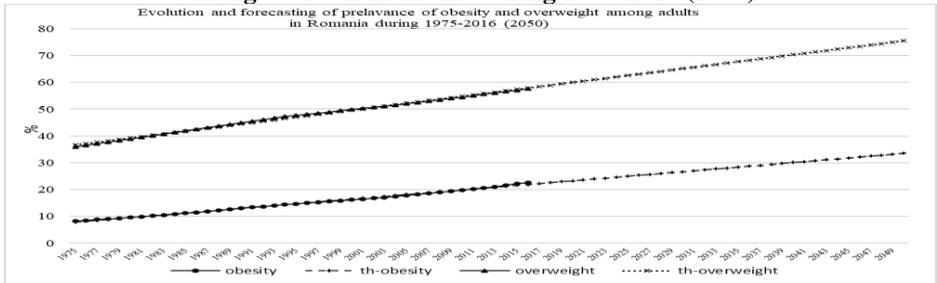
Source: <https://apps.who.int/gho/data/view.main.CTRY2430A?lang=en>

Figure 4: The evolution of overweight in EU countries from 1975 to 2016



Source: [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-30-\(age-standardized-estimate\)-\(-\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-30-(age-standardized-estimate)-(-))

Figure 5: Evolution and forecasting of prevalence of obesity and overweight among adults in Romania during 1975-2016 (2050)



Source: <https://apps.who.int/gho/data/view.main.CTRY2430A?lang=en>
[https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-30-\(age-standardized-estimate\)-\(-\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-30-(age-standardized-estimate)-(-))

The ascending evolutions of the two indicators of prevalence of overweight and obesity are modelled by the following linear models:

$$Overweight_i = 36.151 + 0.518t_i \quad R^2=99.59\%$$

$$Obesity_i = 7.526 + 0.342t_i \quad R^2=99.72\%$$

The coefficients of time varying (t_i) are significant different from 0 with probability of 100%. The prevalence of overweight is increasing each year in average with 0.52%. The prevalence of obesity is increasing each year in average with 0.34%. Keeping these tendencies, the forecasts based on the identified models show that in 2050, the prevalence of overweight will be 75,5%, and the prevalence of obesity 33,5%.

Some policies must be taken by the government when considering the negative consequences of overweight, and especially of obesity for the health care field, for the socio-economic activities.

In order to address some measures, an understanding of the determinants of obesity is necessary (Affenito et al. (2012)). At the same time,

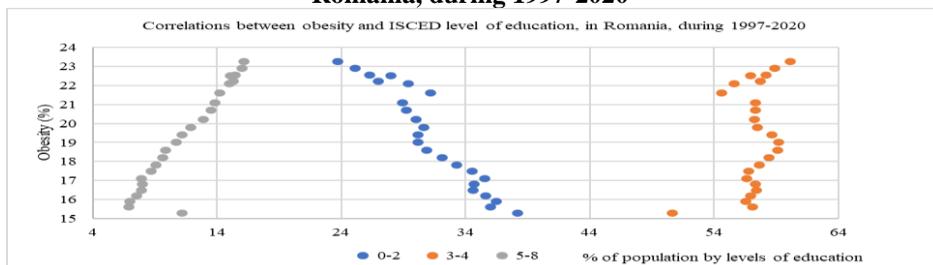
it is necessary to understand the behavioral factors that negatively influence the weight.

The complex research conducted by Roman et al. (2015) it also substantially covers aspects related to obesity for the situation in Romania. The results of the research of Roman et al. (2015) On healthy living factors showed that people with normal weight, overweight and obese have different consumption patterns. They explored the associations between obesity and lifestyle factors, but could not explore any cause-and-effect relationships. Roman et al. (2015) Established that unhealthy habits have a high incidence of irregular meals that are associated with watching television.

6. Obesity, education and salary

Economists have been concerned about the effect of education on earnings on the labor market (Ward 2001). In the present study, we look at the link between education and obesity.

Figure 6: Correlations between obesity and ISCED level of education, in Romania, during 1997-2020



Source: <https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>

The econometric model:

$$\hat{y} = 26.045 - 0.359x_1 + 0.391x_2$$

At the increase of 1 percentage point of the population with education level 5-8 (x_2), obesity (y) increases on average by 0.39 percentage points and at the increase of 1 percentage point of the population with level 0-2 (x_1) obesity decreases on average by 0.36 percentage points.

Between obesity and the two proportions of the population with education level 0-2 and 5-8 there is a simultaneous connection of very strong

intensity. The coefficient of determination $R^2=0.96$ shows that the linear model explains 96% of the variation of obesity depending on the two factors. The population segment with education level 3-4 has a weak correlation with obesity $r = 0.35$.

Table 1: The correlation between the levels of education and the proportion of population obese in Romania an some developed EU countries, during 1997-2016

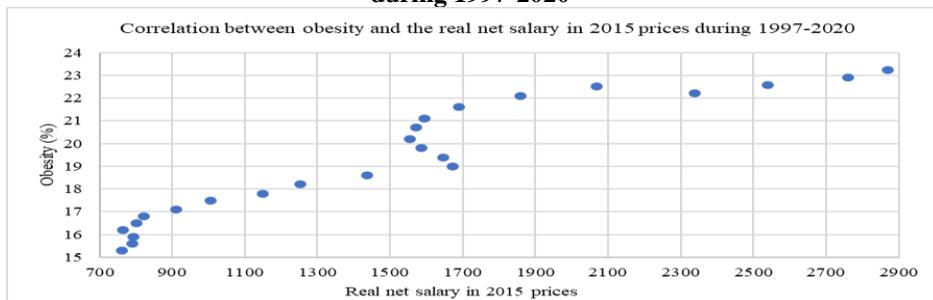
Country	ISCED level of education 0-2	ISCED level of education 3-4	ISCED level of education 5-8
RO	-0.93	0.16	0.91
FR	-0.99	0.88	0.99
LU	-0.86	-0.83	0.95
DE	-0.75	0.24	0.84

Source: <https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>

For these countries, we can also see that there is a more intense correlation between obesity and the population with education level 0-2 and 5-8, education level 3-4 having a lower correlation.

Obesity has also been associated with income inequality in developed countries. (Pickett et al. 2005). Affenito et al. (2012) emphasize that the mechanisms linking socioeconomic status to obesity are not well understood.

Figure 7: Correlation between obesity and the real net salary in 2015 prices during 1997-2020



Source: <https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>
<https://insse.ro/cms/ro/content/c%C3%A2%C8%99tiguri-salariale-din-1938-serie-anual%C4%83-0>

Figure 7 shows that the average net monthly salary in constant prices 2015 is strongly correlated with obesity ($r = 0.94$). It is also strongly correlated with the proportion of the population with education level 5-8 ($r = 0.90$) and very strong and inversely correlated with the proportion of the population with education level 0-2 ($r = 0.96$).

7. Consumption and obesity

Consumers are closed in the circumstances generated by working life and urban living conditions and the continuous impact of marketing (Sanne (2002)). The theme of conditioning needs through marketing has become the favourite topic of discourse about consumer society (Baudrillard). Jackson (2005) mentions the functional role of consumption in satisfying the need for food and emphasizes that this "captivity" of people is in unsustainable consumption patterns. In the context of obesity, we will limit the current research on sustainable consumption to food consumption. Sustainable consumption can be understood both in the context of consumption and of consumer behaviour itself. But, in search of the answer regarding unsustainable consumption, we will take as a starting point the definition of sustainable consumption. Baker (1996) argues that the 1994 Oslo Roundtable helped clarify the concept of sustainable development, appreciating that the one proposed and popularized by the World Commission on Environment and Development (WCED) led by Gro Brundtland was insufficiently defined. On that occasion, a functional definition of sustainable consumption was proposed as "the use of goods and services that meet basic needs and bring a better quality of life, while reducing the use of natural resources, toxic materials and waste emissions, and pollutants over the life cycle, so as not to endanger the needs of future generations". As we know, the basic needs approach was intensely debated and developed in the 1970s. There is probably a need for a broad new debate on basic needs, given that the literature on human needs has become richer since then. This definition touches on the welfare of the future population, welfare that is conditioned by imbalances, especially ecological, produced by the current unsustainable consumption whose effect will be felt especially in the future. But to avoid the tautological explanation, we continue with the observation that the definition of subjective well-being (SWB) includes the satisfaction of life, another concept recently populated with the quality of life. Subjective well-being is a key concept for health as a

homeostatic balance (Marks (2015)) - a healthy functioning body takes into account several factors. We will mark with (+) the necessary energy and (-) energy consumption. (+) is given by the quantity and quality of the foods we eat, which are important for balance. Sleep also plays a vital role in restoring balance. (-) comes from the metabolic activities of the human body, as well as from other activities that we carry out during the day. Physical activity, sedentary lifestyle, nutrition, sleep, and so on are associated with health and well-being. Through lack or excess, any of these can lead to a deterioration of the proper functioning of the human body. But their regularity, intensity, lack, or quantity are part of the lifestyle adopted by each individual. Although the definition of sustainable consumption refers to a better quality of life, well-being has remained a landmark concept even for the general public. Kringelbach (2015) suggests that understanding pleasure can provide information about well-being. What is certain is that the economic literature abounds with works focused on hedonism. Keys et al. (1972) appreciate that hedonic hunger is a desire to consume, but that does not consider energy and nutritional balance regulation. We do not intend to develop ideas about consumer desires here, as this topic will be addressed in further research, but we continue to seek to understand unsustainable consumption. Consumption is influenced by the triad of factors of an institutional, social and psychological nature. Researchers aim to identify factors that promote utilitarian and hedonic consumption. Schachter (1971) proposed that obese individuals are hypersensitive to external stimuli, both food and non-food. Strulik's theory of the social evolution of obesity (2014) shows that poor people are more affected by obesity than rich people. Lu et al. (2016) demonstrates an effect of decision-making objectives based on the role played by "anticipated guilt" regarding choices to purchase hedonic or utility products. Voss et al. (2003) aims to link the hedonic and utilitarian dimensions of the attitude with the purchase intentions.

We appreciate that the discourse on obesity requires the approach of consumption patterns. We consider two perspectives on consumption patterns. The first perspective is focused on the research conducted by Voss et al. (2003) which achieves a two-dimensional conceptualization of consumers' attitude towards the product, as a result of using the product, in which the utilitarian dimension comes from the functions performed by the product, being appreciated as an objective approach. The hedonic dimension comes

from individual experience resulting from using the product, being a subjective approach. The second perspective considers utilitarian consumption and hedonic consumption in relation to a healthy diet and analyses the effects of food consumption on obesity, still looking for the answer. Drewnowski (2004) mentions that a simple economic explanation for the incidence of low-income obese people is the low cost of foods with high energy content. He analysed the relationship between energy density (kilocalories/gram) and the energy cost represented by the monetary cost of a unit of energy measured as dollars/kilocalorie. Drewnowski (2004) concludes that according to a WHO report, the association between the global obesity epidemic and the high consumption of energy-rich foods is highlighted. Often, "calorie bombs" have a pleasant taste, have pleasant aromas. Yeomans et al. (2004) emphasizes that the taste of food contributes to consuming those foods that establish a positive energy balance. Even though excessive consumption of tasty foods is involved in obesity, Yeomans et al. (2004) highlights the limited understanding of the nature of taste. It can be deduced that there are limits in understanding hedonic consumption. Although the neuronal systems underlying the hedonic system regarding taste and homeostatic control of diet are separate, it is estimated that food taste is a behavioural risk factor that promotes excessive consumption. In the 21st century, food is not only perceived as a way to survive, but it is also perceived as a path to pleasure. Obesity is complex and involves both personal and societal costs. It is also of interest to economists, and they contribute to the understanding of this growing phenomenon. Cawley (2004) establishes an economic framework for physical activity and eating behaviours.

8. Economic policies with an impact on health

Various but synergetic measures are required to change consumption patterns. Economic interventions can be process-oriented or results-oriented. Moving to a healthy diet is a behavioural process, while a certain body weight is a result. The policies adopted must act in two directions: towards individual responsibility and towards the responsibility of the states. Responsibility must be shared between the state and the individual. Certainly, in this formula, including the burden on the state budget will lead to an improvement. Mainly, individual responsibility translates into behavioural strategies that consider self-monitoring of diet and physical activity, regular weighing and acts of will and control directed against risky stimuli.

Food strategies must not only be aimed at ensuring food security for all, but must also lead to the consumption of adequate amounts of safe and good quality food, which together make up a healthy diet. Also, following behaviours that support a healthy lifestyle are very important. Implementation of measures in the workplace in order to prevent obesity, similar to the implementation of measures regarding ergonomics. Some authors (e.g., White (2018)) consider that states cannot impose restrictions on entrepreneurs or private economic agents, directly or indirectly, to fight the obesity pandemic. However, some governments around the world are considering public health policies and have implemented restrictive measures (e.g., on tobacco and even drugs). Watt et al. (2020) showed that practices on price promotions increase the purchase of unhealthy foods. According to Mont et Power (2010), current advertising targets feelings, emotions, aiming to sell not only products, but lifestyles. Also, redefining values and social norms will be able to induce mass effects that can lead to sustainable consumption, the behavior of the individual consumer being guided in this regard and being supported, as suggested by some authors (e.g., Liu et al. (2013)) and behavioral economics. Liu et al. (2013) explain using behavioral economics studies, why eating behavior cannot be changed only through information policies. In addressing obesity, policy improvement can also be achieved by implementing non-informative policies. Authors like Liu et al. (2013) appreciate that the promotion of healthy eating behavior can be done by using behavioral economics, contributing to the identification of more effective policies.

9. Conclusions

It is observed that the biological needs vital to the functioning of the human body require a differentiation based primarily on age categories. So, a differentiated taxonomy of human needs is required.

In modern society, characterized by consumerism, it seems that the boundary between a consumption that ensures the solution of the need by passivating it and excessive consumption is invisible. For the management of obesity, the measures adopted must take into account that both diet and physical activity are important components in the weight loss target.

It is also important for decision makers to take action to improve obesity, but perhaps just as important is to monitor the evolution and impact of these measures. In this sense, besides the monitoring of the measures, it is

necessary the evaluation of the developed programs. In addition, adjustment to achieve the set objectives is important. Therefore, in order to establish the impact of the adopted measures, it is necessary to develop adequate tools, and the efforts towards establishing indicators of sustainable consumption and sustainable development are absolutely necessary.

This study proposes a conceptualization of biological needs to support policy makers in order to establish approaches that lead to positive results towards sustainable consumption and sustainable development. It is also important to understand and treat health as a resource for everyday life (Williamson et Carr (2009)).

But in the current context in which a problem of society itself is the generally harmful lifestyle which is based on unsustainable consumption, a paradigm shift is required regarding what Georgescu-Roegen (1979) called “the pleasure of live”, and definitely to live healthy. Georgescu-Roegen considers that this notion is immanent in the economic world. Also, Williamson et Carr (2009) urges us to understand and treat health as a resource for everyday life.

In the context of today's consumer society putting enormous pressure on the planet, our production and consumption contribute to many of today's environmental issues, such as global warming, pollution, depletion of natural resources, and biodiversity loss. Unsustainable consumption is increasingly affecting the natural environment and society in general, and the economy and businesses in particular. We must have sustainable activities in order to achieve a better quality of life, prosperity and growth. That being said, in order to do this, we need to change the way we design, manufacture, use and dispose of our products and services. Moving on to the scope of the paper, there is a direct link between sustainable consumption and obesity. If obesity has become a pandemic in the context of consumerism, then the sustainable consumption paradigm can make a substantial contribution to the effort to overcome this pandemic. Important will be the measures and policies that will guide individuals towards sustainable consumption and a healthy lifestyle. We appreciate that our proposal directs future research in this direction, especially on two issues. The first could look at a classification of human needs by age group that would highlight the need for specific food consumption, and the second looks at research into improving the obesity pandemic by improving human health education that would help sustain sustainable consumption.

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