

CHAPTER 2

Psychologic Factors of Obesity: The Relationship Between Obesity and the Choice of Foods?

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Abstract: It is a fact that we eat because we are hungry. If there is an alteration in balance (stimulus), there is a physiological activity (reaction) in a reverse relationship to restore the initial homeostasis hunger/satiety. It is widely recognized that gustatory and olfactory stimuli are transferred from the mother to the fetus through the amniotic fluid. Many of the learnings about food and nutrition in the first two years of life are produced here, which will shape my food preferences and dietary habits that are followed until adulthood, a stage in which some authors have suggested that Obese people show a tendency to salty flavors, as well as greater reactivity to external factors that stimulate pleasure, being less sensitive to internal hunger/satiety signals. On the other hand, the act of eating not only tries to cover a physiological requirement, but other factors also play an essential role in the acquisition of certain eating patterns. The psychological, social, and cultural aspects interrelate with each other and are key to choosing a type of lifestyle. Various authors attribute the confluence of these factors as causal agents of obesity directly, as well as the relevance of personality on food choice. Specifically, neuroticism includes characteristics considered negative emotionality, which influence the eating behaviors of the subjects. In short, sensory stimuli such as smell and taste contribute to the individual choice of food preference, being the choice of diet individually, and therefore, of modulation of appetite, and also, it seems clear that the relationship between personality, emotions and eating pattern, directly affect the tendency to the current obesity conditions.

Keywords: Choice, Emotions, Factors, Food, Homeostasis, Neuroticism, Obesity, Personality, Preferences, Psychological.

INTRODUCTION

When we talk about the concept of obesity, the review of the scientific literature considers this a disease as long as comorbidities or pathologies associated with it are present. Usually, the BMI equal to or above 35 is associated with it. Obesity has become one of the great epidemics of the 21st century, constituting a problem

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of great importance at the social and health level, together with a strong economic impact in the area of public health, with special incidence in developed countries.

Obesity produces a significant increase in physical morbidity and mortality, as well as psychopathological disorders and social marginalization in patients who suffer from it, causing and/or worsening a large number of problems related to this disease [1].

EMOTIONS, PERSONALITY AND OBESITY

The act of eating not only covers a physiological need that ensures the survival of the species, but also contemplates that obesity has multifactorial causes ranging from genetic, hormonal, metabolic, *etc.*, to socio-cultural factors and psychological [2]. Based on these factors, the subject will choose a certain lifestyle that will guide, among other things, their eating patterns [3].

In this sense, an approach is considered necessary that not only contemplates the organic and physical variables of the disease, but also the psychological ones. Both the study and analysis of the origin are equally important along with the evaluation of the perpetuation of the table of eating behavior, and taking into account some types of cognitive (beliefs, thoughts, distortions), affective (approach to certain emotional states that generate displeasure) and environmental variables (culture, environment, routines) [4].

Following Rodríguez-Santos, Castillo and Gómez, one of the most important psychological mechanisms is related to “the influence of the self, that is, of the image that the person has and what food represents from the point of view symbolic” [5]. Regarding this state of the self, there are other factors, such as cultural values and the importance of the physical aspect, which establish their main means of communication through the different media (social networks, television, press, *etc.*), which interrelate with each other, creating a certain eating behavior, and therefore conditioning the sense of intake towards facilitating or inhibiting it.

When we feel hungry, we need to regulate the emotional state that this sensation causes us in such a way that food intake can act as a reducer of irritability and restlessness, and an amplifier of positive emotions, such as calmness and pleasure. However, for this to be the case, the type of food eaten must be included in the eating habits to which the person is accustomed. In this sense, it has been proven that an excess of food or an alteration of the organoleptic conditions leads to maintaining negative emotionality prior to intake or even can increase it, since psychological needs have not been met, despite having eaten [6].

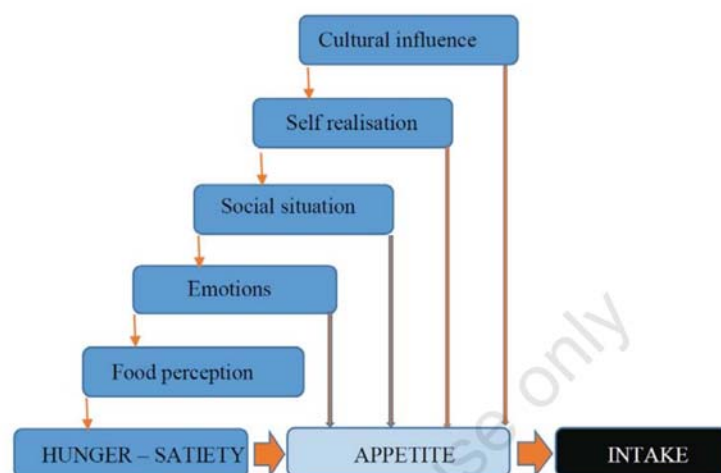


Fig. (1). Relationship between the different reasons involved in eating. Rodríguez, Aranceta and Serra (2008).

There is a clear relationship between food and the emotions we feel; it is the so-called “emotional intake” “eating or emotional dining”, which links certain types of food substances with positive or negative valences of emotions. The relationship between mood states and the eating behavior pattern follows a two-way axis, since both feed back and can modify each other [7]. It is also related to the fact of considering the act of eating, as a relief in the suffering of negative emotions [8].

Over time, the theory about the role of personality in the act of eating has been considered, considering that the obese improved their emotional problems through this behavior, which could become compulsive [9]. In this line, Kaplan and Kaplan [10], spoke of a kind of classical conditioning, where the subject learns that intake is related to a decrease in anxiety, without actually making it clear that this mechanism actually has a physiological effect, but only psychological.

A food containing high amounts of sugars, fats, fried foods, *etc.*, can provoke a positive type of emotional activation. On the contrary, foods with bitter substances, such as green leafy ones, would produce an emotional response of low acceptance, negativity and rejection. At the cerebral level, it is the amygdala that is in charge of making this link between food and the subjective emotion it generates, thus creating a kind of conditioning that is stored in our memory, and conditions us for subsequent food choices. Psychologically, an association of pleasure or displeasure in the face of a certain food can “condition the

physiological reaction of emotion to the mere presence of it.” A pleasant food can produce such a strong emotional reaction,

From the point of view of negative emotionality, we find emotional anxiety, a product of high levels of stress over a long period of time. A form of palliative strategy towards anxiety is based on the search for food and drinks that have an illusory effect towards alleviating the feelings of fear, anguish, hopelessness, *etc.*, that causes anxiety. In this sense, refined sugars, chocolate, ice cream, soft dairy, sugary drinks, alcohol, *etc.* With these foods, we seek to escape from the present, but, on the other hand, we do not realize that other systems of the physical body harm us [11]. In this sense, certain foods are used as an emotional evasion technique before feelings of displeasure [7].

A type of emotion traditionally studied, in terms of its relationship with intake, is boredom. Studies such as that of López and Cebolla [12], Crocket, Myhre, and Roque [13], indicate a significant relationship between both variables. Those subjects who indicated high scores in the emotion of boredom also had a greater tendency to the strategy of emotional suppression, which made it difficult to regulate these emotions. In addition, they tended to fail to find stimulation variables that alleviated boredom, leading to more frustration that further increased the perceived sense of distress [12].

In the eating behavior pattern, emotions redirect our behavior towards an obsession with food, the use of food as a reward or positive reinforcement, bingeing without hunger or aftermath, as well as the loss of the hunger-satiety pattern [13].

It is also true that the binomial emotions and disruptive eating behavior towards excess intake usually vary in each person, with multiple variables that may be influencing, coming to say that there are as many types of obesity as there are obese. Some authors consider psychological factors to be responsible for the onset and maintenance of obesity, while others consider them rather as a consequence of the social rejection suffered by the obese person. Taking into account that the human being is bio-psycho-social, the importance of analyzing and treating the multiplicity of factors that make up this triple reality seems clear [14].

Regarding the personality patterns of the subjects, various studies such as that of Sutin, Ferrucci, Zonderman & Terraciano [15] consider that high levels of neuroticism and low consciousness, as well as high extroversion, contribute to episodes of hyperphagia and polyphagia, which was associated with a higher BMI. Within the neurotic personality factor, the impulsiveness variable is the one that contributes directly to obesity, since the maintenance of certain healthy lifestyle habits requires constancy and emotional balance, it is very difficult for

people to maintain with high impulsivity [3]. Furthermore, the narcissistic type personality also appears as a personality trait that can play an important role in the appearance of obesity and its subsequent maintenance [16].

On the other hand, a personality trait called “reward sensitivity” has been identified, which is associated with a greater choice of sweet and fatty foods and is based on the availability of dopamine in the mesocortico-limbic system. In this way, people with a high degree of neuroticism and problems in social relationships present a strong preference for sweets. On the other hand, the most hostile and anxious people have a tendency to continue eating once their appetite is satisfied. In these cases, the individual may lose the sense of self-control, using intake as a habitual way of reducing anxiety or the negative effects of stress, producing over-eating that leads to obesity due to an increasing drive for the achievement of the organism to repeat this behavior [17].

From the emotional point of view, a large number of obese population state that their eating compulsion is concentrated in situations where they experience negative emotionality, such as anxiety, depression, loneliness, *etc.*, returning to the theory that the act of eating is used for the reduction of this negative psychological manifestation [18]. However, the relationship between obesity and psychological disturbances does not present a common consensus among the scientific community, which is why reasons for exclusion from the DSM-IV were expressed, eventually being excluded, “making it impossible to determine whether obesity causes alterations specific in people or it is these that trigger obesity” [19].

Robin affirms, quoted in Bersh [18]: “obesity protects people in the world that seems threatening due to low self-esteem and the expectation of failure, it also protects against the risks of facing a work, social and emotional life, but at a high emotional cost” p.539

In this line, Cabello and Zúñiga [20] considered that the process by which obesity originates is related to situations of high stress, in such a way that food is a relief mechanism in stressful life situations.

Sinha & Jastreboff [21], assure that:

“A situation of acute stress inhibits the appetite; however, if it is maintained until it becomes chronic, the adrenal glands release a hormone called cortisol, which increases appetite particularly towards foods high in fat, or sugar, or both, which apparently inhibits the action of the limbic system.”

In short, although in the review of the scientific literature it has not been possible to verify what we could call a specific personality disorder in people with obesity

[22], it is true that there are different personality variables that contribute to the onset and maintenance of the picture, being very important to take into account for possible treatments for the obese person, where we should not only monitor the intake but treat the psychological factors that are contributing to the perpetuation of the disease. Otherwise, difficulties in progressing treatment, or even failure, could be assured.

FOOD PREFERENCES AND THEIR RELATIONSHIP TO OBESITY

Historical Reference

Throughout their existence, most human beings, in terms of survival to food, have lived as hunter-gatherers, having to survive frequent periods of food deficiency. This circumstance produced a selection process to promote energy storage, through a genomic process of the so-called “sparing genes”, which allowed for greater survival and thus reaching reproductive age.

About 12000 years ago, what was called “the neolithic revolution” occurred, which occurred as a consequence of the changes in obtaining food, going from hunter-gatherer to produce and store, which involved cultivation and domestication of animals. This transformation is considered one of the most important events in the history of humanity, since from there obtaining food was easier and much less expensive, from an energy point of view. To the extent that this advance is considered an antecedent to favor the obesity society to this day.

The only evidence of the existence of obesity in prehistory (28000-25000 years), dates back to the stone age with the so-called “steatopygical venus”, representing female figures with large volumes in their forms. From an etymological point of view, the name of these figures comes from the Greek “steatos”, which means fat and “pigios”, referring to the hips and buttocks. Some authors believe that women in the glacial period would accumulate fat in the hips as a reserve for times of scarcity.

Subsequently, in the Egyptian culture at the beginning of it, corpulence or obesity implied the ability to obtain food, which brought with it the saving of energy and power, which was considered a desirable state. Thus in the Old Testament, the Pharaoh promises to Joseph, in gratitude, “all the fat of the earth” noting that “the virtuous will flourish like the palm tree ... they will bring abundant fruit in old age, they will be fat and flourishing.” (Psalms XCII, 13).

However, in the Egyptian Middle Kingdom (21st-18th century BC), the relationship between excess intake and obesity can be read for the first time in history and condemn and stigmatize eating in abundance. “Gluttony is rude and reprehensible.

A glass of water quenches thirst. A handful of vegetables strengthens the heart. Take only one thing... a small piece instead of a big one... The one whose belly continues to lust after lunchtime has passed is despicable. When you sit down with an obese glutton, eat once your appetite is gone" [23].

We also find Hippocratic references 5th century AD: "*Sudden death is more frequent in the obese than in the slim*", Plato: "Obesity is associated with decreased life expectancy." Galen. (2nd century AD) "... to eat abundant little nutritious food in order to satiate it so that it is distributed little in the whole body". In Christian culture, Saint Paul (1st century AD) "The enemies of the cross of Christ, the final thing is destruction, whose god is his belly" Arab Medicine. Avicenna Code (X-XI century): "... take bulky but not very nutritious food". Asian culture, medieval Japan: "... there was a lender woman who became too thick.... She ate all kinds of delicious food, her body became thick and her meat too abundant.... She could not walk easily... she sweated profusely, she suffered from breathing fatigued and endlessly suffering ". Or the Byzantine empire (14th century) in which Aetius, a physician of the time, He attributed obesity to a large diet and lack of exercise, and prescribed vegetables, fruit, fish, and chicken, but not butter, meat and meat offal, or seafood, cheese, or wine [24].

Therefore, the possible relationship between obesity and food choice from prehistory is evident. It is already well described in the literature that there is a food choice in humans, which provides nutrients that allow them to maintain energy balance and contribute to survival. But can that choice be the cause of obesity? And, above all, the obese tend to consume specific foods preferably?

BIOCHEMICAL FACTORS RELATED TO THE HUNGER SACIEDAD BALANCE

It is obvious, but the truth is that we eat because we are hungry. The concept of homeostasis involves maintaining the stability of the organism through coordinated complex physiological processes. This balance is produced through negative feedback. If there is an alteration in balance (stimulus), a physiological activity (reaction) occurs in the reverse direction to restore initial homeostasis. (Decrease in circulating glucose/search for food intake).

The three regulatory systems of intake are interrelated with each other depending on the circumstances.

- *Emergency systems*: Physiological and behavioral mechanisms that are put into operation in the face of prolonged food restriction. Carbohydrate intake is involved, and therefore, glucose is obtained.

- *Short-term system*: It includes the initiation and termination of feeding in a reduced time interval, as well as the mechanisms of food selection. Styria is influenced by psychological and environmental factors.
- *Long-term system*: Regulates fat deposits and accumulation of fat compartments.

Related Mechanism in the Hunger/Satiety Balance

The physiological and biochemical mechanisms involved in the intake regulation are divided into two groups: peripheral and central, interrelated, in the anabolic and catabolic phases.

In the peripheral regulation of appetite, mechanical, chemical and hormonal factors intervene. Let's briefly analyze some of them:

Cholecystokinin: Satiety-inducing factor, secreted by the duodenal-jejunal mucosa, after the arrival of nutrients. Has a satiating function.

Leptin: Last segregated, practically entirely, by adipose tissue. It has a satiating effect. It could have a placental effect regulating nutritional status in the mother-child relationship during the gestational process. An attempt has been made to establish a relationship with obesity, but the stages have not, in any case, produced conclusive results.

Gastrin: Produced and stored by G cells, located in the gastric antrum and the proximal duodenal part. From the physiological point of view, it performs various functions, such as promoting gastric acid secretion, esophageal sphincter contraction, smooth muscle contraction, and therefore has an inhibitory effect on intake.

Glucagon-like peptide 1 (GLP1): Peptide originated in the ileum, jejunum and colon. At the central level, it has an appetite-inhibiting role. It stimulates the secretion of insulin in the presence of glucose in the duodenum-jejunum and inhibits glucagon.

Ghrelin: Primarily secreted at the gastric level involved in the regulation of satiety, energy expenditure, and body weight. It has an orexigenic action fundamentally.

In the central regulation of intake, it has been admitted that it is basically induced by the hypothalamus and, more specifically in its ventromedial center, stimulating appetite and increasing body weight, while those produced in the lateral nuclei lead to loss of appetite and loss of appetite. weight [25]. On the other hand, there are other brain areas, which could also intervene influenced by afferent and efferent nerve pathways that could have appetite-stimulating or inhibiting activity.

Within this group, we would fundamentally have orexigenic neuropeptides, such as neuropeptide Y, which reduces systemic energy expenditure and increases the activity of lipogenic enzymes at the liver and adipose tissue level, which may cause an increase in fat deposition and therefore an increase in body weight. Protein R-Agouti, which is released with fasting and with low levels of leptin causing stimulation of appetite, especially for fatty foods and sucrose, The Orexins, related to waking states and behavioral motivation to search for food.

Separate comments deserve the endocannabinoids (eCB), the oleylethanolamide (OEA) synthesized in the small intestine, stimulated by ingestion, exerts an anorectic effect. It inhibits intake and intervenes in lipid and hydrocarbon metabolism, decreases triglyceride and cholesterol levels, blocks fatty acid and glucose deposition of the adipocyte [25]. In another order of things, eCBs have described their role in the hedonic response of food in terms of palatability as a key characteristic to establish food preference, and sweet foods have this attribute. Consequently, eCBs have been shown to improve sensitivity to sweet taste [26].

CHRONOLOGICAL EVOLUTION OF FOOD PREFERENCES

The first two years of life are considered the most critical period to try to prevent obesity. This period is characterized by very rapid development, both from the statistical point of view and by weight. In a short period of time, it goes from a purely milk-based diet to a much more varied solid diet (Beikost). During this period, much of the learning about food and feeding take place, and it has already been sufficiently described in the literature that early feeding and developed dietary learning will shape food preferences and later dietary habits or patterns [27], they are maintained during later childhood and continue until adulthood [28].

The American Academy of Pediatrics (AAP) recommends that babies be exclusively breastfed for the first 6 months, followed by the introduction of complementary foods and beverages (Beikost), and breastfeeding for at least the first year.

DEVELOPMENT OF PREFERENCES DURING THE PRENATAL PERIOD

The development of sensory preferences begins in the gestational period. The gustatory and olfactory systems arise during the first trimester reaching maturity at the end of gestation. This provides an opportunity for early sensory learning that prepares the fetus to be attracted to flavors and foods that are safe and available to you in the postnatal environment.

It is already widely recognized that taste and olfactory stimuli are transferred from the mother to the fetus through the amniotic fluid [29], and this will condition the development of flavor and subsequent food preferences.

A wide variety of flavors ingested by the mother are transmitted to the amniotic fluid during pregnancy and to breast milk during lactation, including garlic, vanilla, anise and carrot, oria, or tobacco and alcohol [30, 31].

There have been studies supporting the claim that the continuity of taste experiences provided during breastfeeding helps incorporate solid foods. While the babies that feed exclusively breastfeeding formula limit your exposure to varied taste experiences.

DEVELOPMENT OF PREFERENCES DURING THE POSTNATAL PERIOD

Newborns show innate preferences for sweet and salty and aversion to bitter and sour. The inclination towards the salty flavor is usually later, around the fourth month. These initial preferences are considered adaptive to the environment and genetically marked to the evolution of the species. In this way, it is ensured that, at the beginning of the feeding, the newborn is attracted by the initial taste of the feeding, breast milk high in lactose and therefore contribution to the sweet flavor and glutamate of free amino acids, as a contribution of salty flavor. On the other hand, since foods that may contain toxic substances are bitter, and those that may have undergone modifications due to excess humidity or maturation, stale foods, are acidic, they dislike them.

While infants learn from their first taste experiences during milk feeding, regardless of whether they are breast-feeding or formula-feeding, exposure to various flavors of breast-feeding appears to contribute to better acceptance of the incorporation of new foods in the weaning period. Still, reactions to new foods vary based on the flavor of the food. For example, salty vegetables are better tolerated than simple ones, and sweeter fruits and vegetables are better accepted than more bitter [32].

PRIMARY TRIGGERS OF INTAKE AND APPETITE

Already in the adult stage, the energy regulation of food intake is carried out through the following mechanisms:

- Energy deficit
- Pleasure
- Stress

Energy Deficit

There are multiple factors involved in regulating food intake that have already been analyzed in the hunger/satiety section.

Pleasure

In today's society, hyperingestion occurs as a result of food availability, low economic expense and good taste of food. Most contain large amounts of fats and sugars. In addition to flavor, other qualities such as texture and smell contribute to consumption [33].

It seems to be a fact that in many cases, an energy-dense diet is more economical than a diet containing lean meats, fresh vegetables, and fruit, so palatability and the convenience or otherwise of energy-dense foods can skew preferences towards these.

Stress

The concept of stress as an inducer of intake is widely known. It can be seen as people who have suffered stressful situations, such as family separations or aggressions of any kind, have ingestions of sweet or high-fat substances. Therefore, in the choice of food, other factors may also participate, such as sensory taste (hedonic anticipation derived from some foods), the external situation in which he finds himself, or even the internal situation in which he finds himself, psychological or physiological [33, 34].

Regarding taste, some authors have raised the possibility that the obese show a tendency for certain flavors. In such a way that despite the fact that both the obese and the slim ones similarly rate the pleasure that certain foods suppose, other authors show that the energy density of the diet of the obese is significantly higher and that they tend mainly to foods perceived as salty.

Another issue to assess is the fact that other authors share in the sense that obese subjects compared to thin subjects are more reactive to external factors, which stimulate pleasure (time, presence, characteristics of food, *etc.*), organoleptic factors at last, being less sensitive to the internal signs of hunger and satiety.

It seems to be a fact that obese subjects do not share a common flavor profile, nor do they necessarily prefer the same type of food, so a large part of the studies carried out on taste preferences or food consumption gave as a result the variability between subjects was greater than any distinction between obese or lean [33, 34].

CONCLUDING REMARKS

In conclusion, to try to clarify what is known so far, through scientific publication, it would be interesting to do it from the following points of view:

1. On one hand, the taste of food is motivated by individual learning based on their own experiences about a specific food. Therefore, the smell and taste produced by sensory stimuli contribute to choosing the individual choice of food preference, the latter being considered the determining factor for choosing the diet individually and therefore modulating appetite.
2. Current food trends are also determined by behavioral standards of eating habits and cultural relationships (breakfast, lunch, dinner) to which must be added, previous snacks or irregular snacks. The choice of mixed sources of caloric energy, including taste, smell, economy, accessibility, speed of preparation, are determining factors in the choice of food.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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