

Implicit cues and obesity: protection strategies against food marketing

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Abstract

Protection against marketing of unhealthy food is an important strategy to curb obesity and chronic non-communicable diseases. Given that the food industry applies neuromarketing techniques as a form of implicit promotion, the use of such knowledge to ground defense strategies becomes urgent and increases their chances of success. We propose, based on several studies, an interdisciplinary research effort to guide public actions to promote healthy eating.

Keywords: Obesity. Marketing. Food Publicity. Defense Mechanisms. Advertisement. Psychology. Neurobiology. Public Health.

Introduction

Obesity is considered a serious global public health problem and an important factor for the mortality and morbidity of cardiovascular diseases, diabetes, cancer and other chronic-degenerative diseases.¹ Such a trend of increasing obesity is particularly relevant in young individuals. In the last thirty years, the percentage of children and adolescents who are overweight or at risk of becoming obese has substantially increased worldwide.² Brazil has been going through a nutritional transition that is reflected in changes related to the population's eating habits. Changes observed are well characterized by the lower occurrence of malnutrition and the higher incidence of obesity in the population, which has been consistently growing, especially in the lower income population.³ Population surveys conducted in periods 1974-1975 and 2008-2009 have shown that prevalences of overweight and obesity continuously increase in both genders.⁴

This worldwide obesity trend tends to be related both to lack of physical activity and dietary patterns.⁵ As a result, there is a great supply of foodstuffs with high amounts of sugar, fats and sodium by the food industry. Health authorities believe that the accumulation of messages embedded in advertisement for these foods may induce their higher consumption.⁶⁻⁸

In the United States, children between the ages of 2 and 11 years watch approximately 12 TV commercials related to food products rich in fat, sugar and/or sodium.⁹ In Brazil, children are exposed to two unhealthy food advertising communications every hour, mostly containing products with high caloric value and low nutritional value.^{10,11} Another study points to the presence of debatable elements regarding ethical questions in this type of advertising in Brazil.¹²

Several solutions have been proposed to mitigate the influence of marketing unhealthy foods, ranging from banning all advertising aimed at children¹³ to more lenient and ineffective mechanisms such as self-regulation.¹⁴ It is noteworthy that the Political Declaration of the United Nations General Assembly High-Level Meeting on the prevention and control of chronic noncommunicable diseases (NCDs) approved in January 2012 points out that these diseases lead avoidable causes of mortality and morbidity worldwide. According to this Declaration, prevention is the main focus, and among the main preventive strategies is the regulation of food and beverage advertising directed at children.¹⁵

In this paper, we shall review the role of environmental cues on food consumption behavior in order to better understand the impact of food marketing on the behavior of children, adolescents and adults. Sequentially, we shall discuss how these concepts can serve as a support for collective health strategies aimed at protecting people from this unwanted influence.

Environmental clues and the consumption behavior

Motivational factors that initiate, sustain, and direct our behavior may be implicitly guided by environmental clues. For example, Bargh & Chartrand,¹⁶ in a series of empirical studies, have demonstrated that prior exposure to a particular stimulus may influence the individual's response to a subsequent stimulus without the individual's awareness of such influence. Part of the behavioral responses to the stimuli that surround us would be automatic, requiring a great cognitive effort to make conscious decisions in an environment favorable to implicit clues.^{16,17}

Corroborating such ideas, Duckworth and contributors¹⁸ have suggested that environmental stimuli would be continuously and unintentionally assessed from their perception as positive or negative, implicitly affecting affective, cognitive and behavioral responses. In biological terms, research on psychophysiology of emotion demonstrates that the motivational relevance of an emotional stimulus can activate motor circuits and automatically prepare the individual for action.¹⁹⁻²¹

Studies on food consumption have shown that environmental cues significantly influence food behavior.²² Package size and color, dish and serving sizes, context, variety and quantity of food available are just a few examples of environmental factors that may implicitly influence food consumption.^{23,24}

A study by Roefs and contributors,²⁵ for example, has demonstrated an implied association between context and food choice through a behavioral reaction time task. Volunteers would be quicker to respond to positive words preceded by words of high-fat foods in a context involving clues about food palatability. In contrast, in a context involving health cues, response times for positive words would be lower when preceding words were for healthy foods.

Another study, using the electroencephalography technique, showed a positive association between frontal beta cortical activity and reports about palatability to sweet foods when these were consumed in a cafeteria context, indicating a motor facilitation in this context.²⁶ Other people's behavior is another important clue as individuals implicitly imitate other individuals' behavior, including the choice of some food or the amount consumed, without realizing that they are doing so.^{27,28}

The food industry uses environmental cues that associate their products with positive and seductive aspects, predisposing actions aimed at the approximation of these foods. Many of the food marketing practices targeted at children, teens and adults go far beyond explicit persuasion to convince them that one brand's products are better than another's. In order to attract consumers,

they incorporate neuromarketing techniques based on theoretical psychology and neurobiology to subtly influence eating and consumption preferences, for example, by establishing brand associations with positive emotions.

In fact, the elaboration of sophisticated commercials with positive images, besides the use of displays in establishments with great lighting, location and easy access, generate impulses of purchase and consumption for adults and mainly for children and adolescents. It has already been shown that advertising predisposes automatic consumption of food products, making impossible any control from the consumer reached by such advertisement.²⁹ The literature, therefore, suggests that exposure to food advertising has potentially powerful direct effects.

Recent experimental studies have shown that exposure to food advertising on television increases the calories consumed during and immediately after exposure.³⁰⁻³² In these studies, participants were not aware that they were affected by advertising. Clues contained in advertising (e.g., images of eating, taste preferences, or an identification with the actors or characters of the product) could increase consumption through the activation of automatic actions.³³

Exposure to other, less complex forms of marketing (e.g., logos, brands, or banners on the Internet) may also create similar effects.²⁹ All individuals exposed are influenced by this manipulation, but children and adolescents are particularly hypervulnerable.³⁰ Aggravating the problem, unhealthy foods containing high amounts of sodium, sugar, saturated and trans-fats, provide high durability, palatability and low satiety, being the main products marketed and present in advertisement.^{10,11}

There is an increasing number of studies demonstrating the direct causal effects of exposure to food advertising on the diet of children and young people, such as: increased snack consumption and total calories, lower consumption of fruits and potherbs, and higher rates of obesity.^{32,34,35} In a study by Harris, Bargh & Brownell,³¹ schoolchildren were exposed to TV programs, whether or not advertising foods with a high calorie content and low nutritional value, while holding a packet of snack-type cookies. Children exposed to advertisement consumed 45% more cookies during the program than non-exposed ones. Another study has shown that consumption of unhealthy foods increases in children exposed to food advertising³⁶, including those between five and seven years of age.³⁷ Obviously, obese children appear to be more affected by exposure to food advertising, substantially increasing the consumption of snacks with high caloric content, saturated fat and/or sugar.³⁸

Brazilians' spending on food corresponds to approximately 20% of their budget.³⁹ The food advertising industry's investment, especially aimed at young audiences, reflects the importance of this market: three billion reais only in the first half of 2014.⁴⁰ Most advertisement campaigns promote products that young people should only consume in very limited quantities or not at

all.¹¹ Therefore, such aggressive marketing practices, aimed primarily at children and adolescents, act perversely, infringing the right of young people and the general population to food that is adequate and conducive to nutritional health.

Strategies to protect against unhealthy food marketing

Considering the accumulation of evidence, the negative influence of food advertising on the population's health becomes obvious. In fact, the above-mentioned Political Declaration of the United Nations Assembly and the Resolution of the 63rd World Health Organization (WHO) Assembly converge to recognize the extensive evidence that products with high levels of salt, sugar and saturated and trans-fats are the major risk factors for obesity and chronic noncommunicable diseases (NCDs), and propose global actions to reduce this pernicious impact.⁴¹

In this sense, public and scientific debates must go from the question of whether food marketing negatively affects health to a debate on how to protect ourselves from its obvious influence. The model of food marketing advocacy proposed by proponent Harris e colaboradores⁶ is based on knowledge in psychology and proposes four conditions necessary for individuals to be able to resist the stimuli from food marketing: 1) *Awareness*, including conscious attention to individual marketing stimuli and understanding their persuasive intent; 2) *Understanding the effects* resulting from exposure to stimuli and how to effectively defend against them; 3) *Capacity*, including the cognitive ability and resources available to effectively resist; and 4) *Motivation*, or the desire to resist.

According to this model, the ability to resist the influence of food advertising depends on the different forms of marketing as well as the contexts in which they occur. The model considers that additional cognitive resources are needed to inhibit the impulse towards extremely tempting but unhealthy food products commonly featured in food advertising. In addition, it recognizes that children and young people are particularly difficult to protect, especially because of the lack of motivation to resist the influence of marketing, since the ability to resist develops with age and understanding.³⁰

From the perspective of how environmental cues influence food behavior, it is suggested that repeated exposure to food advertising can directly alter beliefs and behaviors without deliberately and actively processing the information presented. Therefore, it would be difficult to counteract the implicit effects of exposure to food marketing.⁶

Proposals to defend the population against this kind of persuasion are challenging and urgent. The use by the food industry of experimental methods controlled in the fields of psychology and neurobiology to identify effective practices in marketing unhealthy foods raises particular concern among public health advocates. As the food industry increasingly uses scientific methods and

theories to analyze what works⁴², the need for research within the same sphere to examine how to defend against such practices becomes even more critical.

Some solutions for the crisis of childhood obesity have been proposed, such as measures of self-regulation⁴⁴ and food education.⁴³ Advertising self-regulation measures do not provide sufficient protection. The ineffectiveness of voluntary measures is already quite evident⁴⁴, which has supported the recommendation for mandatory measures. More effective protection measures should be applied in order to avoid interference with other people's rights to food and health. Below, some proposed and/or implemented measures shall be discussed in more detail.

Information Campaigns

Mass media campaigns are considered by WHO as one of the most important strategies for the prevention and control of chronic degenerative diseases.⁴⁵ Public awareness campaigns range from marketing and social campaigns to promoting healthy food to the formulation of food guides for the population.⁴⁶

Some studies have shown that creative strategies of nutritional education seem to have some effect. For example, preschoolers consume more healthy foods when these receive special names.⁴⁷ However, advertisement that is informative and not very creative seems to have little effect. A campaign promoted by the Australian government using various media vectors to promote healthier living habits seems to have increased the population's knowledge about the relationship between abdominal circumference and chronic diseases. However, there was no change in population habits such as increased consumption of healthy foods and physical activity.⁴⁸

Another information strategy includes the implementation of dietary guidelines. These aim to present to the population, in a clearer and more summarized way, what the main nutritional recommendations promoting health would be. There is, however, a difficulty in formulating and standardizing guides that are easy to understand and with the potential of meeting the nutritional needs of the majority of the population.⁴³ Moreover, there is little evidence of the efficiency of the currently proposed dietary guidelines.⁴⁹

Another fact to be considered is that governments are unable to invest as much time and resources in promoting healthy diets as the food industry invests in the commercial dissemination of health-damaging products. Overall, there is not evidence either that marketing for healthy foods can be reflected in reducing consumption of highly palatable foods such as highly processed foods. Determining whether marketing for healthy foods can be used to offset the effects of marketing for unhealthy foods seems to be another critical question to be investigated.

The Counterpropaganda Movements

Common practices in the food industry explore the fact that social processes are still developing in young people, making them more amenable to the threat of social exclusion. There is evidence that the clues to social isolation are considered extremely alarming and painful^{50,51} and that the feeling of loneliness even anticipates an increase in morbidity and mortality.^{52,53} Images of social interaction are capable of pre-activating motor circuits that foster social interaction movements such as affection,²⁰ highlighting the importance of this type of clue. Images of happy families and babies, of success, and celebrities are massively employed in unhealthy food advertising. Resisting these clues, therefore, becomes a difficult task, even when being aware of these influences.

Public awareness about the persuasive and harmful effects of food marketing can provide an important strategy, generating social movements that counteract the harmful effects of marketing unhealthy foods. Social movements have a role that is not only informative but inclusive, as they reduce the sense of social isolation of those who oppose the content of advertisement, which can increase the motivation to resist.

Examples of this are counterpropaganda movements such as those provided by the Truth Initiative (formerly the American Legacy Foundation) called “*The Truth*®”, which have gained prominence in antismoking campaigns.⁵⁴ The main feature of this movement, created in 1999, was to expose the truth behind the tobacco industry’s advertising campaigns, raising awareness and understanding about the persuasive intent embedded in tobacco product advertising. What is most interesting is the fact that this antismoking movement is nucleated in a young population, since the adolescent audience is the tobacco industry’s target, as exposed in the industry’s internal documents.⁵⁵ There is evidence showing that the counterpropaganda social movements focused on tobacco products are able to promote changes in the attitude and behavior of young people and adults, contributing to the reduction of consumption of these products.⁵⁴

In the context of unhealthy food products, this type of movement is still timid. Unlike tobacco products, which are undeniably harmful to health, these products give rise to doubt as to what nutritional aspects could be detrimental to health. The food industry masks the unhealthy content of its products (such as excess of saturated fat, presence of trans-fat, excess of sugar, presence of carcinogenic additives and excess of sodium) through, for example, the addition of items supposedly considered healthy, such as fibers, vitamins and minerals. The latter are highlighted in the packages (e.g. “zero trans fat,” “no cholesterol,” “zero sugar,” “more fibers”), as opposed to the table of nutritional values, which is difficult for the general public to understand. In addition, the food industry seeks support from health professionals, medical societies and athletes in order to give credibility to some healthy aspects of their products. Studies show that adults think products

that are used in these approaches are healthier in relation to others actually healthier though without such highlights.⁵⁶

In this context, exposing the truth to the population as to the actual nutritional content of each product and the possible harm to health becomes urgent and essential. Dixon and contributors⁵⁷ have tested the effects of counterpropaganda on parents' perception regarding unhealthy content of food products. The strategy used involved presenting the product packaging as it is marketed, emphasizing some healthy (e.g. whole) aspect. The same packaging would then be presented, emphasizing the unhealthy aspect (e.g. 30% sugar). They showed that counterpropaganda was effective in reducing purchase intent and reliability in advertising. Another study has shown that the counterpropaganda of unhealthy foods as animated banners was able to affect preadolescents, increasing the perception of unhealthiness of the product and reducing the reliability in advertising.⁵⁸

Counterpropaganda findings on unhealthy food products are still scarce. Also, studies with neurobiological approaches are lacking. However, applying counterpropaganda seems to have the potential to allow a better critical analysis of the messages embedded in food advertisement by children, adolescents and adults, in addition to countering the strategies of threat of social exclusion promoted by advertisement.

The Use of Health Warnings

The introduction in Brazil of cigarette packaging warnings has contributed to a considerable reduction in the number of smokers in the country. The positive results are translated into a decrease in the proportion of smokers in the population.⁵⁹ In the case of an antismoking campaign focused on the use of pictorial images on the packaging of cigarette products, the scientific support was of great value. In this sense, a multidisciplinary team formed by researchers at Brazilian *Universidade Federal Fluminense* (Federal University Fluminense) and *Universidade Federal do Rio de Janeiro* (Federal University of Rio de Janeiro) in a partnership with INCA [Brazilian government *Instituto Nacional do Câncer José Alencar Gomes da Silva* (National Cancer Institute José Alencar Gomes da Silva)], ANVISA [Brazilian government *Agência Nacional de Vigilância Sanitária* (National Health Surveillance Agency)] and the Department of Arts & Design at PUC-Rio [*Pontifícia Universidade Católica do Rio de Janeiro* (Pontifical Catholic University of Rio de Janeiro)], has provided a theoretical and experimental basis in the field of psychophysiology of emotions for the selection of categories of images that would be more adequate for the warnings and tests of their effectiveness.⁶⁰⁻⁶² Recently, it has been shown that the pictorial warnings currently used in Brazil were able to generate an implicit predisposition for the withdrawal of cigarettes in smokers, opposing the positive appeal promoted by cigarette packaging.⁶¹

Despite growing evidence favoring the use of tobacco product warnings, including in the field of psychology and neurobiology, little has been done to apply similar strategies in combating unhealthy food advertising.

In the United Kingdom, a traffic light rating system for labels was proposed, using different colors as indicative of high or safe values of sugar, sodium, saturated and trans-fat. According to Temple & Fraser⁶³, this is the best labeling model yet, as it presents the key nutrients in a simple and intelligible way. The authors also reveal that most consumers find it difficult to understand the information provided by traditional nutritional labels and to translate it into practical guidelines for selecting a healthy diet. Therefore, the traffic light rating system for labels considerably increases consumers' ability to assess the healthiness of food.

Recent studies have shown that the traffic light rating system arranged on the packaging of food products is capable of affecting the choices made by the consumer at the time of purchase.⁶⁴⁻⁶⁷ The implementation of the traffic light rating system for labels is able to increase sales of items labeled as healthy (green) and reduce sales of unhealthy items (red)⁶⁷, including individuals from different ethnic and socioeconomic backgrounds.⁶⁵ In addition, the traffic light rating system for labels appears to increase the percentage of consumers who point to health and nutrition as important food choice factors.⁶⁶ In another study, participants were shown to be willing to pay more for healthy products that contained labels as the traffic light rating system compared to simply informative labels.⁶⁸

Besides the behavioral pieces of evidence, studies with neurobiological measures have also explored the efficiency of the traffic light rating system for labels. Enax and contributors⁶⁸ have compared two types of nutritional labels: one simply based on information and another one having the traffic light rating system. In this study, red nutritional traffic lights were found to activate the dorsolateral prefrontal cortex (DLPFC or DL-PFC), which is an area of the brain involved in inhibiting response and self-control during food choices. In turn, the green nutritional traffic lights have activated the posterior cingulate cortex (PCC), which is possibly involved in reward expectation processing. And another study, using the eye tracking technique, has shown that the incorporation of colors has increased the overhang and reduced the detection time of nutritional labels.⁶⁹

Brazil has also invested in the regulation of unhealthy products, more concretely from Resolution RDC no. 24, enacted on June 15, 2010, by ANVISA [Brazilian government *Agência Nacional de Vigilância Sanitária* (National Health Surveillance Agency)], to regulate the commercial promotion of foods with high amounts of sugar, saturated fat, trans-fat, sodium and beverages with low nutritional content.⁷⁰ The Resolution requires the dissemination and commercial promotion of these foods and beverages to be accompanied by warnings as sentences containing information on the excess of such ingredients and health risks.

Previous studies have shown that texts preceding emotional visual stimuli modulate electrophysiological responses, cardiac reactivity, sweating, and hemodynamic response to these images.⁷¹⁻⁷³ More specifically in the food sector, Grabenhorst, Rolls & Bilderbeck⁷⁴ have observed through the functional magnetic resonance technique that activations related to the affective value of umami savory taste in the orbitofrontal region (area involved in reward processing) can be highlighted by descriptive texts presented to participants. Another study has shown that participants exposed to label emphasizing both the taste and healthy aspects of an apple have selected it significantly more compared to participants who saw the apple without any descriptor.⁷⁵ Therefore, some pieces of evidence within the scope of neurobiology point to the modulation of the autonomic responses and the cerebral circuits by textual sentences.

Warnings and informational labeling have the potential to counteract the impact of positive images embedded in unhealthy food advertisement or packaging. However, further studies are needed to support the preparation and implementation of such strategies.⁷⁶ It is important to consider the interdisciplinarity of these studies. Research in the area of psychology and neurobiology should be previously planned to answer questions aimed at meeting the practical and immediate needs in the public health field, reducing time and resources.

Conclusion

A detailed understanding of the psychological and neurobiological processes involved in marketing strategies can help health care providers to determine the most effective methods to protect the population against this unwanted influence. It is important to develop skills to improve defenses against the harmful influences of marketing unhealthy foods by alerting parents, educators, and health authorities to the ways in which they are marketed, and how they affect children and adolescents.

In addition, it is necessary to limit marketing practices and to aggregate interdisciplinary scientific knowledge to develop actions to promote healthy eating and inhibit the consumption of unhealthy foods.

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