

PAPER DETAILS

TITLE: Effect of Product Color Lightness on Hedonic Food Consumption: The Regulatory Role of Hedonic and Extrinsic Value

AUTHORS: Nur ÇAGLAR ÇETINKAYA

PAGES: 2527-2543

ORIGINAL PDF URL: <https://dergipark.org.tr/tr/download/article-file/2362257>

Effect of Product Color Lightness on Hedonic Food Consumption: The Regulatory Role of Hedonic and Extrinsic Value¹

(Research Article)

Ürün Rengi Açıklığının Hedonik Gıda Tüketimine Etkisi: Hedonik ve Dışsal Değerin Düzenleyici Rolü

Doi: 10.29023/alanyaakademik.1100545

Nur ÇAĞLAR ÇETİNKAYA

Dr. Öğr. Üye., Çankırı Karatekin Üniversitesi, Meslek Yüksekokulu, Bankacılık Sigortacılık Programı, nurcaglar@karatekin.edu.tr,

Orcid No:0000-0002-6047-2718.

Bu makaleye atıfta bulunmak için: Çağlar Çetinkaya, N. (2022). Effect of Product Color Lightness on Hedonic Food Consumption: The Regulatory Role of Hedonic and Extrinsic Value. Alanya Akademik Bakış, 6(2), Sayfa No.2511-2543.

Keywords:

Product color clarity,
Hedonic
consumption,
Consumer Behavior

Received: 08.04.2022

Accepted: 27.05.2022

ABSTRACT

Food colorants mean to evoke positive feelings about the product on consumers and to increase the pleasure of consumption. Much of the research on packaging and food coloring has been carried out on the effects of certain hues and color categories. The neglected subject of product color lightness and saturation necessitated this research. In the study conducted on hedonic foods, which is the product group in which food colorants are most used, the effect of product color lightness on hedonic consumption, extrinsic value behavior, which is characterized as the tendency to consume snacks, and the regulatory role of hedonic value perception factors, which are defined as the hedonic benefit provided to consumers were examined.

ÖZET

Anahtar kelimeler:

Ürün rengi açıklığı,
Hedonik tüketim,
Tüketici davranışı

Gıda renklendiricileri tüketiciler üzerinde ürün hakkında olumlu duygular uyandırmak ve tüketimden alınan hazzı artırmak amacıyla kullanılan bir araç niteliğindedir. Ambalaj renklendirmesi ve gıda renklendirmeleri konusunda yapılan araştırmaların birçoğu belirli tonlar ve renk kategorilerinin etkileri üzerine gerçekleştirilmiştir. İhmal edilen ürün rengi açıklığı ve doygunluğu konusu bu araştırmanın yapılmasını gerekli kılmıştır.

Gıda renklendiricilerinin en çok kullanıldığı ürün grubu olan hedonik gıdalar üzerine yapılan çalışmada ürün rengi açıklığının hedonik tüketime olan etkisi, atıştırma tüketme eğilimi olarak nitelendirilen dışsal değer davranışı ve tüketicilere sağlanan hazzı fayda olarak tanımlanan hedonik değer algısı faktörlerinin de düzenleyici rolü incelenmiştir.

¹ Bu çalışma için Çankırı Karatekin Üniversitesi Etik Kurulu'nun 08.03.2022 tarihli ve 25 sayılı toplantısında alınan karara bağlı olarak "Etik Kurul Onayı" alınmıştır.

1. GİRİŞ

Nutrition; is among the basic / physiological needs necessary for the continuation of life. Life conditions that have changed over time have led to an increase in the demands of individuals for foods that they can easily consume and significant changes in their food preferences. With the developing industrialization, the rapid spread of foodstuffs with a long lifespan necessitated the use of additives in the production of these foodstuffs. Food additives that improve the perceptible properties of foods and extend their useful life; are substances that are used consciously without causing any change in the quality of food (Eroğlu and Ayaz, 2018: 316). Food additives should not be harmful to human health, provided that they are at the rates determined by the law, there should be a technological necessity in their use, should be used in permitted foods and should not reduce their nutritional value (Yurttagül and Ayaz, 2008:8).

Colorants among food additives; They are preparations that do not contain nutritive and aromatic components, obtained by natural or chemical means, that color foods or provide color recovery (Turkish Food Codex, 2013). The fact that natural food products with their own color density are not suitable for storage and processing causes the use of food colorants and other food additives. Food colorants, which are used extensively by food manufacturers, especially in snack food products, in order to gain the appreciation of consumers, are food cosmetics that add attractiveness to foods.

The color factor, which is effective in consumer preferences, also appears in the field of food and is expressed as one of the most important features that directly affect the food preference and desire of consumers (Delgado-Vargas & Paredes-Lopez, 2003; Shim et al. 2011, Martins et al. 2016). Many products with different colors, tastes, odors, textures and similar features that provide visual satisfaction to consumers are produced in order to meet the expectations of consumers. The real impact of consumers' perceptions, views and wishes in the food industry is inevitable. Color factor is one of the oldest aesthetic parameters that consumers consider when choosing food (Todaro et al., 2009). The striking color increases observed in the color variations and shades of foods emphasize the increase in consumers' interest in these food products and the perception of color as a hedonic sign. Many studies show that light colors have more positive meanings and create positive connotations than dark colors (Valdez & Mehrabian, 1994; Meier, et al., 2004; Meier et al. 2007). For this reason, food businesses try to attract consumers by emphasizing the perception of being healthier and closer to nature with lighter-colored products than dark-colored products.

Snack foods, also defined as hedonic foods, are foods with low nutritional value that are usually consumed between main meals (Sezgin and Ayyıldız, 2019). The foods in question consist of products such as cakes, chips, biscuits, chocolate and candies, which are heavily consumed by children and young people. Hedonic foods, which form a bridge between nutrition and pleasure, are foods that are consumed in order to get away from stress as well as being consumed in various organizations, celebrations, birthdays, as well as providing fast satiety. In a study conducted in 2014, it was determined that consumption of hedonic food, which is rich in fat, sugar and salt, and poor in vitamins and minerals, is 2 times higher in developing countries than in developed countries (Nielsen, 2014).

The consumption of food by individuals with the effect of external stimuli is defined as extrinsic value/eating. Brain neurons stimulated by the colors, smells and flavours of foods also affect the eating habits of individuals. The extrinsic value/eating habits of consumers, which are tried to be influenced by color stimulants used in snack foods, is another subject examined in the

research. Consumers' liking for a product or service cannot always be explained by logical inferences. It is known that today's consumers are not only rational, they also buy products for the meaning they express. The concept of hedonic value that emerged in this context states that consumers see shopping as a pleasure and they shop in order to satisfy this pleasure. Consumption of hedonic foods that stimulate the pleasure receptors in the brain causes the formation of hedonic value in consumers. For this reason, the hedonic value perceptions of consumers, which are tried to be influenced by the lightness of the product color in the research, is another subject that is examined.

In this study, it is aimed to examine the effect of product color lightness on consumption in hedonic foods and to test the regulatory role of hedonic and extrinsic value on this effect. There are many studies in the literature examining the effects of colors on marketing. However, the fact that these studies focused on packaging color and certain color tones led to the emergence of this research on product color and color saturation. It is expected that the research will make a significant contribution to the literature in the related field.

2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1. Food Color and Clarity

Nutrition, which is among the physiological / basic needs necessary for the continuation of life; along with the developing industrialization, the food preferences of consumers have changed. Nutrition is among the physiological/basic needs necessary for the continuation of vitality and has led to changes in the food preferences of consumers. In the pre-industrial era, drying and fermentation methods were used to preserve foods for a long time. In 1810, as a result of Napoleon's search for a solution in return for an award in order to feed the military units far from their homes, foods were started to be processed by the canned method by the French chef Nicholas Appert (Eroğlu and Ayaz, 2018: 312). The purpose of food processing is to ensure the permanence of taste, appearance and smell, to extend the life of the food and to protect the nutritional value of the food. The increase in food demand resulting from the gradual increase in population has required businesses to resort to various physical and chemical substances in order to meet the food supply. Food additives resulting from this situation; increasing efficiency in food production, minimizing losses, improving product quality and prolonging the life of products; colorants, flavorings, preservatives, antioxidants, carriers, acids, acidity regulators, anti-caking agents, antifoaming agents, bulking agents, emulsifiers, emulsifying salts, hardeners, flavor enhancers, foaming agents, gelling agents, brighteners, humectants, modified starches, packaging gases are classified as propellants, leavening agents, metal binders, stabilizers, thickeners and flour processing agents (Turkish Food Codex, 2013).

Colorants from food additives; are additives used to regain the lost color of foods during processing and storage, to strengthen the existing color, to color uncolored foods, and to increase the purchasing desire of individuals (Yörük and Danyer; 2016:3). Food colorants whose usage amounts are approved by the Ministry of Agriculture and Forestry in Turkey according to the product class; are food cosmetics used extensively in snacks, breakfast cereals, baked goods and soft drinks. Food manufacturers apply to food cosmetics in order to restore color to foods that have lost color as a result of many technological processes and to make foods more attractive. Exposure to light, oxygen and temperature during the storage conditions and production stage cause color loss in foods. In addition, the attractiveness and diversity of the product are among the reasons for the use of food cosmetics.

As a result of the increasing population, people aimed to reach reliable and abundant food sources, but their concerns about food safety have increased significantly (Fleming, et al., 2007). Potential hazards caused by additives in foods are the source of these concerns (McCarthy et al., 2007). Studies in the literature show that consumers believe that the risk of foods containing food additives is more than the benefit (Shim, et al., 2011; Amin et al., 2013; Bearth, 2014). Rozin et al. (2009), it was stated that foods that do not contain food additives are perceived as natural by consumers. According to a study conducted by Rozin et al. (2009), it was stated that foods that do not contain food additives are perceived as natural by consumers. The issues discussed in the written and visual media about food safety have caused consumers to evaluate food additives negatively (Kadim, 2017:30). Evaluation of any event through communication channels leads to an increase in consumers' perception of risk, and change in their behavior and attitudes. In a study conducted by Wu et al. (2013), it was found that consumers' concern about food additives is caused by lack of sufficient information about the subject and misunderstanding. Both the anxiety caused by the use of food additives and the desire to consume additive-free products are driving consumers away from foods containing food additives. This attitude towards food additives, which provides product diversity and increase in yield to food manufacturers, and provides long life and quality improvement to foodstuffs, prompts food manufacturers to produce light-colored foods. This attitude towards food additives, which provides product diversity and increase in yield to food manufacturers, and provides long life and quality improvement to foodstuffs, directs food manufacturers to produce light-colored foods. In this way, food manufacturers are able to process the product easily and aim to minimize the negative perceptions of consumers.

Color lightness, hue and saturation are the three main characteristics of color. Much of the research on food colorants and packaging has focused on the effects of certain color tones and tonal categories, and the lightness and saturation of colors has been neglected. However, Valdez and Mehrabian (1994) and Labrecque et al. (2013) revealed that the lightness and saturation of colors can have an equally important or even greater impact on perceptions and behavior compared to hues. According to Wedel and Pieters (2012), considering the effect of visual cues on shaping consumer perceptions and triggering behaviors, it is inevitable to say that the color of food is an important stimulus. Considering that every visual stimulus processed by the human perception system contains color information (Elliot & Maier, 2007) and the perception of lightness plays a fundamental role in visual perception and stimulus interpretation (Grady, 1993; Woods and Wilcox, 2006), the finding that lightness in food colors directly affects consumer behavior is reached.

Within the scope of the literature discussed in this direction, the H1 hypothesis in the research is formed in the form as

H₁: There is a significant relationship between product color lightness and hedonic food consumption.

2.2. Hedonic Foods

Hedonism: is a concept derived from the Greek word “hedone” and means pleasure/hedonist. Hedonism, which is frequently used in the field of philosophy, with the hedonistic doctrine advocated by Arristippos and Epicurus; is one of the axiological theories that examines the elements that form the basis of the behavior of individuals (Feldman, 1997). The theory, which asserts that the highest good is pleasure as the main purpose of life, is also defined as the doctrine advocating a behavior style motivated by pursuit of pleasure, devotion to emotional

pleasures or psychologically seeking pleasure (Çelik, 2009; Akgül, 2014:35-36). According to the hedonist viewers, who define the meaning of life as pleasure, it is essential not to live but to consume for pleasure.

Products have varying degrees of both hedonic and utilitarian properties (Batra and Ahtola, 1991). This situation causes consumers to characterize products as utilitarian or hedonic. In general, hedonic products; while it is defined as products consumed for experiential reasons such as aesthetics, pleasure and entertainment; utilitarian products are defined as products consumed by individuals for instrumental and functional purposes (Dhar and Wertenbroch; 2000). The literature on food consumption shows that various situational, dispositional, and sociopsychological factors have a significant impact on consumers' responses to food (Yang et al., 2019; Sussman et al. 2021; VanEpps et al., 2021).

Consumer purchasing decisions are affected by many factors. However, the types of these effects differ for hedonic and utilitarian products (Khan et al., 2015; Li et al., 2020). Hedonic products have a stronger impact on consumer responses compared to utilitarian products (Zhou, et al., 2021). This consequential difference stems from the logic underlying the consumption of two different types of products. While the thoughts and decisions of consumers about hedonic products are determined by sensory and emotional factors, the consumption of utilitarian products is based on cognitive and rational foundations. This situation is interpreted as the possibility that consumers are less likely to be affected by external factors in the consumption of utilitarian products. Hedonic foods are defined as foods that have positive emotional benefits for consumers, offering intense pleasure and hedonic stimuli (Zhou, et al., 2021). Studies on emotion and food show that consumers consume hedonic foods in order to repair a negative emotion or maintain the positive effects it creates (Labroo & Mukhopadhyay, 2009; Sinha, 2016). These foods are emotionally oriented and are defined as snacks characterized by sensory pleasure, wonderful taste and bodily urges, and consist of candy, sweets, chocolate, fruit juice, fast food products, carbonated drinks, ice cream and fruit milk (Avena, 2015). Snacks were defined by Michael Jacobson in 1972 as foods that are easy to prepare and consume and they are foods that are not beneficial for health, contain high amounts of fat, salt and sugar, and have low nutritional value (Rajveer and Monika, 2012). In addition to lack of energy, high cholesterol and poor concentration, these foods that cause many harmful effects on the body such as obesity, diabetes, heart diseases and various skin cancers are frequently consumed in many countries such as USA, Canada, England, Australia, Japan and Sweden (Rajveer and Monica, 2012).

Hedonic foods, which are frequently preferred by children and young people, cause harmful concerns for health, especially for parents, because they contain colorants from food additives. For this reason, food manufacturers aim to create a perception of being less unhealthy or close to nature by choosing light-colored food colorants instead of dark-colored food colors in order to reduce or eliminate this concern. According to a study conducted by Madzharov et al (2016), it was found that the light color of the product affects the amount of food consumed, and it was found that light-colored foods were evaluated more positively than dark-colored foods, and as a result, they were consumed more. This is valid only for hedonic foods and not for healthy foods. Because in healthy foods, the darker and more intense the color of the product, the higher the belief that it is healthy. From this point of view, it is seen that product color lightness in hedonic foods affects the amount of food consumed, and the hypothesis that product color lightness in hedonic foods affects food consumption, which is included in the first hypothesis examined in the research, is supported.

2.3. Extrinsic Eating/Value and Hedonic Value

Eating, which is a behavior like other human behaviors is developed by learning and also has a physiological dimension. Eating, which is a behavior like other human behaviors; It is a behavior that is developed by learning and also has physiological characteristics. Eating disorders are defined as eating behavior disorders that cause medical, social and psychological problems and negatively affect the quality of life of individuals (Öyekçin and Şahin, 2011). In the last 30 years, various theories have been developed to evaluate eating, malnutrition and behaviors that may impair body weight control. In 1985, three different eating behaviors based on psychological principles have been defined by Van Strien et al. These eating behaviors; emotional eating, which expresses eating with the aim of eliminating stress and resisting negative emotions by ignoring satiety before physiological hunger occurs, extrinsic eating; expressing eating in response to stimuli related to food consumption without considering hunger and satiety, and consciously avoiding food for weight loss or maintaining current weight are restrictive eating behaviors expressed as avoidance (Van Strien et al., 1985; Tazeoğlu et al., 2020).

In extrinsic eating behavior, which is defined as the individual's consuming more food than normal food consumption, with the effect of external stimuli; is directed to consumption by being affected by the characteristics of the food such as smell, taste and appearance. These factors, which are expressed as environmental or external factors, are highly effective on the eating habits of individuals and are an indication that nutrition is related to neurons. Cools et al. (1992) and Burton et al. (2007) found that individuals could not remain insensitive to food diversity. Especially in hedonic foods that cause restrictive eating behavior, the consumption demands of individuals in the face of food diversity reveal the importance of product color. This indicates the existence of a relationship between extrinsic eating and hedonic value.

Hedonic value: It is the positive emotional and psychological experience that individuals acquire as a result of purchasing action. Hedonic value, which includes subjective meanings such as pleasure, excitement, entertainment and enjoyment, is also described as a hedonic expression. Hanzae and Rezaeyeh (2013) stated that hedonic value directly affects customer satisfaction, Laverie et al. (1993) stated that vitality is associated with interest, pleasure, and fun, Vieira et al. (2018) found that consumers tend to shop with the effect of consumption and stimulants for pleasure and entertainment. Hedonic value is based on the sensory and emotional aspects of individuals' purchasing behavior. In the studies conducted by Mela (2006) and Lowe and Butryn (2007), it was stated that environmental factors are as important stimulants as the food itself, while in the research conducted by Karsavuran and Özdemir (2017), it was stated that snacks provide an exciting and enjoyable dining experience.

When the relationship between extrinsic value/eating and consumption is examined, it is seen that individuals with extrinsic eating attitudes cannot resist the physical characteristics of foods such as smell, taste and taste, and they consume the food even though they do not feel hunger (Sevinçer, 2013). In extrinsic eating, eating behavior takes place in response to food-related stimuli with the effect of stimuli in the environment without physiological hunger. Based on the finding that individuals with extrinsic eating behavior consume high-calorie foods such as chips, chocolate, and carbonated beverages under the influence of external stimuli (Schachter, 1971), the other hypothesis in the research was created as

H₂: There is a significant relationship between exogenous value and hedonic food consumption.

The relationship between hedonic value and consumption, is explained with the view in the literature that hedonic elements such as pleasure, enjoyment and entertainment lead consumers to purchasing behavior, especially impulse buying behavior (Hausman, 2000), and the view that consumers display purchasing behavior with the effect of positive emotions (Beatty and Ferrel, 1998). Verplanken and Sato's (2011) association of pleasure and entertainment with purchasing behavior and Rook's (1987) association of consumers' purchasing emotions with hedonic elements reveal the existence of a relationship between consumption and hedonic value. Another hypothesis in the research, based on the existence of the cycle that causes the consumers to consume for pleasure and entertainment, to realize the purchasing behavior with the effect of stimulants, to reflect the sensory value of the lived experience, and that the pleasure obtained from the purchasing experience causes repeated purchase and re-acquisition of hedonic value, was created as

H₃: There is a significant relationship between hedonic value and hedonic food consumption.

In the study, it is also assumed that exogenous and hedonic value have a regulatory impact on the effect of product color lightness on consumption in hedonic foods. Extrinsic value behaviors of individuals are important in the relationship between product color clarity and consumption in hedonic foods. Because individuals with extrinsic value/eating behavior have high hedonic food consumption. In such a case, the relationship between product color lightness and consumption in hedonic foods depends on the exogenous value. Based on this assumption, in the research; H_{4a} hypothesis as created as;

H_{4a}: Extrinsic value has a regulatory role in the relationship between product color lightness and hedonic food consumption.

Similarly, product color clarity and the hedonic value perceptions of individuals in hedonic food consumption are also important in the research. In modern and postmodern consumption societies, the fact that the concept of consumption is an action exhibited to satisfy physiological needs as well as psychological needs and the emotional and hedonic aspects of consumption come to the fore, expressing the relationship between consumption and hedonic value. For this reason, based on the assumption that the relationship between product color clarity and consumption in hedonic foods depends on the hedonic value perception of individuals, another regulatory hypothesis in the research was created as;

H_{4b}: Hedonic value has a regulatory role in the relationship between product color lightness and hedonic food consumption.

The use of intense colors in hedonic foods, which is the most intense use of food colorants, causes individuals to move away from consumption. In particular, the emphasis that food colorants are risky in print and visual media has caused individuals to evaluate food additives negatively. It is important for food manufacturers that food additives contribute to the service life and quality of the product, as well as providing product diversity to consumers with food cosmetics. For this reason, the fact that businesses want to create the perception that they are close to nature or less unhealthy by using lighter colors instead of using intense colors reveals the importance of the concept of product color clarity. At the same time, the research model obtained in response to the hypotheses created as a result of the theoretical evaluations drawn with the belief that the extrinsic eating behaviors and hedonic value perceptions of the individuals also have a regulatory impact on the effect of product color clarity on consumption in hedonic foods is given in Figure 1.

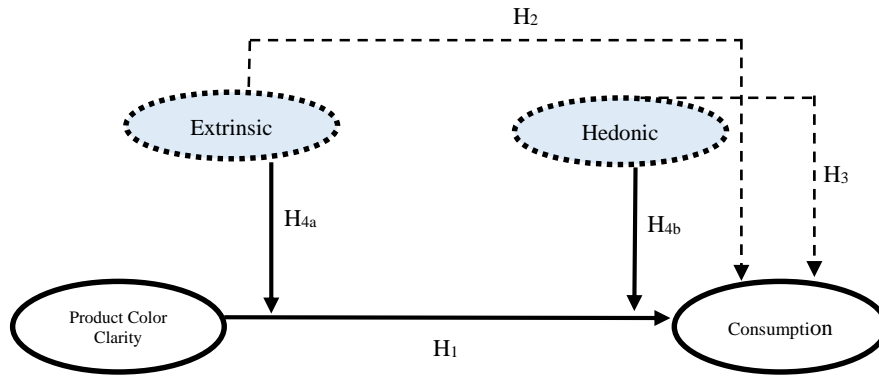


Figure 1. Research Model

3. DATA AND METHODOLOGY

3.1. Sample

The universe of the research consists of consumers living in Turkey and consuming hedonic food. The intense consumption of hedonic food by consumers with extrinsic value/eating habits and hedonic value perception caused the research population to be determined in this way. For this purpose, after the decision of Çankırı Karatekin University Ethics Committee dated 08/03/2022 and numbered 25, that the study is accordance with ethical rules, a questionnaire was applied to the participants in face-to-face interviews with consumers over the age of 18 between January-March 2022 and 420 voluntary participation was provided.

3.2. Data Collection Tools

A questionnaire consisting of two parts was used in the study. In the first part, various questions were asked in order to measure the perception of product color lightness, hedonic food consumption, hedonic value and extrinsic value/eating tendencies of the participants. Edward (1957) to measure consumers' perceptions of product color lightness (URA), Madzharov, et al. (2016) to measure hedonic food consumption (HGT), Moon and Kim (2016) to measure hedonic value (HD), and extrinsic value/eating in order to measure their (DD) perceptions, Van Strien et al. (1986) were asked questions adapted from the scales used in the research, and the participants were asked to answer with a 5-point Likert scale. The obtained data were analyzed with SPSS 20.0 data statistics program, then Structural Equation Modeling analyzes were applied with LISREL 8.7 program. In the second part, questions were asked to measure gender, occupation, educational status, marital status, age and monthly income in order to determine the demographic characteristics of the participants.

3.3. Data Analysis and Findings

Demographic Characteristics of the Participants

In the study in which female participants were more than male participants (73.1% female, 26.9% male), the participants were mostly in the 24-29 age range (32.4%), married (58.1%), had a high-income group (It was found that 29.7%- 10,000 TL and above), undergraduate (24.8%) and postgraduate (31.4%) graduates and public employees (28.9%) and not working (25%) categories.

Explanatory and Confirmatory Factor Analyses

The scales used in the research were adapted from the original scales in different studies, and firstly they were translated into Turkish and then explanatory factor analysis has been applied. As a result of the analysis, the Kaiser-Meyer-Olkin value was calculated as higher than 0.60, and the result of the Bartlett Sphericity Test was calculated as $p < 0.05$. In addition, the kurtosis and skewness values of the variables were analyzed and Hair et al. (1998), it was found that it was within the range of ± 2 .

Table 1. Factor Analysis Results

Factors	Factor Loads	Factor Explanation	Cronbachs' Alpha	AVE	CR
Product Color Clarity					
URA2-I think that the use of light colors in food coloring does not harm human health much.	0.847				
URA1-It would be a pity to ban the use of light-colored food colorants in products, provided that it is not excessive.	0.757	8.905	0.821	0.568	0.977
URA3-The use of colors in food coloring is suitable provided that it is stated on the labels.	0.644				
Hedonic Food Consumption					
HGT1-I am generally very health conscious	0.831				
HGT2-I monitor what I eat in order to stay healthy.	0.711	12.463	0.885	0.598	0.986
Hedonic Value					
HD1-I find it very fun to consume snacks.	0.849				
HD3-Consuming snacks gives me pleasure	0.825				
HD2-Snacks make me happy.	0.793	9.071	0.797	0.596	0.973
HD4-I'm curious about the taste of the newly released snacks.	0.596				
Extrinsic Value					
DD2-If the snack I eat smells good and looks good, I usually eat more than I eat.	0.793				
DD1-If the snack I eat is delicious, I usually eat more than I eat.	0.789				
DD3-When I see or smell a delicious snack, I want to taste it.	0.769				
DD4-If there is a delicious snack to eat, I eat it without thinking.	0.739				
DD5-If I see delicious snacks while walking by a bakery, I would like to buy it.	0.706	39.395	0.816	0.512	0.928
DD6-If I see delicious snacks while passing by a cafe or kiosk, I would like to buy it.	0.687				
DD8-I can't resist tasty snacks.	0.658				
DD7-If I see others eating snacks, I would like to eat too.	0.642				
DD9-I like to eat snacks while preparing/preparing food.	0.635				
TOTAL		69.835	0.865		
Kaiser-Meyer-Olkin Scale Validity= 0.812					
Bartlett Test of Sphericity Chi Square= 4856.862;					
p=0.000					

According to the findings obtained after the explanatory factor analysis applied in the research, is observed that the question groups formed by the sub-dimensions of the variables to be examined show a suitable distribution with the factor distributions. It was found that the 18-item scale in the questionnaire form in Table 1 was distributed in a way to form 4 factors as

desired and explained 69.835% of the total variance. In order to calculate the internal consistency of the factors, the reliability coefficients were examined, and it was determined that the Cronbach's Alpha and CR values were above 70% for all factors and the entire study. In the study, it was also determined that the Average Explained Variance (AVE) values of the factors were above 0.50 and did not have concordance validity problems.

After the explanatory factor analysis, confirmatory factor analysis was applied in the study. Goodness of fit values obtained as a result of confirmatory factor analysis were calculated as $\chi^2/df=4.229$; NFI=0.93; CFI=0.96; IFI=0.97; GFI=0.97, SRMR= 0.07 and RMSEA= 0.088. This shows that the goodness of fit values obtained are in acceptable and excellent ranges (Schermelleh-Engel et al., 2003). After the goodness of fit values obtained as a result of confirmatory factor analysis were determined in appropriate intervals, the structure to be examined in the research was tested and Structural Equation Model (SEM) analysis was performed with the LISREL 8.7 program. Goodness of fit values obtained as a result of Structural Equation Model were calculated as, $\chi^2/df=4.387$; NFI=0.95; CFI=0.98; IFI=0.98 GFI=0.97, SRMR= 0.069 and RMSEA= 0.090, and the goodness-of-fit values were found to be in the acceptable and excellent ranges.

After the goodness of fit values obtained as a result of confirmatory factor analysis were determined in appropriate intervals, the structure to be examined in the research was tested and Structural Equation Model (SEM) analysis was performed with the LISREL 8.7 program. Goodness of fit values obtained as a result of Structural Equation Model were calculated as, $\chi^2/df=4.387$; NFI=0.95; CFI=0.98; IFI=0.98, GFI=0.97, SRMR= 0.069 and RMSEA= 0.090, and the goodness-of-fit values were found to be in the acceptable and excellent ranges.

The regulatory impact in the H_{4a} and H_{4b} hypotheses were wanted to be examined in order to understand in which situations the relationship between two variables changes. In the study, product color lightness was determined as the estimation variable for the regulatory impact analysis. In addition, the variable of hedonic food consumption was determined as the outcome variable and finally, extrinsic value and hedonic value variables were determined as moderator variables. First of all, it was analysed whether extrinsic value has a regulatory role in the effect of product color lightness on hedonic food consumption.

Regulatory Impact Analysis

In the study, it was found that product color lightness affects hedonic food consumption with the H_1 hypothesis. Based on this finding, the consumption trends of individuals increase as the product color clarity increases in hedonic foods. However, whether such an effect is the same for individuals who have extrinsic value behavior and those who do not have extrinsic value behavior was determined after the regulatory impact analysis. In order to determine this effect, Process Macro application was made over SPSS 20.0 program.

It was determined that all variables included in the regression analysis explained approximately 13% ($R^2=0.1336$) of the change in the outcome variable. In order to understand whether there is a regulatory impact, the obtained coefficients table was examined, $b=0.0098$, 95%, CI [-0.0023;0.0218], $t=1.5966$, $p=0.1111$, $p>0.05$ values have been obtained. It is seen that the extrinsic value variable does not have a regulating effect because the p value is greater than 0.05 and the values of the (CI) confidence interval include 0 value, and the extrinsic value behavior does not have a regulatory impact between product color lightness and consumption in hedonic foods (MacKinnon, Lockwood & Williams, 2004). In order to examine the other regulatory impact, product color lightness as a predictive variable, hedonic food consumption as a result variable and hedonic value perception as a regulatory impact were considered in the

study. In the regulatory impact analysis performed to determine whether the hedonic value perceptions of individuals have an effect on the effect of product color lightness on consumption in hedonic foods, $b=0.204$, 95%, $CI[0.0057;0.0352]$, $t=2.7317$, $p=0.0066$, $p<0.05$ values were obtained. It was determined that the regulatory impact was significant because the p value obtained was less than 0.05 and the CI value did not include 0. In order to examine the regulatory impact in detail, slope results were examined, and three different regression statistical values were examined to determine whether the effects of product color lightness on hedonic food consumption were significant in low (5,000), medium (8,000) and high (9,000) conditions of hedonic value perception. According to the findings, the positive relationship between product color lightness and hedonic food consumption is significant in case of low hedonic value perception (5,000) ($b=0.0724$, 95%, $CI[0.0190;0.1257]$, $t=2.6669$, $p=0.0080$, $p<0.05$). In the case where the perception of hedonic value is moderate (8,000), the positive correlation between product color lightness and hedonic food consumption is significant ($b=0.1337$, 95%, $CI[0.1002;0.1672]$, $t=7.8367$, $p=0.0000$, $p<0.05$). Finally, in the case where the perception of hedonic value is high (9,000), the positive relationship between product color lightness and hedonic food consumption is significant ($b=0.1541$, 95%, $CI[0.1165;0.11918]$, $t=8.0497$, $p=0.0000$, $p<0.05$). Based on these findings, it is said that as the severity of hedonic value perception in individuals increases, the relationship between product color lightness and hedonic food consumption becomes stronger.

Table 2. Evaluation of Hypotheses According to Structural Equation Model and Process Macro Analysis Results

Hypotheses	Paths	Standardized Parameter Estimates	t values	Conclusion
H ₁	Product color clarity → Hedonic food consumption	0.18	1.97	ACCEPTED
H ₂	Extrinsic value → Hedonic food consumption	0.17	1.79	REJECTED
H ₃	Hedonic value → Hedonic food consumption	0.43	4.95	ACCEPTED
H _{4a}	Regulatory impact of extrinsic value on product color lightness and hedonic food consumption			REJECTED
H _{4b}	Regulatory impact of hedonic value on product color lightness and hedonic food consumption			ACCEPTED

When the values of the hypotheses are examined as a result of the findings obtained in the research, the H₁ hypothesis, which includes the relationship between product color lightness and hedonic food consumption, is accepted, the H₂ hypothesis, which examines the relationship between extrinsic value and hedonic food consumption, is rejected, the H₃ hypothesis, which examines the relationship between hedonic value and hedonic food consumption, is accepted, H_{4a} hypothesis, which examines the regulatory impact of extrinsic value on color lightness and hedonic food consumption, was rejected, and the H_{4b} hypothesis, which examines the regulatory impact of hedonic value on product color lightness and hedonic food consumption, was accepted.

4. CONCLUSION AND RECOMMENDATION

As a result of the examination of the theoretical structure discussed in the research, the effect of product color clarity on the consumption of hedonic foods and whether extrinsic value and hedonic value have a regulatory impact on this effect were tried to be revealed. In the analyzes made, it was determined that the product color lightness was associated with hedonic food consumption and had a positive effect. This result overlaps with research by Grady (1993),

Woods and Wilcox (2006) and Elliot and Maier (2007). Similarly, the result obtained is supported by the finding in the study conducted by Madzharov, et al. (2016) that light-colored foods evoke more positive emotions and lead to more consumption than dark-colored foods. The positive and significant relationship between product color lightness and consumption in hedonic foods, which is the subject of the research, also supports the view that colors with light tones are more effective on pleasure than intense tones, obtained from a study by Valdez and Mahrebian (1994).

There was no significant relationship between extrinsic value and hedonic food consumption, which is the second hypothesis discussed in the study. When the questions asked to the participants about hedonic food consumption are examined, it is seen that the questions are about whether the individuals are conscious of healthy products and whether they consume snacks for dietary reasons. It is known that individuals with extrinsic value behavior are not conscious of healthy products, on the contrary, they consume hedonic foods excessively under the influence of external stimuli. The fact that underweight is more of an anxiety stimulant than overweight, especially by parents, suggests that unhealthy diet is better than malnutrition and supports the result obtained from the research conducted by Pagnini et al. (2007).

Another result obtained from the research is the existence of a significant relationship between hedonic value and hedonic food consumption. This situation coincides with the research conducted by Madzharov, et al. (2016), which is the source of the research. The pleasure and enjoyment of hedonic foods are associated with hedonic value, and it has been found that it affects the consumption of individuals.

The obtained result is supported by the finding that the consumption of fast-food products, which is a type of hedonic food, provides hedonic value in individuals and it is supported by the finding that the hedonic value obtained is higher than the utilitarian value (Park, 2004; Ryu et al., 2010; Nejati and Moghaddam, 2013; Hanzae and Rezaeyeh, 2013). In the study, it was also examined whether extrinsic value and hedonic value had a regulatory role in the effect of product color lightness on hedonic food consumption. As a result, it has been found that extrinsic value does not have a regulatory role, but hedonic value has a regulatory role. This situation reveals the view that individuals with extrinsic value behavior consume hedonic food regardless of the color of the product. Because in the behavior of extrinsic value, which is characterized as a tendency to consume hedonic food, individuals turn to hedonic food under the influence of various external stimuli, such as the color, smell, taste, texture of the product. In addition, the view that light-colored foods arouse more positive hedonic motivations and mediate more positive hedonic evaluations than dark-colored foods in the effect of product color lightness on hedonic food consumption (Madzharov, et al., 2016) was supported by the findings obtained from the research and has been determined that individuals' hedonic value perceptions have a regulatory role in the effect.

The research was carried out to determine the effect of product color lightness on hedonic food consumption. At the same time, it has also been examined whether individuals' extrinsic value habits and hedonic value perceptions have a regulatory role in the effect. As a result of the findings, it was determined that the lightness of the product color has an effect on hedonic food consumption.

Misperceptions and information sharing about food colorants in the public cause individuals to prefer lighter colors for product color, thus creating the belief that they consume natural or close to natural products. At the same time, the positive hedonic perceptions created by light-colored foods are seen as the reason why light-colored foods are consumed more than dark-colored foods. This is supported by the findings of the study. The effect of individuals' extrinsic

value habits on hedonic food consumption was examined with the health dimension, and it was found that individuals with extrinsic value habits tended to hedonic food consumption even if they were unhealthy. It has been found that individuals with hedonic value perception consume hedonic food, it has been reached the opinion that consumption will continue with the continuation of the pleasure and enjoyment they will derive from consumption. At the same time, the fact that hedonic value perception has a regulatory role in the effect of product color lightness on hedonic food consumption has been associated with the individuals' pleasure and it has been determined that as the hedonic value levels of the individuals increase, the product color lightness affects the hedonic food consumption more.

The consumption demands of individuals for light-colored products are higher than for dark-colored products. For this reason, businesses should tend to produce more light-colored products because light colors create more positive hedonic values in individuals. Because the unhealthy perception of food colorants in the minds of the public reduces the demand for dark-colored products in hedonic products. For this reason, the production of products in lighter tones will lead individuals to believe that the product is both more natural and less unhealthy. At the same time, it is necessary to inform the public about the awareness that food additives do not deteriorate the structure and quality of the product if they are applied in certain and permissible dimensions, on the contrary, they provide quality to the product by extending the life span of the product. This will cause the prejudice created by other additives to change and will enable individuals to have information about the product content.

The research was handled within the scope of hedonic foods. Because hedonic foods, in which product colorants are used intensively, have been the subject of research due to this feature. The research can be applied to different types of foods by categorizing hedonic foods. At the same time, emotional eating and restrictive eating behaviors of individuals can be examined together with the extrinsic value behavior of individuals and their effects on hedonic food consumption can be evaluated. Again, the situational regularity effects of the concepts of hedonic value and extrinsic value, which are examined as a regulatory impact in future studies, can also be examined. At the same time, the research can also be compared within the scope of demographic variables, taking into account whether the individuals have a parenting role, age, gender, education level, income and occupation. It is expected that the research will shed light on future research.

REFERENCES

- AKGUL, D. (2014). Hedonik (Hazcı) Tüketimin Özel Günlerdeki Alışveriş Kültürü Üzerindeki Etkisi Ve Ülkelerarası Karşılaştırmalı Bir Araştırma, Erciyes University, Phd Thesis.
- AMIN, L., AZAD, M. A. K., & SAMIAN, A. L. (2013). Factor influencing risk perception of food additives. *Journal of Food, Agriculture & Environment*, 11(2), 66-72.
- AVENA, N. (2015). Hedonic Eating: How the Pleasure of Food Affects Our Brains and Behavior, 1st Edition, Oxford University Press.
- BATRA, R., & AHTOLA, O. T. (1991). Measuring the hedonic and utilitarian sources of consumer attitudes. *Marketing Letters*, 2(2), 159-170.
- BEARTH, A. (2014). Risk Perception and Communication of Two Potential Food Risks: Campylobacter and Selected Food Additives, Doctoral Thesis, <https://www.research-collection.ethz.ch/handle/20.500.11850/95721>, (Erişim Tarihi:18.02.2022).

- BURTON, P., SMITH, H., & LIGHTOWLER, H. J. (2007). The influence of restrained and external eating patterns on overeating. *Appetite*, 49, 191-197.
- COOLS, J., SCHOTTE, D. E., & MCNALLY, R. J. (1992). Emotional arousal and overeating in restrained eaters. *Journal of Abnormal Psychology*. 101, 348-351.
- DELGADO-VARGAS, F., & PAREDES-LOPEZ, O. (2003). Natural colorants for food and nutraceutical uses. *Trends in Food Science & Technology*, 14, 438.
- DHAR, R., & WERTENBROCH, K. (2000). Consumer choice between hedonic and utilitarian goods. *Journal of Marketing Research*, 37(1), 60-71.
- EDWARDS, A. L. (1957). *Techniques of Attitude Scale Construction*. New York: Appleton-Century-Crofts.
- ELLIOT, A. J., & MAIER, M. A. (2007). Color and psychological functioning. *Current Directions in Psychological Science*, 16(5), 250-254.
- EROĞLU, E. İ., & AYAZ, A. (2018). Gıda Katkı Maddelerinin Sağlık Üzerine Etkileri: Risk Değerlendirme. *Beslenme ve Diyetetik Dergisi*, 46(3), 311-319.
- FLEMING, K., THORSON, E., & ZHANG, Y. (2007). Going beyond exposure to local news media: an information-processing examination of public perceptions of food safety. *Journal of Health Communication*, 11(8), 789-806.
- FELDMAN, F. (1997). *Utilitarianism, Hedonism and Desert: Essays in Moral Philosophy*, Cambridge University Press, Cambridge, 1997, 79.
- GRADY, D. (1993). The vision thing: mainly in the brain, *Discover*, June 1, 1993. <https://www.discovermagazine.com/mind/the-vision-thing-mainly-in-the-brain>.
- HAIR Jr., J. F., ANDERSON, R. E., TATHAM, R. L., & BLACK, W. C. (1998). *Multivariate Data Analysis* (5th Edition). Upper Saddle River, Prentice Hall, NJ.
- HANZAEI, K. H., & REZAEYEH, S. P. (2013). Investigation of the effects of hedonic value and utilitarian value on customer satisfaction and behavioural intentions, *African Journal of Business Management*, 7(11), 818-825.
- KADIM, F. (2017). Türk basınında “gıda katkı maddesi” konusunun çerçevelenmesi ve içerik analizi. *TEAD*, 3(2), 29-38.
- KARSAVURAN, Z., & ÖZDEMİR, B. (2017). Understanding street food consumption: A theoretical model including atmosphere and hedonism. In II. International Conference on Tourism Dynamics and Trends, Seville, Spain.
- KHAN, H., LEE, R., & LOCKSHIN, L. (2015). Localizing the packaging of foreign food brands: A case of Muslim consumers in Pakistan. *Journal of Product and Brand Management*, 24(4), 386-398.
- LABRECQUE, L. I., PATRICK, V. M., & MILNE, G. R. (2013). The marketers' prismatic palette: a review of color research and future directions. *Psychology and Marketing*, 30(2), 187-202.
- LABROO, A. A., & MUKHOPADHYAY, A. (2009). Lay theories of emotion transience and the search for happiness: A fresh perspective on affect regulation. *Journal of Consumer Research*, 36(2), 242-254.

- LAVERI, D. A., KLEINE, R. E., & KLEINE, S. S. (1993). Linking emotions and values in consumption experiences: An exploratory study. *Advances in Consumer Research*, 20, 70-75.
- LOWE, M. R., & BUTRYN, M. L. (2007). Hedonic hunger: A new dimension of appetite?. *Physiology & Behavior*, 91, 432-439.
- MACKINNON, D. P., LOCKWOOD, C. M. & WILLIAMS, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, 39, 99-128.
- MADZHAROV, A., RAMANATHAN, S., & BLOCK, L. (2016). The halo effect of product color lightness on hedonic food consumption. *Journal of the Association for Consumer Research*, 1(4), 579-591.
- MARTINS, N., RORIZ, C. L., MORALES, P., BARROS, L., & FERREIRE, I. C. F. R. (2016). Food colorants: Challenges, opportunities and current desires of agroindustries to ensure consumer expectations and regulatory practices. *Trends in Food Science & Technology*, 52, 1-15.
- MCCARTHY, M., BRENNAN, M., KELLY, A. L., RITSON, C., BOER, M., & THOMPSON, N. (2007). Who is at risk and what do they know? Segmenting a population on their food safety knowledge. *Food Quality and Preference*, 18, 205-217.
- MEIER, B. P., ROBINSON, M. D., & CLORE, G. L. (2004). Why good guys wear white: automatic inferences about stimulus valence based on brightness. *Psychological Science*, 15(2), 82-87.
- MEIER, B. P., ROBINSON, M. D., CRAWFORD, E. L., & AHLVERS, W. J. (2007). When 'light' and 'dark' thoughts become light and dark responses: affect biases brightness judgments. *Emotion*, 7(2), 366-376.
- MELA, D. J. (2006). Eating for pleasure or just wanting to eat? Reconsidering sensory hedonic responses as a driver of obesity. *Appetite*, 47, 10-17.
- MOON, J. W., & KIM, Y. G. (2000). Extending the TAM for a World-Wide-Web context. *Information & Management*, 38(4), 217-230.
- NEJATI, M., & MOGHADDAM, P. P. (2013). The effect of hedonic and utilitarian values on satisfaction and behavioural intentions for dining in fast-casual restaurants in Iran. *British Food Journal*, 115(11), 1583-1596.
- NIELSEN N. V. (2014). What Consumers Are Reaching for Around the World. In: *Snacking with a Conscience*. The Nielsen Company 2014. (Erişim: <http://www.nielsen.com/content/dam/nielsen/global/kr/docs/global-report/2014/Nielsen%20Global%20Snacking%20Report%20September%202014.pdf>)
- ÖYEKÇİN D. G., & ŞAHİN, E. M. (2011). Yeme bozukluklarına yaklaşım. *Türk Aile Hekimliği Dergisi*, 15(1), 29-35.
- PAGNINI, D. L., WILKENFELD, R., KING, L., BOOTH, M. L., & BOOTH, S. (2007). Mothers of pre-school children talk about childhood overweight and obesity: the

weight of opinion study. *Journal of Paediatrics and Child Health*, 43812, 806-810.

- PARK, C. (2004). Efficient or enjoyable? Consumer values of eating-out and fastfood restaurant consumption in Korea. *International Journal of Hospitality Management*, 23(1), 87-94.
- RAJVEER, B., & MONIKA, O. (2012). Junk Food: Impact on health. *Journal of Drug Delivery & Therapeutics*, 2(3), 67-73.
- ROZIN, P., FISCHLER, C., & SHIELDS, C. (2009). Additivity dominance: additives are more potent and more often lexicalized across languages than are "subtractives". *Judgment and Decision Making*, 4(6), 475-478.
- RYU, K., HAN, H., & JANG, S. S. (2010). Relationships among hedonic and utilitarian values, satisfaction and behavioral intentions in the fast-casual restaurant industry. *International Journal of Contemporary Hospitality Management*, 22(3), 416-432.
- SCHACHTER, S. (1971). *Emotion, Obesity and Crime*. New York: Academic Press
- SCHERMELLEH-ENGEL, K., MOOSBRUGGER, H., & MÜLLER, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit-measures. *Methods of Psychological Research Online*, 8(2), 23-74,
- SEVINÇER G.M., & KONUK N. (2013). Emosyonel yeme. *Journal of Mood Disorders*, 3(4), 171-178,
- SEZGIN, A. C., & AYYILDIZ, S. (2019). Çocukların tükettiği atıştırmalık gıdalarda kullanılan renklendiricilere ilişkin bir araştırma. *OPUS Uluslararası Toplum Araştırmaları Dergisi*, 11(18), 877-913.
- SHIM, S. M., SEO, S. H., LEE, Y., MOON, G. I., KIM, M. S., & PARK, J. H. (2011). Consumers' knowledge and safety perceptions of food additives: Evaluation on the effectiveness of transmitting information on preservatives. *Food Control*, 22(7), 1054-1060.
- SINHA, J. (2016). We are where we eat: How consumption contexts induce (un)healthful eating for stigmatized overweight consumers. *Journal of Consumer Psychology*, 26(2), 289-297.
- SUSSMAN, A. B., PALEY, A., & ALTER, A. L. (2021). How and why our eating decisions neglect infrequently consumed foods. *Journal of Consumer Research*. <https://doi.org/10.1093/jcr/ucab011>
- TAZEOĞLU, A., AYTEN, Ş., & TAZEOĞLU, D. (2020). Üniversite öğrencilerinin yeme davranışlarının Hollanda Yeme Davranışı Anketi (DEBQ) ile değerlendirilmesi: Osmaniye Korkut Ata Üniversitesi Örneği. *Turkish Journal of Clinics and Laboratory*, 5, 429-435.
- TODARO, A., CIMINO, F., RAPISARDA, P., CATALANO, A. E., BARBAGALLO, R. N., & SPAGNA, G. (2009). Recovery of anthocyanins from eggplant peel. *Food Chemistry*, 114(2), 434-439.
- TÜRK GIDA KODEKSİ GIDA KATKI MADDELERİ YÖNETMELİĞİ 2013. T.C. Resmi Gazete (28693, 30 Haziran 2013).

- VALDEZ, P., & MEHRABIAN, A. (1994), Effect of color on emotions. *Journal of Experimental Psychology: General*, 123(4), 394-409.
- VAN STRIEN, T., FRIJTERS, J., ROOSEN, R., KNUIMAN-HIJL, W., & DEFARES, P. (1985). Eating behavior, personality traits and body mass in women. *Addictive Behaviors*, 10, 333-343.
- VAN STRIEN, T., FRIJTERS, J. E. R., BERGERS, G. P. A., & DEFARES, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*, 5(2), 295-315.
- VANEPPS, E. M., MOLNAR, A., DOWNS, J. S., & LOEWENSTEIN, G. (2021). EXPRESS: Choosing the light meal: Real-time aggregation of calorie information reduces meal calories [published online ahead of print May 19, 2021]. *Journal of Marketing Research*.
- WEDEL, M., & PIETERS, R. (2012), *Visual Marketing: From Attention to Action*, New York: Psychology Press.
- WOODS, R. J., & WILCOX, T. (2006), Infants' ability to use luminance information to individuate objects. *Psychology Cognition*, 99(2), B43-B52.
- WU, L., ZHONG, Y., SHAN, L., & QIN, W. (2013). Public risk perception of food additives and food scares. The case in Suzhou, China. *Appetite*, 70, 90-98.
- YANG, X., MAO, H., JIA, L., & BUBLITZ, M. G. (2019). A sweet romance: Divergent effects of romantic stimuli on the consumption of sweets. *Journal of Consumer Research*, 45(6), 1213-1229.
- YÖRÜK, N. G., & DANYER, E. (2016). Gıda katkı maddeleri genel bilgiler ve tanımlar. *Türkiye Klinikleri, J. Food Hyg Technol-Special Topics*, 2(2), 1-10.
- YURTTAGÜL, M. & AYAZ, A. (2008). Katkı Maddeleri: Yanlışlar ve Doğrular, <https://sbu.saglik.gov.tr/Ekutuphane/kitaplar/B%2016.pdf>, (Erişim Tarihi: 18.02.2022).
- ZHOU, S., CHEN, S., & LI, S. (2021). The shape effect: Round shapes increase consumers' preference for hedonic food. *Psychology & Marketing*, 38(11), 2051-2072.