

THE EFFECTIVENESS OF JUICE BOX GRAPHIC DESIGN SOLUTION INCONGRUENT WITH CONSUMER MEMORY SCHEMA

UČINKOVITOST RJEŠENJA GRAFIČKOG DIZAJNA TETRAPAK AMBALAŽE VOĆNIH SOKOVA NEPODUDARNOG SA MEMORIJSKOM SHEMOM POTROŠAČA

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Abstract

Graphic design solutions that are congruent with conventions of the consumer memory can initiate information processing in accordance with a schema, that is, unconventional solutions can activate the processing of schema – incongruent information. This paper argues the effectiveness of unconventional graphic design solutions for a juice box packaging in relation to conventional solutions which are present daily in our surroundings. The experiment was designed to exemplify emotional response differences to conventional and unconventional graphic design solutions which can either activate congruent or incongruent information processing. Based on Mandler's findings, we hypothesize that moderately incongruent schema, initiated by unconventional graphic design solution for packaging, will lead to more positive emotional response contrasting with a response initiated after information processing to scheme – congruent solution. Our findings confirm the hypothesis.

Keywords: *Graphic design, Packaging, Emotional response, Schema – congruity*

Sažetak

Grafička rješenja podudarna sa konvencijama u potrošačevoj memoriji mogu utjecati na obradu informacija u skladu sa shemom, odnosno, nekonvencionalna rješenja mogu aktivirati obradu informacija nepodudarnu sa shemom. U ovom radu ističemo učinkovitost nekonvencionalnih grafičkih rješenja tetrapak ambalaže za voćni sok u odnosu na konvencionalni dizajn koji je svakodnevno prisutan u našem okruženju. Eksperiment je

rađen sa ciljem da se izdvoje razlike u emotivnim odgovorima u odnosu na konvencionalno i nekonvencionalno dizajnersko rješenje koje može pokrenuti obradu informacija podudarnu ili nepodudarnu sa memorijskom shemom. Nadovezivanjem na Mandlerova istraživanja, postavljena je hipoteza da će nekonevencionalna grafička rješenja kod ispitanika izazvati pozitivniji emocionalni odgovor, suprotno odgovorima koja se očekuju na prikaz konvencionalnih rješenja. Hipoteza je potvrđena rezultatima eksperimenta sa ispitanicima.

Gljučne riječi: *grafički dizajn, ambalaža, emotivni odgovor, shema podudarnosti*

1. Introduction

1. Uvod

The regional market houses a great number of fruit juice manufacturers. However, most of the graphic solutions for Tetra Pak packaging can be reduced to the same visual convention: a brand logo at the top of the packaging, a name and a type of the product, photographs of fresh fruit, and usually very clean two – colour gradient background. Having in mind that packaging is the main promotional element at the sale point and the first encounter of consumer and product, the aim of good packaging is to convey the message about the brand emphasising one brand in relation to the product of its competitor [1]. If we look at the current situation on the market in the region, we can observe that shelves in supermarkets are stacked with conventions

without noticeable design solutions to highlight and distinguish competitive products one from another. Following previous findings on scheme congruity theory, this paper uses participants in the experiment to explore whether consumers have different emotional response to different design solution, that is, to conventional and unconventional graphic solutions of packaging for fruit juice packaging. The aim of this study is to determine if graphic design solution that is incongruent with memory schema affects more positively consumer's emotional response. It is expected that our findings confirm or deny Mandler's theory which state that moderately incongruous scheme will have the most positive effect on emotional response [2].

1.1 Schema congruency theory

1.1 *Teorija sheme podudarnosti*

The theory of scheme – congruity was primarily defined in the works of social psychology explaining that people process information firstly by categorizing, and then by evaluating whether the information matches or mismatches the category of their expectation [3, 4]. According to the schema congruency theory the reaction of the consumer depends on the fact if the rest of the information matches their expectation [5]. Schemes can be defined as “organized structures of previously acquired knowledge stored in our memory” [6]. They may include details such as feature categories, typical category samples, or formed attitude toward the whole category. Therefore, we can conclude that human brain employs previously accumulated knowledge for specific schema every time we encounter some new information. Such schematic processing enables easier and faster evaluation of new information because we don't have to go through all the steps of classification. The new information is simply allocated to the existing group in our memory [7]. Mandler [2] published a theoretical study arguing that scheme – congruity can lead to consumer behaviour such as inclusion of, or avoidance of information processing. Congruent schemes are processed with less effort than incongruent leading to more positive reaction because new stimuli fit into existing

schemes. However, congruent schemes are not remembered well in contrast to incongruent ones due to low processing. On the other hand, incongruent stimuli seek more extensive consideration which can result in negative effect if the new information does not fit in the existing schema. Mandler suggests that the best scenario to maximize comprehension and positive effect at the same time is a scheme of moderate congruity where information varies just enough to be memorized but not enough to evoke confusion or discomfort for the consumer. He further explains that moderate disagreements are the ones that can be solved successfully and are considered interesting, with positive value; therefore, they lead to positive attitudes. Congruent information can be predicted because it does not generate excitement. Contrary, extreme incongruence is defined as disagreements in schematic fitting which cannot be solved, or can be when essential changes are made to existing cognitive structure. Such discrepancies can lead to frustration rather than explanation [2]. Mandler's theory was used by many researchers in advertising. For example, Peracchio and Tybout argued that previous knowledge also affects emotional response and we can expect that moderate incongruity will lead to more positive response when consumer knows less [8]. It has been theorised that people with less knowledge make more effort to solve moderate incongruence. Expectedly, consumers with previous knowledge are able to deal with extreme incongruence with little effort; therefore, their affective response will be equivalent to their response to congruent information.

1.2 Schema – congruity application in advertising

1.2 *Primjena sheme podudarnosti u oglašavanju*

Congruent schema in an ad can trigger the consumer to be more acceptable of the ad content or to avoid it. If specific ad schema is distasteful or meaningless for some consumer, he will automatically let by the ad content and will not make an effort to process it. Even though when consumer has a positive view toward the schema, an ad that matches exactly

his expectations and does not trigger schema processing will not draw attention to its content. Schema processing aims at avoiding to use the brain or to quickly apply previously acquired knowledge [9]. On the other side, when we encounter incongruence there are a few possible reactions. Consumers can stop further procession of ad content if they decide that new information contains too many unfamiliar elements and takes more comprehension time than they are willing to devote to one single ad. One of the options is generalisation. If consumer can't place the current ad in the existing schema for specific product category, he will place the ad content in generalised product category and devote less attention to it. The option we are aiming for is that consumer invests extra effort to process incongruence by adjusting existing schemas, or creating new ones [9]. This reaction helps ad recall and brand recognition in future encounters. Mayers – Levy and Tybout tested Mandler's theory within the framework of consumer behaviour study in such manner that they gave the participants description of the new product which features are congruent, moderately congruent, or incongruent with features of existing category [10]. Their findings confirm Mandler's theory i.e. they confirmed that moderate incongruity leads to the most positive emotional response. Even when negative feature of the product was evaluated (e.g. additional preservative in natural fruit juice) the participants gave more positive ratings in comparison to congruent or extremely incongruent features. Further research employed background knowledge (familiarity) of the participants for product categories. Participants with least background knowledge gave the best rating to moderate incongruity while knowledgeable participants managed to process extreme incongruity with ease.

1.3 Emotions and consumer behaviour

1.3 *Emocije i ponašanje potrošača*

Emotions play significant part in consumer behaviour because consumers currently respond to their feelings [11]. Human

behaviour is governed by emotions to greater extent than by reason. Usual consumer behaviour is intuitive and emotional, and their actions are subconscious more often than not. Our mind is intertwined with our emotions, however, when disagreement between them occurs, emotions take control. Calne [12] points to major difference between emotions and reasoning – the result of emotions is in action and the result of reasoning is in conclusions. Today, emotions are used as a foundation to create appeals in marketing communication. Seen through marketing standpoint, emotions can be defined as a state of impulse that precedes action.

In everyday communication emotions are linked to stimuli that trigger specific emotion, but there are a number of emotions which depend on an individual and culture [13]. A product must provoke emotion but also it must be functional. For this reason, companies tend to create emotional connection with a consumer which leads to deeper relationship [14].

2. The aim of the research

2. *Cilj istraživanja*

The purpose of this study was to determine if there are differences in emotional response toward conventional and unconventional graphic solutions of packaging i.e. graphic solution which activates schema – congruity or schema – incongruity processing. According to literature review we can assume that graphic design that is in accordance with conventions can activate schema – congruity processing, and the one that is not can activate schema – incongruity processing. Relying on the confirmed studies [10, 15] that moderate information processing leads to more positive rating, the hypothesis of this paper was postulated:

H1: Moderately incongruent schema activated by unconventional graphic design of packaging will lead to more positive emotional response in comparison to response activated after congruent schema processing of the conventional graphic design solution for packaging.

2.1 Method

2.1 *Metoda*

2.1.1 Experiment 1

2.1.1 *Eksperiment 1*

For the purposes of this part of the research we used online questionnaire instead of printed booklet due to the large number of samples and participants. Participants in this study were of various age, profession, gender, education, and purchasing power. The authors used Wordpress platform with ContactForm7 Database Extension plugin for questionnaire design and data collection. In the first part of the experiment participants rated 20 products according to digital equivalent Likert scale in which each attribute (familiarity, typicality, expectancy and persuasiveness) was assigned values (-2, -1, 0, 1, 2) from completely inaccurate to completely true. Accordingly, dimension familiarity was assigned values completely unfamiliar, poorly familiar, familiar, somewhat familiar, and very familiar. All the other dimensions were coded in the same manner. Familiarity scale was included in the experiment as filter category which will help extract all the products participants are familiar with before data analysis. This way participants' attitude toward the ad will not affect the results. Expectancy scale is introduced as the approximate equivalent scale to the one Heckler and Childers used in their study 1992 [5] to determine how much graphic solutions of packaging is in accordance with consumers memory schema. Typicality scale displays how participants see a product in relation to other product from the same category. Less typical products will stand out because of their graphic and technical solution and induce arousal whereas additional mental effort to memorize and fit this new solution into the scheme will have either positive or negative outcome [2]. Persuasiveness scale will provide information about the level of trust in relation to information on the packaging. Participants may or may not believe the arguments that juice is made of real fruit. However, this information is not directly connected to purchase intention which depends on various factors, such as brand, price emotions, etc.

2.1.2 Stimuli

2.1.2 *Poticaji*

Participants were asked to view stimuli material and rate them according to provided attributes clicking on the button "rate this item" at their own pace. Collected data was analyzed with software for statistical analyses where authors analyzed normality of distribution, correlation analysis and factor analyses. Data from the first part of the experiment helped determine two factors of stimuli of similar characteristics which fit into conventional products group i.e. unconventional products group. Stimuli material was assembled from the samples of graphic design solutions of Tetra Pak packaging for fruit juice. The purpose of this type of packaging is to draw attention but also to convince potential buyer that the juice inside is made of fresh fruit and not chemical product supplemented with artificial colours and flavours. The stimuli material used were photographs of packaging not available in the regional market i.e. the fruit juice packaging was not familiar to participants because we wanted to eliminate influence of cognitive attitudes participants have towards packaging they use or have seen.

2.1.3 Factor analysis

2.1.3 *Analiza čimbenika*

Factor analysis was conducted. There were a large number of variables in the study and it best fitted to use this method to extract factor according to groups of variables and their correlation. The factors were extracted with PCA (Principal Component Analysis). The authors used method of Varimax rotation because of its simplicity to interpret data. By testing eigenvalues, it was determined that 12 values meet the criteria that the inherent value is above 1. The inherent value is part of the variance that is explained by a single major component, and the goal is to extract as much of the variance in the first few principal components. According to the Kaiser – Guttman Criterion factors with inherent value above 1 should be kept. This explains 80,54% of the total variance (cumulative % =80,54) (table 1). The Kaiser – Guttman Criterion is sometimes criticized for retaining too many factors. For this

reason the factorial structure was checked with screen plot (figure 1). The diagram displays singling out of a number of factors. It also shows that there is greater spacing after third factor. The authors tried to set three factor criteria to see whether variables can be placed in these three factors. The variables can be placed in three factors (table 1). In each of the three factors there are variables of typicality and expectancy which points to the fact that there is some essential feature that places variables into factors.

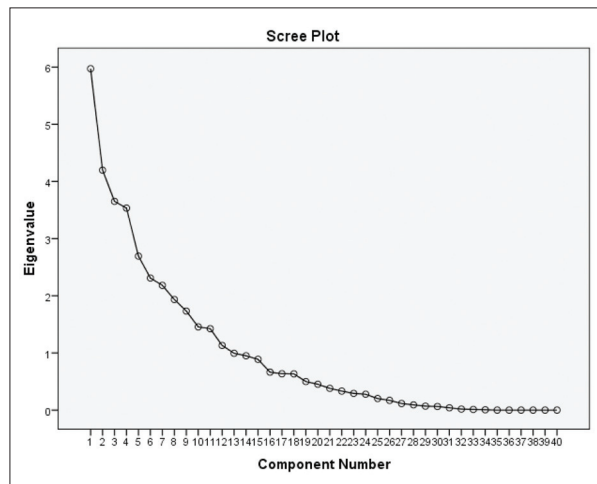


Figure 1 Graphic display of eigenvalues that are above 1

Slika 1 Grafički prikaz svojstvenih vrijednosti koje su veće od 1

Table 1 Factors that were extracted after variable analysis

Tabela 1 Čimbenici koji su se izdvojili nakon grupiranja varijabli

Factor 1	Factor 2	Factor 3
Typicality_p14	Typicality_p4	Expectancy_p10
Typicality_p16	Expectancy_p13	Persuasiveness_p10
Typicality_p19	Typicality_p13	Typicality_p7
Expectancy_p14	Expectancy_p4	Persuasiveness_p9
Typicality_p17	Typicality_p3	Typicality_p9
Expectancy_p17	Expectancy_p13	Typicality_p10
Expectancy_p5	Typicality_p8	Expectancy_p7
Expectancy_p15	Expectancy_p8	Expectancy_p9
Typicality_p15	Typicality_p20	Typicality_p1
Expectancy_p16	Typicality_p11	Persuasiveness_p11
Expectancy_p19	Expectancy_p6	Expectancy_p12
Typicality_p18	Expectancy_p1	Expectancy_p11
Typicality_p5		Typicality_p6
Expectancy_p20		Persuasiveness_p1
Expectancy_p18		Typicality_p12

Graphic solutions we labelled conventional (factor 1) have common features such as the order of the elements and design layout which usually includes a brand logo at the top of the Tetra Pak, followed by the type of the juice and photograph depicting fresh fruit set against two – colour background (figure 2). Unconventional solutions (Factor 3) used graphic elements more freely in terms of the size, typography and vector icons, also white space and unusual order of elements where pictures of fruit don't dominate but complement it just enough that the consumer can quickly draw a conclusion which piece of fruit is in question. The first and the third factor were chosen for stimuli design in the second experiment. The second factor was discarded due to the absence of a common visual attribute in the grouped packaging solutions.



Figure 2 Elements of graphic solution for conventional fruit juice packaging

Slika 2 Elementi grafičkog rješenja konvencionalne ambalaže za voćni sok

2.1.4 Experiment 2

2.1.4 Eksperiment 2

The hypothesis of this paper was tested in an experiment with participants where they were asked to self – assess their emotions on a three – level dimension scale: pleasure, arousal, dominance (PAD). The instrument they used was SAM (Self – Assessment Manikin) [16], an instrument for visual assessment of emotions toward different graphic design solutions of Tetra Pak packaging for fruit juice. The participants had limited time to rate stimuli material. They were given 6 second to view stimuli, followed by 5 second period for each PAD dimension to rate their emotions by selecting appropriate figure shape. The whole experiment was done online

with specially designed electronic instrument. The number of participants included was 144 of various ages, gender, profession, level of education, purchasing financial ability and interest category.

2.1.5 Stimuli

2.1.5 Poticaji

Eight packaging samples were used in the experiment. They were classified in two categories after the results of Principal component analysis in the first experiment. Two factors of highest loadings for both conventional and unconventional solutions were taken in consideration. The first batch of stimuli material had four pictures of products with conventional graphic design solutions for packaging (figure 2). The second batch had the same number of unconventional graphic design solutions for packaging (figure 3).

3. Analysis and discussion of results

3. Analiza i diskusija rezultata

Graphic design solutions in Factor 1 category are conventional solutions (figure 3) whereas in Factor 2 category there are solutions we perceive as moderately incongruent i.e. unconventional solutions that use vector graphics and extensive application of graphic design techniques (figure 4).



Figure 3 Stimuli – Conventional

Slika 3 Poticaji – Konvencionalna rješenja

Factor 1 consists of pictures of a product numbered 1, 7, 9, and 10 (conventional solutions where manufacturer chose simple design based on the photograph of fresh fruit and logo).

Factor 2, that is factor 3 in data analysis of the first experiment, consists of pictures of a product numbered 14, 16, 17, and 19 (unconventional



Figure 4 Stimuli – Unconventional

Slika 4 Poticaji – Nekonvencionalna rješenja

solutions where manufacturer chose vector graphics and more complex graphic intervention). First, we conducted repeated measures ANOVA for the emotion dimension – pleasure. We tested if there was difference between emotional response in relation to different design solution (conventional – unconventional). Based on the results we obtained there is significant statistical difference ($p=,000$) between emotional response for conventional and unconventional graphic packaging solutions. Proportion of variance (Partial Eta Squared = 0,545) for this dimension belongs to great influence of independent to dependant variable. Mean score of emotional responses for dimension pleasure of the unconventional graphic solution is $M=1,21$, and the conventional $M=0,07$. When observing emotional response for dimension arousal there are significant statistical differences in relation to the type of graphic solution ($p=,000$). Mean score for dimension arousal of the unconventional graphic solution is $M=0,66$, and the conventional $M= - 1,06$. Proportion of variance is great (Partial Eta Squared = 0,673). Emotional response for dimension dominance has also significant statistical difference in relation to the type of graphic solution ($p=,000$). Mean score for dimension dominance of the unconventional graphic solution is $M=0,54$, and the conventional $M= - 1,19$. Proportion of variance is great (Partial Eta Squared = 0,467).

After detailed statistical data processing we can conclude that there is significant difference in emotional response of participants toward products with conventional and unconventional graphic solutions. In other words, participants had more positive emotional response toward graphic design solutions that were not congruent with schema.

4. Conclusion

4. Zaključak

Our results unambiguously confirm the hypothesis. More positive emotional response to all three dimensions (PAD) was obtained when participants viewed unconventional graphic design solution of packaging for fruit juice. The results confirm the findings of previous studies [15, 17], that is, the unconventional schematic processing leads to more positive response toward the stimuli. According to Morris et al. [17] findings more positive emotional response is mediator of intention to purchase (more positive response has greater effect than previously acquired beliefs, knowledge and attitude toward the brand). Therefore, ecological validity of the results should reflect better in relation to intention to purchase a product with unconventional package design solution. The findings of this study should encourage manufacturers and

designers to develop and test concepts which do not rely solely on visual rhetorical convention of the double metonymy with the function of identification¹ that is the effectiveness of applying “gastronomic icons”, images of fresh fruit on the packaging of food products, which have proven to be not effective in this case [cf. 18, 19, 20].

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¹ Umberto Eco explains the structure of visual register of the message and distinguishes convention of the double metonymy with the function of identification as coding system at the tropological level. For further reference see [21,22, 23].

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Prethodno priopćenje

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