IMPACT OF COLOR TEMPERATURE ON THE EFFECTIVENESS OF ADVERTISING SPOKESPERSON

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Abstract
Advertising spokesperson is one of the undeniably important factors affecting advertising effectiveness. However, advertising spokesperson has to have some particular features to be effective. Various previous researches resulted in determination of different features of advertising spokesperson and their effectiveness; i.e. type of a spokesperson (celebrity vs. a regular person); gender and race of a spokesperson; etc. were found to have an impact on the spokesperson’s effectiveness. However, the research on the impact of shooting color temperature on its effectiveness is still scarce. The aim of this paper is to fill this gap. Neuromarketing research methods were applied to substantiate the impact of color temperature on spokesperson effectiveness and to determine the guidelines for its usage in advertising.

Keywords: advertising color, advertising effectiveness, color temperature, spokesperson
JEL codes: M31, M37

1. Introduction

In a context of intensive competition, many organizations are trying to conquer the market clutter using various tools of marketing communication. Advertising is becoming an inevitable part of human life. According to Bendixen (1993), advertising represents important means by which organizations communicates with their current and potential customers. Advertising allows companies to communicate a salient message to a large group of consumers faster than any other form of communication, truly connects with consumer by giving an opportunity of developing an ongoing brand relationship (Sharma, 2012). Advertising can play a key role in value creation and capturing (Tackx et al., 2017). However, being used massively, advertising loses its effectiveness and ability of solving many marketing and sales problems. Therefore, marketing scholars and business representatives are searching for ways of making advertisements more attractive, attention grabbing, and encouraging customers to make an action.

Many researches were provided to determine the factors influencing advertising effectiveness. One of the undeniably important factors is determined to be advertising spokesperson. To reinforce consumers’ impressions of advertising, enterprises, based on their brand image, strive for the right spokesperson for their products or service (Chih-Chung et al., 2012). Moreover, advertising spokesperson has to have some particular features to be effective. Various authors have provided researches concerning the features of advertising spokesperson and their impact on spokesperson effectiveness. Such characteristics of spokesperson as type (celebrity vs. a regular person), gender, race, age, etc. were assessed to provide a perfect picture. However, the research on the impact of shooting color temperature as a factor determining spokesperson effectiveness is still scarce. This paper seeks to contribute to previous researches by filling this gap. Therefore, the scientific problem solved in the article is: what is the impact of shooting color temperature on the effectiveness of advertising spokesperson? The aim of the research is to substantiate the impact of color temperature on spokesperson effectiveness and to determine the guidelines for its usage in advertising. In order to solve a problem and to contribute to a theory, neuromarketing research methods were applied. Implicit association test and eye tracking procedure were provided to substantiate an impact of color temperature on spokesperson effectiveness; based on research results, general guidelines concerning the usage of color temperature in advertising to make it more effective were given.

Reaching the aim, article was structured in to three main parts: theoretical substantiation (Chapter 2), methodological background (Chapter 3), and research results (Chapter 4). The summing-up conclusions are provided in Chapter 5.
2. Theoretical Substantiation

A spokesperson is anyone who imparts to the public the advertising message of a personal opinion, belief, finding, experience, etc. and it is believed by the public (Chih-Chung et al., 2012). Relying on spokesperson in advertising is a common strategy in advertising; therefore, the right choice of advertising spokesperson is a critical element in successful advertising (Lin, 2011). The question of ‘what attributes are desirable for an endorser to possess?’ (Priester and Petty, 2003) is quite relevant in a situation of tough competitions for consumer hearts.

After generalizing the scientific findings, Lin (2011) substantiates the usage of four types of spokespersons in advertising: celebrities, top managers, experts, and typical consumers. Despite the possibility of usage of each of them, numerous researches have proved empirically the effectiveness and the positive influence of celebrity endorsements in advertising (Gupta et al., 2015). Therefore, the main body of spokesperson-related empirical research is provided concerning celebrities. Banytė et al. (2011) emphasize that celebrities are often used by advertisers because of their famous attributes (i.e., beauty, talent, athleticism, power, etc.) that often represent the attractions desired for the brands they endorse – consumers may like the brand because they like the celebrity who endorses it. Previous research (see Grigaliūnaitė and Pilelienė, 2015) revealed positive effect of celebrity spokesperson on consumer purchase intentions (whereas a non-celebrity spokesperson hasn’t caused same effect).

However, choosing an appropriate celebrity is not enough. According to Chin-Chung et al. (2012), there are three main characteristics which have to be met by a spokesperson: attractiveness, trustworthiness, and expertise. Sertoglu et al. (2014) substantiated the effect of celebrities having latter characteristics on consumer purchase intentions. However, many factors may affect consumer perception and valuation of even the same spokesperson; therefore, presented in different circumstances the same person could cause different reaction.

One of the elements presumably having an effect on consumers’ perception of the spokesperson is advertising colors. A wide body of scientific research provides evidence of different color impact on consumer perception and behavior (Lee and Barnes, 1989; Smolders and de Kort, 2017). As colors can be classified into warm and cool, Patil (2012) emphasizes that warm colors lean towards activity, and cool colors are passive. Therefore, it can be stated that colors have a particular temperature. The color temperature is defined as the correlated temperature of estimated illumination of color images, and it relates to the energy of illumination in the image: if the color temperature is low, an image looks reddish and the image looks bluish if the color temperature is high (Nam et al., 2005); thus, modifying the color temperature of an image simply changes how warm or cool (blue or red) an image looks. Considering latter insights we hypothesize that shooting color temperature has an impact on advertising spokesperson effectiveness.

3. Research Methodology

Color temperature is often measured in Kelvins (K) and lightning is classified according to color temperature, into the three following groups: Warm (about 2900 K), White (about 4200 K) and Cool (about 6000 K) (Kapogiannatou et al., 2016). Hence, for the research, ten sample advertisements of which 5 were warm color temperature (3000 K) and 5 were cool color temperature (6000 K) was created (see Figure 1). In all of the advertisements the same well known celebrity spokesperson and a product of mineral water (representing the category of fast moving consumer goods) were presented. The only two differences were color temperature and brand name on the product. For advertisements with warm color temperature one brand was created (in order to eliminate the influence of current attitude toward the existing brands) and for advertisements with cool color temperature – the other brand was created. All of the 10 created advertisements were used for the eye tracking experiment and implicit association test.

Figure 1: Color Temperatures Used for the Research

![Color Temperatures Used for the Research](source: author’s elaboration)

**Eye Tracking Experiment**

According to Pieters et al. (2010), effective advertising primarily needs to capture consumers’ attention. Attention is the first element of AIDA model developed by E. St. Elmo Lewis in 1898 (Li & Yu,
2013) (according to Hassan et al. (2015) the AIDA model has been widely adopted in formulating marketing strategies); without capturing consumers’ attention no advertisement will be effective. As the appropriate methodology for analyzing consumers’ attention is eye tracking experiment, latter procedure is applied for this research.

All ten sample advertisements (5 advertisements with 3000 K color temperature and 5 advertisements with 6000 K color temperature) were shown for the participants at one time in a randomized order on the computer screen for 10 times, each time the order of the advertisements was randomized again. Between the screens with 10 advertisements, black screen appeared for 2 seconds in order to eliminate the influence of the trajectory of gaze for the last seen screen.

The experiment was conducted using Tobii Eye-Tracking Glasses – mobile video-based eye tracker recording monocular gaze data from the right eye at a sampling rate of 30 Hz. This eye tracker has an accuracy of 0.5°. The system has a camera to record a scene video with a resolution of 640x480 pixels; maximum recording angles are 56° of visual angle in horizontal and 40° of visual angle in vertical direction.

Each of the participants put on the glasses and performed a standard nine point calibration. All of the participants were volunteers and had not been paid for the participation in the eye-tracking experiment. Convenience sampling method was applied. Before the experiment each of the participants was informed in detail about the experiment. The experiment was held in Lithuania, Vytautas Magnus University, April, 2017. 10 participants’ of the same nationality (4 females) data appropriate for the analysis were obtained. All of the participants were right-handed with normal or normal-to-corrected vision. All of the participants were at the age group of 18-30 years.

For the analysis of eye-tracing results Tobii Studio v.3.2.3 software was applied. Warm color temperature advertisements’ total fixation duration (average duration of all fixations within the specific advertisement) and fixation count (average number of times the participants fixated on the specific advertisement) as well as cool color temperature advertisements’ total fixation duration and fixation count were calculated. IBM SPSS Statistics v.20 software package was applied for the statistical analysis of the results obtained from the Tobii Studio v.3.2.3 software.

**Implicit Association Test**

IAT provides a measure of strengths of automatic associations (strength of association is understood as the potential for one concept to activate another) (Greenwald et al., 2003). The usefulness of the IAT in measuring association strength depends on the assumption that when the two concepts that share a response are strongly associated, the sorting task is considerably easier than when the two response-sharing concepts are either weakly associated or bipolar-opposed (Greenwald et al., 2002).

Thus, the Implicit-Association Test is a widely-used cognitive-behavioural paradigm that measures the strength of automatic (implicit) associations between concepts in people’s minds relying on latency measures in a simple sorting task. The strength of an association between concepts is measured by the standardized mean difference score of the ‘hypothesis-inconsistent’ (target A with attribute B and target B with attribute A) pairings and ‘hypothesis-consistent’ (target A with attribute A and target B with attribute B) pairings (d-score). In general, the higher the d-score the stronger is the association between the ‘hypothesis-consistent’ pairings. Negative d-scores suggest a stronger association between the ‘hypothesis-inconsistent’ pairings.

Inquisit’s Picture IAT by Millisecond Software was applied in this research. Target stimulus A were warm color temperature advertisements (the same five used in the eye-tracking experiment), target stimulus B – cool color temperature advertisements (the same five used in the eye-tracking experiment), attribute A – like (quality, value, advantage, beauty, good), attribute B – dislike (horror, nonsense, boredom, worthless, bad). Inquisit calculates d-scores using the improved scoring algorithm as described in Greenwald et al. (2003). Error trials are handled by requiring respondents to correct their responses according to recommendation. The sequence of the steps applied is as follows:

1. Target Category sorting training;
2. Attribute sorting training;
3. 1. Test Block of hypothesis-consistent pairings with 20 trials (half the participant start with inconsistent pairings);
4. 2. Test Block of hypothesis-consistent pairings with 40 trials;
5. Target Category sorting training with targets switching sides;
6. 1. Test Block of hypothesis-inconsistent pairings with 20 trials;
7. 2. Test Block of hypothesis-inconsistent pairings with 40 trials.

The summary of IAT scoring procedure by Greenwald et al. (2003) is as follows:
1. Delete trials greater than 10,000 ms;
2. Delete subjects for whom more than 10 percent of trials have latency less than 300 ms;
3. Compute the “inclusive” standard deviation for all trials in Stages 3 and 6 and likewise for all trials in Stages 4 and 7;
4. Compute the mean latency for responses for each of Stages 3, 4, 6, 7;
5. Compute the two mean differences (Mean Stage 6 – Mean Stage 3) and (Mean Stage 7 – Mean Stage 4);
6. Divide each difference score by its associated “inclusive” standard deviation;
7. \( D = \) the equal-weight average of the two resulting ratios.

The experiment was held in Lithuania, Vytautas Magnus University, April, 2016. Participants sat in front of the computer screen, where the instruction for them about the IAT procedure was presented. Their task was to classify words and pictures by pressing one of two keys (the response keys were ‘E’ and ‘I’). Participants were informed that each stimulus would remain on the screen until a correct classification had been performed. Convenience sampling method was applied. 19 participants’ of the same nationality (6 females) data appropriate for the analysis were obtained. All of the participants were at the age group of 18-29 years. Ms Excel 2010 and IBM SPSS Statistics v.20 software packages were applied for the statistical analysis of the results obtained from the Inquisit software.

After the implicit association test, participants outlined which brand of the mineral water they prefer to buy (the one from the warm color temperature advertisements or the one from cool color temperature advertisements).

4. Research Results

The analysis of the research results revealed that advertisements with warm color temperature (in this case 3000 K) attract more visual attention than advertisements with cool color temperature (in this case 6000 K) (see Table 1). As it can be seen, mean viewing time to the advertisements with warm color temperature is 9.36 s (S.E. 0.75), while mean viewing time to the advertisements with cool color temperature is 5.43 s (S.E. 0.74). Fixation count (in times) substantiates the results of the mean viewing time. Mean fixation count to the advertisements with warm color temperature is 284.20 (S.E. 22.75), while mean fixation count to the advertisements with cool color temperature is 164.80 (S.E. 22.92). Hence, warm color temperature advertisements (3000 K) are more attention-grabbing than cool color temperature advertisement (6000 K), even when the advertised product is mineral water, usually associated with cool colors.

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Mean viewing time (s)</th>
<th>Fixation count (times)</th>
<th>Mean viewing time (s)</th>
<th>Fixation count (times)</th>
</tr>
</thead>
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<tr>
<td>3000 K ad</td>
<td>9.36</td>
<td>284.20</td>
<td>5.43</td>
<td>164.80</td>
</tr>
<tr>
<td>6000 K ad</td>
<td>5.43</td>
<td>164.80</td>
<td>5.43</td>
<td>164.80</td>
</tr>
<tr>
<td>S.E.</td>
<td>0.75</td>
<td>22.75</td>
<td>0.74</td>
<td>22.92</td>
</tr>
<tr>
<td>95% C.I. Lower bound</td>
<td>7.65</td>
<td>232.73</td>
<td>3.73</td>
<td>112.94</td>
</tr>
<tr>
<td>95% C.I. Upper bound</td>
<td>11.05</td>
<td>335.67</td>
<td>7.12</td>
<td>216.66</td>
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<tr>
<td>Median</td>
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<td>5.10</td>
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<td>S.D.</td>
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<tr>
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<td>2.77</td>
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</tr>
<tr>
<td>Max</td>
<td>11.33</td>
<td>342.00</td>
<td>9.38</td>
<td>286.00</td>
</tr>
</tbody>
</table>

Source: author’s calculations

As the data of eye tracking experiment are non-normally distributed, Wilcoxon Signed Ranks Test (two dependent samples) is applied in order to evaluate whether there are significant differences in visual attention to the advertisements with different color temperature (see Table 2).

As it can be seen, viewing time to the warm color temperature advertisements (3000 K) is statistically significantly higher than viewing time to the cool color temperature advertisements (6000 K). Thus, it could be stated that consumers’ attention is the necessary but not sufficient condition for the advertisements to be effective. In case of the selection of advertising color temperature, based on the research results, warm color temperature increases the possibility for capturing consumers’ attention, hence increases the possibility for advertising to be effective.
The results of the implicit association test, revealing the strengths of automatic associations, are provided in Figure 2 below. As it can be seen, the d-score for all of the 19 participants is positive. Positive d-score means the stronger association between the ‘hypothesis-consistent’ pairings (target A with attribute A and target B with attribute B). As in this research target A is warm color temperature advertisements (3000 K), attribute A is positive words with the title ‘like’, target B is cool color temperature advertisements (6000 K), attribute B is negative words with the title ‘dislike’. Hence it could be stated that warm color temperature advertisements (3000 K) are stronger associated with positive words and feelings than cool color temperature advertisements (6000 K) are. In general, participants have more positive implicit attitude toward warm color temperature advertisements (3000 K) than toward cool color temperature advertisements (6000 K).

As all of the advertisements contain the same celebrity spokesperson and the same product, and the only difference in the advertisements is the color temperature, based on the results it could be stated that color temperature influences not only consumers’ visual attention, but implicit preferences as well. Hence, the assumption could be made that color temperature complements the effectiveness of advertising spokesperson. Contrarily, wrong color temperature can decrease the effectiveness of the advertising spokesperson and in such a way decrease advertising effectiveness. These results suggest that selecting one effective advertising element (e.g. celebrity spokesperson) may not be sufficient to increase advertising effectiveness if all of the remaining elements are not properly managed.

Finally, when analyzing purchase intentions of the products presented in the advertisements of different color temperature, it could be stated that in general the product presented in the warm color temperature advertisement (3000 K) is definitely more likely to be bought than product presented in the cool color temperature advertisement (6000 K) (see Figure 3).
As it can be seen from Figure 3, 17 out of 19 participants (90 percent) chose to buy product (and brand) presented in the warm color temperature advertisements (3000 K). Consequently, visual attention, implicit attitude and purchase intentions are all higher for the advertisement / product with warm color temperature.

5. Conclusions

Being used massively, advertising loses its effectiveness and ability of solving many marketing and sales problems. Therefore, marketing scholars and business representatives are searching for ways of making advertisements more attractive, attention grabbing, and encouraging customers to make an action. Analysis and synthesis of scientific literature leads to the conclusion that without capturing consumers’ attention no advertisement will be effective. After capturing consumers’ attention advertisements receive the opportunity to become effective.

The analysis and synthesis of scientific literature allows concluding that advertising spokesperson is one of the undeniably important factors for advertising effectiveness. Nevertheless, properly selected spokesperson might not be enough to reach advertising effectiveness if other advertising elements are not managed properly and based on the research results one of the factors that influence consumer behavior is advertising color temperature.

The analysis of the research results leads to the conclusion that advertising color temperature influences consumers’ visual attention, implicit preferences, and purchase intentions. In the case of this research, warm color temperature (3000 K) attracts more visual attention to the advertisement, receives more positive implicit attitude toward the advertisement and elicits higher purchase intentions of the advertised product when compared to the cool color temperature advertisement (6000 K). Hence, color temperature complements the effectiveness of advertising spokesperson. Contrarily, wrong color temperature can decrease the effectiveness of the advertising spokesperson and in such a way decrease advertising effectiveness.

References


