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Gender differences in visual attention and attitude towards types of advertisements

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Abstract:	

Gender differences: visual attention and attitude towards advertisements

Structured Abstract

Purpose: This study examines the differences between genders in visual attention and attitudes towards different types of advertisements.

Design: An experimental design using a structured questionnaire and six print advertisements with a male, female, and neutral focus was used to evaluate gender differences. In total, 180 students from a public University in Brazil participated in the study. An eye-tracking device was employed, using the Tobii Studio software, to get the visual attention metrics for this study.

Findings: In the case of the female advertisements, no significant difference between visual attention and attitude was found; however, differences were found in the case of male visual attention to the image and their relative attitudes towards the advertisements.

Research limitations: Because it is a laboratory experiment using quota sampling, mainly Latin consumers, the potential for broader generalization may be limited. Besides, since they are real image advertisement images, there may be some interference in the respondents' responses from previous interactions with the brand or product exposed, or even from a prior observation of this advertisement.

Originality: This study provides deeper insight into Latin consumers' preferences and associations, who have a different cultural and national context. This study contributes to the use of the eye-tracking tool as a neuromarketing technique to evaluate and analyze visual attention.

1 Introduction

Properly targeting a campaign's audience is an essential part of an organization's communication strategy. According to Kraft and Weber (2012), demographic characteristics such as education level, family dynamics, generation, and income are factors that influence marketing strategies. Consumers are exposed to a high number of advertisements over a short period, so an advertisement needs to get the consumer's attention to stand out and be perceived by the consumer. Baack *et al.* (2016) cite that factors such as creativity in the making of the advertisement can influence consumer attention, and consequently, their attitude.

The impact on consumer attitudes may be concerning the advertisement or the advertised brand (Baack *et al.*, 2016; Shaouf *et al.*, 2016). Attitude can be defined as the set of motivational, emotional, perceptual, and cognitive processes concerning some aspect of the environment that influence a favorable or unfavorable reaction towards an object (Hawkins and Mothersbaugh, 2010).

Some variables impact on the elaboration of a communication strategy. According to Lansley and Longley (2016), gender is one of the variables that have a strong influence on the consumption and behavior of individuals. Several studies have pointed out the differences between men and women in the evaluation of advertisements (Cartocci *et al.*, 2016; Franch, 2014; Shaouf *et al.*, 2016; Vecchiato, 2014; Wan *et al.*, 2014) and the attitude towards them (Franch, 2014; Goodrich, 2014; Jung and Rovland, 2016; Shaouf *et al.*, 2016).

Cartocci et al. (2016) verified in their study that gender is one of the relevant factors for the elaboration of an advertisement when carrying out research using a brain-mapping tool (EEG), eye-tracking, and questionnaires with youngsters and adults. The results showed that the different genders showed varying levels of visual attention throughout the car commercial, and in general, men appreciated the commercial more than women did. Nilashi et al. (2020) assert that neuromarketing is considered to be an innovative practice to inform conventional marketing using neuroscience, by examining the impact of various stimuli that may link to specific consumer preferences or purchase intentions. The method of neuromarketing is intended to support product diversification and development, and relative advertisement, by establishing more about the mind of consumers using innovations in neuroscience.

Vecchiato *et al.* (2014) aimed to identify emotional and behavioral differences in men and women after viewing perfume commercials. The women presented the highest appreciation values of the commercials. Visual attention levels also varied according to the commercial display. In a similar study that aimed to identify the behavior of men and women after viewing images of meat with different fat levels, Banovic *et al.* (2016) found that the genders presented constant differences in the responses, and the women presented higher levels of visual attention than the men when observing all the images. By using neuroscience applications such as brain-mapping tool (ECG) and eye-tracking, as an investigatory neuromarketing technique, it could be shed light into such differences by observing nervous and mental activities (Spence, 2019) that control's the choices and preferences, including gender differences with regards to attitudes and evaluations.

Furthermore, previous studies highlight the existence of differences between genders in some variables related to consumer behavior. However, it is noted that there is no consensus on how each gender reacts to a commercial concerning its level of visual attention and attitudes towards advertising. Cartocci *et al.* (2016) pointed out that the differences in the response obtained in their study may be the result of the product chosen for the analysis (car), which can be considered as a product-oriented to masculinity. Besides, some advertised products are directly associated with the female or male gender connotations because of a gender-specific characteristic or greater use by a specific gender (Gainer, 1993). Hence, examining the mental procedures affecting customer's choices may prove beneficial to further understand purchase intentions, specifically establishing differences amongst genders and impulsive reactions to promotional motives (Nilashi et al. 2020).

It is also necessary to consider additional variables that were not explored together in the previous studies to obtain more consistent results: the type of advertisements chosen and potential gender orientation if any. It is also worth noting the relevance of this study due to the difficulty in measuring the return on investment in advertisements, which makes it important to carry out complementary studies that may aid in strategic marketing decisions. In addition to this, there are not many studies concentrating on the combined investigation through neuroscience and marketing practices, specifically focusing on gender differences amongst younger consumers set in the Brazilian context. It is important to consider the emotional reactions, like visual attention and attitudes towards an advertisement, to analyze what impact they have in the advertisement field. Studies in the neuromarketing field can help to identify emotions and attitudes toward advertisements (Rasyid & Djamal; 2019). Srivastava and Balaji (2018) indicate that existing research has neglected the processes of human information processing (rational and experiential) about advertisements and brands.

Employing neuromarketing techniques, it is possible to investigate intentions, behavior, and reactions of consumers that could not be possible by simply interviewing with the consumer after a stimulus. An individual is often not willing to reveal their emotional rationale, preferences, and decisions or what really caught their attention (Fugate, 2007), or possibly does not remember or was not aware of what attracted their attention. In this regard, using Eye-Tracking, these barriers could be overcome.

Therefore, this paper intends to fill in the gap by examining the gender differences in visual attention and attitudes towards advertisements using a neuromarketing technique and provide better insight into the customer's behavior.

2 Literature Review and Hypotheses development

2.1 Visual attention and attitudes

An individual's behavior is not always determined only by rational but also emotional aspects. Sometimes, even consumers believe that they do not consider a commercial when evaluating a product, but the analysis of emotional characteristics shows the opposite (Raluca and Ioan, 2010). About AIDA framework, attention is a primary factor linked to determine consumer intention, and it is further still relevant in the final decision-making of the consumer and can be related to the importance of studying eye movements in terms of neuroscience, that correlates to visual attention (Orquin and Loose, 2013). The number of information captured by the human eye exceeds the total that the brain can process, causing the eye to develop mechanisms that capture only information considered relevant to information processing (Wedel and Pieters, 2007) and helps to identify how a consumer's decision is made (Khushaba *et al.*, 2013). Orquin and Loose (2013) point out that visual attention interferes with an individual's level of perception of a visual stimulus, limiting and controlling it at the same time. In context to this, there has been the increasing impetus of neuromarketing techniques in place to understand and evaluate marketing problems and develop insights into consumer's behavioral motives (Lee, et al. 2018). This is also evident from growing interest, and increasing focus in the marketing research literature especially studies looking at explaining the concept and application of neuroscience and its relationship to neuromarketing and consumer behavior (Nilashi, et al. 2020; Lee, et al. 2018 and Spence, 2019).

Visual attention is one of the focuses of the study of neuromarketing, which seeks to identify the unconscious aspects that may influence a person's perception regarding the visualization of a particular product or commercial (Madan, 2010). Visual attention can then contribute to the understanding of a wide range of themes, including factors such as brand recall, preferences, and attitudes towards an advertisement (Higgins *et al.*, 2014). In support of this, studies such as Wedel and Pieters, (2008) and Li et al. (2016) also seek to understand visual attention through the use of tools such as eye-tracker, a device used to identify the position of the eyes and, consequently, visual attention.

Some studies also seek to understand how the visual attention and the attitude of consumers can be impacted by the advertisements (Cartocci *et al.*, 2016; Vecchiato *et al.*, 2014; Filipovic et al., 2019). In context to this, attitude is the representation of a person's assessment of an entity in question (Ajzen and Fishbein, 1977). Ajzen and Fishbein (1977) consider the influence of attitude in behavior as an entity composed of four elements: action, target, context, and time; which must be examined together and correctly for behavioral analysis. The attitude towards the advertisement construct is an

interesting and useful way for scholars to evaluate affective as well as cognitive responses to advertisements (Machleit and Wilson, 1988).

Thus, advertisements are one of the key strategies that can be used to encourage positive changes in a consumer's attitudes. The attitude toward the advertisement is one of the ways to evaluate the effectiveness because it is related to the attitude towards a product/brand and, therefore, inferring to the intention to buying intentions (Lutz *et al.*, 1983). Lee *et al.* (2016), in a study in Korea on golf product brands, tested the model proposed by Ducoffe (1986) – the existence of the outcome from advertising value (derived from the commercial through three key points: information, entertainment, and irritability); the first directly related to positive attitudes towards the announcement, second to motivate interaction and engagement, and the third directly related to negative attitudes. Lee *et al.* (2016) identified that the level of information and entertainment influenced positive attitudes towards advertising, these attitudes, in turn, had a positive influence on the attitude towards the brand and these, together, impacted on the intention to buy.

Therefore, the constructs of attention and attitude are important in the advertisement field and have been the key aspects of investigation in several studies. More specifically, visual attention and the attitude toward an advertisement are two aspects that capture the emotional reactions of the consumer during the exposure to an advertisement (Raluca and Ioan, 2010). This enhances the importance to understand if an advertisement is, on fact, is achieving the expected consumer reaction results, in both emotional and rational fields. This is especially important in the light of studies that indicate that brand experience may not exert any significant direct effect on brand attitude, but a direct effect in the brand credibility, showing the importance of the network of emotions, cognitions, and behaviors in shaping the value of a brand (Nayeem, Murshed & Dwivedi, 2019). Neuromarketing techniques, coupled to evaluate, in this context, can provide deeper insights into the stimuli features that exhibit customer's visual attention and arousal (Daugherty and Hoffman, (2017).

2.2 Gender Differences

Several studies seek to identify the differences between men and women for responses to various marketing stimuli (Delaney et al. 2015 and Kraft and Weber, 2012). Banovic *et al.* (2016), in their study, identified differences in visual attention patterns, for men and women, associated with meat images containing different levels of fat. The authors identified that women had higher levels of attention and shorter choice times than men did. Earlier, Wan *et al.* (2014) experimented in six Chinese cities in different states of modernization to understand the gender differences in responses and reactions to commercials featuring nudity. Interestingly, one of the most relevant conclusions of the study was that men had more positive attitudes toward advertisements depicting female nudity than women towards advertisements depicting their male counterparts' nudity.

There is also a range of studies that relate visual attention and attitude to advertisements with differences between genders. Cartocci *et al.* (2016), for example, studied differences between genders and ages in emotional engagement when watching television commercials, through the aid of electroencephalogram (EEG) and eye-tracker. Differences between the genders were identified, with men showing a greater appreciation of the car commercial than women, and a greater appreciation of the younger participants to the chewing gum commercial compared to the older group. The levels of

visual attention varied according to the display of the advertisement (Banovic *et al.* 2016): in the car scene, men had more visual attention. In the family scene, the women had more visual attention.

According to Belinskaya (2015), images of celebrities, animals, women, and abstract figures are preferred by the female audience, while images associated with mechanical and technological features have a higher appreciation by the male one. Vecchiato *et al.* (2014) had earlier identified emotional reactions from commercial observation through a neuroscience perspective, using electroencephalogram (EEG), galvanic skin response (GSR), and electrocardiogram (ECG). For the most part, women presented greater appreciation and remembrance than men did.

Moreover, studies carried out by Goodrich (2014) and Shaouf *et al.* (2016) investigated how differences in the aesthetics of an advertisement could impact the evaluation from each gender. Shaouf *et al.* (2016) identified differences between genders about internet advertising design and its impact on purchase intention and attitude. Men presented a greater relationship between advert design and attitude toward advertising and branding than women did. Also, only men showed a correlation between design advertisements and intent to purchase the advertised brand. Goodrich (2014) carried out a study that identified differences in information processing by men and women. An eye-tracking device was used to detect the respondent's visual attention. The male audience presented more visual attention to graphic stimuli such as banners and better attitudes towards advertisements located on the left side of the screen, as opposed to the female audience, who presented better attitudes for advertisements located on the side right.

Finally, Jung and Hovland (2016) analyzed differences in beer advertisements from the three leading magazines for women and magazines aimed at the male audience and identified differences in the creative strategy used for each gender. Advertisements placed in men's magazines highlighted the brand's image, while advertisements from women's magazines featured more of the user's image, the occasion of use, and general product information.

Although this relation between products and genders is considered effective by Jung and Hovland (2016), there is a lack of studies that seek to identify the impact of different types of advertising on consumer perception, such as the level of attention and attitudes towards advertisements. Cartocci *et al.* (2016) state that the use of a car in their study, a product associated with the male audience, may have influenced the results of the research. The same limitation can be observed in the study of Goodrich (2014), with the use of a razor that is intended for the male audience.

Considering the scarcity of studies that focused on the effect of different types of advertisements (with gender connotations, e.g. masculine or feminine advertisements) both on visual attention and on attitude, this study sought to investigate the following hypotheses:

Hypothesis 1: There are differences in patterns of visual attention to different types of advertisements (masculine or feminine) depending on consumer gender (male versus. female). This hypothesis is based on the studies of Banovic *et al.* (2016) and Goodrich (2014), who indicated that there are differences in visual attention patterns, for men and women, considering different types and layouts of advertisements.

Hypothesis 2: There are differences in attitudes toward different types of advertisements (masculine or feminine) depending on consumer gender (male versus. female). This hypothesis is based on the works of Wan *et al.* (2014), Cartocci *et al.* (2016), Belinskaya (2015), Vecchiato *et al.* (2014) and Shaouf *et al.* (2016), that concluded that there are different levels of attitudes and emotional reactions, for men and women, when different types of advertisements were presented to the audience.

Although many studies analyze gender differences in attitudes and visual attention genders towards an advertisement, as exposed in the literature review, there is a dearth of similar studies carried out focusing upon South American countries. Furthermore, this study will provide deeper insight into Latin consumers' preferences and associations, who have a different cultural and national context. The use of neuromarketing technique evaluation, by application of the eye-tracking device, will add value to understand gender differences in visual attention and attitudes towards different types of advertisements, especially in the context of a South American country, as explained in the methods section.

3 Methods

3.1 Pretesting

The initial procedure was the selection of the advertisements that composed the experiment. For the pretest, 243 students from a public University in Brazil acted as volunteers (96 men and 147 women). We selected advertisements that were available on the internet of the products within the categories proposed by Paek et al. (2011) for the pretest. Women's products consisted of food, cooking utensils, personal care, cosmetics, clothing, and jewelry; while men were alcoholic beverages, office supplies, automobiles, business-related products, finance, and telecommunications. Neutral products were hobbies, education, health or medicine, travel, housewares, furniture, and entertainment.

Following the study of Vecchiato *et al.* (2014), two advertisements from each pretest product category were selected. We used real-name and well-known advertisements as Cartocci *et al.* (2016), Goodrich (2014), and Vecchiato *et al.* (2014). To allow for greater differentiation in the analyzes, each advertisement contained, at least, product image, text, name, or symbol of the brand, which are the key points in the design of an advertisement (Wedel and Pieters, 2007). The advertisements chosen for analysis were print advertisements, as well as in the studies of Banovic *et al.* (2016), Jung and Hovland (2016), and Wan *et al.* (2014).

Participants were asked to choose from 30 previously categorize advertisements as being female, male or neutral and, according to the analysis of the responses, the two advertisements with the highest values for each category were kept for the experiment (as in Paek *et al.,* 2011).

After completing this first step, the six chosen images (two female, two male, and two neutral ones) were placed in the Studio Professional software, and the areas of interest (AOIs) were selected to initiate eye-tracking data collection. The visual attention capture was done with a Tobii Eye Tracker model X1L, data capture at 30 HZ, a dual-camera system for both eye-tracking, and automatic clear and dark selection for pupil tracking. The tracking recovery time after a blink of an eye was 10 ms. We used a 15-inch monitor, Windows-based notebook, and Intel Core i5 processor and 4G of RAM.

For the female advertisement type, the images of well-known cosmetic and lingerie brands in Brazil were chosen. For the male advertisement type, the images corresponding to well-known beverage and car brands were chosen. Finally, for the neutral advertisement type, the images referring to well-known electronic and travel brands were chosen. All images were selected from the companies' websites. Manipulation check questions were added at the end of the experiment.

3.2 Experimental procedures

In total, 180 students from a public University in Brazil participated as volunteers of the experiment, being 90 men and 90 women, aged between 18 and 42 years. The 180 participants were divided into three groups of 60 people, each group with 30 men and 30 women.

The variable manipulated in the experiment was the type of advertisement displayed (feminine, masculine, or neutral). The experiment intended to test the effect of the type of advertisement in visual attention (measured through the eye tracker) and attitudes to advertising (measured through a questionnaire). Participants were randomly assigned to each group in which two advertisements from one of the three categories.

All participants were prepared in a standardized way, following the procedures of Felix and Borges (2014): volunteers who accepted to participate in the study were taken to the room where the eye-tracker device was installed, and sat in a chair front of it. No information about the study content was provided to participants. There was an adjustment in the height of the chair so that the participant is at a distance between 50 and 60 centimeters of the screen. Luminosity and noise were verified so that there was no interference in the study.

Before exposure to the announcements, calibration was done to optimize the capturing of each participant's eye location data. After the calibration procedure, the two selected advertisements were exposed for 15 seconds each, as in Felix and Borges (2014). The participant was then asked to answer a questionnaire to collect the necessary data on demographic characteristics and attitudes toward the advertisement, as in Lee *et al.* (2016), Lin and Kim (2016), Raluca, and Ioan (2010). The total duration of the experiment was three to four minutes per participant.

For the "Attitude Toward the Advertisement" construct, three items of the questionnaire of Lee *et al.* (2016) and one item of the questionnaire by Lin and Kim (2016) were selected. The items were measured by a 7-point Likert scale ranging from "strongly disagree" to "strongly agree": The advert is persuasive; Advert is adorable; Advert is satisfactory; I intend to purchase this product in the future. These four questions are related to the three components of attitude mentioned by Hawkins and Mothersbaugh (2010), being cognitive, affective, and behavioral intention. These four questions tried to capture the immediate reactions of participants upon viewing the adverts. The responses were consolidated in one factor through factor analysis.

Regarding visual attention, the eye-tracker device was chosen to assist measurement because it is more accurate than a questionnaire (Wedel and Pieters, 2007), as well as in studies by Banovic *et al.* (2016), Cartocci *et al.* (2016) and Goodrich (2014). As in the Bang and Wojdynski study (2016) and Fidelis *et al.* (2017), the following metric for visual attention analysis were used: total average duration of fixations (measured in

seconds), which refers to the sum of the duration of all fixations performed within an area of interest or all areas of interest belonging to the same group.

Wedel and Pieters (2007) state that product image, text, and brand name or symbol are key points in the design of an advertisement. Thus, the areas of interest (AOIs) of the study were composed of these items. In the case of advertisements containing more than one area of interest for the same category (product image, text, or brand), the data was grouped to allow a comparative analysis across all advertisements.

Besides, another output generated by Tobii Studio (the eye-tracker software) was used to aid the analysis: the heat maps. As Cartocci *et al.* (2016), the use of heat maps helps to identify areas in which there were a concentration of green, yellow, and red colors. Green means less concentration and red means more concentration.

4 Findings and Discussion

4.1 Hypothesis 1

Hypothesis 1 of the study aimed to verify if there are differences in patterns of visual attention to different types of advertisement (masculine or feminine) depending on consumer gender (female versus male). The areas of interest (AOIs) were separated into product image, brand, and text/slogan and therefore three unfolding hypotheses from H1 were developed:

- H1a: There are differences in patterns of visual attention to the text considering different types of advertisement (masculine or feminine), depending on consumer gender (female vs. male);
- H1b: There are differences in patterns of visual attention to the image considering different types of advertisement (masculine or feminine), depending on consumer gender (female vs. male);
- H1c: There are differences in patterns of visual attention to the brand name considering different types of advertisement (masculine or feminine), depending on consumer gender (female vs. male);

4.1.1 Hypothesis 1a

For the masculine advertisements, since there was the normality of the data and homogeneity of the variances, the parametric Test-T test of means between two independent samples was chosen. For the neutral and feminine advertisements, the non-parametric Mann-Whitney test was chosen since normality was nor confirmed.

Through the parametric and non-parametric tests performed, it was verified that there was no statistical difference between genders regarding visual attention to the text in any of the three advertisement types studied (significance level of .05). By observing the descriptive statistics (Table 1), it can be verified that the results obtained by the two genders are very similar.

Table 1 – Descriptive Statistic for all hypotheses

SOURCE: Prepared by the authors.

	Descriptive Statistics for H1a					Descriptive Statistics for H1b					Descriptive Statistics for H1c					Descriptive Statistics for H2				
Type of Advert	**Gender**	**Min.**	**Max.**	**Mean**	**S.D.**	**Gender**	**Min.**	**Max.**	**Mean**	**S.D.**	**Gender**	**Min.**	**Max.**	**Mean**	**S.D.**	**Gender**	**Min.**	**Max.**	**Mean**	**S.D.**
Male Advert	**Male**	1.26	10.08	5.54	1.95	**Male**	.28	8.72	3.92	2.25	**Male**	.0	5.82	1.62	1.61	**Male**	-2.06	1.89	.18	.96
	Female	1.58	11.78	6.15	2.17	**Female**	.26	6.82	3.07	1.88	**Female**	.0	6.85	1.85	1.90	**Female**	-2.47	1.77	-.31	1.09
Female Advert	**Male**	.0	10.84	3.81	2.81	**Male**	1.09	12.6	6.95	2.32	**Male**	.0	7.87	1.79	1.82	**Male**	-2.29	189	-.12	.93
	Female	.28	9.99	3.87	2.32	**Female**	2.58	11.43	7.37	2.52	**Female**	.0	6.91	1.35	1.35	**Female**	-2.47	1.89	-.16	1.06
Neutral Advert	**Male**	.17	12.24	4.82	2.57	**Male**	1.39	11.17	5.52	2.31	**Male**	.0	3.25	1.30	.84	**Male**	-1.96	1.89	.23	.96
	Female	.92	11.33	4.55	2.73	**Female**	.32	13.12	5.11	2.44	**Female**	.0	3.41	1.07	.79	**Female**	-1.82	1.89	.16	.89

4.1.2 Hypothesis 1b

Male and neutral types of advertisements did not follow the normal distribution pattern, but the female types did. Therefore, for the masculine and neutral advertisements, the non-parametric Mann-Whitney test was performed and for the female ones, the t-test was performed.

It can be verified that, in the case of male advertisements, there are differences between the genders in the average total time of fixation in the images (significance level of .05).

For female and neutral advertisements, on the other hand, there are no differences between genders in the mean total time of image fixation in the case of female and neutral advertisements (significance level of .05).

Through the descriptive statistics (Table 1), it can be verified that in the case of the male type of advertisements, the greatest difference in the average time of fixations occurred, being 3.92 seconds for men and 3.07 seconds for women

4.1.3 Hypothesis 1c

We chose to perform the non-parametric Mann-Whitney test for all advertisement types since the normality was not confirmed. It was verified that there is no difference between the genders for the total average time of fixation in the brand, in none of the three types of advertisements studied. Through descriptive statistics (Table 1), it can be seen that the average total time of brand fixations for men and women is very similar across the three advertisement types presented.

4.1.4 Heat Maps for Genders

In the hypothesis testing, we saw that only in the case of the average total time of fixation in the image of masculine advertisements there was a difference between the genders. To complement the gender analysis, heat maps were generated for each image by comparing the data of the male participants with the data of the female participants. Due to space constraints, only three maps will be exhibit.

In the case of beverage advertisements, there is almost no difference in the concentration areas of men and women's visual attention, and for both, the slogan region was the one that attracted the attention for a more extended time (the red color on the heat map, Exhibit 1).

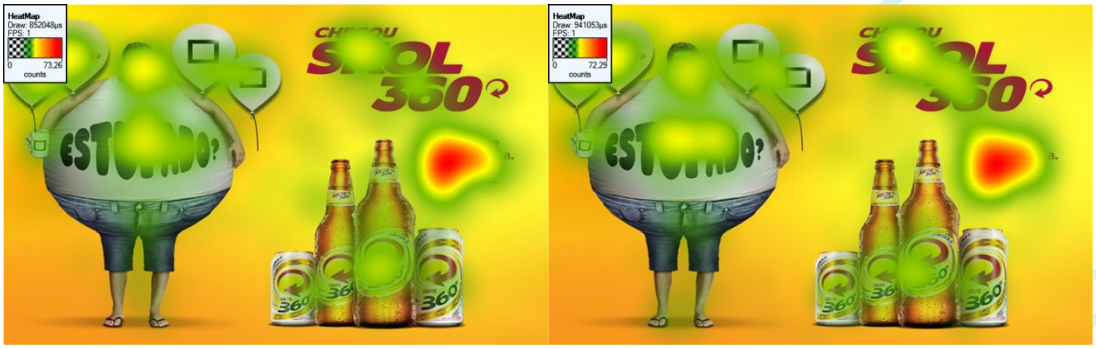

Exhibit 1 - Heat Map for Beverages - Man vs. Woman

SOURCE: Prepared by the authors.

For car advertisements, differences in the visual attention of men and women can be observed (Exhibit 2). For the male audience, the images of the two cars, as well as text located in the upper right corner, attracted the attention of the participants for a longer time. For the female audience, it is noted that the upper right text also attracted a greater time of visual attention, however, the image of the cars was not observed for the same duration in comparison with the male audience.

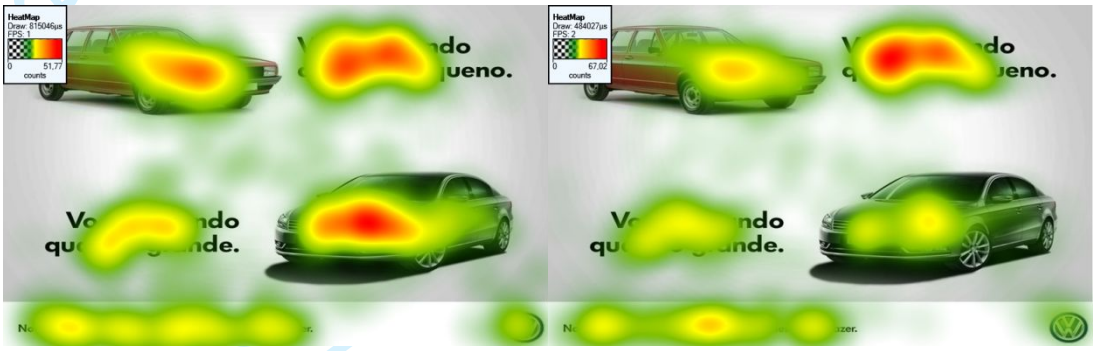

Exhibit 2 - Heat Map for Car - Man vs. Woman

SOURCE: Prepared by the authors.

Concerning lingerie advertisement, it can be seen that brand, slogan, and face were the regions that most attracted the visual attention of men and women (Exhibit 3). There is, however, a small difference between the male and female audience, in which the male audience had similar levels of visual attention to the brand and the slogan, and the female audience had a slightly greater focus on the text of the slogan.

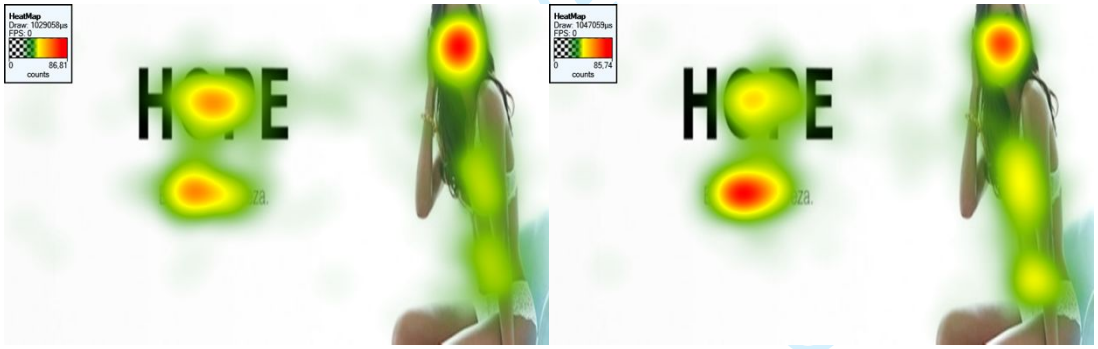

Exhibit 3 - Heat Map for Lingerie - Man vs. Woman

SOURCE: Prepared by the authors.

For make-up, cellphone, and travel company, the maps are discussed but not shown. Regarding the make-up advertisement, it was observed a few differences between the genders in the areas of observation concentration, with a higher concentration of women's observations in the make-up product than men's. It was also noted that both genders had a greater focus on the text than on the rest of the image. Concerning the cell phone advertisement, it was also seen that there was not much difference between the genders in visual attention. The region of the brand and text was the ones that attracted the highest focus of attention.

Finally, in the case of the advertisement of the travel company, it was observed that, once again, there was no difference between the genders in the attention spots. It should be noted, however, that there were more attention-focused regions than in the previous

advertisements, with the brand, text/slogan, and image being classified as regions of great visual attention on the heat map.

The hypotheses H1a, H1b and H1c were derived from the hypothesis H1 and aimed to verify if there are differences in patterns of visual attention to different types of advertisement (masculine or feminine), specifically on text (H1a), image (H1b) and brand name (H1c) areas, depending on consumer gender (female versus male). The hypothesis H1a was not confirmed in any of the three types of advertisement presented. The hypothesis H1b was confirmed only in advertisements considered masculine (that is, it was not confirmed in advertisements considered female and neutral). The hypothesis H1c was not confirmed in any of the three advertisement types presented.

The results obtained by the H1b hypothesis for the male advertisement type confirm the results found by Banovic *et al.* (2016), Feng *et al.* (2011), and Goodrich (2014), which state that there is a difference between genders in visual attention. Also, through the heat maps, one can verify that the largest difference between groups is found in the car advertisement, which was also studied by Cartocci *et al.* (2016). The car's image attracted more men's visual attention than women's, and these results also confirm Belinskaya's (2015) claim that car images are most appreciated by the male audience.

The AIDA communication micromodel indicates that attention is the first stage of consumer behavior in a communication process. Therefore, the results can be an indication of more appreciation and behavioral intention concerning men's attitudes towards masculine advertisements. It should be noted that this confirmation of results is valid only for advertisements considered to be masculine, whereas, in the case of the female and neutral advertisements, the differences have not been confirmed.

4.2 Hypothesis 2

Hypothesis 2 aimed to identify if there are differences in attitudes toward the different types of advertisements (masculine or feminine) depending on consumer gender (female vs. male).

We chose to perform the T-Test parametric test for two independent samples in the case of the female advertisements and the Mann-Whitney test in the case of the male and neutral type of advertisements (since the distribution was not normal). Employing the non-parametric and parametric tests, at the significance level of .05, it can be verified that, in the case of the masculine advertisements, there is a difference between the genders regarding the attitude towards the advertisement. In the case of the female and neutral advertisements, we found no statistical difference regarding the attitude towards the advertisement ($p > .05$).

Through descriptive statistics (Table 1), it can be seen that, in the case of men's advertisements, on average men presented more positive attitudes than women did. In the case of female advertisements, both genders presented, on average, more negative attitudes. Finally, in the case of neutral advertisements, it can be noted that, on average, both genders presented more positive attitudes towards the advertisement. Therefore, hypothesis 2, which stated that there was a gender difference in attitudes towards advertising, was confirmed in the case of men's advertisements and not in the case of women's and neutral advertisements.

The findings confirm the existence of gender differences in attitudes, as pointed out by Belinskaya (2015), Cartocci *et al.* (2016), Goodrich (2014), and Lanseng (2016). Moreover, it can be noted that attitudes towards men's advertisement were more positive than those of the others, which reaffirms the findings of Cartocci *et al.* (2016) that more positive responses from men may be related to the fact that the advertisement is intended for this audience. Also, it supports the results from Jung and Hovland (2016) study, where a focused advertisement for a specific audience shows increased positive effectiveness. However, this confirmation of results in this study is valid only for masculine advertisements in the case of neutral advertisements, the non-confirmation of the hypotheses of differences between the genders demonstrates an expected result during the experiment: the lack of differences in the responses between men and women in the case of advertisements that are not intended for one specific gender.

5 Conclusions

This study contributes to the existing literature by analyzing the impact of the type of advertisement and differences between genders. At the same time, this study contributes to the use of the eye-tracking tool as an additional means of visual attention analysis. Moreover, the study also contributes with additional findings to bridge the gender impact gap by verifying that, in the case of feminine advertisements, the gender does not interfere in the responses to an advertisement, this difference being present only in the case of advertisements considered masculine. And in the case of neutral advertisements, the responses of men and women do not show differences.

The results can infer that the type of advertisement is not a point of differentiation between genders. This an important point, because although the advertisements were pointed to be of a specific gender, the study showed that the gender response was different than the one expected. So, there are also practical contributions of the study, showing that organizations should better understand and concurrently evaluate if its advertisements are having the expected impact on its target audience and how it could be improved to achieve aspired results in terms of positive attitudes.

4.1 Managerial Implications

With the results, it was possible to verify that the creation of advertisements directed to a specific target audience may have influences on the visual attention and emotional reactions such as attitudes. The creation of advertisements that are intended for men or women or no specific gender has a different impact on visual attention and attitudes/reactions towards the advertisement, which have implications for product and brand managers.

Since gender is one of the variables that have a strong influence on the consumption and behavior of individuals, and different genders react differently to a commercial concerning its level of visual attention and attitudes, managers should have caution when choosing to associate or not a brand and a commercial to a specific gender. By correctly choosing the type of advertisement (male, female or neutral), the return on investment can be improved since the target audience will pay more attention to the commercial and process the information with more favorable attitudes. Studies in the neuromarketing field, like this one, should be more developed in the advertising field to better identify emotions and attitudes toward advertisements.

4.2. Limitations and future research directions

One limitation of this study is the fact that, because it is a laboratory experiment using quota sampling, the results presented here cannot be generalized for the whole population, and even the culture of the participants might have an effect on the results of the study. The choice of one institution and faculty, where the laboratory with the equipment was installed, to do the study can be seen as another limitation. Besides, because they are real-time advertisement images, there may be some interference in the participants' responses from previous interactions with the brand or product exposed, or even from a prior observation of this advertisement. Additionally, the content of the advertisements was not the same across the categories, which could also have affected the observed visual attention pattern. Moreover, because the study expected the participant to see the advertisement, the result can be different from reality, where a lot of stimuli compete with the advertisements. Another limitation can be the selection of some questions to analyze the attitude toward the advertisement: due to the construct attitude being complex, there might be different results in future studies with differentiated metrics.

According to the analysis of the results and the limitations of this study, it was possible to identify some points that can be approached in future research studies. Regarding the limitation of sampling, surveying with a larger number of participants and a more random selection method may help in the generalization of the results. Concerning the limitation of using real brands, a future study could use fictitious brands or even control attitudes towards the brand in the case of real advertisements. Additionally, future studies could create three versions of the same advert, one for the female audience, one male and one neutral, and thus allow a better comparison of results. Finally, the use of additional tools to analyze emotional characteristics that were not considered in this study, such as the EEG, GSR, among other neuromarketing tools, may be used for future studies.

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