



Visual attention to the Logos of Popular and Unknown Brands: An Eye-tracking Study during Decision-making

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Abstract

A logo epitomizes a brand and depicts the picture of a product; consequently, attention, as an initial step of the AIDA model, to the logo is a good-looking index to survey the cognitive processing during consumers' decision-making. Eye tracker extracts the visual attention data. For these reasons and appreciated from fixation duration, in the present study, the process of visual attention to the logo of a brand during decision-making was studied. To analyze the effects of the popularity of a brand on consumers' decision-making, visual attention of 53 undergraduate students was studied. The brands were selected from two categories of beverages: soft drinks and non-alcoholic beers. Prior to the test, the participants had declared their favorite categories. The results showed that 75% of the participants selected a popular brand of their unfavorite categories. On the other hand, the

difference of fixation duration between logos of popular and unknown brands did not directly relate to the choices of the participants. Therefore, these results did not correspond with the AIDA model. Additionally, cognitive processing toward the unknown brands' logos was more than the popular brands' logos. Moreover, the consumers who changed their decision were subjected to more cognitive processing compared to the consumers who insisted on their selection. In contrast to the AIDA model which implies that decision-making is triggered by attention, the present study indicated that decision making can also be influenced by the popularity of the brand. This can be due to optimization of the working memory usage by the brain. Finally, these results could be helpful in creating a new brand. According to the AIDA model, the more attractive logo and package of the brand, the more chance for being selected by the customers. However, our findings emphasize the importance of the popularity of the brand.

Keywords: Visual attention, Cognitive process, Fixation duration, Eye tracking, Decision- making.

Introduction

Brands are important intangible assets that significantly affect the performance of companies. Indeed, customers can develop deep meaningful relationships with a brand, which results in an increased brand purchase, reduced customer price sensitivity, and lower marketing costs (Foroudi, 2019; Hunt, 2019; Park, Eisingerich, Pol, & Park, 2013). A brand consists of a name, symbol, package design, slogan or any other characteristic that makes a difference with the competitors (Bossel, Geyskens, & Goukens, 2019).

Certain brand perception is formed in terms of various brand stimuli like name, logos, color, and advertisements. However, more experienced consumers are more likely to evaluate intrinsic attributes since the brand induces different emotions in consumers (Wedel & Pieters, 2008). Usually, brands and marketing contents have been systematically used to expose and to arouse emotions that encourage desired consumer responses; while there is a small stream of researches who study how different emotions integrate together to influence decision-making (Achar, So, Agrawal, & Duhachek, 2016).

On the other hand, Zeelenberg and Pieters (2006) suggested that the nature of the experienced emotion has a highly determinant effect on an individual's subsequent actions. Thus, consumers' anger toward a brand is likely to be predictive of their decision to complain (e.g., file is written complaints) against the brand's parent company and/or participate in campaigns against the company.

Park et al. (2013) argued that through consumers' values or lifestyles, brands are able to help consumers express or define their actual or desired selves; for instance, NIKE has been building its brand image on an active lifestyle (Japutra, Molinillo, & Wang, 2018). Consequently, marketers increasingly use brand popularity statements in attempts to influence consumers' purchase decisions (Francisco-Maffezzoli, Semperebon, & Muller Prado, 2014; Magnini, Karande, Singal, & Kim, 2013).

Park and his colleagues studied this hypothesis that, from the customers' viewpoint, brand logos reflect the meaning of a brand and therefore serve as summary information about a brand's marketing efforts (Park, Eisingerich, Pol, & Park, 2013). A brand and its logo are usually indistinguishable such that logo is one of the most salient features of a brand that facilitate the identification and differentiation from competing alternatives (Japutra et al., 2018). Additionally, brand logos are capable of fulfilling the motives because the logos offer benefits to consumers (e.g., aesthetic and self-expressive benefits) (Park et al., 2013). Subsequently, visual attention to logo is a vital element and often the only way to acquire information about brands in consumer choice contexts.

AIDA model as the pivotal of the classical theory of marketing explains four stages (Attention-Interest-Desire-Action) of consumers' decision-making. Attention is also the first stage to make a positive consumer response (Felix & Hinck, 2016). According to the AIDA, only those elements of a message that receive sufficient attention from the audience will receive cognitive processing capacity. Furthermore, attention is a necessary (but not sufficient) factor for the next stages in information processing and decision making (Felix & Hinck, 2016).

According to Orquin research, visual attention plays an important role in decision-making. However, the relation between cognitive process, working memory, and attention, as the important factors underlying decision-making, are not completely clear, fixation duration indicates the attention process supposed to be a part of the cognitive process (Orquin & Mueller Loose, 2013). Eye-tracking is an equipment to analyze the visual attention, seeking to associate visual attention with the cognitive responses of consumers (Fidelis et al., 2017). Eye-tracking research focuses on the process between the input (stimulus onset) and the output (decision response) and can enrich input-output analysis by providing insight into the underlying cognitive processes (Zuschke, 2019).

In this research, to analyze the effects of the popularity of a brand on consumers' decision-making, the visual attention to the logos of popular and unknown brands are studied. To reach this aim, the duration of fixation to logos of brands was measured as a visual factor that is effective on the consumers' decision-making and cognitive process.

Background and hypothesis

Brand influence

Theoretical evidence for the ability of a brand popularity statement to influence purchase behavior comes from several sources (Banerjee & Chua, 2019). First, a positive significant correlation often exists between a brand's market share (popularity) and the quality of the brand's products/services (Buzzell & Wiersema, 1981). Second, a brand popularity statement is a highly specific message of companies to their consumers because more popular brands are a sign of quality (Dean, 1999). Moreover, brand identity refers to a symbol to represent what a company wants to be (Lourenção & Giraldo, 2017). Third, the usefulness of brand popularity statements is found in empirical findings surrounding the confidence construct (Machado, Vacas-de-Carvalho, Azar, André, & dos Santos, 2019).

We thus hypothesize that:

- **H1.** The popularity of a brand makes a positive significant impact on the customers' decision-making.

Eye-movement

Eye-tracking is an intelligent tool to measure visual attention (Wedel & Pieters, 2008). It is effective in investigating the role of attention in consumer behavior and evaluate packaging design, promotions, product placement, and store planning. (Oliveira, Henrique, & Oliveira, 2015). Moreover, eye tracking can contribute to understanding the success of brand identification by showing where consumers are focusing their attention and what they are looking at (S. Zhang, Shen, Zhang, Yang, & Zhang, 2018; Zuschke, 2019). Eye-tracking has been used to measure cognitive processes that underlie consumers' decision-making (Fiedler & Glöckner, 2012; Zuschke, 2019).

There are a number of variables that need to be analyzed such as duration of fixation, fixation density and dwell time (Glöckner & Herbold, 2011; Kärnä, Junnonen, & Sorvala, 2009; Waechter, Sütterlin, & Siegrist, 2015). Psychological research on pupil dilation showed that not only light contributes to the pupil's response, but also memory load, cognitive process, pain, and emotional state are effective factors (Alghowinem, Alshehri, Goecke, & Wagner, 2015). Fixation is states where the retina is moderately stably focused on the area of interest (Hautala & Parviainen, 2014). Duration of fixation can be used to measure these cognitive processes and is calculated by dividing the fixation times by the fixation count (Waechter et al., 2015). Fixation duration is used as a measure of the cognitive processes behind directing one's visual attention towards an AOIs (Mahmoodi-Aghdam, Dehghani, Ahmadi, Khorrami Banaraki, & Khatibi, 2017). Logos are one of the main factors to communicate an image, gain attention, increase recognition and differentiation of the brand as

well as a means of provoking an emotional response (Müller, Kocher, & Crettaz, 2013). In the present study, this factor was used to analyze the obtained data.

Cognitive Processing

Generally, cognitive processing consists of two types of activity, information acquisition, and internal computation. No matter what kind of a strategy the consumer chooses to use in the decision-making process of purchase, they always show a pattern of these two (Orquin, Ashby, & Clarke, 2016).

Eye-tracking has been used to measure visual attention and information acquisition to trace the cognitive process (Orquin et al., 2016). It has been closely related to higher-order cognitive processes for decades to provide insight into the cognitive processes that underlie consumers' decision-making (Fiedler & Glöckner, 2012). As aforementioned, the attention as the initial step in AIDA model describing decision-making is able to affect the fixation duration; consequently, in order to understand the roots, current developments, and future research avenues of eye-tracking research, it is necessary to focus on process-tracing research on consumer decision-making (Fiedler & Glöckner, 2012; Zuschke, 2019). Fixations also reflect the cognitive processes behind directing one's visual attention towards an object of interest (Glöckner & Herbold, 2011). In the current study, the duration of fixation to find the decision process was used as the main parameter to analyze the cognitive processing of consumers. Moreover, we consider the following preconception:

- Consumers decide to buy a special kind of beverage and they are looking for a popular brand of their favorite beverage categories.
- If they cannot find popular and trusted brands of their favorite category, they will evaluate their decisions (Orquin & Mueller Loose, 2013) on the type of beverages.
- At this time, the cognitive effects on the popularity of brands may overcome the consumers' decision to choose another category of beverages affordable with a popular brand.

Therefore, the following hypothesis was considered to evaluate in this study.

- **H2.** During decision-making, the popularity of a brand makes a significant difference in the duration of the fixation of consumers when they pay attention to unknown and favorite brands' logos.
- **H3.** During decision-making, there is a significant difference between the duration of the fixation of consumers who have selected a popular brand from their unfavorite category and who have selected an unknown brand from their favorite category.

Material and Method

Participants

To test our hypotheses, we utilized 55 volunteers of undergraduate students, 18 to 25 years, 26 males and 29 females. Because of the inattention of participants to the task, two records were omitted. Therefore, recorded data of 53 participants were analyzed, 51% of whom were females. This data was collected from the faculty of Management, University of Tehran, where the study protocol has been approved by the ethics committee of the faculty.

Apparatus

Instruments: Pro Glasses 2 was used in this study with a gaze sampling frequency of 100Hz. The calibration procedure is one point. Moreover, wearable eye tracker designed to capture natural viewing behavior in any real-world environment while ensuring outstanding eye-tracking robustness and accuracy was employed.

Method: In the first step, we asked participants to fill in a questionnaire to determine their favorite category and popular brand of beverages. There were two categories of beverages: a soft drink category and a nonalcoholic beer category. There are also three popular brands in each category and three unknown brands. To represent the unknown brands, some fake brands were used in this study to ensure that they are completely unfamiliar to participants.

Since this research was a marketing study, the setup of the experiment was designed to simulate the real shelves in a store as much as possible. To control the unpredictable situation in the real environment, and to guarantee the robustness and accuracy of data, shelves were set up at a controllable laboratory environment.

Moreover, to control the research factors such as packaging, size, and design, we used brand logos with the same sizes on the same glasses of beverages. Besides, the participants were left alone during the experiment. The participants had already worn the Tobii glasses while standing in half a meter in front of the shelves and were asked to select one glass in each arrangement. There were totally 10 arrangements of glasses on the shelves, which contain different combinations of popular and unknown brands. In this research, the consumers' attention on the areas of interest (AOIs), logos of brands, was considered into two different studies:

Control study: To verify the consumers' answer in the questionnaire, a set of five arrangements were provided such that these arrangements consisted of only popular brands of favorite beverage category and unknown brand of unfavorable beverage category. Therefore, it was expected that the participant selects the popular brand of favorite category.

Experiment study: To study the effect of the popularity of a brand on consumers' decision, a set of five arrangements were provided such that these arrangements consisted of only popular brands of unfavorite beverage category and unknown brand of favorite beverage category.

• **Data collection set up:**

There were two different categories of beverages.

1. Soft drinks
2. Non-alcoholic beer

To cover the preference of location on shelves, we set five different arrangements of unknown (fake) (UB) and popular (PB) brands, in the way that, for the experiment study, there were three PBs of the unfavorite category of beverage (UCB) and three UBs of the favorite category of beverage (FCB) as it has shown in Table 1. In the same way, Table 2 shows the arrangement of the control study.

Table1. Collection set up of the experimental study

	Popular brand(PB)	Unknown brand(UB)
Favorite category of Beverage (FCB)	0	3
Unfavorite category of Beverage (UCB)	3	0

Therefore, the experimental study included the following arrangements:

1. UB-FCB/ UB-FCB/ UB-FCB/ PB-UCB/ PB-UCB/ PB-UCB
2. PB-UCB/ PB-UCB/ PB-UCB/ UB-FCB/ UB-FCB/ UB-FCB
3. PB-UCB/ UB-FCB / UB-FCB/ UB-FCB/ PB-UCB/ PB-UCB
4. UB-FCB / PB-UCB/ PB-UCB/ PB-UCB/ UB-FCB/ UB-FCB
5. PB-UCB/ UB-FCB / PB-UCB / UB-FCB/PB-UCB/ UB-FCB

Table2. Collection set up of the control study.

	Popular brand(PB)	Unknown brand(UB)
Favorite category of Beverage (FCB)	3	0
Unfavorite category of Beverage (UCB)	0	3

Furthermore, there were five different arrangements for the control study as following:

1. PB-FCB / PB -FCB/ PB -FCB/ UB-UCB / UB-UCB/ UB-UCB
2. UB-UCB/ UB-UCB/ UB-UCB/ PB-FCB/ PB-FCB/ PB-FCB
3. UB-UCB/ PB-FCB / PB-FCB/ PB-FCB/ UB-UCB/ UB-UCB
4. PB-FCB / UB-UCB/ UB-UCB/ UB-UCB/ PB-FCB/ PB-FCB
5. UB-UCB/ PB-FCB / UB-UCB / PB-FCB/ UB-UCB/ PB-FCB

Therefore, each participant had to select one glass from ten different arrangements independently. The picture of one sample of arrangement is displayed in Fig1.



Fig1. One sample of arrangements

- **Data analysis set up**

According to the sample size, G.power software proposed α error equal to 0.1 for the independent T-test and α error equal to 0.05 for the paired T-test. In order to quantify the consumers' selections on the questionnaires and in the different arrangements of the shelves, values 1 and 2 were used to show the choices of a bear or a soft drink, respectively, by the participants. Therefore, if in an experiment the mean of choice on a set of arrangements is 1.66 then; overall, the soft drinks have a priority in this experiment.

Results

At first, the logo area on each glass was defined as areas of interest (AOI) for using the Tobii Studio software. Fig2 displays one example of AOIs. Therefore, there were totally 30 AOIs in the experimental group and 30 AOIs in the control group.



Fig2. AOIs of one of the arrangements of beverages

To verify the first hypothesis (H1), consumers' answers in their questionnaires and their selections in the experiment study arrangements were analyzed. Interestingly, for all the arrangements in the experimental group, the T-test results showed a statistically significant difference (Table3) between consumers' answers in their questionnaires and their selections. Table3 shows that the mean of consumers' selections in questionnaires is 1.66 and the means of consumer' selections in different arrangements are 1.33 and 1.38. While, in the control study, the mean of consumer' selections from different arrangements is 1.66 too. Additionally, the results showed that when there were no popular brands of favorite category, 75% of the participants changed their choices and selected a popular brand of unfavorable category

Table3. Results of the T-test of questionnaires and the experimental and control group (five arrangements in each group)

Statistics about the choice of the participant on the questionnaire		Statistics about the choice of the participant from different arrangements of the experimental and control group				
		1	2	3	4	5
Mean (experimental)	1.66	1.33	1.33	1.38	1.38	1.33
SD	0.9829	0.9829	0.9829	0.1009	0.1009	0.9829
T	t(46)=2.39	t(46)=2.39	t(46)=2.39	T(46)=2.07	T(46)=2.07	t(46)=2.39
P	.021	.021	.021	.044	.044	.021
Mean(Control)	1.66	1.66	1.66	1.66	1.66	1.76
SD	.4815	.4815	.4815	.4815	.4815	.5500
T	T(46)= .000	T(46)= .000	T(46)=.000	T(46)= .000	T(46)= .000	T(46)= .279
p	1	1	1	1	1	.781

To test H2 and H3, the duration of fixation as a factor to find the attention of cognitive processing was used. To verify the second hypothesis (H2), all of the ten arrangements in the experiment and control groups were considered. The mean duration of fixation on unknown

brands' logos was (Mean=.653, SD= 1.103) and on favorite brands' logos was (Mean=.370, SD= .639). According to the paired T-test, the results showed that there is a statistically significant difference between the two groups, ($t(772) = 6.244, P=.000$). In Fig3, these results were compared.

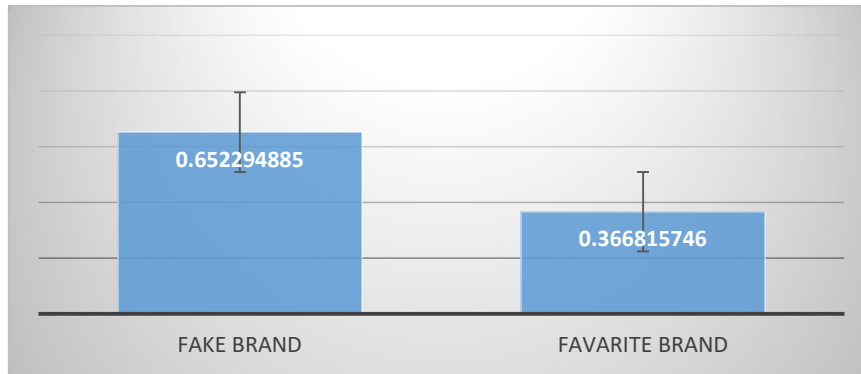


Fig3. The mean of fixation time on unknown and favorite logos

The standard errors were used in this diagram

In the H3 hypothesis, we were going to understand the difference in the attention process of consumers who have selected a popular brand from their unfavorable category and who have selected an unknown brand from their favorite category. Therefore, we considered only the experimental group. The mean duration of fixation for the first group was (Mean=.719, SD=1.14) and the second group (Mean=.599, SD=.860). According to the independent T-test, the results showed that there was a statistically significant difference between the groups. The results for consumers who changed their selection was $t(1268) = 1.847, p= 0.065$ and for consumers who did not change their selection was $t(1054) = 2.03, p=.042$. The results are shown in Fig4.

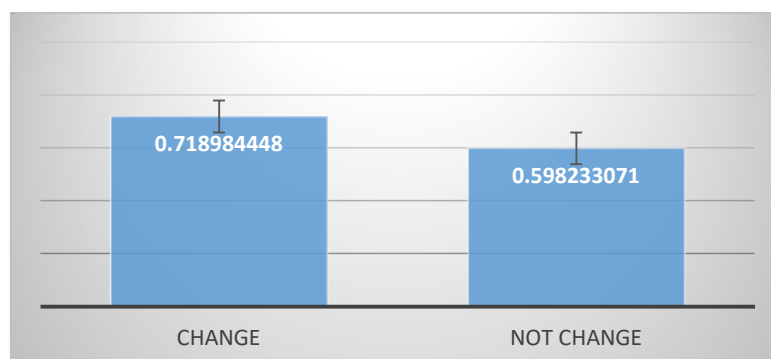


Fig4. The mean of the fixation time of consumers who selected a popular brand from their unfavorable category and who selected an unknown brand from their favorite category

The standard errors were used in this diagram

Discussion

Previous studies have shown the ability of brand popularity to influence consumers' purchase behavior and decision, to the same aim, the first hypothesis was tested to understand the impact of the popularity of a brand on the customers during decision-making. The videos recorded by the eye tracker were an online record from consumers' attention during decision-making without any interruption in a semi-real environment. The obtained result from these data (Table 3) shows that when the consumers faced the challenges of choice between an unknown brand of a favorite category and a popular brand of an unfavorable category, they changed their category in favor of the brand. There was a statistically significant, $p < 0.05$, the shift in choices of the participants in the experimental group despite the fact that did not happen in the control group. This indicated that the participants in this study have also been influenced by the popularity of a brand because they selected a popular brand from an unfavorable category. On the other hand, in the control group, the mean of consumers' selection on the questionnaires is 1.66 ; hence, it seemed that the consumers insisted on their answers in their questionnaires. Therefore, not only there was not a statistically significant difference, $p > 0.05$, between consumers' answers and their selections in the control arrangements, but also nearly all the participants kept their choices of their favorite brands. However, our results showed that in the experimental group, 75% of the participants changed their choices toward the popular brand. Consequently, the hypothesis H1 was approved.

Many studies have addressed the alternation of the attention of the process as a part of cognitive processing (Orquin & Holmqvist, 2018; Waechter et al., 2015; Zuscke, 2019). On the other hand, according to the AIDA model, attention is the primary step for consumers' decision-making (Li & Yu, 2013). In the present research, the hypothesis H2 addressed the difference between the duration of fixation for popular compared to the unknown brand. In the first step, the data obtained from eye tracker were arranged based on the consumers' attention to popular or unknown brands for all the participants. In Fig3, the T-test showed that duration of fixation presented a statistically significant difference, $p < 0.05$, between the popular and unknown brands. Furthermore, the mean of fixation time for the unknown brands' logos was almost twice of the favorite brands' logos. Therefore, the cognitive processing was different when the participants looked at the unknown brands' logos and favorite brands' logos. This result approves the second hypothesis.

Interestingly, the results not only support the hypothesis two but they are also in agreement with the Orquin *et al.* finding that the time of fixation on a brand does not have a positive relation to select its product (Orquin & Mueller Loose, 2013). On the other hand, these results did not support the AIDA model because based on this model, more attention to the product means more chance to be selected (Li & Yu, 2013). While this result was in agreement with the Zuscke's research explaining that the brain always like to load a

minimum of working memory (Zuschke, 2019). Therefore, when there are background knowledge and context (product type, emotional attachment, and information)(Pekka J.Korhonen, Pekka Malo, Tommi Pajala, Niklas Ravaja, Outi Somervuori, 2018) about a popular brand, a shorter fixation duration, and cognitive processing take place.

The last step of the AIDA model is action and in the third hypothesis, we focused on the difference in the attention of participants who take different decisions. Therefore, based on the final action (decision) of the participants, they were divided into two groups; consumers who selected a popular brand from their unfavorable category and those who selected an unknown brand from their favorite category. Then we compared these two groups based on their attention process to verify the difference between duration of fixation of the two different groups; consumers who selected a popular brand from their unfavorable category and those who selected an unknown brand from their favorite category were analyzed. In other words, Our data showed that the difference between the duration of fixation in the two groups was statistically significant, $p < 0.1$. Moreover, Fig4 showed that the mean of the fixation time of consumers who changed their selection was more than consumers who did not change their selections. These results confirmed the third hypothesis.

Conclusion

The current study aimed to understand the impact of the popularity of a brand on the consumers' decision-making. The attention as a part of cognitive processing was analyzed in this research. This study proved that the popularity of brands has an important effect on consumers' choices. Additionally, the eye tracker analysis of the attention to the logo, as the visual part of the brands, showed a significant difference between popular and unknown logos' brands while this difference did not directly related to the participants' choices. The result of this research showed that attention to the brand alone is not an adequate factor to predict consumers' final decisions. Therefore, if a company decides to create a new brand to compete with other popular brands, not only should they make nice-looking advertisements to present their brands, but they also have to improve different aspects of their brands such as emotion, information, and experience of the brand.

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