The Coherence Between the Eye Tracking and Survey Data of Consumers

Jose Mazzon
University of Sao Paulo
Thais Harume
University of Sao Paulo

Cite as:
Mazzon Jose, Harume Thais (2020), The Coherence Between the Eye Tracking and Survey Data of Consumers. *Proceedings of the European Marketing Academy*, 49th, (63869)

Paper from the 49th Annual EMAC Conference, Budapest, May 26-29, 2020.

The Coherence Between the Eye Tracking and Survey Data of Consumers

Abstract

This study explore the association between the data collected with the eye tracking, and the data collected with a Survey when interviewees were exposed to a digital advertisement. This study aims to challenge the current digital banner template that is commonly boosted in digital online campaigns as well as evaluate its performance from a neuroscientific perspective. The research partially proved that there is a association between the survey and the eye tracking data. The results' analysis adopted statistical techniques in order to identify groups with similar beliefs. It is clear to see that the components in an online advertisement compete among each other for the consumer's attention. It is clear how inefficient the current digital banner template is when the consumer's conscious and unconscious perception towards it are taken in consideration altogether. Besides, it was not possible to conclude that celebrities' endorsements are powerful in this type of advertisement.

Keywords: consumer behavior, eye tracking, neuroscience.

Track: Consumer Behavior

1. Introduction

The twenty-first century was built by the advent of globalization, time-space barriers reduction and the fast development of disruptive technologies. The amount of information produced daily increased substantially with the advent of the internet. However, perhaps the greatest revolution is that we now have greater visibility of what is happening around us and everywhere in the world. Companies now have access to diversified communication channels that resulted in higher competition in search of user's attention. However, what did not change is that we continue to be human beings with a limited cognitive capacity for processing information. In this way, we are constantly adapting to new technologies and scenarios: this is what Benway and Lane (1998) proposed in their "banner blindness" theory, which argues that due to our vast experience using the internet in our lives, we end up developing selective attention so we become blind to what seems to be out of the context we are paying attention to. It is in this modern and chaotic scenario that new studies appear in order to enrich the already existing research on consumer behavior. Multidisciplinarity is a trend in this field as we can see through the volume of research on neuroscience techniques applied to consumer behavior.

2. Research Problem and Objectives

In Brazil, advertisements reflect the heterogeneous and unequal character of an economically developing society. On television, we can see the contrast between sophisticated perfume ads typically consumed by premium segments, to deal campaigns from popular brands, coexisting at the same time and space. The digital environment also ends up reflecting what happens on television, with the difference that most of the content is shown through static images: the banners. The Internet has provided a territory which institutions of all shapes and sizes share a small or large slice of it, free or paid. Throughout the world, the access and daily use of social networks is increasing, which ends up being a precious platform for advertising and influencing consumers. Chaotic growth, however, makes the digital platform too chaotic and disputed by companies and there is no perspective of establishing a "discipline" in that direction. (Christensen, 2017).

Besides, companies are estimated to spend about $ 300 billion in paid digital ads in 2019 (Mediamax, 2018). Nevertheless, does it guarantee that this investment will not be wasted on a type of advertising that is no longer able to attract and retain consumer attention? Or at least,

companies are missing the opportunity to become more compelling for their consumers through more visually attractive banners?

The goal of this study is to challenge the current graphic template of static banners that are commonly boosted in paid ads on the Internet. This happens due to banners being one of the oldest advertising tools used online and that have shown a decline in their effectiveness over the decades. Thus, we will explore this issue not only from the point of view of consumer behavior but also from the perspective of neuroscience techniques in order to understand the behavior that is under the level of consciousness through an eye tracking experiment linked to a survey.

3. Literature Review

The internet has undeniably changed the way we receive information and interact with people and entities, becoming even more a common space for people to share their ideas and to debate. As a result, online advertising investments are increasingly reaching the amount spent on traditional medias such as TV and radio. However, according to Kawano, Furtado and Batista (2017), very little is known about the dynamics of these new media and their impacts with proper scientific rigor, since they are areas commonly linked to the market, and discussions in the academic environment that reflect the theme from an interdisciplinary perspective are rare.

However, it was in the scope of design that Kawano, Furtado and Batista (2017) affirmed that Internet caused most of the striking changes and provided a basis for new possibilities of interaction, consumption, relationship, management, participation and even politics. According to the same authors, design as a meaning conductor has a persuasive strength face its consumers. In the internet, user experience design in websites, applications and programs contributes to the formation of the user attitude towards a brand. In other words, if the consumer attitude towards television advertising is strictly passive (companies think over brand awareness most of the time) depending on the nature of advertising, social media requires a more proactive attitude on the users side, engaging them as if they were actually interacting with a person, even though it is just a personified company.

Internet is a chaotic place where several entities live together in the same space, making it difficult for the user to make many decisions that are beyond his/her capacity for assimilation (Christensen 2017). Then, how is it possible to embrace the design so that it is feasible to inspire engagement on the user side? Kawano, Furtado and Batista (2017) state that

some principles such as grid, eye path and contrast facilitate it independent of aesthetic tastes such as color, typography or rounded buttons and they are related to studies in sensorial design and visual experience in partnership with cognitive psychology. Interdisciplinarity and understanding of the user as a complex human being are, therefore, necessary to enrich the traditional tools used in studies of consumer behavior.

The reason for this need arises, according to Kumlehn (2011), because people usually cannot or are not aware of their preferences when questioned or participating in surveys such as questionnaires or focus groups. The reason for this lack of knowledge can be further explained by Calvert and Brammer (2012) as result of human behavior being processed under the level of consciousness, which makes researches that monitor brain activity or other cognitive aspects while consumers observe and interact with advertisements and products more successful to better understand the effectiveness of marketing strategies. In addition, using these techniques, it is possible to avoid biased responses, difficulties in expressing emotion and to recall the question on the part of the interviewee, socially accepted responses, among others.

4. Methodology

The eye tracking experiment was conducted with 60 people living in the city of São Paulo using the snowball sampling technique. Interviewees were divided into 4 groups according to the type of banner they had to observe for 10 seconds on a 13" retina display with Tobbi X2-60 device attached. For the definition of the graphic composition of the banners, a previous research was carried out with about 100 static banners of clothing brands arranged in Brazilian social networks in June 2019. In this way, it was concluded that the elements that commonly compose the banners are: image (people or illustrations), logo and text. Thus, the 4 groups of the experiment were defined based on this previous study: Group 1 - banner with a celebrity and logo of a well-known brand, Group 2 - banner with a well-known brand, Group 3 - banner with a celebrity and unknown brand and Group 4 - banner with unknown brand. All groups contained the same promotional text. The known brand was Zara ™ and the unknown brand was a fictitious name Avilana. All 4 images were black and white to minimize the influence of colors. For 10 seconds, the quantity and time of visits in each of the three AOI (areas of interest, which were "celebrity", "logo" and "text") of each interviewee were collected and then, created gaze plot animations and heatmaps in Tobbi Studio X2-60

software. The four groups of the eye tracking experiment according to the presence or absence of a known brand and/or celebrity.

Right after the eye tracking experiment, the same interviewees should switch computers and answer an online survey built on SurveyMonkey platform. The survey was composed of two parts: part I - sociodemographic variables (gender, age, income, education, frequency of purchase and recall of the brand) and part II - 15 statements in a 7-points Likert scale (randomized) regarding satisfaction with advertising, brand awareness and online shopping behavior.

Results

The sample consisted of 52% of women and 48% of men. There was a predominance of participants between 21 to 29 years (38%), followed by 30 years or more (33%). Most of the participants said they had only completed high school degree (60%). Only 23% of the sample completed higher education and 17% finished graduate studies. The descriptive data of the eye tracking experiment are presented by groups (Table 1).

Table 1 - Means of the Likert 7-points sentences and eye tracking variables.

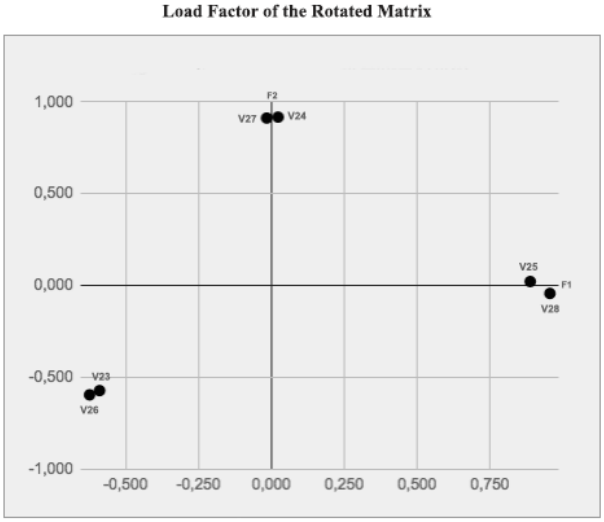
Statements in Survey (V01 thru V15) and Indicators of Eye Tracking (V23 thru V28)	G1	G2	G3	G4
V01 - I felt encouraged to buy products from this brand by seeing this advertisement	3,00	2,00	3,19	2,86
V02 - I would buy products from this brand	3,76	2,00	3,75	3,14
V03 - I think this is a high quality advertisement	4,53	3,00	3,69	2,79
V04 - I think the brand of the showed products are high quality	4,76	3,00	4,56	4,14
V05 - I find the advertising attractive	4,19	3,00	3,75	3,36
V06 - Products from this brand seem to be expensive	4,94	5,00	5,13	4,43
V07 - I know the celebrity of this advertisement	4,41	-	4,31	-
V08 - The celebrity from the advertisement encourages me to buy their products	3,18	-	3,23	-
V09 - The celebrity showcased makes me remember this advertisement more easily	4,59	-	4,23	-
V10 - I often pay attention to clothing advertisements on internet	4,76	3,00	3,25	3,79
V11 - I usuyally buy clothing in online stores	3,06	4,00	2,50	3,29
V12 - I usually remenber online ads when I search what I want to buy	3,65	4,00	3,38	3,29
V13 - I usually buy products from well-known brands	4,18	6,00	5,13	4,21
V14 - I'm not afraid to risk buying products from unknown brands	3,47	4,00	4,13	5,57
V15 - I trust the brand of this advertisement	3,41	2,00	3,25	3,64
V23 - Number of fixations in celebrity	8,24	-	6,75	-
V24 - Number of fixations in brand	4,71	6,46	8,25	11,36
V25 - Number of fixations in text	12,94	18,85	14,06	21,86
V26 - Visit duration in celebrity	2,91	-	2,09	-
V27 - Visit duration in brand	1,16	2,40	2,22	3,02
V28 - Visit duration in text	3,49	5,17	3,48	5,02

All the variables exhibited were measured by the survey and the eye tracking. The values are related to the means of the variables through groups of the experiment. It is interesting to note that, in some cases, the group 3 obtained higher means than group 1: for example, with respect to variable V06 - "The products of this brand seem to be expensive",

group 3 that contained an unknown brand obtained mean 5.13 vs. 4.94 (n.s) from group 1. However, the greatest satisfaction with advertising was over group 1. It is also interesting to note that, in the case of the unknown brand, the celebrity AOI obtained less visitation time compared to the group of the known brand (2.09 vs. 2.91, $p<.05$). This may occur because people immediately recognize Zara brand and spend more time observing the other elements of the advertisement. In the case of Avilana, as it is an unknown brand, people tend to fix and spend more time in this AOI trying to decode that brand. The visitation time at the unknown brand (2.22) makes this hypothesis clear against 1.16 ($p<.01$) of the known brand.

The factorial analysis was done with only the data collected through the eye tracking experiment. Thus, six variables regarding number of fixations and fixation time in each AOI ("celebrity", "logo" and "text") were selected for the study. Bartlett's test, KMO and commonalities were satisfactory (Hair Jr. et al., 2014). Two factors were found that explained 79.9% of data variance. Factor 1 contained the variables "V23 - number of fixations in celebrity, V25 - number of fixations in text, V26 – visit duration in celebrity and V28 - duration of visit in text", which we call "variable advertisement elements" those that, depending on advertising, may vary in format and presence/absence. Factor 2 contained the variables "V24 - number of fixations in brand and V27 - duration of the visit in text", which we call "fixed advertising elements", that is, those that are always present in advertisements (in this case, the logo).

Figure 1 - Factorial analysis using eye tracking variables only.



Notes:

F1: celebrity and text
F2: brand

V24: number of fixations in brand
V27: duration of visit in brand

V25: number of fixations in text
V28: duration of visit in text

V23: number of fixations in celebrity
V26: duration of visit in celebrity

It clear that the 3 pairs describe each dimension of the areas of interest in the images observed by the interviewees: celebrity and text together in Factor 1 and brand in Factor 2. Therefore, it is correct to state that the three AOIs are in fact easily identified by the interviewees as three different dimensions that compose the propaganda. As a result, through the arrangement of the variables in the Cartesian plane, it is possible to interpret them as inversely proportional which are disposed in a perfectly triangular way, quite distant in different quadrants. Observing the X axis, it is possible to affirm that the celebrity and text dimensions are inversely related. On the other hand, observing the Y axis, we can see that the inversion ratio between the variable brand is higher in relation to the celebrity variables than to the text variables. In any case, the branding and text variables are closer to each other than to celebrity ones. Thus, the graph interpretation can be made by saying that, in general, the variables related to AOI are related negatively. While the number of fixations and visitation time in the AOI brand and text have a strong relation to the two factors determined by the factorial analysis, although distant from each other, the number of fixations and the visit time in the AOI celebrity deviates a little from this pattern being more distant from the two factors, belonging also to the two negative quadrants.

We can conclude that, by analyzing the ocular behavior variables measured by the eye tracking device, there is not a statistically significant relationship between the presence or absence of celebrity in an advertisement as an endorsing element of the brand or the message (text) of it. Moreover, the fact that they are negatively related proves that these three elements compete for user attention. The longer you observe the text – usually the element that has more fixations in an advertisement – the less time will be spent on other elements. Therefore, it depends to the advertising proposal to balance these elements, so they do not "steal" the consumer's attention, which is limited, and direct it to the most important element, whereas it is brand, image (in this case, celebrity) or text.

To analyze the relationships between all variables (statements and eye tracking) and experimental groups we used correspondence analysis. The two dimensions (F1, F2) of the figure 2 explain 92.4% of the variables' variance. Quadrant 1 (x, y), contains the variables related to the online shopping behavior, fixations and time of visits in the AOI text and Group 2, which contains the known brand and text. Quadrant 2 (-x, y), contains satisfaction variables associated to advertising, brand perception and Group 1, which contained celebrity, known brand and text. Quadrant 3 (-x, -y), contains the reliability variables in the advertisement brand and Group 3, which contained celebrity, unknown brand and text. Finally, quadrant 4 (x, -y), contains variables of fixation and visit duration in the AOI brand, the only variable

with inverted scale about assuming risks when it comes to unknown brands and Group 4, the one that contained unknown brand and text.

Observing the arrangement of the variables in the perceptual map, it is possible to note that the variables with greatest geometrical proximity within the Cartesian plane are those that are on the left side: in the 2nd quadrant (-x, y), the variables 3 (V03), 5 (V05) and 7 (V10) close to G1 (group 1) and in the 3rd quadrant (-x, -y), variables 1 (V01), 2 (V02), 4 (V04) and 12 (V15) close to G3 (group 3). Regarding variables cited in the second quadrant, it is possible to affirm that they measure the interviewee satisfaction related to the advertisement (whether it is high quality and attractive) and the attention they have to the clothing advertising on the Internet. We can call this quadrant as perception dimension of the advertising. Observing the overall mean of the Likert 7-point responses for these three sentences, it is possible to note that they have relatively low scores (3.60, 3.56 and 3.78, respectively), below the 15 phrases mean. However, when the means are evaluated by groups, Group 1 obtained the highest averages (4.53, 4.19 and 4.76, respectively). In general, people did not notice the advertisement as high quality or attractive. It is interesting to note that the phrases that measure advertising satisfaction (that had low overall scores) are those closest to Group 1 of the experiment, which, compared to the other 3 groups, is the most "appealing" because it contains 1- the celebrity and 2- the known brand. A wide range of banners are built based on the composition of these three elements (celebrity/ model, brand and text) only, as observed in an empirical experiment at the time of the construction of the images of this experiment. The fact that variable 7 (V10) is also associated with this group also indicates that interviewees may have made the association between the pattern of promotional banners on the internet and the type of image presented to them in experiment Group 1.

Regarding the variables in the quadrant (-x, -y), they have a stronger brand attitude than the advertising itself, unlike 2nd quadrant above. We can call this quadrant as the dimension of brand reliability. However, two of them - 1 (V01) and 12 (V15) - have very low averages (2.90 and 3.30, respectively) with 1 being the lowest of the 15 sentences. When the means by group were observed, sentence 1 had the highest mean (3.19) and sentence 12 had the third highest (3.25). On the other hand, it is interesting to note that the phrases most related to the brand element are closer to the 3rd group of the experiment, exactly the one that contained the unknown brand. This can be explained by the fact that Zara ™ is a known brand and therefore has some history in the minds of interviewees. Due to its reputation in the market and its involvement in numerous slave labor scandals, the brand may have biased

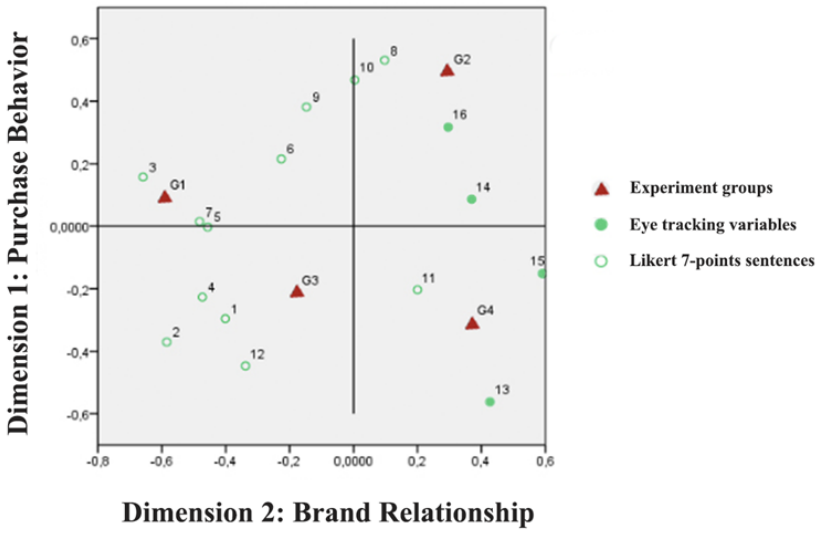
respondents' attitude around survey questions. On the other hand, Avilana had no brand history.

Unlike quadrants 2 and 3, quadrants 1 and 4 present widely dispersed variables. Note that the variables 8 (V11) and 10 (V13), close to the y-axis, and the variable 16 (V28), distant from the two axes, are close to the 2nd group of the experiment. This quadrant can be described as buying habits dimension since they aggregate variables that relate to the habit of buying known brands and clothing online. It is interesting to note that the habits dimension is mainly related to the variables of ocular behavior that focused on the AOI text and the group of the experiment that was not as appealing as the Group 1 (considering the celebrity presence) but still contained the known brand. Therefore, it is a much more conservative group opposite to variable 11 (found in the quadrant below) that talks about not being afraid to consume unknown brands.

Finally, quadrant 4 (x, -y) shows the variables 11, 13 and 15 distributed triangularly around 4th group of the experiment. It is possible to name this quadrant as the risk dimension because the variable found here is the one that had the scale inverted about not being afraid to risk consuming unknown brands. There is also the pattern that, precisely due to its unknown brand, there are many more fixation on its logo than a known brand that is easily and quickly recognized by the participants.

It is possible to name Dimension 1 as purchase behavior and Dimension 2 as brand relationship. It is evident that individuals who have more frequent buying behavior are more likely to observe and engage more with the advertising itself. On the other hand, those who do not have such frequent buying behavior are more vulnerable to brand influence.

Figure 2 – Association between survey statements, eye tracking indicators and groups



5. Conclusion

This study showed that the three elements present in the advertisement of the experiment (celebrity, text and logo/brand) compete for the attention of the user. This is particularly troubling if we consider that, especially in digital media, the most traditional advertisement causes the user to get lost in terms of number of fixations and fixation time within the advertisement itself. It is therefore necessary to redefine and test new models that are more attractive, visually appealing and with a better performance in the digital media. The results showed us how the variables measured through eye tracking and survey can relate to the dimensions buying behavior and brand perception. Finally, in this study we also look at the static banner model placed on digital media and the effectiveness of celebrity performance. Both appeared to be inefficient in the experiment performed.

References

Benway, J. P., & Lane, M. (1998). Banner blindness: Web searchers often miss "obvious" links. *Internetworking*, 1(3), 1-4.

Calvert, G. A., & Brammer, M. J. (2012). Predicting consumer behavior; using novel mind-reading approaches. *IEEE*, 3, 38-41.

Christensen, J. (2017). *A crucial paradigm for a changing world.* Retrieved from http://interbrand.com/views/a-paradigm-for-a-changing-world/i (Acessed October 26, 2018).

Hair, J. F. Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2014) *Multivariate Data Analysis* (7th ed.). Harlow: Pearson Education Limited.

Kawano, D. R.; Furtado, E. J. C & Batista, L. L. (2017). Design, publicidade e neurociência: uma reflexão interdisciplinar em tempos de convergência midiática. *Revista Geminis*, 6(1): 224-251.

Kumlehn, M. (2011). *Consumer Neuroscience: Pricing research to gain and sustain a cutting edge competitive advantage by improving customer value and profitability.* Working Paper. Umeå (Sweden): Umeå School of Business, Economics and Statistics.

Mediamax. (2018, may 29). "*How successful companies spend their advertising budget".* Retrieved from https://mediamaxnetwork.com/blog/how-successful-companies-spend-their-advertising-budget/ (Last accessed: July 16, 2018).