RESEARCH MONOGRAPH

Colour usage in the lettering and in background manipulation on logotypes: Eyetracking evidences

Hugo Márcio Rodrigues de Almeida[1], Sónia Brito-Costa[2, 3, 4], Pedro Bem-Haja[5], Juan José Maldonado Briegas[6]

[1] University of Aveiro, CNL – Consumer Neuroscience Lab, ISCA- Email: hugodealmeida@ua.pt; [2] Polytechnic Institute of Coimbra, Applied Research Institute (I2A) – Email: sonya.b.costa@gmail.com; [3] Coimbra Education School, Human Potential Development Center (CDPH); [4] Coimbra Education School, Research Group in Social and Human Sciences (NICSH); [5] University of Aveiro, NeuroLAB, Research unit of Cintesis.ua.- Email: pedro.bem-haja@ua.pt; [6] University of Extremadura. Spain. juanjose.maldonadob@gmail.com

Abstract. Placing of university age on your logo is a common practice that is related to the need to convey the image of institutional credibility and reliability. We wanted to understand if, as regards the logo of the 40th anniversary of one University, attention to the age number increased, manipulating both the colors of the letters and the colors of the background, in a sample of 40 participants (26 men and 14 women), with a banner 18 to 24 years old (M = 21.1 SD = 1.24). We use the EyeTribe tracker connected to the OGAMA software. The sampling frequency was set to 60 Hz and a 16-point calibration was also used to record eye movements. The procedure included 3 experimental blocks, each containing a logo and a photo of a cat's muzzle. The logos were displayed for 10 seconds each and the cat's muzzle for 5 seconds in each piece. No inter-stimulus and inter-block intervals were programmed, with the cat's muzzle being an inter-stimulus interference displayed in the center of the screen. The logos and photos in each block and their order of presentation were balanced. When we kept the color of the ROI numbers (40). The results of our study showed that individuals increasingly looked for the birthday number (ROI) when it was on a gray background than when it was on a black background, and that search performance is obstructed by the visual similarity of the target and the background, increasing the processing time for complete analysis of the information within the image. When the background color of the logo was kept constant, the results showed that individuals looked more and more for (ROI) when it was painted in color than when they saw a logo in which these same numbers were in shades of gray.

Keywords: *Eyetracking; Higher Education Marketing; Brand Identity; Logotypes*

Introduction

In order to overcome the challenges of consumer preferences, universities had to come up with strategies to relate with its actual and potential consumers. Thus, regarding the portray of the university's values – and what distinguishes it from others - higher education is focusing in developing its branding (Wæraas & Solbakk, 2009), seeking trust and stakeholders' satisfaction (Bennett & Ali-Choudhury, 2009).

As there is not a tangible product to associate with the brand, higher education (like other service-sector brands) must have a strong brand (Underwood, Bond, & Baer, 2001), with the organization becoming a brand with a distinct identity, personality, and image (Onkvisit & Shaw, 1989; Thomas, 1978; as cited in Harris, 2009).

College and universities seek recognition and prestige, in order to acquire a competitive edge over other institutions, focusing their discourse and operations

in its pursue (Goldman, Goldman, Gates, Brewer, & Brewer, 2004), with history and tradition assuming tremendous value (Thelin, 2011). Indeed, brand age is associated with experience, being extremely important for customer satisfaction and trust (Mayer, Davis, & Schoorman, 1995). This is particularly true in academic context, where a great number of universities have their year of foundation (or age) in their logos linking the institution with experience (e.g., Howard University, Penn State University, Dartmouth College, University of Southern California, Karolinska Institutet, Hohenheim University, University of Heidelberg, University of Geneva, University of Bologna). One of the most interesting examples is the University of Manchester, whose logotype highlights the "EST" from its name and adds the foundation year below it, to disclose the establishment year. Another example is the Oslo University, whose logo has the foundation year in roman numerals.

Therefore, the name, color scheme, logo and tagline of an organization, like an university, assume main relevance to its total Visual Identity (Alessandri, 2007), which is deeply related with the reputation, as both concepts deal with the perceptions shared by its internal and external constituents. (Alessandri, Yang, & Kinsey, 2006).

If university brand managers understand better the interaction of consumers with a brand, all branding efforts are developed more effectively (Watkins & Gonzenbach, 2013), providing a distinct brand personality that consumers can easily identify. In fact, marketing theories and concepts are gradually being applied by many universities (Hemsley-Brown & Oplatka, 2006), which were forced to equip themselves with the necessary marketing intelligence and information that would enable them to face the challenges of the international market for higher education (Binsardi & Ekwulugo, 2003).

One of the main pieces of branding - the logo- is a way to increase a company's reputation (Balmer, van Riel, Baker, & Balmer, 1997; Olins, 1989), acting both as a badge of identification (Dowling, 1994) and a mark of quality (Balmer et al., 1997), which, if properly managed, may add competitive advantage (Balmer, van Riel, & van den BAN, 2001) and simplify corporate communications (Balmer et al., 1997)

Thanks to its quality of prompting recognition and recall (Henderson & Cote, 1998; Napoles, 1988), the logo is very important, with colour playing a major role in transmitting information, creating lasting identity (Henderson & Cote, 1998; Napoles, 1988) and grabbing consumer's attention.

Attention is the degree to which consumers focus on specific stimuli within their range of exposure (Solomon, Bamossy, & Askegaard (2002), as cited in Bialkova & van Trijp (2010)) occurring when the processing capacity is triggered by the stimuli (Guido, 2001). The reason underlying its direction may be the goal of the consumer and/or if it emerges exceptionally within the visual field (Shiffrin & Schneider, 1977; Yantis, 2000).

Accordingly, developing a logo with adequate colour and design is crucial to any corporation, but it has being partially neglected by academia (Hynes, 2009). Henderson & Cote (1998) said that colours may carry emotional and neurophysiological values and may affect levels of excitation and cognitive stimulation. Hence, it is of main importance to consider its psychological and strategic (Dowling, 1994; Guaspari, 1995) uses instead of letting the impulse and/or disposition of the designers or managers take control.

Also, higher contrasts between text and background colour led to faster searching and recognition (Ling & Van Schaik, 2002).

Taking in account the interest of the University of Aveiro in transmitting experience by adding the age to the logotype, the aim of our study was to analyse the influence that changing the background and the colour of the numbers has on the 40th anniversary of the University of Aveiro's logotype, specifically the differences observed in the Region of Interest (ROI) – the number 40 - using an eyetracker.
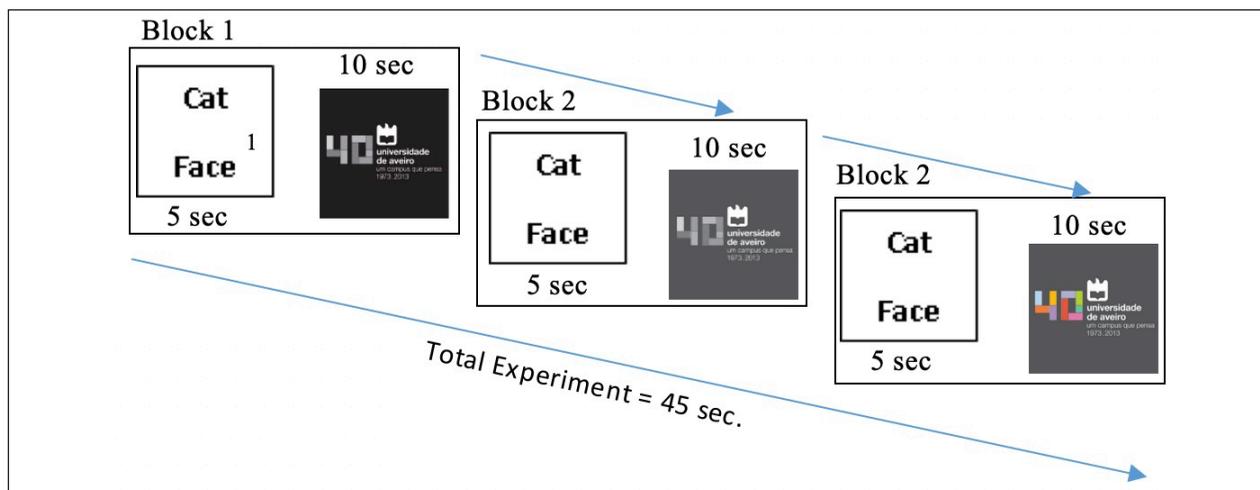
Methodology

Participants

The sample was composed of 40 subjects (26 male and 14 female), with an age span 18 − 24 years (M = 21.1 SD = 1.24) recruited from the Superior Institute of Accountability and Administration (ISCA) of the University of Aveiro.

Eyetracking

To record eye movements we used the EyeTribe tracker (more information in https://theeyetribe.com/)

Figura 1. Experiment presentation
¹Cat faces are not presented due to Copyright issues.

connected with the OGAMA software (Voßkühler, Nordmeier, Kuchinke, & Jacobs, 2008), where the experiment was set. The sampling frequency was set up to 60 Hz and a 16-point calibration was used.

Stimuli and Experiment

The experiment contained 3 experimental blocks, each one containing one logo and one cat face picture (fig. 1). The logos were presented for 10 seconds each and the cat faces were presented for 5 seconds a piece. No inter-stimuli and inter-block interval were programmed, with the cat face being an inter-stimuli interference displayed in the centre of screen. The logos and pictures in each block and their order of presentation were counterbalanced.

Procedure

After completing the informed consent, the participants performed the experimental task.

Data Analysis

In the data analysis, we compared the fixation time and number of fixations on "Anniversary" (Our region of Interest) between three logos using t paired samples t-test. To assess the Background Colour Effect in fixation on "Anniversary", we compared the logos "Black Background & Grey Anniversary" and "Grey Background & Grey Anniversary". For Anniversary Colour Effect assessment, we compared the

logos "Grey Background & Grey Anniversary" and "Grey Background & Colour Anniversary" (see figure 2). The Double Effect Colour Effect was assessed with the logos "Black Background & Grey Anniversary" and "Grey Background & Colour Anniversary".

Results

For a better understanding of the results, we separated their exposure by purpose (Background Colour Effect, Anniversary Colour Effect and Double Effect).

Background Colour Effect (Black Background & Grey Anniversary VS Grey Background & Grey Anniversary)

The heatmap and the descriptive statistics (Table 1) registered in the variable "time of fixation on anniversary" and "number of fixing looks on the anniversary"

Table 1. Descriptive statistics of the time and number of fixations in ROI "anniversary" in the logos of Background Colour Effect.

	Logo	N	Mean	Std. Dev.
Fixation time on "anniversary"	Black Background &Grey Anniversary	40	1277,3	1601,3
	Grey Background & Grey Anniversary	40	2017,2	2103,7
Fixation number on "anniversary"	Black Background &Grey Anniversary	40	4,2	4,6
	Grey Background & Grey Anniversary	40	6,4	4,2

on the two logos of the Background Color Effect are shown below.

Through the "visual data analysis" table 1, we can say that for the two variables under study the absolute values obtained in the logo "Grey Background & Grey Anniversary" were higher than in the "Black Background & Grey Anniversary". To evaluate the statistical significance of the differences, we performed two t-tests for paired samples.

The results of these tests showed that participants looked more often (t Fixation number on anniversary(39)=-2.840, p<.01, Cohen d =-0,449, CL effect size = 0,327) and longer (t Fixation time on "anniversary"(39) =-2.550, p<.05, Cohen d = -0,403, CL effect size = 0,343) for the numbers of the anniversary in the logo "Grey Background & Grey Anniversary" than to the same ROI in the logo "Black Background & Grey Anniversary" and that those differences were statistically significant.

Anniversary Colour Effect (Grey Background & Colour Anniversary VS Grey Background & Grey Anniversary)

The heatmap and the descriptive statistics (Table 2) registered in the variable "time of fixation on anniversary" and "number of eye-fixations on the anniversary" on the two logos of the Anniversary Colour Effect can be found below.

The analysis of Table 2 show that, on both variables, the absolute values in the logo "Grey Background & Colour Anniversary" were higher than in the "Grey Background & Grey Anniversary".

The result of the t-tests for paired samples showed that the participants looked more times (t Fixation number on "anniversary"(39)=-2,19, p<.05, Cohen d = -0,346, CL effect size = 0,365) and for a longer period of time (t Fixation time on"anniversary"(39)=-2,43, p<.05, Cohen d = -0,384, CL effect size = 0,350) for the numbers on the "Anniversary" logo in the "Grey Background & Colour Anniversary" than for the same area of the logo "Grey Background & Grey Anniversary" and that these differences were statistically significant.

Double Effect (Black Background & Grey Anniversary VS Grey Background & Colour Anniversary)

The heatmap and the descriptive statistics (Table 3) registered in the variable "time of fixation on anniversary" and "number of eye-fixations on the anniversary" on the two logos of the Anniversary Colour Effect can be found below.

Given the descriptive data of Table 3 and looking for the heatmap of figure 5, we observe that, for the two variables under study, the absolute values obtained in the logo "Black Background & Colour Anniversary" were higher than in the "Black Background & Grey Anniversary". T-tests for paired samples showed us that the participants looked more times (t Fixation number on "anniversary"(39)=-4,33, p<.001, Cohen d = -0,685, CL effect size = 0,247) and longer (t Fixation time on "anniversary"(39)=-4,595, p<.001, Cohen d = -0,727, CL effect size = 0,234) for the numbers of the anniversary in the logo "Black Background & Colour Anniversary" than for the same area of the logo "Grey Background & Colour Anniversary" and that these differences were statistically significant.

Discussions and conclusions

The attention drawn to marketing by higher education institutions has been increasing over the last years (e.g, Thelin, 2011). Communication and image offices try to pass an image of credibility prestige and

Table 2. Descriptive statistics of the time and number of fixations in "Anniversary" ROI of the two logos of the Anniversary Colour Effect.

	Logo	N	Mean	Std. Dev.
Fixation time on "anniversary"	Grey Background &Grey Anniversary	40	2017,2	2103,7
	Grey Background & Color Anniversary	40	2928,7	1807,8
Fixation number on "anniversary"	Grey Background &Grey Anniversary	40	6,4	4,2
	Grey Background & Color Anniversary	40	8,3	3,7

Table 3. Descriptive statistics of the time and number of fixations in ROI "anniversary" of the two logos of Double Effect.

	Logo	N	Mean	Std. Dev.
Fixation time on "anniversary"	Black Background &Grey Anniversary	40	1277,3	1601,3
	Grey Background & Colour Anniversary	40	2928,7	1807,8
Fixation number on "anniversary"	Black Background &Grey Anniversary	40	4,2	4,6
	Grey Background & Colour Anniversary	40	8,3	3,7

recognition in order to be distinguished and compete with similar institutions (Goldman et al., 2004). In order to achieve it, institutions have been investing in their brand identity, by changing colours, letterings and backgrounds (Alessandri, 2007) and displaying information about their age or year of foundation in the logo as an indication of the experience of the institution. Given this, it was the objective of the present study to verify the impact of the region of interest "40" with manipulations of the background of the logo and the colour of the region of interest.

When we maintained the colour of the ROI numbers (40), the results of our study showed that individuals looked more and longer for the anniversary number (ROI) when it was on a grey background than when it was on a black background. These results are in line with studies that have shown that the search performance is obstructed with target and background visual similarity, increasing the processing time to fully analyse the information within the image (Neisser, 1963 as cited by Farmer & Taylor, 1980). The author adds that dissimilarity may also help to guide search throughout the display.

When the background colour of the logo was kept constant, results showed that individuals looked more and longer for the ROI when it was painted in colour than when they viewed a logo in which these same numbers were in shades of grey, a result that is in line with the studies of Elliot & Maier, (2014); Zeki & Marini, (2011) who advocate that objects painted in colour get more attention from human beings. In fact, inumerous marketers, advertisers, and graphic artists state that colour influences consumer behavior (Sable & Akcay, 2011), influencing psychological functioning in a subtle way (Friedman & Förster, 2010). In regards to the double effect, individuals looked more and longer for the ROI when it was painted in colour and on a grey background than when it was painted grey on a black background, which is in line with what has already been discussed in the previous points of this discussion, and shows the importance of using colours and background manipulation in marketing campaigns. One aspect to be careful about regarding the conclusions of this study is the fact that although the objective of the university is to convey the message about the number of years of existence (associated with

experience and prestige), the fact of looking more and for a longer period for 40 years (ROI) can make one look less for other features in the logo like the slogan, a very important issue regarding the Brand Identity.

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