Image, Brand and Price Info: do they always matter the same?

ABSTRACT

We study attention processes to brand, price and visual information about products in online retailing websites, simultaneously considering the effects of consumers' goals, purchase category and consumers' statements. We use an intra-subject experimental design, simulated web stores and a combination of observational eye-tracking data and declarative measures.

Image information about the product is the more important stimulus, regardless of the task at hand or the store involved. The roles of brand and price information are dependent on the product category and the purchase task involved. Declarative measures of relative brand importance are found to be positively related with its observed importance.

Keywords: Attention, Product area, Branding, Eye-tracking, Experimental design

1. INTRODUCTION

Analysis of the web customer's experience is an increasingly important area of research because online retailing is now a basic feature of all sectors. In 2017, online sales worldwide grew by 24.8% with respect to the previous year and made up 10.2% of total retail sales worldwide (Statista 2019). The knowledge about those parts in which the online consumers' attention is focused is essential in Business to Consumer (B2C) e-commerce sites to properly manage the design of these channels (Puccinelli et al. 2009).

A pre-requirement of any response is attention to the stimulus (Sandage 1946; Kellogg 1980). Consumers' attention is a scarce resource for which companies compete (Davenport and Beck 2001). In the field of visual marketing, the research about the role of the attentional processes has been mainly concentrated on the area of advertising (Belanche, Flavián, and Pérez-Rueda 2017; Brasel and Gips 2008; R. Pieters and Wedel 2004; Drèze and Hussherr 2003; Wedel and Pieters 2000; Keith Rayner et al. 2001) and to a minor extent on websites processing due to its later introduction (Hasan 2016; Velásquez 2013; Shi, Wedel, and Pieters 2013; Leuthold et al. 2011; H.-C. Liu, Lai, and Chuang 2011; Lindgaard et al. 2006; Richard 2005 among others).

Website attention analysis has identified various areas of interest in a website (AOIs) (Holzschlag 1998) considering the product area in B2C e-commerce sites, as "marketing information areas" (Huizingh 2000) where the key content is included (Van Duyne, Landay, and Hong 2003). Information presentation in this area is critical for success (Flavián, Gurrea, and Orús 2010). Consumers expect products to be presented in much the same way as in a store (Badre 2002). Therefore, the function and layout of the content area are similar to those of a shop window. The product area is the one with the higher number of eye fixations and, accordingly, the area most largely observed by the consumers regardless of the stage of the purchasing process (Cortinas et al. 2018).

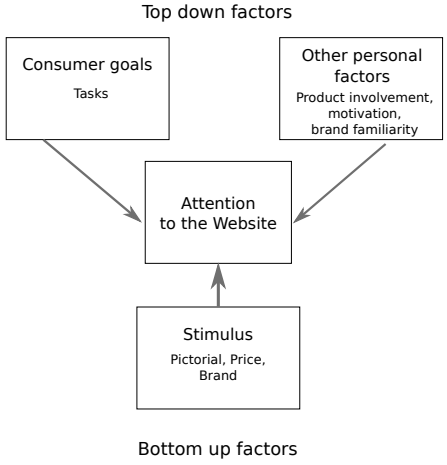


Figure 1: A model of attention capture (adapted from Wedel and Pieters, 2008)

The visual marketing attention theory (Wedel and Pieters 2008) differentiates between bottom-up and top-down sources as determining factors that drive the attentional processes related to the visual marketing stimuli. Bottom-up factors that affect the attention result from the physical features of the visual stimuli to which the consumers are exposed. These characteristics, such as text, illustration, size, colors or shape, determine the perceptual significance of the stim-

uli (Janiszewski 1998).

Analogously, the literature in online point-of-sale has used the term atmospherics (Kotler 1973) to refer to the elements of the shopping environment that affect the consumer's purchasing process and his/her web-surfing behavior (Richard 2005). These features are able to capture subject's attention even in a non-actively searching condition of the consumer (Wolfe 1998). Contrarily, top-down factors are related to individuals' unique aspects such as expectations, objectives and emotions. These are personal characteristics affecting the attentional process. In this framework subject's factors such as the engagement with the product or the acquaintance of the brand (Keith Rayner et al. 2001; Rosbergen, Wedel, and Pieters 1997), are the ones driving the attention of the individual to the stimuli with varying strength. Both types of sources, i.e. top-down and bottom-up, are combined to determine the attention patterns. In this manner, significantly outstanding stimuli are able to capture user's attention while the consumers vary their attention according to their objectives or specific tasks (Ohman et al. 2001). In Figure 1 the attentional model for the product area in an online store is represented.

Regarding the research on advertising, the study of the perceptual significance difference between text and image is one of the most frequent topics (R. Pieters and Wedel 2004; Keith Rayner et al. 2001; Rosbergen, Wedel, and Pieters 1997). In general, it can be concluded that in advertising illustrations are key elements to capture consumers' attention (Singh et al. 2000) regardless of their size (R. Pieters and Wedel 2004).

The research devoted to attention on websites has been oriented to Areas Of Interest (AOIs) (Van Duyne, Landay, and Hong 2003; Huizingh 2000), navigation menus design (Leuthold et al. 2011), navigation strategies (Drèze and Hussherr 2003), appearance evaluation (Lindgaard et al. 2006), product presentation (Shi, Wedel, and Pieters 2013) and web atmoshpherics (Richard 2005; Dailey 2004). Moreover, it is probable that the attentional process in the online framework varies as a function of the product category in the store (Shi, Wedel, and Pieters 2013; Leuthold et al. 2011; Wang et al. 2014). There have been research on text-image combination (Yandandul, Chaitra and Paryani, Sachin and Le, Madison and Jain 2018). However, despite its importance, there is still a lack of knowledge about how subjects observe an image in comparison to text (Keith Rayner et al. 2001) and research on text-image combination in the product area of e-commerce sites is reduced (H.-C. Liu, Lai, and Chuang 2011). The perception of the image is faster and more automatic, therefore, less effort and time are required while focal attention and willingness are required for text processing (K Rayner 1998).

In a retailing website, the brand and price of the products are considered as text stimuli and present a high relevance when experience attributes are prevalent (Nelson 1974). Products are conceived as a set of attributes, each of which acts as a cue contributing to the formation of the consumer's impressions of the product itself (Dawar and Parker 1994; Richardson, Dick, and Jain 1994). In the online environment the product image is used to approach the consumer physically. However the product cannot be processed using senses, except for the human visual sense. Price becomes more important when information about other attributes is lacking and there is a risk of making the wrong choice. When comparing two similar products, the higher-priced alternative is usually expected to be of better quality (Dodds and Monroe 1985; Monroe and Krishnan 1985).

Finally, the brand name is another way of differentiating a product. Its role is to represent the aggregate consumer perception of a particular firm. Thus it tells us what to expect of a specific product (Gordon 2002). When consumers are unable to judge quality, brand names often emerge as an important assessment criterion or as a substitute quality indicator (Boulding and Kirmani 1993). When analysing the attention to the brand using printed ads, it has been concluded that the brand is the most effective element transferring the attention to other relevant elements such as the text or the image (R. Pieters and Wedel 2004).

Product images, prices and brands are considered relevant stimuli in comparison to other non-significant aspects such as color, fonts and animations among others (Eroglu, Machleit, and Davis 2001) . In the online environment, when users visit a website, their attention to these stimuli varies according to what they are aiming to achieve (top-down factors) (Puccinelli et al. 2009), which depends, in turn, on which stage of the purchasing process they are engaged in (Rowley 2000):

- the pre-purchase stage, in which the consumer seeks and analyses information prior to making a choice.
- the purchase stage, in which the consumer makes the purchase.
- the post-purchase stages, which include, for example, the use of customer services or customer review sites.

Consumers' aims change and vary in complexity as they progress through the different stages (Neslin et al. 2006; Verhoef, Neslin, and Vroomen 2007). Studies studying variation of behavior and attitudes in online purchasing include aspects of the pre-purchase stage (Shim et al. 2001); of the channel choice stage (Chocarro and Cortinas 2013); of purchase intention formation (Chen, Hsu, and Lin 2010) ; of purchase decisions (McDowell, Wilson, and Kile 2016) ; and of repeat purchase intention and loyalty formation in the post-purchase stage (C. Kim et al. 2012; Chocarro, Cortiñas, and Villanueva 2015) . It is also well documented in the literature that these tasks imply different degrees of cognitive burden and that the more complex tasks take longer to complete (Wang et al. 2014; Leuthold et al. 2011).

To conclude it is worth to mention those subject-dependent top-down factors influencing the attentional process such as product involvement that is dependent on the consumers' inherent needs, values and interests (Zaichkowsky 1985) and leads to an attentive state of mind that makes consumers more capable to process information (Belanche, Flavián, and Pérez-Rueda 2017; Yoo, Kim, and Stout 2004). In this respect, it has been concluded that higher involvement increases attention to the product area (Cortinas et al. 2018). Online shopping experience and demographics are consid-

ered to be additional subject characteristics affecting attentional processes.

Thus, the objective of this paper is to examine precisely how the consumer attention process in the product area on a website varies according to bottom-up and top-down factors. In more detail, we aim to:

1. Analyse the effect of the stimulus: The same attention is paid to the image, the price and the brand?
2. Analyse the effect of the consumers goals: The attention paid to the stimuli is task dependent?
3. Analyse the effect of the website: Does the attention vary when the category of the product is different?
4. Analyse the relationships between observed attention processes and stated responses.

This paper contributes to the literature with a novel analysis of variations in attention processes in digital environments in the product area (picture, prices and brand) in three stages of the purchasing process (pre-purchase, purchase and post-purchase) using observational techniques and eye-tracking methods.

The customer's experience along the purchasing process is internal and subjective (Meyer and Schwager 2007) and therefore difficult to measure through declarative responses as in a questionnaire. This paper adopts eye-tracking as an attention-measuring tool. Eye tracking is described by (Lemon and Verhoef 2016) as a useful means to explore more deeply into the experiences of the customer throughout the purchasing process.

The use of eye-tracking for attention measurement is nothing new (Wedel 2015). However, the analysis of observational data alone could lead us to overlook relationships with other key variables such as the effect of category involvement or the relative importance of different product attributes. Another contribution of this paper, therefore, is to investigate the attention process by performing a joint analysis of eye-tracker data and declarative feedback from a questionnaire.

2. RESEARCH DESIGN

2.1 Subjects and design

The research team recruited students from the fourth year of a degree course in Business Administration and Management, who were them invited to the laboratory where the data were to be collected. There were several reasons for restricting the survey population to university students. 25 to 34 year-olds make up the second largest segment (20.6%) of online purchasers in Spain in 2017, while the higher education population accounts for 34.3% (ONTSI, 2018). The product categories selected for the experimental tasks (sport shoes, mobile phone, ball-point pens, hard disks) are popular as online purchases among university students. Other eye-tracking studies analysing websites tasks have also used students as their subjects (Djamasbi, Siegel, and Tullis 2010; Leuthold et al. 2011; Reutskaja et al. 2011; Shi, Wedel, and Pieters 2013; Velásquez 2013) although this is not the case in ad attention studies, where randomly-selected consumer samples are used (R. Pieters and Wedel 2004; Wedel and Pieters 2000).

This study uses an intra-subject design including 4 tasks (exploration, evaluation, purchase, postpurchase) x 4 webs (sport shoes, mobile phone, ball-point pens, hard disks). This design has the advantage of controlling both for individual effects and for potential bias from the learning effect, which appears as the subjects progress through the required tasks (Gentile, Roden, and Klein 1972). Thus, all subjects are required to perform all four tasks and to visit all four stores (categories), but the task-store pairs are random combinations, such that no subject repeats the same task in the same category in order to avoid interference from the learning effect.

2.2 Materials: web sites and areas of interest

The experimental design was implemented by creating a simulated web store for four different product categories. Such simulation is not new to this type of research (Leuthold et al. 2011; Wang et al. 2014) and, although it reduces the degree of realism, it enables stricter control of other effects that might bias the results. It is a natural-looking e-commerce website layout enabling unambiguous location of the three areas of interest (AOI) as found in most countries worldwide (Bernard and Sheshadri 2004), being the product area the one containing purchase key information (Huizingh 2000; Flavián, Gurrea, and Orús 2010). The first area of interest, the header showing the company identity, appears centre top and has a menu with contact details, the "Home" button on the left and the shopping cart on the right. The second area of interest, the product offer, occupies centre-screen below the header. It has the appearance of a shop-window displaying brands, images of the goods, with prices and add-to-cart buttons below. The third area of interest, services, appears on the left below the header.

The product category can affect both time spent completing the task and how much attention is paid to the web page. This effect is mitigated by including these four different product categories with different degrees of risk and including both search and experience products (Mitra, Reiss, and Capella 1999). The four categories are sports shoes, mobile phones, ball-point pens and hard disks. The same layout is used for all four stores, with variation in the colours but in no other features so as to avoid other potential biases.

2.3 Materials: tasks definitions

Prior to task definition, qualitative interviews were conducted following a pre-test. The tasks are analogous to those used for each stage in previous studies (Leuthold et al. 2011; Reutskaja et al. 2011; Shi, Wedel, and Pieters 2013; Wang et al. 2014). One task per stage is set plus one more for control purposes, as shown below:

- Control: Exploration Task: "rate the website for overall appeal"
- Evaluation Task: "visit the website and select from those offered the product which most appeals to you based on the information provided"
- Purchase Task: "add option X to the shopping cart"

- Post-purchase Task: “find how to track your order”

Control and evaluation tasks are, a priori, more complex than the purchase and post-purchase tasks and involve a greater cognitive burden.

2.4 Procedure

The study took place in April 2018 in Spain. A random sample of 58 students is recruited by the research team. Eligible recruits are shown into the laboratory and seated at individual computer terminals where they are to perform the 4 tasks and complete a questionnaire. After eye-tracker calibration, the questionnaire becomes accessible and the tasks can begin. As an incentive, participants receive numbers in a draw for an Amazon €20 shopping voucher. Given the profile, the sample is highly homogeneous with regard to age (mean age 24.8, with a standard deviation of 4.7) and occupation (94% were full-time students). More than half (60%) are women.

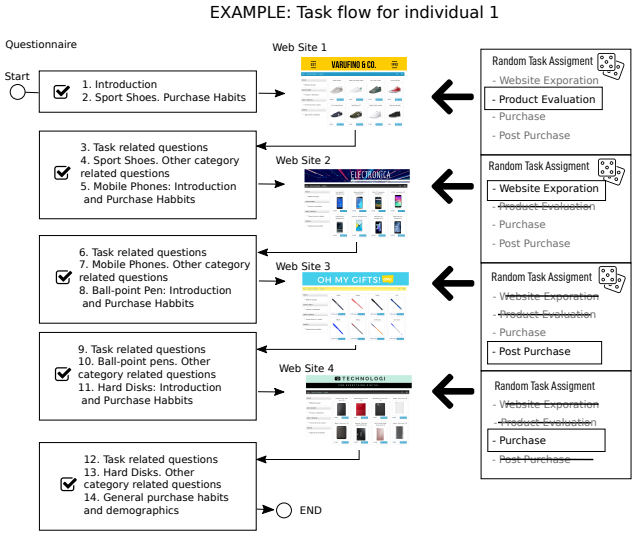


Figure 2: Experimental Procedure

Each subject is randomly assigned to randomly-formed task and category pairs, such that each subject completes all four tasks and visits the four categories but the category in which each subject completes each task, and the order in which the tasks are completed are different for each subject. Store-task pair assignment and questionnaire implementation require another platform, in this case, the Qualtrics online platform. The questionnaire is linked to the four web stores such that, when the task for a certain category comes up on screen and the subject presses the store access button, the time spent in the store up to the first click is registered and the subject returns to the questionnaire.

Data collection, including eye tracker instrument calibration, questionnaire completion and associated tasks take an approximate total of 15 minutes per person. Subjects are accompanied by a researcher throughout this process. Figure 2 shows the data collection procedure for an example subject.

2.5 Method

This experiment enables us to obtain observational (eye-tracking) data and declarative feedback (questionnaire responses) from each subject. Subjects' level of attention across task types is measured by means of purpose-designed eye-tracking hardware comprising cameras and infra-red light. The specific choice of hardware for this study is The Eye Tribe Tracker. According to its manufacturers, The Eye Tribe Tracker has an average accuracy of 0.5°, a spatial resolution of 0.1° (rms) and an average frame rate of 30 Hz. The user calibration is repeated in order to assure a reliable tracking accuracy. The system monitors the subject's gaze throughout the trial and registers eye fixations according to a specified spatial dispersion criterion.

A fixation is defined as a quasi stable position of the eye for a minimum of 200 milliseconds. The requirement for a quasi stable position requires that the angular dispersion of the eye is below 1°. The fixation check procedure filters out noise in the gaze data. The procedure only records fixations within the selected AOIs; thereby outliers in the gaze patterns are filtered out. Once the trial is completed, the gaze position coordinates and time patterns across the four tasks are taken and the subject's fixation times are recorded and classified by AOI and type of task. We compute attention indicators such as the number of gaze fixations on each area of interest.

This information is completed with declarative feedback from the questionnaire to control for potentially unobserved subject characteristics that might affect attention and time spent on task. The questionnaire includes information about purchase habits, category involvement and sensitivity to brands, prices and services. Finally, subject characteristics, such as online shopping experience, and demographics are included for control purposes. The individual attention patterns obtained by eye-tracking are linked to the declarative data from the questionnaire by a unique code generated by Qualtrics for each questionnaire.

Figure 3: Definition of Areas of Interest

3. RESULTS

In order to analyse the results, we aggregate the fixations by individual, task and area of interest. We use the classification of AOIs that is shown in Figure 3.

We group fixations in AOI4 to compute fixations in the brand content area, fixations in AOI5 to compute observations in the image area and fixations in AOI6 to compute

fixations in price content area. Then, we aggregate measures in the other AOIs in a general "Others" category (AOI1, AOI2 and AOI3). After that, these measures are standardized, i.e. normalized,taking into account the relative size of each area.

3.1 General Results

The plot in the left of Figure 4 shows statistics for the sum of fixations by area, and the one in the right pannel shows statistics for the sum of fixations divided by the total number of fixations of each individual in each tasks.

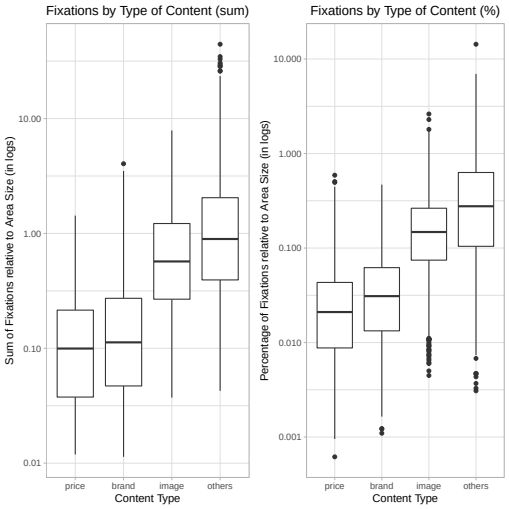


Figure 4: Boxplots. General Measures by Area of Interest

The first plot shows that, among the AOIs of interest, image attracts more atention (mean value 0.91), followed by brand content (mean value 0.24) and finally price (0.16). The Anova test gives an F value of 717.8 (sig. <2e-16). The results with the values standardized with regard to the individual total fixations are very similar (Anova F Value 874.6, probability <2e-16).

3.2 Differences by task

In order to explore the differences in these patterns according to the task at hand, we plot in Figure 5, both the sum of fixations and their relative importance both by content and task.

Firstly, in the upper pannel, we observed great differences in the total amount of fixations between tasks. The more complex the task is, more attention is required to fullfill it. General exploration of the website and product evaluation require in general much more effort than location and purchase of a pre-determined product and the location of the content related with order tracking (Anova F value is 20.94, significance 1.89e-13).

Regarding the differences between AOIs, the comparison is better shown in the lower panel that shows the percentage of fixations in each AOI. We can clearly see that the areas of attention differ depending on the task. The product area in general is much more important in the evaluation of products and in the purchase tasks, as we can infer for

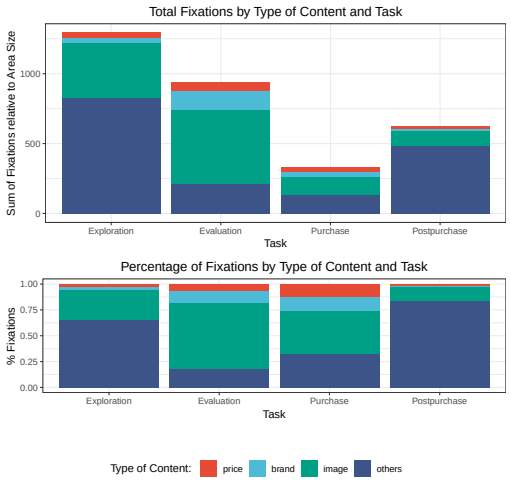


Figure 5: Distribution of Fixations by Area of Interest and Task

the lesser relative importance of the category "others" (mean value 3.13 and 1.92 vs. 1.73 and 1.13 respectively).

Finally, the relative importance of the different types of information in the content area also varies between tasks. Brand and price information are important only in purchase related tasks, but images are important in all four cases, confirming the atraction capacity of this type of information. In the evaluation and purchase of products, brand content is more important than price information although both types of content are relevant. The Anova test gives an F Value of 234.10 (sig. <2e-16).

3.3 Differences by product category

The relative importance of our AOIs changes also depending on the product category. In order to explore the impact of the category, Figure 6 shows, in the upper pannel the distribution of total fixations by store and content and, in the same way as the previous case, the relative importance of each area by store and type of content.

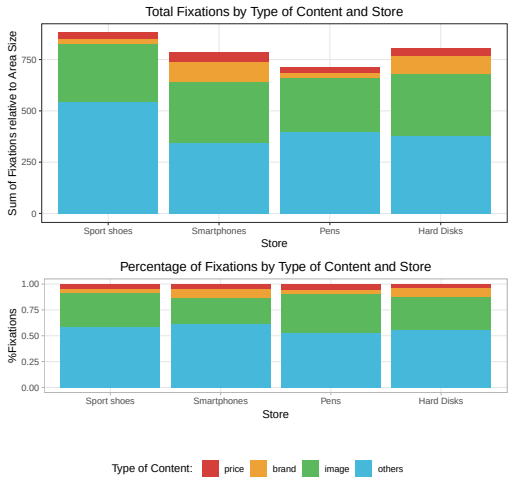


Figure 6: Distribution of Fixations by Area of Interest and Product Category

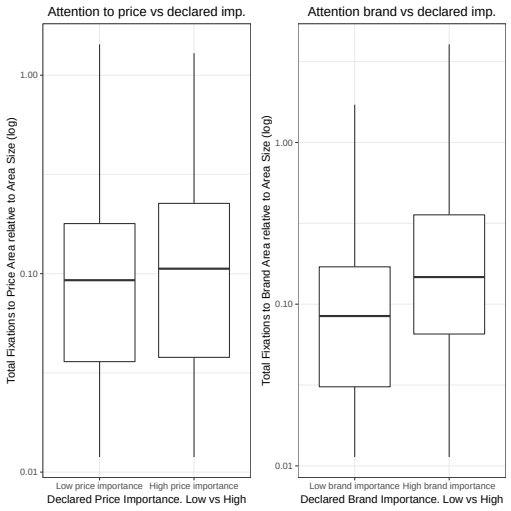
The differences between stores in the total amount of fixations are lower than in the case of the purchase task, but they exist. The sport shoes and hard disks stores seem to attract greater attention than the other two stores but the differences are not significant (mean values 0.88 and 0.80 vs 0.78 and 0.71 respectively, Anova F value F=1.19, prob. 0.31).

Finally, with regard to the differences in attention to the content, the price content is much more important in the pen store (mean value 0.06) than in the other tree stores (0.04, 0.033 and 0.030 respectively). Regarding brand, the stores in which brand content attracts more attention are the smartphones store and the hard disks store (mean value 0.052 and 0.055 vs 0.038 and 0.041 respectively). The importance of the image content is greater for sport shoes and pens (mean values 0.21 and 0.28 respectively) than for smartphones and hard disks (0.16 and 0.19).

3.4 Comparison with declarative importance

Our experimental design allows the comparison of the level of attention to the different product atributes with the importance that each individual asigns to that attribute during product choice for each category.

Figure 7 shows the relationship between attention to the price and brand total fixations and the level of importance the subject gives to that attribute in the questionnaire (recoded as dichotonomous according to the median value of the scale).



The plots show a positive association between the median value of fixations and the importance attached to the atribute in the questionnaire, specially in the case of brands. Individuals that, in the the questionnaire, declare to give more importance to the brand when buying products, also pay more attention to the brand on the web sites. The difference in the mean value is not significant in the case of prices (Anova F value 2.473, sig. 0.116) but it is highly significant in the case of brands (Anova F value 47.74, sig. 8.96e-12).

4. CONCLUDING REMARKS

In this paper we study attention proccesses to both textual (brand and price) and visual information about products in online retailing websites. In doing so, we are simultaneously considering the effects of consumers' goals and purchase category and consumers' statements about the relative importance of different products attributes. The study uses an intra-subject experimental design and a combination of observational (times and fixations) and declarative measures (feedback from a questionnaire).

Image information about the product is, as expected, the more prominent stimulus attracting more attention. Images are the most important element, regardless of the task at hand or the store involved.

The roles of brand and price information, on the contrary, are dependent on the product category and the purchase task involved. For example, price pays a key role in the pen store, while brand is more important for the smart phones category. General exploration and evaluation of the website and product evaluation and selection require much more effort than purchase and post-purchase tasks.

We also analised the relationship between the observed attentional proccesses to brand and price and the relative importance that the individuals declare for both attributes. Declarative measures of motivational attitudes have been strongly critizied for their potential biases. In this cases, both type of measures are found to be positively related although the relationship is only significant in the case of brand.

As future research lines, it might be also interesting to explore variation in relation to product-category attributes, such as complexity, and whether they require sensory or non-sensory (Trijp, Hoyer, and Inman 1996) evaluation. The signs of variation in relation to the degree of product-category interest point to another potentially fruitful line of research.

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