Can Fixation on Main Images Predict Visual Appeal of Homepages?

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Abstract

Research suggests that a main image on a homepage creates a distinct visual hierarchy that maybe inherently appealing to people. This in turn suggests that main images may play an important role in shaping user aesthetic reactions to a homepage. Research also shows that images of people are effective in drawing attention and that these images are pleasing to users. Grounded in these two lines of research, we show that fixation on main images has significant positive relation to visual appeal ratings of 24 homepages. We also show that when images of people are included in the main image, they attract more attention. Our results also show that users give higher visual appeal ratings to homepages that include images of people in their main image. These results and their implication for theory and practice are discussed.

1. Introduction

Aesthetic reactions to a web page has an important role in shaping a user's experience of the page and can affect how the page is evaluated by the user [1]. Appealing webpages can entice people to purchase products and revisit the webpage [2]. Interestingly, when people find a website appealing, they are more willing to turn a blind eye on its usability flaws [3]. For example, for websites that were appealing to users, the usability issues that rendered almost half of the assigned tasks incomplete, did not affect how the users evaluated the value of the website before and after they completed the tasks [3]. Aesthetic reactions are also linked with users' trust of a website [4]. For example, a prior study found a strong positive correlation between trust in the informational content of a page and visual appeal of the page [5].

The relationship between visual appeal and its impact on subsequent judgments and behavior is consistent with confirmation bias phenomenon in social psychology [6,7], which shows that people tend to look for information that confirms their existing judgments [8]. Therefore, when people judge a website, they are likely to maintain their initial judgment. When the judgment is positive, subsequent negative experiences are forgiven [3]. When the judgment is negative, subsequent positive experiences with the website are less likely to change the initial negative perception of the site [6]. This bias suggests that aesthetic aspects of visual design should receive careful attention.

In this study, we look at several factors that help predict visual appeal, which in turn can help designing more successful webpages. Grounded in prior research we argue that user attention to (or fixation on) main images, can serve as reliable predictor of visual appeal of a page. We also argue that presence of images of people within the main image can have a significant impact on the attention they receive. Additionally, we argue that including people in main images can have a significant impact on overall ratings of the page. We use eye tracking to capture attention to main images.

2. Theoretical Background and Hypotheses

Visual hierarchy refers to arrangement of perceptual elements on a page. This hierarchy influences the way we view a page [9]. By manipulating the attributes of perceptual elements, we can change the attention they receive. One such attribute is the type of an object. For example, studies show that image based objects can solicit a great deal of attention from users [e.g., 10].

A recent study shows that main images maybe particularly important in forming user reaction to the homepages [10, 11]. This is because the home pages that were rated as more appealing tended to have almost an identical visual design; they all created a distinct visual hierarchy through a main image [11]. Given that main images may play a role in creating positive reactions, and that we tend to look longer at

things that we find appealing [12], it is reasonable to argue that the amount of attention that the main image of a homepage receives is positively correlated with the attractiveness of the page. In other words, grounded in the above discussion, we assert that:

H1) Fixation on main images can predict the visual appeal ratings of homepages.

Research shows that images are effective in drawing our attention and we often used them as entry points to a page [9]. A recent study shows that images of people are particularly effective in drawing our attention [13]. The reason that we are attracted to images of people is rooted in evolutionary psychology, which argues that this attraction has been important in our survival and well-being. For example, by looking at people we can recognize family and friends. This ability is crucial in survival of an infant. Paying attention to people can also give us an assortment of non-verbal cues about the social situation, helping us recognize safe encounters and avoid dangerous or unpleasant situations [14, 15]. Grounded in this point of view a recent study shows that images of people more than non-human images (e.g., images of logos) are effective in diverting attention from information that is placed next to them. Therefore, we speculate that:

H2) Fixation duration on main images that include people is longer than fixation duration on main images that do not include people.

In hypothesis 1, we asserted that main images play an important role in forming users' visual appeal ratings of a page. Research shows that images of people are generally more appealing than other types of images to users [12]. Given the potential effect of main images on visual aesthetics of a page (as hypothesized in H1) and the fact that images of people are appealing to users, we assert that including people in main images of a homepage is likely to impact visual appeal ratings of the page:

H3) Visual appeal ratings of homepages that have people in their main image are more positive than those pages that do not include people in their main images.

3. Method

Thirty one employees of various businesses (16 female; 15 male) participated in the experiment.

Participants were recruited through corporate emails and were offered a $20 gift check as an incentive for participating in the study. The experiment used a repeated measure design. All participants viewed the same 24 web pages, which were randomly selected from the top 100 retail websites as rated by Foresee Results, an independent company that rates websites based on customer data. As in prior research [10,11], in this study we focused on home pages only.

The experiment was conducted in the usability labs of the hosting company, which recruited the professionals from various businesses. The usability lab was equipped with a Tobii 1750 eye tracker, which allowed us to capture users' eye movements unobtrusively. Before staring the task, a brief calibration (about 15 seconds) procedure was conducted for each participant to allow the collection of eye movements. All participants viewed each of the 24 web pages one at a time. These pages were displayed in a random order to prevent possible order effects. After viewing each page, participants were asked to rate the visual appeal of the page that they just viewed. Participants were asked to disregard their preference for the content and make their evaluation based on the aesthetics of the web page.

We tracked user eye movements on the webpages during the experiment. We used the eye tracking data to calculate fixation duration on the main images of webpages used in the study. We used fixation duration because they are reliable indicators of attention. As in prior studies, we defined fixation as a steady gaze that lasts at least 300 millisecond [11, 13].

We measured users' overall aesthetic reaction to a page with a survey that was used in a number of prior studies [e.g., 11, 13]. This survey, which was administered after viewing each homepage, asked participants to rate the visual appeal of the page on a 5-point Likert scale (1 = Not At All Appealing; 5 = Very Appealing).

4. Results

Prior research suggests that creating distinct visual hierarchies by using a main image on a webpage may be inherently appealing to users [11]. Main images are an important part of such a pleasant visual hierarchy and therefore attention to them may indicate a positive reaction toward the page. Because research suggests that we look longer at objects that we find appealing [12], we predicted a positive relationship between

fixation duration on main images and visual appeal ratings of the pages.

The results of a regression analysis, displayed in Table 1, supported this prediction (H1). As shown in Table 1, longer fixation duration on main images of the pages, resulted in higher visual appeal ratings of the pages.

Table 1: Regression results

Dependent Variable	Independent Variable	B	t-Stat	p
Visual Appeal	Fixation Duration on the Main Image	.26	2.20	.04

F = 4. 87; p = 0.038; R2 = 0.18; adjusted R^2 = 0.14

Research shows that we are drawn to images of people [13]. Therefore, we predicted that users would have longer fixations on main images that include people. The results of a t-test, displayed in Table 2, showed that fixation duration was significantly longer on main images that included people.

Table 2: t-test, fixation duration on main images

Main Images	Mean	SD
with people	1.81	0.96
without people	0.94	1.02
df= 22, t Stat= 2.15, p(one tail)=0.021		

Figure 1 provides an example of viewing trend in the study. In this figure, the heat map for a homepage that included a person in its main image and the heat map for a page that does not include people in its main image are provided. The colors on the heat maps indicate the spectrum of fixation intensity with red representing the longest fixation duration and green the shortest fixation duration. Areas not covered by colors were not viewed.

As shown by the heat maps, users had longer fixations on images of people, particularly their faces. This is consistent with prior research that suggests people attend to faces because they are an excellent source of information for non-verbal communication [13]. The results of the t-test reported in Table 2 and the heat maps in Figure 1 support H2.

Prior research suggests that users find images of people appealing. We predicted that this tendency is likely to transfer to ratings of a page if images of people are included in the main image. That is, we predicted that presence of human pictures on main images of homepages would have a positive impact on

visual appeal rating of the pages. We used a t-test to compare the mean of visual appeal ratings for pages that had picture of people in their main image with those that their main image did not include a picture of a person. The results, which are displayed in Table 3, supported this hypothesis.

Table 3: t-tests comparing visual appeal of pages

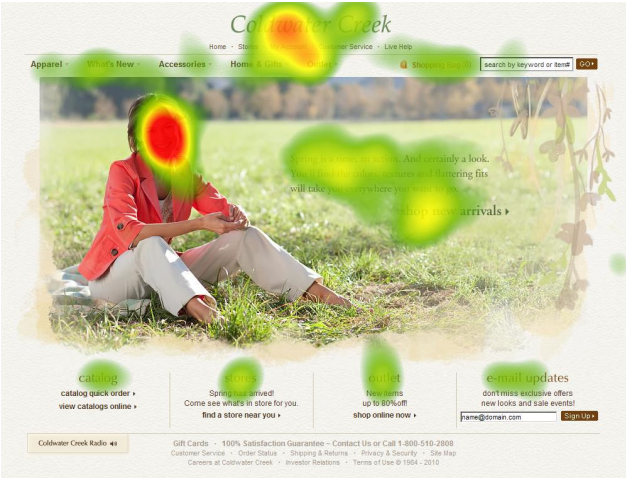| Main Images	Mean	SD
with people	4.78	0.52
without people	4.26	0.70
df= 22, t Stat= 2.07, p(one tail)=0.025		

Figure 1: Example of viewing trend

5. Discussion

We predicted that fixation on main images are likely to have a positive correlation with the visual appeal rating of a homepage. We also asserted that images of people are likely to attract longer fixation on main images and also they are likely to have an impact on aesthetic evaluation a home page.

The results of this study showed that attention to main images was a strong indicator of how people rated the overall appeal of the page. This result extends prior research by providing evidence for the suggestion that creating clear visual hierarchies with main images may be inherently appealing to people [11].

The results also showed that images of people attracted more attention to main images. These results confirm prior research that suggests images of people, more than other types of images, are effective in attracting our attention [13].

Additionally, the results showed that pages with people in their main image were rated as more appealing by users. These results extend the finding of a prior study that shows people tend to like images of people more than other types of images [12] and suggest that the appeal of images of people may extend to the page, rendering the page as being overall more aesthetically pleasing.

The results of this study have important theoretical implications because they extend user experience research in the area of visual hierarchy [9]. The results also extend HCI research that focuses on the impact of images of people on behavior [12, 13].

From a practical point of view, the results provide insight for designing more appealing homepages. The results suggest that including people in main images may improve the overall aesthetic evaluation of a home page.

It is important to note that we used actual homepages that were rated by ForseeResutls as top 100 websites. All the images of people on the homepages of these websites were relevant to the content of the homepage and the website. Adding random pictures of people to main images are unlikely to produce the favorable results observed in this study.

6. Limitations

In this study, we looked at homepages only. Therefore, care must be taken when generalizing the results. As with any laboratory study, the results of our study are limited to the setting and the task used. Future research, examining different settings using different tasks, is needed to increase the confidence in the generalizability of these results.

7. Conclusion

The results of this study have important theoretical and practical implications because they provide evidence that main images of home pages play an important role in forming user experience of the page and that including people in main images is likely to increase the appeal of the home page. Hence, the results provide useful insight for designers. They also provide insight for HCI research that focuses on web aesthetics.

10. References

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