

# Graphic Design of Brochures

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## ABSTRACT

This paper provides an insight as to how visual design effects search patterns and efficiency. We tracked eye movements among participants while they searched for material using two separate flyer types, one with color, and one without.

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## 1 INTRODUCTION

Eye movements are seen as an indication of the amount of cognitive processing that is required in finding certain information as well as how easy information is to process. With this assumption eye tracking and its analysis can be used to contribute to efficiency in information display and usability. (Rayner and Pollastek, 1994). Pattern, proximity, and movement are design features that can stimulate eye movement and in turn reduce the cognitive load needed for information processing, thus leading to a greater usability (Renshaw et al, 2003). This paper will discuss how eye tracking can assist with the development of useful, readable flyers by examining the effect of color usage and text boundaries in informational flyers. Flyers are commonly used to display information in a concise way. They are cheap, easy to distribute and easy to read. However, flyers can easily be dismissed by potential viewers. Using eye tracking analysis this paper will examine the role of color and text boundaries in producing efficient flyers. We will also explore how color and text boundaries in flyers affects information processing. Our goal is to determine how eye movements, specifically gaze and fixations, can help in increasing the usability and ultimately the retention of information conveyed in flyers. We hypothesize that when color and text boundaries are present in flyers, there will be a faster response time when viewers are asked to find information within the flyer as well as higher accuracy rates in regards to information retention.

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Figure 1: A visual of the Gazeport GP3 eye tracker that will be used in the experiment

## 2 BACKGROUND

The use of color in web pages has been studied and researchers have found that it has been able to decrease search times due to enhancing the effectiveness of graphical displays. While color can help, lack of color or poor use can increase search times (Ling and Schaik, 2002). Our research team is attempting to use this finding and study how color affects the ability to get information from a flyer. Eye tracking has been found to provide evidence that openness can influence the ability of a reader to consume graphical content (Renshaw et al, 2003). Knowing that spacing and boxing of information effects a readers ability to assimilate information will play a role in the design of our flyers for the experiment. Studies about color has found that color has makes a difference in how consumers perceive products and companies (Labrecque and Milne, 2012). Our research team intends to use this finding and use eye tracking to compare how accurate subjects are able to retain information in a black and white flyer vs a colored flyer. The eye tracker will give us information on how lack of color affects search patterns in subjects.

## 3 EXPERIMENT

### 3.1 Equipment

The equipment that will be used for this experiment is the Gazeport GP3 eye tracker. This device is used in conjunction with a computer



Figure 2: Flyer A



Figure 3: Flyer B

to track the users eyes. There is software used to help the eye tracker calibrate to a user, this software is also used to produce results after tracking the users eye for a period of time. The Gazepoint Gp3 is a research grade tracker that has between a .5 and 1 degree of accuracy, and a 60 Hz sampling rate.

### 3.2 Subjects

There will be 10 total subjects that will participate in this study. They will voluntarily take part in the study and will be contacted by the researchers through email. There will be no compensation for participating in the study.

### 3.3 Visual Stimulus

The subjects of our experiments will be looking at a total of 4 flyers (A,B,C,D). Flyers A and B will contain different information than flyers C and D. Flyers A and B contain the same information, portrayed by open text (not surrounded by an outline). However, flyer A will be in color, and flyer B will be in black and white. Flyers C and D contain the same information, portrayed by boxed text (surrounded by an outline). However, flyer C will be in color and flyer D will be in black and white. The experiment tests a subject ability to get information from say, Flyer A (color) and then from Flyer D (black and white). Above is an example of flyer A and flyer C. Flyers B and D are not shown but will be the same as flyers A and C (respectively), just in black and white.

### 3.4 Experimental Design

This experiment was a 2x2 mixed design. Color was one of the factors and was tested between subjects at two levels (present or absent). Flyer design was tested within subject at two levels as well (boxed text or open text). The first set of flyers contained text information that was open (not surrounded by a box or other outline). Within this first set, the two flyers were the exact same aside from

one having color (flyer A) and the other being black and white (flyer B). The second set of flyers contained text information that was surrounded by a box. Within this second set, the two flyers were the exact same aside from one having color (flyer C) and the other being black and white (flyer D). The possible combinations of the flyers the subjects would see were AD, DA, BC, and CB. The combination each subject was shown was completely randomized to counter balance fatigue and order effects. Fixation, saccade, speed, and accuracy data were gathered from each subject. To gather fixation, saccade, and speed data, eye movements were tracked in subjects during the experiment and the data was stored in the Gazepoint software. This data was later extracted using Python scripts and statistical tests were performed in R. To test for accuracy, the subjects were given surveys after they viewed each flyer that contained multiple choice questions for the information asked (such as "Which performers are playing at the event? Select all that apply:").

### 3.5 Procedures

When the experiment starts subjects are instructed on how the overall experiment is going to work. They are told there will be two flyers. They will be informed that they should look for specific information within each flyer. The subject is told that once they find the information, they should click the space bar that will take them to a new screen where they are asked a questionnaire about the flyer and its information. After informing the subject of the experiment they are asked to sit down in front of the computer and eye tracker. When they are ready they are able to click start to begin the experiment. A message appears telling them what they will looking for in the flyer that appears next. After a short time the flyer appears. The subject looks for the information and the clicks the space bar to advance when they believe they have found what they were tasked to find. They will be shown a questionnaire asking them about the information that they were tasked with finding. A

short delay occurs to allow the subject time to compose themselves. The subject will be tasked with information in the next flyer and to click the space bar when they believe they have found it. They will then be presented with another questionnaire asking them about the information they were tasked with finding. Once the subject has finished the set of flyers the experiment is finished. A questionnaire asking the subjects about which flyer they prefer and which flyer was easier to find the information will be handed out for the subject to complete. After completion the subject leaves.

#### 4 RESULTS AND DISCUSSION

Two tailed, paired sample t-tests were performed on each the results between the black and white flyers and the colored flyers to determine whether or not there were significant differences between the two types of flyers at the 5% alpha level. The three results that were tested against each other were time viewed (how long the subject viewed the area of interest), number of fixations, and the number of revisits. For average time viewed as shown in Figure 5, there was no statistically significant difference between the colored flyers and the black and white flyers when examining all three areas of interest. ('Date' area of interest: T-value = 1.095, p-value = 0.288. 'Location' area of interest: T-value = 0.930, p-value = 0.3665. 'Artist' area of interest: T-value = -0.612, p-value = 0.549). For number of fixations as shown in Figure 6, there was no statistically significant difference between the colored flyers and the black and white flyers when examining all three areas of interest ('Date' area of interest: T-value = 0.496, p-value = 0.626. 'Location' area of interest: T-value = 1.049, p-value = 0.315. 'Artist' area of interest: T-value = -0.369, p-value = 0.716). For number of revisits as shown in Figure 4, there was no statistically significant difference between the colored flyers and the black and white flyers when examining all three areas of interest ('Date' area of interest: T-value = -0.104, p-value = 0.919. 'Location' area of interest: T-value = 0.439, p-value = 0.668. 'Artist' area of interest: T-value = -0.319, p-value = 0.753).

After the experiment was over, the subjects were given a questionnaire about the survey. Their responses were recorded and the results were analyzed. Overall, out of the 10 subjects, 8 of them said the colored flyers were more visually appealing. Even though the presence of color did not result in improved performance and ability to locate and retain information from flyers, 9 out of 10 participants still preferred the colored flyers over the black and white flyers. Out of the 10 subjects, 7 of the subjects responded that they were more likely to attend the event that was advertised on the colored flyer rather than the black and white flyer.

The statistical results of the time viewed, fixations, and revisits were not expected and are contrary to our hypothesis. This could be because of a small number of participants. With more participants, differences in data would have more weight and may become statistically significant.

#### 5 CONCLUSION

Our original hypothesis that colored flyers help with the location and retention of information is not supported by the results of the experiment. However after the experiment, in general, not only did the participants prefer the colored variants of the music festival

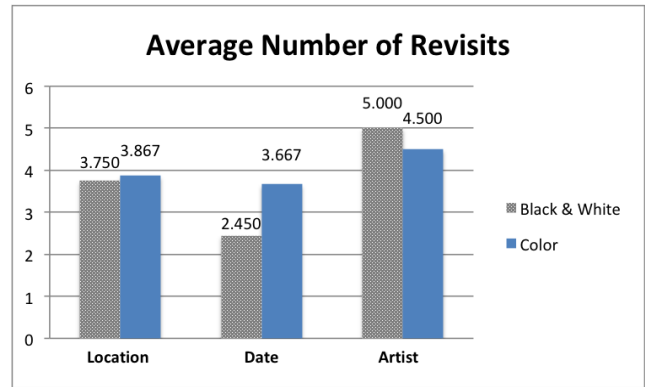


Figure 4: Average Number of Revisits

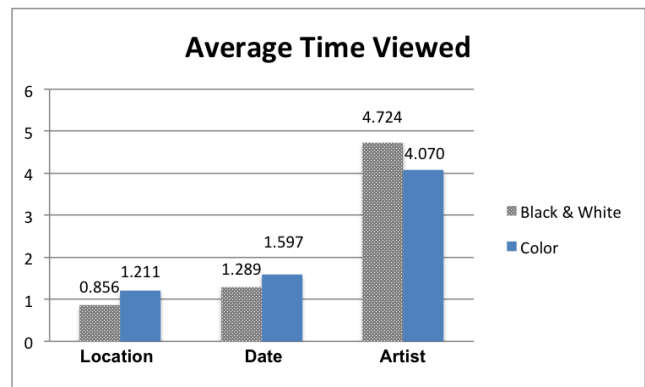


Figure 5: Average Time Viewed in Seconds

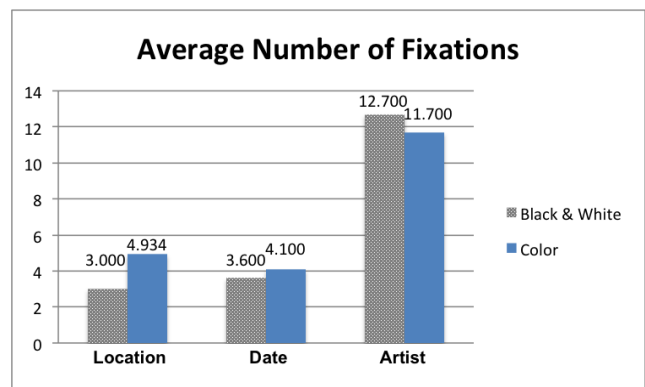


Figure 6: Average Number of Fixations

flyers, they also claimed to be more enticed to attend the events that used colored flyers.

#### 6 REFERENCES

Renshaw, J.A , Finlay, J.E, Tyfa, D., Ward, RD. (2003) Designing for Visual Influence. Published by IOS Press.

Laberque, L.I. , Milne, G.R.J. of the Acad. Mark. Sci. (2012) Exciting Red and Competent Blue: The Importance of Color in Marketing. Journal of the Academy of Marketing Science.

Ling, J. , Schaik, P. (2002) The effect of text and background colour on visual search of web pages. Published by Elsevier.