The relationship between emotion, type of company and color combination

Blomgren, Sofia
EECS, KTH Royal Institute of Technology
Brinellvägen 8
114 28 Stockholm
sofiablo@kth.se

Bonnaudet, Melanie
EECS, KTH Royal Institute of Technology
Brinellvägen 8
114 28 Stockholm
melbon@kth.se

Inkeri Dimle, Okra Livia
EECS, KTH Royal Institute of Technology
Brinellvägen 8
114 28 Stockholm
dimle@kth.se

Nordell, Sabina
EECS, KTH Royal Institute of Technology
Brinellvägen 8
114 28 Stockholm
sabnor@kth.se

ABSTRACT

Colors and color combinations are important factors when forming a product, a service, a brand or a logo. Different colors are used for shaping them and for evoking emotions and associations in people. In this study we research which emotions are related to which color combinations, as well as what types of companies are associated with those colors, using five website with the same design but with different color schemes. It has shown that each combination has a majority in what people feel and what type of company they associate the color combination with. Colors together can be aesthetically pleasing or unpleasing. This study has shown that contrasting colors are mostly seen as chaotic and by this affect the felt emotion. In conclusion, the result show that choosing the right color combination is important while shaping products for consumers or an audience.

Keywords
color; color scheme; emotion; type of company.

1.   INTRODUCTION

In our everyday lives, we are constantly exposed to different colors and impressions. Wherever we look we see buildings, stores, commercials - all with distinctive looks and colors. Color theory is a central aspect of design, but it is often overlooked. With colors we can make observers feel different emotions, which can be a powerful tool for companies to use to effectively create their branding. Both colors and color combinations can evoke different feelings and associations. These are important aspects to think about when forming a brand or product.

This study investigates how the same webpage is perceived differently based on altered color schemes. Moreover, if a color scheme of similar or contrasting colors is perceived as harmonic or chaotic, and what type of company that is associated with it.

2.   BACKGROUND

2.1. Key concepts

Harmonic colors

Harmonic colors is a combination of colors that have a relationship that is aesthetically pleasing for the human eye. In this study, the subjects had to choose if the colors in a given webpage felt harmonic, so aesthetically pleasing, according to their opinion. The hypothesis is that the combination of similar colors should be seen as harmonic.

Chaotic colors

Chaotic colors is the contrary of harmonic colors. It is a combination of colors that have a relationship that is not aesthetically pleasing for the human eye. In this study, the subjects had to choose if the colors in a given webpage felt chaotic, so aesthetically unpleasing, according to their opinion. The hypothesis is that the combination of contrasting colors should be seen as chaotic.

2.2. Related work

Kaya and Epps did a study on the relationship between colors and emotions.[2] Ten fully saturated chromatic colors from the Munsell color system and three achromatic colors (white, black and gray) were tested on 98 college students. From the tests, they could draw the conclusion that color-related emotions are highly dependent on personal preference and one's past experience with that particular color. This could be a possible source of error, in the current study, since different people can have different experiences and preferences for the same colors. It could also be shown that the principle hues induced the highest number of positive emotional responses followed by the intermediate hues and the achromatic colors, which reinforces the thesis of the current paper. They found that the color green reminded the students of nature and woke feelings as relaxation and comfort. The color green was also the color that had mainly positive reactions. However, the color green-yellow was the most disliked color and reminded the students of vomit, sickness and disgust.

It takes no more than 90 seconds for a person to make up their mind in the initial interaction with other people or products and some 62-90% of this judgement is based solely on colors. Because of this, choices of colors can add to the differentiation between products and to shape moods and feelings. Thus choice of color cannot be neglected in marketing.[6] This is of interest for this study since the aim is to establish what colors are related to what type of company.

Colors and color combinations are important factors in shaping products, brands, services and logos. It is shown that color gives an image and impressions to the customers. Those can be different between different cultures. Colors that have different connotation in different parts of the world can still be well-liked from different places. Madden, Hewett and Roth suggest after their study that research in the relationship between brands and colors is necessary. [4]

Labrecque et al [3] examined how consumers perceptions are affected by different types of colors in company branding and products. Color can influence the likability and familiarity of a brand and it is important that companies are aware of this when changing the colors in their logo or graphical profile. They did four studies with the topics *hue*, *saturation and value*, *package design* and *incremental effects of color for logo design* where they found strong support for the relationship between color and branding.

Bright colors are known to convey positive emotions, while dark colors often convey negative emotions. Also, women usually respond more positively to bright colors than men do, and they also respond more negatively to dark colors. This was shown in a study by Michael Hemphill [1], in which 20 women and 20 men got to complete a questionnaire about how they perceive color.

In order to establish what emotion is experienced with a specific color, Robert Plutchik's theory of emotion was used. Plutchik's theory proposes that there are eight primary emotions: anger, fear, sadness, disgust, surprise, anticipation, trust and joy. Plutchik argue that these eight emotions are biologically primitive and have been developed so that the reproductive fitness of the animal would increase. Shawn and Hamilton [5] summarizes Plutchik's Wheel of Emotions as follows:

Fear → feeling of being afraid, frightened, scared

Anger → feeling angry. A stronger word for anger is rage

Sadness → feeling sad. Other words are sorrow, grief (a stronger feeling, for example when someone has died)

Joy → feeling happy. Other words are happiness, gladness

Disgust → feeling something is wrong or nasty

Surprise → being unprepared for something

Trust → a positive emotion; admiration is stronger; acceptance is weaker.

Anticipation → in the sense of looking forward positively to something which is going to happen. Expectation is more neutral.

It has been shown that these eight basic emotions have been useful when designing customer experiences. They are also of interest since people tend to create emotions as a reaction to different aspects of their experience.

Aesthetic coloring is important in visual arts on the computer. Many factors can affect how the color is perceived on the computer screens. [7] It is important that the colors of a visual art are the same on all screens because different tones of colors can be perceived differently.

3.   METHOD

The test group consisted of 14 Media Technology students from KTH Royal Institute of Technology in Stockholm between the ages of 21 and 26 years old.

The test itself consisted of 5 different webpages, each built with elements of 5 different colors. The color schemes of webpage 1, 2 and 3 were based on orange (friendly), green (peaceful) and blue (trustful) [2]. The color schemes of webpage 4 and 5 were based on a mix of different colors. The colors for the mixed schemes were selected

from three different parts of the color wheel to make sure the colors would be in as much contrast to each other as possible.

The webpages consisted of a simple layout with a few text elements and no distracting pictures or typefaces.
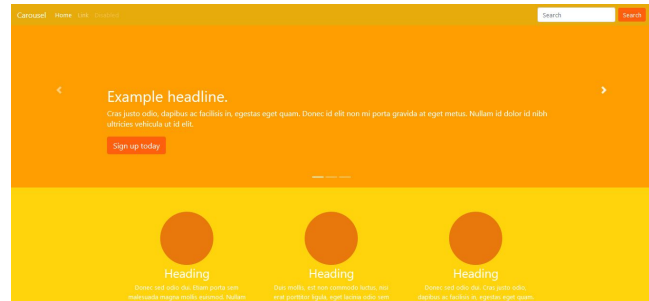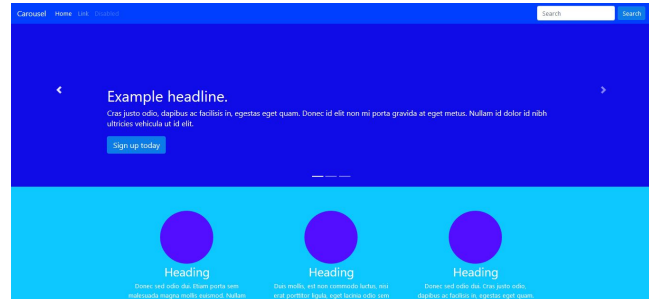

Image 1. Screenshot from webpage 1: Orange

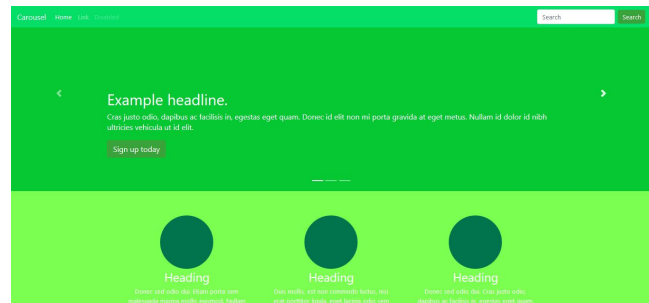**Image 2. Screenshot from webpage 2: Blue**

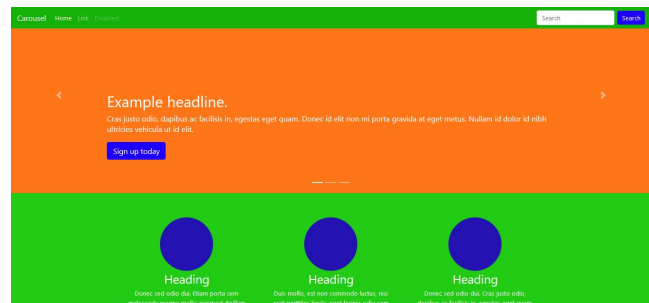**Image 3. Screenshot from webpage 3: Green**

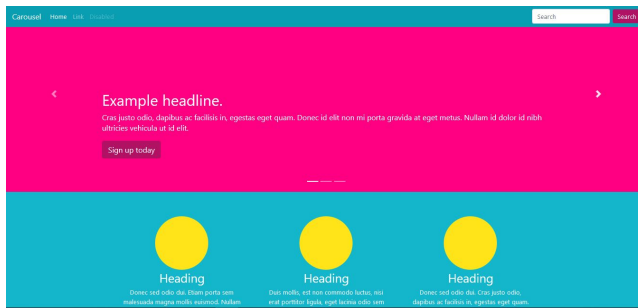**Image 4. Screenshot from webpage 4: Orange, Blue, Green**

Image 5. Screenshot from webpage 5: Cerise, Cyan, Yellow

In the test, the subjects were first presented individually with a webpage with one of the five color schemes. The subject explored the webpage for a brief moment and then afterwards answered associated questions in a form without looking back at the webpage. The subject did the same procedure for the four next-coming different colored webpages.

Before starting the questionnaire about the webpages, the subjects had to give their age. The first question, they had to choose what emotion they felt from the webpage. They could pick one or several from 8 given emotions. The emotions that they could choose from were chosen by reading previous researches. Then, they were asked to explain why they felt this or these emotions.

The second part of the questionnaire was to answer to what type of company the webpage would correspond. Here they could also choose one or several between 7 type of companies. They had also the possibility to add an option. Then, they were asked to explain why they chose what they choose.

Lastly, the subjects were asked if they found the webpage harmonic or chaotic as these color combinations can evoke different moods.

Before doing the final questionnaire on the subjects, some extra subjects got to do the test. This was used to get feedback and detect potential problems with the webpages and the questionnaire. After this pre-experiment, some colors were adjusted so that they weren't too intense, as they took too much focus. Also, the subjects found it hard to explain why they felt like they felt about the colors when answering the questionnaire. The questions was not changed but subjects got a free amount of time to think and write down what they felt during the test.

4.   RESULTS

The result presents a summary of the collected data from the subjects for each webpage. For each webpage the top 3 emotions that were most felt by the subjects, as well as the top 3 associated type of companies, are shown in tables accompanied by how many of the subjects chose these alternatives. The most relevant comments are quoted for each page as well as the answers about harmonic and chaotic. Lastly, it is presented which pages were felt as chaotic or harmonic.

Page 1 (Orange)

Top emotion	*Top company*
Trust (7)	Education (5)
Joy (6)	Entertainment (5)
Surprise (3)	Food industry (4)

Mostly perceived as Harmonic (10)

The participants had mixed feelings about the first page. One person said that it made them feel the emotions surprise and anticipation because "*it was very 'screamy' and wanted too much attention*", while it made another person feel the emotion trust because the webpage "feels warm, kind and relaxed". The result for the top companies was described by two subjects as "*Education and entertainment feels happy*" and "*Just the attention seeking aura that I felt could fit good to an entertainment company*".

Page 2 (Blue)

Top emotion	*Top company*
Trust (10)	Financial services (10)

Disgust (3)   Health care (6)

Anticipation (3)   Entertainment (3)

Mostly perceived as Harmonic (8)

The emotions evoked by the second page were more similar between the participants. Almost all participants felt the emotion trust and we got responses like "*it feels like a cool and trusting environment, professional but still soothing*". Many subjects associated this page with financial services and health care and one of them said "*Financial because I think of the Nordea banks color scheme. Healthcare because I connect cold colors to that*".

Page 3 (Green)

Top emotion   *Top company*

Joy (7)   Food industry (6)

Surprise (6)   Education (5)

Disgust (5)   Health care (3)

Mostly perceived as Harmonic (8)

For the third webpage it was very even between the top three emotions, even though they are so different from each other. Comments on this webpage ranged from "*Calming, fun*" to "*Green is quite the joyful color, it feels like anything can happen - therefore the surprise factor*" and "*The colors clashed and was hard to look at. I wanted to skip to the next FAST, haha*". Regarding what type of company is associated with the color one person said that "Food industry because it felt ecologic, health care because it was so calm".

Page 4 (Orange, Blue, Green)

Top emotion   *Top company*

Disgust (8)   Education (5)

Anger (5)   Entertainment (4)

Joy (5)   Construction/ Retail (2)

Mostly perceived as Chaotic (14)

The top felt emotions for the fourth webpage was disgust, anger and joy. The opinions among the subjects had large variations. One subject which chose both joy and disgust stated that "*In some weird way the colors go together in a playful way, but at the same time they're too much.*" The top companies was Education, Entertainment and Construction/Retail. Some subjects thought it felt frivolous and associated it to clowns or webpages for younger kids.

Page 5 (Cerise, Cyan, Yellow)

*Top emotion*   *Top company*

Joy (8)   Entertainment (10)

Surprise (6)   Education (6)

Trust (5)   Financial services/
                   Health care (2)

Mostly perceived as Chaotic (8)

Many of the subjects had a positive attitude towards this webpage compared to the fourth that also consisted of different colors. One person said "*I feel like anyone bold enough to use colors like these have some grand party plans they wanna show me*" and another said "*I think it looked like an ice cream! Ice cream make you feel joy!*" It was clear that most people experienced the last page as being one from the entertainment business, one subject said "*I think no one except an entertainment company would dare use something like this. and bar or club because purple is a party color and I expect dancefloors and neon lights and lasers. maybe like a beach rave bar*".

Perception of harmony and chaos

The majority of the subjects found the webpages 1-3, with similar colours, harmonic and the webpages 4-5, with contrasting colors, chaotic. The exact distribution between finding the webpages with similar colors and the webpages with similar colors harmonic or chaotic are shown in the pie-charts below.

Webpage 1-3

Chaotic
38,1%

Harmonic
61,9%

Webpage 4-5
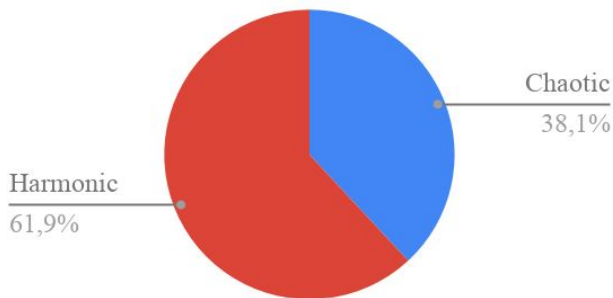
Harmonic
21,4%
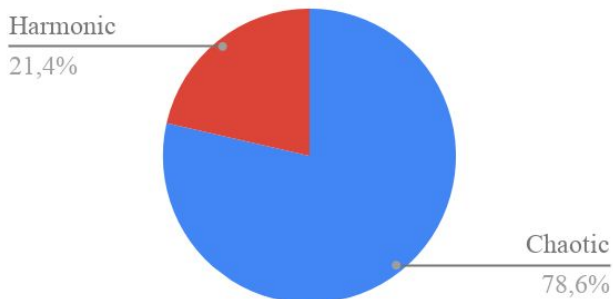
Chaotic
78,6%

5. CONCLUSION

In conclusion, this study has shown that color schemes with different hues of the same color are overall perceived as harmonic, while color schemes with different contrasting colors are overall perceived as chaotic. This study also shows that colors and color combination give a consistent emotion to people. The associated type of company with the color combination is connected to people's previous experience.

6. DISCUSSION

One hypothesis for this study was that the webpages with similar colors should be seen as harmonic and that the webpages with contrasting colors should be seen as chaotic. The result of this study has confirmed this hypothesis.

This study has got results that agree with other researcher's result. The top emotions for the orange webpage were trust, joy and surprise. Orange is shown to be associated with friendliness which is not far from a combination of joy and trust. Most subjects felt trust from the blue webpage which corresponds with Kaya's result that blue is a color felt as trustful. The green webpage had a large variation in what they felt. It was even between the emotions joy, surprise and disgust. This one does not correspond to Kaya's study where green is felt as peaceful. The reason to this response can be that one of the green colors was much more illuminating than the other colors. In the comments for the green webpage, several subjects describe a calming feeling. This corresponds to green being peaceful. [2]

All pages had an associated emotion that at least half of the subjects felt. This shows that colors and color combination have a consistent meaning for the target group of this study, thus swedish media technology students.

The relation between experienced emotion and type of company was not as clear as the relationship between color and experienced emotion. Even though, the responses for each page was quite intuitive, for example the blue page had a clear majority that connected the page to financial services. This could have something to do with the theory of color or personal experience. Kaya has shown that what emotion is felt with a specific color has much to do with the subject's previous experience with this color [2]. As stated above, the blue page was associated with financial services. All the subjects participating in this study are Swedish and many banks in Sweden uses the color blue. The same applies for the green page. The majority associated it with food industry - many food stores and ecologic products uses the color green. When it comes to the multi-colored pages, a clear majority of 10 subjects associated the cerise, cyan and yellow page with entertainment, a reaction of many subjects feeling the emotions joy and surprise.

Sources of error

There are several aspects that could have given different results. One of them would have been to test on a different test group. The test group of

the study all have the same background, studying Media Technology at KTH and are around the same age, in their 20s. Although, this was a relevant test group as these students will work with forming products and will have to deal with picking colors.

The focus of the webpages were the five colors but there was some white text. Some participants commented on the text being white which was not meant to happen. The five colors did not all take the same percentage of the space on the webpage, this could have given different result to have them in a different presentation. This study was limited to five webpages with five different colors, of course there are endless combinations to test.

On the same note, the webpages were designed so that the specific colors that were studied took up the whole pages except for the text that was white. In a real webpage design that's normally not the case, since white or another neutral color usually is used as a base and colors are used as highlights or similar. Because of this these pages might have been perceived as intense and/or chaotic, even though the colors themselves are known to be perceived as harmonic.

We didn't define the words "harmonic" and "chaotic", so the participants might have perceived those two words differently and therefore given different answers based on their own perception.

To complement the statistics of the study some additional questions should have been asked in the questionnaire. It could have been interesting to know if the subjects were female or male. It is good to know if there is different perception of colors between men and women to know how to form products for each gender. In addition, the subjects should have been asked if they have a defected color vision.

Future development

For future studies, it would be useful to not only investigate different colored webpages but also other applications and contexts of color schemes and companies. It would also be useful to study the perception of colors in different target groups as target groups are important when shaping a product. Different subjects from different countries and cultures could also perceive the colors differently, which makes it interesting to investigate further in this area as well.

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