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Measuring Effectiveness of Characteristics of Fliers in Marketing

Bachelor Thesis

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This paper conforms to the requirements for a Bachelor Thesis

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(signature of supervisor)

Admitted for defense (date)

I have written this paper independently. Any ideas or data taken from the authors or other sources have been fully referenced.

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(signature of the author and date)

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Introduction

With the evolving technological situation that is present in this ever forward moving society, marketing has been forced to evolve along with it. Some would make an argument that shifting to an entirely electronic system is the way of the future but this idea could be challenged. Fliers (sometimes referred to as pamphlets, leaflets, or brochures) have been used for years to market all types of companies and events, and are easily distributed.

Print advertisements play a key role even today in marketing strategies as they reach a broad variety of audiences. Additionally, companies are shelling out up to 65% of their marketing budgets on print advertisements (Ziliani and Ieva, 2015). With such high stakes on this portion of marketing strategies, it is imperative to have an understanding of how to maximize the utility gained from such advertising vehicles. The problem is, there is still so much to learn. With the advancement in technologies, new opportunities to better study and understand older practices arise.

With the introduction of eye tracking technologies, it has become possible to get more accurate data about the aspects of fliers and their effectiveness (Griffith, Krampf, & Palmer, 2001). Because the strategies are so new, relatively low amount of works have been done on this topic. Research on store flier designs have been done in the past, but taking individual characteristics of fliers and measuring their effectiveness with eye tracking software is still a novel strategy (Chaabane, Sabri, & Parguel, 2010) (Prediger, Huertas-Garcia, & Gázquez-Abad, 2018).

By taking individual characteristics and measuring how effective they are when utilizing eye tracking technologies, this work will move toward closing the gap of information and assisting in better understanding characteristics of fliers. Characteristics of font, pictorial, shape,

and color will all be tested by being placed in eye tracking technology that can measure levels of attention in participants and with the information, marketing strategies can be altered or created to not only create more efficient advertisements, but additionally to understand how they function.

The aim of this thesis is to measure the effectiveness of characteristics of fliers used in marketing. With this information, companies and organizations can make more educated decisions when constructing a marketing plan that includes fliers. The above aim will be completed through the series of research tasks listed below.

- Define the term “fliers” which will be used throughout this work, as well as the physical characteristics they contain that will be measured for effectiveness.
- Define how effectiveness has been measured and how it will be measured within the empirical work.
- Study and summarize previous works on effective characteristics and works with eye tracking technology on effective characteristics of fliers in marketing.
- Create fliers containing predefined characteristics to measure effectiveness in empirical study.
- Create questions for collecting participants’ responses about effective characteristics of fliers.
- Utilizing eye tracking technologies, interview and receive feedback from test groups about their perception of effective characteristics in fliers.
- Review results of experiment and report results of characteristics’ effectiveness and possible reasoning for outcomes.

The theoretical portion will set a groundwork of understanding how and why strategies are currently being used with fliers in marketing. Chapter 1.1 of this work will cover the definitions such as flier and effectiveness. It will also include how effectiveness has been measured and will subsequently be measured in the empirical work later. Additionally, it will explain the importance of using fliers in marketing specifically within western cultures.

Chapter 1.2 will review works done by others in this field. It will also contain ideas from experiments and theory as they may apply to that work that is being reviewed. In this portion of the work, the characteristics that will be utilized in the empirical work will be presented along with theoretical work on these topics and why they were chosen. The process of the experiment will also be explained as it is important in understanding later how the work was accomplished.

A focus on physical attributes of the fliers will be a primary aspect as it plays an important part in the future of this project. With the completion of these chapters and the analyses of works, it should be understandable how this technology has been used in previous works and will give an insight as to what the author of this thesis will be attempting with studying fliers specifically.

The collection of resources will be primarily limited to academic journals, official studies, and official reports from government sites in an attempt to minimize errors and avoid the use of information from untrusted sources.

The author of this thesis would like to thank those who assisted in this process, especially the supervisor. An additional special thanks to Amelia Hillery for assisting in creating the fliers and for providing the original art for the experiment.

1. The effectiveness of fliers and its main characteristics in marketing

1.1. Definitions and importance of effective characteristics of fliers

As mentioned, the topic being covered in this work seems to be a relatively unsaturated environment when it comes to previous works. This in and of itself is a reasoning to pursue research, however it will be shown that fliers are an important vessel utilized in marketing. As fliers is the main term in this work, it is imperative to have an understanding of what they are and how they fit into marketing. Many sources define a flier in a similar fashion but according to Suttle, a flier is characterized as a small printed page utilized to promote a product or service. Some characteristics of fliers include being inexpensive, easy to read, and easy to produce (Suttle, 2017). The Oxford dictionary simply quantifies a flier as a small advertisement to be distributed to a large number of people (Oxford, 2019). As an additional definition, fliers have been described as “...a frequently distributed free printed matter, part of the mass communication marketing from the sender(s), with a minimum of four pages, immediately readable, targeted at private households or firms” (Schmidt & Bjerre, 2003). Because there are some contradicting definitions, one specific format must be decided on. For this work, the definition of a flier will be an adaptation of Schmidt & Mjerre’s definition with the change of page numbers being reduced to one.

There is additionally the point to be made as to which type of fliers are being focused on in this work. The theoretical work will not be restricted to a single type of flier, but rather will focus on all types and even other marketing methodologies, but when it comes to the empirical work, the fliers will be in the form of an informative flier, meaning that it is only to distribute information. This work will focus on an idea of fliers that would be delivered either to individuals’ homes or posted in stores or on bulletin boards to catch attention. When discussing

characteristics of a flier, it can be broken down into near unlimited categories, and so the author of this paper has decided that the characteristics that will be observed within the empirical part of this work will be color of flier, font style, pictorial, and shape of flier. These characteristics and the reasoning for their inclusion will be focused on in the next portion of this work.

Additionally, there is the idea of effectiveness that needs to be addressed. Effectiveness can be measured in various ways. In many of the works reviewed, the idea of effectiveness is shown by either an increase of store traffic, or in the case of eye tracking, more attention or longer viewing times. In addition, another way to measure effectiveness is laid out in a research from 2015 stating that four measures that can be taken when studying neurophysiological methods, and they are attention, affect (attitude toward ad/brand), memory (ad recall), and desirability (purchase intention) (Venkatraman et al, 2015). In accordance with the idea that effectiveness could be attention, when analyzing eye tracking works, the movements of the eye show attention levels. This factor has been used in many recent studies of advertisements (Higgins, Leinenger, & Rayner, 2014; Rayner, Miller, & Rotello, 2008).

The author of this thesis will measure effectiveness in the following ways. For the eye tracking portion, time to first fixation and absolute fixation time will indicate effectiveness of characteristics of the flier. These measurements signify the grabbing and retention of attention of viewers. During the first phase of the experiment, facial recognition software will obtain measurements that indicate happiness. This generation of happiness when viewing fliers will be seen as a measurement of effectiveness. In addition, the questions that are asked following the experiment will allow the participants to justify their choices during the experiment.

Fliers are used in nearly every kind of marketing and are instantly recognizable due to the fact that they are part of everyday life. Consumers are swamped with advertisements everywhere

they turn. You see these specific fliers when you check the mail, visit your local café, or when you enter a grocery store. These small bits of advertisements are seen by nearly everyone and yet they go largely unnoticed when it comes to breaking down why they are successful.

When choosing the gap in research in which to proceed, it is wise to define why that research is important. In this instance, it would be easy to dismiss this topic as being unnecessary. As stated above, the improvement in technology has evolved marketing strategies. On the other hand, that new technology can be utilized to improve older methods such as fliers. One point to make is that relatively low amounts of research have been completed on this topic. There have been some efforts of study on this category, but because the amount is relatively low, it leaves a dramatic gap in research still to be done. Humans are often motivated by emotions and make decisions from them. Fliers have been considered to play a strategic role by appealing to customers who make decisions based on deals (Luceri, Latusi, Vergura, &Lugli, 2014). Another reasoning put forth by the author of this thesis is a physical one in the form of the vast amount of money that is available to be targeted. Even with a focus on a flier in which information is being distributed, this could lead to sales at a later time. Simply put, marketing strategies are put in place to get information to a potential customer and entice them to spend money. This money would fall under the category of disposable income.

Disposable income is that which a household has after paying taxes. This is a factor that was chosen to be looked at as a measurement of importance to marketing strategies by the author of this paper. Of course, it is unreasonable to think that all disposable income is available to be acquired, but even a small portion of that which is available for spending creates an attractive target. In the United States, personal spending increased in September of 2018 by .4% to 53 billion dollars ("Personal Income", 2018). According to statistics from the U.K. government,

personal spending in 2017 was around 15 billion GBP ("Family spending", 2018; "Families and Households", 2017). With such high amounts of currency up for grabs, marketing strategies are worth their weight in gold. Keeping to the topic of money, statistics show that in the U.K., 3.8 billion GBP were spent on advertisement and market research in 2019 (Advertisements, 2019). Another source reports that nearly 2.5 billion GBP of that was spent solely on print advertisement (Personal Income, 2018).

Over the last 12 years, the amount spent on print media has decreased, however in 2014 the decrease leveled off and has been steady for five years. Additional reports show that anywhere from 33%-65% of marketing budgets are spent on print advertisements. (Gázquez-Abad and Martínez-López, 2016; Ziliani and Ieva, 2015; Pieters et al., 2007). In addition to this, it is stated that the utilization of fliers in marketing increases sales and therefore would indicate higher profit levels (Burton et al., 1999; Volle, 2001). Along with this fact, fees can be charged to distributors to feature their products in fliers which generates additional income (Luceri et al., 2014). It is because of the sheer amount of money at stake when it comes not only to marketing plans but specifically to print marketing; this research is important.

1.2. Previous studies of effectiveness of flier characteristics and eye tracking technologies

As explained previously, this section will be focused on previous studies done within the topic of this work as well as theory focused on characteristics and processes that will be utilized in the empirical work to follow. The focus will be on works with fliers as well as eye tracking and other marketing techniques.

Eye tracking technology is a key aspect in this research to identify the effectiveness of characteristics. Eye tracking measures fixations which are relatively still motion of the eye on a singular position (Gofman et al, 2009). Some studies also show the importance of visually

capturing the customer's attention. One example describes the importance with high competition and explains that the brain can take in and process information and that it is mostly done subconsciously (Berger, Wagner, & Schwand, 2012).

Similarly to the work done by Pentus, Ploom, Kuusik, & Mehine (2018), emotional data can be collected by utilizing the Facial Action Coding System (FACS). This system which was introduced by Paul Ekman and W. F. Friesen, measured the most minute movements of points on a facial map and can correlate them to emotion (Wojdel & Rothkrantz, 2005).

Below are just some examples of the many characteristics that can be part of a flier. The characteristics that will be measured in the empirical analysis are separated and these characteristics will be reviewed in previous works. There has to be a separation of what will be defined in the analysis due to the exponential numbers of possibilities each characteristic divides into.

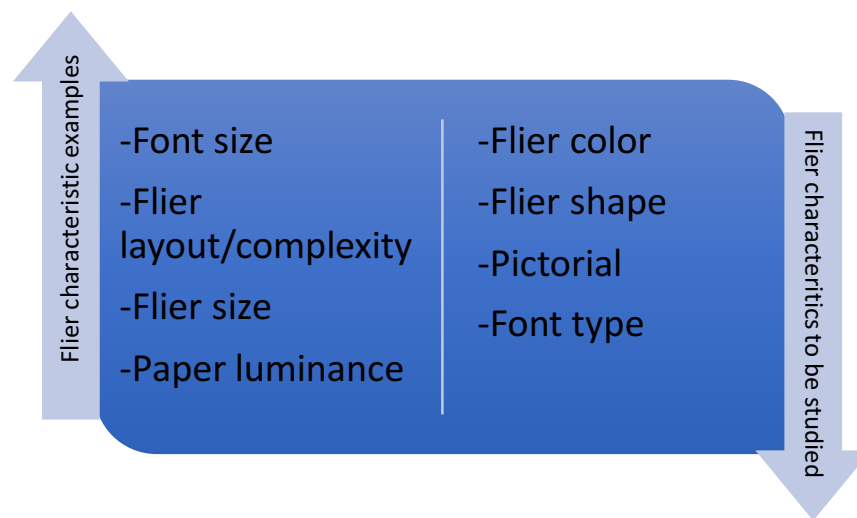


Figure 1. Flier characteristic examples and those to be tested

Source: (Prediger, et al., 2018) (Puškarevic et al., 2016) (Pieters, Wedel, & Batra, 2010)

(Pentus et al., 2018)(Price et al., 2015)

One report regarding eye tracking covers the topic of using the eye tracking software to study the attention to print advertisements when changing typeface (design of written words) (Puškarevic, Nedeljkovic, Dimovski, & Klementina Možina, 2016). In the experiment, participants were shown advertisements where the typeface was shown normally and then shown with a change made (Puškarevic et al., 2016). Additionally, advertisements of different types were shown such as those that give utility vs those that aim toward feelings. Various advertisements were used which covered separate regions of interest. The findings showed that when the typeface was altered in a way to make it more complex, there was more attention given and longer viewing times were logged. (Puškarevic et al., 2016) To add to the findings, Pieters, Wedel, & Batra discuss the importance of attention paid to an advertisement and claims that the sale begins when the eyes stop. They found that feature complexity (color, luminance) details hurt attention whereas design complexity (creativity of organizational design) increased attention (Pieters, Wedel, & Batra, 2010).

This idea can be taken into account in the future for the design of the fliers. Keeping this in mind, it would be wise to make the design of the flier itself minimal and simple while making the items and organization creative or complex. This is a thin line to balance to ensure that one factor is accounted for without making changes to the other. This factor will additionally be taken into account during the empirical work since color will be a factor. Additionally it plays into a question about possible effects of paper vs electronic advertisement and how the paper itself could play a role. That work stated that the luminance could hurt attention. With the use of electronic advertisement, this can more or less be eliminated but when the actual print of advertisements take place, the choice of paper may lead to this being an issue.

It seems like an obvious statement to state that the use of a picture in advertisement would be a factor when choosing effectiveness, but surprisingly some works have differing stances when it comes to this point. Kenneth Holmqvist and Constanze Wartenberg explain in their research that viewing times were significantly longer when pieces utilized graphics or other figures (2005). Their work measured graphics along with text, but the difference in measurements can be used to assume that the graphics and figures are the variables which led to higher levels in attention.

In another work, it is pointed out that brighter and larger aspects are easier to spot when they are in contrast with other (often more uniform) factors (Treisman & Gormican, 1988). It was also reported that there was a higher correlation to the changes made in a hedonic (characterized as pleasant) advertisement (Puškarevic et al., 2016). Hedonic imagery is that which incites a feeling of happiness typically. An example of such an item would be ice cream or puppies. Again, humans often make irrational decisions based off emotions and this work takes a quick glimpse into this phenomenon.

The research that concerned hedonic imagery was well explained; however, it has its limitations. The use of limited advertisements along with the fact that each had only two versions leaves a gap for variables. Each design had one that was unchanged and the other only contained one change. If there were additional versions with more substantial changes, a spectrum could be calculated to search for a more decisive correlation. The other large variable that could be tested here is if there was a change of the imagery. This was even eluded to by the authors, but with the focus being on the typeface, it is understandable that this is omitted for future studies.

Additionally, it is difficult to test many variables at once due to the increase causing an

exponential growth of subject material to test. This idea is an obstacle that will also need to be considered by the author of this thesis for the empirical experiment to come.

Continuing with the topic of text vs picture, in a study by Rayner, Rotello, Steward, Keir, and Duffy from 2001, empirical work was completed showing that viewers would have a longer gaze at text than pictorial subjects in an advertisement (Rayner et al., 2001). It is interesting because when asked, participants indicated a preference for advertisements with low amount of text, but when examined, the viewing time of text in ads accounted for around 70% of the time. (Rayner et al., 2001) It is considered important to note that this contradiction appears to be a possible reoccurring theme and something that will have to be accounted for. Humans often make statements that are not entirely accurate and this is why eye tracking software is an amazing tool. Eye tracking technology is considered to be the most accurate information to what a customer is perceiving when looking at advertisements (Griffith, Krampf, & Palmer, 2001). With this accuracy, this human aspect can be circumvented and the true answers can be found.

As already briefly discussed, the text of an advertisement plays an important role in effective advertisements. It was found that there is a higher retention of information when using bold style of text and larger font sizes (Price, McElroy, & Martin, 2015). Additionally, it was explained that the comparison of cursive and print text, cursive not only took longer to recognize, but also took longer time to accurately identify (Danna, Massendari, Furnari, & Ducrot, 2018). These findings follow the logic that would be considered when testing those aspects. Consider a flier that you may find around town. The use of bold lettering tends to grab your eyes as you walk by and intrigue you to come read it. Though cursive text may look “fancier” or more refined, it typically feels like more work to read it than block lettering.

Another work placed a focus on flier size and its affect on the test subjects. Though the

empirical work to follow will not measure the flier size, it is still something to take note of. Being that there is an effect of flier size, this means that the subjects material must be the same size or fill a relative space to avoid having size of the flier interfere with the findings. In addition, a flier for a fictitious company was designed to show participants. The reasoning behind it being fictitious was to avoid brand bias. (Prediger, Huertas-Garcia, & Gázquez-Abad, 2018) This will be a key factor utilized by the author of this thesis in the empirical analysis. Brand identity can be a powerful driver for attention and actions.

In one research, an advertisement was shown to participants for 30 seconds and utilized eye tracking software to measure reactions. They found that when participants viewed the product element longer, they had a better attitude toward the advertisement (Zhang & Yuan, 2018). This can be used to predict how participants may make choices in the empirical analysis when comparing those choices with their absolute viewing times. The prediction here would be that if a product element has a longer viewing time, there is a likelihood for that item to be chosen. Additionally, time can be a factor. One item to be taken into account is that the advertisements were shown for equal amounts of time. Though it may seem a trivial point to be made, keeping the playing field even in this way will create more concrete findings.

This next work which was already referenced, focuses primarily on eye tracking of sales fliers. In this work, the authors set out on the task to utilize eye tracking software along with a survey to capture the responses of participants who viewed sales fliers of local companies. Additionally, the authors used facial recognition software to compile an emotional response when viewing the test fliers (Pentus et al., 2018). With the data collection, an analysis was made of the participants' responses to answer four questions (Pentus et al., 2018). When reviewing this work, it was obvious that of the materials that were found when researching this topic, this one

by far has the most value and influence. There was one primary issue that was spotted and was also found in the conclusion of the report. During the tests, it was made aware that a variable not originally accounted for was brand recognition (Pentus et al., 2018). Just as individuals will pay more to have a logo attached to an item, brand recognition could skew results and therefore needs to be worked around.

Again it can be seen that aspects such as brand recognition can play an influential role when testing advertisements. Seeing this issue arise in several tests leads to a belief that this is something that is imperative to avoid when conducting the future empirical work. Because of this, research about original content is important to be aware of.

This work found that participants preferred more complex front pages even though eight of them stated in an interview they avoid complex advertisements (Pentus et al., 2018). This pattern has continued to show that the statements made can be useful data, however there are many instances of discrepancies between statements and the data created from eye tracking software. It will be interesting to match up the responses of the empirical work coming later to compare if respondents react to the complexity level of the fliers.

Research from 2002 viewed how the originality of an advertisement affected the way a person views it. The work reported that original content would lead to longer viewing times of participants however it had a major drawback. The advertisements would be primarily focused on brand awareness and not on giving a positive feeling of the brand. (Pieters et al., 2002) Similar studies showed that in work with static and animated advertisements, participants' attention was held much longer by a static subject rather than a moving one, and that complex advertisements were preferred (Lee & Ahn, 2012). Again it can be seen that complexity is important to viewers. It is understandable that animations attract more attention but more

importantly is the use of originality. The creation of original content is one factor that will be taken and used by the author of this thesis when creating the materials for the empirical analysis.

A study by Marques da Rosa, Spence, & Tonetto took into account the use of shape and color in packaging. Though it is not print advertisement, these aspects can be taken and utilized in other marketing strategies such as fliers. In their work, it was found that participants preferred rounded shapes over angled. Additionally they tested preference of color next to greyscale and found a high preference for color over its greyscale counterpart. (Marques da Rosa, Spence, & Tonetto, 2018) Fliers can come in many shapes and colors, but these factors can be refined and placed into an experiment for examinations. The choice of rounded design over angular will be challenged as with fliers, the standard shape is angular. Of course other designs of shapes can be made in fliers however their perceived dominance is quite low.

Additionally, with the color idea, it has been shown that color plays a role in advertisement, but how? As already stated, the color was directly chosen over greyscale unanimously. In their experiment, they used a “red to yellow” and a “blue to green” design. The preference for each were nearly identical. (Marques da Rosa, et al., 2018) Unfortunately this doesn’t answer the question of which color dominates attention, only that color dominates over greyscale. The use of primary colors in this experiment (green is excluded in this statement) is wise in the opinion of the author of this thesis. As is common knowledge, the primary colors create all other color combinations. If a color can be eliminated from the primary three, nearly an infinite number of colors could be assumed as being inferior when measuring attention. This is of course a theoretical statement made of opinion and would need to be tested thoroughly to be proven or disproven.

Table 1

Ranking effective characteristics of fliers to be measured in empirical analysis

Effectiveness ranking	Characteristic
1	Pictorial
2	Font
3	Color
4	Shape

Source: Compiled from author's perception based on previous works

The characteristics that will be tested in the empirical work have been ranked by effectiveness based on the previous research analyzed by the author. In several of the works covered above, the use of pictorials served a pivotal point (Holmqvist & Wartenberg, 2005) (Puškarevic et al., 2016). The focus placed on this item has led the author of this thesis to place pictorial as the most effective variable.

In an extremely close second, font was placed as second most effective. With the data showing how much time is spent viewing text in an experiment by Rayner, it is hard to argue against it being placed in a top position (Rayner et al., 2001). Add in the consideration of cursive vs printed font examinations done by Danna, et al., and the second most effective characteristic is set. (Danna, et al., 2018).

The use of color in these works did not carry as much attention as the first two variables. With a focus more on color vs greyscale, it leaves a lot of space for more research. Color was highly effective as shown in the work by Marques da Rosa, Spence, & Tonetto however it was

not clear how effective specific colors were (Marques da Rosa, Spence, & Tonetto, 2018).

Because of this, it was decided that color would take the place of number three.

Finally the variable of shape is added to the list. With very little work focused on shapes of advertisements, shape does not appear to carry as much weight in the department of effectiveness as its counterparts. It easily can be placed in this position based on the reviewed works and will be interesting to see if it remains in that position when it is a direct focus of a new experiment.

This overview will be compared at the end of the empirical analysis to decide whether the same conclusions are created from the new findings. By taking aspects from these materials covered, the continuation of study in this field can move forward. Each of the materials had some aspects that can be taken and utilized as well as some missed points that can be improved upon. The coming experiment offers a unique opportunity to measure these specific criteria in a way that has not directly been done before.

2. Empirical study of effectiveness of fliers' characteristics in marketing

2.1. Design of empirical study of effective characteristics of fliers

This empirical analysis set out to measure the effectiveness of characteristics on fliers. Eleven fliers were created to be used in the experiment. With the University of Tartu being such an important factor to the city, it was decided that the subject of the flier would be a fictitious community day put on by the university.

The variables of the flier characteristics are as follows. The characteristic inputs were kept to a minimum as an increase of inputs drastically increases the number of flier outputs produced. For the characteristic of shape, the options of rectangle, octagon, and circle were chosen. As was discussed in the theoretical portion, a differentiation between rounded and

angled shapes can be made. These shapes have similarities such as straight edges or rounded shape, however are different enough to be individual. For color, the author chose to stick to primary colors (blue, red, and yellow). As was specified in the theory, the author of this thesis has made this decision with the reasoning of all colors being created by these three primary colors. The specific shades of these colors were taken from the color codes produced by Crayola. The reason for this choice was simply to the fact that the colors needed to be tangible shades that would be used throughout the experiment. This was a trustworthy source for choosing these shades. These colors are blue II (4570E6), red (ED0A3F), and yellow (FBE870) (Crayola, 2019). It was important to have predefined shades of the primary colors that will be used across the entire experiment for consistency.

When determining font, there are numerous options as discussed before. This category was defined into two options being block and script. Some also explain this as printed and cursive (Danna, Massendari, Furnari, & Ducrot, 2018). The same font was used across all block font fliers as well as the same font within all script fliers. The size of the text was kept the same across all fonts to avoid the introduction of a new bias. For the final variable of pictorial, three drawings were created based on three recognizable features of Tartu. These pictures were the University of Tartu main building, the “kissing students” fountain, and the pedestrian bridge that crosses Emajõgi. The images were original drawings of these landmarks with thought to work that states original designs carry higher attention levels (Pieters et al., 2002).

The completed design of the fliers was the result of the pre-defined characteristics input into SPSS orthogonal design feature. This feature gives a sample of outputs based on the inputs that gives the best combination of options. From this program, eleven designs were specified. The table containing the orthogonal output will be placed in Appendix A.

The output requirements were then used to create fliers for a fictitious event that would be relevant to those affiliated with the university. 30 participants with various affiliations to the university were then shown the experiment where eye tracking and facial mapping were captured. A majority of the participants were students of different faculties within the university and also contained a professor. These participants were chosen from different faculties and levels of study in an attempt to best represent the university community.

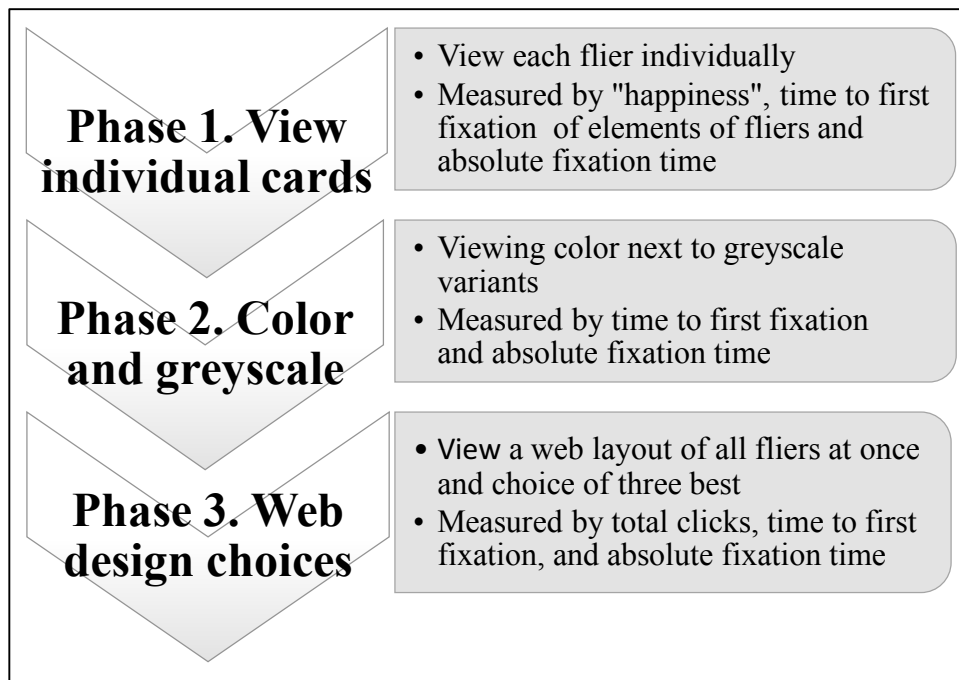


Figure 2. Experiment flowchart with aims of every phase as well as the measurements

Source: Compiled by author

The design of the empirical analysis was broken down into three parts as shown above. As previously discussed, the use of hedonic imagery can have an effect on viewers of advertisements. Because of this, the first part of the test utilized facial recognition to map and calculate feelings along with eye tracking. For this study, the emotion of happiness was singled

out to view in order to see the change in an individual's happiness when viewing the fliers. The participants were shown one flier at a time for an interval of five seconds each. Half of the participants were shown the fliers in one order while the other half were shown a mirrored order. In doing so, the averages could be looked at to avoid biases possibly introduced with the order in which they were viewed. The information was captured in the form of absolute viewing times and time to first fixation.

The second phase of the experiment focused on preference of color and measured noticing times. In this step, participants were shown one flier with color and the same in greyscale next to each other for an interval of five seconds. The main principle being examined here is if color plays a part and if so how. Again, half of the participants were shown one order while the other half saw a mirrored order. To additionally attempt to avoid biases, each participant saw two instances where color was on the left and two instances with color on the right. This portion of the experiment also measured time to first fixation and absolute fixation time.

In the final step of the experiment, the participants were shown all eleven fliers on a web layout. They were given the task to choose three fliers which they felt were best and click on them. They were given no time limit on this step and chose freely. Once again, half of the participants were shown one layout while the other half saw a separate layout. In addition to the choices, fixation time and time to first fixation were captured and can be compared together.

After the experiment was concluded, a brief informal interview was conducted where the participants were asked about anything they found out of place such as an error that may have gained attention and could skew attention results. Additionally, they were asked why they chose

the fliers they selected. The aim of this was to get qualitative information as to their choices to go along with the quantitative data that was collected through the machinery.

2.2. Results of empirical study of effective characteristics of fliers

As stated above, the first portion of the empirical study revealed each flier individually to the participants while collecting facial recognition information. This facial recognition data is used to measure a happiness level within participants. Though static imagery is less likely to promote high emotional responses than materials such as video, these micro changes can still be captured. The data was collected for each individual and an average reading was calculated of their reactions across all fliers shown. With this data, a weighted average for each participants' reactions to each flier was mapped and compared with all other participants' readings. In doing this, spikes of happiness changes can be easily seen and patterns of reactions caused by fliers emerge. Unfortunately two individuals' recordings became unusable and were not able to be analyzed. Additionally, in any figures where it can be seen that there are 31 recordings, it is because one recording attempt was failed and had to be restarted. This made that recording (along with its numeric title) unusable. Thus 31 recordings appear to be shown however only 30 were captured.

Table 2

Fliers in order of weighted average happiness

Card	2	9	7	6	11	5	8	4	1	10	3
Average	1.26	1.15	1.09	1.07	1.00	0.95	0.93	0.92	0.90	0.88	0.80

Source: compiled by author from raw data received from eye tracking software

Based upon the average reading a participant had over all materials they viewed, the measurement of each flier against that average gives the individual's weighted average. The table above shows the average of those measurements of all participants for each card. What this means is that the average happiness measure for a card across all participants is 1. If the measurement is less than the average it will be <1 and conversely if it is higher than their average it will be >1 . What was found in the data was that fliers 2, 9, 7, and 6 created the highest average levels of happiness within participants. Trying to analyze the reasons behind these measurements is where the challenge comes in.

When reviewing these fliers, the largest pattern is the use of block font. Three of those four utilized this style. Additionally, two of the fliers were red as well as two used the imagery of the UT main building. Along with responses of participants, this is likely due to the recognition of the building. This could be considered an example of "brand recognition". Two of the shapes within these four fliers were octagons while another was a circle. With these two shape designs being relatively round, this could be looked at as a pattern that could be recognized within the happiness readings. When looking at this data, it was also identified that there were three incidents of extremely high measurements of happiness. When compared with the other data, this likely will be an external factor at play as such high readings are quite unlikely. If these outliers are removed, the fliers that had the highest happiness readings mostly remained at the top and therefore the anomalies don't appear to make any large difference in this case.

Additionally, in the first portion of the empirical test, heat maps were created to show the focal points of each flier. These heat maps show the duration in which participants focused on individual locations of a flier. They are compiled based upon the sum of focus times of all participants. For each heat map, the calculations are completed based on absolute fixation

duration. This means that the longer fixations at a point create a “hotter” location. In the program, the fixation radius was set to 100 and an opacity of 80% was chosen. This way it is easy to see the heat points as well as the ability to see through them to the subject material. This was chosen so that the ability to make deductions based on the materials would not be hindered by the heat maps. An example of one is shown below. All heat maps of fliers will be included in appendix B.

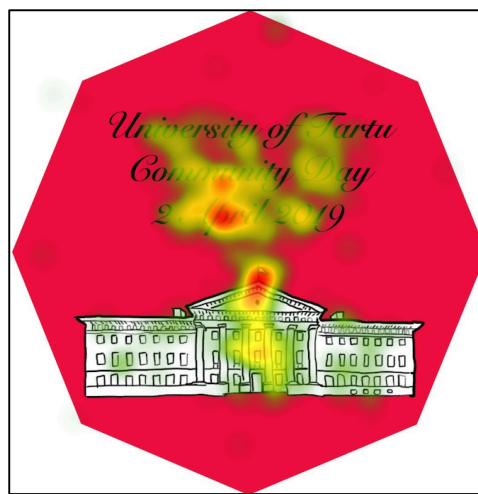


Figure 3. Heat map of “card 2” created by Tobii eye tracking software.

Card 2 was chosen based upon it being the flier with the highest happiness measurements within the experiment. In this example it can be seen that long focal times were logged on the lower levels of the text and the center and top portions of the pictorial. Upon closer inspection, it can also be seen that short points of focus were placed on some of the outer points of the shape. The shape of this particular flier did garner some attention, but it was such a small amount. Looking at all the heat maps of the first stage of the experiment, it appears one main pattern is shown. Along the center axis of each flier is where a majority of the attention is shown. Additionally, along all text, much of the attention is focused on the bottom half, whereas the

pictorials gained most of their attention toward their tops. The cause of this may be how the eyes flow from one aspect to the next and the eyes remain trained in the center of all stimuli. An additional point to be made has to do with the consistency of heat patterns on the pictorials. When viewing these stimuli, each example has very similar heat patterns. While some fliers had focal points near the edges, it appears that shape of fliers were essentially a non factor when it comes to heat maps. Very low attention was placed on shapes according to these materials.

Along with the heat maps, the program generated tables which show the actual viewing time measurements. These data tables further explain the heat maps and show where the longest viewing times were logged. As stated in the theoretical portion, it was stated that longer viewing times lead to a better perception of the advertisement (Zhang & Yuan, 2018). Areas of stimuli were chosen in the program to cover the font and the pictorial. When viewing the data, nearly every instance showed that longer viewing time was spent on the font than on the pictorial which is similar to the findings of (Rayner et al., 2001). This could be that it is above the pictorial and therefore the eyes naturally move to it first. This data is important because only looking at the heat charts, it is hard to distinguish and separate the stimuli. Somewhat surprisingly, the font overall dominated viewing time over the pictorial. Further looking into the data shows that the average times viewed for each slide were quite similar but three of the fliers logged much lower measurements of time viewed than the others. These fliers were numbers 1, 8, and 9. Looking at those fliers, no clear pattern emerges as to why the viewing times would be so different. They do have some similarities but mostly remain different.

As mentioned before, another measurement is that of time to first fixation. This gives the amount of time it took (in this case on average) for the participants to make it to their first fixation point. In this instance, there were points of interest marked over the font and over the

pictorial of the fliers. What this shows is the first fixation time to each of those points of interest. By comparing these times, it can be measured which characteristic between font and pictorial drew attention the quickest. When analyzing the data, it was found unanimously that the first fixation times were overwhelmingly to the font over the pictorial.

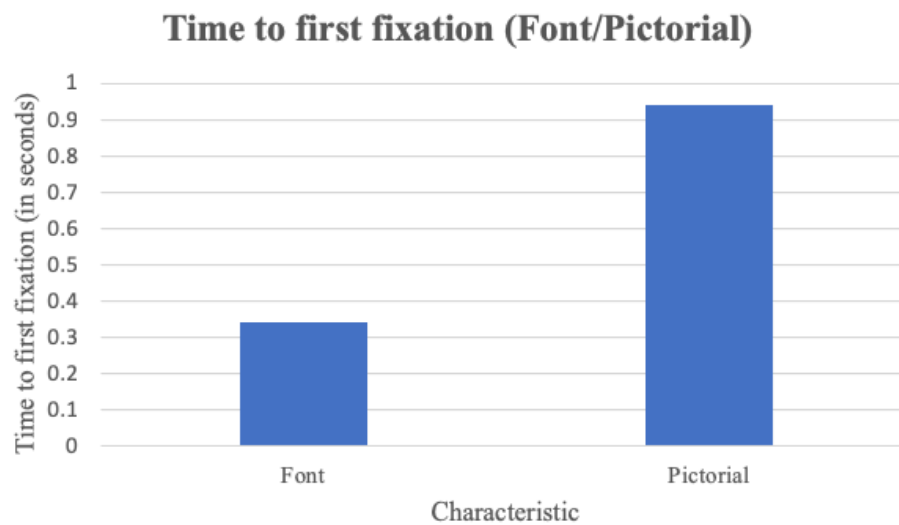


Figure 4. Time to first fixation on individual fliers (font and pictorial AOI) (in seconds)

As shown in the figure above, the average time to first fixation of the font AOI was .34 seconds whereas the average for the pictorial AOI was .94 seconds. These are the averages of all respondents across all fliers when they were shown individually to the participants. This is a compelling statement that the font was far more effective at drawing attention than the pictorial was.

In this portion of the experiment, the most important takeaways are that when looking at viewing times, font dominated pictorials (at least in this layout). Additionally, the fonts were the first area of interest focused on across all averages. Interestingly enough, the longest cumulative

view times were fliers which were round, contained script text, and utilized the pictorial of the fountain. The “happiest” fliers were also of the rounded shapes, but preferred block text. Here two patterns have emerged and can be measured with other patterns to find possible reasoning. Additionally, when looking at time to first fixation, there was a pattern of rounded or pseudo-rounded shapes and the choice of block font.

The second portion of the experiment focuses on choice between color and greyscale. A flier in color was placed next to a copy of itself in greyscale. Some previous works have shown evidence of more attention placed on the upper left. (Pentus et al., 2018) In an attempt to avoid such a bias, each individual was shown four pairs with two being color on the left and two with color on the right. Before each pair, the participant focused on a point in the center so that when revealed, they would then subconsciously move toward the one that gains their attention. This is why there are large heat spots in the center. Below is an example of what was shown to the participants in the form of heat maps to show attention hot spots. The complete collection of side by side images are located in Appendix C.

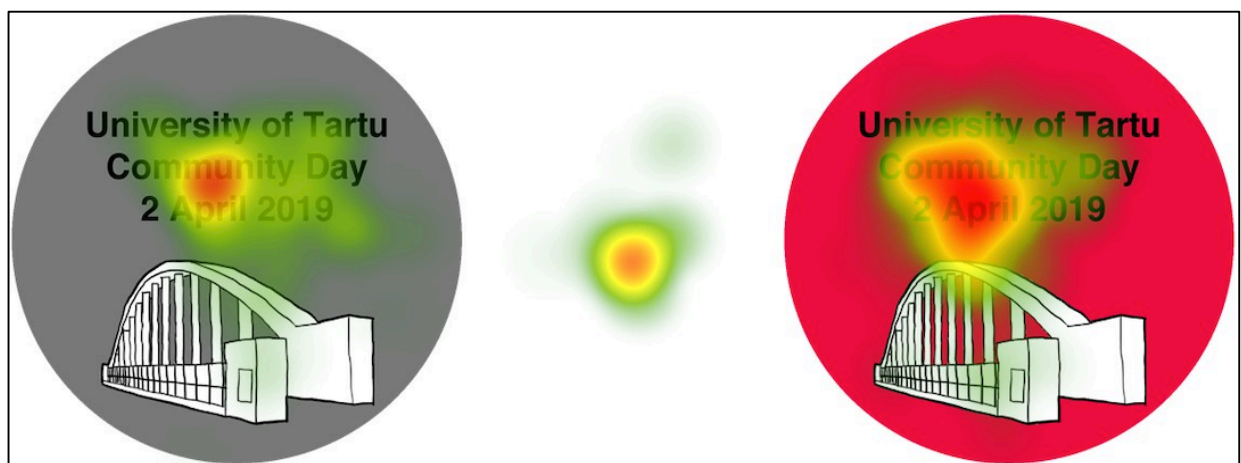


Figure 5. Heat map of greyscale and color analysis by Tobii eye tracking software

The total fixation duration shows the amount of time focused on either the color or greyscale flier. In this way, it can be shown which one drew more attention for each participant. Additionally, the sum of time can be examined for a less detailed breakdown for each pair of fliers.

Table 3

Average and absolute viewing times of color vs greyscale

	BW 1		BW3		BW2		BW4	
	Color left/Black right		Color left/black right		Black left/color right		Black left/color right	
Average	0.80	1.19	0.80	1.25	0.81	1.19	0.94	1.14
Total duration	22.34	33.31	22.42	33.72	22.79	33.43	24.39	29.64

Source: Compiled by author from raw data received from eye tracking software

It was seen in the data that individually, there are examples of preference of greyscale over color, however overwhelmingly, color dominated their grayscale counterparts. With the interview, some participants stated that they preferred the greyscale versions to the color counterparts. It is difficult to say why this is, but with some participants stating that some colors were straining on the eyes, this could give an insight to the readings. An interesting point to be made is that for example, one individual who stated in the interview to preferring greyscale fliers actually viewed the color fliers for longer periods on three of the four pairs. This is an example of how an individual may claim a feeling but their actions do not match. Looking at the final row with the totals for all recordings, it shows that in each of the four situations, the preference for color is higher than for black and grey which was to be expected. Both the average time and total times on all color fliers were higher than their non-color counterparts although the fourth pairing is much closer than the previous three. There is no noticeable reasoning for this to be much more

equal. This particular flier was mentioned to be reminiscent of a traffic stop sign. This recognition may give insight as to why it would be drastically different readings from what was captured.

As with before, the use of time to first fixation can show how quickly the software registered a fixation from the participants. The table below shows the average time to first fixations for the slides where the black and white variants were next to the colored variants. Here it can be seen that in three of the four cases, the color version had the fastest time to first fixation. This is the expected outcome especially since the colored versions additionally held the longest fixation times. There was one surprise however in the case of the fourth set. In this set it can actually be seen that the black and white version had the faster time to first fixation. This could be attributed to participants naturally looking to the left first. It would be much more notable if the black and white variant was on the right with a lower time to first fixation.

Table 4

Average time to first fixation of color vs greyscale

BW 1		BW3		BW2		BW4	
Color left/Black right		Color left/black right		Black left/color right		Black left/color right	
0.66	1.06	0.60	1.30	0,91	0,72	0,80	1,06

Source: Compiled by author from raw data received from eye tracking software

Aside from the slight surprise of the black and white even though it is likely due to that tendency of peering left first, the findings were along the line of what was expected. In agreement with the works discussed before, color imagery has a strong effect on marketing strategies (Pieters, Wedel, & Batra, 2010) (Marques da Rosa, et al., 2018).

The final portion of the empirical experiment utilized a web layout and let the participants view all 11 fliers simultaneously with no time restraint. They were instructed to click on the three fliers that they found to be the most attractive to them. The choice here would allow a participant to see all factors of the fliers and then make a decision based upon them. Below are the layouts that the participants viewed in the form of a heat map.

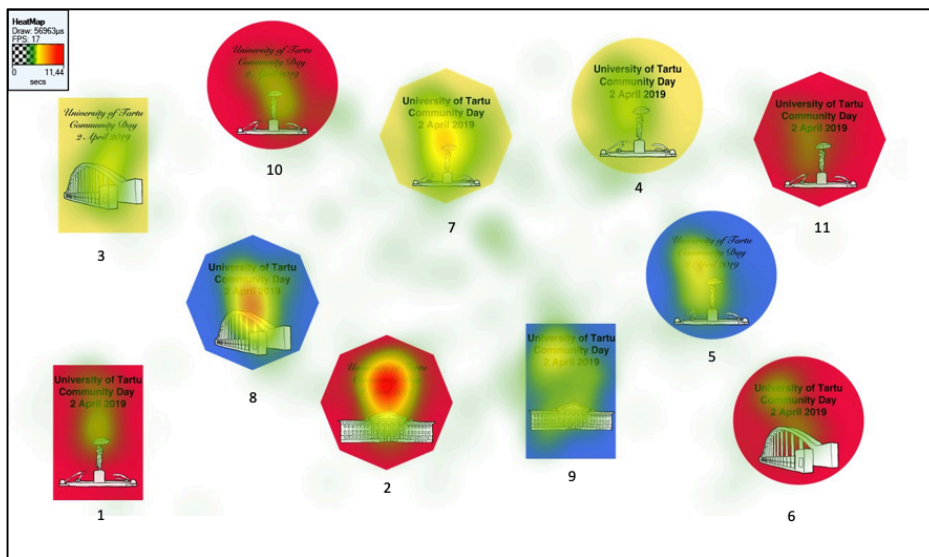


Figure 6. Heat map of web 1 created by Tobii eye tracking software.

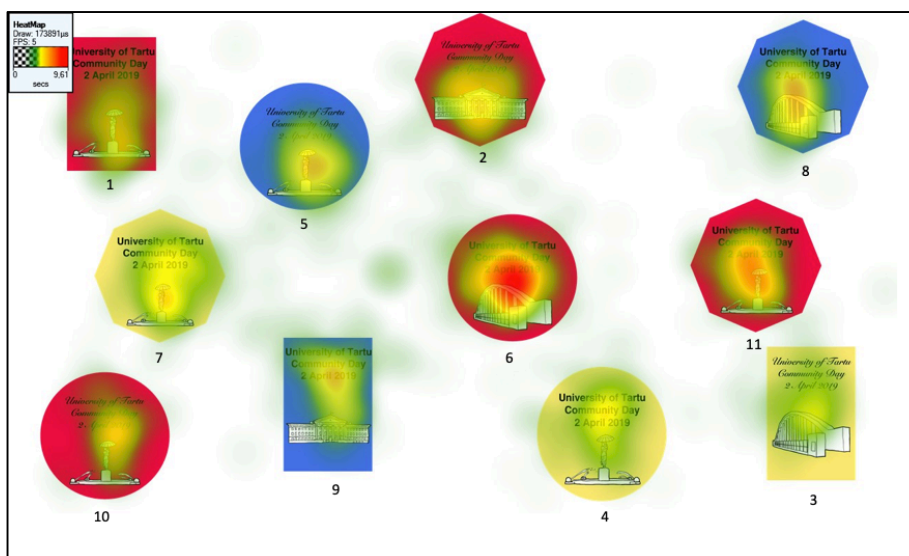


Figure 7. Heat maps of web 2 created by Tobii eye tracking software.

Half of the participants were shown the first layout above. The other half were shown the second layout. The same design of heat maps here are used as the individuals and color/greyscale pairings for continuity. In the first heat map, it can be seen that fliers 7,8, and 2 seem to have the most attention given while the corners seem to be the most vacant. This could be due to the layout and that the farther ones are less noticed, but in the second web, this is not the case. The corners received nearly equal viewing as the average. In fact three of the corners have large heat signatures. In the second web, fliers 6, and 11 received the most attention. Looking back to the fliers that created the most happiness, it could be assumed that those would be the most viewed due to the perceived happiness they brought to viewers. Three of the four “happiest” fliers also appear to be within the most viewed in the webs as well. This seems to justify the data of the first section. As stated, each individual was instructed to click on the fliers they found most appealing. Inspecting those specific choices is also important to the experiment in identifying choices made by individuals based on the advertisements they are shown.

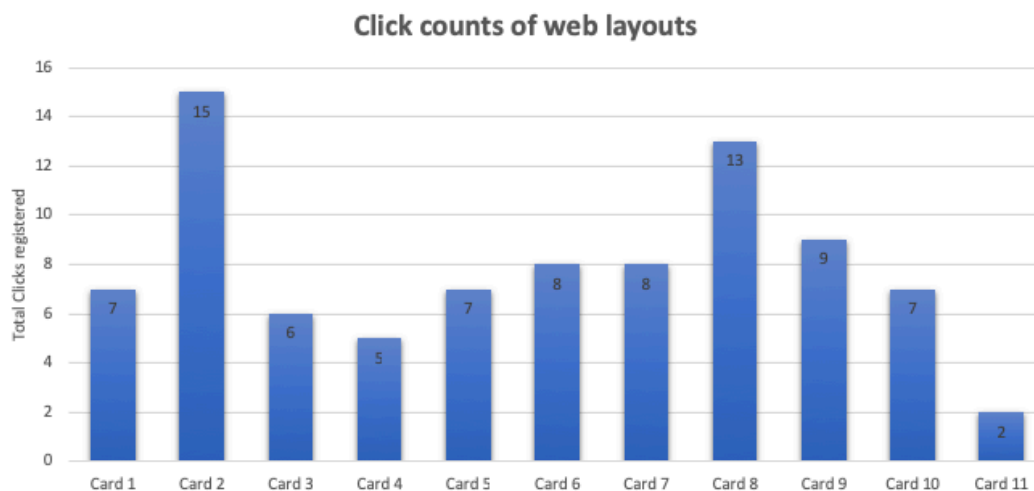


Figure 8. Total click counts from web layouts

Source: Compiled by author from raw data received from eye tracking software

As already mentioned, participants chose the most appealing fliers from the web layout at the end of the experiment. The above figure shows those clicks. One participant (rec 02) clicked on four fliers. Because it is impossible to know which three were meant to be chosen, it is necessary to ignore all four clicks of that individual. Based on the totals, the most selected fliers across both webs were 2, 8, and 9. When looking at the heat maps of the webs, 9 and 8 seemed to be average in views, but 2 recorded a high amount of fixation. The most interesting thing about the click totals is that flier 2 was selected the most. A pattern has been across the experiment that keeps pointing out flier 2. In the first section it was the “happiest” while in the final section it gained the most attention as well as the most choices. While it does not contain the blue color associated with the university, it is assumed that the pictorial of the university main building brings fond feelings as well as carries with it an identity that participants connect with. It is possible that the contrast and bright color additionally fuel this decision.

Along with the most clicks, looking at the least clicks can also be useful to research. After omitting the clicks of recording 2, the lowest amount of clicks registered went to fliers 4 and 11. This adds a bit of confusion. It is understandable that flier 4 is not chosen much as it does not receive a large amount of fixation in the webs, as well as it is quite low on the average happiness measurements. On the other hand, flier 11 has a very large heat signature on the web. Additionally, it is in the top half when measured for happiness. Flier 11 is quite similar to the most popular flier 2 but has different pictorial and font. This appears to show that one or both of those factors may play a significant role in choices made by participants.

This portion of the experiment can additionally utilize time to first fixation. In this case, the readings are interesting since the options are all laid out in front of the participant at once. The reading here shows which fliers draw the most attention between all of the options.

Table 5

Average time to first fixation of web layouts

Card	7	5	6	11	1	2	4	10	9	8	3
Average	1.66	2.65	2.93	4.02	4.25	4.76	4.79	5.01	5.19	5.44	6.34

Source: Compiled by the author from raw data received from eye tracking software

What can be seen from this is the fastest average time to first fixations belong to fliers 7, 5, and 6. It is one thing to note that in one web, flier 2 which has been singled out several times had one of the fastest averages, but with the average from the second web, it lowered in standing to the middle of the pack. Patterns again arrive when looking at the fastest noticed fliers. In these, it is shown that the fliers were similar in shapes and font. Two were round and the other was octagonal. Two used block font as well as the picture of the fountain.

Following the experiment, the participants were informally asked questions regarding their experience. They were first asked if they saw any errors or issues with the design of the fliers. This was done in order to know if there was a possibility of attention being drawn by an unknown source. It was discussed that mistakes such as spelling errors could create a false reading of noticing times within the experiment. Across all participants, the responses were negative. There were no issues identified by participants in this case. Secondly they were asked

about their choices of fliers clicked. When asked, each had their own reasoning but below will be a list of some of the more common responses.

- Script text was more difficult to read
- UT is represented with blue color thus that color and the use of the main building feel natural
- Red was bright and difficult to look at
- Contrast was important to choice
- Yellow was more difficult to see

When reviewing these statements with heat maps and data sets, it is seen that even though red was stated to be difficult to look at, it drew a lot of attention. Additionally, those fliers with the UT main building and more importantly those which are also blue were heavily viewed. An interesting point is that many stated that yellow was not their favorite but the yellow fliers were chosen at an average number. This is likely due to the contrast between the yellow color and the black text. The use of high contrast was one of the most selected reasons for choices according to the participants.

Below is a figure that shows the favorable fliers that were chosen in the three phases of the empirical experiment. This visual aid was created based on the results of the raw data that was received from the eye tracking software. Phase one represents the “happiest” choices. For phase two, only one example was chosen based on the biggest difference in time to first fixation between the color and greyscale counterpart of a flier, and phase three is represented by the most choices in clicks and the fliers with the fastest time to first fixation.

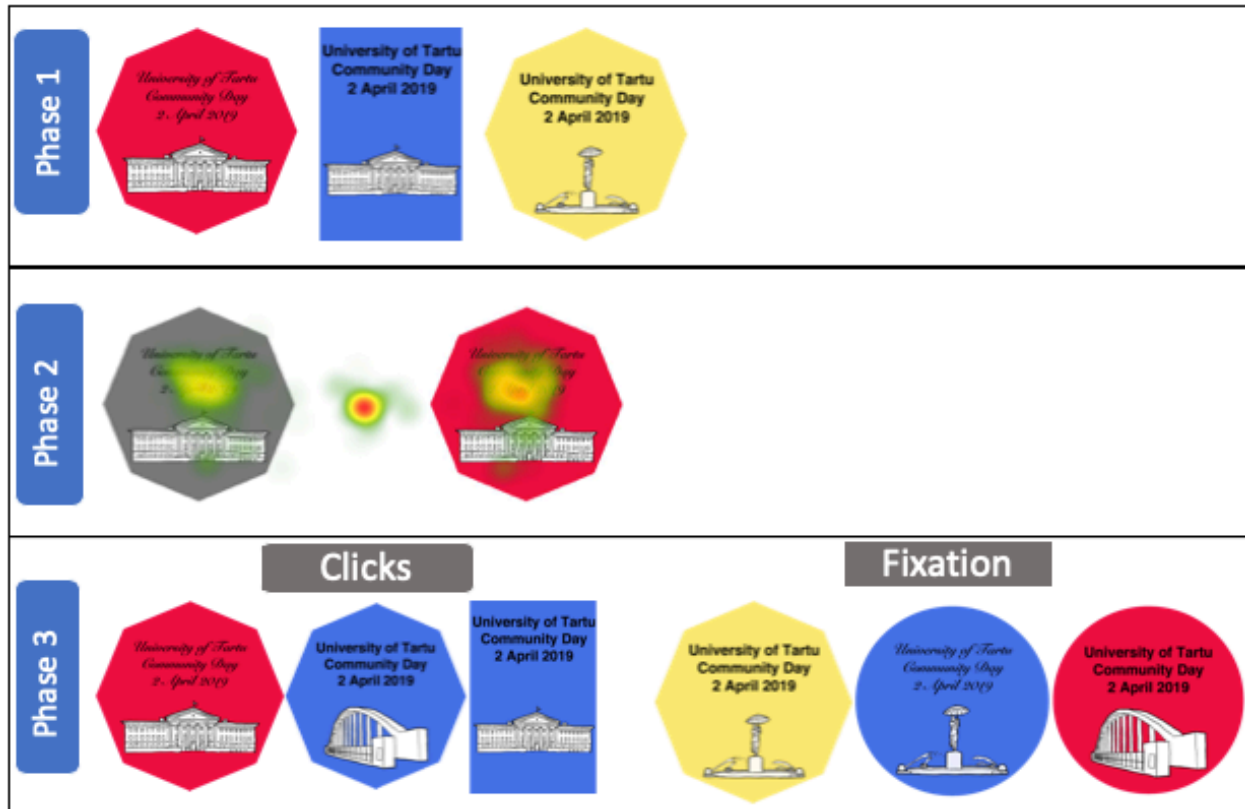


Figure 9. Summary of findings based on phases of experiment

Source: Compiled by author from raw data received from eye tracking software

When viewing each phase individually, some patterns came to light, but when all the phases are viewed together, the full picture is clearer. Beginning with color, phase two of the experiment showed that color is nearly unanimously preferred over greyscale. With that being said, the use of blue and red dominated yellow. Moving on to shape, it is clear that the more rounded styles of the octagon and circle were preferred. Though the rectangle claimed one of the positions of “happiest”, it performed poorly across all other categories.

Though it was not one sided, the font that was preferred was that of block lettering. It was in the “happiest” flier as well as ranked in the top fliers for both selections and time to first

fixation in the third phase. In the theory, it was explained that script font took longer to recognize and identify and here it appears to be the same (Danna, Massendari, Furnari, & Ducrot, 2018).

Finally the pictorials. Puškarevic et al explained that hedonic imagery held longer attention (Puškarevic et al., 2016). It can be seen that the choices in imagery were unanimously of the university main building and the kissing students fountain. Both of these images in the question portion were explained to have a connection to individuals where the bridge did not. This is supported when only two subjects in the figure above sport the picture of the bridge.

As in the theoretical portion, it was decided to rank the characteristics measured by effectiveness based on previous work, the author of this thesis has decided to follow up with a similar ranking structure based on the findings of the empirical work.

Table 6

Ranking effective characteristics based on empirical analysis

Effectiveness ranking	Characteristic
1	Pictorial
2	Font
3	Color
4	Shape

Source: Compiled from author's perception based on empirical analysis

Due to the overwhelming choice of imagery that would be considered hedonic over non-hedonic, pictorial is chosen to be the most effective characteristic of the four. There were decisive statements made by participants supporting their choices based on imagery. Closely

behind is the use of font. Font had a faster time to first fixation, but it may have been aided by the layout of the fliers. That being said, it was a main focal point of the flier and drew high levels of attention.

As color was overwhelmingly chosen over greyscale, it would rank next in order of effectiveness. The stronger red and blue dominated over the softer yellow and shows a clear preference being made based on this. Finally, is shape. This was one of the more difficult to define and measure characteristics of the experiment. The review of findings in figure 8 sheds some light into this aspect. Though it is clear that the more angular rectangle shaped flier was clearly inferior in comparison, the choice of shape appeared to be an afterthought behind the other decisions of pictorial, font, and color.

Conclusion

From the beginning, this work has set out to figure out fliers and what makes them effective. Through research and empirical works, patterns arose and deductions can be made to better quantify these techniques. In the theoretical research, factors such as color and the use of hedonic imagery had an effect of how people view fliers (Puškarevic et al., 2016). With empirical analysis it was also found that color plays a key role in how an individual perceives information. Not only does hedonic imagery give particular feelings but so to do the colors used. The use of bright colors can induce feelings of happiness and warmth that darker colder ones do not. It was found to be difficult to isolate the variables of color and shape so easily. What was found was that the contrast was more important in most cases than the specific color as it was in previous work (Danna et al., 2018). In future studies, this can be of note over a focus only on color. Paired with imagery specifically that an individual can empathize with, the combination can be quite powerful.

The shape of a flier plays an important subconscious role within a marketing plan. While a majority of fliers tend to appear in a square or rectangular shape, findings showed that the use of irregular shapes at least held some attention and even drew memory to similar shaped items in everyday life. This recognition and correlation can be utilized when designing a plan. A gap that appeared in this empirical work was the singling out of individual shapes and individual colors. As colors were viewed longer than greyscale, more research would be needed in order to definitively state which of the colors were most effective. With the color and greyscale portion of the test, it gave limited opportunity for analyzing how each color would be perceived for each scenario. It was quite clear that the block style of font was preferred in nearly each circumstance to its script counterpart. Likely due to clarity, this goes back to the definition of fliers where often referred to as “easy to read”. (Suttle, 2017)

As with most empirical work, there are always gaps left for further study. Admittedly the largest hurdle in this type of experiment is sheer levels of data. For each additional variable and each of its possible identities, the amount of subject material to be tested grows exponentially and the risk of new biases being introduced increases. For an example, if a new variable of flier size was introduced, for each size chosen, each of the fliers would then need to be in those sizes as well as all other combinations. Because of this, variables were limited and the design of the fliers were plain in an attempt to accurately measure the data to the stimuli.

This information gathered can be used in the future when creating fliers and marketing plans. It would be the suggestion of the author that the most focus should be placed on font and pictorials. The use of clean easy to read font and original pictures (especially those that give personal feelings) would be the most effective strategy.

A high level of focus was placed on avoiding brand recognition as several materials reviewed previously even mention this as a research gap. Even with steps taken, various levels and forms of brand recognition remain. The fliers were created to be believable and to represent an event that could be actually happening. In doing this, the university was a subject and since participants are affiliated, they still identify with this subject. Additional recognition in the form of everyday items such as traffic signs were recorded. Brand recognition in one way or another seems to be inevitable and something that can be minimized but not completely eliminated. These factors dance around the realm of semiotics/biosemitotics and further research of this field in combination with marketing could be quite useful.

An additional focus to the results should be noted in the fact that this type of flier is for a particular audience, the results must be kept in mind in that state. In this instance, the most effective characteristics across the board appeared to be font and pictorial. color was also important but appeared to be a lesser characteristic for effectiveness. For a wider statement of these findings, this test would need to be run on different groups of participants to look for the same patterns.

Because of the limitation in size of variables, the findings can be stated about the effectiveness of these particular characteristics. With more research of additional characteristics, more precise statements about the most effective characteristics could be made.

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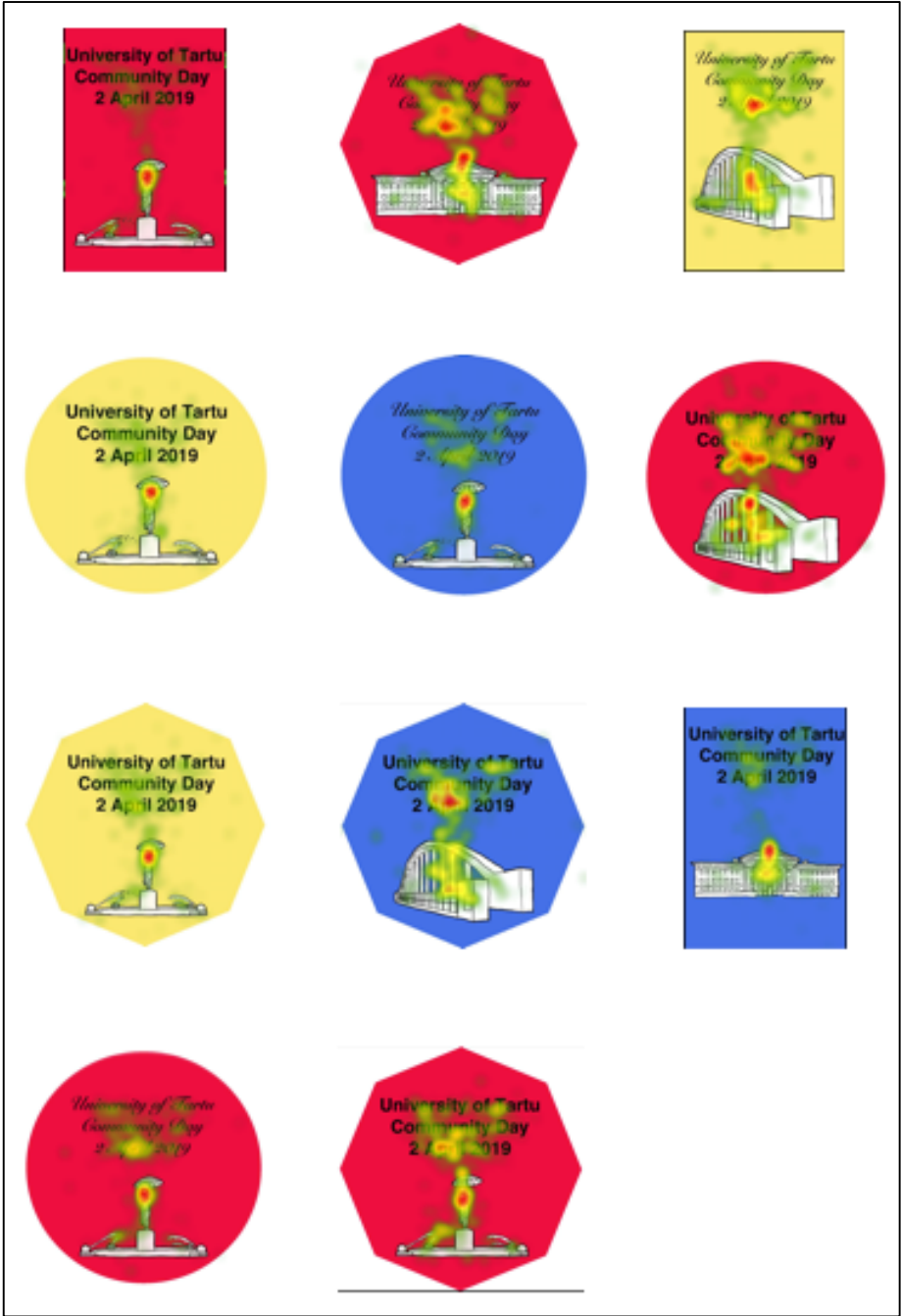
Appendix A

Orthogonal table of fliers

Card	Font	Pictorial	Shape	Color
1	Block	Fountain	Rectangle	Red
2	Script	UT Main	Octagon	Red
3	Script	Bridge	Rectangle	Yellow
4	Block	Fountain	Circle	Yellow
5	Script	Fountain	Circle	Blue
6	Block	Bridge	Circle	Red
7	Block	Fountain	Octagon	Yellow
8	Block	Bridge	Octagon	Blue
9	Block	UT Main	Rectangle	Blue
10	Script	Fountain	Circle	Red
11	Block	Fountain	Octagon	Red

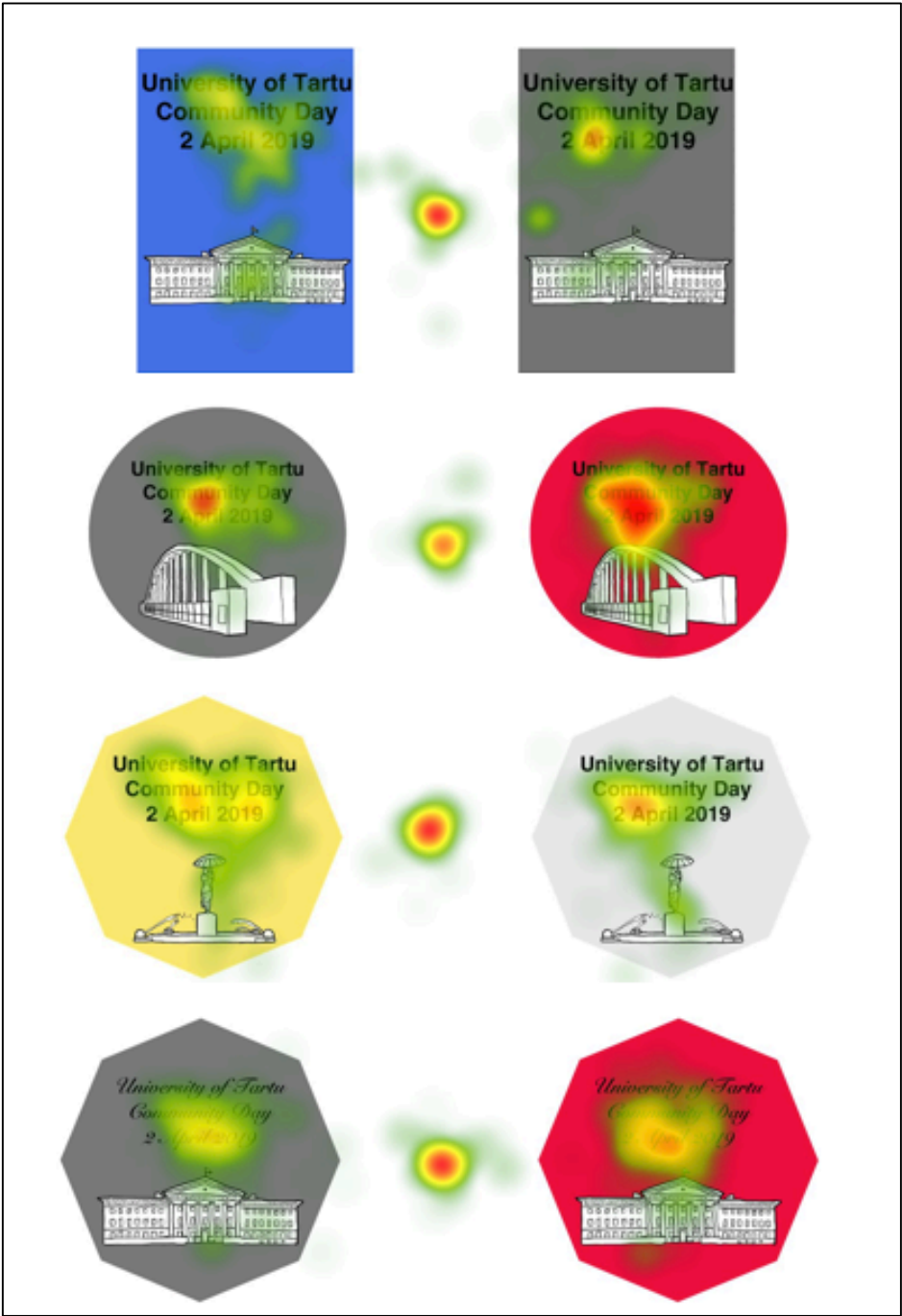
Appendix B

Flier heat maps.



Appendix C

Heat maps of color vs greyscale



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