Erasmus School of Economics

Changing the layout of online ads by repositioning messages to affect ad perceptions and the Click-Through intention.

A combination of a controlled experiment and a natural field experiment

Author:	Joris Verboom (445946jv)
Supervisor:	Yadi Yang
Coreader:	Prof. dr. Radek Karpienko
Date:	23-07-2021
Institution:	Erasmus School of Economics
Program:	MSc. Economics & Business – Marketing

Abstract

On social media, marketers must create captivating and memorable ads. This thesis aims to create more memorable ads that increase attention and click-through intention (CTI) by repositioning ad elements. We did so by testing four hypotheses in a controlled experiment:

(1) Ad perception positively affects ad attention
(2) Ad perception directly and indirectly (ad attention as mediator) increases click-through intention
(3) a. Positioning an ad message in the upper half, in the middle affects ad attention beneficially
    b. Positioning an image on the left has a positive moderating effect on the message-attention relationship.
(4) Positioning an ad message in the upper half positively impacts ad perception.

We did not find enough support for hypotheses 2, 3, and 4. However, we found significant results for hypothesis 1. In addition, we found direct effects of ad perception on the CTI. Contrary to these results, we found beneficial effects of both message and image positioning on the click-through rate in a field experiment.

These results show that applying neuroscience findings to online ads can be beneficial. However, some issues still need to be resolved. The mediating variable guiding the effects of message positioning is unknown. We found ad perception to be highly influential. However, message positioning did not have a causal impact on ad perceptions. In addition, we question the nature of some hypothesized relationships. Due to the importance of imagery on social media, image positioning is potentially causal, whereas message positioning might be a moderator.

Keywords: visual attention – social media - message positioning – click-through rate – ad design

Acknowledgments

I would like to thank the owner of SEED&eat. By providing resources to carry out a social ad campaign, I could collect data instrumental for making conclusions.

In addition, I would like to thank my supervisor Yadi Yang. You have been very helpful in providing direction. By giving honest feedback, I could scale back my initial (sometimes unrealistic) ideas, which saved me from an unrealistically high workload. In addition, whenever I had any issues, you were always very quick to answer anything, greatly helping my thesis process.

Table of Contents

1. Introduction 6
2. Literature Review 8
2.1 Social Advertising 8
2.2 Attention in general 8
2.3. Factors influencing advertisement-attention 8
2.3.1. Top-down factors 9
2.3.2. Bottom-up factors 10
2.3.3. Visual attention from a neurological perspective 10
2.4. Repositioning ad elements 10
2.4.1. Optimal positions of text-elements 11
2.5. Building the conceptual model 12
3. Methods 14
3.1. Methods – Controlled Experiment 14
3.1.1 Manipulation check 16
3.1.2 Tested variables 16
3.1.3 Sample size calculation 16
3.1.4 Sample Recruitment 17
3.1.5 Materials 18
3.1.6 Procedure 19
3.1.7 Statistical analysis 20
3.2 Methods – Field survey 22
3.2.1 Experimental design 22
3.2.2. Sample 23
3.2.3 Materials 23
3.2.4 Procedure 23
3.2.5 Analysis 24
4. Results – Controlled experiment 25
4.1 Hypothesis 1 26
4.2 Hypothesis 2 27
4.3 Hypothesis 3 28
4.4 Hypothesis 4 29
5. Results – Field experiment 30
5.1 Descriptive results 30
5.2 Logistic regression results 31

6. Discussion 33
6.1 Key findings 33
6.2 Effects of ad perception on attention 33
6.3 (In)direct effects of ad perception on click-through intention (attention as mediator) 33
6.4 Effects of message positioning on ad-attention and the moderating effect of image positioning 34
6.5 Effects of message positioning on ad-perception 35
6.6 The conceptual model in review 36
6.6. Limitations 36
7. Conclusion 37
7.1 Academic implications 37
7.2 Practical implications 38
Bibliography 39
Appendices 43

1. Introduction

Advertising is a persuasive form of communication in which marketers aim to move consumers to action. On average, a single consumer sees over 5000 ads on a daily basis through multiple channels (Yankelovich, 2005). However, as with most phenomena, more is not always better. Consequently, when consumers encounter an overload of marketing messages, these decrease in effectiveness. Individuals become less attentive to these ads, which increases the need for advertisements that stand out. Thus, marketers face the challenge of creating more captivating and memorable advertisements.

An important contributor to this advertisement overload is social media. The launch of MySpace in 2003 has started a movement that has led to a myriad of social media platforms. Facebook, Instagram, TikTok are all examples of commonly-used platforms nowadays. All of these platforms serve different audiences, thus serving as countless new marketing channels. Before, traditional media served as mass communication channels, with all consumers receiving the same message. Social media has enabled the tracking of online consumer activity and thus micro-targeting of consumers. Especially through Facebook, marketers can use advanced methods to target consumers. The combination of being the most used social network (2.85 billion monthly active users) and owning multiple social platforms (e.g., WhatsApp, Facebook, Instagram) and its advanced advertising network make Facebook an important force in online marketing. Through Facebook Ads, businesses can set up online advertising campaigns for selected audiences. It uses data of Facebook users, allowing for tailored messages per audience, thereby increasing potential effectiveness.

A prerequisite for ad-effectiveness is attention. With no attention, no other (desired) ad-effects will happen. On average, the human attentional span has decreased in recent years (Subramanian, 2018). Especially on social media platforms, attention is low, resulting in 'scrolling' behaviors. In social media advertising, Wedel & Pieters (2008) identify three consumer segments: scanning, initial, and sustained attention segments. A scanner will scan over the ad. Someone with initial attention will look at one/two element(s) more closely. Someone with sustained attention will observe all elements closely. It is therefore relevant to find convenient ways to capture customer attention. Past studies distinguish between top-down and bottom-up factors impacting attention (Pieters & Wedel, 2018; Rosbergen et al., 1997; Milosavljevic, M., & Cerf, 2008; Wedel, 2018). Top-down factors are consumer-related (e.g., cognitive capacity, age, gender). Bottom-up factors, on the other hand, are advertisement-related. These two groups cooperate rather than coexist since consumers use both to form responses to an ad. Marketers can leverage the top-down factors of their audience by altering the bottom-up factors appropriately. They can change ads in a way (top-down) that automatically allows humans to behave in a certain way (bottom-up).

A form of this heuristic is called 'visual attention.' Visual attentive processes filter out irrelevant information from cluttered visual scenes (Higgins et al., 2014). The human eye fixates on an element to

process the information from it. Having multiple elements can exceed brain processing capacity, and thus the brain uses attentional mechanisms (Wedel & Pieters, 2008). By doing so, consumers automatically process conveniently placed information that. Visual attention in combination with advertising has been studied before using fMRI (eye-tracking) technology. These studies show that visual stimuli of the ad can 'guide' attention to a targeted object.This thesis aims to apply the results of visual attention studies to social media advertisements.

Advertisements are roughly built up by three elements: image, message, and brand elements. In this thesis, we use these three key elements. A call to action is often embedded in the message, making it the key element advertisers want consumers to see. Using the findings of eye-tracking experiments, marketers can increase the attention for their message. In this thesis, we aim to investigate if this also holds in practice.

There is evidence that consumers react differently to internet advertisements (Lohtia et al., 2003). In combination with the decreasing consumer attention span on social media, it is useful to investigate if message positioning can still be a source for change. Most of the cited eye-tracking studies conducted their experiments on print advertisements, posing an opportunity for new findings. From a meta-perspective, we can see that multiple ad-design studies exist. Most of these studies have looked into the effects of adjusting the elements themselves. However, in no experiments, all factors except for element positions were kept constant. This thesis aims to bridge this knowledge gap by looking at the effects of message-positioning on attention and click-through intention.

We use the fMRI results of previous studies to determine optimal message positions based on two dimensions (right/middle/left and upper/lower half). Our guiding research question is:

How can repositioning message elements lead to an increased click-through intention?

A conceptual model is set up based on existing literature, which we test in a two-fold experiment. Using an online survey, we examine causations and internal validity. Complementary to these results, a field experiment involving an actual Facebook ad campaign is carried out. With the results of the second experiment, we can establish external validity.

2. Literature Review

2.1 Social Advertising

Social media advertising (hereafter: social advertising) is a new complex form of advertising. Over the past decade, its importance has grown, which can be seen back in the exponential growth in scientific literature about this concept (Knoll, 2016). The most widely applied form of social advertising is display ads. A display ad consists of a visual component often accompanied by textual content and an attention-grabbing caption. Based on existing data, advertisers can target specific (most suitable) audiences per ad. By grouping members according to specific attributes (e.g., location, interests, gender), Facebook can show the right messages to the right audience, thus increasing ad-effectiveness. Gathered data can also be used for scientific purposes when investigating consumer social media behaviors.

Consumer motives for using social media can be divided into rational (knowledge-sharing, information) and emotional (entertainment, social) (Stafford et al., 2004; Krishnamurthy & Dou, 2008). On social media, consumers display low levels of participation and contribution (Jones et al., 2004; Preece et al., 2004), thus acting as content-consumers instead of content producers. This type of behavior promotes 'scrolling' habits resulting in insufficient individual attention per post. On average, individuals look at a social media post for 1.7 seconds (Voorveld et al., 2018). For advertisers, a challenge thus lies in capturing consumer attention on social media.

2.2 Attention in general

For advertising to be successful, attention is a prerequisite. Without attention, consumers cannot perform the desired action. In advertising, Wedel & Pieters (2008) identify three consumer segments: scanning, initial, and sustained attention segments. These three groups all approach ads with different levels of attention. A scanner will quickly look over the ad. Someone with initial attention will look at one/two element(s) more closely, whereas an individual with sustained attention observes all aspects closely.

Studies about attention conceptualize it differently and use different metrics. As a general metric, attentional span (in seconds) is often used. On the other hand, multiple studies use memorization questions (Pelet & Papadopoulou, 2012; Hong & Zinkhan, 1995) to measure attention in hindsight. High memorization scores indicate that individuals have paid sufficient attention in the past. In this study, we use the latter concept. Previous attention studies have shown that increased attention also leads to a higher likelihood to engage (Pelet & Papadopoulou, 2012; Jian & Jing, 2007). In this thesis, we test for effects on the likelihood to click: the click-through intention (hereafter: CTI). We thus believe that attention will benefit the CTI.

2.3. Factors influencing advertisement-attention

To fully understand attention, we must also understand its potential causes: factors influencing ad-attention. In a meta-analysis by Pieters & Wedel (2008), a distinction is made between top-down and bottom-up

factors. Other marketing studies agree with this notion (Milosavljevic, M., & Cerf, 2008; Wedel, 2018). Top-down factors are consumer-based (e.g., consumer traits and mood). These factors are hard to capture for marketers since they (almost always) do not have control over these factors. The bottom-up factors are associated with the advertisement itself (Milosavljevic, M., & Cerf, 2008). Consumers use a combination of top-down and bottom-up factors to form responses to ads. Bottom-up factors grab attention, while top-down factors determine the length of attention.

2.3.1. Top-down factors

In general, consumers have unfavorable attitudes toward advertisements (Lutz et al., 1983). Thus, opening a potential for avoidance. With the emergence of new advertising channels, attitudes toward advertisements have turned more negative (Ferreira et al., 2017). Combining this with the previously-mentioned decreased attention spans, all efforts to reduce avoidance benefit effectiveness. Both Speck (1997) and Ferreira et al. (2017) found that ad perception is a strong predictor of avoidance. If consumers form negative perceptions about an advertisement, they will be more inclined to avoid the respective ad. Thus, we hypothesize that ad perception has a beneficial effect on attention.

H1: Ad perception positively affects ad attention.

We also infer that ad perception positively affects the CTI since it indicates substantial product interest (Borji et al., 2019). Previously, we also suggested that attention has beneficial effects on CTI. Thus, we hypothesize that ad perception directly and indirectly (mediator: attention) affects CTI.

H2: Ad perception directly and indirectly (ad-attention as mediator) positively affects click-through intention.

Ad perceptions are closely related to other perceptions as well. Positive brand perceptions also lead to favorable ad perceptions and higher purchase intentions (Goldsmith et al., 2000; Ko et al., 2005). Thus, if the sender is not trusted or believed, the message itself will have lower effectiveness. Product perceptions have the same confounding effect. These perceptions include all subjective views and opinions customers have from the product itself. Product perceptions are the target of most advertisers since these play the most prominent role in consumers' buying decisions. However, logic also tells that these three do not stand on their own. Having positive brand perceptions about brand X can also result in more favorable ad and product perceptions of that product and the other way around. Therefore, we will control for both product and brand perceptions in this thesis.

Both Lutz et al. (1983) and Pelet & Papadopoulou (2012) describe consumer mood as another impactful top-down variable for purchasing behavior. Responses are conveyed by mood, meaning that all possible purchase intentions can either be helped or hindered by the current mood state.

2.3.2. Bottom-up factors

Factors associated with the advertisement itself are coined bottom-up factors. Bottom-up factors can help influence some of the top-down factors previously discussed.

Previously, we discussed three social ad elements: a visual component, textual content, and an attention-grabbing caption. Regarding the text, two tone-of-voice categories exist: emotional and rational. The first plays into consumer feelings (Hussain et al., 2020), whereas the latter provides factual, relevant information (Puto & Wells, 1984).

Another bottom-up factor is the ad design. By making the proper designing choices, marketers can emphasize specific elements and make the ad more attractive. Mueller (1987) stresses the importance of the attractive theme of the advertisement for ad-effectiveness. Advertisement design influences both ad perceptions and ad avoidance.

By making proper designing choices, visual attention can be guided. Visual attention refers to the filtering out of irrelevant information from cluttered graphic scenes (Higgins et al., 2014). Through stimuli, ad design can guide an individual's attention to desired elements. Visual attention has beneficial effects on both brand memory and purchase intention (Treistmann and Gregg, 1979). Visual attention is often studied using eye-tracking (fMRI) experiments, allowing researchers to capture individuals' eye movements when confronted with an advertisement (Wedel & Pieters, 2008). Visual attention thus takes a neurological approach. In this study, we will not conduct neurological experiments. However, a basic understanding of the neurological processes behind visual attention helps to understand the gist of the concept.

2.3.3. Visual attention from a neurological perspective

To process information from an object, individuals have to fixate their eyes on the respective object. Eye movements are required to sequentially move between fixations (Higgins et al., 2014), called saccades. Thus, when processing advertisement information, saccades and fixations are used. Since this information often exceeds the processing capacity, the brain uses attentional mechanisms (Wedel & Pieters, 2008). Visual attention selects specific objects and improves the processing of that area, guided by stimuli. Thus, visual attention acts as a kind of heuristic. This coupling between attention and eye movements is the key to eye-tracking research. It suggests that element-positioning can be used to grab attention.

Hence, finding optimal positions of ad elements can direct visual attention. A case study conducted in 2000 by Verify International involved a newspaper ad in which content elements were rearranged without content changes. By relocating ad elements, consumers were more attentive to the advertisement (Exhibit I), underlining that by relocating ad elements, initial attention can be captured as well.

2.4. Repositioning ad elements

Itti & Koch (2001) meta-analyzed eye-tracking studies and underlined the cognitive spot visual attention has in the brain and the interplay between eye movements and attention. Furthermore, they found beneficial

effects of repositioning ad elements.

A debate exists about the preference of text over images. Pieters et al. (2007) suggest that the pictorial largely determines attention selection. Changing its size is more effective than changing text size in the same proportion. Rosbergen et al. (2004) found contradictory results. In print advertising, consumers tend to look at the text first, which differed per attention segment. Rayner et al. (2001) support this notion. All studies agree on the fact that image and text processing are separate events in the brain. The span of effective vision is larger for pictures than for text (Rayner et al., 2001). These studies are all conducted on print advertising. Since this thesis involves social advertising, we assume a greater influence of images and thus agree with Pieters et al. (2007). While looking at the ad, the attentive state will gradually diminish, however. Therefore, it would be more beneficial for marketers to get an initial focus on the message to get its gist across.

2.4.1. Optimal positions of text-elements

To assess the optimal placement of all elements, we first look at the scan path of consumers (tracking of eye movements (Exhibit II)). Leven (1991) found an automatic preference for the center of ads. Sides were briefer fixated; the upper-right corner was fixated least, revealing scanning behavior there. Chandon et al. (2009) confirm this notion by showing that top- and middle positions receive prolonged gaze. Furthermore, in their study, they showed that a center position is often the first focus point. Other studies look at this statement from a broader perspective: instead of the center, they argue that the entire middle section of an ad receives attention first. On average, the preferential scan path starts in the middle, goes to the top, and ends in the lower-right corner (Leven, 1991).

An often applied designing standard is the Rule of Thirds. This concept has its base in photography and considers how the human eye scans (Amirshahi et al., 2014). An image adhering to this rule is divided into a grid of nine equal squares. The preferred focus points of an image are placed along one of the third lines or on one of the four intersections of the third lines.

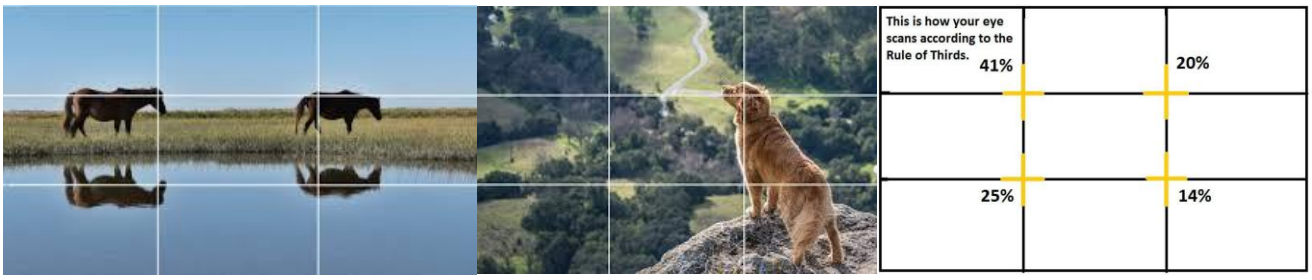


Figure 1 – Examples of the Rule of Thirds

Even though specific scientific literature about this concept lacks, it has its roots in the findings of the earlier found studies. Based on the previous analysis, we can hypothesize that text elements positioned on the lower half (especially in the right-down corner) will receive less attention. Thus:

H3a: Positioning the ad message in the upper half, in the middle beneficially affects ad attention.

Since all social ads involve pictures, we infer that the placement of the image also affects consumer attention. No literature exists about the effects of images on text perception. However, we infer that an image can either strengthen or weaken the previously hypothesized relationship. Therefore:

H3b: Positioning an image on the left has a positive moderating effect on the message-attention relationship.

Summarized, we aim to find possible effects of element placement on attention. Based on the previous discussion, we look at the left/right placement of the pictorial. Furthermore, we look at message positioning on two dimensions: upper/lower half and left/middle/right.

2.5. Building the conceptual model

We can summarize all hypothesized relationships in one conceptual model. To fully complete this model, we also look at the effects of message positioning on ad perception. According to Mueller (1987) and Gorn et al. (1997), element-positioning can affect ad perception. Not many studies have been conclusive about this notion. Therefore, we want to examine this in this thesis. We thus hypothesize:

H4: Positioning an ad message in the upper half positively impacts ad perception.

Combining these hypotheses with the others leads to our conceptual model:

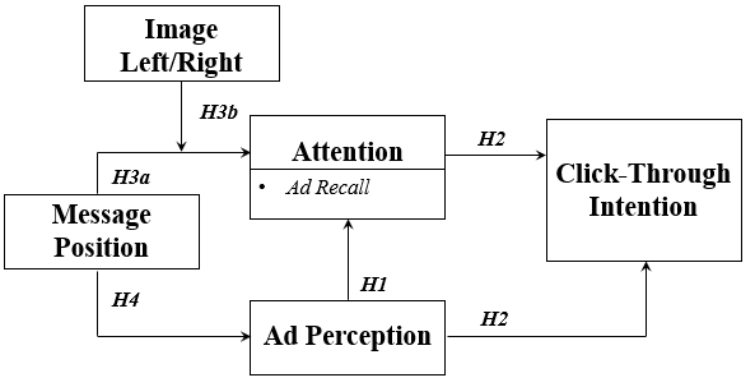


Figure 2 - Conceptual Model

This study elaborates on previous eye-tracking studies. Eye-tracking studies have mainly been conducted on print advertisements using fMRI technology. In this thesis, we apply the effects found in these studies

and to social media ads. Lohtia et al. (2003) underline the difference in effects for internet and print advertisements. It is beneficial to determine to what degree effects found for print ads also apply to social ads. We do so by employing a two-fold experiment: an online survey to establish internal validity of the model, a field study to confirm external validity.

3. Methods

In the previous section, we identified a conceptual model. This model was tested by setting up a two-fold experiment. First, we conducted an online survey to test all variables in a closed environment. The effects of message positioning on attention were measured as well as other related hypotheses. All the data used was collected after obtaining participant approval.

To establish the external validity of these results, we employed a field experiment solely testing for effects on the intention to click. By doing so, the results of both experiments can strengthen each other. A field experiment provides externally valid results. A closed environment is needed to understand the mechanisms behind these effects.

3.1. Methods – Controlled Experiment

First, we conducted a controlled experiment in the form of an online survey. This experiment entailed an artificial Facebook timeline with multiple display ads containing one altered advertisement. Since shopping is not a primary objective of Facebook users, we chose to use a low-involvement good, relatable to everyone. A 3-year old coffee (Nescafé) advertisement was used. The other ads also involved low-involvement goods, eliminating confounding effects. Hence, no advertisement received special attention because of a difference in goods. An example of the timeline can be found in Exhibit V.

To mimic actual social media behaviors; we pretested the artificial social media environment in a manipulation check (n = 12) (Exhibit VI). Based on those responses, we found that it was not apparent to participants that the Nescafé ad was manipulated, thus preventing demand bias. If we would have shown the advertisement without the surrounding environment, participants would automatically pay more attention because of the task demanded, making results harder to generalize for real social media environments. Therefore, we also pretested the environment. Participants agreed that the timeline closely resembled a real Facebook environment (Exhibit VII).

Participants were told that the experiment revolved around social media use. Next, they were asked to scroll through the Facebook timeline. Attention to the advertisement was measured by asking how well participants could remember four aspects of the ad. After this set of questions, perception-related questions were asked. To avoid forgetting the ad, participants saw both the ad and the product. The complete set of questions can be found in Exhibit X.

From an ethical point of view, man could argue that we deliberately deceived participants. In this experiment, we indeed did not fully tell the participants the purpose of the study upfront. However, if we had done so, demand bias would have been more likely to occur. Therefore, we opted not fully disclosing information before the experiment. At the end of the survey, we included a full disclosure, including a drop-out option.

The ad contained two interventions: *M_Position* and *ImageLeft* (message and image positioning,

respectively). The message was positioned based on two dimensions: upper/lower half and right/middle/left side (Figure 3), resulting in six different message positions. The image was positioned either on the right or the left side of the ad (Figure 3), allowing for eight different ad variations (Figure 4).

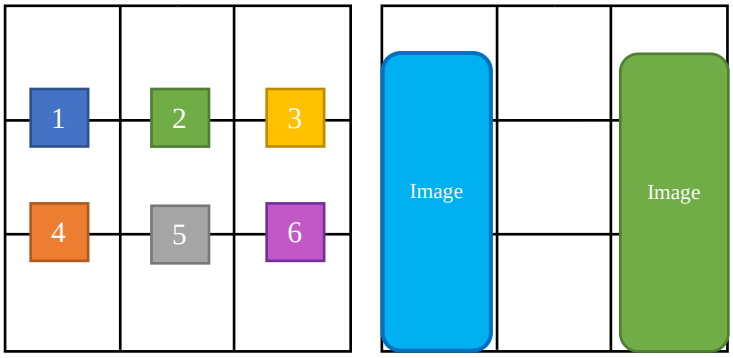


Figure 3 – All possible message and image positions on an empty grid.

Figure 4 – the six different message positions and two different image positions located on a grid

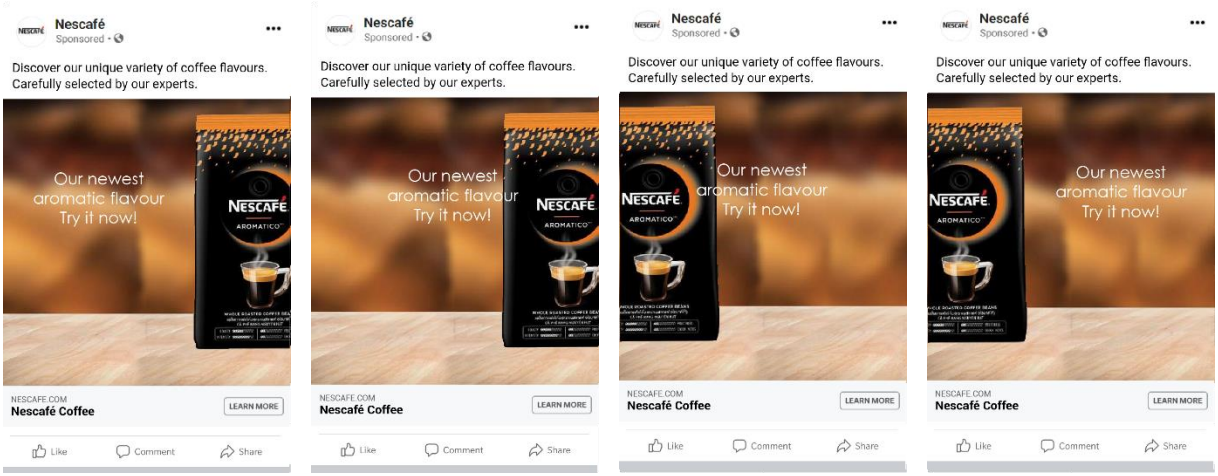


Figure 5 – All possible ads with messages located in the top half (complete set of ads in Exhibit IV)

The message and image were never positioned on the same side. If the message was located on the right, the image was located on the left and vice versa. When the message was positioned in the middle, the image was located either on the right or left. Brand elements were controlled for by similar placement through all conditions.

As said previously, we pretested the advertisement using a manipulation check. We tested if the ad

stood out from the rest as being altered (Exhibit VII) to avoid demand effects. Furthermore, we tested whether changes in element positions caused changes in attention using online eye-tracking software. Even though this software lacks scientific validity, we could see different visual attention distributions per ad layout (Exhibit VIII) from its outcome.

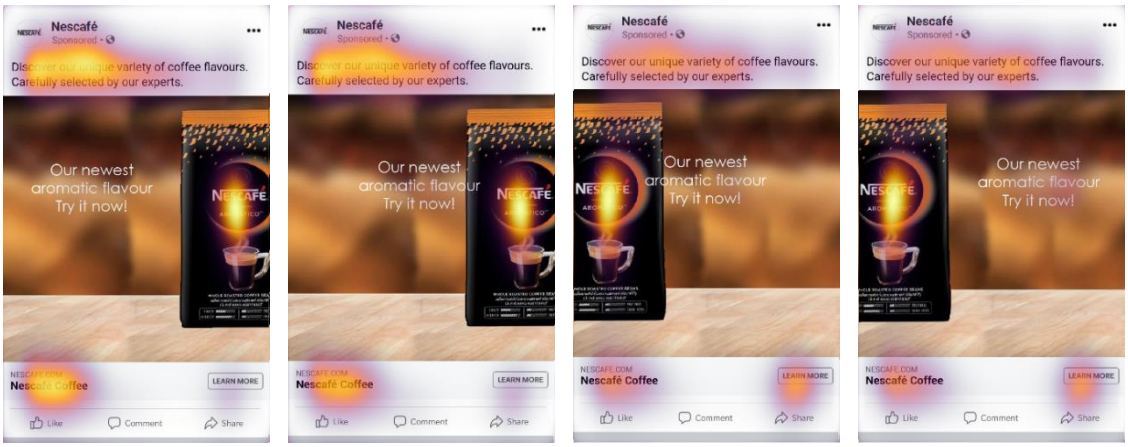


Figure 6 – Heatmaps with different focuses of interest (all heatmaps in Exhibit IX)

3.1.1 Manipulation check

We pretested the advertisement using a manipulation check to avoid demand biases. We did not test for different ad versions since the interventions are distinguishable. However, since the other ads were not modified, we wanted to ensure the validity of the results by excluding the possibility that participants paid more attention to this ad because they noticed its modification. Questions in the pretest were thus related to the experiment as a whole (exact statements in Exhibit VI). We explain and use its results (Exhibit VII) in the remainder of this chapter.

3.1.2 Tested variables

The two variables implemented in the interventions were *M_Position* and *ImageLeft*. Furthermore, attention was measured using *Ad_Recall.* We also aimed to find effects on ad perception and the click-through intention; *Ad_Percep* and *CTI*, respectively. To reduce research bias, we opted for a between-subjects design. We thus measured effects by looking at differences between subjects. If a within-approach were to be adopted, multiple ads should have been shown to the same individual. Answers regarding advertisement A would then likely affect answers regarding advertisement B.

Based on previous studies, we identified other (controllable) variables of influence. By keeping other design choices constant, we controlled for design effects. Other control variables included: *Age* (categorical), *Male* (binary), and *Education* (categorical), *Mood, BrandImage,* and *Product_Percep*.

3.1.3 Sample size calculation

Based on G-Power calculations, a sample size of 166 participants was deemed necessary to get valid results (Exhibit IX). To fully ensure validity, we aimed for 240 responses. By doing so, we could safely take out

invalid responses while still meeting the threshold. The six message positions and two image positions resulted in 8 different ads, and subsequently, 8 participant groups. We aimed to have 40 participants per message position (Table 1). The ads per group can be found in Exhibit IV.

Group	Message Position	Image position	Aimed *N* (Total = 240)
1	Position 1	Right	40
2	Position 2	Right	20
3	Position 2	Left	20
4	Position 3	Left	40
5	Position 4	Right	40
6	Position 5	Right	20
7	Position 5	Left	20
8	Position 6	Left	40

Table 1 – All participant groups

3.1.4 Sample Recruitment

The research population of our thesis was young adults/students. A 2017 US survey of 1,030 consumers revealed that individuals aged 18-34 are influenced most by advertisements (Clutch, 2017). Furthermore, participants needed to be familiar with social media (Facebook).

We recruited participants using a wide array of online sources: survey-exchange websites and survey sharing groups. A total of 454 replies was collected; we deleted 180 unsuitable or invalid responses (either unfinished or failed attention check). The total sample size was 274 (Table 2).

Group	Targeted *n*	Actual *n*	Actual Percentage (%)
1	40	46	16.79%
2	20	26	9.49%
3	20	23	8.39%
4	40	42	15.33%
5	40	42	15.33%
6	20	21	7.66%
7	20	26	9.49%
8	40	48	17.52%
Total	*240*	*274*	

Table 2 – Participants per group

Measure	Item	Count	Percentage (%)
Gender	Male	86	31.39%
	Female	188	68.61%
Age	18-24	186	67.88%
	25-29	66	24.09%
	30-34	15	5.47%
	35-39	7	2.55%
Education	High school degree or equivalent	28	10.22%
	Associate degree or equivalent	5	1.82%
	Bachelor's degree	159	58.03%
	Master's degree	78	28.47%
	PHD	2	0.73%
	Other	2	0.73%

Table 3 – Demographical statistics of the sample

3.1.5 Materials

A total of 9 variables were tested and measured. To measure *CTI* (dependent variable), we asked participants directly how likely they were to click on 'Learn more.' In the pretest, the average CTI was 35.6%. Based on actual CTR's usually revolving around 2 to 5%, we rephrased the question. A message emphasizing the situation ('while scrolling through your timeline, you see this ad') was added before the question. By doing so, results would be a closer resemblance to the actual situation. However, due to the self-reporting nature of this metric, it could still be prone to research bias. Hence, we used a field experiment to establish external validity.

We measured *Ad_Recall* using the metric of Pelet & Papadopoulou (2012). In this study, participants were asked to write down which ad aspects they remembered. Per aspect, they added a point. We developed this metric into four multiple-choice questions, in which we asked how well participants remembered four aspects of the ad (product, brand, message, caption).

To measure the control variable *Mood*, we employed the Pick-A-Mood instrument. This instrument is a cartoon-based pictorial instrument in which participants self-selected one of eight pictures most closely resembling their current mood state. Desmet et al. (2016) underlined its validity and simplicity. All options were arranged along a scale from *unpleasant* to *pleasant* (1-5). Based on their answers, we ranked participants on a similar scale (unpleasant to pleasant).

Perceptions were measured using Likert Scale questions. *BrandImage* can be measured in numerous ways. In this study, we adopt the BAV model as introduced by Larkin (2013), distinguishing between positive and negative perceptions. The BAV model uses five-point Likert scale questions. *Product_Percep* was measured using 5-point Likert scale questions based on the study of Leclerc, Schmitt

et al. (1994). This study divided the ranking questions into hedonic (emotional) and utilitarian (usefulness) scales. *Ad_Percep* was measured using a similar (widely-applied) scale of Gupta et al. (2015), in which participants had to rank opinions regarding different attributes on seven dimensions.

Lastly, we measured demographical characteristics (age, education, male/female) by asking directly. An overview of all variables and (if applicable) their measurement is included below:

Name	Type	Scale	Measurement
CTI	DV	Ratio	Likelihood to Click
Ad_Percep	IV	Interval	Metric by Gupta et al. (2015)
Ad_Recall	IV	Interval	Metric based on Pelet & Papadopoulou (2012)
Mood	Control	Nominal	Pick-a-Mood (Desmet et al., 2016)
BrandImage	Control	Interval	BAV model (Larkin, 2013)
Product_Percep	Control	Interval	Metric by Leclerc et al. (1994)
Male	Control	Binary	(1,0)
Education	Control	Nominal	(Highschool, Bachelors, Masters, Other)
Age	Control	Nominal	(18-20,21-25,26-30)

Table 4 – Overview of variables and their respective measurements

3.1.6 Procedure

Before starting the survey, participants received information about the study itself. The voluntary, anonymous, and confidential nature of the survey was stressed to assure no forced results. Contact information was included as well. Last, it was kindly asked to fill in the survey honestly. The fact that invalid responses can be detected was also included. After participants gave consent to use their data for research purposes only, they could proceed.

The survey itself contained two parts: research-related and socio-demographic questions. We asked participants to use the artificial timeline and questions regarding the ad, product, and brand perceptions in the research-related questions. Eight different ads and consequently eight different participant groups existed. In the second (socio-demographic) part, we asked for demographical information and measured participants' mood. In both sections, participants had to fill in an attention check. Responses were only deemed valid if participants passed both attention checks.

After finishing the questionnaire, the purpose of the study was revealed, and an option to withdraw answers was included. The contact information was included to handle open questions or complaints. The complete survey can be found in Exhibit X.

3.1.7 Statistical analysis

To test for all hypotheses, we employed different sets of statistical tests. Since different measurement scales were used, we standardized all the coefficients. We were able to draw better comparisons, and variables contribute in correct proportion to the regression model. Previously, we identified four hypotheses. Per hypothesis, we used appropriate statistical tests. Below, every hypothesis (translated into variables) and its associated tests are listed:

H1: Ad_Percep positively affects Ad_Recall

Figure 8 – Statistical model hypothesis 1

Both variables are measured at the interval level. We also created a linear regression to find effects between two interval variables (DV = *Ad_Recall*). The assumptions of linear regression are: linear relationships, normally distributed data, little multicollinearity, no auto-correlation, and homoscedasticity. Using different tests, we tested these assumptions. Since we did not expect all variables to be normally distributed, we employed an appropriate non-parametric test: a Spearman correlation.

H2: Ad_Percep directly and indirectly (Ad_Recall as mediator) positively affects CTI.

The relevant variables for this hypothesis were *Ad_Recall* (interval), *CTI* (continuous), and *Ad_Percep* (interval). *Ad_Recall* served as mediator, *CTI* as the dependent variable, and *Ad_Percep* as the independent variable. We thus first tested for separate relationships between these variables and combined them later in one statistical model:

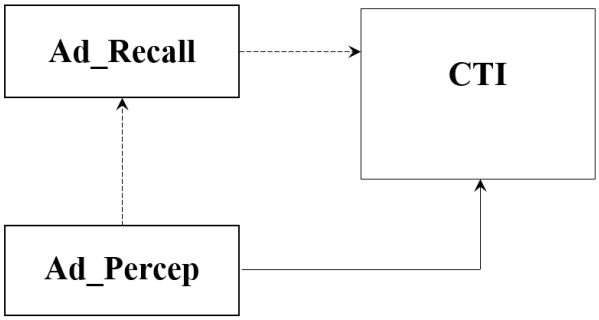


Figure 9 – Statistical model hypothesis 2

To test for effects on *CTI*, we ran a linear regression with *CTI* as the dependent variable (after testing for assumptions). To test for causal effects of both (interval) variables, we conducted extra (non-parametric) tests in the form of two Spearman correlations. The effects between *Ad_Percep* and *Ad_Recall* were already found in the results of Hypothesis 1. Lastly, to establish indirect effects of *Ad_Percep* through the mediator *Ad_Recall*, we conducted a Bootstrap analysis.

H3a: M_Position (upper half) beneficially affects ad-attention.

H3b: ImageLeft has a moderating effect on the M_Position-Attention relationship.

These hypotheses involved multiple variables: *M_Position* (nominal), *ImageLeft* (binary), and *Ad_Recall* (interval). We also conducted two extra analyses for this model, substituting *M_Position* for the categorical variable *AdPart* (Left, Middle, Right) and binary variable *Upperhalf* (1 = message in upper half, 0 = in lower half).

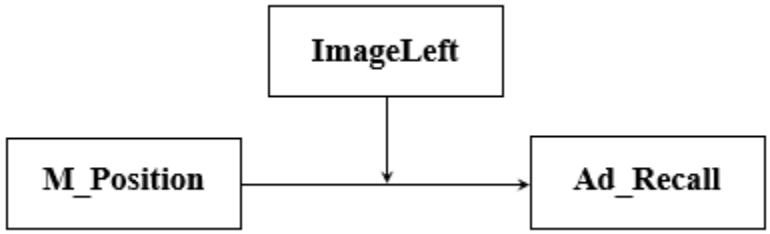


Figure 10 – Statistical model hypothesis 4

To find the effects of *M_Position* on *Ad_Recall*, we conducted a Kruskal-Wallis H test, the non-parametric alternative to the ANOVA. This test tells whether there are statistical differences between groups of the independent variable. We created an interaction variable *ImageLeftUpperhalf*, denoting messages positioned in the upper half with images on the left to establish a moderating effect.

H4: Positioning an ad message in the upper half positively impacts Ad_Percep.

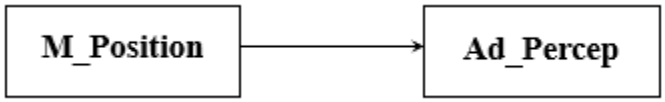


Figure 11 – Statistical model hypothesis 4

In this relationship, two variables are in play: *M_Position* and *Ad_Percep*. These variables are nominal (6 categories) and interval, respectively. To establish causation, we also employed a Kruskal-Wallis H test. Like previous analyses, we substituted *M_Position* with *Upperhalf* and *AdPart* to make new analyses.

3.2 Methods – Field survey

In addition, we executed a randomized field experiment in a natural environment. In itself, such an experiment is low on internal validity. However, it complements the findings of the online survey with its high external validity. Thus, it tells whether the results of the controlled experiment will hold in reality.

3.2.1 Experimental design

In this field experiment, potential direct effects of *M_Position* on *CTI* (as in the conceptual model) were tested. Since this experiment involved actual results, we changed the dependent variable into *Click.* A Facebook ad campaign was set up in collaboration with the Dutch B2C webshop SEED&eat (selling vegetable garden seeds). Similar to the online survey, we also used low-involvement products.

Again, eight different ads (and eight participant groups) on two elements: image (left, right) and message (6 options) positioning, existed. Thus, the model used two variables: *M_Position* (categorical) and *ImageLeft* (binary). Similar to the controlled experiment, two extra variables were created concerning the message position: *Upperhalf* (binary) and *AdPart* (categorical). We tested for differences between these groups, making *Click* a between-subjects variable.

Figure 12 – Ads field experiment Groups 1,2 and 3 (with grid) respectively (all ads in Exhibit XI)

Figure 13 – Heatmaps of all advertisements in the upper half (all heatmaps in Exhibit XII)

3.2.2. Sample

We extracted sample information and created the dataset using the Facebook dashboard. Every impression represented one participant. It was ensured that participants did not see the ad more than once, ensuring unique impressions. Based on the number of clicks in a specific group, we subsequently assigned a (binary) amount to a similar number of participants of the corresponding group. A total of 32,333 impressions were generated, being our sample size. These impressions gathered a total of 580 clicks, with an average CTR of 1.79% (Table 5).

Group	**Experimental Condition**	**Impressions (*n*)**	**Clicks**	**CTR**
Group 1	M_Position1 / Image Right	3,870	110	2.84%
Group 2	M_Position2 / Image Right	4,074	70	1.72%
Group 3	M_Position2 / Image Left	4,146	40	0.96%
Group 4	M_Position3 / Image Left	4,003	50	1.25%
Group 5	M_Position4 / Image Right	4,127	110	2.67%
Group 6	M_Position5 / Image Right	4,026	100	2.49%
Group 7	M_Position5 / Image Left	3,992	50	1.25%
Group 8	M_Position6 / Image Left	4,095	50	0.73%

Table 5 – Obtained Clicks and Impressions per Group

3.2.3 Materials

As said previously, we used the Facebook dashboard to create a dataset. Each impression represented a participant. The (binary) dependent variable included was *Click*. The independent variables all resulted from the interventions (*M_Position, Upperhalf, AdPart,* and *ImageLeft*)). For each of the three message positions, we generated a separate model.

Name	**Type**	**Scale**	**Measurement**
Click	DV	Binary	1 = clicked on ad, 0 = did not click
M_Position	IV	Categorical	One of six previously described positions
Upperhalf	IV	Binary	1 = message in the upper half, 0 = in lower half
AdPart	IV	Categorical	Message on the Left, Middle or Right
ImageLeft	IV	Binary	1 = image on the left, 0 = image on the right

Table 6 – All variables with associates scales and measurements

3.2.4 Procedure

To ensure a proper click-through rate, an existing audience with characteristics related to this company was selected. However, we ensured that no participant would see different versions of the same advertisement,

preventing double counts. For each group, we created a dataset with one row per participant. In the *Click* column, we filled in the appropriate amount of 1's per group.

3.2.5 Analysis

Effects on the binary dependent variable *Click* were analyzed by performing Logit analyses. The probability to click is modeled as a logit function of the independent and control variables, using the exponential of the likelihood to click.

In all models, the likelihood to click (*Click*) was the dependent variable. Three models were estimated:

1. To test for effects of *ImageLeft* and *M_Position*
2. To test for effects of *ImageLeft* and *Upperhalf*
3. To test for effects of *ImageLeft* and *AdPart*

Since no other variables of the conceptual model are measurable in this experiment, we decided to only test for direct effects of the input variables *ImageLeft* and *M_Position* (or *Upperhalf* or *AdPart*). Resulting in three statistical models:

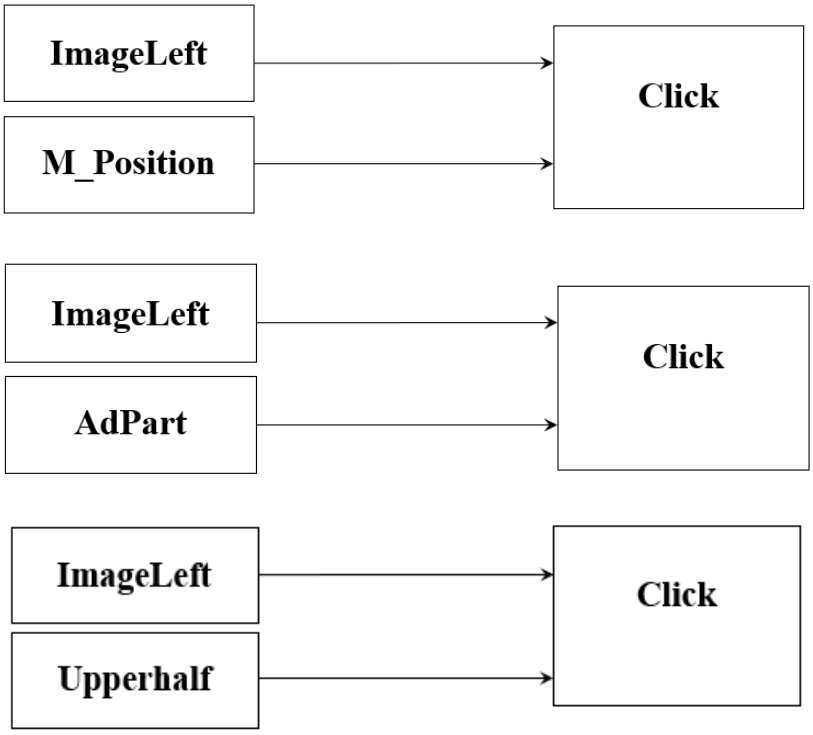


Figure 14 – Statistical models Field Experiment

4. Results – Controlled experiment

As said in the previous chapter, we tested all variables using a sample of 274 participants. The research question concerned the effects of message positioning on click-through intention (CTI). Overall, the average CTI coefficient was 0.2051. We divided this coefficient accordingly to get more insight into effects per message position (Table 7).

Message Position	Average CTI	STD CTI
1	0.2115	0.2736
2	0.1457	0.2307
3	0.3052	0.2977
4	0.2181	0.2729
5	0.2162	0.2658
6	0.15	0.2278

Upper half	Average CTI	STD CTI
1	0.2167	0.2730
0	0.1936	0.2556

Ad Part	Average CTI	STD CTI
Left	0.2147	0.2717
Middle	0.1802	0.2497
Right	0.2224	0.2726

Table 7 – Average CTI per (message) position (table)

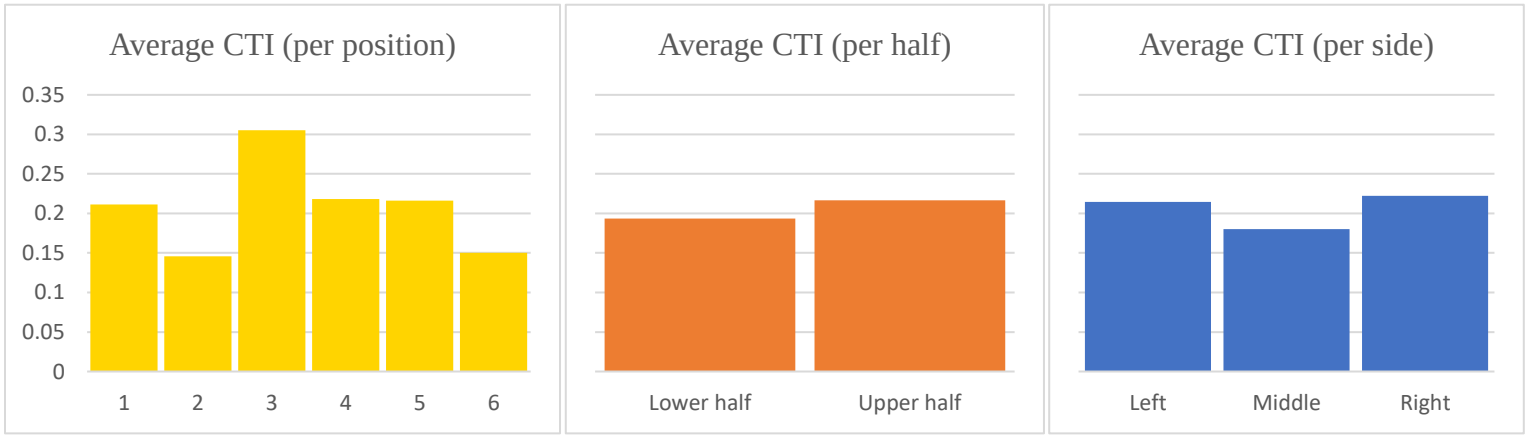


Figure 15 – Average CTI per (message) position (histogram)

From these figures, we see differences in click-through intention per position. Messages on position 3 (upper half, right side) have the highest CTI coefficients (0.3052). Based on previous studies, we expected position 2 to be most effective (upper half, middle). However, with a coefficient of 0.1457, it is the least effective message position, contradicting hypothesis 3. This hypothesis inferred favorable effects of the upper half and the middle part of an ad. We indeed see a higher average CTI for messages located in the upper half. However, compared to its two counterparts, the middle side of the ad has the lowest CTI

coefficients (0.1802). Whether attention plays a mediating role in this effect needs to be tested.

In both halves, approximately similar CTI coefficients are found (0.2167 and 0.1936). Since the distribution of averages is more volatile when looking per side, the side-dimension is potentially more influential in causing differences. However, the preference of the right side is mainly caused by the above-average CTI's of position 3. So, to test whether these differences stem from effects as proposed in the conceptual model, we ran several standardized linear regression models.

A full overview of the test results for regression assumptions can be found in Exhibit XIV. We see that all data meets the linearity, independence, and homoscedasticity assumptions. The results of the Shapiro Wilk test reveal that not all variables are normally distributed. The continuous/interval variables *CTI*, *Ad_Percep,* and *Pleasant* do not follow a normal distribution. Therefore, to safely conclude from the regression results, we conducted extra statistical tests. We distinguish position effects on three dimensions: message position (1-6), upper or lower half, and ad side (left, middle, right). To avoid inter-correlation each regression was executed three times, including one of the three variables.

All results are evaluated at a 5% significance level ($\alpha = 0.05$).

4.1 Hypothesis 1

In hypothesis 1 we investigated potential relationships between ad perception and ad recall. First, we ran a linear regression (DV = *Ad_Recall*). From this model we do not see a significant effect of *Ad_Percep* on *Ad_Recall* ($\beta = 0.136$, $p = 0.066$).

VARIABLES	Ad_Recall
Ad_Percep	0.136*
	(0.0734)
Constant	-0.793**
	(0.356)
Observations	274
R-squared	0.131

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8 – Relevant linear regression results Hypothesis 1 (Full results in Exhibits XVI))

However, since *Ad_Percep* violates the normality assumption, we conducted an additional test. Both variables fit the assumptions of a Spearman correlation. Therefore, we can safely use this test. The results indicate a significant positive relationship (P = 0.1967, $p = 0.0011$). The variables are not independent and thus related. Favorable ad perceptions lead to a better memorization of the ad.

4.2 Hypothesis 2

The second hypothesis centered around the direct and indirect effects of ad perception on the click-through intention. In this regard, ad recall served as a mediator. We reran the linear regression with *CTI* as the dependent variable (Table 9).

VARIABLES	(Positions) CTI	(Per half) CTI	(Per side) CTI
Ad_Recall	0.0131	0.0130	0.0148
	(0.0574)	(0.0556)	(0.0554)
Ad_Percep	0.308***	0.311***	0.309***
	(0.0713)	(0.0708)	(0.0709)
Constant	0.000527	0.240	0.272
	(0.371)	(0.229)	(0.252)
Observations	274	274	274
R-squared	0.327	0.317	0.320

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9 – Relevant linear regression results Hypothesis 2 (Full results in Exhibit XV)

From the regression results (Table 9) no significant effects of *Ad_Recall* on *CTI* can be found ($\beta = 0.0131$, $p = 0.820$). To validly test for causal effects, we executed a Spearman correlation. Assumptions of this test are monotonicity and paired observations. The latter meaning that the ad recall of participant 1 matches with the CTI of participant 1. This assumption is met along with the monotonicity assumption (Exhibit XIV). The spearman correlation does not reveal significant results ($P = 0.0720$, $p = 0.2346$) (Exhibit XV). Therefore, we cannot draw any significant conclusions about relationships between ad recall and click-through intention.

From Table 9 we do observe a significant positive effect of the variable *Ad_Percep* on *CTI* ($\beta = 0.308$, $p = 0.000$). We again employed an extra test in the form of a Spearman correlation. This test ($P = 0.4913$, $p = 0.000$) also shows a positive relationship between these two variables, which is in line with the linear regression results.

We found direct effects of ad perception on click-through intention. Previously, we also found direct effects on ad recall. Since we did not find significant effects of ad recall, there is not a high probability of a mediation role of ad recall. The bootstrap results (Exhibit XV) confirm this by showing no significant indirect effects of *Ad_Percep.* As such, we cannot conclude that ad recall is a mediator.

4.3 Hypothesis 3

In hypothesis 3, we investigated the relationship between *Ad_Recall* and *M_Position*. Looking at regression results in Exhibit XVI, we see significant positive relationships between ad recall and position 4 ($\beta = 0.457$, $p = 0.026$). For the other message positions, no significant effects are found. For the variables *AdPart* and *Upperhalf* insignificant effects are found. To test whether these effects are accurate, we conducted both a Kruskal-Wallis H and Wilcoxon test, of which the full output can be found in Exhibit XVI.

VARIABLES	(Positions) Ad_Recall	(Per half) Ad_Recall	(Per side) Ad_Recall	(Moderator) Ad_Recall
Message Position 2	0.351			
	(0.217)			
Message Position 3	0.409			
	(0.287)			
Message Position 4	0.457**			
	(0.204)			
Message Position 5	0.271			
	(0.235)			
Message Position 6	0.238			
	(0.281)			
Upperhalf		-0.0629		-0.219
		(0.120)		(0.174)
ImageLeft	0.00276	0.0633	-0.00804	-0.0913
	(0.197)	(0.117)	(0.194)	(0.171)
ImageLeftUpperhalf				0.308
				(0.244)
AdPart (Middle)			0.0985	
			(0.1780)	
AdPart (Right)			0.1158	
			(0.2452)	
Constant	-0.793**	-0.475	-0.531	-0.429
	(0.356)	(0.333)	(0.356)	(0.331)
Observations	274	274	274	274
R-squared	0.131	0.112	0.112	0.118

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10 – Relevant linear regression results Hypothesis 3 (Full results in Exhibits XVI)

A Kruskal Wallis H test showed that there were no significant differences in ad recall for the different message positions ($\chi^2 = 6.081$, $p = 0.2984$) and ad sides ($\chi^2 = 0.9053$, $p = 0.8985$). The Wilcoxon results also show no significant effects of *Upperhalf* and *Ad_Recall* ($z = -0.176$, $p = 0.8606$). Hence, we cannot make conclusions about the effects of message positioning on ad recall.

In the conceptual model, a moderating variable in the form of image placement was identified (H3b). We created the interaction variable *ImageLeftUpperhalf* and ran a regression with this moderator, *Upperhalf*, *ImageLeft*, and control variables (Exhibit XVI). From the regression results we do not observe significant results (($\beta = 0.308$, $p = 0.209$) for this moderator.

4.4 Hypothesis 4

In hypothesis 4 we investigated effects of message position on ad perception. From the standardized linear regression models (Exhibit XVII) we do not observe significant effects for all message positions. Substituting with the binary variable *Upperhalf* or *AdPart* neither provides significant effects ($\beta = 0.0538$, $p = 0.579$ and $\beta(\text{Middle}) = -0.0795 + p = 0.557$ and $\beta(\text{Right}) = 0.0855 + p = 0.683$ respectively).

VARIABLES	(1) Ad_Percep	(2) Ad_Percep	(3) Ad_Percep
Message Position 2	-0.0928		
	(0.172)		
Message Position 3	0.0858		
	(0.235)		
Message Position 4	-0.0658		
	(0.161)		
Message Position 5	-0.133		
	(0.165)		
Message Position 6	0.0225		
	(0.237)		
Upperhalf		0.0538	
		(0.0969)	
AdPart (Middle)			-0.0795
			(0.135)
AdPart (Right)			0.0855
			(0.209)
Constant	0.0598	-0.0714	0.00198
	(0.341)	(0.296)	(0.331)
Observations	274	274	274
R-squared	0.412	0.408	0.411

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11 – Relevant regression results Hypothesis 4 (Full results in Exhibits XVII)

The Kruskal-Wallis test results for the six positions do not show significant differences in ad perception per message position ($\chi^2 = 7.317$, $p = 0.1981$). The same holds for the Kruskal-Wallis results for the three ad parts ($\chi^2 = 1.258$, $p = 0.5330$). Lastly, results of the Wilcoxon test reveal no significant effects of *Upperhalf* ($z = -1.348$, $p = 0.1777$). The full statistical results can also be found in Exhibit XVII.

An overview of all test results substituted into the statistical models can be found in Exhibit XIX.

5. Results – Field experiment

As said previously, the field experiment involved a binary variable *Click* (1 = person clicked on ad, 0 = person did not click on ad). We conducted a logistic regression with *M_Position* (nominal) and *ImageLeft* (binary) as independent variables. Two extra models were generated by substituting *M_Position* for *Upperhalf* (binary) and *AdPart* (nominal).

5.1 Descriptive results

M_Position	**N**	***Clicks***	**CTR**
1	3760	110	2.93%
2	8110	110	1.36%
3	3953	50	1.26%
4	4017	110	2.74%
5	7868	150	1.91%
6	4045	50	1.24%

Upperhalf	**N**	***Clicks***	**CTR**
1	15,823	270	1.71%
0	15,930	310	1.95%

AdPart	**N**	***Clicks***	**CTR**
Left	7,997	220	2.75%
Middle	16,238	160	0.99%
Right	8,098	100	1.23%

Table 12 – Average CTR per (message) position (table)

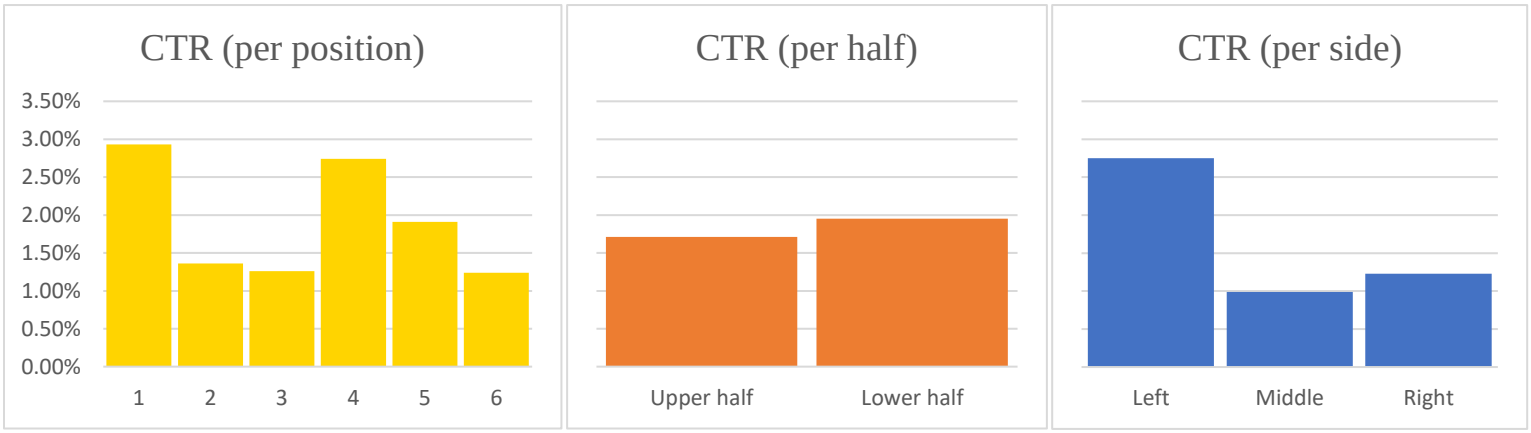


Figure 16 – Average CTR per (message) position (table)

The total sample size was 32,333 with an average CTR of 1.79%. From the descriptive statistics, we see that messages positioned on the left have a higher CTR (2.75%). Furthermore, messages located in the lower have a slightly higher CTR. We see corresponding effects at the specific message positions, with a high CTR of position 4 (2.74%). Position 1 (also located on the left) also has a high CTR (2.93%). Hence,

these results suggest positive effects of messages located on the left. However, to establish causality, a logistic regression is run.

The assumptions of a Logit model are: independent observations, absence of multicollinearity, and lack of strong influential outliers. From the test results (Exhibit XVIII), we see that these assumptions are met and that we can safely draw valid conclusions from the Logit models. We use a significance level of 5% ($\alpha = 0.05$).

5.2 Logistic regression results

VARIABLES	LOGIT 1 *Click*	LOGIT 2 *Click*	LOGIT 3 *Click*	PROBIT *Click*
Message Position 1			0.492***	0.200***
			(0.143)	(0.0585)
Message Position 3			0.302	0.116
			(0.193)	(0.0732)
Message Position 4			0.426***	0.172***
			(0.143)	(0.0582)
Message Position 5			0.337***	0.132***
			(0.127)	(0.0499)
Message Position 6			0.279	0.107
			(0.193)	(0.0731)
ImageLeft	-0.739***	-0.651***	-0.649***	-0.254***
	(0.0892)	(0.131)	(0.131)	(0.0509)
AdPart (Left)		0.277***		
		(0.103)		
AdPart (Right)		0.112		
		(0.146)		
Upperhalf	-0.126			
	(0.0841)			
Constant	-3.636***	-3.843***	-4.024***	-2.104***
	(0.0645)	(0.0775)	(0.106)	(0.0417)
Observations	32,333	32,333	32,333	32,333

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13 – Logistic regression coefficients for the field experiment

A total of four different logit models were run. To test for the reliability of the results, Model 3 was rerun using a Probit regression. Looking at its coefficients, we see consistency with the logit results. All findings show similar directions, while all remain their statistical significance. We leave the probit results out of the interpretation for the remainder of this chapter.

In all models, the Image placement was tested. We see negative significant effects of image positioning on the left ($\beta = -0.649$, $p = 0.000$).

The findings in Model 1 do not show significant results for messages located in the upper half

compared to the lower half (β = -0.126, p = 0.000). However, looking at the six message positions themselves (taking position 2 as a reference category), we see significant effects for some of them (Model 3). Message positions 1, 4, and 5 have positive significant effects on the likelihood-to-click (β = 0.492, β = 0.426, and β = 0.337 respectively). In the descriptive table, these three positions also have the highest CTR.

Looking at Model 2, we subsequently see favorable effects of the left-located messages. Taking the middle as a reference category, messages on the left side have significant positive effects (β = 0.277, p = 0.007) on the likelihood to click. Compared to messages located in the middle, left-located messages increase the likelihood to click by 0.277 units, ceteris paribus. In summary, these results lead to the following statistical models:

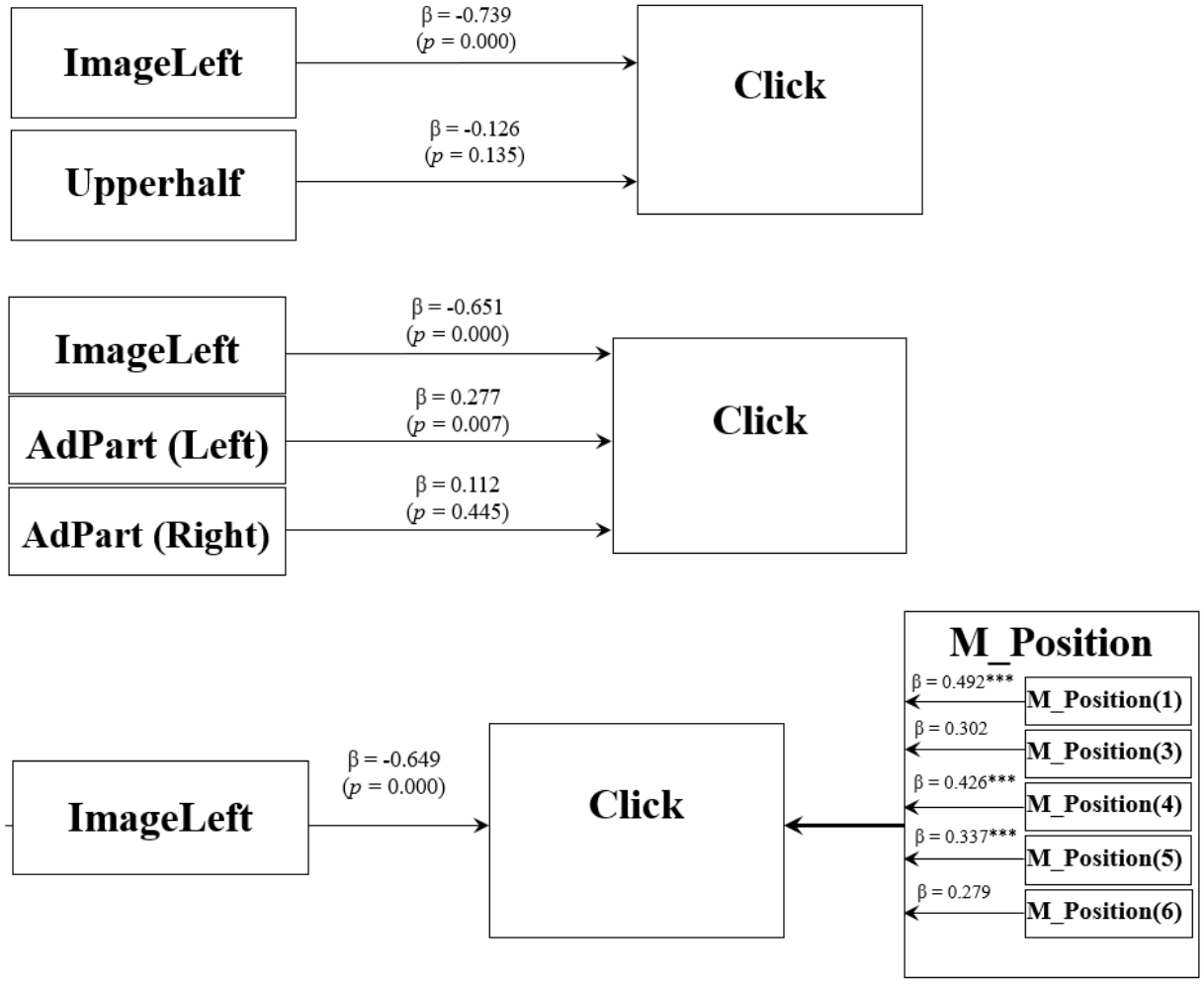


Figure 17 – Statistical models with logistic regression results.

6. Discussion

6.1 Key findings

In setting up online advertisement campaigns, marketers face a wide range of choices: e.g., target audience, message. One constant choice remains the ad design. By choosing the appropriate design, advertisers can convey their message correctly. One of these design choices involves element positioning. In this thesis, we investigated whether message positioning affects the effectiveness of social media ads. No evidence for this claim was found in the controlled experiment. In addition, we employed a field experiment. In this experiment, we found evidence of effects of both image and message positioning on the likelihood to click. Consequently, we reject some hypotheses and fail to reject others.

6.2 Effects of ad perception on attention

We found significant evidence in the controlled experiment supporting H1. Ad perception beneficially affects ad attention. Hence, we can reject its null hypothesis (no causal relationship).

In previous advertising studies, similar effects were found. According to Speck (1997), ad perceptions are the strongest predictors of ignoring advertisements. If an ad is not ignored, individuals are more likely to recall the ad, which is the attention measure of this thesis. Hervet et al. (2011) also couple ad perceptions and ad recall. Ferreira et al. (2017) found that ad perceptions are at the heart of ad-effectiveness on social media. However, a wide range of attention metrics exist. Thus, to increase the validity of the effects on ad attention, it is worthwhile to examine effects on other attention metrics.

In ad perceptions, Speck (1997) distinguishes between perceptions regarding the ad itself or advertising in general. Both concepts are intertwined, but perceptions regarding advertising in general are harder to influence since these involve overarching beliefs. In this study, we did not distinguish between them. For future studies, it can be worthwhile to examine potential differences between these two concepts.

6.3 (In)direct effects of ad perception on click-through intention (attention as mediator)

We found sufficient evidence in the controlled experiment for the role of ad perception in ad-effectiveness. We found that favorable ad perceptions positively affect click-through intention. Previously, we also found significant positive effects of ad perception on attention. However, since no significant effects of attention on CTI were found, we could not establish a mediating relationship. Hence, even though we found direct effects of ad perception, we did not find indirect effects with attention as a mediator. As such, we do not have sufficient evidence to draw conclusions and we fail to reject the null hypothesis (no relationships).

These inconclusive results do not follow current literature. Marketing studies have shown that increased attention leads to a higher likelihood to engage (Pelet & Papadopoulou, 2012; Jian & Jing, 2007). From a social media perspective, attention has also been a strong predictor of ad-effectiveness (Kuisma, 2015). Differences in click-likelihood between the three attention consumer segments (scanning, initial, and sustained attention) were observed (Wedel & Pieters, 2008). About the positive effects of attention, all

studies universally agree. Thus, to explain the discrepancy between our results and existing literature, we should look into the methodological choices made.

From a methodological perspective, other attention measures might have produced different results. Ad recall was used as a measure in this thesis since it captures in hindsight how well individuals paid attention. Due to the research circumstances, a multiple-choice-question scale was adopted, based on the scale of Pelet & Papadopoulou (2012). The original scale consisted of open-ended questions, after which researchers assigned a score. This metric eliminates the potential for guessing correctly. However, researcher bias is possible to occur. Original metrics of visual attention also refer to 'on-the-spot' attention compared to 'hindsight' attention. A solution would be to measure the number of times participants look at an ad. The gaze duration is closely related to visual attention. In addition, asking participants an open-ended memory question would strengthen the attention measurement. A preset scoreboard diminishes the potential for researcher bias.

In summary, since we found direct effects of ad perception on both attention and the click-through intention, indirect effects of ad perception possibly exist. This can be tested by using alternative attention metrics.

6.4 Effects of message positioning on ad-attention and the moderating effect of image positioning

In the controlled experiment, we did not find significant differences in ad attention for different message positions. Hence, we fail to reject the null hypothesis of H3a. These results contradict with studies of Chandon et al. (2009) and Leven (1991), both underlining the automatic visual focus on the middle of an ad. This raises the question of whether the results of studies on print advertisements also hold in a social media environment.

In this thesis, we did not focus on the effects of environmental surroundings but purely focused on the ad itself. Common consensus exists among marketing studies that a cluttered environment leads to ad avoidance (Ha & McCann, 2008; Lee & Sundar, 2002). In processing a cluttered webpage / social media page, individuals automatically filter out relevant objects. Advertisements are often not considered as relevant objects and thus automatically ignored. Ads blending into the environment and looking less 'ad-like' suffer less from this issue. However, when an ad is easily identifiable, individuals can automatically be less attentive. Positioning effects will then be less likely to occur.

A methodological choice of this thesis was to use one advertisement for hypothesis testing. Most of the previously cited attention studies use multiple advertisements to determine effects, thereby strengthening reliability of the results. In the field experiment, we did find a significant difference in clicks per message position. Messages located on the left side of the advertisement were more effective, somewhat contradicting visual attention studies and thus implying potential third factors to be in play. By testing multiple ads, researchers can examine the existence of these potential third factors. While examining these

factors, we should also reconsider the nature of the relationships in the conceptual model.

Because, contrary to the hypothesized, we found direct effects of image placement on the likelihood to click. Instead of a moderator, image placement is a causal variable in this relationship. Hence, evidence lacks to support H3b. We fail to reject its null hypothesis. Past studies do distinguish between image and message effects. According to Pieters et al. (2007), images serve as both attention-grabbers and perception-determiners. Consumers tend to look at the pictorial first. Ferreira et al. (2017) describe the importance of images on social media. They can serve to combat ad-blindness (the automatic ignorance of ads). On the other hand, text elements often serve as the last 'push' for consumers to act (Hussain et al., 2020). By embedding effective call-to-actions in the message, advertisers can nudge consumers into action.

Both Rosbergen et al. (2004) and Rayner et al. (2001) describe image and text processing as two different neurological processes. Whether these two processes (and associated effects) are sequential is debated (Rosbergen et al., 2004; Rayner et al., 2001). A causal relationship would reveal such sequential processing. In that case, it is helpful to look at the effects of image positioning on ad attention. Taking visual attention studies into account, the role of image positioning could be causal instead of moderating.

6.5 Effects of message positioning on ad-perception

Regarding the fourth hypothesis (H4), we found no significant effects. As such, we fail to reject its null hypothesis. We cannot make result-based conclusions.

Kurahashi et al. (2018) found that perceptions of pictorial advertisements are mainly affected by element-arrangement. Mueller (1987) and Gorn et al. (1997) also emphasize the favorable role of element positioning. In this thesis, we aimed to put focus on the message, using concepts of visual attention. Subsequently, we tested whether individuals would click or had changed perceptions. An important factor in the latter is the content of the message itself. Previously, we identified two message tones: emotional and rational (Mortimer et al., 2008). Emotional appeals play into the emotions of individuals, whereas rational appeals are rather informative. On average, emotional appeals are more effective in influencing consumers' ad perception (Hussain et al., 2020). Therefore, it is worth considering if changes in perceptions caused by the message stem from content rather than positioning.

Previous attention studies emphasize the favorable role of element positioning on ad perception, also involving other elements like images. On social media, it seems that images serve as both attention-grabbers and perception-determiners (Pieters et al., 2007). Thus, to form perceptions, consumers rely more on pictorial over text-based cues. Due to the separate processing of images and texts, the message can alter the initial perception caused by the image. This traces back to the previously described tone of voice. Nevertheless, ad design affects ad perception. If consumers perceive an ad to be styled unattractively, they will be less likely to have favorable ad perceptions. As a component of the whole layout-mix, message positions can still influence ad perceptions.

Summarized, based on the results and existing literature, we infer image positioning to be more influential in perceiving ads than expected beforehand. However, potentially message positioning has a moderating role through both message tone and as part of the general layout.

6.6 The conceptual model in review

In summary, we did not find enough evidence to reject all null hypotheses in the conceptual model. From the field experiment, we see favorable effects of message positioning on the click-through intention. However, for multiple hypothesized relationships, no significant evidence is found. It did become evident, however, that ad perception has a valuable role in ad-effectiveness. Also, multiple studies found effects of element positioning on ad perceptions. The results, however, do not provide sufficient evidence to claim that message positioning affects ad perception. In addition, we found direct effects of image positioning. So, all in all, we can question the nature of some hypothesized relationships. Future research should investigate the potential moderating nature of message positioning and causal nature of image positioning.

Secondly, since ad perception does not serve as a mediator for the effects of message positioning, another challenge in ad-design research is to identify the unknown mediating variable guiding the effects of message positioning.

6.6. Limitations

As in every study, this thesis also had its limitations. In particular, the main limitations were embedded in the available resources. The aim was to use visual attention results on social media ads. The most optimal form to test the conceptual model and control other variables would be in a lab experiment. Due to financial and practical reasons, this was not feasible. A lab experiment would also allow for greater technological capabilities. As such, we would have been able to test for multiple ads in the same timeline, expanding the scope of the experiment. This lack of resources forced us to distribute an online survey.

Using this survey, we were limited in our measurement for attention. The most suitable form was the ad-recall measure. In setting up the experiment, time-measurement (in seconds) was considered. However, it was only possible to measure time spent on the whole timeline. This would not have been an accurate measurement. We lacked both knowledge and resources to change this attention measurement. In future research, technologies should be used that measure the time spent on a particular ad in an entirely artificial environment (in this case: Facebook timeline).

Lastly, there were potential flaws in participant selection. Participants were mainly selected using Facebook groups, fitting our sample selection criteria. Virtually all participants had unknown identities to the researcher. Hence, participants could easily report unreal demographical data (e.g., age). Even though we believe almost all participants were young students, potentially some participants not fitting the sample criteria have not been adequately removed.

7. Conclusion

In this study, we examined potential effects of message positioning on the click-through intention of consumers. The controlled and field experiment produced contradictory answers to our research question. So additional studies are necessary that take third factors into account or use other attention metrics to establish coherency between these two experiments.

7.1 Academic implications

The objective of this thesis was to show the application of visual attention research insights without the need for expensive eye-tracking technologies like fMRI. This study showed differences in click-through rates per message position. Thus, showing the potential of element-repositioning on the likelihood to click. However, ambiguity about the causality of some factors still exists. Currently, most visual attention studies have been conducted on print advertisements. However, as concluded in the discussion chapter, the nature of the hypothesized relationships remains largely unknown in social media advertising.

Furthermore, this thesis has also shown the existence of potential third factors. Thus, future research can investigate which variables serve as mediators for message positions. In the discussion chapter, some recommendations about future studies were made. There is sufficient opportunity for future research on the topic of social ad design.

This thesis has shown the possibilities of merging controlled lab and natural field experiments. The topic of social media advertising is very suitable for this. However, the setup also had some drawbacks, as discussed in the previous chapter. Therefore, to overcome these drawbacks, we have designed two possible future experiments without the need for expensive technologies:

(1) In a lab setting, let participants scroll through and interact with a Facebook timeline for five minutes. Measure attention by counting the seconds participants gaze at an ad. Subsequently, ask them in hindsight how many elements they remember. This method measures attention in two ways: in hindsight and on-the-spot, thus providing a more complete attention measure. Furthermore, the lab/field combination is maintained but fitted in one experiment.

(2) Test for the actual effect of message positioning by keeping image placement constant. Thus, test for differences between messages within the same ad-part or -half. This way, the distinction between image and message placement can be made, and the causal or moderating nature can be identified.

These two experiments are examples of how other studies can elaborate the first glance into the application of visual attention findings on Facebook ads. In this study, we only took static Facebook ads into account. However, effects might differ for other types (e.g., videos) on other platforms.

7.2 Practical implications

In the first chapter of this thesis, we underlined the growing number of ads and decreasing attention span. As such, marketers face the challenge of creating more captivating and memorable advertisements.

This thesis has shown the successful implementation of neuroscience results in online marketing. In recent years, studies in the field of either neuromarketing or behavioral economics have rapidly increased. Marketers should not turn a blind eye to these findings since these can be beneficial for the outcomes of their campaigns. In marketing, practitioners always need to balance campaign effectiveness and costs. In online marketing, the ROAS (Return On Ad Spend) is closely watched. This coefficient denotes the return on each dollar spent. It is instrumental in determining the success of a campaign. Improving the ROAS can be done on different stages in the marketing funnel: the landing page can be altered, the campaign settings can be changed, etc.

However, the results of this study provide a starting point in improving this metric by editing the ad design. The advertisement itself is the starting point of the funnel. Using neuro-insights, the click-through rate can be improved, which allows for a higher number of consumers entering the marketing funnel. In that way, the conversion rate and subsequently the ROAS can be improved.

Advertisers should therefore anticipate changes in current practices. They need to make a shift in their train of thought regarding ad design. Instead of solely concerning about the content of ad elements, they should also concern about the arrangement of these elements. Even though there is much ambiguity about the exact effects, a coupling between online marketing and neuro-science shows beneficial effects for online ads. Marketers should therefore use this coupling to their benefit.

Bibliography

Amirshahi, S. A., Hayn-Leichsenring, G. U., Denzler, J., & Redies, C. (2014). Evaluating the rule of thirds in photographs and paintings. *Art & Perception*, *2*(1-2), 163-182.

Bentz, J. W. (2005). New Opportunities for Social Marketing: A Keynote Address by Daniel Yankelovich. *Social Marketing Quarterly*, *11*(3-4), 32-36.

Borji, A., Cheng, M. M., Hou, Q., Jiang, H., & Li, J. (2019). Salient object detection: A survey. *Computational visual media*, *5*(2), 117-150.

Chandon, P., & Ordabayeva, N. (2009). Supersize in one dimension, downsize in three dimensions: Effects of spatial dimensionality on size perceptions and preferences. *Journal of Marketing Research*, *46*(6), 739-753.

Clutch. (2017). *How Consumers View Advertising: 2017 Survey.* USA: Clutch.

Desmet, P. M., Vastenburg, M. H., & Romero, N. (2016). Mood measurement with Pick-A-Mood: review of current methods and design of a pictorial self-report scale. *Journal of Design Research*, *14*(3), 241-279.

De Souza, C. S., & Preece, J. (2004). A framework for analyzing and understanding online communities. Interacting with computers, 16(3), 579-610.

Duffy, S. A., Kambe, G., & Rayner, K. (2001). The effect of prior disambiguating context on the comprehension of ambiguous words: Evidence from eye movements.

Ferreira, C., Michaelidou, N., Moraes, C., & McGrath, M. (2017). Social media advertising: Factors influencing consumer ad avoidance. *Journal of Customer Behaviour*, *16*(2), 183-201.

Goldsmith, R. E., Lafferty, B. A., & Newell, S. J. (2000). The impact of corporate credibility and celebrity credibility on consumer reaction to advertisements and brands. *Journal of advertising*, *29*(3), 43-54.

Gorn, G. J., Chattopadhyay, A., Yi, T., & Dahl, D. W. (1997). Effects of color as an executional cue in advertising: They're in the shade. *Management science*, *43*(10), 1387-1400.

Gupta, R., Kishore, N., & Verma, D. P. S. (2015). Impact of celebrity endorsements on consumers' ad perception: a study of Indian consumers. *British Journal of Marketing Studies*, *3*(8), 34-49.

Ha, L., & McCann, K. (2008). An integrated model of advertising clutter in offline and online media. *International Journal of Advertising*, *27*(4), 569-592.

Hervet, G., Guérard, K., Tremblay, S., & Chtourou, M. S. (2011). Is banner blindness genuine? Eye tracking internet text advertising. *Applied cognitive psychology*, *25*(5), 708-716.

Higgins, E., Leinenger, M., & Rayner, K. (2014). Eye movements when viewing advertisements. *Frontiers in psychology*, *5*, 210.

Hong, J. W., & Zinkhan, G. M. (1995). Self-concept and advertising effectiveness: The influence of congruency, conspicuousness, and response mode. *Psychology & Marketing*, *12*(1), 53-77.

Hussain, A., Parvaiz, G. S., & Rehman, S. U. (2020). Advertising Appeals and Consumer's Buying Intention: The Role of Emotional and Rational Appeals. *Global Social Sciences Review*, *1*, 172-179.

Itti, Laurent, and Christof Koch. "Computational modelling of visual attention." *Nature reviews neuroscience* 2.3 (2001): 194-203.

Jian, L. U. O., & Jing, A. I. (2007). Mental Factors of Advertisement Design [J]. *Packaging Engineering*, *12*.

Knoll, J. (2016). Advertising in social media: a review of empirical evidence. International journal of Advertising, 35(2), 266-300.

Ko, H., Cho, C. H., & Roberts, M. S. (2005). Internet uses and gratifications: A structural equation model of interactive advertising. *Journal of advertising*, *34*(2), 57-70.

Krishnamurthy, S., & Dou, W. (2008). Note from special issue editors: Advertising with user-generated content: A framework and research agenda. Journal of Interactive Advertising, 8(2), 1-4.

Kuisma, J. (2015). Consumer perception of online advertising-the effects of animation, ad characteristics, repetition and task relevancy on attention and memory.

Kumar, V., & Gupta, S. (2016). Conceptualizing the evolution and future of advertising. *Journal of advertising*, *45*(3), 302-317.

Kurahashi, C., Misawa, T., & Yamashita, K. (2018). Evaluation of online advertisement design using near-infrared spectroscopy. *Sensors and Materials*, *30*(7), 1487-1497.

Larkin, Y. (2013). Brand perception, cash flow stability, and financial policy. *Journal of Financial Economics*, *110*(1), 232-253.

Leclerc, F., Schmitt, B. H., & Dubé, L. (1994). Foreign branding and its effects on product perceptions and attitudes. *Journal of marketing Research*, *31*(2), 263-270.

Lee, S. Y., & Sundar, S. S. (2002). Psychological effects of frequency and clutter in web advertising. In *52nd annual conference of the International Communication Association (ICA), Seoul, South Korea*.

Leven, W. (1991). Blickverhalten von Konsumenten: Grundlagen. *Messung und Anwendung in der Werbeforschung, Heidelberg*.

Lohtia, R., Donthu, N., & Hershberger, E. K. (2003). The impact of content and design elements on banner advertising click-through rates. Journal of advertising Research, 43(4), 410-418.

Lutz, R. J., MacKenzie, S. B., & Belch, G. E. (1983). Attitude toward the ad as a mediator of advertising effectiveness: Determinants and consequences. *ACR North American Advances*.

Mortimer, K. (2008). Identifying the components of effective service advertisements. *Journal of Services Marketing*.

Milosavljevic, M., & Cerf, M. (2008). First attention then intention: Insights from computational neuroscience of vision. International Journal of advertising, 27(3), 381-398.

Mueller, B. (1986). Reflections of Culture: An analysis of Japanese and American advertising appeals.

Pelet, J. É., & Papadopoulou, P. (2012). The effect of colors of e-commerce websites on consumer mood, memorization and buying intention. *European Journal of Information Systems*, *21*(4), 438-467.

Pieters, R., & Wedel, M. (2004). Attention capture and transfer in advertising: Brand, pictorial, and text-size effects. Journal of Marketing, 68(2), 36-50.

Puto, C. P., & Wells, W. D. (1984). Informational and transformational advertising: The differential effects of time. *ACR North American Advances*.

Rai, N. (2013). Impact of Advertising on Consumer behaviour and attitude with reference to consumer durables. *International Journal of Management Research and Business Strategy*, *2*(2), 74-79.

Rosbergen, E., Pieters, R., & Wedel, M. (1997). Visual attention to advertising: A segment-level analysis. Journal of consumer research, 24(3), 305-314.

Speck, P. S., & Elliott, M. T. (1997). Predictors of advertising avoidance in print and broadcast media. *Journal of Advertising*, *26*(3), 61-76.

Stafford, T. F., Stafford, M. R., & Schkade, L. L. (2004). Determining uses and gratifications for the Internet. *Decision sciences*, *35*(2), 259-288.

Subramanian, K. R. (2018). Myth and mystery of shrinking attention span. International Journal of Trend in Research and Development, 5(1).

Treistman, J., & Gregg, J. P. (1979). Visual, verbal, and sales responses to print ads. *Journal of Advertising Research*, *19*(4), 41-47.

Vakratsas, D., & Ambler, T. (1999). How advertising works: what do we really know? *Journal of marketing*, *63*(1), 26-43.

Voorveld, H. A., Van Noort, G., Muntinga, D. G., & Bronner, F. (2018). Engagement with social media and social media advertising: The differentiating role of platform type. *Journal of advertising*, *47*(1), 38-54.

Wedel, M. (2018). Improving ad interfaces with eye tracking.

Wedel, M., & Pieters, R. (2008). A review of eye-tracking research in marketing. Review of marketing research.

Appendices

Exhibit I - Study results of Verify International obtained from Pieters & Wedel (2008)

Figure 5.2 **Robyn Test Case Results: Initial Ad (Top) and Improved Ad (Bottom), With Same Editorial Counterpage; Regions of Interest (Rounded Boxes), and Fixation Points Superimposed**

Exhibit II – Scan path of 100 consumers on a car ad

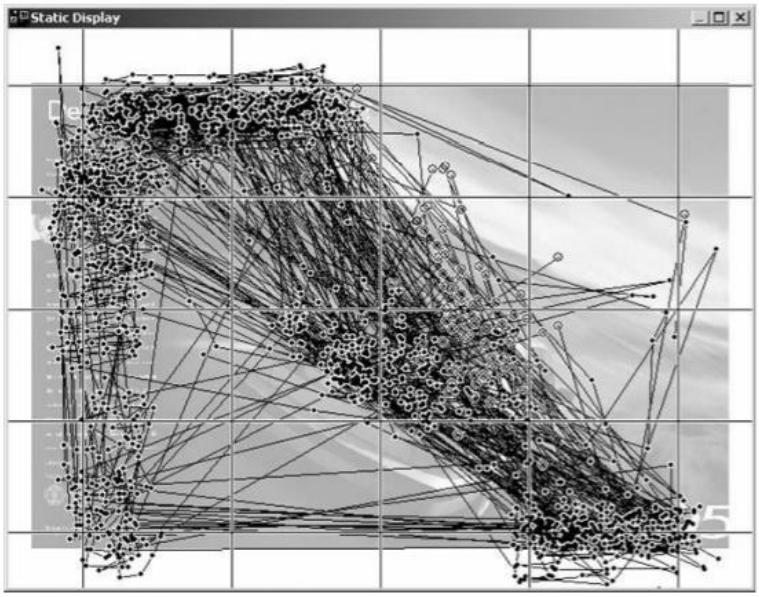


Exhibit III – Overview of all tested social advertisement versions (with grid)

Exhibit IV – Overview of all tested social advertisements (from left to right: Group 1 to 8)

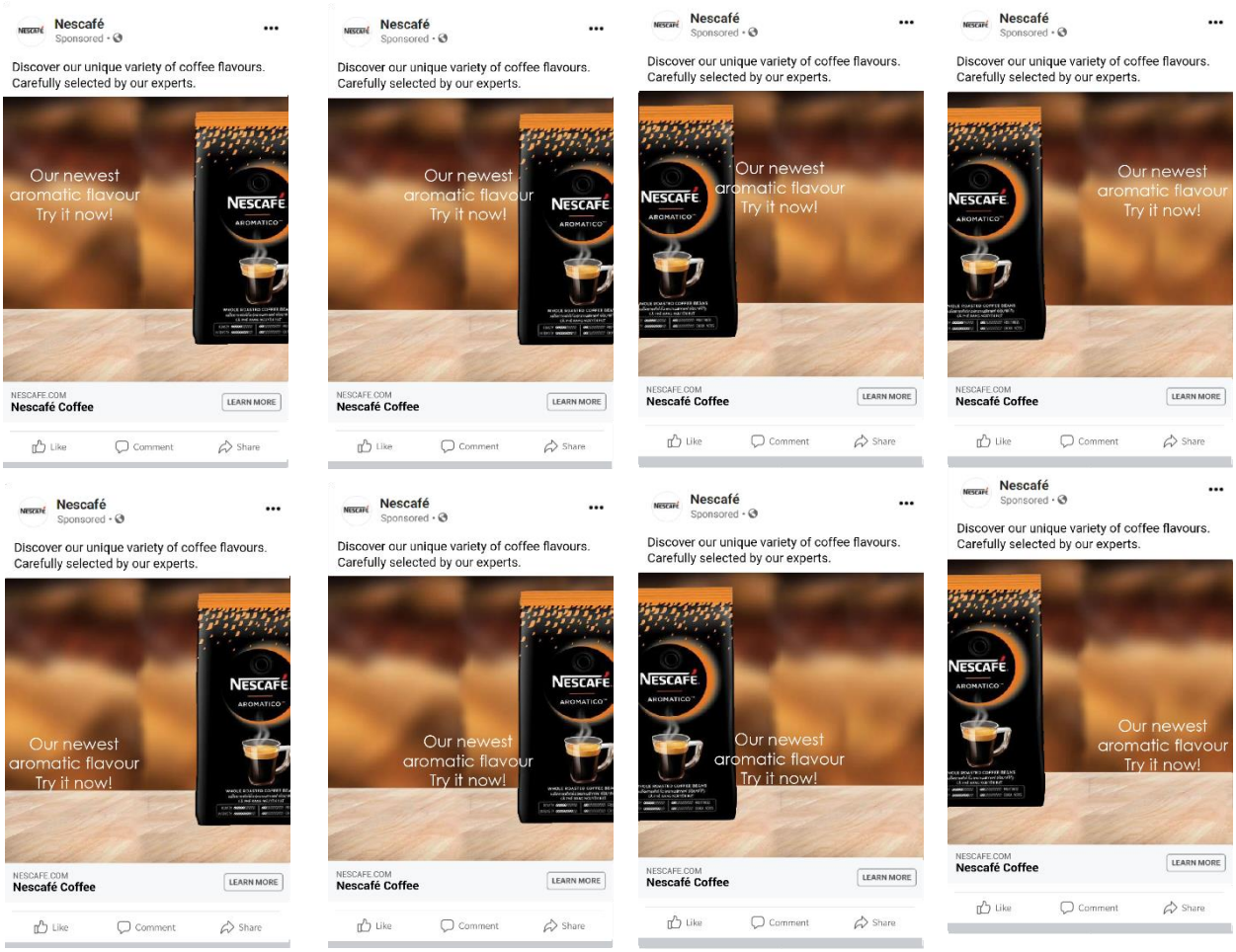


Exhibit V – All advertisements embedded in the tested Facebook timelines.

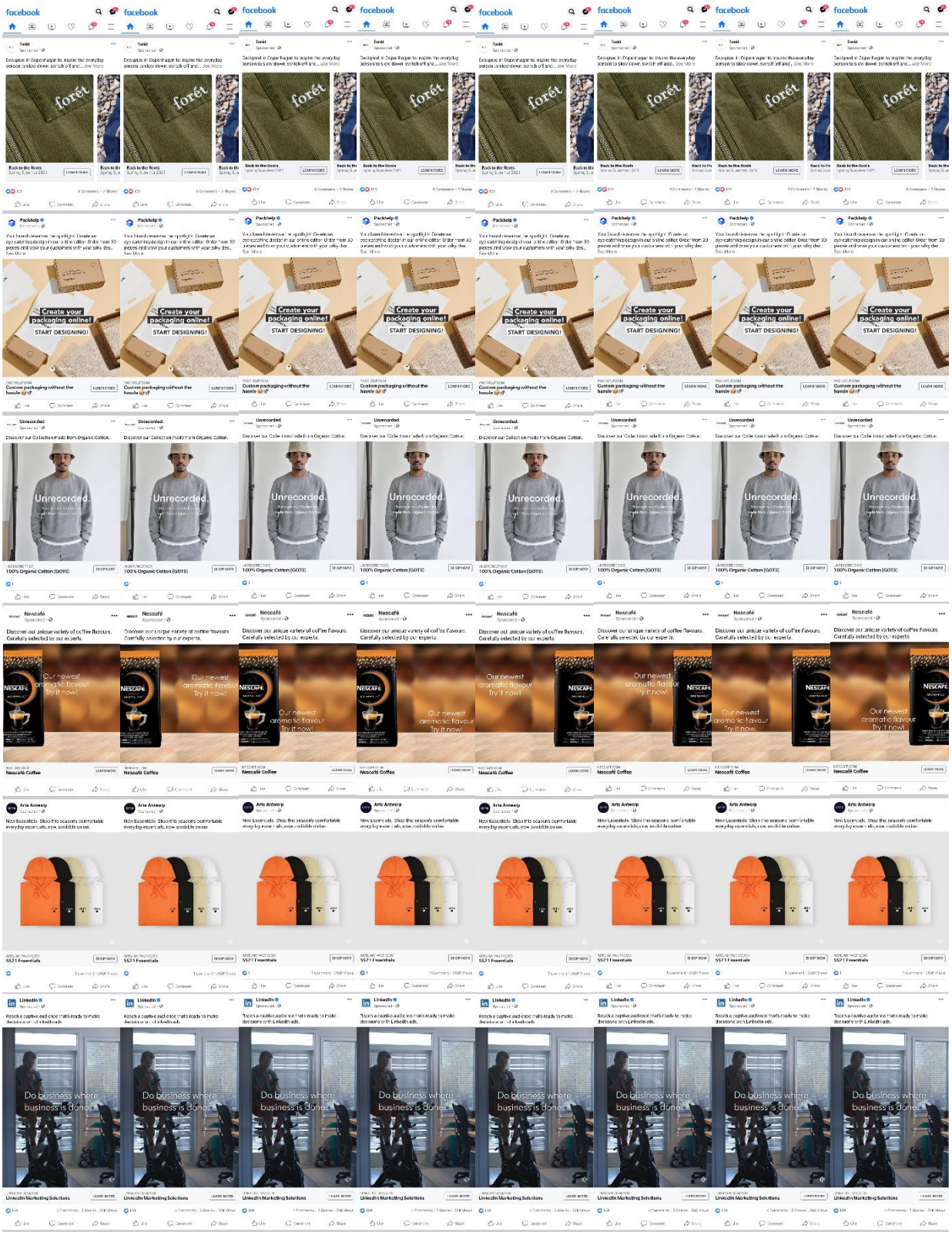


Exhibit VI – Manipulation check questions

Which of the advertisements you just saw, is altered according to you?

Did any of the ads below capture an above-average amount of your attention? If so, please select the applicable ad. If not, please select "none".

5-Point Likert Scale Questions:

The text on the advertisement is readable.

It took me a big effort to figure out the brand of the advertisement.

Please select 'Neutral'

The design of the timeline closely resembles an actual Facebook design.

Exhibit VII – Results Manipulation Check

Which of the advertisements you just saw, is altered according to you?	Freq.	Percent	Cum.
Arte Antwerp	3	25.00	25.00
Foret	2	16.67	41.67
Nescafé	1	8.33	50.00
None	1	8.33	58.33
Packing Help	2	16.67	75.00
Unrecorded	3	25.00	100.00
Total	12	100.00	

Did any of the ads below capture an above-average amount of your attention?	Freq.	Percent	Cum.
Arte Antwerp	3	25.00	25.00
Foret	1	8.33	33.33
Nescafé	3	25.00	58.33
None	1	8.33	66.67
Unrecorded	4	33.33	100.00
Total	12	100.00	

The text on the advertisement is readable	Freq.	Percent	Cum.
Totally Not Agree	0	0.00	0
Not Agree	1	8.33	8.33
Neutral	0	0.00	8.33
Agree	5	41.67	50.00
Totally Agree	6	50.00	100.00
Total	12	100.00	

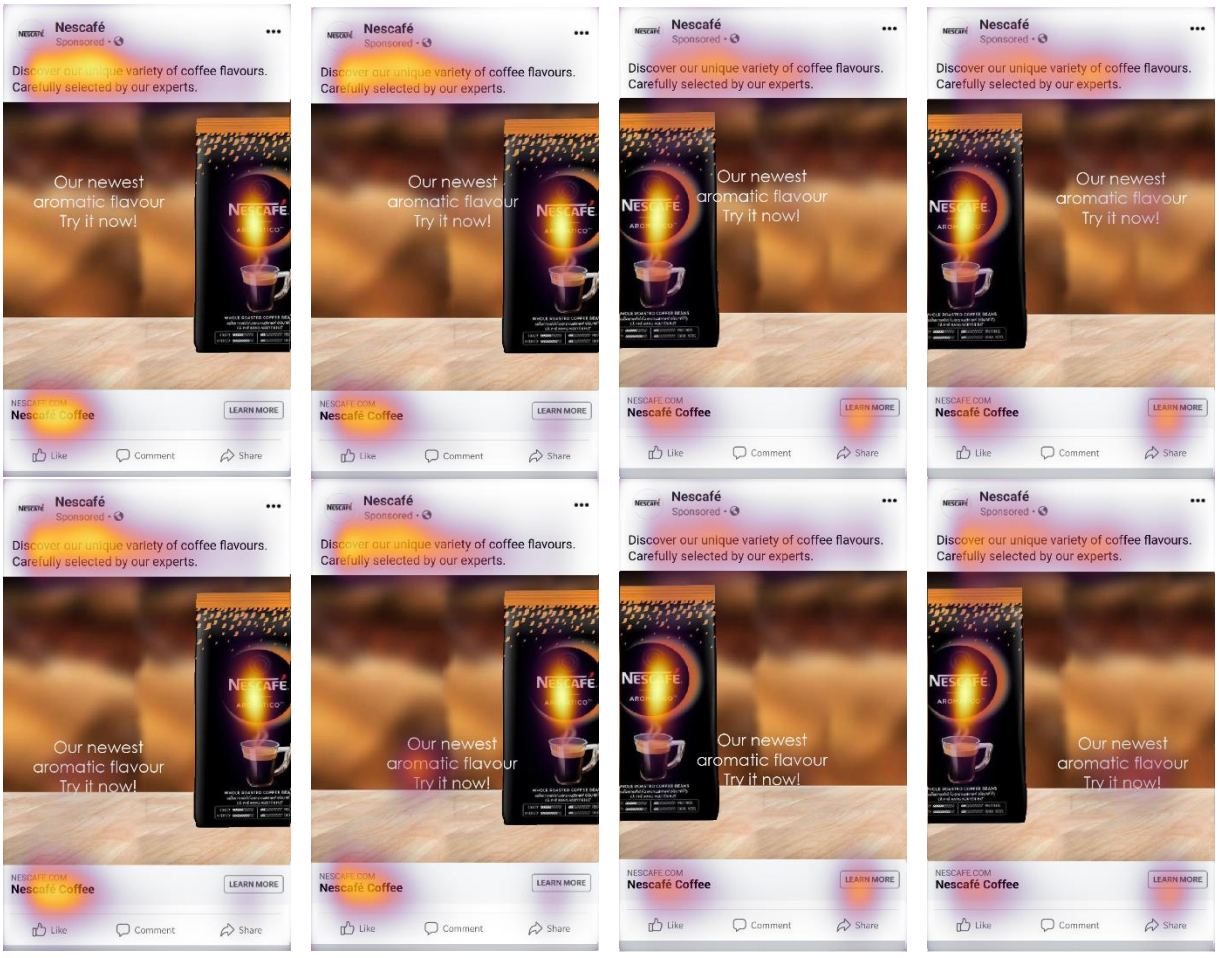
It took me a big effort to recognize the brand.	Freq.	Percent	Cum.
Totally Not Agree	6	50.00	50.00
Not Agree	3	25.00	75.00
Neutral	1	8.33	83.33
Agree	2	16.67	100.00
Totally Agree	0	0.00	100.00
Total	12	100.00	

The Timeline closely resembles a real Facebook timeline	Freq.	Percent	Cum.
Totally Not Agree	0	0.00	0.00
Not Agree	1	8.33	8.33
Neutral	1	8.33	16.67
Agree	6	50.00	66.67
Totally Agree	4	33.33	100.00
Total	12	100.00	

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CTI	19	.356	.368	0	.9
Ad_Recall	19	.684	.248	.25	1
Ad_Percep	19	3.564	.576	2.571	4.714
Product_Percep	19	3.544	.763	1.667	4.667
BrandImage	19	3	.546	2	4

Exhibit VIII – Eye-tracking results using predictive eye-tracking software.



Area of interest / Group	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Caption	0.258	0.254	0.233	0.231	0.252	0.24	0.229	0.235
Message	0.028	0.047	0.037	0.054	0.043	0.092	0.026	0.075
Image	0.23	0.243	0.298	0.277	0.233	0.236	0.30	0.279
Logo	0.142	0.131	0.162	0.151	0.147	0.14	0.163	0.163

Exhibit IX - GPower Size calculations:

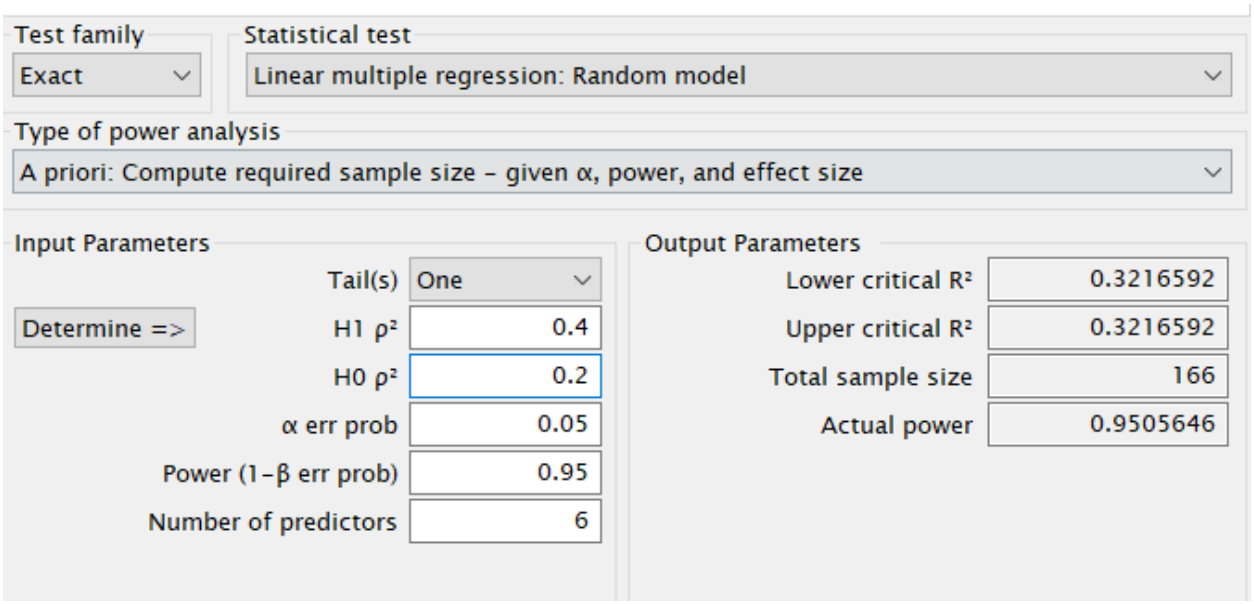


Exhibit X – Survey Outline

Introduction

You are invited to participate in this survey of this study about social media. Your participation in this study is completely **voluntary**. If you feel uncomfortable answering any questions, you can withdraw from the survey at any point.

All responses to this survey are **anonymous** and **confidential** and will be used for purposes of this research only.

This survey is conducted on behalf of the Erasmus School of Economics as part of the MSc. Thesis of J.J. Verboom.

If you have any questions about this survey, please email me: 445946jv@student.eur.nl.

The responses to this survey will be of importance for my thesis as a whole. Therefore, I want to kindly ask you to fill in the survey seriously. **Invalid responses** can be detected and will be left out. Filling in this survey will approximately cost 5 minutes.

Thank you very much for your time. Please start with the survey now by clicking on the button below.

I agree that all information provided in this survey can anonymously be used by the researcher (for research purposes only).

- Yes/No

Part 1 | Research-Related Questions

In this section, you will see an artificial Facebook timeline with advertisements.
Please scroll through the timeline as you would normally do on Facebook.
If you are not familiar with Facebook, you unfortunately cannot participate.

Are you familiar with using Facebook?

- Yes/No

Please scroll through this timeline as you would normally do.

(Image of Timeline, based on the participant group)

Ad Memory questions

Which of these products was featured in one of the ads you just saw?

- Tea, Orange Juice, Cola, Coffee (Multiple Choice)

What was the brand of the product of this ad?

- Nespresso, Sense, Nescafé, Lavazza (Multiple Choice)

Which of the following messages was displayed on the ad?

- Tasty coffee. Super delicious.
- Our newest aromatic flavor. Try it now!
- Coffee. Reinvented. Reimagined.
- Do you like coffee? We are too.

What was the caption of the ad?

- At Nescafé we always strive for the best. Both in our mission and our coffee.
- Our coffee is made of pure organic coffee beans. Coffee with a small footprint.

- Discover our unique variety of coffee flavors. Carefully selected by our experts.
- Now in store! New coffee flavors for sweet memories and beautiful moments.

CTI + Ad-perception questions

(Ad from the timeline is shown separately)

While scrolling through your Facebook timeline. You come across this advertisement.
On a scale from 0-100, how likely do you think you will be to click on 'learn more'? (0 means scrolling down for sure)

0 100

Please use the slider	

On a scale from 1-5, can you rate your opinion about the **advertisement** on the following attributes?

	1	2	3	4	5	
Bad	○	○	○	○	○	Good
Dislike	○	○	○	○	○	Like
Boring	○	○	○	○	○	Interesting
Uninformative	○	○	○	○	○	Informative
Unbelieveable	○	○	○	○	○	Believable
Not clear	○	○	○	○	○	Clear
Unconvincing	○	○	○	○	○	Convincing

Product Perception and Brand Image questions

The majority of questions have been asked. In this section questions regarding various topics are asked, which will take approximately 1-2 minutes.

(Picture of the product was shown separately)

Please rate your attitude towards this **product** on the following dimensions:

	1	2	3	4	5	
Like	○	○	○	○	○	Dislike
Not interesting	○	○	○	○	○	Interesting
Bad	○	○	○	○	○	Good

How much do you agree with these statements about Nescafé?

	None at all	A little	A moderate amount	A lot	A great deal
Nescafé is unique	○	○	○	○	○
Nescafé plays into my personal needs	○	○	○	○	○
Nescafé is trustworthy	○	○	○	○	○
Please select "A little"	○	○	○	○	○
I understand what Nescafé stands for	○	○	○	○	○

Part 2 | Socio-Demographic questions

Please select your age group:

- 18-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50+ (Multiple Choice)

How would you describe your gender?

▼ Male (1) ... Prefer not to say (4)

What is the highest degree or level of education you have completed?

- High school degree or equivalent
- Associate degree or equivalent
- Bachelor's degree
- Master's degree
- PHD
- Other

Can you select the picture most closely resembling your **current mood state**?

Exhibit XI – Social ads tested in the field experiment (with grid)

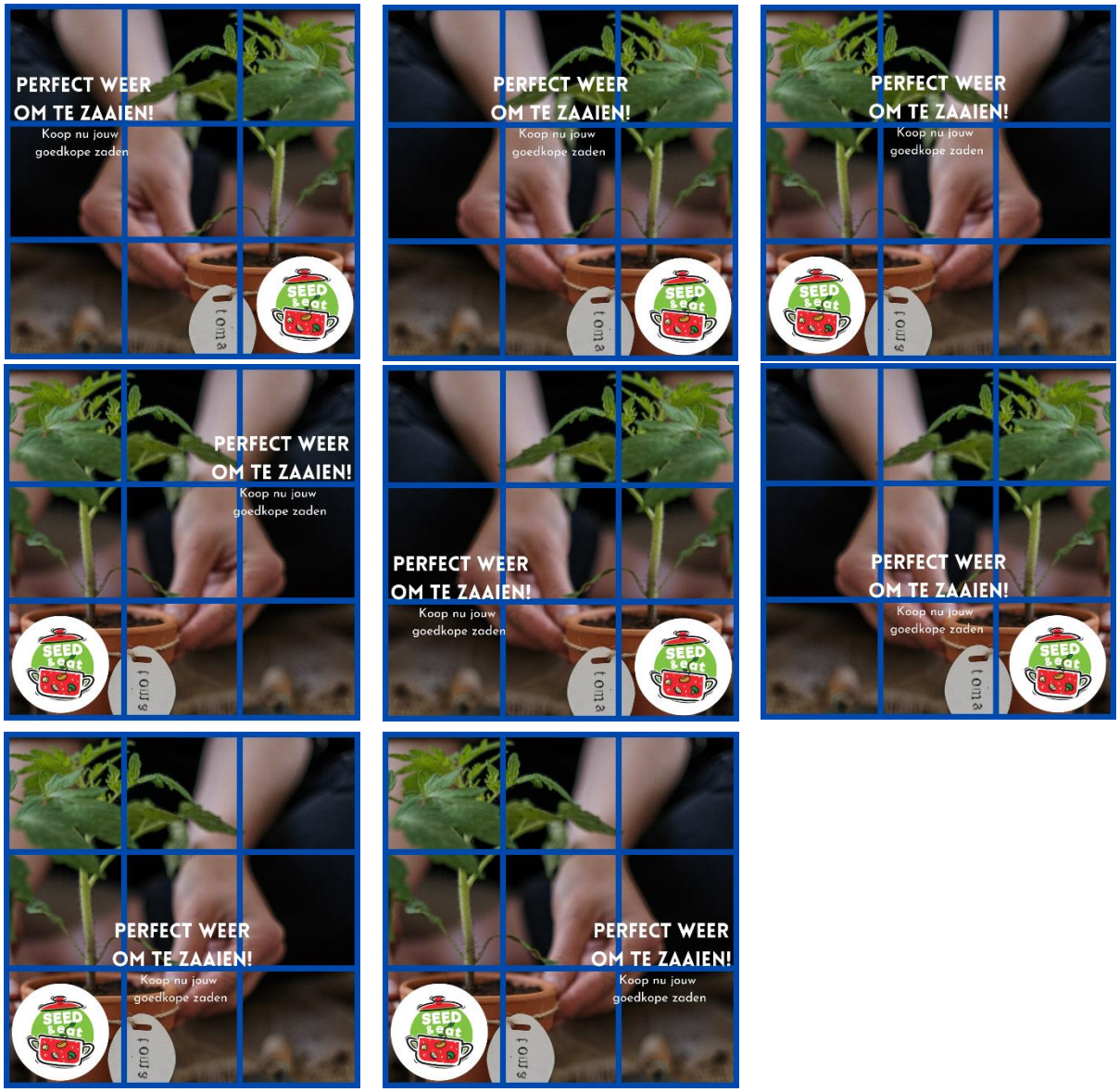
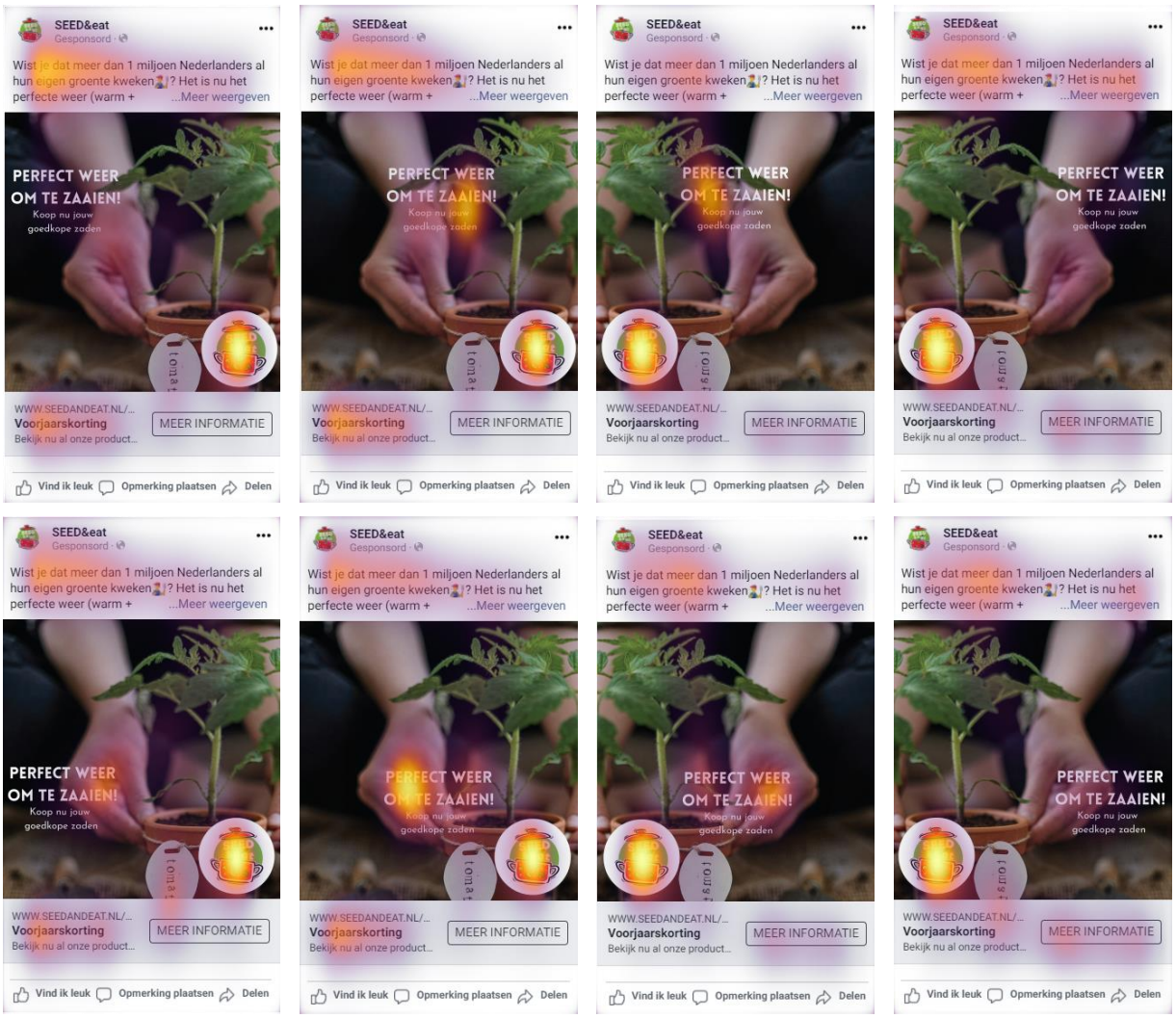


Exhibit XII – Eye-tracking results using predictive eye-tracking software for field experiment ads.

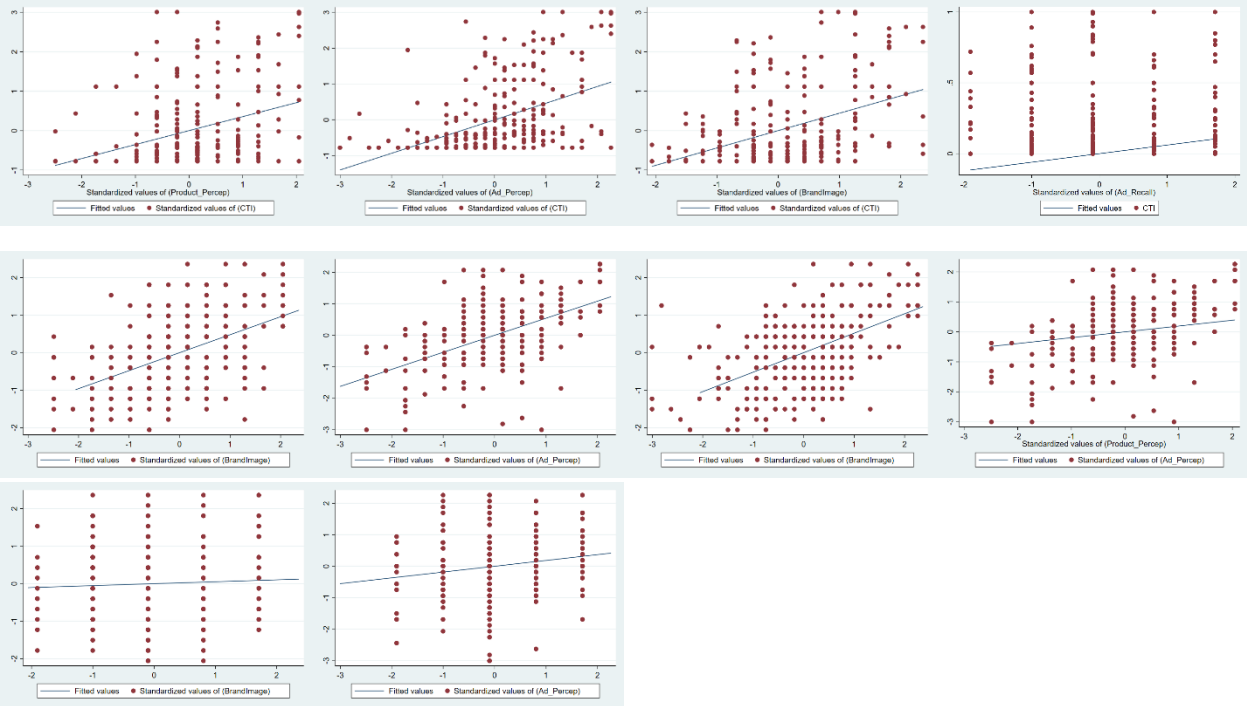


Area of interest / Group	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Caption	0.225	0.207	0.195	0.244	0.204	0.215	0.206	0.223
Message	0.093	0.181	0.166	0.072	0.105	0.206	0.184	0.085
Image	0.298	0.395	0.283	0.276	0.368	0.356	0.394	0.302
Logo	0.106	0.11	0.156	0.134	0.115	0.108	0.143	0.135

Exhibit XIII – Social ads field experiment (without grid)

Exhibit XIV – Linear regression assumptions test results

1) Linear relationships between all continuous variables



All continuous and interval variables have linear relationships.

2) Normally distributed variables -> Shapiro Wilkin test ($p < 0.005$, not normally distributed)

Variable	Z	Prob>z	Normally distributed?
Ad_Recallstd	-2.224	0.98691	Yes
CTIstd	8.083	0.00000	No
Product_Percepstd	-0.853	0.80320	Yes
Ad_Percepstd	2.000	0.02273	No
BrandImagestd	0.137	0.44532	Yes
Pleasant	3.467	0.00026	No

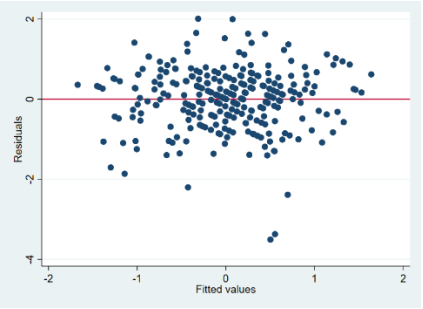
3) Independence of observations

Each row in the dataset corresponds with a different participant (observation). Since data have no time component, every observation stands on its own and cannot be affected by another observation.

4) Homoscedasticity

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	133.78	104	0.0262
Skewness	18.67	18	0.4122
Kurtosis	2.63	1	0.1051
Total	155.08	123	0.0267



The test suggests heteroskedasticity, closely associated with normality assumption). Combining this with the graph of residuals and fitted values, we assume homoscedastic data.

5) Multicollinearity – VIF Analysis

Variable	VIF	1/VIF
MessageCat		
1	4.07	0.245564
2	2.75	0.363649
3	2.03	0.492680
4	3.87	0.258474
5	2.50	0.399704
agecodes		
2	1.50	0.667648
3	1.20	0.830510
4	1.23	0.811517
Male	1.56	0.639215
EduCat		
2	34.96	0.028607
3	7.14	0.139978
4	17.61	0.056774
5	1.48	0.677493
6	1.53	0.654004
ImageLeft	6.09	0.164110
Ad_Recallstd	1.15	0.868628
Ad_Percepstd	1.72	0.581098
BrandImage~d	1.61	0.620274
Product_Pe~d	1.65	0.607055
Pleasant	7.12	0.140405
intercept	88.76	0.011266
Mean VIF	9.12	

Variable	VIF	1/VIF
MessageCat		
2	2.60	0.384572
3	3.86	0.258789
4	1.99	0.503261
5	2.73	0.366655
6	4.24	0.235970
agecodes		
2	1.50	0.667840
3	1.20	0.832798
4	1.23	0.811545
Male	1.52	0.656938
EduCat		
2	34.79	0.028741
3	7.10	0.140873
4	17.59	0.056859
5	1.48	0.677739
6	1.53	0.654788
ImageLeft	6.09	0.164110
Ad_Percepstd	1.70	0.588335
BrandImage~d	1.60	0.625597
Product_Pe~d	1.61	0.620072
Pleasant	7.06	0.141583
intercept	72.29	0.013834
Mean VIF	8.69	

Variable	VIF	1/VIF
MessageCat		
2	2.60	0.384960
3	3.86	0.258918
4	1.99	0.503548
5	2.72	0.367348
6	4.24	0.235979
agecodes		
2	1.49	0.669000
3	1.20	0.832806
4	1.23	0.812986
Male	1.50	0.665072
EduCat		
2	34.75	0.028776
3	7.08	0.141148
4	17.57	0.056900
5	1.47	0.679385
6	1.53	0.655256
ImageLeft	6.09	0.164200
BrandImage~d	1.41	0.708573
Product_Pe~d	1.38	0.723536
Pleasant	6.95	0.143895
intercept	72.28	0.013835
Mean VIF	9.02	

VIF Analyses for all three regressions with different Dependent Variables

(Moderate VIF-coefficient -> moderate multicollinearity. Caused by *EduCat*, no variable of interest so can consider no multicollinearity)

Exhibit XV – Linear regression + Spearman correlation results Hypothesis 2

VARIABLES	(1) CTIstd	(2) CTIstd	(3) CTIstd
Message Position 1	0.279		
	(0.234)		
Message Position 2	0.0272		
	(0.192)		
Message Position 3	0.237		
	(0.208)		
Message Position 4	0.267		
	(0.247)		
Message Position 5	0.210		
	(0.202)		
AgeCat (25-29)	0.219	0.197	0.196
	(0.138)	(0.136)	(0.136)
AgeCat (30-34)	0.0399	0.00161	0.0132
	(0.277)	(0.277)	(0.281)
AgeCat (35-39)	0.179	0.197	0.234
	(0.298)	(0.286)	(0.309)
Male	0.189	0.198	0.201
	(0.122)	(0.121)	(0.122)
EduCat (Bachelor)	-0.321	-0.337	-0.325
	(0.257)	(0.212)	(0.224)
EduCat (Highschool)	-0.177	-0.211	-0.195
	(0.294)	(0.255)	(0.258)
EduCat (Master)	-0.0878	-0.0907	-0.0718
	(0.262)	(0.212)	(0.230)
EduCat (Other)	-0.278	-0.246	-0.201
	(0.740)	(0.700)	(0.750)
EduCat (PHD)	-0.457	-0.390	-0.410
	(0.308)	(0.261)	(0.270)
ImageLeft	0.205	0.107	0.226
	(0.166)	(0.106)	(0.165)
Ad_Recallstd	0.0131	0.0130	0.0148
	(0.0574)	(0.0556)	(0.0554)
Ad_Percepstd	0.308***	0.311***	0.309***
	(0.0713)	(0.0708)	(0.0709)
BrandImagestd	0.257***	0.268***	0.266***
	(0.0645)	(0.0631)	(0.0639)
Product_Percepstd	0.0449	0.0540	0.0538
	(0.0671)	(0.0680)	(0.0670)
Pleasant	-0.0480	-0.0526	-0.0475
	(0.0376)	(0.0371)	(0.0369)
Upperhalf		0.0136	
		(0.110)	
ImageLeftUpperhalf			
AdPart (Middle)			-0.166
			(0.133)

AdPart (Right)			-0.183
			(0.211)
Constant	0.000527	0.240	0.272
	(0.371)	(0.229)	(0.252)
Observations	274	274	274
R-squared	0.327	0.317	0.320

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Spearman test results Hypothesis 2:

```
. spearman Ad_Recallstd CTIstd, pw stats(rho obs p) star(0.05)

 Number of obs =     274
Spearman's rho =       0.0720

Test of Ho: Ad_Recallstd and CTIstd are independent
    Prob > |t| =       0.2346
```

Spearman test results Hypothesis 2:

```
. spearman Ad_Percepstd CTIstd, pw stats(rho obs p) star(0.05)

 Number of obs =     274
Spearman's rho =       0.4913

Test of Ho: Ad_Percepstd and CTIstd are independent
    Prob > |t| =       0.0000
```

Bootstrap test results Hypothesis 2:

Direct effects

	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
Structural						
Ad_Recall						
Ad_Percep	.0671624	.0207366	3.24	0.001	.0265195	.1078054
CTI						
Ad_Recall	-.0249723	.0571044	-0.44	0.662	-.1368949	.0869503
Ad_Percep	.1637071	.0220834	7.41	0.000	.1204245	.2069897

Indirect effects

	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
Structural						
Ad_Recall						
Ad_Percep	0	(no path)				
CTI						
Ad_Recall	0	(no path)				
Ad_Percep	-.0016772	.0038654	-0.43	0.664	-.0092533	.0058989

Exhibit XVI – Linear regression + statistical test results hypotheses 1 + 3

VARIABLES	(2) Ad_Recallstd	(3) Ad_Recallstd	(5) Ad_Recallstd	(6) Ad_Recallstd
Message Position 2			0.351	
			(0.217)	
Message Position 3			0.409	
			(0.287)	
Message Position 4			0.457**	
			(0.204)	
Message Position 5			0.271	
			(0.235)	
Message Position 6			0.238	
			(0.281)	
AgeCat (25-29)	-0.0307	-0.0328	-0.0393	-0.0387
	(0.141)	(0.140)	(0.143)	(0.142)
AgeCat (30-34)	-0.188	-0.192	-0.229	-0.225
	(0.229)	(0.228)	(0.229)	(0.231)
AgeCat (35-39)	0.0568	0.0246	0.0380	0.0178
	(0.375)	(0.376)	(0.381)	(0.371)
Male	-0.328**	-0.329***	-0.341***	-0.338***
	(0.126)	(0.126)	(0.126)	(0.126)
EduCat (Bachelor)	0.438	0.402	0.493	0.485
	(0.310)	(0.316)	(0.307)	(0.307)
EduCat (Highschool)	0.558	0.506	0.620*	0.603
	(0.380)	(0.381)	(0.375)	(0.374)
EduCat (Master)	0.221	0.179	0.283	0.259
	(0.313)	(0.319)	(0.314)	(0.308)
EduCat (Other)	0.0837	0.0340	0.252	0.114
	(1.349)	(1.356)	(1.283)	(1.287)
EduCat (PHD)	-0.602	-0.661	-0.466	-0.523
	(0.998)	(1.004)	(1.136)	(1.048)
Ad_Percepstd	0.134*	0.132*	0.136*	0.137*
	(0.0737)	(0.0728)	(0.0734)	(0.0744)
BrandImagestd	-0.111	-0.111	-0.109	-0.113
	(0.0738)	(0.0738)	(0.0743)	(0.0740)
Product_Percepstd	0.190***	0.191***	0.173**	0.180***
	(0.0673)	(0.0672)	(0.0694)	(0.0687)
Pleasant	0.0694	0.0655	0.0648	0.0705
	(0.0427)	(0.0427)	(0.0427)	(0.0430)
Upperhalf	-0.0629			-0.219
	(0.120)			(0.174)
ImageLeft	0.0633	-0.00804	0.00276	-0.0913
	(0.117)	(0.194)	(0.197)	(0.171)
ImageLeftUpperhalf				0.308
				(0.244)
AdPart (Middle)		0.0985		
		(0.1780)		
AdPart (Right)		0.1158		
		(0.2452)		

Constant	-0.475	-0.531	-0.793**	-0.429
	(0.333)	(0.356)	(0.356)	(0.331)
Observations	274	274	274	274
R-squared	0.112	0.112	0.131	0.118

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Spearman test results Hypothesis 1:

```
. spearman Ad_Recallstd Ad_Percepstd, pw stats
> (rho obs p) star(0.05)

 Number of obs =     274
Spearman's rho =       0.1967

Test of Ho: Ad_Recallstd and Ad_Percepstd are
> independent
    Prob > |t| =       0.0011
```

Kruskal-Wallis H test results Hypothesis 3a:

Kruskal-Wallis equality-of-populations rank test

M_Posi~n	Obs	Rank Sum
1	46	5507.00
2	49	7240.50
3	42	6201.00
4	42	6371.00
5	47	6214.50
6	48	6141.00

chi-squared = 6.081 with 5 d.f.
probability = 0.2984

chi-squared with ties = 6.543 with 5 d.f.
probability = 0.2569

Kruskal-Wallis equality-of-populations rank test

AdPart	Obs	Rank Sum
Left	88	11878.00
Middle	96	13455.00
Right	90	12342.00

chi-squared = 0.199 with 2 d.f.
probability = 0.9053

chi-squared with ties = 0.214 with 2 d.f.
probability = 0.8985

Wilcoxon test results Hypothesis 3a:

```
. ranksum Ad_Recall, by(Upperhalf) porder

Two-sample Wilcoxon rank-sum (Mann-Whitney) test

   Upperhalf |       obs    rank sum    expected
-------------+---------------------------------
           0 |       137     18726.5     18837.5
           1 |       137     18948.5     18837.5
-------------+---------------------------------
    combined |       274       37675       37675

unadjusted variance    430122.92
adjustment for ties    -30332.83
                     ------------
adjusted variance      399790.09

Ho: Ad_Rec~l(Upperh~f==0) = Ad_Rec~l(Upperh~f==1)
             z =  -0.176
    Prob > |z| =   0.8606

P{Ad_Rec~l(Upperh~f==0) > Ad_Rec~l(Upperh~f==1)} = 0.494
```

Exhibit XVII – Linear regression + statistical test results hypothesis 4

VARIABLES	(1) Ad_Percepstd	(2) Ad_Percepstd	(3) Ad_Percepstd
Message Position 2	-0.0928		
	(0.172)		
Message Position 3	0.0858		
	(0.235)		
Message Position 4	-0.0658		
	(0.161)		
Message Position 5	-0.133		
	(0.165)		
Message Position 6	0.0225		
	(0.237)		
AgeCat (25-29)	0.0795	0.0866	0.0779
	(0.118)	(0.116)	(0.117)
AgeCat (30-34)	0.0110	0.00189	0.00831
	(0.341)	(0.344)	(0.345)
AgeCat (35-39)	-0.224	-0.201	-0.213
	(0.170)	(0.146)	(0.158)
Male	-0.186*	-0.184*	-0.187*
	(0.111)	(0.110)	(0.109)
EduCat (Bachelor)	-0.206	-0.163	-0.187
	(0.307)	(0.276)	(0.309)
EduCat (Highschool)	-0.281	-0.235	-0.251
	(0.331)	(0.302)	(0.332)
EduCat (Master)	-0.161	-0.103	-0.142
	(0.312)	(0.279)	(0.313)
EduCat (Other)	0.536	0.578*	0.565*

	(0.342)	(0.303)	(0.336)
EduCat (PHD)	0.296	0.388	0.347
	(0.352)	(0.334)	(0.338)
ImageLeft	-0.0621	-0.00830	-0.0636
	(0.171)	(0.0979)	(0.168)
BrandImagestd	0.332***	0.335***	0.334***
	(0.0539)	(0.0515)	(0.0519)
Product_Percepstd	0.368***	0.365***	0.370***
	(0.0576)	(0.0559)	(0.0565)
Pleasant	0.0738*	0.0723*	0.0757**
	(0.0378)	(0.0376)	(0.0374)
Upperhalf		0.0538	
		(0.0969)	
AdPart (Middle)			-0.0795
			(0.135)
AdPart (Right)			0.0855
			(0.209)
Constant	0.0598	-0.0714	0.00198
	(0.341)	(0.296)	(0.331)
Observations	274	274	274
R-squared	0.412	0.408	0.411

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Kruskal Wallis H test results Hypothesis 4:

Kruskal-Wallis equality-of-populations rank test

M_Posi~n	Obs	Rank Sum
1	46	6696.50
2	49	6295.00
3	42	6728.00
4	42	5960.00
5	47	6262.50
6	48	5733.00

chi-squared = 7.317 with 5 d.f.
probability = 0.1981

chi-squared with ties = 7.350 with 5 d.f.
probability = 0.1959

Kruskal-Wallis equality-of-populations rank test

AdPart	Obs	Rank Sum
Left	88	12656.50
Middle	96	12557.50
Right	90	12461.00

chi-squared = 1.258 with 2 d.f.
probability = 0.5330

chi-squared with ties = 1.264 with 2 d.f.
probability = 0.5315

Wilcoxon test results Hypothesis 4:

Two-sample Wilcoxon rank-sum (Mann-Whitney) test

Upperhalf	obs	rank sum	expected
0	137	17955.5	18837.5
1	137	19719.5	18837.5
combined	274	37675	37675

unadjusted variance 430122.92
adjustment for ties -1926.15
adjusted variance 428196.76

Ho: Ad_Per~d(Upperh~f==0) = Ad_Per~d(Upperh~f==1)
z = -1.348
Prob > |z| = 0.1777

P{Ad_Per~d(Upperh~f==0) > Ad_Per~d(Upperh~f==1)} = 0.453

Exhibit XVIII – Logistic regression assumptions

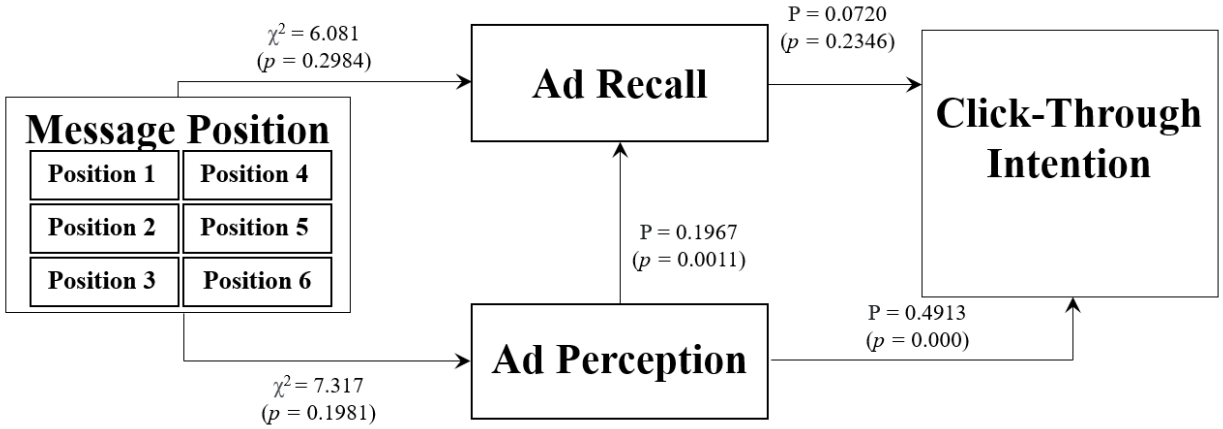
Variable	VIF	1/VIF
MessageCat		
1	1.00	1.000000
3	1.65	0.605750
4	1.00	1.000000
5	1.32	0.755771
6	1.67	0.600311
ImageLeft	2.64	0.378816
Mean VIF	1.55	

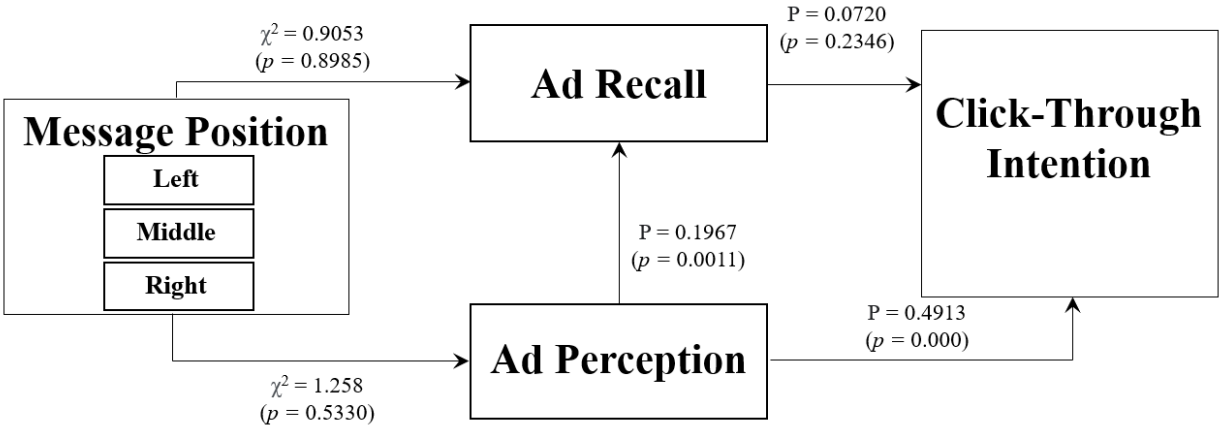
Variable	VIF	1/VIF
ImageLeft	1.34	0.745849
upperhalf	1.34	0.745849
Mean VIF	1.34	

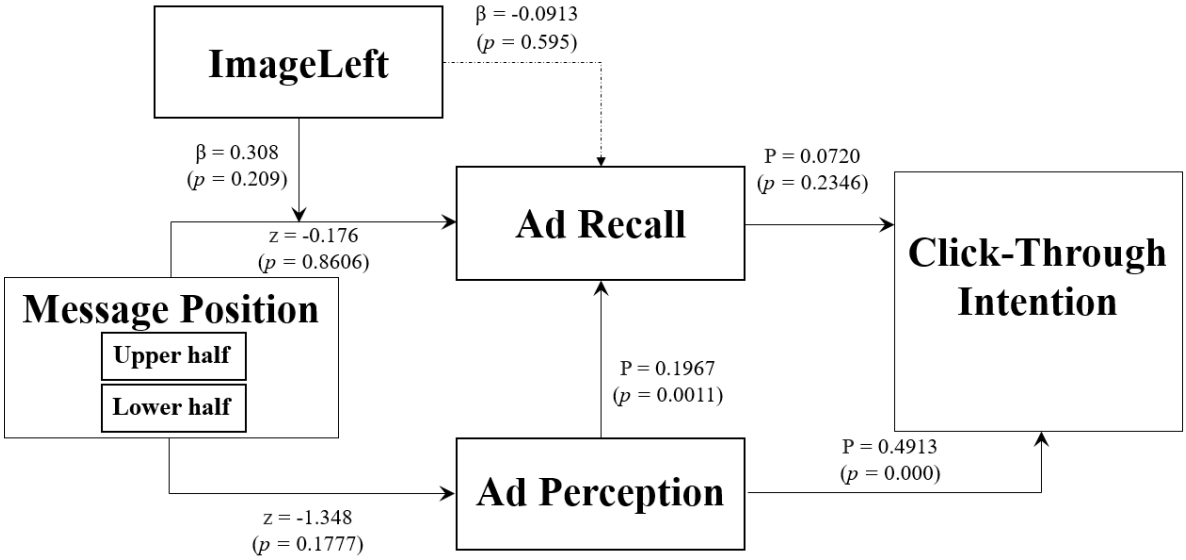
Variable	VIF	1/VIF
AdPart		
1	1.00	1.000000
3	2.00	0.501232
ImageLeft	2.00	0.501232
Mean VIF	1.66	

Low VIF-coefficients, so no multicollinearity.

Exhibit XIX – Conceptual model with statistical test results (three versions)




χ^2 = 0.9053
(p = 0.8985)
Ad Recall
P = 0.0720
(p = 0.2346)
Click-Through Intention
Message Position
Left
Middle
Right
P = 0.1967
(p = 0.0011)
P = 0.4913
(p = 0.000)
Ad Perception
χ^2 = 1.258
(p = 0.5330)


ImageLeft
β = -0.0913
(p = 0.595)
β = 0.308
(p = 0.209)
Ad Recall
P = 0.0720
(p = 0.2346)
Click-Through Intention
z = -0.176
(p = 0.8606)
Message Position
Upper half
Lower half
P = 0.1967
(p = 0.0011)
P = 0.4913
(p = 0.000)
Ad Perception
z = -1.348
(p = 0.1777)