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The Emotional Journey Towards Increased Consumer Involvement

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Abstract

This thesis takes point of departure within the field of consumer neuroscience, which has its origin in neuroscience, behavioural economics and social psychology (Genco, Pohlmann, & Steidl, 2013). The research field seeks to understand how emotions impact purchasing behaviour (Va, 2015). The purpose of this thesis is to investigate *how Trollbeads A/S can increase consumer involvement in their newsletters through measurements of emotions generated when exposed to these?"*

Trollbeads is chosen as case company, as the company finds it challenging to reach its' 20-30 year old female segment effectively. 'Consumer involvement' is defined as a company's ability to trigger the motivational factors influencing consumer behaviour and loyalty towards a certain brand (Beatty, Kahle, & Homer, 1988). Emotions are measured through proxies of visual attention. Eye-tracking is selected as neuroscientific research method in the experiment, based on methodological inspiration from earlier studies by Va (2015) and Holmqvist (2011). The thesis focuses on online newsletters as this touch point enables continuous interaction between the company and its' consumers and thereby a way to increase consumer involvement (Maslowska, Putte, & Smit, 2011).

The theoretical framework for this thesis is a combined model, based on the *Moment of Truth* (MOT) theory (Lecinski, 2011) and the personalization process (Vesanen & Raulas, 2006). The MOT theory explains interactions and interdependencies among a company's touch points and its consumers, and the personalization process is used as analytical framework, since it enables a narrow focus on a single touch point, online newsletters. The innovation sweet-spot model (Genco, Pohlmann, & Steidl, 2013) is used to illustrate key findings from the experiment. The main finding is that seeing images that trigger emotional arousal increases consumer involvement. The conclusion is that measurements of emotions can be used as a tool to improve marketing content to increase consumer involvement.

Through the implications it is explained how Trollbeads A/S can explore the consumer data generated on their website as well as how significant consumer insights could be retained by measuring emotions. It has thereby provided an understanding of the importance of personalized marketing content in order to increase consumer involvement.

This thesis adds relevant findings to the pool of knowledge within consumer neuroscience, it is still a relatively new field of study and has a multitude of topics that still needs to be explored in order to increase the overall understanding of how neuroscience can complement existing research methods to understand consumer behaviour and preferences.

Key Words: Emotions, Marketing, Eye-tracking, Newsletter, Consumer Neuroscience, Consumer Behaviour

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Acknowledgement

Trollbeads A/S

I would like to thank Trollbeads A/S for letting me use them as a case company and providing me with data whenever I was in need. Furthermore, I would like to thank Trollbeads A/S for lending me 8 physical beads, which made my experiment more valid and reliable. I hope you will enjoy reading this thesis that attempts to bring you insights into how to use measurements of emotions in order to obtain improve marketing content and consumer involvement.

Adam James Hommel Varab

Thank you Adam for your indispensable patience each time I changed my mind with regards to your drawings. Please be aware that your drawings have increased the validity of the findings and made the performed experiment possible.

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Abbreviations and Terms

In order to ensure the reader's understanding of the terms used throughout this thesis, a list of abbreviations and terms has been provided below.

AOI: Area of Interest counts the included areas analysed throughout the eye-tracking experiment

Biased: Test subjects who have been exposed to images prior to the experiment

Calibration: The eye-tracker measuring characteristics of the test subject's eyes and thereby calculate gaze data

Consumer involvement: A company's ability to trigger motivational factors influencing consumer behaviour and brand loyalty

Emotional arousal: A stat of heightened physiological activity, triggered through one of our senses: Smell, hearing, sight etc.

Eye-tracking: A physiological neuroscience research method measuring visual attention

Fixation: Retention of the gaze in a constant direction

FMOT: First Moment of Truth counting the purchase of a product/service

Marketing content: Counting messages and images presented in marketing

Marketing initiatives: Implemented marketing content, counting messages, images and campaigns

MOT: Moment of Truth indicates the touch points between consumer and company in a potential purchase situation

Number of fixation points: The amount of times the gaze has entered an AOI

Online communication content: Ways to communicate advertisement through online channels such as Internet: E-mail, social networks etc.

Saccades: A quick eye movement between two or more AOIs

SMOT: Second Moment of Truth counting for the experience of the purchased product

Stimuli: A product, message, advertisement, image, happening; everything that trigger your motivation towards a search process/purchase

Time to first fixation: The start time of first fixation to enter an AOI

Total duration fixation: The total amount of time a fixation has been constant to an AOI

Trial 1: Contains the survey used to bias test subjects, involving images of original design Trollbeads: Fish, rabbit, sheep and turtle

Trial 2: Contains animal drawings related to the original designed Trollbeads

Trial 3: Contains images of original designed animal beads made by Trollbeads

Trial 4: Contains the simulated purchase situation presenting original Trollbeads

Unbiased: Test subjects who have NOT been exposed to images of beads prior to the experiment

Visual attention: A cognitive process selecting or filtering information from visual scenes

ZMOT: Zero Moment of Truth counting the online touch point between a company and the consumer

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1. Introduction – The Journey Towards Consumer Involvement

Over the last decades there has been a tremendous development in the way companies exploit marketing. Many of the traditional marketing tools and research methods, such as surveys and focus groups have been challenged as new neuroscientific methods have presented marketers with more efficient ways of taking advantage of marketing initiatives (Va, 2015). This progress is partially driven by technological development as well as an acknowledgment amongst consumer experts that consumers are less rational and more influenced by emotions in their decision-making process (Weber & Johnson, 2009). This acknowledgement has come about as it has been illustrated that consumers are relying on both internal and external search, such as emotions, memory and product information, when making consumer choices (Ibid).

The recognition of the importance of emotions generated with regards to decisions has led to an investigation of the advantages gained by connecting with consumers' emotions. It has been found that the amount of end-users and thereby also sales increase when an emotional bond is made (Magids, Zorfas, & Leemon, 2015). Corporations are therefore doing their utmost in order to differentiate themselves in marketing initiatives hoping that they will draw consumers' attention and arouse positive emotions towards their respective brand (Ibid). Relying on the individuality of consumer preferences, one could question how companies ensure that their marketing initiatives arouse the right memories and/or emotions for each and every consumer in order to obtain increased consumer involvement.

In order to properly understand the starting point of the investigated research question, a deeper understanding of the development within consumer neuroscience and technology must be obtained. Below sections will therefore provide this, by thoroughly explain the leverage of consumer neuroscience and evolution of digitalisation.

1.1 - Leveraging Consumer Neuroscience

Today companies are often using self-reporting satisfaction surveys and focus groups in order to determine how and where to improve marketing initiatives and thereby increase consumer involvement.

Studies initiate that consumer statements typically differ from their actual brand choice and descriptions of emotions (Krajbich & Smith, 2015a; Va, 2015) as they may not even be aware of them (Magids et al., 2015; Va, 2015). This contradiction is not something consumers do deliberately – it simply occurs due to brain activities in the unconscious level because emotions do not only operate within our consciousness, but also as automatic reactions and biases (Genco et al., 2013). This gap between statement and reality adds complexity for companies to know in which direction to go in order to ensure effective marketing initiatives eliciting the right memories and/or emotions.

As the gap between consumers' statement and reality is one of the fundamental dilemmas of traditional market research(Genco et al., 2013; Va, 2015), the concept of consumer neuroscience has emerged. The leveraging of consumer neuroscience is an attempt to illustrate the emotional impacts on buying behaviour (Va, 2015) and thereby close the gap between statements and consumer actions. Consumer neuroscience is originated from neuroscience, behavioural economics and social psychology (Genco et al., 2013) and provides companies with the opportunity of getting a deeper and more fact based understanding of consumer behaviour(Robu, 2013; Va, 2015).

By bringing brain science into the world of consumer behaviour, consumer neuroscience tries to indicate the generated emotions and responses to advertising stimuli by decoding sensory signals from the brain (Va, 2015).

Therefore, by using different neuroscience methods allow companies to get insights into consumers' conscious and unconscious levels of thoughts (Genco et al., 2013; Va, 2015). Measurements of these physiological and neurological reactions evoked when being exposed to marketing content will provide insights to the levels of thoughts that are engaged in the decision-making process (Ibid). By understanding the development within consumer neuroscience and how to use it, this can provide companies with insights into how to target consumers in order to evoke emotions and increase consumer involvement.

However, one cannot neglect the importance of technology and how our society today are driving towards digitalization (Danmarks Statistik, 2015; Va, 2015). Below section will therefore provide an overview the technological development within consumer behaviour.

1.2 - Driving Towards Digital

The growing interest in consumer behaviour and the evolution within both technology and brain science studies have led to a new mental model in marketing, counting the online interaction between companies and consumers throughout the purchase process (Lecinski, 2011).

Over the last decades there has been a tremendous increase in the usage of the Internet. In 1995 less than 1% of the world's population had an Internet connection, today that number counts 46.1% (Internet Live Stats, 2016). Focusing on the Danish marked 82% of the entire Danish population is using the Internet almost every day, counting people within the age of 16-74 years (Danmarks Statistik, 2015). Based on these statistics a shift towards digitalisation is indicated and it must be assumed that companies not bidding into this "new" media will lose out on potential growth opportunities. This is further supported as 79% of the user group between the age 16-74 uses the Internet for product/service search (Ibid). This leaves the online touch points between companies and consumers vital in with regards to future increased consumer involvement.

Companies are therefore changing their marketing distribution channels from offline- to online media and with today's web-based technologies, it has given them opportunities to move towards the use of viral marketing approaches, counting: Advertisement, files and videos (Va, 2015). With the technological development, software now provides marketers the opportunity to track users' browsing behaviour and information, such as names, addresses and product search. The data and virtual footprints are gathered and analysed through "cookies" which are stored on the users' devices: Computer, tablet or smart phone, each time he or she is using online sites (Bang & Wojdynski, 2016). By the new found opportunity to track and store consumer data, companies are now able to generate more direct marketing content, targeting consumers individually with communication initiatives, which are sought with the change in consumer behaviour.

Above introduction illustrates how previous research has already explored that using neuroscience methods within marketing brings a lot of advantages to marketers based on consumer insights.

However, due to the early stage of development, the field of consumer neuroscience is still left with numerous unexplored areas. As a researcher, my goal is to explore the unexplored and fill out the missing parts in present research. It has been observed that no earlier studies contain the use of eye-tracking testing if and how the Danish jewellery industry can gain advantages of neuroscientific measures in order to implement personalized marketing and thereby obtain increased consumer involvement.

This thesis is therefore based on a case study examining if and how measurements of emotions, found by visual attention, can be used in with regards improve marketing content and thereby increase consumer involvement for the Danish jewellery company Trollbeads A/S (here after referred to as Trollbeads). Through the neuroscientific method, eye-tracking, visual attention will be explored in a pilot study counting four experimental trials (see page 44). The eye-tracking experiment is carried out to indicate strategic insight as to how measurements of emotions can ensure marketing content to increase consumer involvement. In order to give the reader an understanding of the structure of the thesis, below section will provide an overview and explanation of this.

2. Structure of the Thesis

As said, this section will provide the reader with an overview of the thesis. Through a structure model, developed by the researcher, the overview is presented in Figure 1.

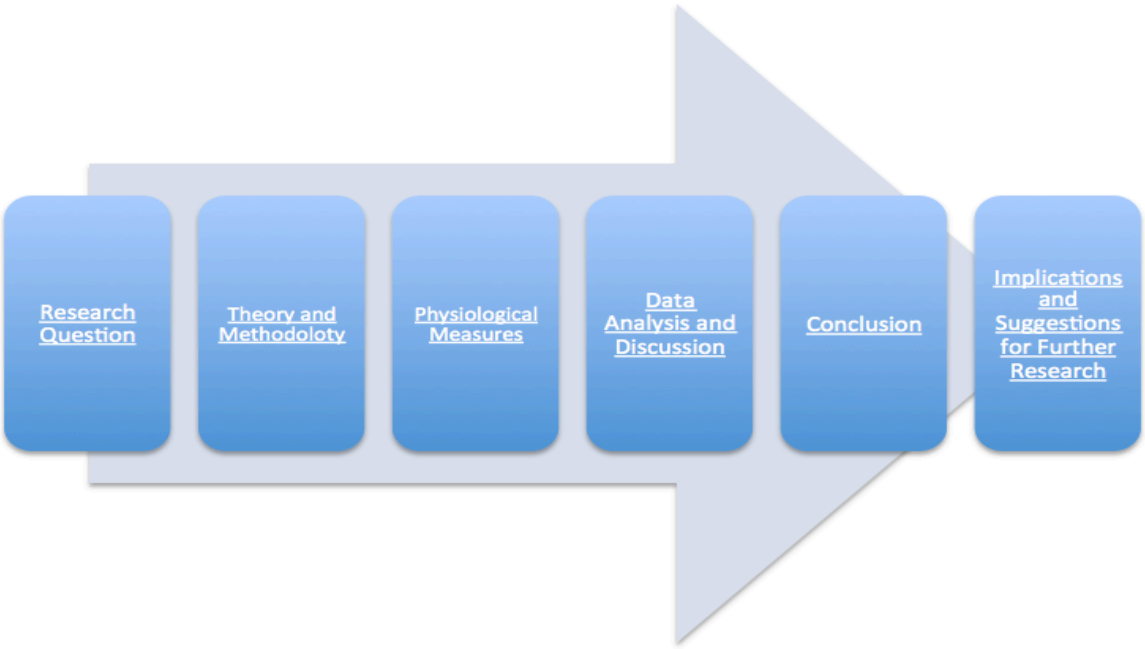

Figure 1 - Structure of the Thesis

First, this thesis seeks to investigate the proposed research question found to contribute to the understanding of: If and how Trollbeads can gain advantages of emotional measurements in order to obtain increased consumer involvement. Second, the theory and methodology chosen for this investigation will be described and reflected upon. The methodology section will provide the reader with an outline of the experimental design involving eye-tracking, which brings insights to the foundation of this thesis. Third, physiological measures provide insights into what Trollbeads can obtain by relying on these as opposed to traditional marketing research methods as surveys and focus groups. Fourth, the data analysis section brings a statistical explanation of what was explored in the performed eye-tracking experiment. The discussion will take point of departure in the results examining the outcome of the findings. Fifth, the conclusion will summarize how the findings answer the research question investigated. Finally, the implications and suggestions for further research will propose suggestions for how Trollbeads can implement personalized newsletters in order to increase consumer involvement and review what could been done in the future. With a clear structure in mind, below section will introduce the problem statement and the investigated research question.

3. Problem Statement

Understanding visual attention and emotions elicited when exposing potential consumers to marketing content can be a game changer for companies like Trollbeads, because emotional arousal is an essential motivator in the decision-making process (Li, Scott, & Walters, 2015;

Weber & Johnson, 2009). As a lack of involvement is explored in the consumer segment counting females aged between 20-30 (Trollbeads & Lindstrøm, 2013), providing Trollbeads with insights into whether and how they can increase consumer involvement represent a great market opportunity. The purpose of this thesis is therefore to investigate the relation between consumer involvement and the emotional arousal, found by visual attention, when perceiving marketing content in the form of newsletters.

3.1 - Research Question

Based upon above reflections on the development in technology and consumer neuroscience the following research question has been investigated:

How can Trollbeads A/S increase consumer involvement in their newsletters through measurements of emotions generated when exposed to these?

As this thesis relies on an eye-tracking experiment 8 hypotheses and 3 sub-hypotheses have been developed in order to support the research question. The hypotheses is investigated through the experiment trying to support the assumption about exposing consumers to images that elicit emotional arousal will increase consumer involvement. The hypotheses will correlate 'number of fixation points', 'time to first fixation' and 'total fixation duration'. The test subjects will be divided into two groups counting biased and unbiased. Further, it should be stated that the experiment is divided into four trials making the hypotheses test each trial and thereby enable a comparison of the different reactions. For further explanation of the experimental design, please see the research design on page 42.

3.2 – Hypotheses Supporting the Research Question

3.2.1 - Testing Trial 2 – Animal Drawings of Trollbeads Products

- ***H1:*** *Biased test subjects will have shorter time period until first fixation throughout trial 2*
- ***H2:*** *Biased test subjects will have a longer first fixation duration*
- ***H3:*** *Biased test subjects' first fixation is towards an already known image presented in trial 1*

3.2.2 - Testing Trial 3 – Images of Original Designed Animal Beads by Trollbeads

- ***H4:*** *Biased test subjects have shorter time period until first fixation towards images viewed throughout trial 2*
- ***H5:*** *Unbiased test subjects have shorter time period until first fixation towards images viewed throughout trial 2*
- ***H6:*** *Biased test subjects look into known images for a longer period of time during first fixation*
- ***H7:*** *Unbiased test subjects look into known images for a longer period of time during first fixation*

3.2.3 - Testing Trial 4 – Simulated Purchase Situation

- ***H8:*** *Biased test subjects purchases the animal bead, which has attracted the longest total fixation duration throughout the entire experiment*
    - ***H8.1:*** *Test subjects purchases the animal bead with the longest total fixation duration*
    - ***H8.2:*** *Test subjects purchases the animal bead counting the most fixation points*
    - ***H8.3:*** *Biased test subjects purchases the animal bead best rated in trial 1*

In order to answer the research question, this thesis seeks to test if emotional arousal has an effect on consumer involvement by measuring whether a correlation is found between visual attention focusing on 'duration of fixation', 'number of fixation points' and final consumer choice. This means that increased consumer involvement can be expected if a significant amount of test subjects choose the bead in the simulated purchase situation, which also counts the 'longest duration of fixation' and 'number of fixations'. Through the hypotheses the aim is to illustrate that measurements of emotions can bring insights to whether implementing personalized marketing content in a newsletter would increase consumer involvement. In order to ensure a more precise investigation below section will provide an introduction to the delimitations and the assumptions that create the foundation for this thesis.

4. Delimitations

As this thesis investigates an area of complexity, further assumptions and limitations are made in order to get a more focused and narrow thesis. The first section will introduce the limitations made in order to support the hypotheses.

4.1 - Limitations Supporting the Hypotheses

Through an eye-tracking experiment, examining visual attention that indicates a test subjects' interest in a tested object, this thesis seeks to explore if there is a positive connection between visual attention, emotional arousal and consumer involvement summarized into suggestions of how Trollbeads could improve online communication content in order to obtain increased consumer involvement.

This thesis exclusively focuses on newsletters created by Trollbeads and received by e-mail. Further, as this thesis relies on an eye-tracking experiment it must be acknowledged that people tend to have different reading patterns and therefore presenting stimuli only focussed on text opens for potential lacks in the findings. The experiment carried out in this thesis will therefore expose test subjects to different images of both original and related Trollbeads products. This will form the basis of if and how Trollbeads should implement personalized newsletters in order to increase consumer involvement. The presented images are based on original designed animal beads counting: Fish, rabbit, sheep and turtle plus fillers.

The hypotheses will be verified or rejected based on the results from the eye-tracking experiment terminated in a simulated purchase situation. 19 of the 38 test subjects will be biased, as they will be provided with a survey containing four images of original beads designed by Trollbeads mixed with nine random chosen categories such as beer, pizza and coffee mugs[1]. The bias secures the researchers ability to make comparisons between the two test groups and illustrate how visual attention and consumer involvement interferes. It should be noted that fixation counts for the test subjects visual focus point, see abbreviation and terms on page 7. Through the perceived understanding of the limitations that supports the hypotheses, an introduction to the chosen case company is provided below.

[1] See appendix 1 – Survey Bias

4.2 - Case Company Presentation

As stated this thesis is a case study enabling the research to be narrower as well as to provide a deeper understanding of the explored. Trollbeads has therefore been chosen as case company forming the foundation for this thesis. Trollbeads is a family driven company founded in 1976 by the Danish Nielsen/Aagaard family. The company operates within 38 countries worldwide. The company works within the jewellery industry and is the creator of the original "bead on bracelet" concept[2], which is often confused with the products of the company of Pandora, a competitor to Trollbeads. The Trollbeads DNA goes beyond being just a jewellery brand; it sees itself as a unique lifestyle brand because investing in their products increase both emotional and financial value because each consumer's collection grows (Trollbeads & Lindstrøm, 2013). This is further supported as the beads are created upon the vision that each bead represents a unique story and is thereby designed to elicit emotional affiliation to each consumer (Trollbeads, 2016a).

4.2.1 - The Segment

Trollbeads has four distinct audiences, referred to as segment 1, 2, 3 and 4 (Trollbeads & Lindstrøm, 2013). The four segments are not only categorized by age and demographics as usual segmentations, but they place greater emphasis on consumer actions, individuality and emotional dimensions towards the Trollbeads brand. The organisation has a strong ownership of segment 1 and 2 consisting of women characterized by having grownup children, an independent mind-set and an often deep affiliation with their beads. Segment 3 and 4 consists of the younger generation and represent almost 70% of the potential Trollbeads audience. Though, a lack in involvement and interest from these segments represent a great potential for increased consumer involvement (Ibid). It should be noted that segment 3 and 4 could additionally be divided into smaller target groups differentiating women between the age of 13-20 and 20-30 years old. Lack of involvement is especially found in the last mentioned target group (Ibid). Women in the age of 20-30 years old have therefore been chosen as the targeted segment throughout this thesis.

[2] See appendix 2 - Beads on Bracelet

4.2.2 - Growth Opportunities

In 2012 a new product called 'Bangle'[3] was launched and figures now show that the simple and elegant bracelet appeals particularly to the younger audience in segment 3 and 4 (Trollbeads & Lindstrøm, 2013). This further indicates that Trollbeads' many products appeal differently to the four segments as a result of different preferences in jewellery taste. The discovery in the market makes up a great opportunity for Trollbeads to improve and maintain the newly established relationship with the younger segment. Due to the wide span of the four segments and the changes in consumer behaviour, with regards to digitalization, the importance of communicating the right product to the right segment or even person, is crucial in order to evolve the newly established brand awareness.

Trollbeads is currently targeting all four segments through a generic newsletter[4] sent by e-mail not distinguishing between interest in products, earlier purchase or design. Due to the very different taste in jewellery among the four segments, it must be assumed that targeting consumers through a generic approach like this is not an ideal way to increase consumer involvement. By using neuroscientific methods, Trollbeads could get insights into how implementation of personalized newsletters addressing emotions could help to increase consumer involvement and thereby maintain the newly established relationship with segment 3 and 4. Through a pilot study, involving eye-tracking, correlating visual attention and consumer purchase, this thesis attempts to provide insights into how exposure to images attracting visual attention and thereby eliciting emotional arousal affects a consumer's purchase and involvement.

Summarizing on above, this thesis will exclusively focus on segment 3 and 4 and women aged between 20-30 years. Furthermore, if a positive correlation is found between exposures to images attracting visual attention, emotional arousal and consumer involvement, a focus on implementing personalized newsletters will be chosen. This is done as it is assumed that personalized newsletters are a marketing initiative inviting for continuous interaction and a long-term relationship between company and consumer (Maslowska et al., 2011).

[3] See appendix 3 - The Bangle
[4] See appendix 4 – Generic generated newsletter sent by Trollbeads

However, further delimitations have been made due to time and resource constrains as introduced below.

4.3 - Time and Resource Constrains

As it is impossible to achieve everything, delimitations are made with regards to time and resource constrains. Due to the starting point of the research question this investigation emphasize physiological measures and not neurological. In addition, only one physiological research method, eye-tracking, is chosen and forms the fundamentals of this thesis. Thereby, it limits the theoretical research to focus on visual stimuli by exposing test subjects to different images. This creates the foundation for if and how measurements of emotions can be used to increase consumer involvement. These limitations are necessary because neuroscience in itself is very complex as well as for the interpretation of results.

It must be acknowledged that neurological measures can provide the thesis with more accurate insights to the consumer brain than those of biometrical measurements(Genco et al., 2013; Ramsøy, 2015; Va, 2015). However, testing the level of emotional arousal through electroencephalography (EEG) or pupil dilation is deselected and the following assumption is therefore made: The image counting the longest 'fixation duration' throughout the entire experiment, also evoke positive emotions for the test subject.

This thesis aims at increasing the involvement of the end-user, referred to as consumer, and not necessarily the actual buyer of the product. This limitation is made because most jewellery is bought as 'gift-givings', indicating buying a gift for another person than yourself(Trollbeads, 2013). This research thus omits the importance of the potential buyers' emotions towards the Trollbeads brand, as the point of this thesis is to understand, as to how and as to whether one could increase consumer involvement. An increase in consumer involvement will be reached if the eye-tracking experiment indicates a positive correlation between the four experimental trials.

Furthermore, all financial measures and potential of increased revenue have been disregarded. The only focus of this thesis has been to show whether exposure to images attracting visual attention motivates consumers into greater consumer involvement.

Also, the researcher neglects deliberately the opportunity to create a new newsletter framework as designing newsletters has not been a part of this investigation.

By understanding the delimitations and assumptions made in order to obtain a narrower thesis, the following section will provide a comprehension of the used concepts.

5. Concept Definitions

In order to understand the starting point of this investigation and the choices of theories and methods used to answer the research question, a concept definition section is provided below.

5.1 - Consumer Involvement

As increased consumer involvement is the aim of this thesis a clear understanding of the concept must be obtained.

According to Beatty et al. (1988) one cannot neglect the concept of involvement when talking about consumer behaviour. This is argued as greater consumer involvement leads to stronger brand commitment, which must be seen as a competitive advantage that every company strives to achieve. The concept of consumer involvement is distinguished between two types of involvement: 1) *Ego involvement* and 2) *Purchase involvement*, which are defined as followed:

"*Ego involvement may be defined as the importance of the product to the individual and to the individual's self-concept, values, and ego, while purchase involvement relates to the level of concern for, or interest in, the purchase process triggered by the need to consider a particular purchase*" – Beatty et al. (1988)

This means that whenever a stimulus is related to the ego, for instance by sending the right message to the right person indicating that we are treated as individuals, ego involvement will exist (Beatty, Kahle, & Homer, 1988). Moreover, if Trollbeads manages to arouse emotions triggering a consumer's self-concept, one must assume this could be done through exposure to personalized marketing content. As this enables the consumer to more easily relate to the presented product and thereby lead to increased purchase involvement.

Because, purchase involvement is an effect of ego involvement, further influencing brand commitment, applying the right stimuli when targeting consumers through newsletters is crucial in order to reach an overall increased consumer involvement (Beatty et al., 1988; Dantas & Carrillat, 2013). By targeting a consumers ego involvement, and not necessarily the actual buyer, it is important that the aroused emotions correlates with how the consumer wants to be perceived by his or her peers. This assumption is made, as consumers' appearance often is perceived as a crucial point with regards to decision-making and purchases (Beatty et al., 1988; Maslowska et al., 2011).

Throughout this thesis, consumer involvement is therefore defined as a virtuous process concerning below three steps.

Figure 2 - Involvement-Commitment Model by Beatty et al. (1988)

Elaborating on Figure 2, consumer involvement is led by the values that are important for a person's self-image (ego involvement) (Beatty et al., 1988). This supports the statement about how society can influence once engagement in a given decision-making process. The values that trigger either ego- or purchase involvement addresses different forms of arousal and is considered as the motivational factors in consumer choice situations (Ibid). As both ego involvement and purchase involvement drive actions based on formed arousal the success rate of increased consumer involvement heavily relies on the stimuli presented in a newsletter further leading consumer decisions (Ibid).

In short, by understanding the dynamic process of ego- and purchase involvement, leading to brand commitment, one has perceived the meaning of consumer involvement. Furthermore, as measurements of emotions also form the foundation of this thesis, a clear definition of the concept is needed and therefore provided below.

5.2 – An Emotional Understanding

As emotions are not just emotions a clear differentiation between emotions and feelings are needed in order to fully understand the starting point of this investigation.

In short below section will provide an introduction to emotions and consumer behaviour, how to understand the emotional brain as well as shortly indicate the strength of understanding emotions with regards to marketing initiatives.

5.2.1 - Emotions vs. Feelings

Emotions and feelings are crucial terms in order to understand consumer behaviour as it highly impacts the decision-making process(Ramsøy, 2015). However, it is two closely interrelated concepts and a clear definition is needed as even specialists are often experiencing confusion between the two terms (Ibid).

According to Ramsøy (2015;Loc 3238:6075) is it possible to have emotions without feelings, but not feelings without emotions. Emotions are one of the most important aspects of consumer behaviour and often seen as the governing physiological unconscious mechanism influencing both simple and complex consumer choices (Hansen & Christensen, 2007).

Emotions	**Feelings**
An organism's expression of an inner/bodily state; a bodily response to an event with a mechanical, stimulus-response basis	An organism's experience of being in a certain emotional state
Occurring without or before consciousness	Always associated with consciousness
An impulse	"Introspective"

Table 1 – Emotions vs. Feelings by Ramsøy (2015)

Shown in Table 1, Ramsøy (2015) outlines the differences between emotions and feelings. As presented, emotions arouse in consumers' unconsciousness whereas feelings are something you can look at and explore, as in: "*Today I woke up feeling happy*" (Ramsøy, 2015). Also, emotions are an unconscious response to stimuli in the environment and deviations in inner state of bodily needs and cognitive activities (Hansen & Christensen, 2007). This means that exploring external stimuli, such as seeing an image or an internal bodily process as thinking about something, arouse emotions that lead to actions even before consumers are being conscious about it. This is also enlightened by the famous Renaissance philosopher; Rene Descartes, who has described how our actions are driven by emotions aroused from events and memories. Rene Descartes uses the example of how we react when being stung by a bee. If we are stung at the hand, we withdraw it at the same time we experience the pain.

We do not wait until we can feel the pain to remove our hand. This indicates how our emotions lead our conscious feelings arising from a certain experience (Ramsøy, 2015).

Figure 3 – Tentative Model of Emotions and Feelings by Ramsøy (2015)

As seen in Figure 3, this also supports how decision-making is conceptualized as a dynamic process rather than a consistent one (Krajbich & Smith, 2015b). As illustrated, events, counting personalized newsletters, influence consumers' emotions, which then leads to aroused feelings and consumer actions (Ramsøy, 2015) such as consumer involvement. With regards to the research question *how can Trollbeads increase consumer involvement in their newsletters through measurements of emotions generated when exposed to these?* Understanding the aroused emotions is vital in order to direct and optimize consumer actions towards an increased consumer involvement. In the light of the empowered emotions, below section will outline emotions with regards to consumer behaviour.

5.2.2 - Emotions and Consumer Behaviour

In the 1990's an increased scientific interest in emotions bloomed, however, emotions remains as one of the most complex areas within research(Dylan, 2003). Though, it is now known that human rational behaviour is shaped by instinctive emotional responses as well as being the most vital part in human behaviour (Plessis, 2005). Supported by the theory of Sigmund Freud our subconscious is the area in the human brain that handles memories and thereby affect our behaviour. An example could be:

1. A kid is stung by a bee
2. The kid now associates fear with a bee
3. When the kid sees a bee an emotional memory is raised, even though the actual event might not be readily retrievable

Taking point of departure in the example above found in "The Advertised Mind" by Plessis (2005), imaging a consumer receiving a newsletter containing irrelevant or unappealing information for his or her specific situation. The perception of irrelevant and uninterested marketing content will not leave any positive memories at the receiver in this situation. Furthermore, supported by the shift in consumer behaviour towards digitalization, where people now delete newsletters unopened (Blumberg, 2004), what are the odds that this consumer will open the next received newsletter? It is of cause not as severe as being stung by a bee, but realising the consequences of creating uninspiring associations towards ones brand can be of great risk for future consumer involvement. Elaboration on this, understanding the impact emotions has on consumer behaviour is not enough; one must also obtain an understanding about the emotional brain. Below section will therefore provide insights into how the brain process information with regards to aroused emotions.

5.2.3 - Understanding the Emotional Brain

As explored, emotions are a key cource with regards to consumer behaviour and how one make decisions. Previous research has therefore emphasized brain lateralization, which holds that our left side of the brain process verbal, numerical and symbolic information whereas holistic and similar impressions are processed in our right side (Hansen, 1998). Kahnemann (2003) supports this theory by his presentation of the two cognitive systems in the brain called: *System 1* and *system 2*, indicating the process of intuition and reasoning. These two theories imply that the human brain has two very different ways in which information is processed and stored while having crucial impact on the judgment and choice of consumers (Kahneman, 2003). Furthermore, Ramsøy (2014) describes two systems in the brain through the concept: "Tug-of-War", outlining the positive and negative emotions. The positive emotions are driven by rewards, approach behaviours and accompanied by feelings of anticipation, enjoyment and happiness, whereas the negative emotions are driven by fear and aversion, avoidance behaviours and accompanied by feelings of fear, anxiety and sadness (Ramsøy, 2015). By understanding the two systems, marketers are given an opportunity to direct marketing initiatives towards arousal of positive emotions.

As emotions are not just emotions, it is crucial to understand the different reaction patterns as well as an acknowledgment of overlapping patterns (Glimcher & Ernst, 2014).

An example could be the emotions joy and distress, which are two complex emotions evolved to act as motivator in order to lead humans towards pursue or avoid certain courses of action (Dylan, 2003). Also, it must be acknowledged that not every event addresses emotions as well as elicits the same emotions across individuals (Ekman, 1993). This implies how vital it is to leave a good impression at each touch point a company has with its consumers in order to keep momentum and a good customer relation. By this statement, an introduction to: The strength of understanding emotions with regards to marketing initiatives is presented below.

5.2.4 - The Strength of Understanding Emotions with Regards to Marketing Initiatives

As seen in Figure 3, emotions are an immediate response to a current event, which further guides consumer actions and feelings. As explained with the 'bee example' proposed by both Rene Descartes and Sigmund Freud above (Plessis, 2005; Ramsøy, 2015), the arouse emotions are led by memories from earlier experiences (Ramsøy, 2015). Therefore, by understanding the generated emotions from exposure to marketing content can provide companies with insight into how to improve this. In short, measurements of emotions allow for a deeper and more fact based understanding of consumer's individuality. This leads to below explanation of how one should understand the concept of personalization.

5.3 - Personalization vs. Generic Marketing Messages

As this thesis strongly relies on how one perceives the concept of personalization with regards to newsletter content, a definition is provided in the following section.

The concept of personalization lacks in theoretical clarifications and is a difficult concept to integrate into organisations because each business perceives the concept and makes use of it differently (Fan & Poole, 2006; Vesanen, 2007). Some rely on a clear distinction between personalization and customization where others do not (Vesanen, 2007). Earlier research illuminates the many definitions by discussing whether and how one could or should distinguish between the two terms (Ibid). Based on the definition posed by the Personalization Consortium (2005), this thesis will perceive the two terms as one due to the belief that the use of both approaches will bring the best outcome when targeting consumers with personalized newsletters (Personalization Consortium, 2005).

"Personalization is the use of technology and customer information to tailor electronic commerce interactions between a business and each individual customer. Using information either previously obtained or provided in real-time about the customer, the exchange between the parties is altered to fit that customer's stated needs as well as needs perceived by the business based on the available customer information." – Personalization Consortium (2005)

Above definition is also supported by Sunikka and Bragge (2012) stating that personalization has a stronger focus on technology and the Internet emphasizing needs and preferences of consumers than customization. Customization is perceived as an older research stream focusing on tangible products and not information collection for user modelling (Sunikka & Bragge, 2012). Therefore the used term: Personalized newsletter is taking point of departure in above definition proposed by the Personalization Consortium (2005) and Sunikka and Bragge (2012). The personalized newsletter content will thus be developed based on consumer-generated data gathered through the official Trollbeads website.

A generic or standardized newsletter on the other hand implies mass generated e-mail content relying on what a company wants the consumer to see, rather than presenting content that appeals to each individual's needs and preferences(Stone, 2012).

In short by understanding of the concepts: Consumer involvement, emotions and personalization, an introduction to the applied theories is provided below in order to explore the theoretical foundation of this investigation.

6. Theory – Exploring the Moment of Truth

In recent years companies communicates with their consumers in many different ways, such as through media, the product itself, personal communication, the packaging design, advertising and much more(Lecinski, 2011). The use of these communication channels can be portrayed as the stimuli (event), which lets consumers be aware of the existence of a certain product or service and perhaps even result in a: "*let me search for that online*" (Ibid). "*Let me search for that online*" (Ibid), is an evolving reality.

As already mentioned, 79% of the Danish Internet users aged between 16-74 years search for information about goods and services online on a daily basis (Danmarks Statistik, 2015). Due to this change in consumer behaviour, it is argued that the online interaction between a company and its consumers is crucial in order to improve consumer involvement. Although the online decision-making process is increasing, the online marketing budgets are not. In 2010 only 15% of media ad budgets were invested online, which does not at all match the increase in decisions made online (Lecinski, 2011). This leads to the following question: Are today's marketing initiatives and all the money invested working effectively?

"*Today you are not behind your competition. You are not behind the technology. You are behind your consumer*" – Rishad Tobaccowala, Chief Strategy & Innovation Officer, Vivaki (2011)

As stated by the quote above, companies are behind their ever evolving consumers and their ever-changing needs. The quote also implies the relevance of the statement about marketers having a tendency to argue: "*It doesn't matter whether the target group likes the advertising as long as it sells*" (Hansen, 1998). Even though the statement presented by Hansen (1998) is nearly 20 years old, it creates a reliable picture about how companies still have a tendency to base their marketing strategies on the message they want to bring to the consumer instead of taking point of departure in what the consumer requires and needs.
As marketers tend to have a too narrow perspective, this thesis will use the *Moments of Truth* theory (further referred to as MOT) (Lecinski, 2011) as well as a virtuous *personalization process* (Vesanen & Raulas, 2006)implying how to implement personalization successfully with regards to increased consumer involvement. The MOTs will be analysed by the use of a *value creation cycle* (Teboul, 2006), which will provide Trollbeads with an overview of touch points between them and potential consumers. Based on this very short introduction, below section will provide the reader with a broader and deeper understanding of the applied theories.

6.1 - Moments of Truth

MOT, is a theory that establishes a consumer's perception of a given company, brand or service (Lecinski, 2011).

MOTs occur in the moment where a potential consumer gets into contact with a firm either by viewing a product on a shelf, by being exposed to an online newsletter, talking to a help-desk or even through word-of-mouth (Ibid).

The MOTs are thereby a way for companies to influence the decision-making process as well as any future relationship between both company and consumer (Lecinski, 2011). Because MOTs can affect a consumers' future loyalty towards a brand the creation of attractive MOTs is vital in order to increase consumer involvement for Trollbeads.

6.1.1 – The Changing Mental Model

Today there are three theoretical forms of MOTs: Zero Moment of Truth (ZMOT), First Moment of Truth (FMOT) and Second Moment of Truth (SMOT). For many years the *Mental Model* within marketing has only been focusing upon three critical touch points involving: Stimulus, FMOT (Shelf) and SMOT (Experience) as presented below in Figure 4 (Lecinski, 2011).

Figure 4 – The Traditional 3-step Mental Model by Lecinski (2011)

Consider the traditional 3-step model above in a purchase situation:

- **Stimulus** – Mom is reading a magazine and sees an ad for a baking machine, thinking "this would be great in the kitchen".
- **FMOT** – She goes to the hardware store, where she sees another advertisement for the baking machine and the salesperson answers all of her questions before she finally decides to buy the baking machine.
- **SMOT –** Mom gets home and the machine helps her bake the most beautiful buns as the advertisement promoted.

As seen in the example closely related to one proposed by Lecinski (2011), this situation has a successful conclusion. Due to the technological development, it can be argued that this is not how a decision-making process evolves nowadays.

Imaging this example: You are looking at a poster promoting a piece of jewellery which captures your interest (Stimulus) – what do you do? You immediately search on your laptop, mobile or tablet, which indicates that you have entered ZMOT. In ZMOT you search for information about the jewellery such as: How much does it cost, can I subscribe to any newsletter or what do other people say about the product. Through the online decision-making process (ZMOT), you decide whether you want to purchase the jewellery or not, which you do in this situation (FMOT), naturally leading to an experience of the product (SMOT) (Ibid). This development within consumer behaviour has changed the traditional 3-step mental model with a further step, the ZMOT implemented between Stimulus and FMOT as presented in Figure 5.

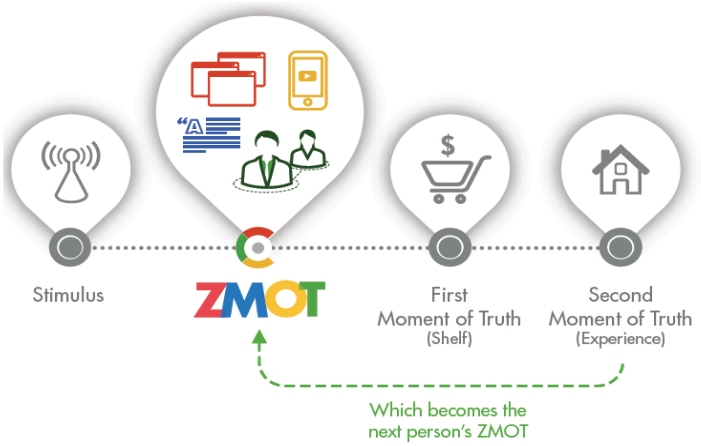

Figure 5 - The New Mental Model by Lecinski (2011)

As seen, ZMOT is categorized as the online touch point between consumer and company, where the consumer is in charge. ZMOT happens in real time, which means that it can happen anywhere and anytime during the day.

Moreover, the moment is emotional as the consumer is emotionally engaged in the research process because he or she wants to satisfy his or her special needs. Lastly, ZMOT initiates a multi-way conversation as marketers, strangers, experts and websites, counting for external search (Weber & Johnson, 2009), suddenly have a say the final purchase decision (Lecinski, 2011).

Because MOTs can be seen as thousands of decision-making moments influencing whether consumers want a product or not (Ibid), these are all crucial touch points in order to increase consumer involvement for Trollbeads.
As seen in the new mental model, Figure 5, ZMOT has become an important part of the decision-making process and a MOT that companies cannot afford to neglect when designing marketing initiatives and communication channels.

Although, it should be noted that the three factors from the traditional 3-step mental model are still essential as stimulus still have to lead consumers towards ZMOT. The only change in the two models is that the stimuli now direct consumers towards a detour before FMOT is reached (Lecinski, 2011). In the light of the research question investigating how Trollbeads can increase consumer involvement through their newsletters, MOTs enable companies to influence the actions and state of mind of their potential consumers. These consumer-company interactions are therefore vital to analyse and improve in order for Trollbeads to increase consumer involvement.

6.1.2 - ZMOT - The Most Important MOT for Trollbeads

Based on the introduction above, a MOT analysis has been carried out in order to classify the most important MOT for Trollbeads. By the use of the value creation cycle (Teboul, 2006) and the personalization process (Vesanen & Raulas, 2006) the researcher has developed a combined model seen in Figure 6. The model identifies the front stage MOTs, which are the touch points between consumers, from the time of stimuli exposure and Trollbeads. The value creation cycle starts in the moment a potential consumer becomes aware of their desire for jewellery to their awareness of Trollbeads as well as to the last MOT closing the experience (SMOT) (Lecinski, 2011; Teboul, 2006). However, the model presents an opportunity of a dynamic loop creating continuously interaction points driven by consumer-generated data from the Trollbeads website.

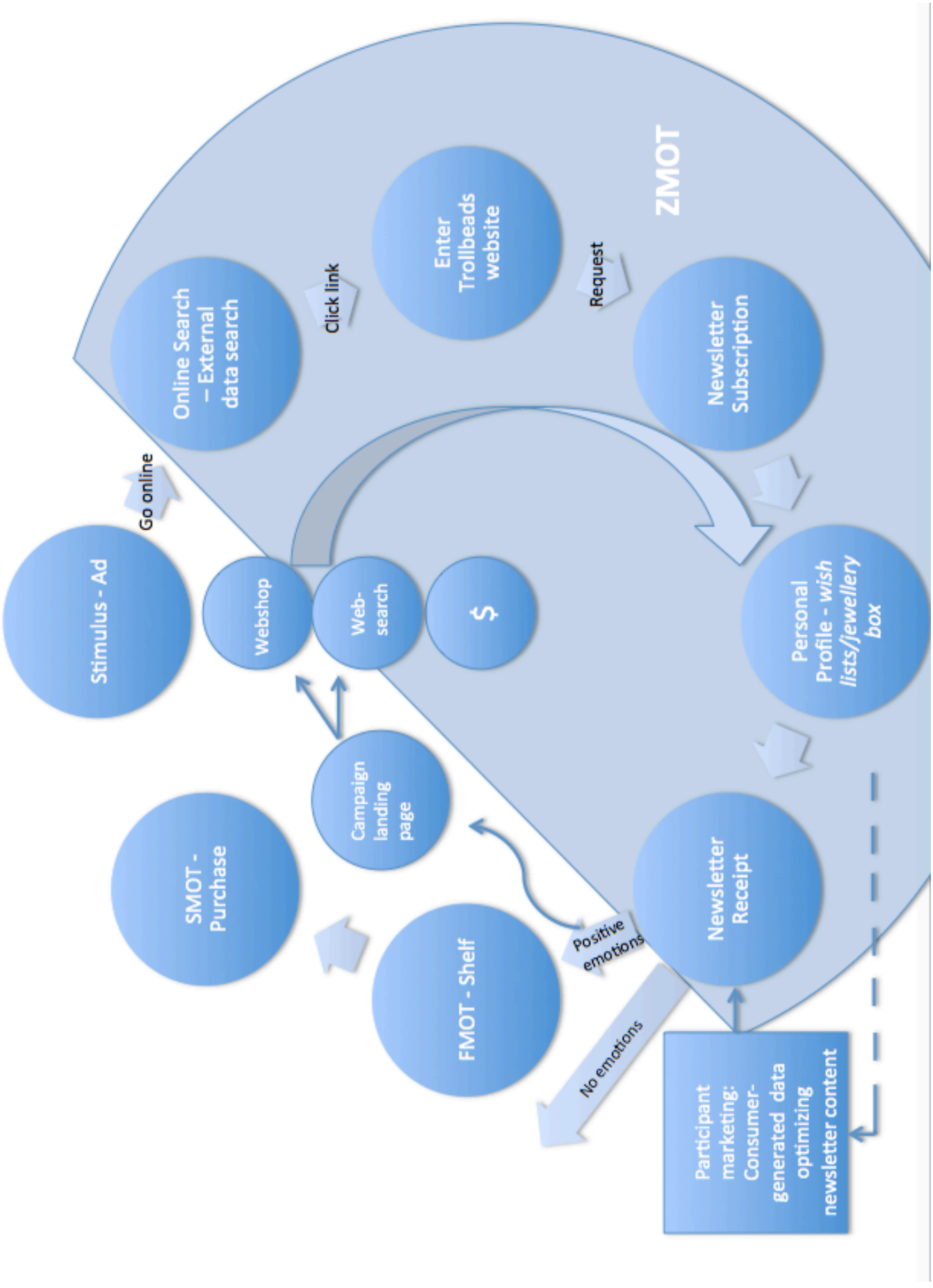

Figure 6 - Combined Value Creation Cycle and Personalization Process for Trollbeads made by the Researcher (2016)

As shown, Figure 6 not only outlines the identified MOTs between consumers and Trollbeads, but incorporates the personalization process proposed by Vesanen and Raulas (2006). The personalization process provides insights into how Trollbeads achieves personalized newsletters based on participant marketing. Participant marketing relies on collaboration between consumers and marketers in order to create most value for each consumer(Keller, 2011). As the personalization process is based on continuously generated consumer information gathered online, the combined model virtualizes the constant interaction between marketers and consumers creating the content for personalized newsletters (Vesanen & Raulas, 2006).

6.1.3 – The Newsletter Receipt Touch Point

Based on the value creation cycle analysis, the most vital MOT for Trollbeads is identified as the time of receipt of the newsletter. This is based upon the fact that this MOT is where Trollbeads is given the opportunity to create an emotional arousal for each potential consumer and thereby increase consumer involvement. The newsletter receipt touch point is also essential, as it not only enables Trollbeads to improve consumer involvement on short term, but through the continuous company-consumer interactions the relationship between Trollbeads and the consumers can easily grow.

The newsletter receipt MOT is also within the ZMOT, as ZMOT involves the entire online research process a consumer goes through to learn more about a company and its offerings. Because a newsletter is received online providing the opportunity for further research, this MOT is vital as ZMOT heavily influences today's consumer behaviour. As it is assumed that awakening emotional arousal through marketing content will increase consumer involvement, eliciting emotional arousal with the newsletter sent by Trollbeads is seen as the last stage the company has to influence consumers and obtain increased consumer involvement.

As the decision-making process relies on both internal and external search as proposed by Weber and Johnson (2009) a company must do what they can to accommodate the expectations of their consumers based on their emotions, memories and product information.

If the expectations are not met through ZMOT, the consumers most likely choose not to buy Trollbeads' products and the company thereby loses its chance to influence the decision-making process as well as any future consumer involvement. If Trollbeads do not succeed in creating personalized and interesting newsletters eliciting emotional arousal, they will have no future option of persuading consumers, as they will never reach FMOT and SMOT. On the other hand if Trollbeads manages to capture the interest of their potential consumers, a continuous ZMOT will most likely occur as consumers will keep entering the Trollbeads website and receive newsletters creating potential purchase situations and thereby increase consumer involvement.

By presenting the right content to the right consumer, newsletters are perceived as a key channel to affect future consumer involvement. Thereby, relying on measurements of emotions and consumer-generated data, below section will provide an introduction to how Trollbeads can take advantage of the generated data. Therefore a theoretical examination of the personalization process proposed by Vesanen and Raulas (2006) has been provided.

6.2 - Personalization Process – Transforming Consumer Data into a Competitive Advantage

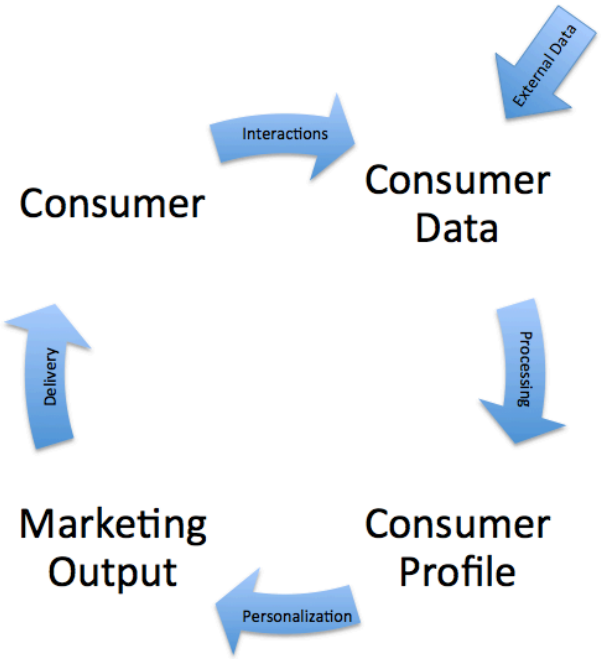

Figure 7 – Participant Marketing - Personalization Process by Vesanen & Raulas (2006)[5]

[5] Consumer is shifted to consumer due to the researcher choice of word definition

As the perception of the newsletter sent by Trollbeads is considered to be the most important MOT, one way to optimize and secure a good perception is to expose potential consumers to a newsletter that meets their expectations (Maslowska et al., 2011). As the fundamental objective of personalization is to increase consumer involvement (Ibid), a key point to do so is by providing offers based on consumer preferences maximizing consumer value, rather than what the business wants to communicate (Kwon, Cho, & Park, 2010). The personalization process will to be developed based on consumer-generated data gathered through the Trollbeads website. The data is generated as consumers are engaged in creating a personal profile that invites to create wish-lists and a virtual jewellery box[6]. Through the personal profiles Trollbeads is able not only to distinguish between consumers and their preferences (Vesanen & Raulas, 2006), but get important insights about what the consumer already has and what is wanted in the future (Trollbeads, 2016b). Even though this thesis implies that self-reported data can have its limitations it must be acknowledged that it is impossible for companies to make physiological measures on all consumers in order to create personalized marketing content. This is why newsletters based on individual consumer-generated data are suggested.

6.2.1 – The Eight Basic Elements

As seen in Figure 7 the personalization process is a continuous dynamic loop, visualizing the process of how to personalize marketing content (Vesanen & Raulas, 2006). The model initiates that the process of personalization never shall be put to rest, as the need for improving and optimizing personalization is an ever on-going process (Ibid). The process consists of eight basic elements: *Customer, Interactions, Customer Data, Processing, Customer Profile, Customization, Marketing Output* and *Delivery,* further distinguished between *operations* and *objects* (Vesanen & Raulas, 2006). Operations counts for: *"What is done at different stages of the process",* whereas objectives withdraws: *"The elements that are needed to perform the operations"* (Ibid). The process proposed by Vesanen and Raulas (2006) and the eight basic elements will be explained in the following section below.

The *consumer* is perceived as the foundation for personalized marketing as they are driven by different needs, which is also supported by Beatty et al. (1988).

[6] See appendix 5 – Wish-list and jewellery box

As argued by Beatty et al. (1988) consumers are driven by ego and purchase involvement as explained in previous section (page 20), seeking individualized products and services.

Interactions are where the consumer meets the company, in this case ZMOT starting from a consumers' online search to receiving the online newsletter. At the interaction stage, consumer data coding preferences are generated as well as demographics and purchase behaviour (Vesanen & Raulas, 2006).

Consumer data is perceived through the interaction phase generating consumer information as well as through external data such as matching previous consumer purchases with internal online search (Ibid). For instance as Trollbeads encourages their consumers to create a personal profile Trollbeads thereby engaging them in selecting items they already possess as well as want, which is then converted to the virtual wish-list and jewellery box (Trollbeads, 2016b). By matching the internally generated consumer data provided by wish-lists and jewellery boxes, with consumers' external search and purchases, it can be argued that it provides Trollbeads with a better foundation for creating the ideal personalized marketing content.

Through *processing* the consumer data is transformed into consumer profiles enabling marketers to differentiate and identify consumers. Processing is needed when personalization attributes are not to be found directly in the consumer data (Vesanen & Raulas, 2006).

Consumer profile is made to differentiate consumers by their preferences, which is analysed through consumer data, behaviour and interest. The output of each consumer profile is used as input to customization (Ibid).

Personalization is the development of the personalized marketing content (Ibid).

The *marketing output* consists of everything from offline to online personalized marketing content (Vesanen & Raulas, 2006)as well as personalized price or speech in automated telephone services (Murthi & Sarkar, 2003).

An example could be Pinterest, an online pin-board based on visual bookmarks, using recommendation systems in order to create personalized suggestions based on the users' prior interest in different pins and boards. Another example could be Netflix that sends personalized e-mails announcing new movies, which could be of interest to the user based on previous film choices. However, as this thesis focuses on personalized newsletters the opportunity of creating personalization of any offline marketing material is neglected.

Delivery is the final function before a new personalization process begins. This stage explains how the marketing output is delivered to the consumer as it could or should be different based on the consumers' delivery preferences (Vesanen & Raulas, 2006). For instance some consumers would prefer to receive a physical letter whereas others would prefer e-mails. However, this thesis focuses on online newsletters received by e-mail, thereby neglecting any other delivery methods.

To summarize, the personalization process proposes eight stages that should be taken into consideration when companies want to implement personalization. However, relying on this is not enough. Below section will therefore outline the importance of balancing both novelty and familiarity in the personalized marketing content.

6.2.2 – Finding the Sweet-spot Between Novelty and Familiarity

As illustrated, emotions are driven by memories (Hansen & Christensen, 2007; Ramsøy, 2015) and it is important to acknowledge that meeting a consumer's emotional expectations towards a product or marketing initiative is crucial in order to gain success (Maslowska et al., 2011). As seen in Figure 8 below, a company's ability to balance novelty and familiarity in marketing content is a key factor in order to achieve positive perception of a product or marketing initiative. This is due to the natural curiosity of the human mind, which makes most consumers attracted to novelty. However, as much else, too much novelty will overwhelm us and maybe lead to a rejection of the product and/or marketing initiative. Therefore, the right level of familiarity is also needed in marketing or product development, as familiarity generates emotions, which indicates feelings of comfort, confidence and understanding (Genco et al., 2013). A newsletter created with the right balance will therefore be vital in order to meet the expectations of the consumer and to attract continuous interest.

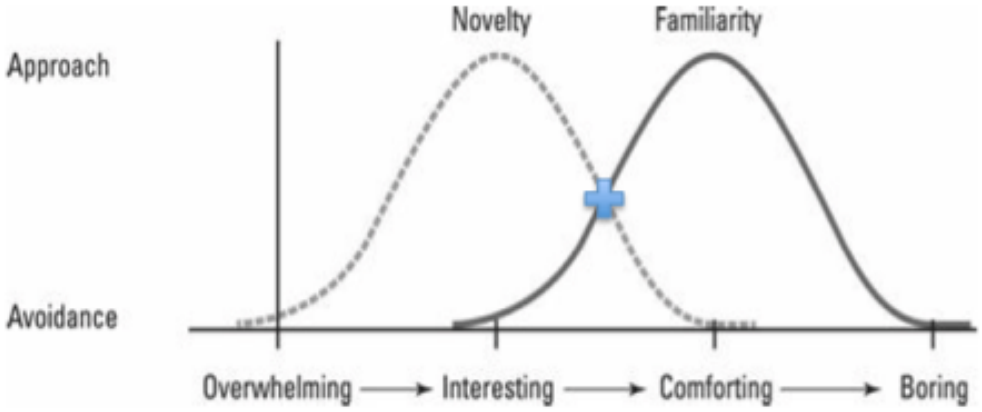

Figure 8 - Innovation Sweet-spot by Genco et al. (2013)

By understanding consumer behaviour through measurements of emotions, evoked by marketing content, will provide marketers with insights into how the right balance between novelty and familiarity can be reached. In short, understanding emotions will provide the opportunity to create a memorable newsletter that will affect future consumer actions.

Elaborating on above, the aim of the implementation of the personalization process, is to providing Trollbeads with an understanding of how they can optimize consumer involvement through personalized newsletters based on consumer-generated data and measurements of emotional arousal. With regards to the newly obtained understanding of the applied theories, below section will provide insights into the chosen methods and data collection.

7. Methodology

The following chapter will allow the reader a deeper understanding of the research carried out through this thesis. The section will also give insights into how it has been conducted by the use of chosen methods with regards to data collection and analysis.

"*All methods individually are flawed*" – Turner, Cardinal & Burton (2015)

According to Turner, Cardinal and Burton (2015) all methods are flawed if they stand alone. This is why this thesis will mitigate this through the use of a mixed method approach based on the principle of triangulation, discussed further below (see page 39).

With the aim of illustrating how Trollbeads can use measures of emotions to increase consumer involvement through personalized newsletters, the data collection methods for this thesis involves both quantitative and qualitative research. According to Flemming Hansen (1998) one of the major advantages of using qualitative techniques, is its flexibility and ability to provide soft data as well as adding on quality of the tested executions. Quantitative data, on the other hand, can be defined as a descriptive research strategy describing the collection of numerical data(Bryman, 2012)Numerical data will provide this thesis with the opportunity for statistical analysis and thereby obtain an objective point of view (Ibid). Moreover, through traditional market research methods and physical measurements, observations and eye-tracking, it is attempted to find the emotional reactions generated when being exposed to different images of beads designed as animals. This has been based on an experimental eye-tracking set-up, where 38 female subjects have been tested.

Taking up a deductive theory approach the process of theory appears very linear as this approach implies that theoretical ideas are driving the data collection and analysis (Bryman, 2012). Starting from the 8 hypotheses, based on the researchers view between theory and research, the research strategy and design have been prepared and will be presented on page 39 and 42. However, prior to the description of the chosen research strategy and design, a data classification section is provided below with regards to a presentation of the used data.

7.0.1 – Data Classification

In order to be able to answer the hypotheses, the data gathered consists of different types of information based on both secondary and primary data. In this thesis secondary data consist of "*literature review*", which provides a deeper understanding of related concepts and insights into what is already known. The first type of primary data for this thesis is collected through "*observations and interactions*", which are carried out both prior and along each of the 38 experiments. Supporting the contradiction between what consumers think they want and what they actually choose, physiological measures are often seen as a more reliable source of data than self-reporting methods. Another primary data type is therefore counting for measurements of biometrical reactions explored by the use of an eye-tracker. It must be underlined that the various data/methods will be overlapping in order to guarantee a more

reliable result, and will thus only be divided throughout the analysis of the material. Below is a summary of the different data classifications available.

Type of data classification	**Information content**
Literature review	Secondary data
Observations and interactions	Primary data - Written and interpreted observations
Physical measures	Eye-tracking: 1. Time to first fixation 2. Total fixation duration time 3. Most wanted image

Table 2 - Data Classification

The data generated from the physical measures, based on the experimental eye-tracking set-up, is vital in order to confirm the assumption that implementation of personalized marketing content will increase consumer involvement. As a consequence, the experiment has been divided into four trials, which will be explained in the research design (see page 42). Further, as the physiological measures are carried out by the use of an eye-tracker, in order to find perceptions unavailable for the conscious mind (Genco et al., 2013), a device description is to be found in appendix 6[7]. Based on the data classifications below section will introduce the research strategy used for this investigation.

7.1 - Research Strategy

The research strategy of this thesis is based on a case study grounded on quantitative and qualitative data collection. By mixing approaches like these, the applied mixed method offers the reader a way to broaden and deepen his or her understanding of the explored (Turner, Cardinal, & Burton R. M., 2015).

7.1.1 - Triangulation

In order to mitigate the limitations when using individual methods, this thesis will be grounded in a mixed methods research based upon the principle of triangulation as stated.

[7] See appendix 6 – Device description

Figure 9 - Applied Triangulation

The original concept of triangulation according to Denzin (1970) took its starting point in multiple forms of qualitative research methods and not a combination of both quantitative and qualitative methods. The concept has developed and is today based on researchers applying more than one method or source of data (Denzin, 2012). This is also supported by Saunders (2003), as he states that it is not unusual to use both quantitative and qualitative methods as well as secondary and primary data sources when carrying out research (Saunders, 2003). Triangulation is therefore based on a combination of methodologies, theories and data from different paradigms enabling the findings to be compared and cross-checked (Bryman, 2012).

As this research is based on a combination of both quantitative and qualitative data as well as different research philosophies, this research relies on triangulation, which enhances the degree of validity and reliability within this thesis. Furthermore, as the use of eye-tracking takes up a positivistic research philosophy and consumer involvement, on the other hand, takes up an interpretivistic research philosophy(Saunders, 2003), this fact also supports why this investigation depends on triangulation. Relying on positivism philosophy means that this thesis has adopted a philosophical stance of natural science by working with an observable social reality. On the other hand interpretivism accepts that everything is unique as well as complex (Ibid).

Elaborating on the concept of triangulation, this investigation takes up this concept by combining the use of both quantitative and qualitative data collection. This leads to an introduction to the research approach, which is described below.

7.1.2 - Research Approach

As outlined, the research approach for this thesis is a deductive approach as the researcher has developed hypotheses and thereby designed a research strategy testing the hypotheses (Saunders, 2003). With regards to the chosen research strategy, experiments have been carried out based on a case study involving Trollbeads. Not only do case studies allow a deeper understanding of the explored (Saunders, 2003) but they also provide an opportunity of capturing behaviours taking place in an authentic context, although it is not always suitable for maximising generalizability (Turner et al., 2015). The research creating the foundation for this thesis has been carried out as a cross-sectional study also referred to as a 'snapshot' of time (Saunders, 2003). Due to time constrains the experiments and observations were carried out over a short period of time, which indicates the cross-sectional time horizon.

7.1.3 - Data Collection

With the aim of understanding consumer involvement through measurements of emotions found by visual attention when being exposed to different images, the use of both qualitative and quantitative primary data collection has been conducted. As quantitative data contains of numerical data enabling statistical data modelling (Agresti & Franklin, 2009), the physiological eye-tracking experiment will generate data enabling these statistical measures. As statistics aim at translating data into knowledge, the use of statistical methods allow the researcher to investigate the hypotheses not only in an objective manner but also summarize the data into visual graphs through descriptive statistics (Ibid).
The data will be analysed through the use of SPSS, which counts for a statistical software used to analyse large data sets (Bryman, 2012).

The qualitative data carried out for this research consists of observations carried out both prior and alongside the experiments. The observations are rooted in the ethnography methodology, encountering an active role to the "*cognitive modes of observing, watching, seeing, looking at, gazing at and scrutinizing*" (Silverman, 2011).

Ethnography is a methodology that is obtained at a certain moment in history and not just a tool of data collection (Ibid). Using ethnographic methodology attributes to two research strategies: 1) Participant observation and 2) Non-participant observation. The observations carried out for this research rely on participant observations because the researcher has established a direct relationship with the test subjects (Silverman, 2011). Due to the established relationships, as well as the origin of ethnography, it should be recognized that this method is viewed as subjective, based on its sensitivity towards the attitude of the researcher (Silverman, 2011).

Furthermore, it should be recognized that qualitative data often relies on unstructured data consisting of words and written notes (Saunders, 2003). This entitles that the usefulness of the data relies on the researcher's ability to conceptualise and systematize the gathered data (Ibid). It is therefore crucial that the researcher is setting clear targets for what the observations must bring to the investigation. The design of the observations is described in detail in the observation section found on page 48.

To sum, the research strategy counts the approach and data collection methods chosen to explore the investigated. Because, the results of the eye-tracking experiment will create the foundation for this thesis, the research design is a key factor with regards to the chosen method and will therefore be explained into details below.

7.2 - Research Design

"*Perfect data quality from a high-end eye-tracker can never compensate for an inadequate experimental design*" - Holmqvist et al. (2011;1)

As initiated by above quote, an inadequate experimental design cannot be compensated with perfect data quality (Holmqvist et al., 2011). The following section will therefore outline the experimental design carried out in this thesis.

As stated, using Trollbeads as case company allows for a more narrow as well as a more exact investigation (Bryman, 2012). Also, to ensure the relevance of the results, the content presented to the 38 test subjects is based on original designed Trollbeads products.

In short, this is chosen in order to obtain most precise indications of correlations between visual attention, emotional arousal and consumer involvement. However, it must be acknowledged that this thesis is carried out as a pilot study, meaning a study conducted prior to managing a larger self-completed questionnaire or experiment (Ibid). A pilot study only withholds a small sample size in order to enhance the quality of an experiment. Conducting a pilot study with a small group of test subjects, makes it even more important that the chosen test group is homogenous with regards to age, social context and educational level, because these factors can, if not homogenous, lower potential differences in responses (Bryman, 2012).

The experiment is based on the use of eye-tracking, which is a methodologically skill requiring practical and theoretical training for several years (Holmqvist et al., 2011). Since this is not the case for the researcher, a test person chosen from the researcher's own network is used as a test person, in order for the researcher to be familiar with the equipment and experiment process before carrying out the real experiments. This approach provides the researcher with the opportunity to receive feedback on the process and thereby the opportunity of avoiding lacks when carrying out the real tests. The experiments were carried out in the neuroscience lab at Copenhagen Business School in the period from April 28th to May 4th 2016.

Because people are easily stressed by new surroundings and experiences, as much information as possible is given prior to the experiment in order to avoid unintended stress factors[8]. Thus, each test subject is also given a three minutes introduction to the eye-tracker, as well as guidance in what is expected of them. The guidance is provided orally to the test subjects while sitting in front of the eye-tracker. This makes the surroundings more familiar and easier to understand[9].

As mentioned, the experiment is divided into four trials, testing the correlation between biased and unbiased consumer behaviour towards related and original images of Trollbeads products.

[8] See appendix 7 – Information given prior to the eye-tracking experiment
[9] See appendix 8 – Oral introduction to the eye-tracking experiment

The four trials are made in order to explore whether the assumption about images eliciting emotional arousal also indicate higher consumer involvement. As mentioned, 19 of the 38 test subjects are biased, as a survey (trial 1) is received only minutes before the eye-tracking experiment. By dividing the test subjects into two groups, the researcher is enabled to make comparisons and thereby capable of answering the hypotheses and research question in a reliable manner. Further, it should be noted that the tested beads are all designed as animals and not signs so as to exclude any religious biases. Throughout the entire experiment, four fixed animals: Fish, rabbit, sheep and turtle, are shown to the subjects, each time mixed with four new animal fillers. By using this approach, it is made possible for the research to compare visual attention and thereby explore emotional arousal.

Figure 10 seen below, provides an overview of the eye-tracking experiment and the four trials already mentioned.

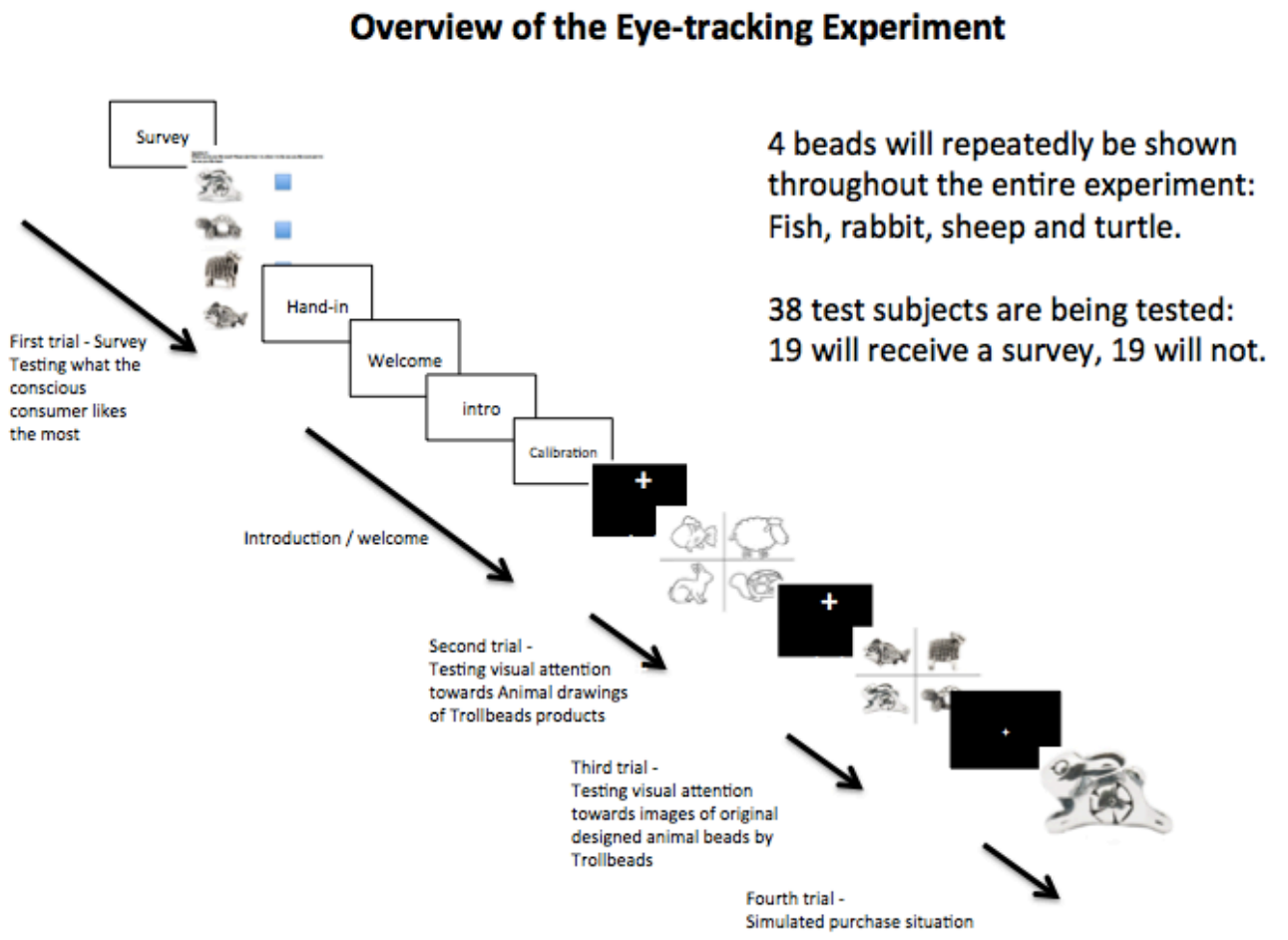

Figure 10 - Experimental Design made by the Research

7.2.1 - Trial 1 - Survey

As seen in Figure 10, trial 1 consists of a survey, designed to subconsciously bias 19 of the 38 test subjects by mixing the four fixed beads tested throughout the entire experiment with nine other product categories[10]. As none of the 38 subjects are aware of what the experiment is about, besides testing visual attention with the help of an eye-tracker, the survey is designed to generate data showing whether a bias, arousing emotions, are influencing future visual attention and consumer choice. By creating this kind of data, the researcher is enabled to see if an exposure to appealing images presented in online newsletters can increase consumer involvement.

7.2.2 - Introduction/Welcome

In the introduction phase, the 38 test subjects are given the three-minute oral introduction to the experiment design[11]. However, it should be noted that the purpose of the test is not exposed until after trial 4 in order to limit potential and unwanted biases towards the tested product. This approach is chosen in order to increase the reliability of the final test results. Furthermore, throughout the introduction, the eye-tracker is adjusted to each individual's height as well as fine-tuned through a calibration process[12].

7.2.3 - Trial 2 – Animal Drawings of Trollbeads Products

Trial 2 exposed the 38 test subjects to eight different drawings: Four related to the same rated variables as in trial 1: Fish, rabbit, sheep and turtle, plus four fillers. Throughout this experiment, fillers count for four random chosen animals that enable the researcher to compare if a bias has an effect on visual attention. The fillers differ in trial 2 and 3. The eight drawings are mixed in every possible way creating a total of 504 images excl. calibration points. The 504 images are merged into matrixes presenting four images in order to prevent potential visual noise, when analysing the visual attention. The subjects are thereby exposed to 126 scenes (slides) excl. calibration scenes. The scenes contains drawings related to the original beads in order to get an understanding of which images that contains 'longest fixation duration' as well as 'time to first fixation'[13]. Trial 2 attempts to answer below hypotheses:

[10] See appendix 1 – Trial 1 - survey bias
[11] See appendix 8 – Oral introduction to the eye-tracking experiment
[12] See appendix 8 - Oral introduction to the eye-tracking experiment
[13] See appendix 9 – Drawn animals – Trial 2

Testing Trial 2

- ***H1:*** *Biased test subjects will have shorter time period until first fixation throughout trial 2*
- ***H2:*** *Biased test subjects will have a longer first fixation duration*
- ***H3:*** *Biased test subjects' first fixation is towards an already known image presented in trial 1*

7.2.4 - Trial 3 - Images of Original Designed Animal Beads by Trollbeads

Trial 3 also exposes the test subjects for 126 scenes, excl. calibration slides, consisting of eight different animal beads presented in a matrix of four. Four of the images are showing the exact same beads as presented in trial 1 plus four fillers also representing images of original beads[14]. By presenting the test subjects to similar images throughout the entire experiment, the results will indicate if the best rated bead in trial 1 also attracts the subject's visual attention and influences their final consumer choice in trial 4. Trial 3 attempts to answer below hypotheses:

Testing Trial 3

- ***H4:*** *Biased test subjects have shorter time period until first fixation towards images viewed throughout trial 2*
- ***H5:*** *Unbiased test subjects have shorter time period until first fixation towards images viewed throughout trial 2*
- ***H6:*** *Biased test subjects look into known images for a longer period of time during first fixation*
- ***H7:*** *Unbiased test subjects look into known images for a longer period of time during first fixation*

7.2.5 - Trial 4 - Simulated Purchase Situation

Trial 4 simulates a purchase situation, where each subject is asked to choose between eight physical original beads designed by Trollbeads. Four of the eight beads are again the exact same as the four presented in both trial 1 and trial 3 and drawn in trial 2.

[14] See appendix 10 – Original beads – Trial 3

The subjects are also asked to describe why they chose as they does as well if they can remember the four animals presented in trial 1. Trial 4 attempts to answer below hypotheses:

Testing Trial 4

- ***H8:*** *Biased test subjects purchases the animal bead, which has attracted the longest total fixation duration throughout the entire experiment*

    - ***H8.1:*** *All test subjects purchases the animal bead with the longest total fixation duration*
    - ***H8.2:*** *Test subjects purchases the animal bead with the most fixation points*
    - ***H8.3:*** *Test subjects purchases the animal bead best rated in trial 1*

The four trial experimental set-up will collect data about potential consumers in Trollbeads' segment 3 and 4, counting the younger segment. The data will attempt to find correlations between preferences and whether advantages can be obtained by implementing personalized newsletters in order to increase consumer involvement.

7.2.6 - Sample Population

Selecting test subjects for an experiment like this is highly important in order to properly judge the validity of the results. With regard to the complexity of conducting experiments involving eye-tracking measuring fixation points and duration, the experiment is carried out with 38 participants. As stated, it is important to gather a homogeneous participant group when conducting a pilot study. The 38 subjects are therefore found amongst students from Copenhagen Business School and/or University of Copenhagen assuming that it is a segment living within the same paradigm. Furthermore, it is a segment that the researcher herself easily can relate to and also get in contact with because they are in the same environment. Though, it must be stressed that a rather large amount of test persons can be necessary in order to increase the validity and confidence level of the outcome of this thesis.

The 38 subjects are all females aged between 20 and 29 years (Median = 25[15]) and recruited by a written invitation[16] posted in Facebook communities, groups consisting of students from Copenhagen Business School and University of Copenhagen. The snowball effect is initiated in such a way that the respondents are asked to activate their networks in order to engage more test subjects. However, it must be acknowledged that a snowball sample does not make it possible to draw a random sample size representative of the population (Bryman, 2012). The fact that this is a pilot study, the purpose has never been to draw a conclusion upon the population, on the contrary, the purpose is to imply that an experiment like this could bring insights into potential competitive advantages for Trollbeads.

Participants wearing glasses are asked to switch to contact lenses, as these do not interfere with the eye-tracker calibration to the same extent as glasses do. Further, as the test subjects only counted female students[17], they are all asked to take off their eye make-up due to the possibility of interfering with the results of the experiment (Holmqvist et al., 2011). All men were excluded from the experiment, as they are not a part of the targeted segment. Moreover, people with direct knowledge and personal relations with the researcher have also been excluded from the sample size because these groups can interfere negatively to the findings. Similarly, persons with disorders have been omitted from the experiment.

7.2.7 - Observations

As behavioural measures are also used to understand motivation as well as choice conflicts (Ramsøy, 2015) participant observations during the 38 experiments are made in order to depict the actions of the test subjects. The observations also count for the qualitative data, as it tends to discover insights about the test subjects with minimal interventions.

It should be acknowledged that test subjects often appear as abstract entities in the research planning phase, which is why the observations carried out during the recordings are made in order to observe the participants as the people they really are (Holmqvist et al., 2011).

[15] See appendix 12 – Participant information, observations and field notes
[16] See appendix 11 – Invitation to becoming a test subject
[17] See appendix 12 – Participant information, observations and field notes

Observations of the subjects prior to the experiments involve looking for characteristics of the test persons physics, such as downward pointing eyelashes that can mess up the recordings (Holmqvist et al., 2011). Furthermore, as each person has different fixation duration, the observations are seen as a method to correlate results from the physiological measures as to what is explored in the lab.

Because, blinks can be detected as a flaw in the sample size, the observations during the experiments include counting of unusual amounts of blinks as well as any other possible distractions. The validity of the observations relies on the researcher's ability to structure and prepare her notes. Therefore a scheme is made in order to improve the counting process as well as to remember which factors to observe[18]. All observations are noted as field notes emphasizing the body language, vocal expression, and the emotional state emerging from the experimental set-up.

7.2.8 - Designing the Stimuli

"Anyone or anything that does not bring you alive ... is too small for you." - David Whyte (1996)

Taking point of departure in above quotation (Whyte, 1996), the stimuli designed for the experiment carried out is constructed to bring the test subjects "alive". Because choices and judgements mostly engage various psychological processes such as attention, memory and external sources (Weber & Johnson, 2009), the stimuli is designed to retain attention driven by memory. Further, due to the assumption that the exposed stimuli attracting the longest fixation duration arouse emotions, the attention guided by memory will attempt to found whether consumer involvement can be increased by implmenting personalized newsletters.

By the use of the eye-tracker and the designed stimuli, the researcher attempts to map choices based on the test subjects' intuition. Further, the stimuli also attempt to indicate the connection between automatic and deliberative processes by measuring both 'time to first fixation' and 'total fixation duration time'. By this it is vital to recognize the recent merge of memory and prediction processes as a clarification of choice and judgement phenomena (Weber & Johnson, 2009).

[18] See appendix 12 - Participant information, observations and field notes

According to Weber and Johnson (2009) one needs to distinguish between preferences and inference. This is argued even though they draw on the same cognitive processes, as preferences imply a subjective decision involving value judgement and inference relies on beliefs and objectively verifications (Ibid). However, the presented stimuli rely on preferences, as the test subjects' choice of bead is a very individual matter.
It should be recognized that any further cognitive processes influencing the choice of the test subjects has been neglected as the stimuli are only designed to be tested through an eye-tracker.

The stimuli presented are chosen according to the research question and based on artificial and balanced scenes and not natural and unbalanced (Holmqvist et al., 2011). This means that the images presented to the test subjects are constructed by special selected artefacts that reduce visual noise. Although, choosing a natural scene can offer a better generalization to the real world, this experiment however focuses on a comparison between four trials and thus choosing a controlled scene provides an advantage as all low-level features of the scene can be controlled (Ibid).

As this thesis analyses fixation duration, the placement of the presented images is crucial as the results can be affected negatively if the stimulus is not presented in the same way e.g. if one image is placed close to the edge of the scene and another in the middle. The stimuli presented for the 38 test subjects are therefore divided into a matrix of four images consisting of a large square area with clear margins in order to compensate for minor offsets or data samples as seen below in Figure 11:

Figure 11 - Images from Trial 3

The presented images are chosen based on the proposed research question, which makes all presented images have its origin in original Trollbeads products. This is due to the researcher's assumption about: Exposing consumers to images that elicit emotional arousal will provide Trollbeads with the opportunity to increase consumer involvement.
Also, in order to make the results of the experiment comparable, it is based on the four trials, as trials help to extract the maximum amount of data (Holmqvist et al., 2011). The trials also help prevent learning-effects as well as order-effects as they are set to randomized the presented images (Ibid) as seen below in Figure 12 compared to Figure 11. The rearrangement of the images will lower the possibility of the results from being affected due to the placement of the stimuli (Ibid).

Figure 12 - Rearrangement of Images in Trial 3

Each scene is presented at a constant duration of 3000 milliseconds. The short duration time is due to the possibility of test subjects taking advantage of learning how long time they have to look at each scene (Holmqvist et al., 2011). An example could be "I can easily look at the sheep for a while, as I know I have time to look at the other images afterwards". 3000 milliseconds also enables the researcher to measure fixation point and duration while not giving the test subject's time to look at anything else than the most desired item presented to them (Robu, 2013). The time limit also makes this study a forced-choice study, which will suppress conscious deliberation (Genco et al., 2013).

Furthermore, to illustrate a comparison between the experimental set-ups, trial 2 will consist of drawings related to the original Trollbeads products as seen below.

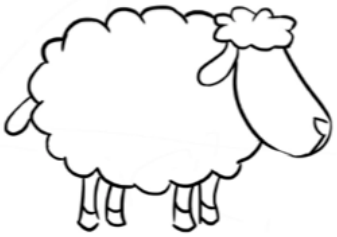

Figure 13 - Drawing Shown in Trial 2

Figure 14 - Image Shown in Trial 3

The chosen Trollbeads products: Fish, rabbit, sheep and turtle, have been chosen as they are assumed to provide the experiment with the most unbiased results. As for example the researcher could have chosen to expose the test subjects to a snake bead but as snakes are a symbol of fear for most humans, the results generated based on an exposure to this exact animal, could be seen as invalid. Furthermore, in order to eliminate possibilities of confounding effects from the test subjects, they are not made aware of the tested brand or images (Bang & Wojdynski, 2016).

As stated, trial 2 and 3 expose each subject for 504 images divided into 126 scenes mixing the two times eighth presented animals. Each of the 504 images is marked as an Area of Interest (AOI) in order for the researcher to keep track of the different images when analysing the results(Holmqvist et al., 2011). The AOI is divided as illustrated in below Figure 15.

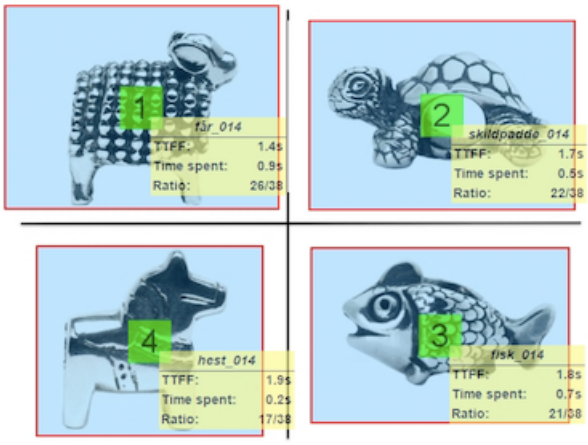

Figure 13 - Example of Area of Interest (AOI)

Through the different trials, the researcher attempts to awaken the test subject's *top-down* attention analysed by fixation duration. Top-down attention is categorized as voluntary allocation of attention towards certain objects (Genco et al., 2013). Furthermore, it should be recognized that variability in the experimental process has tried to be eliminated.

This has been done by testing all subjects in the same room, as temperature can influence the results, as well has all participants will receive the same guidance prior, along and after the experiment. However, as stated, the presented stimuli will be randomly exposed in order to prevent potential lacks in the results, in case the test subjects should notice each other about the material.

7.2.9 - Ethical Considerations

When carrying out neurological consumer behaviour tests, one must take ethical considerations into account. In 2008 a code of ethics were conducted summarizing three topics: "*Protecting the rights of the participants, talking responsibly to the media, and being honest with clients and customers*" (Grenco et al., 2013;344). Furthermore, as ethnographic methodology has been applied through participant observations, it will be impossible for the researcher to sort all dilemmas and questions in advance as participant observations imply for situational responses (Silverman, 2011).

However, as outlined by Holmqvist (2011) participants often ask questions such as whether their intellectual abilities are tested or if they can do anything wrong during testing. Consequently, it is crucial that the researcher has prepared answers to these questions as hesitation and weak answers can affect the results negatively. Thus, this will be eliminated through the oral introduction. Also, the researcher must decide whether a test person should be alone when being exposed to the stimuli. As this experimental set-up neither tests the intellectual state of the test subjects nor does it involve any risks, the researcher will be present in the lab since it is assumed that her presence will not affect the behaviour of the test subjects.

In addition with regard to privacy policies, all participant information such as names, date of birth etc. will be solely available to the researcher. This is decided in order to provide the participants with security and a notion about their responses being anonymous. By speaking nicely and by creating an open environment, the researcher aim at leaving the participants with a good impression about participating in the experiment (Holmqvist et al., 2011).

7.3 - Physiological Measurements

"The eyes are the window to the soul" – oculus animi index Robu (2013)

The physiological measures of this thesis consist of visual attention focusing on 'time to first fixation', 'duration of fixation time' and 'number of fixation points'. Eye-tracking is chosen as it is a technology that can help marketers overcome some of the drawbacks of standard marketing tools such as focus groups and interviews, which can result in biases (Vecchiato et al., 2014). Furthermore, according to Krajbich and Smith (2015) choices and visual attention is clearly interrelated as it is argued that there is a positive correlation between positive rated items, 'total fixation time' and final consumer choice (Krajbich & Smith, 2015b). Testing visual attention towards marketing content can therefore provide a more precise recording of where and when the visual attention is directed (Robu, 2013). Further, this is also supported by the internal and external factors influencing consumers when making decisions (Weber & Johnson, 2009). As the external factors are related to the presented marketing content and the internal addresses memories and emotions these can only be measured correctly through the actions of consumers. Mapping these factors is therefore crucial to clarify in order to establish efficient marketing initiatives and increase consumer involvement (Robu, 2013).

The physiological measures are also seen as a more reliable form of research method, as our - often biased - choices are replaced by scientific data (Ibid). Moreover, the physiological measures are necessary and central to this investigation in order to be able to answer the research question: *How can Trollbeads A/S increase consumer involvement through measurements of emotions generated when exposed to online communication content?* The measurements are therefore used as an indicator of either a positive or negative physiological process implying if there is a correlation between visual attention, emotional arousal and consumer involvement.

Furthermore, by using physiological measures, the researcher is able to test potential corrolations between the test subjects' automatic or deliberative processes based on 'time to first fixation', 'total duration fixation time' and consumer choice.

7.3.1 - Eye-tracking

"*The more we like something, the faster we tend to respond*" – Ramsøy (2015)

There is no doubt that the use of eye-tracking has grown over the past years due to the recognition of its usefulness with regards to technological innovations as well as its ability to advance science (Holmqvist et al., 2011). Elaborating on above statement, the use of eye-tracking as a research method within this thesis, is in fact an attempt to both tackle the research question properly and at the same time produce data which can be analysed statistically.

Stated by Ramsøy (2015), response time can be an indicator of consumer preferences as the decision-making process often depends on milliseconds, which makes it impossible to detect without the correct measurement tools such as an eye-tracker.
As it has been realised that memory and prediction processes arise judgement and choice, Weber and Johnson (2009) also outlines the importance of distinguishing between automatic and deliberative processes, which also only can be detected through physiological measures such as eye-tracking. Below section will therefore introduce a more theoretical examination of eye-movement.

7.3.2 – Eye Movement

According to Duchowski (2007) visual attention and eye movement is seen as a cyclical process divided into three stages. In stage one the presented stimuli, for instance a scene with four images, is perceived as a whole through peripheral vision. Though, interesting images may "occur" in the field of view, directing attention towards their location for further detailed inspections. Throughout stage two, attention is reengaged and automatically directed towards the first AOI. Stage three engages the foveal, which is the only system in the retina that permits 100% visual acuity, towards the region of interest (Duchowski, 2007). As shorter fixation is being associated with greater processing and longer fixation often related to processing of difficulties (Genco et al., 2013) this experiment will thoroughly rely on 'time to first fixation'. Theoretically speaking 'time to first fixation' is the amount of time it takes between the loading of an image and the test subject's first fixation within the area of the presented material (Bang & Wojdynski, 2016).

Furthermore, the decision to focus on 'time to first fixation' is also supported by Robu (2013), who states that eye-tracking can point out the certain objects that have our attention. It is further outlined that a fixation larger than 300 milliseconds begins a cognitive process, which indicates the object of interest to us (Robu, 2013). As our cognitive and thereby deliberative process already begins after 300 milliseconds, 'total fixation duration' has also been put into focus. By measuring 'total fixation duration' the researcher is allowed to correlate whether or not the stimuli attracting attention, based on 'time to first fixation', corresponds with total duration time or if the cognitive process has overruled and manipulated the test subjects to choose a different bead than what they looked into at first.

As stated by Ramsøy (2015) the decision-making process relies on milliseconds and consumer preferences can therefore be impossible to detect without the right tools. Especially saccade, which represents the period of visual search exposed by a rapid eye movement occurring between fixations, indicates shifts between understanding and attention. A regressive saccade, found by an eye movement moving forwards and back to a previously AOI, often represents confusion and lack of understanding. By finding saccades the researcher is allowed to gain insights into the test subjects' goals or if there is a lack between stimuli and expectations (Genco et al., 2013).

Thereby, applying the method of eye-tracking allows for a scientific observation of the attention evolved from the moment the test subjects are being exposed to the presented stimuli (Duchowski, 2007). Also, the eye-tracking instrument enables the researcher to record the different models of fixation as well as the saccadic movements the test subjects make through the visualization of the stimuli (Robu, 2013). Based on above introduction to methodology and the research design, the following section will present the results from the eye-tracking experiment.

8. Data Analysis

According to the combined value creation cycle personalization process made for Trollbeads, (see Figure 6, page 31), one of the key points in order to successfully implement personalization is the data collection stage.

As the quality of the data collection affects the entire personalization process any lack occurring in this stage will have a negative influence on future marketing content and thereby consumer involvement. The experiment carried out has therefore been designed to provide Trollbeads with insights on why and how they should use the online generated consumer data available through their website by illustrating the importance of evoked emotions. By getting a clear overview of how to target individuals within the younger segment, Trollbeads can get a more efficient way of advertising and thereby increase consumer involvement. The results from the eye-tracking experiment will therefore form the foundation for the implications (see page 79).

In the following section, an analysis of the collected data and tested hypotheses is carried out. Through the use of Microsoft Excel and SPSS, the data from the Tobii Pro T60XL eye-tracker has been analysed. It should be noted that the results from trial 1, involving the survey, only investigated the ratings of the four fixed animal beads and thereby excluded any other ratings. This limitation was made, as the survey mixed the four animal beads with 9 random categories in order to ensure that the tested product was not revealed prior to the eye-tracking experiment. In order to indicate whether a correlation was found between bias and purchase, each of the biased test subjects' ratings was correlated with 'time to first fixation', 'total duration time' and final consumer choice.

One test person was dropped from the sample size as she failed to complete trial 2 and 3 due to illness. This left the total amount of test subjects to be 37 – 18 biased and 19 unbiased. Consequently, the dataset was corrected for any fixation errors. The corrected fixation errors counted for 14.2% throughout trial 2 and 15.7% in trial 3. This means that 29.9% of the merged data was useless. These errors affect the data negatively as a greater amount of data is always perceived as more reliable. However, this was accounted for, because no experimental set-up can be 100% correct plus the fact that testing humans counts for many intangible factors.

8.1 - Summary of Results

In order to provide the reader with an overview of the results, below Table 3 has been provided.

Testing Trial	*Hypotheses*	*Method*	*P-value*	*Conclusion*
Trial 2	**H1:** Biased test subjects will have shorter time period until first fixation throughout trial 2	Mann Whitney U test	P < 0.05	Verified
	H2: Biased test subjects will have a longer first fixation duration	Mann Whitney U test	P > 0.05	Rejected
	H3: Biased test subjects' first fixation is towards an already known image presented in trial 1	Binomial test	P > 0.05	Rejected
Trial 3	**H4:** Biased test subjects have shorter time period until first fixation towards images viewed throughout trial 2	Mann Whitney U test	P > 0.05	Rejected
	H5: Unbiased test subjects have shorter time period until first fixation towards images viewed throughout trial 2	Mann Whitney U test	P > 0.05	Rejected
	H6: Biased test subjects look into known images for a longer period of time during first fixation	Mann Whitney U test	P > 0.05	Rejected
	H7: Unbiased test subjects look into known images for a longer period of time during first fixation	Mann Whitney U test	P < 0.05	Verified
Trial 4	**H8:** Biased test subjects purchases the animal bead, which has attracted the longest total fixation duration throughout the entire experiment	Binomial test	N/A	Verified
	H8.1: All test subjects purchases the animal bead with the longest total fixation duration	Binomial test	P < 0.05	Verified
	H8.2: Test subjects purchases the animal bead with the most fixation points	Binomial test	P < 0.05	Verified
	H8.3: Test subjects purchases the animal bead best rated in trial 1	Binomial test	P < 0.05	Verified
Extra	**H9:** First fixation is more likely towards the worst rated animal (trial 2) among biased subjects.	Binomial test	P > 0.05	Rejected
	H10: First fixation is more likely towards the worst rated animal (trial 3) among biased subjects.	Binomial test	P < 0.05	Verified

Table 3 - Summary of Results

8.2 - Results of Trial 2 - H1, H2 and H3

Through H1, H2 and H3 the main aim was to investigate whether a bias had an effect on 'time to first fixation' of the presented animal drawings. The reactions of both biased and unbiased test subjects were compared in order to answer the hypotheses.

The data collection was sorted by biased and unbiased test subjects and thereby correlated with their 'time to first fixation' throughout trial 2 counting the animal drawings related to the original Trollbeads products. The observations applied for further analysis were: n_{Total} = 11.584 with $n_{unbiased}$ = 5791 and n_{biased} = 5793. A mean rank of 'time to first fixation' was estimated to 5885,94 for unbiased subjects and 5699,09 for biased. Based on a mean estimation, $\bar{x}_1 - \bar{x}_2$ = 743.37 – 695.35 = 48.02, it was found that biased test subjects were in average 48.02 milliseconds faster towards their first AOI of fixation than unbiased test subjects. The lower rank between the two means indicates that the biased test group had a faster 'time to first fixation' than unbiased. The mean estimation can be seen in a histogram in appendix 13.1 showing the distribution of visual attention.

Thus, in order to analyse if there was a significant difference between the two test groups, Mann Whitney U test was selected in SPSS. Mann Whitney U test was chosen, as the samples were not paired and Mann Whitney U test is a nonparametric statistical method used when it is inappropriate to assume normality within the tested group (Agresti & Franklin, 2009). Through the use of SPSS, the distribution was tested in order to support the choice of Mann Whitney U test. Through the analysis a significant difference was found between the two means as $p < 0.05$ and a confirmation of H1 was found. Furthermore, it was illustrated that the data was not normally distributed, which increases the reliability of the chosen method. For a graphical visualization of the distribution see appendix 13.1.

With regards to H2 and H3, there was no significant difference as the p-values for the hypotheses were calculated to: H2 $p > 0.05$ and H3 $p > 0.05$. A rejection of the two hypotheses was therefore found. H2 was based on the same observations as H1: n_{Total} = 11.584 with $n_{unbiased}$ = 5791 and n_{biased} = 5793 comparing the two test groups and calculated based on Mann Whitney U test in SPSS. The mean rank for H2 also indicate a rejection of the hypotheses as the mean rank for unbiased test subjects = 253.63 and biased subjects = 241.29, showing a difference of only 12.34 milliseconds, see Figure 16.

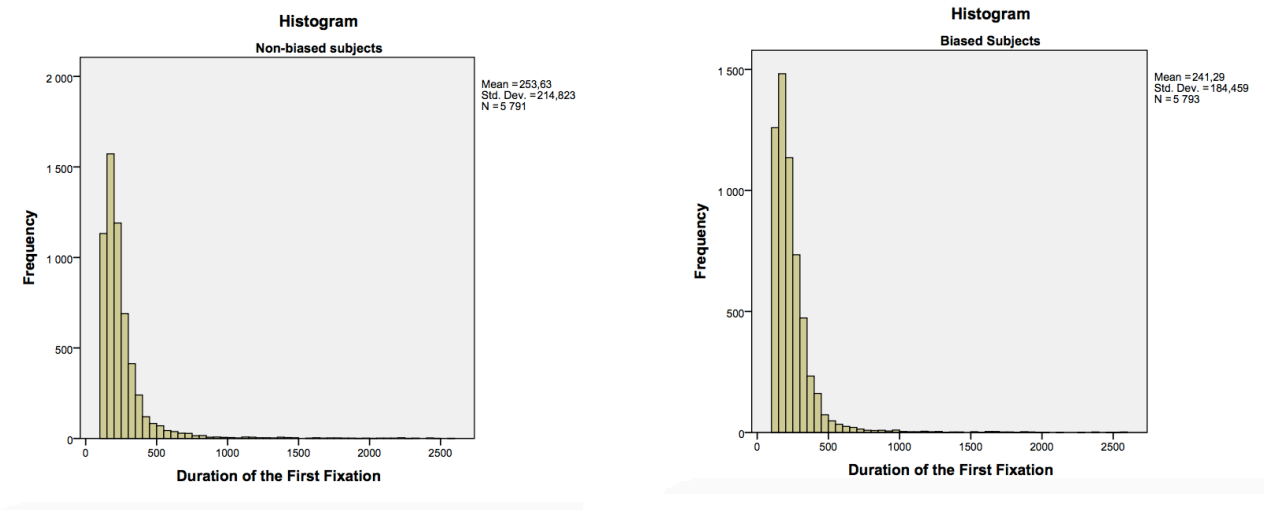

Figure 14 - H2 Histogram – Unbiased and Biased Test Subjects

While, H2 was based on the value: 'Duration of first fixation' in order to reject or verify the hypothesis, H3 focused on biased subjects testing whether the first AOI fixation conformed with one of the four animals seen in trial 1. The observations used for further analysis were: n_{Total} = 5838 with $n_{notmatching}$ = 2906 and $n_{matching}$ = 2932. Through the observations, it was found that 50.22% of the first fixations were towards an AOI matching one of the known animals from trial 1. Thus, as 49.78% of the first fixations were towards unknown animals H3 was rejected. H3 was estimated through a Binomial test as the tested n trials were independent as well as the tested variables only implicated for having two possible outcomes, each with the same probability of success (Agresti & Franklin, 2009).

8.2 - Results of Trial 3 - H4, H5, H6 and H7

Through H4, H5, H6 and H7 the intention was to investigate potential correlations as well as make comparisons between results from both trial 2 and 3 in the eye-tracking experiment. The results were based on reactions from both biased and unbiased test subjects.

Through the use of Mann Whitney U test, it was indicated that there was no significant difference for both H4 and H5. H4 was estimated based on 'time to first fixation', stating that it would be towards an animal seen throughout the trial 2. H4 was rejected as $p > 0.05$. H5 was based on variables counting unbiased test subjects exploring whether their first fixation was towards an already known animal.

However, as p > 0.05, H5 was also rejected as the measured non-dependent variables were: 1) 'Fixation start time' and 2) 'Duration of first fixation' indicating a significant higher p-value than assumed. This means that the change of stimuli between trial 2 and 3 could have had a negative effect on the expected results. This will be discussed further on page 71.

Test Statistics[a,b]

	First Fixation Start Time
Mann-Whitney U	4376495,000
Wilcoxon W	9307865,000
Z	-1,142
Asymp. Sig. (2-tailed)	,254

a. Was survey completed? = Yes

b. Grouping Variable: Animal seen before?

Test Statistics[a,b]

	First Fixation Start Time
Mann-Whitney U	5606389,500
Wilcoxon W	11621635,50
Z	-1,759
Asymp. Sig. (2-tailed)	,079

a. Was survey completed? = No

b. Grouping Variable: Animal seen before?

Figure 15 - H4 and H5

H6, claiming that biased subjects would look into a known AOI for longer time during first fixation, was also found to be incorrect as p > 0.05. Number of observations were: n_{Total} = 5976 with $n_{knownanimal}$ = 2836 and $n_{unknownanimal}$ = 3140. This indicates that 52.55% compared to 47.45% of the biased test subjects, had a longer 'duration of first fixation' towards a known animal. Even though 52.55% is more than half of the total fixations, there is no significant difference.

H7 stating that unbiased subjects would look into known AOI's, was confirmed as p-value < 0.05. This indicates a significant difference between the two groups as H6 was rejected but H7 focusing on unbiased test subjects was verified. The number of observations was: n_{Total} = 6783 with $n_{unknownanimal}$ = 3315 and $n_{knownanimal}$ = 3468 indicating a mean rank on 3343.44 milliseconds towards unknown animals and 3438.42 milliseconds towards known animals. H7 was also tested through Mann Whitney U test in SPSS.

8.3 - Results of Trial 4 - H8 and Sub-Hypotheses

The main purpose of H8 was to investigate whether the AOI attracting the longest fixation duration throughout the entire experiment correlated with consumer purchase in trial 4. Through the three sub-hypotheses different variables were tested: 1) 'Total fixation time', 2) 'Most fixations' and 3) Ratings from the survey, in order to compare and correlate. Each hypothesis was tested through Binomial test using a one-tail calculation.

Using one-tail means that one needs to get twice as small a test value < 0.025 in order to prove the hypotheses (Agresti & Franklin, 2009). By using one-tail the researcher is able to evaluate upon whether something is smaller/lager and not just if there is a significant difference.

H8.1 states that the purchased animal bead in trial 4 would be correlated with the bead attracting the longest 'total fixation duration'. It should be noted that the measured sample size only consisted of n_{Total} = 16 with $n_{durationdoesnotmatch}$ = 5 and $n_{durationdoesmatch}$ = 11, as the estimation only involved test subjects who had the longest 'fixation duration' towards one of the fixed AOI's: Fish, rabbit, sheep and turtle. This type of test design was chosen, as subjects who have had the longest 'total fixation duration' towards one of the fillers, would be unable to purchase the bead that she actually wanted based on her fixations during the experiment. As a consequence, the probability value of the test was adjusted to 0.25 (1/4 of 'known' animals). Similar logic was applied for H8.2.

Indeed, for H8.1 a significant difference was found as p < 0.0005, meaning that consumers purchase things they are visually attracted to. However, it should be noticed that due to the very small sample size, there are incentives to improve the research design by involving more test subjects.

H8.2 was also confirmed as p < 0.05, which indicates a significant difference between the purchased animal bead and the most fixation points. However, as in H8.1 the measured sample size was small as it only consisted of subjects having most fixations towards 'known' AOI's leaving n_{Total} = 18 with n_{no}[19] = 6 and n_{yes}[20] = 12. However, the observed probability for n_{yes} was 69%.

H8.3 only evaluated biased test subjects comparing if their ratings of the four animal beads perceived in trial 1, was correlated with the final purchase in trial 4.

[19] No = animal drawing most fixations did not match the final bead choice
[20] Yes = animal drawing most fixations matched the final bead choice

As H8.3 only counted biased subjects the sample size was small and observations used to further analyses: n_{Total} = 17 with n_{no}[21] = 6 and n_{yes}[22] = 11 'yes' probability on 0.647. A significant difference was found as p-value < 0.05 based on the observed estimated test probability value calculation of 0.125.

Because all three sub-hypotheses were confirmed, H8 was evaluated to be very likely true. By confirming both H8 and the three sub-hypotheses a confirmation of the hypothesis stating that exposing consumers to images that elicit emotional arousal will increase consumer involvement is verified.

Furthermore, through observations it was illustrated that consumers have different biases and thereby associate each image with something they can relate to from earlier experiences. For instance test subject A001 who was biased, rated the sheep as the most wanted item[23] in trial 1. Further, it was found, that the sheep also counted significantly higher fixation duration compared to the other presented stimulus as seen in below Figures 18 and 19.

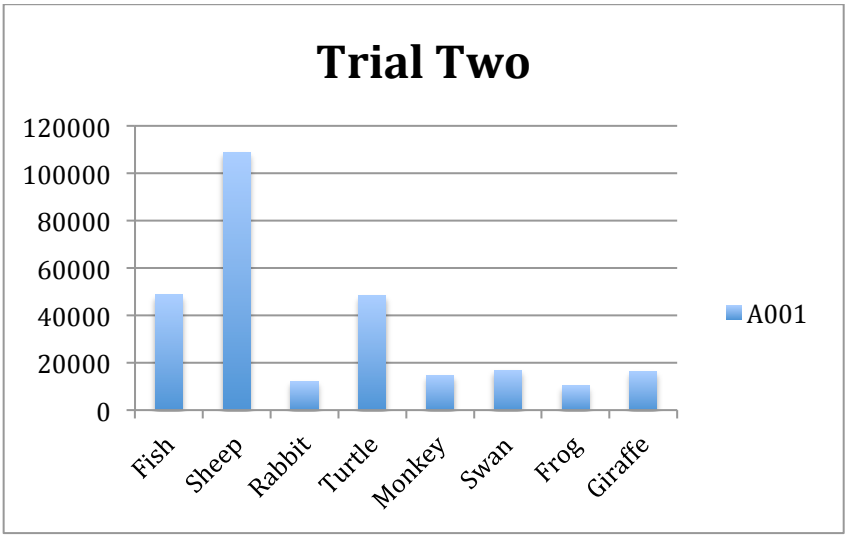

Figure 16 - Test Subject A001 Visual Attention Trial 2

[21] No = the best rated animal did not match the final bead choice
[22] Yes = the best rated animal matched the final bead choice
[23] See appendix 12 – Participant information, observations and field notes

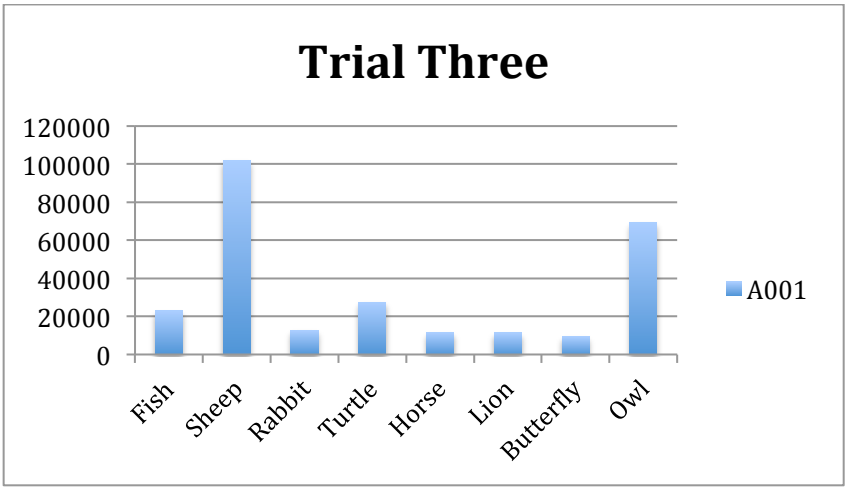

Figure 17 - Test Subject A001 Visual Attention Trial 3

Throughout trial 4, A001 chose to purchase the sheep and was then asked why she was choosing as she did. A001 expressed that she had lived on a farm when she was a child where they had sheep. Last she was asked if she could remember the animals she rated in trial 1 prior to the eye-tracking experiment, and the answer was no. Throughout this observation the importance of personalization is further supported.

In order to secure the validity of above tested hypotheses as well as exclude any uncertainty about humans being attracted towards things they like, hypotheses H9 and H10 were made.

Through the two extra hypotheses, the researcher tends to exclude any uncertainties about test subjects paying attention to AOIs that they do not like and thereby strengthen the hypotheses stating that exposing subjects to stimuli awakening emotions will increase consumer involvement.

- ***H9****: First fixation is more likely towards the worst rated animal (trial 2) amongst biased test subjects.*
- ***H10:*** *First fixation is more likely towards the worst rated animal (trial 3) amongst biased test subjects.*

Both hypotheses were tested by Binomial test with a p-value = 0.125 calculated based on P1 (the probability of certain animal of being in a slide) * P2 (the probability of choosing it randomly if it is in the slide) = 64/128 * ¼ = ½ * ¼ = 1/8 = 0.125.

H9 shows no significant difference, i.e. worst rated animals have the same probability to be firstly fixated as randomly chosen animal – 12.5%. However, H10 does show a significant difference as $p < 0.05$, but in this case the test subjects rather tend to firstly fixate on another animal than the worst rated. This analysis was made because only 11% of the first fixations were towards the worst rated animals (11% < 12.5%). Hence it could be concluded that least rated animals attracts the same or less interest of the biased test subjects than other animals. Moreover, it was also important to notice that the test subjects were having a slighter tendency to firstly fixate towards the least rated animal during trial 3 rather than trial 2.

Elaborating on above results it has been found that sending the right message to the right person increases consumer involvement. Hence, above data analyses heavily rely on statistics and technical calculations, below discussion will provide a broader understanding of the findings. However, the validity of the results will be presented in advance in order to outline the reliability of the findings.

8.4 - Validity of the Results

As stated, biometric measures are collected for this thesis, as these are perceived as more reliable than self-reporting research methods due to the involvement of different cognitive biases.
However, for example eye-tracking is a technical and methodological skill that requires both theoretical and practical training for many years (Holmqvist et al., 2011), which the research does not have.

The probability for lacks within the sample size as well as a more optimized research design could have been obtained if the researcher had explicit knowledge within this specific area. Another disadvantage about eye-tracking is that it has to be integrated with specific tasks in order for it to be useful(Holmqvist et al., 2011). However, this was why the test subjects were exposed to different stimuli, counting the four trials. This further provided a common baseline against which the eye-tracking results could be evaluated (Genco et al., 2013). It should also be taken into consideration that different measurement of eye movement invites for different technical set-ups(Robu, 2013). The most common methods used today are techniques based on either corneal reflection or video-based (Ibid).

Corneal reflection provides the opportunity of fixating the head so the movement of the eyes is distinguished (Duchowski, 2007). The video-based trackers can either be worn on the head or table mounted both consisting of relatively cheap cameras and image processing hardware (Ibid;54).

Thus, working with data like this easily illustrates if there is an offset in some of the stimulus or if data samples are lost (Holmqvist et al., 2011). For instance if a test subject closes her eyes or turns her head away from the eye-tracker. This also implies the importance of blink detection, as blinks are a cognitive function and therefore need to be detached from happenings such as fixations (Holmqvist et al., 2011). It is therefore often recommended to eliminate fixations shorter than 120 milliseconds in duration or manually counting the blinks of each test subject (Ibid).

A sample size consisting of 37 test subjects could be seen as valid, as testing this amount of people in a pilot eye-tracking experiment could be perceived as more reliable than for instance results from a survey. However, testing more people would of course increase the validity of the results.

Through the validity analysis it has been identified that a more reliable research design could have been obtained by using methods as EEG or measurements of pupil dilation. However, the used research design was evaluated to be the best possible performed with regards to the researchers inexperience and this being a pilot study. Below section will discus the findings and illustrate that implementing personalization will increase consumer involvement.

9. Discussion

The main purpose of the experiment carried out in this thesis was to investigate if a correlation was found between bias, visual attention, emotional arousal and consumer purchase. The experiment investigated whether increased consumer involvement could be obtained by exposing consumers to images eliciting emotional arousal.

As consumers are a key source in order to improved business processes and increased consumer retention, (Gupta, Gilbert, & Fabbrizio, 2013), this analysis provides Trollbeads with an understanding of how the company can benefit from using neuroscientific methods such as the eye-tracking experiment carried out. Furthermore, by understanding the emotions generated through exposure to marketing content, Trollbeads will be provided with insights on how to maximize the output of their marketing initiatives (Robu, 2013). This can improve the relationship with the younger segment in the future. Even though this thesis has focused on segment 3 and 4, one could argue that the findings from the experiment also could match segment 1 and 2. This is argued as it must be assumed that our age does not influence the way we react when being exposed to something that arouse emotions and/or memories, but only our preferences within style and/or design. It should therefore be acknowledged that implementing personalized newsletters should involve all four consumer segments mentioned on page 17.

With regards to the analysis of the validity of the results there has further been found lacks in the findings. Below section will therefore provide an overview of the choice of technology and what could have been done in order to obtain a better research design.

9.1.1 – Choice of Technology

If the researcher had been aware of the lacks in the findings prior to the creation of the experimental design, the hypotheses would include other variables than 'time to first fixation'. These lacks could have been prevented if for instance the researcher had chosen to measure on 'number of fixation points' or 'total fixation duration' in all hypotheses. This could have provided insights into the test subject's preferences.

It should be recognized that eye-tracking has its limitations and cannot stand alone in mapping what people think (Robu, 2013). A combination of eye-tracking and EEG could therefore provide additional insights into whether fixation duration and emotions are associated with consumer involvement(Va, 2015). This could be obtained as EEG measures electrical impulses aroused in the brain when being exposed to stimuli indicating the engagement level towards the stimuli (Ibid). However, this method request knowhow as a headset with numerous sensors should be applied to each test subjects head (Ibid).

Furthermore, in order to test whether there was a correlation between fixation point and emotional arousal, pupil dilation could have been chosen as another measurement method. Pupil dilation consists of measures of both pupil size as well as changes within these (Genco et al., 2013). Because most eye-tracking devices measure pupil size as a side effect when monitoring eye movement (Holmqvist et al., 2011), the use of this method would be a low-cost add-on that would provide necessary and reliable results to the thesis. Pupil dilation would illustrate whether an arousal was elicited when the test subjects were exposed to different stimuli (Va, 2015). Moreover, pupil dilation is an implicit measure of pleasure. It is stated that pupils dilate more when looking at images perceived as pleasing compared to those remarked as not pleasing (Alvarez, Winner, Hawley-Dolan, & Snapper, 2015). Measuring pupil dilation through the experiment would therefore provide the findings with a deeper insight into the correlation between emotional arousal and consumer involvement.

Furthermore, as the researcher is not knowledgeable about whether the arousal towards the presented stimuli is positive or negative, this indicates a further drawback of the chosen method. However, this could have been prevented through implementation of either EEG or pupil dilation (Va, 2015)and thereby made the results more sufficient. Though, the chosen research design is seen as the ideal 'first step' taking the researchers inexperience into consideration. As the performed research design illustrates how Trollbeads can use measurements of the emotions aroused when being exposed to marketing content, the research question is answered and thereby fulfilling the intention with the investigation. Hence, below section will illustrate what was indicated by the eye-tracking experiment.

9.1.2 – Seeking Familiarity

Through H1 it was verified that consumers seek familiarity when being exposed to marketing content. This was found as a significant percentage of the biased test subjects had a shorter time period until first fixation than unbiased, indicating that they were drawn towards the familiar images counting: Fish, rabbit, sheep and turtle, rather than the fillers. However, due to the research design, the images presented throughout trial 2 were not the exact same as those in trial 1. The presented animals shifted from images of original beads to drawings of the same animals. This could have had an effect on the visual attention due to different perception and preferences in the stimuli.

However, as our subconscious mind has a great impact on the decision-making process, one could argue that it was the bias in trial 1 that led attention towards the four fixed animals and not the shift in stimuli. However, through the observations carried out continuously with the eye-tracking experiment, it was found that the test subjects' interest decreased towards the familiar animals throughout trial 3. Between trial 2 and 3 stimuli were shifted once again, counting for original images of the beads. This argument further supports the theory about balancing both novelty and familiarity in order to reach the sweet-spot (see Figure 8, page 37) and thereby gain increased interaction with the consumer (Genco et al., 2013).

However, one could ask: How companies ensure to obtain the sweet-spot, what is too much familiarity and what is too much novelty? And what are the consequences of presenting either too much of one thing over the other?

Presenting either too much novelty or too much familiarity in a newsletter, counting the most important ZMOT for Trollbeads, could have a negative effect on the future consumer involvement. As presenting the wrong stimuli to the wrong person will not evoke positive emotions and thereby be perceived as a bad memory towards the Trollbeads brand. But how does one ensure the perfect balance? (see Figure 8, page 37). Throughout trial 3 it was found that the interest within the familiar images decreased. This could be analysed as the stimuli becoming boring and thereby being too familiar. Due to the shift in attention between trial 2 and 3 it could be argued that exposing consumers to the same image over and over will lead to ignorance and decreased consumer involvement.
However, high saccades (see page 7) were identified at scenes only containing fillers, which could be evaluated as an aroused feeling of confusion. Therefore, creating newsletter content based on data gathered from the consumer-generated wish-list, earlier research and purchases, Trollbeads can ensure that they create a balance of both novelty and familiarity. Presenting consumers to images they have already shown interest in as well as relying content on new items and information will awaken their interest and a balance of familiarity and novelty will be reached. However, an exact analysis of how to balance novelty and familiarity is a suggestion for further research, as it is out of the scoop of the investigated research question.

Though, it initiates how companies can take advantages of measurements of emotions evoked through different marketing content. However, it must be concluded that if a company holds information regarding a consumer, this should be used in order to obtain competitive advantage by increasing consumer value.

9.1.3 – The Effects of Randomization

H2 and H3 were developed to support the findings from H1, however the two hypotheses were rejected which could be explained by the chosen research design being randomized. Even though H2 and H3 were rejected, they supported the hypothesis stating that consumers seek familiarity. This statement was found through observations discovering that the test subject's first point of fixation was instinctively drawn towards the corner of the matrix, which holds the previous attracted AOI.

Therefore, as the research design was built upon randomization, the test subject's expectation of finding the familiar AOI in the same corner as in previous scene, were not fulfilled. Through this finding it could be argued that first fixation is not a reliable proxy for whether people like something as it could be considered as a seek throughout this experiment.

However, if a change in research design was made and the images were presented in the same corner throughout the entire experiment, it could be argued that first fixation would be towards the same AOI and thereby verify the two hypotheses. However, taking up this research design could create invalid results as placing stimuli in the same corner each time would enable the test subjects to take advantage of the subconscious learning-effects making the measurements of first fixation invalid as a proxy for wanting and liking.

Though, the findings could be considered as a proxy for where to place stimuli in a newsletter ideal. For instance, if Trollbeads use a generic designed framework for their newsletters but relying content on personalization, eye-tracking could indicate where to place the most attractive item in order to increase consumer involvement. However, this would be for further research as this thesis investigates how Trollbeads can use measurements of emotions to increase consumer involvement.

9.1.4 – Changing the Image

Throughout trial 3, testing H4-H7, the stimuli were changed from animal drawings to images of animal designed beads. As H4-H6 were rejected, one could argue that the differences in the presented images could have had a negative influence on the perception of the four familiar animals. One could argue that for example the drawing of the sheep could be perceived as more cute than the jewellery designed as a sheep, see Figure 13 and 14.

Through, H4 and H5 it was found that different images arouse different reactions and emotions, even though they show the same animal. This illustrates that relying on consumer statement gathered through traditional marketing methods such as focus groups, could open for lacks in the findings and the risk of creating the wrong marketing content could arise. For instance if a person states that she likes sheep it is not the same as she would like the bead designed as a sheep.

Thus, this finding supports the importance of relying on the online consumer data generated through the wish-lists and jewellery boxes at the Trollbeads website as it gives Trollbeads an understanding of each individuals preferences. Basing marketing content on personalized data matching consumer needs with the presented stimuli in newsletters will therefore arouse ego involvement and lead to increased consumer involvement.

One could further argue that as jewellery is purchased as "gift-givings", increasing consumer involvement with regards to brand commitment is a key component for a company like Trollbeads. It could be argued that selling a product, which the consumer is not purchasing herself, should arouse even stronger emotions when being exposed to stimuli indicating that the consumer cannot live without this exact product. This could be argued as the consumers' ego involvement must be transmitted to the actual buyer of the product. This is stated, because even though a bead is placed on an online wish-list, it is still the buyer who is making the decision as regards to whether the product is bought or not.

Therefore, it should be noted that Trollbeads can obtain an increased consumer involvement through implementation of personalized newsletters, but in order to increase sales and gain brand commitment, the ego involvement should be transmitted to the actual buyer of the product. This could be achieved through an online sharing platform enabling the consumer to invite peers to engage in their Trollbeads "universe".

By letting the buyer know about the affiliation the consumer has towards Trollbeads, could increase the chance of a purchase of Trollbeads products rather than other items on the consumer's offline wish-list. It is therefore also important that the ego involvement aroused matches the ego that the consumer wants to be.

Many companies rely on focus groups when gathering feedback on products, processes and websites, even though this is a method that has large drawbacks with regards to biases and unreliable statements(Va, 2015). As humans are easily influenced by the norms and expectations of society, the environment of focus groups could easily direct conversations and results towards an utopian image of the world relying on what people think the company wants to hear rather than what they really think.
This statement and above findings also indicate the importance of using neuroscientific methods. Understanding visual attention and the effects shifts in stimuli brings to the decision-making process is crucial to obtain increased consumer involvement. This is supported through the shift in stimuli presented in the experiment throughout trial 2 and 3, illustrating the differences in consumer preferences. For example: Just because you rate sheep high in a survey, does it not mean that you want a sheep bead on your bracelet. Thus, by analysing online consumer data, Trollbeads could overcome this potential lack, as they would target consumers based on what the consumer want rather that what the company wants to communicate.

9.1.5 – Lacks in the Findings

Prior to the experiment, it was assumed that both H6 and H7 would be either verified or rejected due to the origin in the hypotheses. However, H6 was rejected and H7 verified. The 5% chance, indicated by p-value for a result to be incorrect, should be taken into consideration. This implies that if H6 and H7 were to be tested again it could be argued that both H6 and H7 would result in being either verified or rejected.
Furthermore, due to the findings from H1-H5, it is assumed that H7 should be rejected because first fixation is perceived as a search towards familiarity and not counting the longest duration. It should therefore be acknowledged that the researcher's choice of focusing on 'time to first fixation' as variable could have been another, however, as this researcher is new in the field this could not have been predicted.

9.1.6 – Verifying the Correlation Between Emotional Arousal and Consumer Involvement

Through the hypotheses H8-H8.3 it was found that exposing consumers to images attracting visual attention and thereby also eliciting emotional arousal, an increased consumer involvement was reached. This is argued as a positive correlation was found between best rated bead, 'longest fixation duration', 'number of fixation points' and final purchase. The results of the eye-tracking experiment thereby verify that personalized marketing content triggers ego involvement (see page 20), further supporting that targeting consumers through personalized newsletters, containing images and information relevant for each individual, will increase consumer involvement in the younger segment.

This is further illustrated, as purchase involvement and brand commitment are effects of ego involvement (Beatty et al., 1988). It can therefore be argued that affecting ego involvement positively through personalized newsletters also will influence future involvement in a positive way. This is concluded as purchase involvement counts for the interest in the purchase process triggered by the need to consider a purchase, which is awakened by increasing individual's self-concept (Ibid). Thereby, creating newsletters based on individual consumer-generated data aiming at reaching the sweet-spot between novelty and familiarity (Genco et al., 2013) will evoke an interest within the purchase situation and automatically lead to increased interest towards the Trollbeads brand.

9.1.7 – The Subconscious Take Over

Through trial 4 of the experiment, it was explored that 15 of the biased test subjects could not remember the four animals rated in trial 1[24]. This indicates that our subconscious has a tremendous effect on the decision-making process, as H8 and the sub-hypotheses, illustrated that the best rated animal also attracted the 'longest fixation time', 'most fixation points' as well as being the purchased animal bead.

However, as H3 and H4 were rejected, illustrating that biased subjects did not have their first fixation towards a known animal, this supports the effect of people's unconsciousness. Through this exploration it was found that using neuroscientific studies can provide Trollbeads with insights on the importance of targeting consumers more specifically, as our subconscious takes over our mental process, leading us towards a decision that we are not aware of.

[24] See appendix 12 – Participant information, observations and field notes

This is also supported by earlier research indicating that consumers often are not aware of exposures in the environment that trigger them into a specific consumption behaviour (Chartrand & Fitzsimons, 2011). It is therefore important to personalize the different touch points between Trollbeads and the consumers as each touch point influences the purchase decision either positively or negatively.

9.1.8 – Eliciting Individual Memories and Emotions

As already stated, earlier research has illustrated that we as individuals arouse different memories and emotions when being exposed to stimuli (Weber & Johnson, 2009). This statement was also verified through the experiment, as it was found that the animal bead purchased, also counting the longest 'total fixation duration' for the test subjects, evoked individual memories. This is further illustrated through the results presented in Figure 18 and 19 (page 63 & 64). The example of test subject A001 clearly outlines how this specific consumer has personal memories of sheep, associating it with her childhood. It could be argued that targeting her with a newsletter containing images of the sheep bead would arouse ego involvement, leading to an increased interest in the purchase process, leading to higher brand commitment and thereby increased consumer involvement.

Based on Figure 18, consider: If test subject A001 was targeted with a newsletter containing images of the frog, counting the shortest 'total fixation duration', the chance of an emotional arousal is unlikely to appear as it must be argued that this exact consumer does not have any positive memories or emotions towards the frog. Therefore, viewing marketing content as a way to create emotional bonds between a brand and its consumers is a way to obtain competitive advantage. This is due to the activation of the subconscious level in the consumer brain, which is important as it drives the decision-making process. However, it should be noted that A001 is an example of a test subject that both rated the sheep highest in trial 1 as well as not changing her visual attention even though the stimuli changed character between trial 2 and 3.

Though, as this was not the case for all test subjects, the statement indicating that presenting the same item in different ways has an effect on whether a consumer wants a product or not is supported. This further illustrates how measurements of emotions can be used in order to obtain an understanding of how to target consumers be finding unconscious biases.

Furthermore, the effect of the chosen research design, involving bias, could be questioned. As illustrated by the example of A001 she had a deeper affiliation towards sheep and the attempt to influence her only through trial 1, is not totally reliable. As explored through observations, 11 of the test subjects had a pre-intake affiliation towards one of the presented animals. It should therefore be noted that one can never 100% omit biases as culture, religion and earlier experiences drive our emotional arousal and thereby our decisions. This also illustrates how consumer statements gathered through traditional research methods could be obtained as invalid because consumers are not aware of the pre-intake biases they have towards the explored.

Thereby, using neuroscientific measures can give companies as Trollbeads more reliable consumer insights. It could therefore be argued that presenting the test subjects to other animals or items could have illustrated different results than the findings of this thesis, due to different biases. This is also supported as it was explored that 15 of the 18 test subjects could not remember the animals presented in the survey[25] and further that 13 of them chose to purchase the exact same animal bead as the one rated as the most wanted. This further highlights how our subconscious takes over the decision-making process. However, it also indicates the importance of presenting personalized marketing content based on consumer preferences as the subconscious drives decisions. Thereby this supports how Trollbeads could take advantage of using an eye-tracker exploring emotions and visual attention in order to gain consumer insights and thereby obtain an understanding of how to make marketing content more appealing to the consumer's brain and eyes.

However, testing H8 based on the amount of fixation points could invite for lacks in the findings. It should be noted that if a high 'number of fixation points' is found between two AOI's, it could be due to shifting attention between an attracting and confusing AOI.

Through observations it was found that a high saccades were reached at scenes not containing any of the four fixed animals presented throughout the entire experiment. This supports the argument about exposing consumers to marketing content balancing both novelty and familiarity as being the ideal way in order to elicit positive memories and emotions in order to achieve increased consumer involvement.

[25] See appendix 12 – Participant information, observations and field notes

9.1.9 – Investing in Communication Channels

As stated earlier, investment in media budgets does not follow the increase in decisions made online (Lecinski, 2011). This could be due to the ignorance of the technological development within communication channels and companies' anxiety to invest in something unfamiliar. Though, as explored throughout this experiment, creating personalized marketing content matching individual needs could increase consumer involvement. Companies should take into consideration that they could gain competitive advantages through implementation of online marketing. As online marketing campaigns gives the opportunity to analyse the outcome more specifically than offline marketing. This is argued, as it is easier to analyse online search behaviour than finding out who the receiver is when a commercial is running on TV.

However, using Omni-channels, which counts for both offline and online marketing, will provide the opportunity of a broader reach. Though, obtaining knowledge about how to further improve campaigns and the effectiveness of them are easier found by online interaction and analysis. It could therefore be argued that a need for merging both offline and online marketing is needed.

This statement is also supported by the development of the new mental model driving the purchase process (see Figure 5, page 29) (Lecinski, 2011). This is further supported by the findings from the experiment as the results indicate that the marketing process of campaigning is losing overall effectiveness compared to content building, which provides a steadily growing demand for personalization and online interaction. With regards to ZMOT, it could be argued, that it is the consistent content on different search engines that builds preferences. However, these rely on statements made by other consumers and experts and the importance of targeting them right in order to terminate their ego involvement to other potential consumers is found.

Consequently, it must be concluded that by providing consumers with personalized newsletters, this will improve an implicit learning process that will create a positive emotional connection with the brand and thereby increase consumer involvement (Beatty et al., 1988; Genco et al., 2013). This is further central in order to obtain the newly evolved consumer relationship for Trollbeads.

Based on the discussion the conclusion has been evolved and will provide an overall understanding of the investigated research question, the findings and structure of the thesis.

10. Conclusion

The starting point of this paper was an acknowledgement of today's speedy development within the field of marketing. Consumers are interacting with brands more than ever before (Va, 2015) and have developed a tendency of ignorance towards mass media marketing (Bang & Wojdynski, 2016). As a response to this behaviour, many companies have tried to implement personalized marketing. An example of this is personalized newsletters. This touch point enables companies to maintain a continuous interaction with consumers. Though, research indicates that the huge amount of newsletters consumers are receiving on a daily basis from different companies tends to result in the same indifference to the content they are being exposed to. This is supported by Blumberg (2004), who states, that 80% of consumers stop reading the newsletters they receive, and 93% of those rather delete these unread e-mails than unsubscribe to the service. In short, the challenge for companies is how they can maintain consumer involvement by continuously ensuring that marketing content is relevant to the consumers.

In the light of this challenge facing all B2C companies, the purpose of this thesis was to investigate *how one company, Trollbeads, can increase consumer involvement in their newsletters through measurements of emotions*.

In order to answer this research question, ten hypotheses were tested in an eye-tracking experiment. The focus was to see how emotional arousal from exposure to Trollbeads products influenced consumer involvement in a purchasing decision. The eye-tracking method was chosen as it is thoroughly tried and tested in previous studies (Robu, 2013) and is regarded as a valid method to assess reactions to marketing content (Va, 2015).

As baseline, the experiment confirmed that emotional arousal and consumer actions are driven by stimuli, resulting emotions and their links to past events, as found by (Ramsøy, 2015) and as illustrated in figure 3.

This was confirmed by the finding that many of the test subjects unconsciously chose the animal bead, which evoked associations towards childhood memories or other good events. This finding also emphasized the importance of personalization in order to increase consumer involvement.

The key finding from the experiment was that seeing images that trigger emotional arousal does in fact increase consumer involvement. This was illustrated by the findings that the bead rated highest in trial 1, also attracted longest fixation time and highest number of visual fixation points in trial 2, where it was shown as a drawing of the given animals, and in trial 3, where it was shown as an image of the actual bead. In trial 4, the simulated purchase situation, the same bead was 'purchased'.

The conclusion from this is that measurements of emotions can be used as a tool to improve marketing content to increase consumer involvement. The measurement variables used to answer this question were 'number of fixation points', 'total fixation duration' and 'rated bead vs. choice' (see page 7).

By testing the links between trial 1, 2, 3 and 4, the final purchasing decision, it was also emphasized that the unconscious mind plays a large role in decision-making. The key finding here was that many test subjects could not recall that they had been exposed to the same animal beads in trial 1 as they chose in trial 4.

Lastly, it was found that people seek familiarity, as H1 was verified and following the pattern of fixation points observed in testing H2 and H3. However, too much familiarity makes us bored, as it was observed that interest in the fixed animals decreased from trial 2 to trial 3 and during trial 3.

The implication of decreasing interest in familiar images emphasizes the importance of hitting the sweet-spot between familiarity and novelty. However, as the focus of this research has never been to investigate how the sweet-spot is reached, this is suggested for further research.

To summarize, the key finding from the experiment is that measurements of emotions can be used to obtain insights into consumer's unconscious preferences and leverage these for optimizing marketing content.

With the acknowledgement of the importance of aroused emotions and memories in the decision-making process, it is concluded that targeting consumers with personalized marketing content will increase a consumer's emotional relationship with a certain brand or product. Therefore, companies should take advantage of the many virtual "footprints" as well as consumer-generated data in order to achieve a competitive advantage.

As this thesis focuses on the practical application of measurements of emotions for a specific company, Trollbeads, the next section will elaborate on the implications for this company.

11. Implications

Based on the findings from the eye-tracking experiment, this section will provide Trollbeads with insights into how they can use measurements of emotions and online consumer-generated data in order to improve marketing content through personalization of newsletters.

The personalization process for Trollbeads was outlined previously in this thesis (page 33) in order to define part of the theoretical foundations for the experiment. This framework will also be used to provide Trollbeads with practical steps to make newsletter content more relevant to each consumer. It is worth noting that the value creation cycle also outlined previously (page 31) is not used, as this framework covers a broader set of touch points (MOTs) and is thus not as effective at focusing specifically on newsletter content.

The marketing aim for Trollbeads is to offer relevant content and increase consumer involvement, as this provides brand commitment, positive word of mouth effects and ultimately leads to more sales.

Today, Trollbeads relies on generic e-mail newsletters that do not differentiate between consumer preferences, search behaviour or prior purchases. Based on earlier cited neuroscientific research (Maslowska et al., 2011) as well as findings in this thesis, this setup is not ideal.

The following section will outline how Trollbeads can leverage measurements of emotions to improve marketing activities at the relevant hurdles in the process and ultimately increase consumer involvement.

10.1.1 – Key Hurdles in the Personalization Process

The key hurdles in the personalization process that measurements of emotions can be used to overcome, in order to increase consumer involvement in Trollbeads' marketing content, are steps 5, 6, 8 and 9. These hurdles as well as the ways in which Trollbeads can leverage measurements of emotion to overcome them will be outlined shortly.

However before doing this, it should be noted why hurdles 1 through 4 as well as 7 are not within the remit of this thesis. Hurdles 1 through 4 cannot be overcome more effectively by using measurements of emotions as these hurdles relate to the setup of consumer relationship management (CRM) systems and data handling processes for the contacts held in databases. With today's technologies it is not possible in any cost-effective manner to observe all consumers' preferences by measuring their emotions. It is also highly unlikely that such measurements would be accepted by consumers, should the technology exist, as cookie tracking and other online tracking methods are hot topics for discussion on marketing ethics (Bang & Wojdynski, 2016). Hurdle 7 can be overcome more effectively, however the scope of this thesis is to focus on a single marketing channel, newsletters received by e-mail, so it is not possible to elaborate on the positive impact of measurements of emotions in this hurdle.

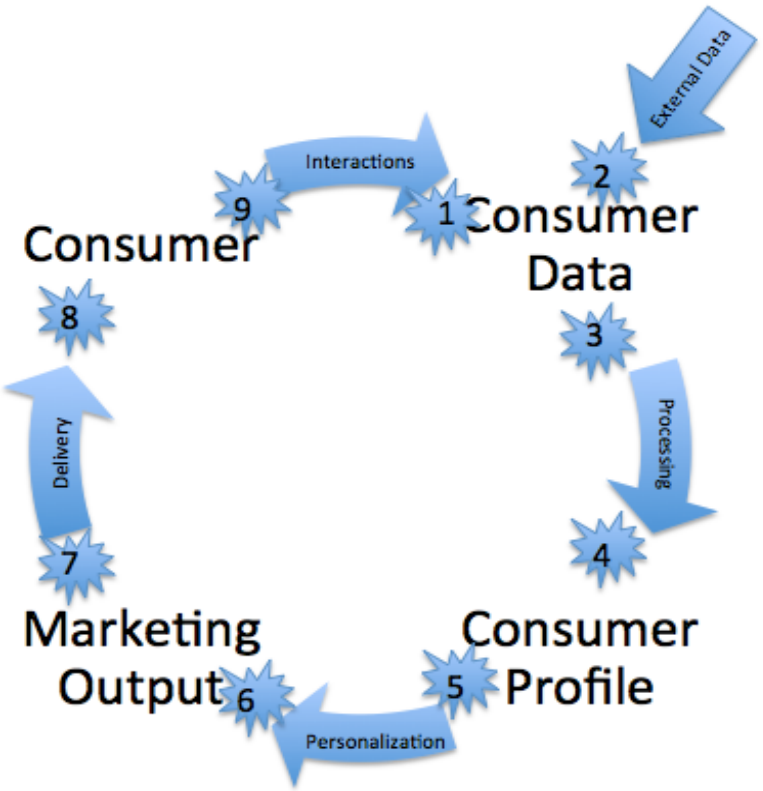

Figure 18 - Potential Drawbacks in the Personalization Process by Vesanen & Raulas (2006)

The first hurdle where measurements of emotion can help Trollbeads is hurdle 5. This hurdle involves data generated from consumer profiles and how marketers chose to transform the data into personalized marketing content. As consumers are driven by *memories* when making decisions based on no prior brand preferences, and *emotions* when they already have an existing brand preference (Plassmann, Kenning, Deppe, Kugel, & Schwindt, 2008), it is important that Trollbeads distinguishes between these two types of consumers in order to communicate most effectively with each type. In short, this means focus on evoking memories for the first group and trigger emotions for the second group in order to increase consumer involvement. Trollbeads can use measurements of emotions to gain insights into specific consumer preferences in order to improve their communication. By gaining knowledge about consumer preferences, Trollbeads can easier develop suggestions, which could be of preference to each consumer.

The ideal targeting could be reached through a merger of measurements of emotions and consumer generated data. As consumers are already engaged to create personal profiles, Trollbeads has made it easy for its marketers to match the company's objectives with consumer preferences.

By using measurements of emotions, e.g. through eye-tracking experiments such as the one conducted in this thesis, Trollbeads can obtain an understanding of the broad trends in consumer preferences across the four segments and within each segment. Trollbeads can use these insights, to e.g. decide whether their four consumer segments should be exposed to four different newsletter designs or if consumers in all segments are targeted most effectively by one given design.

The second hurdle where measurements of emotion can help Trollbeads is hurdle 6. Hurdle 6 accounts for the creative solution and production (Vesanen & Raulas, 2006). This stage is important; as it is here Trollbeads create their marketing content targeting individual consumers. If relying on the data generated from the consumer profiles, Trollbeads are enabled to make analyses on how to arouse memories and emotions through the newsletters. If this hurdle further should be overcome, measurements of emotions can support the findings from the online consumer-generated data. For example, the finding from the above eye-tracking experiment that images that draw attention increase consumer involvement indicates that newsletters should draw the recipient's attention. Attention can be drawn by including products on the recipient's wish-list, by including images with a high likelihood of evoking positive memories, e.g. of a farm if the recipient's postal address is in a farming area. Also, the finding that people seek familiarity indicates that the content in newsletters should have both elements that the consumer recognizes, e.g. products on their wish-list, and elements that are new to them, e.g. products not on their wish-list (but somewhat related).

The third hurdle is hurdle 8, which involves differentiation and timing of delivery of the marketing output to consumers. As each consumer has individual needs and wants regarding marketing, the differentiation of the timing and content is crucial in order to elicit emotional arousal. If marketers understand the responses of the consumer, it is easier to successfully target them in the right way. Through the use of e.g. Google Adwords, which is a marketing tool helping companies targeting consumers online, Trollbeads can gain insights into when and how it would be most optimal to target each consumer. Implementing this tool could be of future interest for Trollbeads, as consumers often randomly search online without knowing which stage of the purchase funnel they are actually in (Lecinski, 2011). However, this is most ideal to implement with regards to the search ZMOT stage.

The fourth hurdle where measurements of emotions can help Trollbeads is hurdle 9. Hurdle nine elaborate upon a marketer's ability to take advantage of the feedback given to the implemented personalized content (Vesanen & Raulas, 2006). This hurdle is crucial as it holds the opportunity to improve the next loop of the personalization process. Therefore, by relying on both click rates, consumer-website interaction and measurements of emotions, this would provide Trollbeads with an ideal way to take advantage of the consumer respondents towards the implemented marketing content. Through measurements of emotions Trollbeads can be informed about emotional arousal illustrating whether they has implement the personalization right.

Furthermore, in order to overcome some of these hurdles towards implementation of personalization, a personalization agent could be implemented in the process. A personalization agent is a collection of software that is used to generate specific and unique content to each individual consumer. Through an implementation of a personalization agent Trollbeads can gain advantage as these can manipulate content-related parameters and thereby minimize the consumer's search effort ensuring that the consumer is led to the crucial touch points and not being lost in the search process (Tam & Ho, 2006).

As described in "*Finding the Sweet-spot Between Novelty and Familiarity*" on page 36, creating a balance between novelty and familiarity is vital in order to awakening the desired memories and emotions and thereby gain competitive advantage of the marketing content presented. It is important to ensure the balance, as too much novelty can be overwhelming and too little can be boring for a consumer's visual attention as explored in the experiment. One suggestion for Trollbeads could be to implement a half personalized and half generic newsletter. By mixing both personalization and generically generated content, Trollbeads can create interest by catching the visual attention of their consumers as well as presenting them to new products and expand the consumer's knowledge about their products. As the personalized newsletter is the touch point counting the stimuli, it is crucial to let it consist of images that the receiver finds interesting in order to arouse emotions and engage consumers in the brand.

Below section will bring suggestions to what could have been done for further research as well as outline the impacts of implementation of personalization can bring to the companies.

12. Suggestions for Further Research

This thesis finds that companies, such as Trollbeads, can use neuroscientific methods to measure emotions in order to gain deeper and more reliable consumer insights. It also suggests ways in which Trollbeads can use measurements of emotion to improve marketing efforts and increase consumer involvement.

There are still several potential topics that falls beyond the scope of this thesis but that could be relevant to investigate further. As mentioned in the discussion, it could be investigated how Trollbeads could use neuroscientific research methods to identify the sweet-spot between familiarity and novelty for their consumers and thereby create the ideal newsletter design and content.

Furthermore, Trollbeads could engage consumers to participate in an eye-tracking experiment, in order to obtain an understanding of the perception of their website. Eye-tracking could indicate if consumers are confused by the website design or whether they experience challenges in the interaction process. By gaining insights into the online website behaviour, Trollbeads could obtain an understanding of how to optimize their website and increase consumer involvement even further.

Elaborating on the performed eye-tracking experiment in this thesis, measures of click rates could have been implemented in the research design. By emphasising participants' click rates, the measurements could explore whether a further correlation was found between emotional arousal and consumer involvement. Thus, it could be interesting to investigate if the implemented personalized newsletters results in increased consumer involvement or not. Through further physiological measurements the consumer perception of the newsletter content could be analysed and provide Trollbeads with insights into whether they have implemented personalization correctly.

Research proves that personalization has a positive effect on direct marketing in the way that sending the 'right' message to the 'right' person will increase the effectiveness of communication (Postma & Brokke, 2002).

It could be relevant to investigate *how big* the effect actually is and whether this can be forecasted for a company like Trollbeads.

It is further concluded that due to the development within technology and consumer behaviour, using neuroscientific methods to gain insights into consumer behaviour is an effective tool to obtain valid and reliable market research results. These findings are not only relevant for Trollbeads but for companies in general. It could be of further interest to explore whether the use of neuroscientific methods has a significant (and positive) effect on companies' ability to create high consumer involvement in general. This could be explored by comparing one or several groups of companies using neuroscientific methods and one or several groups of companies that does not.

Another area that is relevant for further research is based on the risk that personalization could be implemented wrongly and evoke bad associations towards a brand, as found by Bang & Wojdynski (2016). By only relying on online generated data could provide companies with misguiding consumer data, as people not only search for things they want but also for gifts to peers as well as things they do not necessarily like. It could be interesting to explore how to avoid such misinterpretations of data. This could be done by an analysis testing how often and when consumers search for gifts to others compared to themselves, in order to approximate the likelihood of whether given online behaviour should be used to target marketing content or not.

As illustrated in this thesis, using both neurological and online data measurements would provide companies with more reliable data that could be used as foundation for personalized marketing content. One could therefore argue that in order to obtain the most optimal marketing outcome, one must also match the use of offline and online marketing channels. This is stated, as it was found through the MOT analysis that consumers needs to be caught by stimuli before starting their engagement process towards a certain brand. It could therefore be interesting to compare different marketing initiatives in order to obtain an understanding of how channels complement each other. This could be done by testing how a offline marketing poster influence online interaction and consumer involvement.

In sum, while this thesis adds relevant findings to the pool of knowledge within consumer neuroscience, it is still a relatively new field of study and has a multitude of topics that still needs to be explored in order to increase the overall understanding of how neuroscience can complement existing research methods to understand consumer behaviour and preferences.

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14. Appendix

Appendix 1 – Trial 1: Survey Bias

Question 1:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:




Question 2:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:




Question 3:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:




Question 4:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:




Question 5:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:

Question 6:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:

Question 7:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:

Question 8:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:

Question 9:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:

Question 10:
Which one do you like most? Please rate from 1-4, where 1 is the one you like most and 4 is the one you like least:

Appendix 2 – Beads on Bracelet

Appendix 3 – The Bangle

Appendix 4 – Generic Generated Newsletter Sent By Trollbeads

Stay open to

NEW POSSIBILITIES

This spring, we present stunning new pendants.

YIN YANG FLOATING

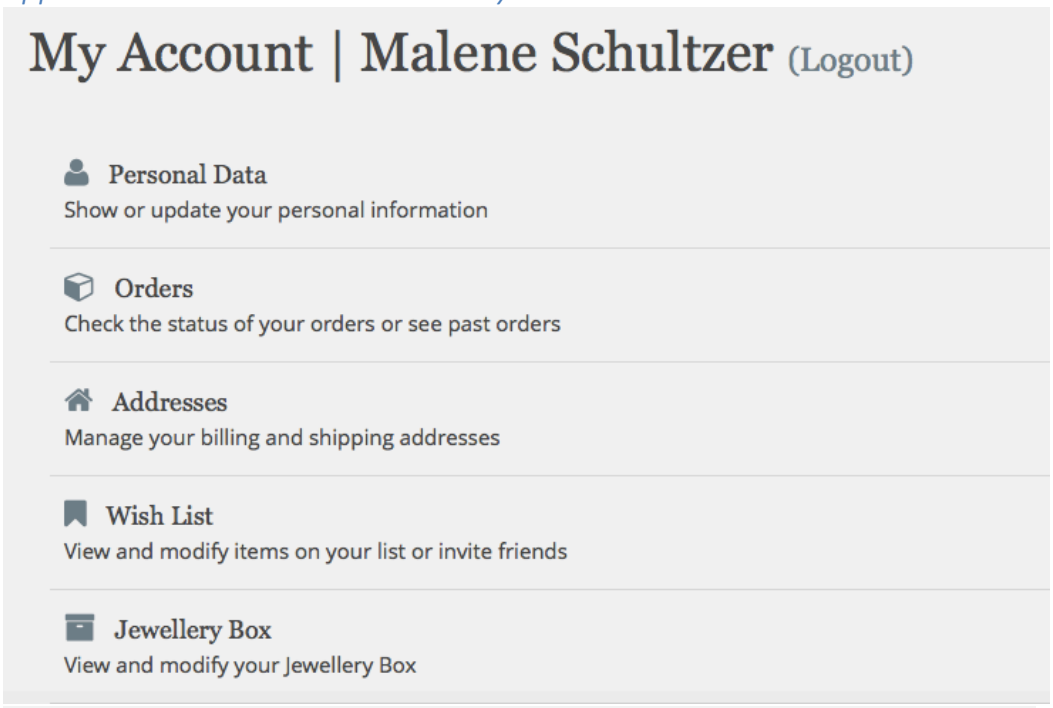
Life is made up of day and night, inhaling and exhaling, tension and relaxation.
Unite these pulses into one.

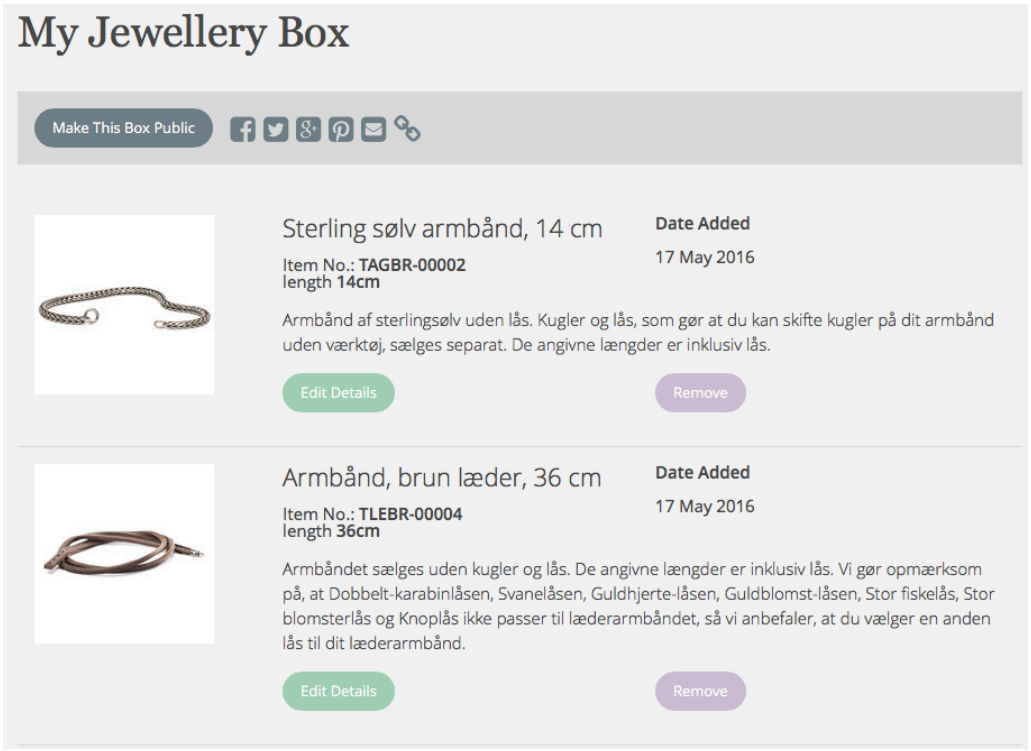
MIX AND MATCH

Prepare to fall in love
with our new rings.

Shop Now

Appendix 5 – Wish-List and Jewellery Box





Appendix 6 – Device Description

Figure 19 - Tobii Pro T60XL

The used eye-tracker was a Tobii Pro T60XL, which is an integrated solution combining eye-tracker and screen in one piece as seen in Figure 10. Tobii Pro T60XL has a 24-inch high-resolution screen making the machine very accurate and easy to use (Tobii AB, 2016). The two highlighted spots in Figure 10 outline the integrated sensors tracking the eye movement. Furthermore, with a sampling rate of 60 Hz, the eye-tracker enables the researcher to measure exactly where the test subjects are looking and thereby indicate timing and duration of fixation. As the eye-tracker used for this experiment is a combination of eye-tracker and screen, this device is suitable for lab experiments, which the experimental design relies on (Ibid).

As can be seen from above, Tobii Pro T60XL measures timing and duration of fixation covering the test subjects' visual attention. The applied eye-tracking method attempts to find a possible correlation between 'duration of fixation point', 'time to first fixation', emotional arousal and consumer involvement and thereby answer the overall research question.

Appendix 7 – Information Given Prior to the Experiment

When the test subjects have given their consent to be a part of the experiment, they will be given:

"*Dear XX,*
You are here given a little information prior to the eye-tracking experiment, in order for you to relax on the day of the test.

Please note that:

- *Using an eye-tracker does not hurt or provide any nausea, you are simply asked to look at a computer screen*
- *The experiment will take around 30 min. in total – divided into two sessions*
- *Please do not wear any mascara as this can interfere with the results*
- *If you wear glasses they should be replaced with contacts*

Next time we will meet at the neurosciencelab at CBS – Solbjerg Plads 3, 2000 Frederiksberg, stairway C, 2. Floor. Please call me when you arrive at the reception +45 21441746 and I will come and pick you up.

I look forward to seeing you on April/May XX at XX o'clock.

Thank you once again for participating in this experiment!

Kind regards
Malene Schultzer"

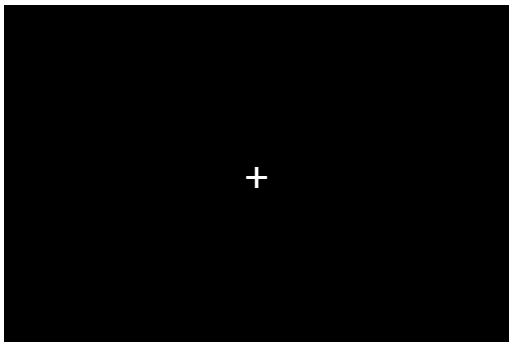
Appendix 8 – Oral Introduction to the Eye-tracking Experiment

The subjects were introduced to the eye-tracker as follows. The eye-tracker was also adjusted to each individual's height.

"*This experiment will take around 30 min. In total. It is divided into two experimental set-ups each taking 10 min. to view, making a little room for relaxing between the two trials.*

The images you will be exposed to, will be related to the research question investigated, but in order to obtain the most reliable results the theme cannot jet be reveal. You will be exposed to four images, where you have to look at the image you like the most.
The images will be presented as the example with the sodas.

Between each scene the screen will go black, revealing a white cross in the middle, which are

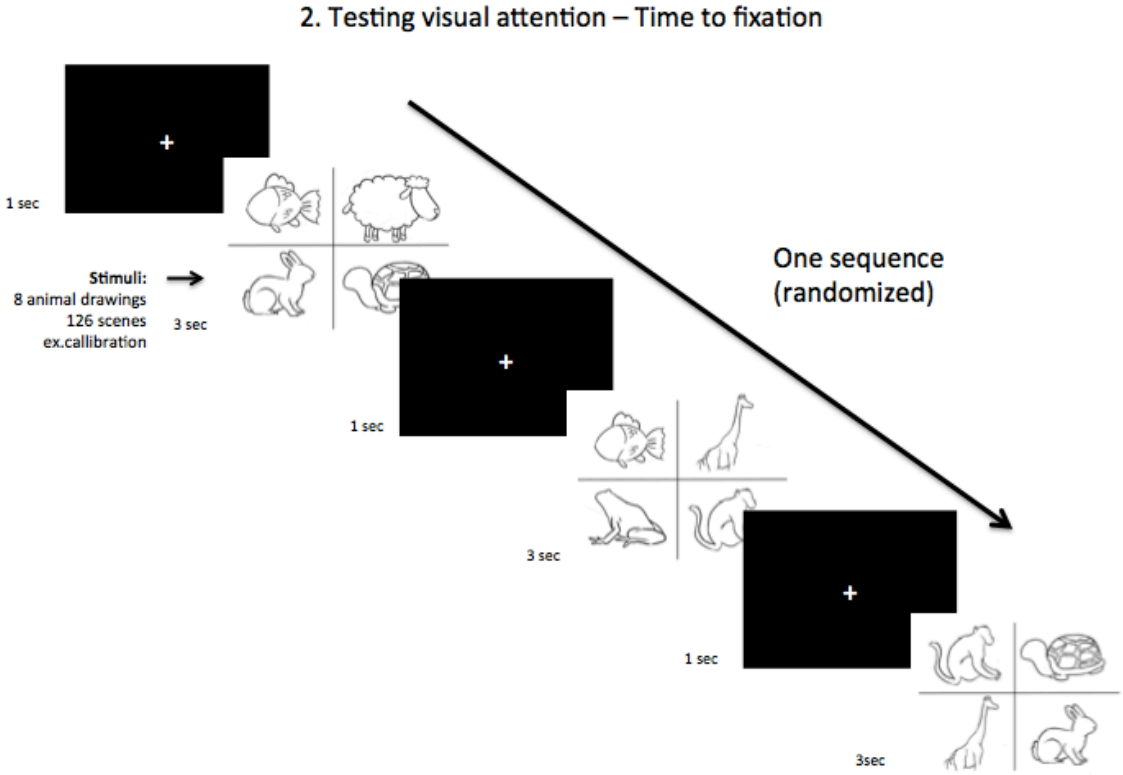


what we call the calibration point. You should look into the white cross between each scene in order to secure the most reliable measures.

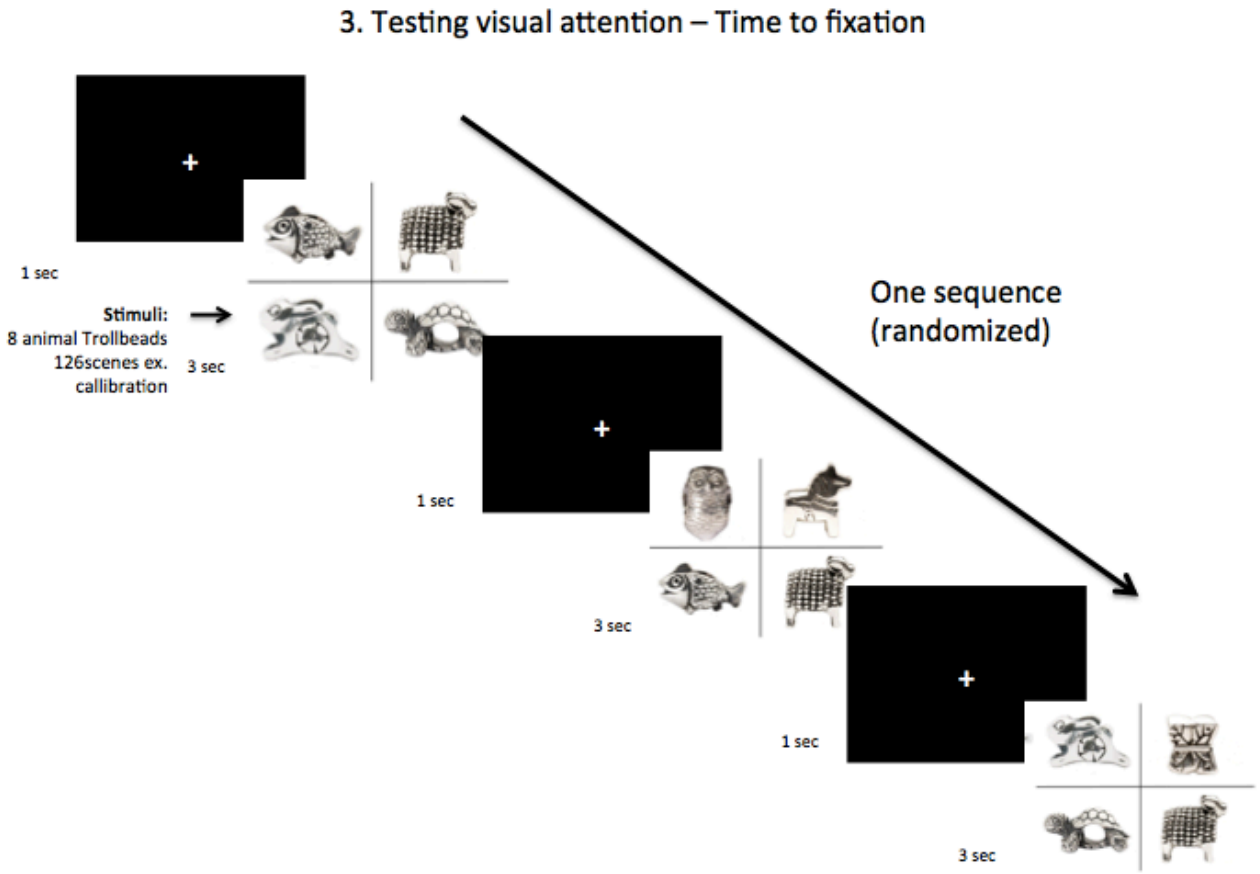
It should be noted that I do not expected anything from you apart from you looking at the presented images at the computer screen in front of you throughout the entire experiment. This experiment is harmless and do not test your IQ our ability to see in any way.

First we will start with what we call calibration in order to fine-tune the eye-tracker to your eyes".

Appendix 9 – Drawn Animals Shown Throughout Trial 2



Appendix 10 – Original Animal Beads Shown Throughout Trial 3



Appendix 11 – Invitation to becoming a Test Subject

"Hey guys,
With regards to my thesis I'm conducting a neuroscience experiment testing visual attention by the use of an eye-tracker.
If you are a female between the age of 20-30 you are the perfect match for this pilot project carried out at the neuroscience lab at CBS. The experiment will take around 25 min. and will measure your visual attention and interest in the presented images. The individual tests are carried out Thursday and Friday this week as well as Monday, Tuesday and Wednesday next week between 09:30-17:00.
If you want to hear more about the opportunity to become a participant please send me an email at masc10am@student.cbs.dk
**You will receive a box of candy, as thanks for your participation;)"*

When potential subjects contact me, they will receive below:

"*Dear XX,*

Thank you for your interest in becoming a participant and helping me complete my thesis.

I'm currently writing my thesis within marketing and behavioural neuroscience attempting to indicate if companies can increase consumer involvement by the use of personalized newsletters.

Participating in this experiment will therefore include a 1-hour session in the neurosciencelab at CBS, where you will be equipped with an eye-tracker. You will then be exposed to different images related to the research question and your only assignment is to look.

The eye-tracker will measure your visual attention towards the different images.

I will kindly ask you to reach out to your network of fellow female student and ask them to contact me if they want to be part of this experiment.

I look forward to hearing from you and your friends.

Best regards Malene Schultzer"

Test Subject	University	Nationality	Age	Linces	Mascara	Survey	Survey ratings · Rabbit	Turtle	Sheep	Fish	Purchased animal bead in trial 4	Does the purchased bead fit the ratings?	Why do you choose as you do?	Can you remember the animals from the survey?	Field Notes
A001	CBS	Danish	27	No	No	Yes	4	3	1	2	Sheep	Yes	Grew up at a farm where they had sheep	No	Had to move backwards trial 2;5:34min.*The eye-movement/calibration was bad. The participant was nervours
A002	CBS	Danish	24	No	No	Yes	2	1	4	3	Fish	No		No	
A003	CBS	Danish	26	No	No	No					Bear		The bear reminds her of childhood memories do to a teddybear she had. Otherwise the sheep as she has looked at through the entire experiment.		Deep and long blincs, long eye-lashes
A004	CBS	Danish	22	No	No	No					Sheep		No, like the structure		Good calibration throughout the entire experiment. Trial 3;7.04min. Moved her arms
A005	CBS	Danish	22	No	No	Yes	4	1	2	3	Turtle	Yes	Just draw her attention	No	Trial2;5.55min - spoke:"Are all the animalsthe same?"
A006	CBS	Danish	25	No	No	Yes	4	1	3	2	Turtle	Yes	Cuite animal	No	Trial2;4.10min. Moved her legs from crossed
A007	CBS	Danish	20	No	No	No					Fish		Zodiac = fish		Trial2&3 was restless
A008	CBS	Danish	23	Linces	No	No					Sheep		Zodiac = lion (was a filler), but as she could not chose this, the sheep do to the design/structure		
A009	CBS	Danish	27	No	No	No					Sheep		Has a friend who draws sheep		Trial 3 her hands began to "sleep" which took up her focus
A010	KU	Danish	26	Linces	No	Yes	4	1	2	3	Sheep	No	Liked the structure, reminded her of fluffy skyes	No	
A011	CBS	Danish	26	No	No	Yes	4	2	3	1	Falcon	No	It is mo raw and not cuite as the others	No	Trial3;4:50-4:04min. "missing eyes" eye-tracker froze during the experiment
A012	CBS	Danish	25	Linces	No	No					Falcon		It is mo raw and not cuite as the others		Trial2;5:33min. Moved 2 cm. Away from the eye-tracker. Trial3;5.05min. Itch on her cheek · she is a rider which can attract her attention towards the horse filler
A013	CBS	Danish	20	No	No	No					Fish		Zodiac = fish		
A014	CBS	Danish	27	No	No	Yes	4	3	2	1	Fish	Yes	Zodiac = fish	No	Trial2;0.10min. "Ohh you have to make up your mind quickly"
A015	KU	Danish	26	No	No	Yes	2	1	3	4	Rabbit	No	Had a rabbit when she was a child	No	Trial 2 - had to restart theexperiment due to bad calibration. Trial3;3.33min. Moved her head
A016	CBS	Danish	24	No	No	No					Turtle		She liked the shape		Trial2; generaal bad calibration/eye-movement measurement. Trial3;8.25min. Moved her body 1 cm away from the eye-tracker
A017	CBS	Danish	24	No	No	No					Turtle		It is a different animal, more exotic		Trial2;restless
A018	CBS	Danish	25	No	No	Yes	4	2	3	1	Fish	Yes	Has fish earings	No	Good calibration and blinc rates
A019	CBS	Danish	27	No	No	Yes	4	2	1	3	Sheep	Yes	Liked the structure, reminded her of fluffy skyes	Yes	Trial2;6:10min had to move away in order for the eye-tracker to measure her movement
A020	CBS	Danish	20	No	No	No					Squirrel		Wanted to choose something different, she had looked at the sheep to much		
A021	KU	Danish	26	No	No	No					Falcon		It is mo raw and not cuite as the others		Trial2;5:35min.-coughed ;3:45min. Itched her cheek/ear Trial3;1:04min.- had to move backwards. Zodiac = Lion (filler trial3)
A022	CBS	Danish	21	No	No	Yes	4	2	3	1	Falcon	No	Like the symbol of the falcone = being free	No	
A023	CBS	Danish	21	No	No	Yes	3	1	2	4	Turtle	Yes	Looked at the sheep, but it was not as "sweet" real life than she imagened	No	Trial2;4.43 - restless hands, itched her cheek - she had the time to change her mind many times during the expriment, was easily board. General bad calibration.
A024	CBS	Danish	22	No	No	No					Falcon		Remindes her of freedom		

A025	CBS	Chinese	23	Linces	No	No					Falcon		Remindes her of freedom		
A026	CBS	Danish	28	Linces	No	Yes	4	2	1	3	Falcon	No	Remindes her of freedom - "Just do it!	Yes	
A027	CBS	Danish	28	No	No	Yes	4	3	1	2	Sheep	Yes	Grew up next to a farm where they had sheep	No	Tria12;09:09 - remember to look at the calibration cross between the slides
A028	CBS	Danish	20	No	No	No					Turtle		Her boyfriends favourit animal		Sick had to drop out
A029	CBS	Danish	20	No	No	No					Turtle		Cuite animal		
A030	CBS	Danish	26	No	No	Yes	4	2	1	3	Sheep	Yes	No, like the structure	Yes	Tria13;1:56min. "missing eyes" as the test subject closed her eye due to sleepieness
A031	CBS	Danish	25	Linces	No	Yes	4	2	1	3	Sheep	Yes	Reminds her of baby animals	No	
A032	CBS	Danish	25	No	No	No					Rabbit		Younger sister had a rabbit		Tria12;06.45min. Itched her chin Trial3;02.30min. Itched her hair Trial2;6.31min moved her legs.
A033	CBS	Danish	25	No	No	No					Turtle		No, like the structure and it is cuite		Zodiac = fish
A034	CBS	Danish	28	Linces	No	Yes	4	2	1	3	Sheep	Yes	No, like the structure and it is cuite	No	Tria12;5.20-4.04min. Bad eye-movement/calibration
A035	KU	Danish	28	No	No	Yes	4	2	1	3	Sheep	Yes	Reminded her of home - Jylland	No	
A036	CBS	German	24	No	No	No					Turtle		No, like the structure and it is cuite		
A037	CBS	Danish	25	No	No	No					Turtle		Dived with turtles		
A038	CBS	Danish	24	No	No	Yes	4	3	1	2	Sheep	Yes	Rminded her of a vacation she had when she was young	No	Zodiac = fish
Yellow=excluded from the sample size	4 KU/34 CBS	Danes=36/2Foreigners	Median = 25		Linces=7	No=38	Yes=19/No=19				Rabbit = 2 Turtle = 10 Sheep = 12 Fish = 5 Other = 9	Yes=13/No=6		Yes=3/No=16	

Appendix 13 – SPSS Calculations

- 13.1 – Hypotheses 1 and 2

```
 GET DATA /TYPE=XLSX
  /FILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\Test2H1.xlsx'
  /SHEET=name 'Ark1'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.

SAVE OUTFILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav'
  /COMPRESSED.
EXAMINE VARIABLES=FixationStartMs BY Surveyyes1no0
  /PLOT BOXPLOT STEMLEAF
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

Notes

Output Created		28-MAY-2016 18:01:22
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	11584
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=FixationStartMs BY Surveyyes1no0 /PLOT BOXPLOT STEMLEAF /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:00.97
	Elapsed Time	00:00:01.42

Page 1

```
EXAMINE VARIABLES=FixationStartMs BY Surveyyes1no0
 /PLOT BOXPLOT STEMLEAF NPPLOT
 /COMPARE GROUPS
 /STATISTICS DESCRIPTIVES
 /CINTERVAL 95
 /MISSING LISTWISE
 /NOTOTAL.
```

Notes

Output Created		28-MAY-2016 18:02:33
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav
	Active Dataset	DataSet1
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	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	11584
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=FixationStartMs BY Surveyyes1no0 /PLOT BOXPLOT STEMLEAF NPPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:02.31
	Elapsed Time	00:00:02.46

```
EXAMINE VARIABLES=FixationStartMs BY Surveyyes1no0
 /PLOT BOXPLOT STEMLEAF HISTOGRAM NPPLOT
 /COMPARE GROUPS
 /STATISTICS NONE
 /CINTERVAL 95
 /MISSING LISTWISE
 /NOTOTAL.
```

Explore

Notes

Output Created		28-MAY-2016 18:04:01
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav
	Active Dataset	DataSet1
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	Split File	<none>
	N of Rows in Working Data File	11584
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=FixationStartMs BY Surveyyes1no0 /PLOT BOXPLOT STEMLEAF HISTOGRAM NPPLOT /COMPARE GROUPS /STATISTICS NONE /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:02.82
	Elapsed Time	00:00:02.85

[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav

Was the survey completed?

Case Processing Summary

		Cases			
		Valid		Missing	
	Was the survey completed?	N	Percent	N	Percent
Fixation Start Time	No	5791	100,0%	0	0,0%
	Yes	5793	100,0%	0	0,0%

Case Processing Summary

		Cases	
		Total	
	Was the survey completed?	N	Percent
Fixation Start Time	No	5791	100,0%
	Yes	5793	100,0%

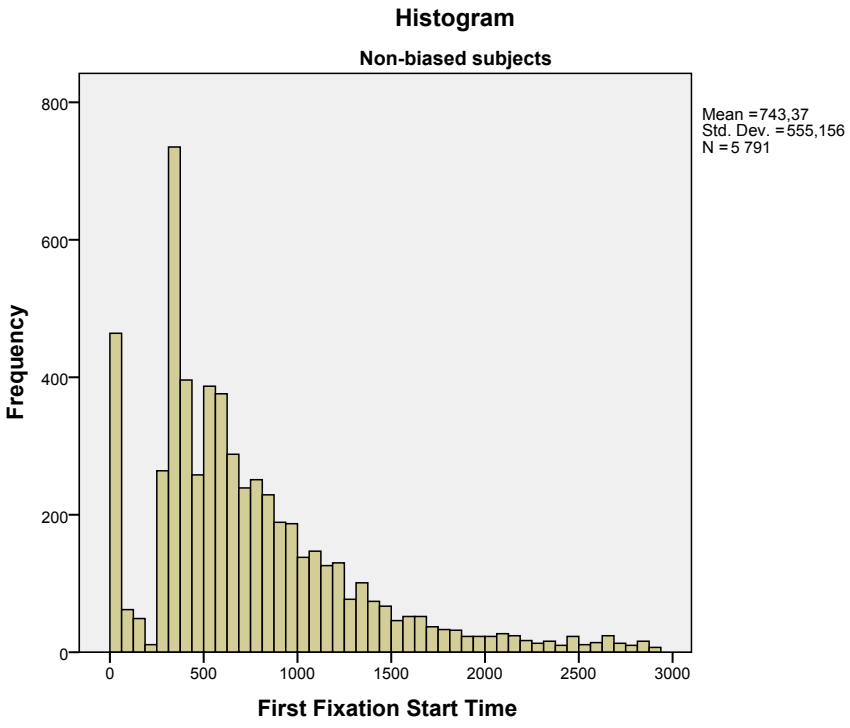
Tests of Normality

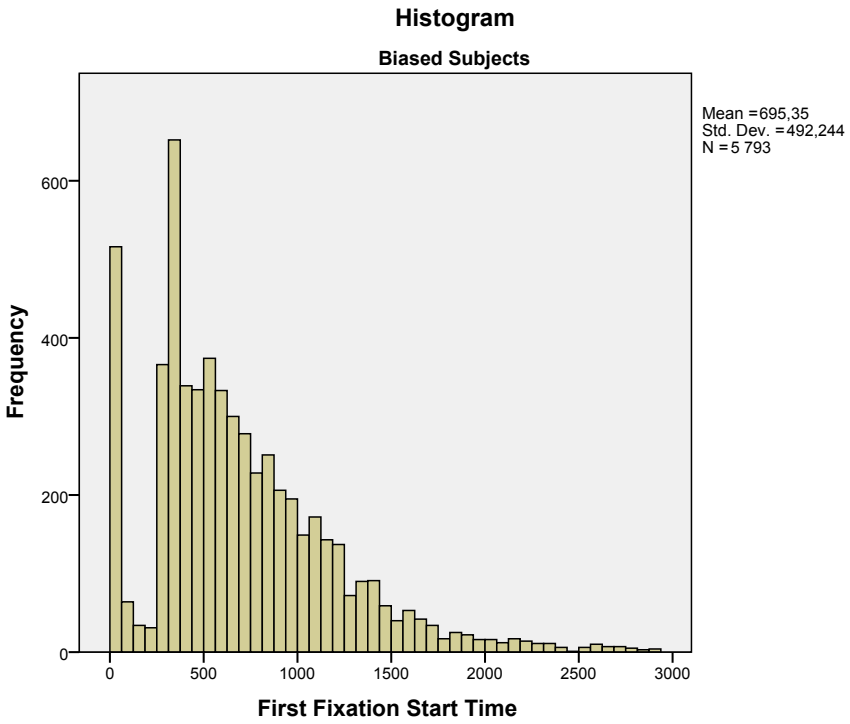
		Kolmogorov-Smirnov[a]		
	Was the survey completed?	Statistic	df	Sig.
Fixation Start Time	No	,112	5791	,000
	Yes	,090	5793	,000

a. Lilliefors Significance Correction

Fixation Start Time

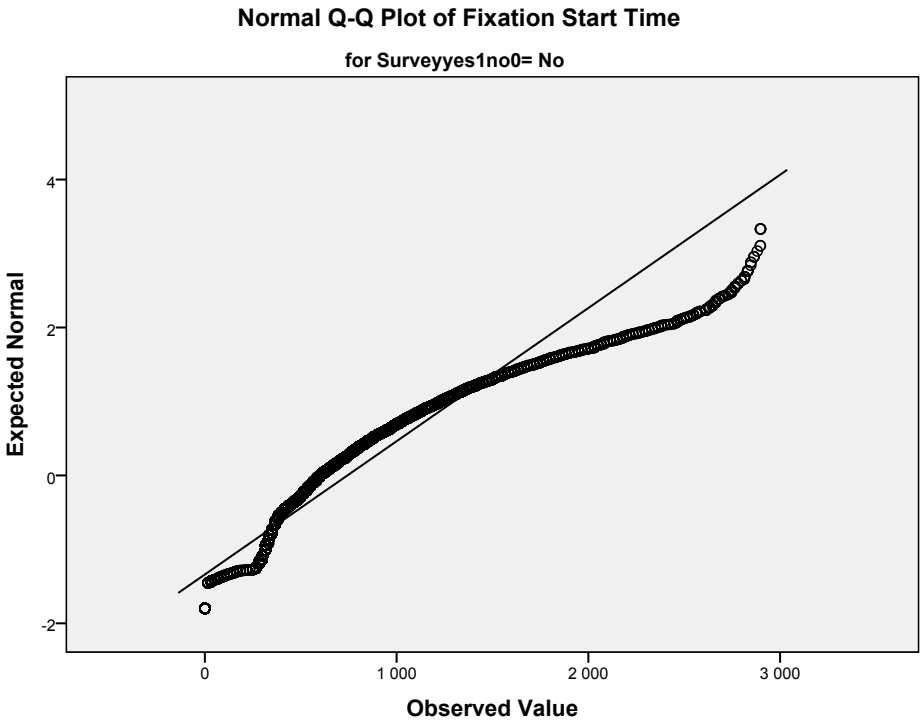
Histograms

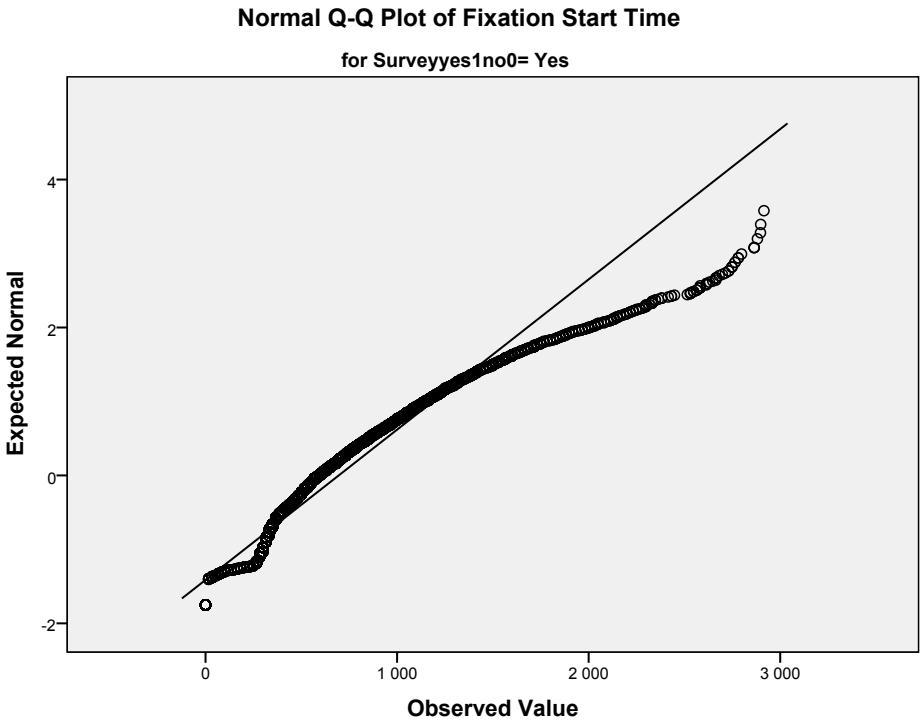




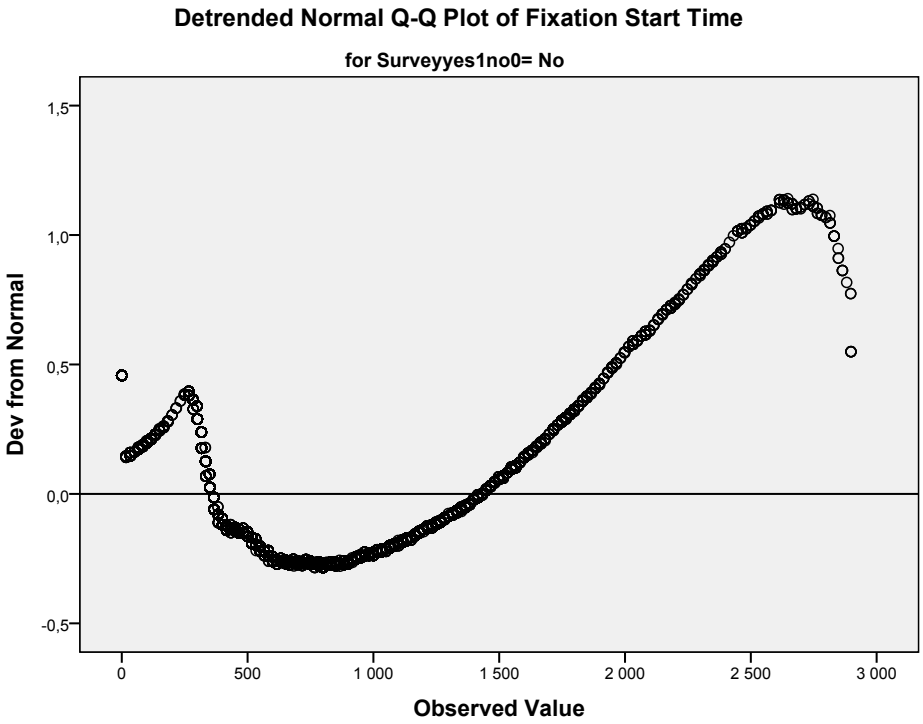
Stem-and-Leaf Plots

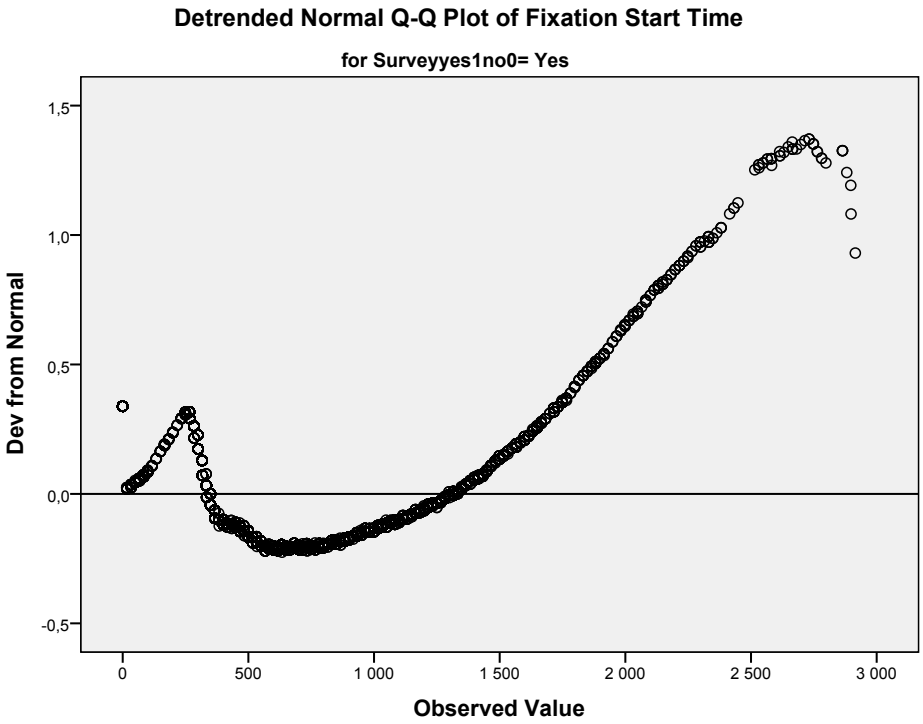
Normal Q-Q Plots


Normal Q-Q Plot of Fixation Start Time
for Surveyyes1no0= No
Expected Normal
4
2
0
-2
0
1 000
2 000
3 000
Observed Value



Detrended Normal Q-Q Plots


Detrended Normal Q-Q Plot of Fixation Start Time
for Surveyyes1no0= No
Dev from Normal
1,5
1,0
0,5
0,0
-0,5
0
500
1 000
1 500
2 000
2 500
3 000
Observed Value




```
NPAR TESTS
  /M-W= FixationStartMs BY Surveyyes1no0(0 1)
  /STATISTICS=DESCRIPTIVES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		28-MAY-2016 18:05:21
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav
	Active Dataset	DataSet1
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	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	11584
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /M-W= FixationStartMs BY Surveyyes1no0(0 1) /STATISTICS=DESCRIPTIVES /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02
	Number of Cases Allowed[a]	112347

a. Based on availability of workspace memory.

```
[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.
sav
```

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Fixation Start Time	11584	719,36	525,165	0	2915
Was the survey completed?	11584	,50	,500	0	1

Hypothesis 1: Seeing an animal in a survey will lead to a faster first fixation time (Mann-Whitney Test)

Ranks

	Biased	N	Mean Rank	Sum of Ranks
Fixation Start Time	No	5791	5885,94	34085477,50
	Yes	5793	5699,09	33014842,50
	Total	11584		

Test Statistics[a]

	Fixation Start Time
Mann-Whitney U	16232521,50
Wilcoxon W	33014842,50
Z	-3,008
Asymp. Sig. (2-tailed)	,003

a. Grouping Variable: Was the survey completed?

```
EXAMINE VARIABLES=DurationMs BY Surveyyes1no0
 /PLOT BOXPLOT HISTOGRAM NPPLOT
 /COMPARE GROUPS
 /STATISTICS NONE
 /CINTERVAL 95
 /MISSING LISTWISE
 /NOTOTAL.
```

Explore

Notes

Output Created		28-MAY-2016 18:09:26
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	11584
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=DurationMs BY Surveyyes1no0 /PLOT BOXPLOT HISTOGRAM NPPLOT /COMPARE GROUPS /STATISTICS NONE /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:02.81
	Elapsed Time	00:00:03.07

[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav

Was the survey completed?

Case Processing Summary

		Cases				
		Valid		Missing		Total
	Biased	N	Percent	N	Percent	N
Duration of the First Fixation	No	5791	100,0%	0	0,0%	5791
	Yes	5793	100,0%	0	0,0%	5793

Case Processing Summary

		Cases
		Total
	Biased	Percent
Duration of the First Fixation	No	100,0%
	Yes	100,0%

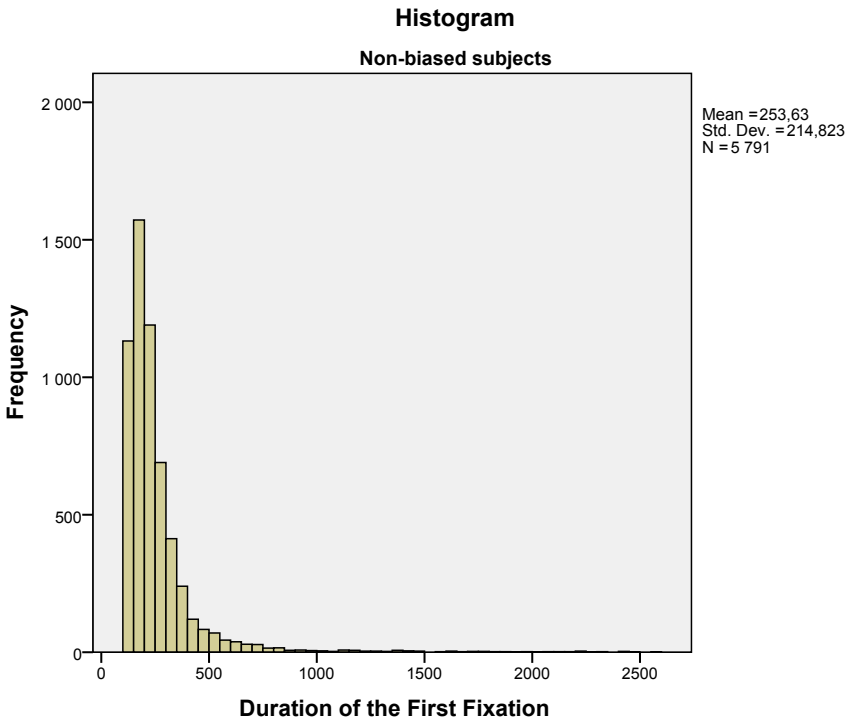
Tests of Normality

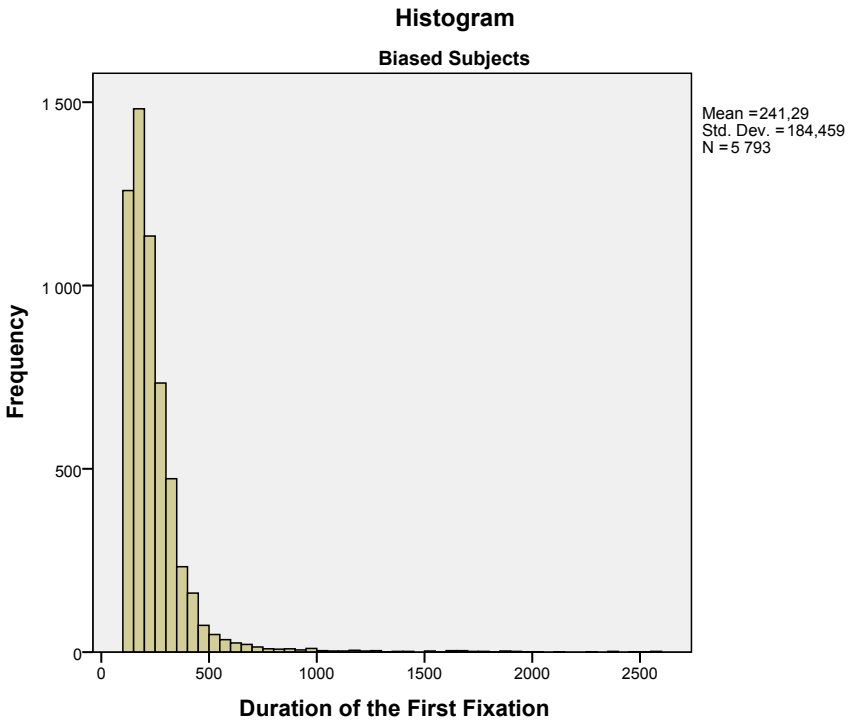
		Kolmogorov-Smirnov[a]		
	Biased	Statistic	df	Sig.
Duration of the First Fixation	No	,237	5791	,000
	Yes	,222	5793	,000

a. Lilliefors Significance Correction

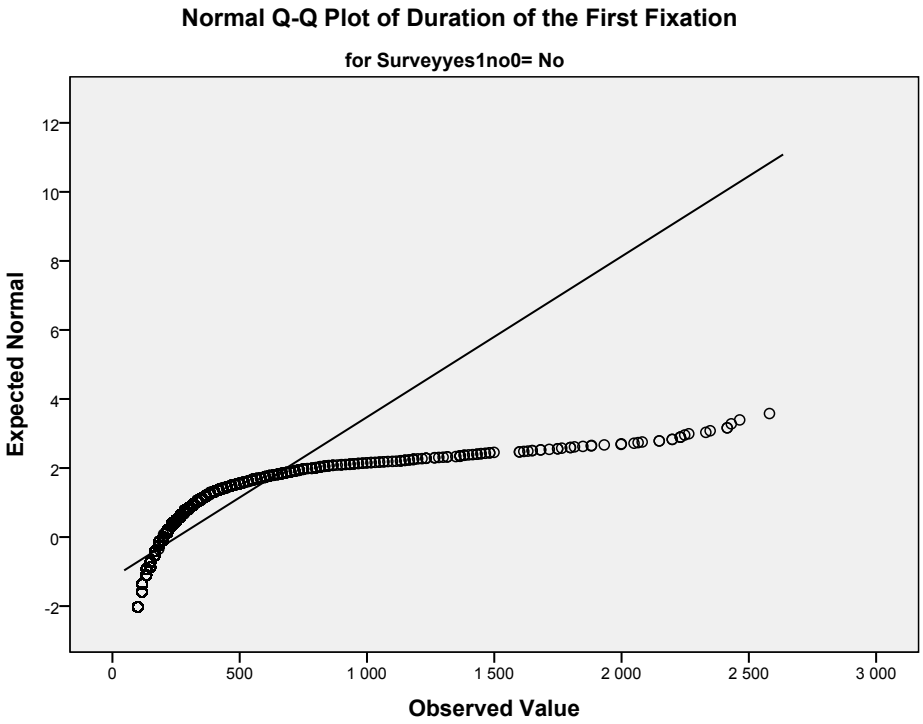
Duration of the First Fixation

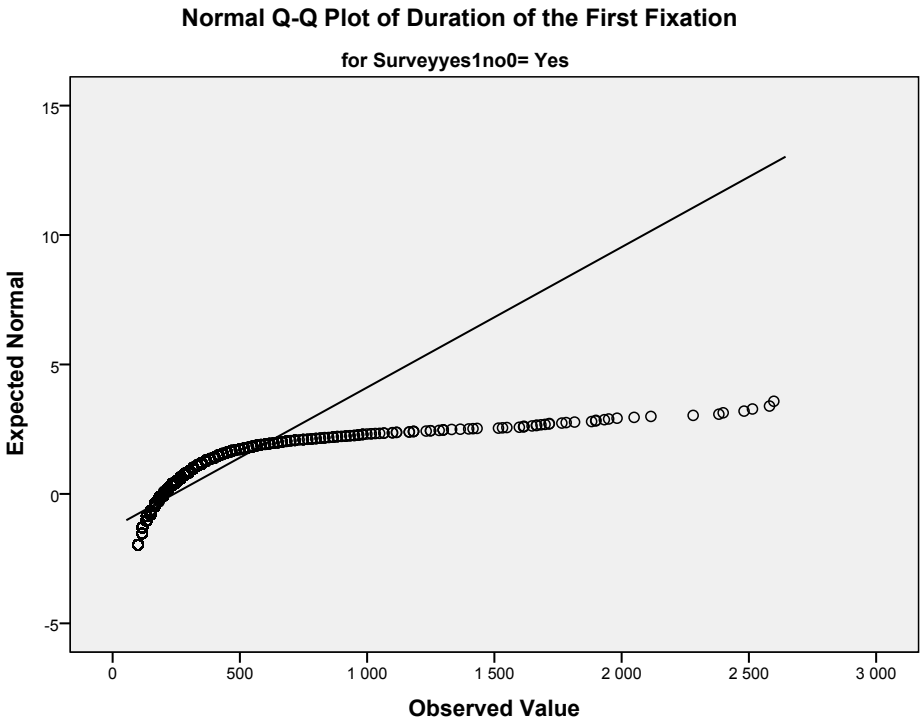
Histograms



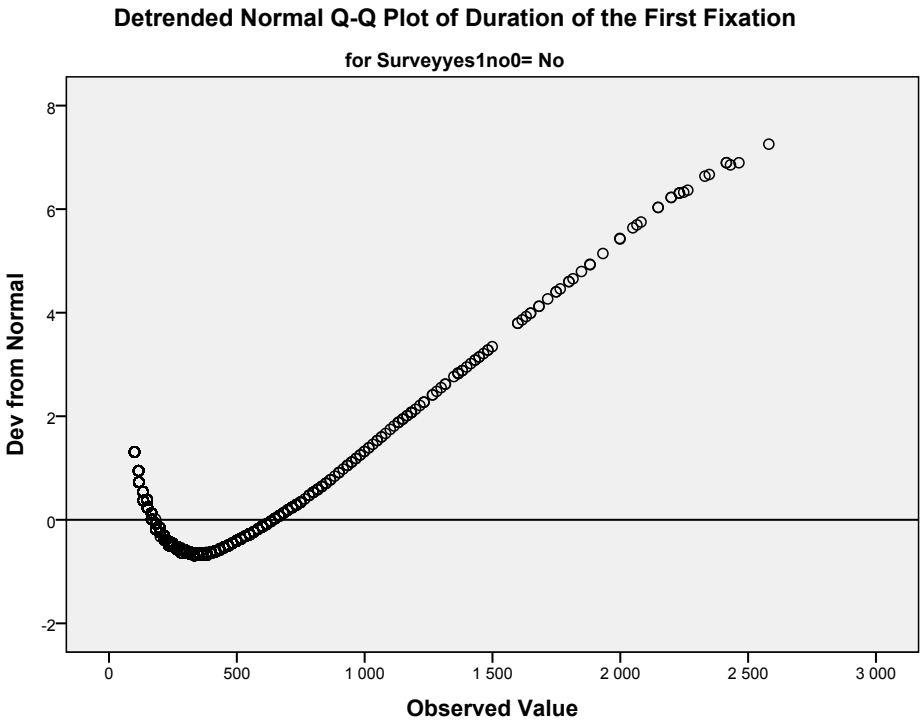


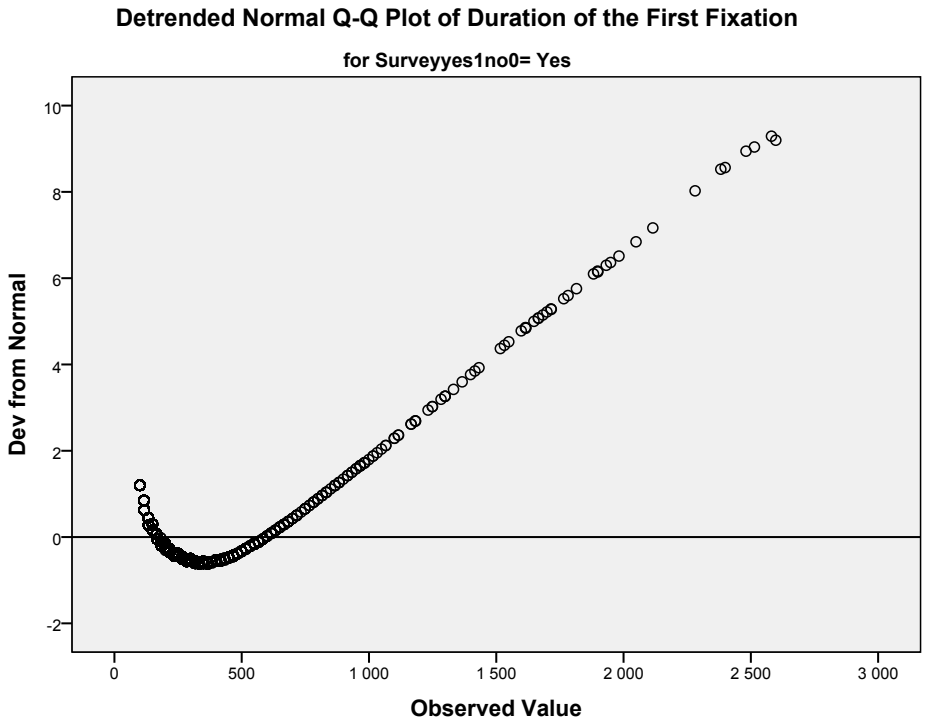
Normal Q-Q Plots


Normal Q-Q Plot of Duration of the First Fixation
for Surveyyes1no0= No
Expected Normal
Observed Value
12
10
8
6
4
2
0
-2
0
500
1 000
1 500
2 000
2 500
3 000



Detrended Normal Q-Q Plots


Detrended Normal Q-Q Plot of Duration of the First Fixation
for Surveyyes1no0= No
Dev from Normal
8
6
4
2
0
-2
0
500
1 000
1 500
2 000
2 500
3 000
Observed Value




```
NPAR TESTS
  /M-W= DurationMs BY Surveyyes1no0(0 1)
  /STATISTICS=DESCRIPTIVES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		28-MAY-2016 18:10:44
Comments		
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	Active Dataset	DataSet1
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	Split File	<none>
	N of Rows in Working Data File	11584
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /M-W= DurationMs BY Surveyyes1no0(0 1) /STATISTICS=DESCRIPTIVES /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Number of Cases Allowed[a]	112347

a. Based on availability of workspace memory.

```
[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.
sav
```

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Duration of the First Fixation	11584	247,46	200,301	100	2598
Was the survey completed?	11584	,50	,500	0	1

H2: Seeing an animal before in a survey will lead to longer first fixation duration

Ranks

	Biased	N	Mean Rank	Sum of Ranks
Duration of the First Fixation	No	5791	5851,03	33883339,00
	Yes	5793	5733,99	33216981,00
	Total	11584		

Test Statistics[a]

	Duration of the First Fixation
Mann-Whitney U	16434660,00
Wilcoxon W	33216981,00
Z	-1,886
Asymp. Sig. (2-tailed)	,059

a. Grouping Variable: Was the survey completed?

```
 DATASET ACTIVATE DataSet1.
SAVE OUTFILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\Hypothesis 1.sav'
 /COMPRESSED.
```

- *13.2 - Hypothesis 3*

```
 DATASET ACTIVATE DataSet1.
DATASET CLOSE DataSet2.
GET DATA /TYPE=XLSX
  /FILE='C:\Users\Mantas\Documents\Food Science\Test2H2.xlsx'
  /SHEET=name 'Sheet1'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet3 WINDOW=FRONT.

SAVE OUTFILE='C:\Users\Mantas\Documents\Food Science\Hypothesis 2.sav'
  /COMPRESSED.
NPAR TESTS
  /BINOMIAL (0.50)=BiasedFixationtowardstheanimalasseeninsurveyyesfor1Test1
  /STATISTICS DESCRIPTIVES
  /MISSING ANALYSIS.
```

Notes

Output Created		28-MAY-2016 17:25:36
Comments		
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	Active Dataset	DataSet3
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	5838
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.50) =BiasedFixationtowardstheanimalasseeninsurveyyesfor1Test1 /STATISTICS DESCRIPTIVES /MISSING ANALYSIS.

Notes

Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.

[DataSet3] C:\Users\Mantas\Documents\Food Science\Hypothesis 2.sav

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Fixation of animal seen in survey?	5838	,50	,500	0	1

Binomial Test

		Category	N	Observed Prop.	Test Prop.
Fixation of animal seen in survey?	Group 1	No	2906	,50	,50
	Group 2	Yes	2932	,50	
	Total		5838	1,00	

Binomial Test

		Exact Sig. (2-tailed)
Fixation of animal seen in survey?	Group 1	,744
	Group 2	
	Total	

- *13.3 – Hypotheses 4-7*

```
 GET DATA /TYPE=XLSX
  /FILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\Test3H4-H7.xlsx'
  /SHEET=name '1'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.

SAVE OUTFILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav'
  /COMPRESSED.
EXAMINE VARIABLES=FixationStartMs DurationMs BY Surveyyes1no0
  /PLOT HISTOGRAM NPPLOT
  /STATISTICS NONE
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

Explore

Notes

Output Created		28-MAY-2016 19:50:41
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	12759
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=FixationStartMs DurationMs BY Surveyyes1no0 /PLOT HISTOGRAM NPPLOT /STATISTICS NONE /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.

Notes

Resources	Processor Time	00:00:05.26
	Elapsed Time	00:00:06.05

[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav

Was survey completed?

Case Processing Summary

		Cases			
		Valid		Missing	
	Was survey completed?	N	Percent	N	Percent
Fixation Start Time	No	6783	100,0%	0	0,0%
	Yes	5976	100,0%	0	0,0%
Duration of the First Fixationn	No	6783	100,0%	0	0,0%
	Yes	5976	100,0%	0	0,0%

Case Processing Summary

		Cases	
		Total	
	Was survey completed?	N	Percent
Fixation Start Time	No	6783	100,0%
	Yes	5976	100,0%
Duration of the First Fixationn	No	6783	100,0%
	Yes	5976	100,0%

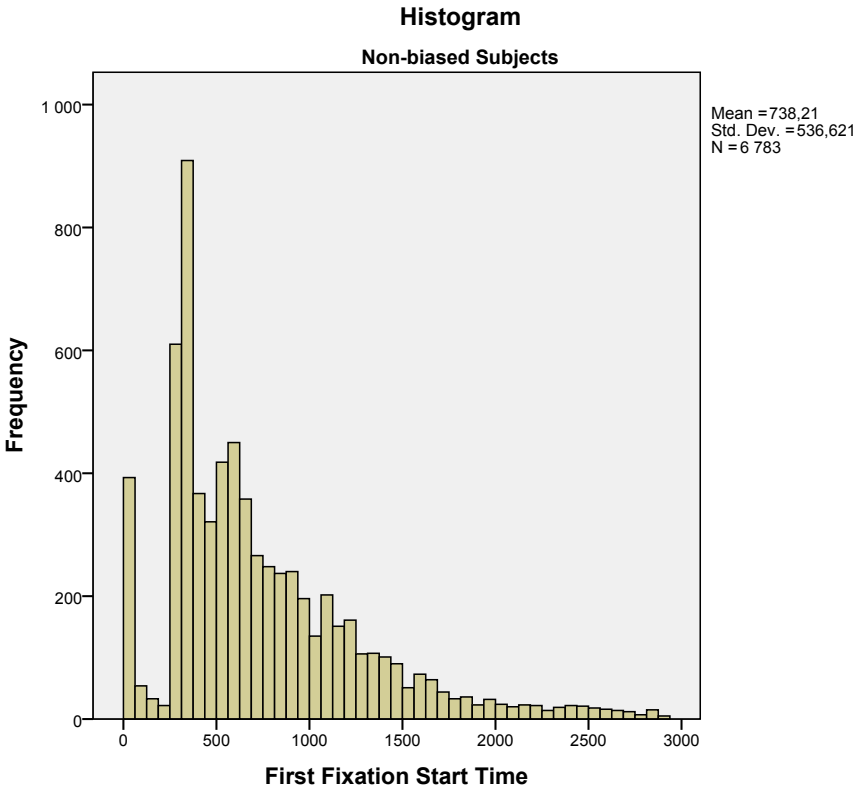
Tests of Normality

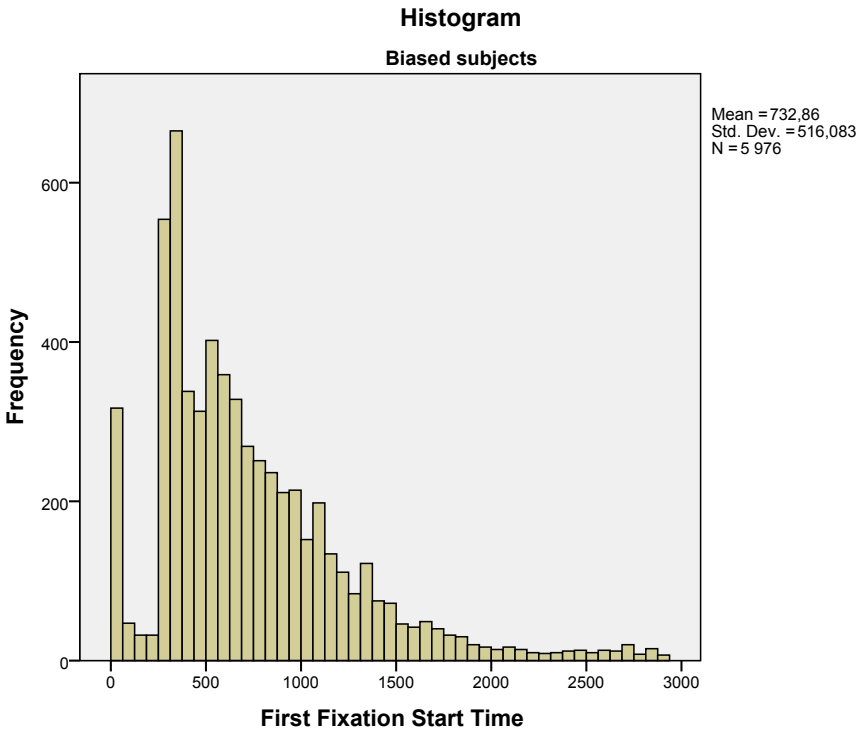
		Kolmogorov-Smirnov[a]		
	Was survey completed?	Statistic	df	Sig.
Fixation Start Time	No	,121	6783	,000
	Yes	,106	5976	,000
Duration of the First Fixationn	No	,246	6783	,000
	Yes	,240	5976	,000

a. Lilliefors Significance Correction

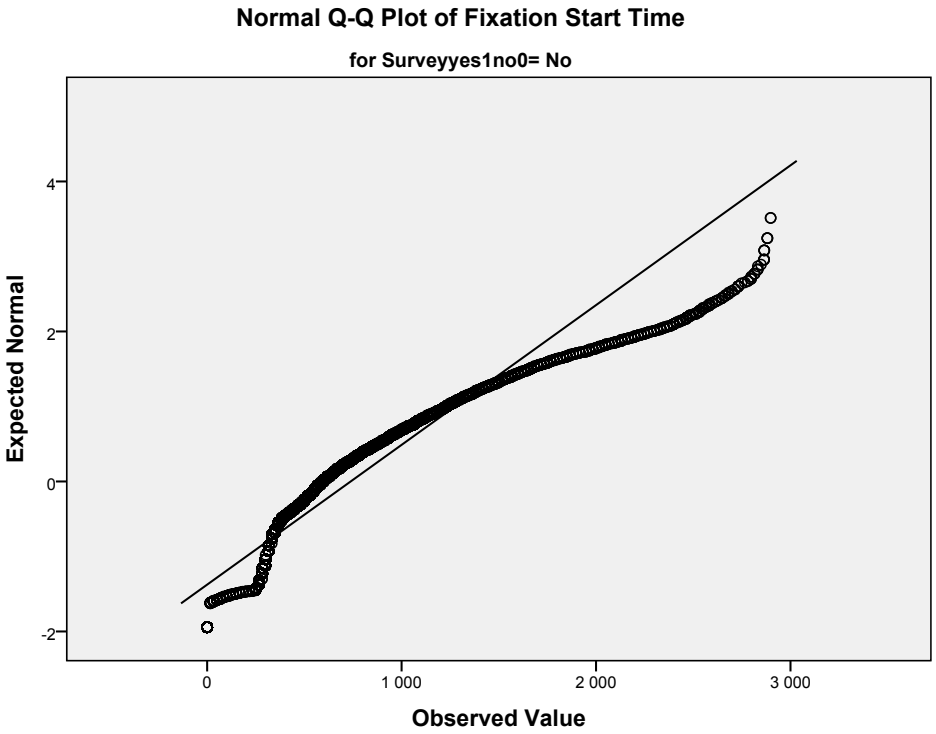
Fixation Start Time

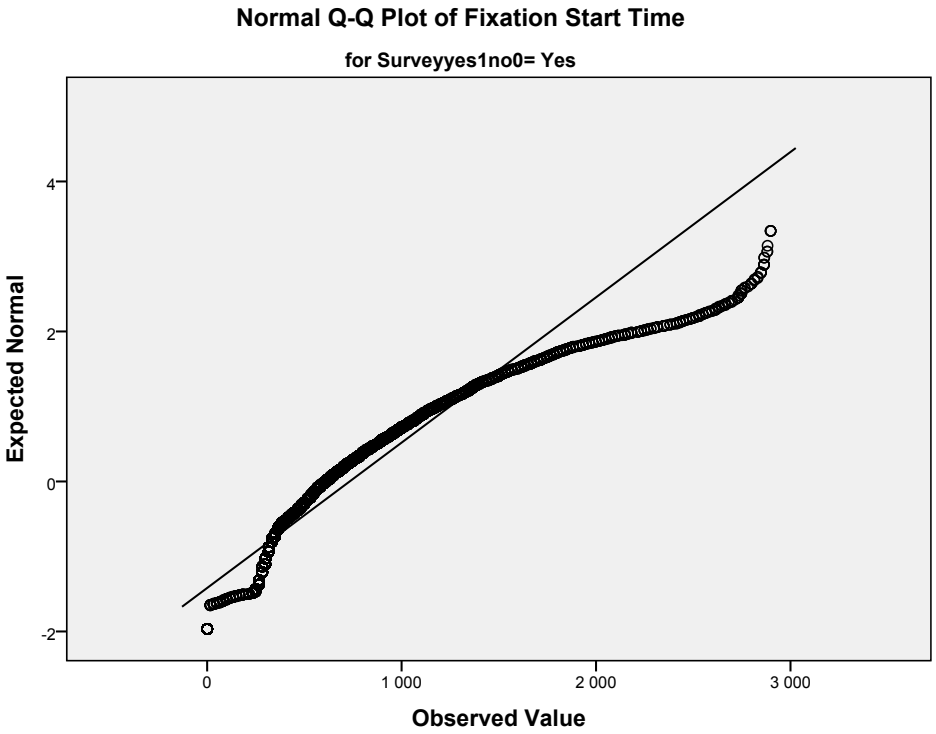
Histograms


Histogram
Non-biased Subjects
Mean =738,21
Std. Dev. =536,621
N =6 783
Frequency
1 000
800
600
400
200
0
0
500
1000
1500
2000
2500
3000
First Fixation Start Time

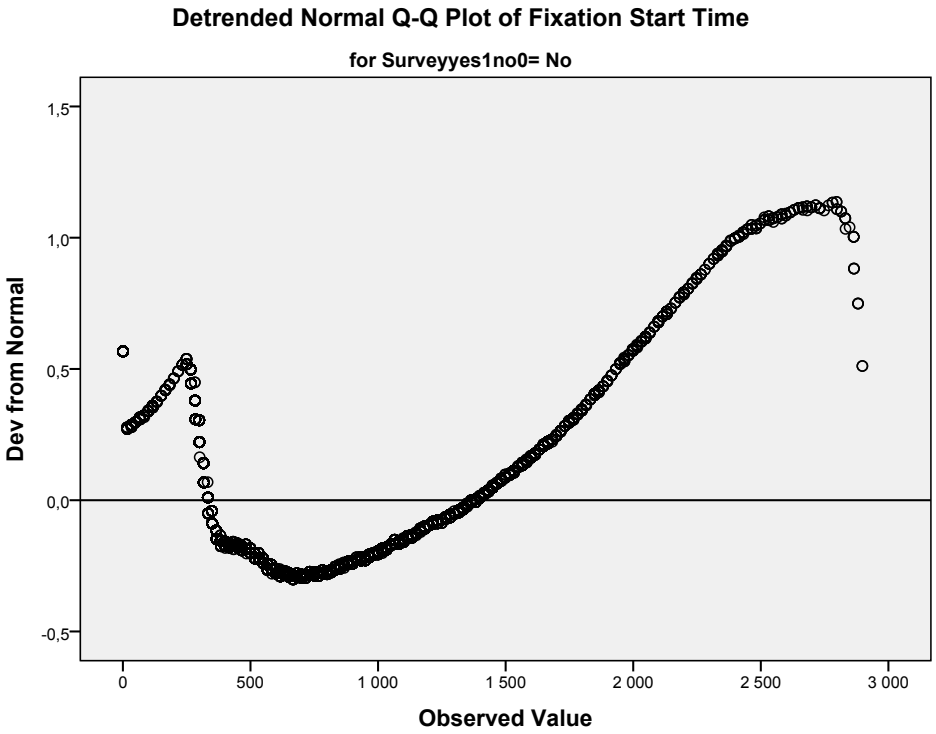


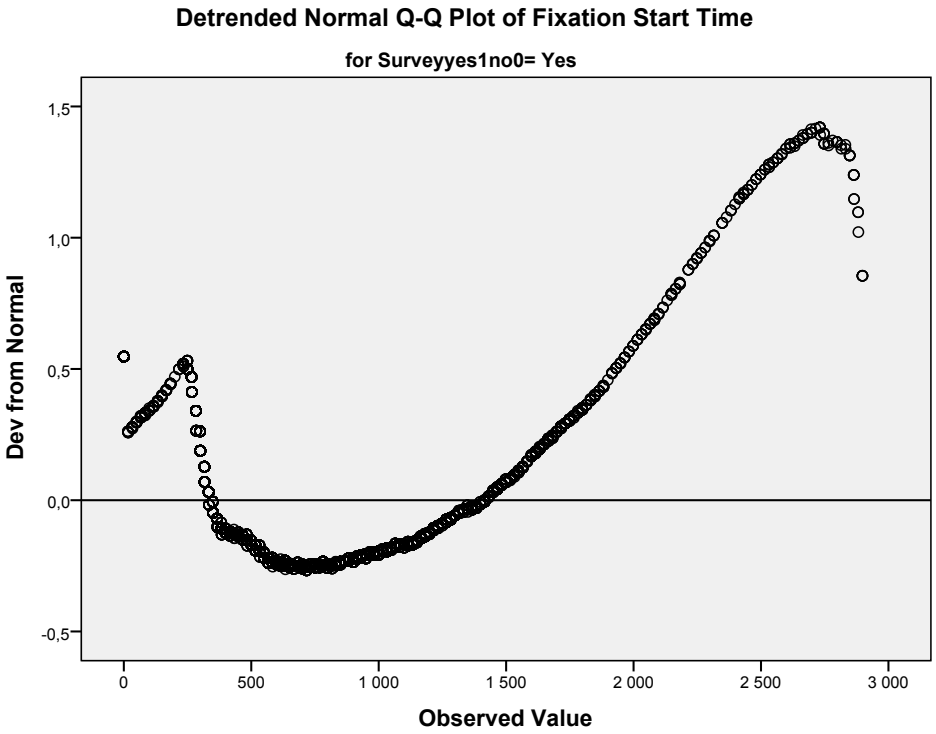
Normal Q-Q Plots


Normal Q-Q Plot of Fixation Start Time
for Surveyyes1no0= No
Expected Normal
4
2
0
-2
0
1 000
2 000
3 000
Observed Value



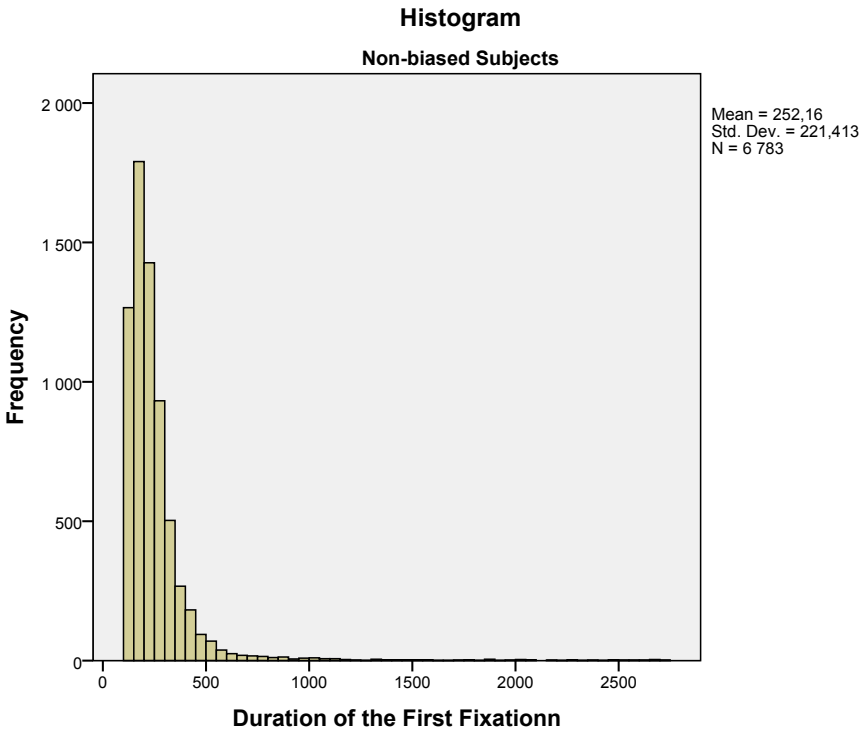
Detrended Normal Q-Q Plots

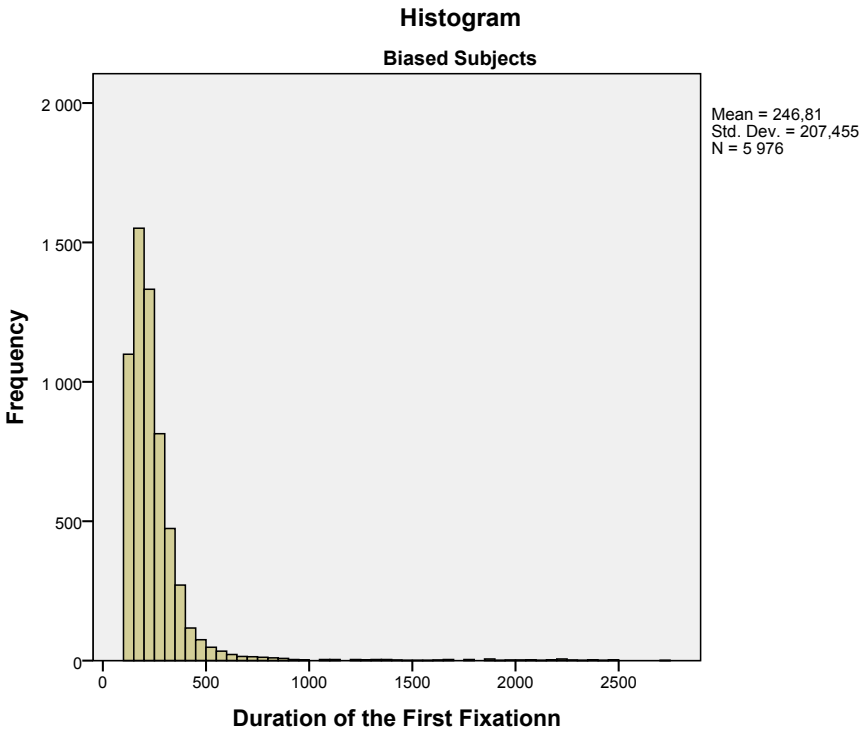

Detrended Normal Q-Q Plot of Fixation Start Time
for Surveyyes1no0= No
Dev from Normal
1,5
1,0
0,5
0,0
-0,5
0
500
1 000
1 500
2 000
2 500
3 000
Observed Value



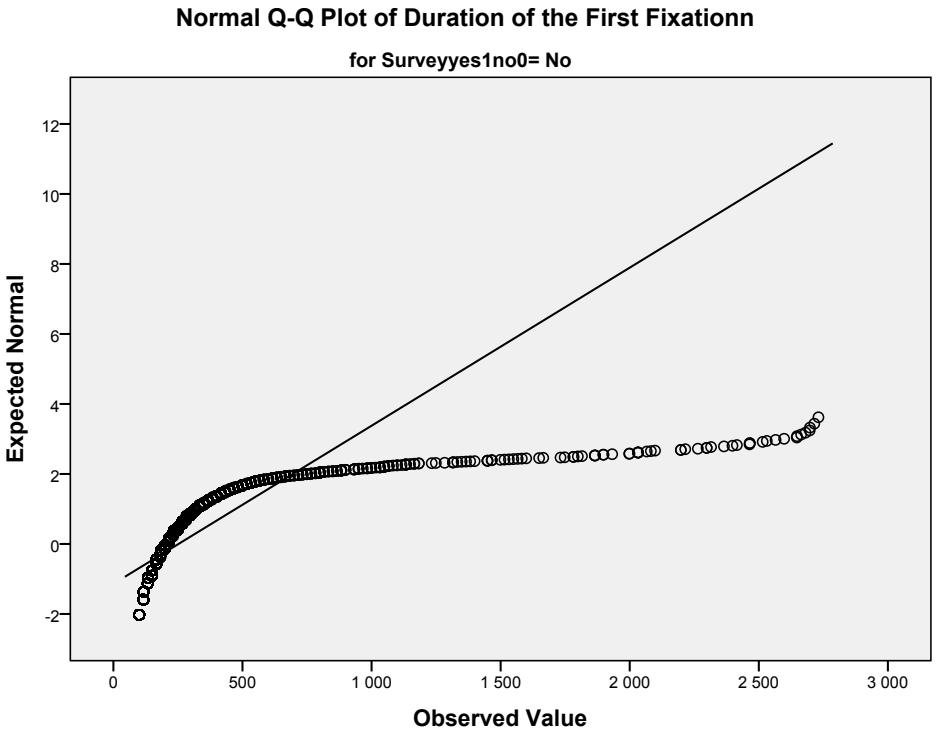
Duration of the First Fixationn

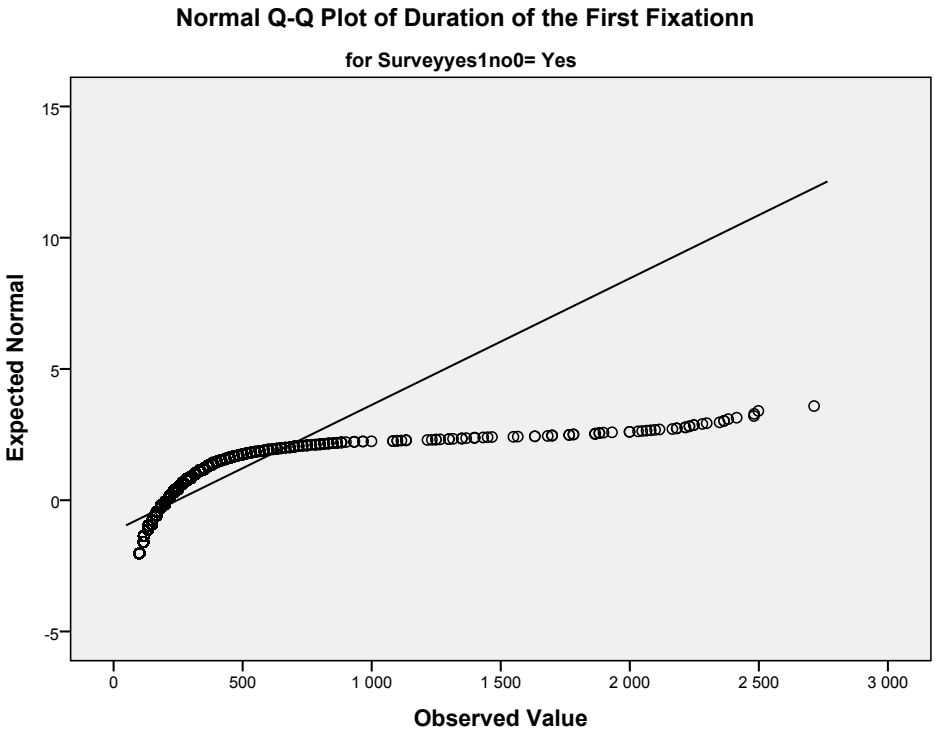
Histograms


Histogram
Non-biased Subjects
Mean = 252,16
Std. Dev. = 221,413
N = 6 783
Frequency
2 000
1 500
1 000
500
0
0
500
1000
1500
2000
2500
Duration of the First Fixationn

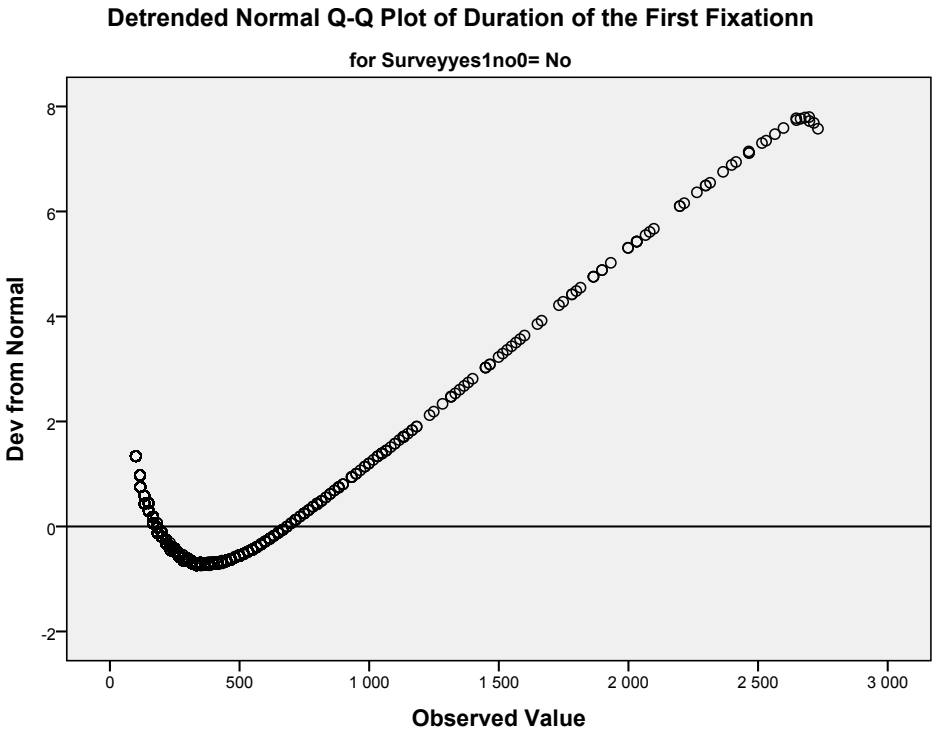


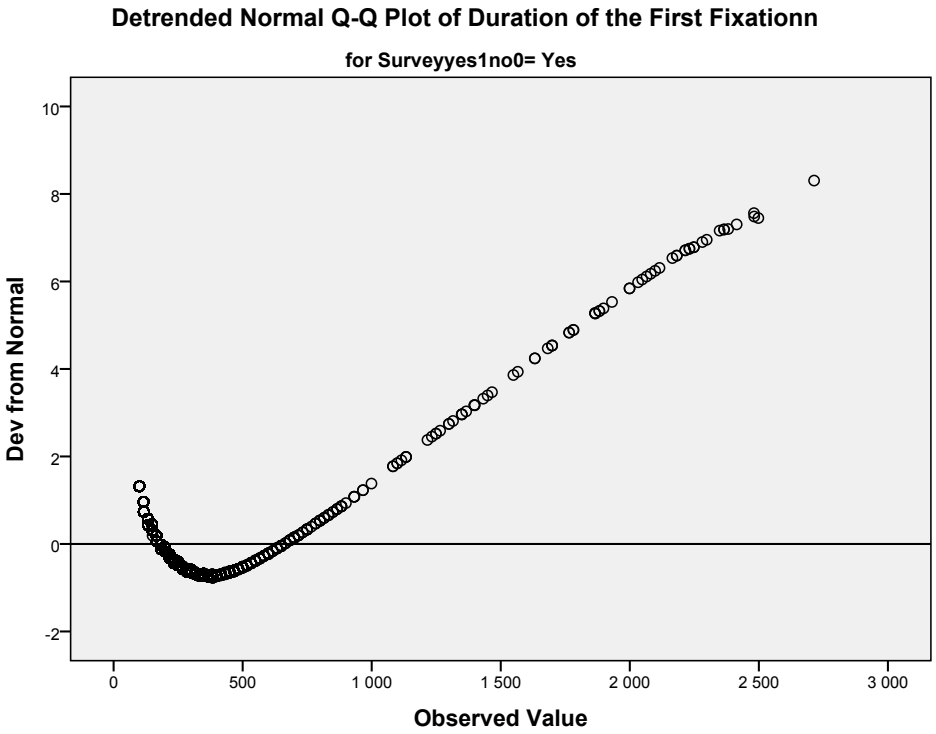
Normal Q-Q Plots


Normal Q-Q Plot of Duration of the First Fixationn
for Surveyyes1no0= No
Expected Normal
Observed Value
12
10
8
6
4
2
0
-2
0
500
1 000
1 500
2 000
2 500
3 000



Detrended Normal Q-Q Plots


Detrended Normal Q-Q Plot of Duration of the First Fixationn
for Surveyyes1no0= No
Dev from Normal
8
6
4
2
0
-2
0
500
1 000
1 500
2 000
2 500
3 000
Observed Value




```
 USE ALL.
COMPUTE filter_$=(Surveyyes1no0 = 1).
VARIABLE LABELS filter_$ 'Surveyyes1no0 = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Surveyyes1no0.
SPLIT FILE SEPARATE BY Surveyyes1no0.
NPAR TESTS
  /M-W= FixationStartMs BY Fixationofanimalfromfirst4(0 1)
  /MISSING ANALYSIS.
```

Mann-Whitney Test

Notes

Output Created		28-MAY-2016 19:59:14
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav
	Active Dataset	DataSet1
	Filter	Surveyyes1no0 = 1 (FILTER)
	Weight	<none>
	Split File	Was survey completed?
	N of Rows in Working Data File	5976
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /M-W= FixationStartMs BY Fixationofanimalfromfirst4 (0 1)...
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Number of Cases Allowed[a]	112347

a. Based on availability of workspace memory.

```
NPAR TESTS
  /M-W= FixationStartMs BY Fixationofanimalfromfirst4(0 1)
  /STATISTICS=DESCRIPTIVES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		28-MAY-2016 20:46:31
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav
	Active Dataset	DataSet1
	Filter	Surveyyes1no0 = 1 (FILTER)
	Weight	<none>
	Split File	Was survey completed?
	N of Rows in Working Data File	5976
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /M-W= FixationStartMs BY Fixationofanimalfromfirst4 (0 1) /STATISTICS=DESCRIPTIVES...
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.04
	Number of Cases Allowed[a]	112347

a. Based on availability of workspace memory.

```
[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav
```

Was survey completed? = Yes

Descriptive Statistics[a]

	N	Mean	Std. Deviation	Minimum	Maximum
First Fixation Start Time	5976	732,86	516,083	0	2898
Animal seen before?	5976	,53	,499	0	1

a. Was survey completed? = Yes

H4: Biased subjects have smaller time period until first fixation to animals seen in survey or in the trial before

Ranks[a]

	Animal seen before?	N	Mean Rank	Sum of Ranks
First Fixation Start Time	No	2836	3015,31	8551411,00
	Yes	3140	2964,29	9307865,00
	Total	5976		

a. Was survey completed? = Yes

Test Statistics[a,b]

	First Fixation Start Time
Mann-Whitney U	4376495,000
Wilcoxon W	9307865,000
Z	-1,142
Asymp. Sig. (2-tailed)	,254

a. Was survey completed? = Yes

b. Grouping Variable: Animal seen before?

```
 DATASET ACTIVATE DataSet1.
SAVE OUTFILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav'
 /COMPRESSED.
SPLIT FILE OFF.
USE ALL.
COMPUTE filter_$=(Surveyyes1no0 = 0).
VARIABLE LABELS filter_$ 'Surveyyes1no0 = 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPAR TESTS
  /M-W= FixationStartMs BY Fixationofanimalfromfirst4(0 1)
  /STATISTICS=DESCRIPTIVES
  /MISSING ANALYSIS.
```

Notes

Output Created		28-MAY-2016 20:49:34
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav
	Active Dataset	DataSet1
	Filter	Surveyyes1no0 = 0 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	6783
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /M-W= FixationStartMs BY Fixationofanimalfromfirst4 (0 1) /STATISTICS=DESCRIPTIVES...
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.03
	Number of Cases Allowed[a]	112347

a. Based on availability of workspace memory.

```
 SORT CASES  BY Surveyyes1no0.
SPLIT FILE SEPARATE BY Surveyyes1no0.
NPAR TESTS
  /M-W= FixationStartMs BY Fixationofanimalfromfirst4(0 1)
  /STATISTICS=DESCRIPTIVES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		28-MAY-2016 20:50:50
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav
	Active Dataset	DataSet1
	Filter	Surveyyes1no0 = 0 (FILTER)
	Weight	<none>
	Split File	Was survey completed?
	N of Rows in Working Data File	6783
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /M-W= FixationStartMs BY Fixationofanimalfromfirst4 (0 1) /STATISTICS=DESCRIPTIVES...
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Number of Cases Allowed[a]	112347

a. Based on availability of workspace memory.

```
[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-
H47.sav
```

H5: Unbiased subjects have smaller time period until first fixation time to animals seen in previous trial

Descriptive Statistics[a]

	N	Mean	Std. Deviation	Minimum	Maximum
First Fixation Start Time	6783	738,21	536,621	0	2898
Animal seen before?	6783	,51	,500	0	1

a. Was survey completed? = No

Ranks[a]

	Animal seen before?	N	Mean Rank	Sum of Ranks
First Fixation Start Time	No	3315	3434,78	11386300,50
	Yes	3468	3351,11	11621635,50
	Total	6783		

a. Was survey completed? = No

Test Statistics[a,b]

	First Fixation Start Time
Mann-Whitney U	5606389,500
Wilcoxon W	11621635,50
Z	-1,759
Asymp. Sig. (2-tailed)	,079

a. Was survey completed? = No

b. Grouping Variable: Animal seen before?

```
 USE ALL.
COMPUTE filter_$=(Surveyyes1no0 = 1).
VARIABLE LABELS filter_$ 'Surveyyes1no0 = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPAR TESTS
  /M-W= DurationMs BY Fixationofanimalfromfirst4(0 1)
  /STATISTICS=DESCRIPTIVES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		28-MAY-2016 20:56:55
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav
	Active Dataset	DataSet1
	Filter	Surveyyes1no0 = 1 (FILTER)
	Weight	<none>
	Split File	Was survey completed?
	N of Rows in Working Data File	5976
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /M-W= DurationMs BY Fixationofanimalfromfirst4 (0 1) /STATISTICS=DESCRIPTIVES /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.04
	Number of Cases Allowed[a]	112347

a. Based on availability of workspace memory.

[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav

Was survey completed? = Yes

Descriptive Statistics[a]

	N	Mean	Std. Deviation	Minimum	Maximum
Duration of the First Fixationn	5976	246,81	207,455	100	2714
Animal seen before?	5976	,53	,499	0	1

a. Was survey completed? = Yes

H6: Biased subjects will look into known animals for longer during first fixation

Ranks[a]

	Animal seen before?	N	Mean Rank	Sum of Ranks
Duration of the First Fixationn	No	2836	2966,85	8413981,50
	Yes	3140	3008,06	9445294,50
	Total	5976		

a. Was survey completed? = Yes

Test Statistics[a,b]

	Duration of the First Fixationn
Mann-Whitney U	4391115,500
Wilcoxon W	8413981,500
Z	-,923
Asymp. Sig. (2-tailed)	,356

a. Was survey completed? = Yes

b. Grouping Variable: Animal seen before?

```
 USE ALL.
COMPUTE filter_$=(Surveyyes1no0 = 0).
VARIABLE LABELS filter_$ 'Surveyyes1no0 = 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPAR TESTS
  /M-W= DurationMs BY Fixationofanimalfromfirst4(0 1)
  /STATISTICS=DESCRIPTIVES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		28-MAY-2016 20:59:10
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav
	Active Dataset	DataSet1
	Filter	Surveyyes1no0 = 0 (FILTER)
	Weight	<none>
	Split File	Was survey completed?
	N of Rows in Working Data File	6783
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /M-W= DurationMs BY Fixationofanimalfromfirst4 (0 1) /STATISTICS=DESCRIPTIVES /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.04
	Number of Cases Allowed[a]	112347

a. Based on availability of workspace memory.

[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\HypothesisH4-H47.sav

Was survey completed? = No

Descriptive Statistics[a]

	N	Mean	Std. Deviation	Minimum	Maximum
Duration of the First Fixationn	6783	252,16	221,413	100	2731
Animal seen before?	6783	,51	,500	0	1

a. Was survey completed? = No

H7: Unbiased subjects look into known animals for longer during first fixation

Ranks[a]

	Animal seen before?	N	Mean Rank	Sum of Ranks
Duration of the First Fixationn	No	3315	3343,44	11083510,50
	Yes	3468	3438,42	11924425,50
	Total	6783		

a. Was survey completed? = No

Test Statistics[a,b]

	Duration of the First Fixationn
Mann-Whitney U	5587240,500
Wilcoxon W	11083510,50
Z	-1,999
Asymp. Sig. (2-tailed)	,046

a. Was survey completed? = No

b. Grouping Variable: Animal seen before?

- *13.4 – Hypothesis 8.1*

```
 GET DATA
  /TYPE=XLS
  /FILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\TotalDurations.xls'
  /SHEET=name 'ForSPSS'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.

SAVE OUTFILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\H81.sav'
  /COMPRESSED.
NPAR TESTS
  /BINOMIAL (0.25)=Ifanimaloflongestdurationisknowndoesitmatchchosenani
  /MISSING ANALYSIS.
```

Notes

Output Created		29-MAY-2016 10:21:12
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\H81.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	16
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.25) =Ifanimaloflongestdurationisknowndoesitmatchchosenani /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.04
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.

```
NPAR TESTS
```

```
/BINOMIAL (0.25)=Ifanimaloflongestdurationisknowndoesitmatchchosenani
/MISSING ANALYSIS.
```

H8.1: Does animal of the longest duration match chosen animal?

Notes

Output Created		29-MAY-2016 10:22:21
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\H81.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	16
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.25) =Ifanimaloflongestdurationisknowndoesitmatchchosenani /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.

```
[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\H81.sav
```

Binomial Test

		Category	N	Observed Prop.	Test Prop.
Does animal of the longest duration match chosen animal?	Group 1	Yes	11	,69	,25
	Group 2	No	5	,31	
	Total		16	1,00	

Binomial Test

		Exact Sig. (1-tailed)
Does animal of the longest duration match chosen animal?	Group 1	,000
	Group 2	
	Total	

- *13.5 – Hypothesis 8.2*

```
 GET DATA
  /TYPE=XLS
  /FILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\TotalFixations.xls'
  /SHEET=name 'For SPSS'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.

SAVE OUTFILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\H82.sav'
  /COMPRESSED.
NPAR TESTS
  /BINOMIAL (0.25)=Ifanimalofmostfixationsisknowndoesitmatchchosenanima
  /MISSING ANALYSIS.
```

H8.2: Does animal of most fixations match chosen animal?

Notes

Output Created		29-MAY-2016 10:29:40
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\H82.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	18
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.25) =Ifanimalofmostfixationsisknowndoesitmatchchosenanima /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.

[DataSet1] C:\Users\Mantas\Documents\Food Science\Beads SPSS\H82.sav

Binomial Test

		Category	N	Observed Prop.	Test Prop.
Does animal of most fixations match chosen animal?	Group 1	Yes	12	,67	,25
	Group 2	No	6	,33	
	Total		18	1,00	

Binomial Test

		Exact Sig. (1-tailed)
Does animal of most fixations match chosen animal?	Group 1	,000
	Group 2	
	Total	

- *13.6 – Hypothesis 8.3*

```
 GET DATA
  /TYPE=XLS
  /FILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\Best Rated Comparison.xls'
  /SHEET=name 'RealData'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet2 WINDOW=FRONT.

SAVE OUTFILE='C:\Users\Mantas\Documents\Food Science\Beads SPSS\H83.sav'
  /COMPRESSED.
NPAR TESTS
  /BINOMIAL (0.125)=Doesbestratedanimalmatchchosenanimal
  /MISSING ANALYSIS.
```

H8.3: Does best rated animal match chosen animal?

Notes

Output Created		29-MAY-2016 10:35:47
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\H83.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	17
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.125) =Doesbestratedanimalmatchchosenanimal /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.

[DataSet2] C:\Users\Mantas\Documents\Food Science\Beads SPSS\H83.sav

Binomial Test

		Category	N	Observed Prop.	Test Prop.
Does best rated animal match chosen animal?	Group 1	Yes	11	,647	,125
	Group 2	No	6	,353	
	Total		17	1,000	

Binomial Test

		Exact Sig. (1-tailed)
Does best rated animal match chosen animal?	Group 1	,000
	Group 2	
	Total	

```
 DATASET ACTIVATE DataSet2.
DATASET CLOSE DataSet1.
```


- *13.7 – Hypotheses 9 and 10*

Notes

Output Created		23-JUL-2016 11:41:22
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\H9-H10.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	11769
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.125) =Isfixatedanimaltheleastliked /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.11
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.

Notes

Output Created		23-JUL-2016 11:42:15
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\H9-H10.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	11769
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.875) =Isfixatedanimaltheleastliked /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.

H9: First fixation is more likely towards the worst rated animal (trial 2) among biased subjects

Binomial Test

		Category	N	Observed Prop.	Test Prop.
Is firstly fixated animal the least liked?	Group 1	No	5068	,875	,875
	Group 2	Yes	725	,125	
	Total		5793	1,000	

Binomial Test

		Exact Sig. (1-tailed)
Is firstly fixated animal the least liked?	Group 1	,492[a]
	Group 2	
	Total	

a. Alternative hypothesis states that the proportion of cases in the first group < .875.

H10: First fixation is more likely towards the worst rated animal (trial 3) amon

Notes

Output Created		23-JUL-2016 11:53:46
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\H9-H10.sav
	Active Dataset	DataSet1
	Filter	Trialnumber = 2 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	5976
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.875) =Isfixatedanimaltheleastliked /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.

Binomial Test

		Category	N	Observed Prop.	Test Prop.
Is firstly fixated animal the least liked?	Group 1	No	5320	,890	,875
	Group 2	Yes	656	,110	
	Total		5976	1,000	

Binomial Test

		Exact Sig. (1-tailed)
Is firstly fixated animal the least liked?	Group 1	,000
	Group 2	
	Total	

Notes

Output Created		23-JUL-2016 11:41:22
Comments		
Input	Data	C:\Users\Mantas\Documents\Food Science\Beads SPSS\H9-H10.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	11769
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.
Syntax		NPAR TESTS /BINOMIAL (0.125) =lsfixatedanimaltheleastliked /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.11
	Number of Cases Allowed[a]	196608

a. Based on availability of workspace memory.