



Virtual Reality in Experience Marketing

An Empirical Study of the Effects of Immersive VR

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Executive Summary

Recent technological development has led virtual reality (VR) head mounted displays (HMD) to become commercially available to the mass market. Consumers have started to adopt the technology quickly, and forecasts for the VR industry are very promising for the upcoming years. However, little research has been conducted on the effects of exposure to immersive VR video through HMDs. Our aim for this thesis has been to investigate the effects of exposure to VR video and uncover the underlying mechanisms taking place. This insight can give marketers and content creators a better understanding of how to utilize the full potential of this new medium. We conducted a study of 100 participants evenly distributed between VR video and 2D video. The different experimental conditions were tested against the participants' consumer attitude, willingness to try, behavioral intention, telepresence, engagement and perception of length. We found some effects on consumer attitude, behavioral intention and telepresence, that were canceled out due to suboptimal image quality of the HMD. Further, we found that VR had no effect on the ability to discriminate between alternatives. Lastly, we found evidence suggesting that VR can induce a state of flow. The image quality of the HMD did however again cancel out some of the effects caused by VR. Our findings suggest that there are several positive effects from VR that could be used to reach consumers in new and efficient ways. Still, it seems that the image quality of the current technology is severely hindering VR from reaching its full potential. Content creators should hence emphasize aspects of interactivity like pacing and exploration to mitigate the negative effects of the image quality.

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1 - Introduction

1.1 Background

Virtual Reality (VR) has been one of the most discussed new consumer technologies the last couple of years. VR is defined as "*a computer-generated, interactive, 3D environment in which people become immersed*" (Wexelblat, 1993; Suh & Lee, 2005 p. 675). The technology provides users with a realistic and interactive virtual experience in a 360 degree, 3D environment (Suh & Lee, 2005). Rapid technological development and lower production costs have recently made VR commercially available, and as sales are climbing, content creators are starting to take notice of this new medium.

VR headsets are making remote experiences possible with inexpensive and available technology, and the applications of VR are vast. Due to the versatility of the technology, VR has the potential to disrupt many different industries, such as video games, live events, real estate, retail, education, healthcare and the military. Imagine surgeons perfecting a difficult procedure in VR before operating on real patients, going to virtual open houses when looking to buy a new home, or being able to experience a travel destination before deciding to go there. In these applications, VR allows us to reduce uncertainty, one of the technology's major strengths. When you are not confined to the two-dimensional limitations of photos or regular video, you are able to get more information which can be used to make better informed choices.

The development and adoption of VR technology are progressing quickly, and shipments are expected to reach 12,2 million units in 2017, increasing to 55,8 million units by 2022 (Smith, 2016). According to estimates and forecasts conducted by Goldman Sachs (2016), they expect the market for VR to reach \$60bn in revenue by 2025. The same report outlines nine markets they expect to be disrupted by the technology within the same time frame. Hence, it seems obvious that VR will play a major role in several industries in the coming years.

The main reason why VR is gaining traction, is because of smartphone-powered head mounted displays (HMD) have been introduced to the mass market. The rapid development in mobile technology has made it possible for consumer level smartphones to power VR HMDs. Also, the recent technological advancements in VR have enabled HMDs to render immersive virtual environments without inducing motion sickness. As VR becomes more accessible and

the user experience improves, great opportunities arise for companies to use VR to communicate with consumers in a more effective, immersive and personal way. However, there is little knowledge on how best to take advantage of this new communication channel in order to use it for marketing purposes.

1.2 Purpose

The purpose of this study is to investigate how VR can impact experience marketing. Experience marketing can be understood as marketing which aims to create a closer connection between the brand and the consumers, by immersing them in fun and memorable experiences (Moth, 2014). VR enables companies to immerse consumers in unique experiences and connect with them in new ways. Hence, it becomes increasingly important for marketers to understand how exposure to VR influences consumers. This insight is critical when developing VR content to utilize the full potential of the technology.

Existing literature has mainly focused on the effect of non-immersive VR on consumers' purchasing intention, brand attitude and brand awareness. With the rapid adoption of fully immersive VR HMDs, it can be argued that literature on non-immersive VR is somewhat outdated. To complement the existing literature, we intend to investigate the effects of VR on consumer attitude and behavioral intention further, by using immersive VR video in our experiment. There are also many unexplored areas of VR regarding its effect on the consumer, such as how it influences the decision-making process and how it affects the consumer's psychological state. Our research on these topics will make a novel contribution to the existing literature on VR's potential in experience marketing. This thesis will hence investigate the effects of VR in three areas:

First, we will examine if VR video can influence consumers' attitude, behavioral intention and telepresence more effectively than traditional (2D) video. Second, we will investigate whether exposure to VR video can affect people's ability to discriminate between different alternatives and make more confident decisions. Finally, we will identify whether VR video can induce a psychological state of flow which can engage the consumer to a higher degree than 2D video.

1.3 Structure

This thesis starts with a review of relevant literature related to VR and consumer behavior, which presents findings that can support and help explain our own findings. By drawing on the relevant literature, we present a research question and three hypotheses. We continue by explaining the process of developing the stimulus for the experiments in detail. Furthermore, we argue for the choice of experimental design and then describe how the data collection was conducted. This is followed by a presentation of analyses related to our hypotheses, and some additional findings. Finally, a discussion of the findings and suggested implications will be presented, along with limitations of our study and suggestions for further research within the field.

2 - Literature Review

First, we reviewed the typical focus of previous research and investigated the results to find gaps in the existing literature. We then focused on exploring areas of VR in marketing and consumer behavior which are not so well documented. We performed some additional literature searches to expand our knowledge in these areas that do not carry an obvious connection to the field of VR. This helped us uncover new insight on the mechanisms and processes involved with VR exposure and make a novel contribution to the existing literature.

The literature we went through can be divided into seven different categories; online shopping, telepresence, virtual reality, decision-making, discrimination and flow, with some literature in a miscellaneous category. We noticed that most of the literature was experimental, while some were descriptive. While reviewing the literature, we took notes of descriptive features like main theme, sub context, independent and dependent variables, technology and main effects. Most of the literature has been used to establish our theoretical understanding of VR and construct our hypotheses. The remaining parts of the review have functioned more as support and are not further discussed in this thesis. For a more complete insight into our literature review, see appendix A.

2.1 Main Focus of Previous Research

Although VR has increased in popularity recently, the concept is not new. Different varieties of the technology have been introduced throughout the years from the View-Master (1939), the Sensorama (1962), the SEGA VR (1991) to the Sony Playstation VR (2016). Even though the technology has changed a lot since the introduction of the View-Master, the different products have one thing in common; they present the viewer a reality different from his/her immediate surroundings. This process of mediating a virtual environment has been coined "telepresence" by Jonathan Steuer (1992), and is commonly used in literature to define the concept of virtual reality.

2.1.1 The Concept of Telepresence

Telepresence refers to the sensation of feeling like you are somewhere else than in your immediate surroundings, through the means of a communication medium (Steuer, 1992). To comprehend the full meaning of the term "telepresence", a definition of "presence" must first

be established. Jonathan Steuer (1992) describes presence as "*the experience of one's physical environment*" (p. 5). As the experience of a physical environment differs between individuals, the perception of presence is subjective. Hence, presence can be defined as the *sense* of being in an environment.

Steuer (1992) describes telepresence on the other hand, as "*the extent to which one feels present in the mediated environment, rather than in the immediate physical environment*" (p. 6). He hence defines telepresence as "*the experience of presence in an environment by means of a communication medium*" (p. 6), for example through, but not limited to, a VR HMD. Another definition is offered by Draper, Kaber & Usher (1998) as "*the perception of presence within a physically remote or simulated site*" (p. 354).

In short, while presence refers to the natural perception of an environment, telepresence refers to the mediated perception of an environment. According to Steuer (1992), the degree of telepresence an individual experiences through exposure to virtual reality environments, is determined by the limitations of the technology, more precisely the degree of *vividness* and *interactivity* the VR experience offers.

Vividness refers to the representational richness of the mediated environment, and is defined by the way it presents information to the senses. Steuer (1992) focuses on two factors that affect the vividness of a mediated environment; *sensory breadth* and *sensory depth*. Sensory breadth refers to the number of the five sensory dimensions (orientation, audio, touch, taste-smell and visual) which can be simultaneously presented by a given technology. Sensory depth refers to the resolution or quality within each of the five dimensions, such as pixel density, audio fidelity etc. An increase in one or both factors will in turn lead to increased vividness of the mediated environment.

Steuer (1992) defines interactivity as "*the extent to which users can participate in modifying the form and content of a mediated environment in real-time*" (p. 14). The degree of interactivity a user can engage in, depends on three different factors; speed, range and mapping. Speed is by Steuer (1992) referred to as the response time of the system for assimilating input into the mediated environment. Range is defined as the number of possible actions the user can manipulate at any given time. Lastly, mapping is defined as "*the way in which human actions are connected to actions within a mediated environment*" (p. 16). Like

vividness, an increase in one or more of these factors will in turn lead to increased interactivity. Figure 1 shows Steuer's (1992) construct of how different factors influence the degree of telepresence a user experiences.

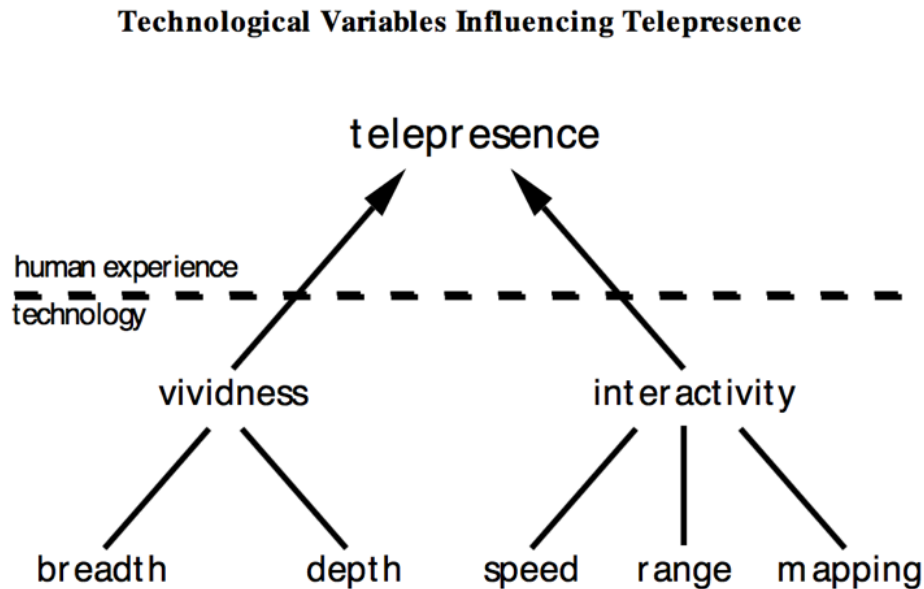


Figure 1, The construct of Telepresence, as defined by Steuer (1992)

2.1.2 Research on Virtual Reality and Telepresence

Empirical work on VR technology supports that it can induce a feeling of being somewhere else (Lenggenhager et al., 2007; Bailey et al., 2012). While not specifically mentioning the concept of telepresence, Lenggenhager et al. (2007) concluded that the use of VR could lead to an “out-of-the-body” experience. That VR can lead to telepresence is again supported by Bailey et al. (2012), while also using a different term than Steuer, namely “physical presence of virtual environment” (PVE). These concepts are however in line with Steuer’s definition.

2.1.3 Research on Consumer Behavior and Virtual Reality

McLuhan and McLuhan (1988) states that within any medium, there is a connection among the human mind, the technology and the environment that serves to immerse the users.

According to Klein (1998), the greatest value of a virtual experience is that it allows consumers to assess product performance prior to purchase, essentially turning experience attributes into search attributes for products. To uncover ways to take advantage of VR's ability to induce telepresence, marketing researchers have devoted more attention over the

years to how exposure to VR can influence consumers. More specifically, researchers have focused on how VR can affect brand attitude and intention.

Li, Daugherty and Biocca (2002, 2008) investigated whether virtual product experiences have a stronger impact on consumers' brand attitude, brand knowledge and purchasing intention as compared to 2D advertising. They argued that 3D product advertising can induce telepresence where the vividness and interactivity of the medium creates a salient experience. The implication is that knowledge is made more accessible and applicable, and more likely to have a positive impact on learning, evaluations and ultimately, behavior. Their findings indicated that 3D advertising had a positive effect on brand attitude and product knowledge, but there was only a marginally significant difference in purchase intention from the studies conducted. It must however be added that the research was based on non-immersive virtual experiences.

It is important to distinguish between non-immersive VR and fully immersive VR. By non-immersive, we are referring to VR experiences displayed on a monitor or projected on a surface around the viewer. Non-immersive VR only stimulates a subset of the viewer's senses and allows for peripheral awareness of the viewer's physical surroundings outside of the virtual experience (Reality Technologies, 2016). By fully immersive we are referring to the use of HMDs to fully enclose the viewer in the VR experience. By using advanced motion tracking, the HMD can mirror the viewer's motions in real time to change the field of view according to where the viewer is looking. By enclosing the viewer and increasing interactivity, fully immersive VR can stimulate more of the viewer's senses. It is thus fair to assume that fully immersive VR can have a stronger impact on the viewer than non-immersive VR. This is supported by research from Persky & Blascovic (2007), where an immersive virtual environment had a significantly higher effect on the users' emotions than a non-immersive virtual environment.

Like most of the literature we reviewed, Li, Daugerty and Biocca's (2002, 2008) research was based on non-immersive VR where the users were exposed to the virtual environment on a monitor. There are very few studies that involve the use of HMDs where the user is completely enclosed by the virtual environment. The literature on non-immersive VR may be argued as outdated, as evident by the number of high-end HMDs released to the mass market by major players in the tech industry in 2016 (Morris, 2015).

Vekony & Korneliussen conducted a study in 2016 to investigate the main effects of immersive VR on consumer attitude, intention and actual purchase, using Samsung Gear VR HMD (Vekony & Korneliussen, 2016). Their research focused on how VR could be used in destination marketing and tourism. Their results showed no significant main effects, but there were indirect effects on consumer attitude and intention, mediated through telepresence and enjoyment. The stimulus used in their experiment consisted of immersive VR images versus 2D images. One could argue that there is room to push this field of research further by using audio-visual stimulus. By incorporating both high-quality video and stereo sound in the virtual experience, one can create a more sensory-rich environment for the consumer. Multisensory interactions can more easily create salient experiences that affect behavior (Li et al. 2008).

2.2 Positioning the Thesis

Our research will seek to complement previous literature of VR's influence on consumer attitude and behavioral intention by investigating the effects of immersive VR video. We also found two interesting topics which we believe could benefit from further research. First, emotional engagement is considered to be an important driver for decision-making. This is of great interest to our research as we also found that emotional engagement is one of the strongest effects of VR. Second, the concept of flow has been connected to telepresence, which again is strongly linked to VR. By looking further into these topics, we intend to find underlying mechanisms of VR that gives it an advantage over 2D when persuading the consumer, and isolate these elements in immersive VR marketing.

2.2.1 Emotional Engagement and Decision-Making

Emotional engagement has been identified as one of the strongest effects of VR, and further research on the effects of emotional engagement has often revolved around decision-making.

2.2.1.1 Research on Virtual Reality and Emotional Engagement

One of the most promising aspects of VR is the potential to drive engagement and connect with audiences in a deeper, more authentic way. A report from YuMe and Nielsen (2016) compared mobile VR, 360-degree video on a flat screen, and 2D video. Their findings showed that content presented in VR produced the highest emotional engagement among consumers.

The study used advanced technological equipment to monitor how participants reacted to the different media. Biometric wristbands were used to capture changes in heart rate and galvanic skin response to create an emotional engagement metric. For participants who were exposed to 360-degree video and 2D video, eye tracking glasses were used to track the participant's eye movements. In addition to this, the head, device and chair movement were recorded to see how participants behaved when exposed to the different media.

The study found VR content to be more emotionally engaging than content on the other two platforms, eliciting emotional engagement 27% higher than 2D video, and 17% higher than 360-degree video. In addition, participants exposed to VR were engaged with the content 50% of the time, in contrast to 34% for 360-degree video and only 16% for 2D video. The study used three different video scenarios with different degree of exploration opportunities. The first was a helicopter flyover of Las Vegas, the second was a movie promo with a character-based narrative, and the last one was a bartender cocktail tutorial. The results showed that content with exploration opportunities led to higher levels of engagement in immersive environments. This research illustrates how VR can lead to stronger emotional engagement.

The findings from the YuMe & Nielsen (2016) report are consistent with the assumption that fully immersive VR affects viewers to a higher extent than other media. Stimulation of multiple senses leads to several outcomes which are absent in other media. First, the opportunity to manipulate the framing of the content leads to activation of the viewer. The viewer can distribute attention to whatever excites him/her the most. Second, being fully enclosed in the VR experience, the viewer's attention is shifted from his/her physical environments and evoking a sensation of being somewhere else, making it easier to immerse themselves in the experience. Third, the opportunity to explore a virtual environment causes the viewer to look around for information. The ability to shape his/her own experience can make the viewer more vested in it. All these mechanisms can lead the viewer to take more ownership of the experience, and thus evoke emotional engagement.

2.2.1.2 Discrimination and Decision-Making

In 1994, neurobiologist Antonio Damasio presented his research where he suggested that decision-making was driven by emotions rather than logic (Damasio, 1994). In his experiments, he studied people with damage to the right hemisphere of the brain where emotions are generated. While appearing normal except for lacking the ability to feel

emotions, they all had in common that they found it very difficult to make even the simplest decisions. The notion that decision-making is heavily influenced by emotions has been supported by several studies since (Lerner et al., 2015, Seo & Barrett, 2007, Naqvi & Shiv, 2006). Especially interesting is the research from Seo & Barrett (2007) which found that more intense emotions lead to better decision-making performance, contrary to popular belief.

Furthermore, research from Howard et al. (2008) found evidence that emotional learning could impact the ability to discriminate between stimuli that had previously been indistinguishable from each other. These findings were later supported by Pool et al. (2014), and strengthens the assumption that emotions can contribute to better discriminate between alternatives.

In addition, research from Hertwig & Pleskac (2010) indicates that a person's judgements become more reliable as the objective difference between two stimuli grows larger. In other words, larger differences in the physical stimuli makes it easier to discriminate between them. This idea is further strengthened in the research from Jarvstad et al. (2013), which suggests that an individual's ability to make optimal choices increases when the options become more discriminable, as positive and negative differences between them become more apparent.

As immersive technology like VR video leads to emotional engagement, and intense emotions lead to better decision-making performance, it is reasonable to assume that exposure to VR video will lead to more accurate and confident decisions. This is a relationship we will investigate further.

2.2.2 The Concept of Flow

Flow relates strongly to the theory of telepresence (Nah, Eschenbrenner, & DeWester, 2011). However, this connection is not well documented in previous literature. The flow concept is defined as a psychological state that arises when a person becomes so engaged by their current activity that their consciousness of self completely fades away. In these moments, your mind becomes entirely absorbed in the activity so that you "forget yourself" and begin to act effortlessly. Athletes often describe this as "being in the zone" (Csikszentmihalyi, 1998). According Csikszentmihalyi, it is in this state of consciousness that people find genuine satisfaction. Flow is therefore recognized as an "optimal experience" (Nakamura &

Csikszentmihalyi, 2002). During flow, people feel strong, alert, in effortless control, unselfconscious and at the peak of their abilities.

Imagine that you are studying for a math exam. You are working hard to solve the different types of problems, and suddenly you get a breakthrough. You start solving the problems faster than ever, you become completely engaged in the task itself, you lose sense of time and cannot be distracted by the surroundings around you. This is an example of entering a flow state. Or, consider a top basketball athlete like Stephen Curry playing an important game and being “in the zone”; making creative passes, breaking opponents ankles with crossovers and hitting shots that should be statistically impossible. Stephen Curry is not consciously thinking of how to do all those things because if he did, he would interrupt his flow-like state and make more mistakes. *“Absorption in a task indicates the absence of the self, and merging your awareness into the activity you are engaged in”* (Brown, 2015).

The flow concept was initially established while researching the phenomenon of intrinsically motivated activities, also called autotelic activities (Nakamura & Csikszentmihalyi, 2002). Csikszentmihalyi investigated the intrinsic enjoyment of these experiences by interviewing people with great skill such as chess players, rock climbers and surgeons. The factors to achieve optimal experience for these “flow activities”, related to creating a balance between difficulty and skill, while having clear short term goals and immediate feedback from the progress being made. Further research has however established that a given individual can find flow in almost any activity. Steven Kotler (2014) has continued this study, working to codify flow and has come up with 17 triggers that help achieving flow state, shown in figure 2 (Kotler 2014). The characteristics of a flow experience include the following:

- Complete engagement/absorption in a task
- Action and awareness are merged
- Distractions are excluded from consciousness
- There is no worry of failure
- The sense of time becomes distorted
- The activity becomes an end goal in itself



Figure 2, 17 triggers to achieve flow

2.2.3 Research on Virtual Reality and Flow

There exists some literature on the connection between flow and VR in a few different contexts. Csikszentmihalyi et al. (2014) has for example suggested that VR should be implemented in schools to cultivate engaged learning and create optimal learning environments.

Within the field of consumer behavior, the link between telepresence and flow has been drawn previously. Nah et al. (2011) coined telepresence as one of the aspects of flow. Their study investigated the effects of a non-immersive virtual environment versus a 2D environment on brand equity, telepresence, enjoyment and behavioral intention. The results showed that the telepresence induced by the virtual environment positively influenced brand equity and enjoyment, similar to the findings of the study conducted by Vekony and Korneliussen (2016). Despite the positive effects of telepresence, the non-immersive virtual environment had a direct negative impact on brand equity. To explain the negative effect, Nah et al. (2011) used distraction-conflict theory. Because the richness of the media, the consumer struggled to pay attention to the brand.

However, none of the previous research conducted has tested if VR induces the psychological characteristics of a flow-state. Also, there is little research regarding the elements that are present to induce flow states in VR. These are areas we will investigate further in this thesis.

3 – Research Model and hypotheses

Our proposed research model and hypotheses will be presented in this section to answer our research question, derived from the main purpose of the study. Our research question is as follows:

RQ: How effective is VR in an experience marketing setting, what types of consumer behavior are emphasized in VR, and what are the elements of VR that affect consumers the most?

3.1 Proposed Model and Hypotheses

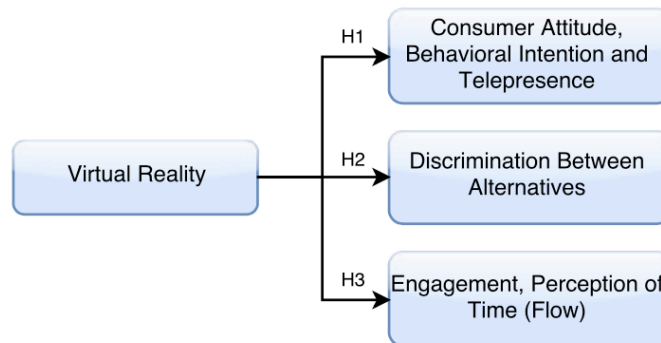


Figure 3, Proposed model

To answer our research question, we have constructed three main hypotheses, as illustrated in figure 3. The first hypothesis (H1) tests the direct effects of immersive VR exposure on consumer attitude, behavioral intention and telepresence. We propose that exposure to fully immersive VR videos through an HDM will have a positive influence on consumer attitude and behavioral intention. We also expect the vividness and interactivity of the VR experience to induce a sense of telepresence in the participants' minds.

The second hypothesis (H2) tests whether exposure to immersive VR will have a positive effect on the ability to discriminate between alternatives. The immersiveness that VR offers compared to 2D will lead to emotional engagement, which in turn will cause the participants to improve their decision-making performance and make more confident decisions.

The third and final hypothesis (H3) tests if immersive VR exposure can induce flow-like states in the consumers' minds. We believe the immersiveness and activation by using VR

will engage and captivate the viewer, thus inducing flow-like states within the mind of the consumer. With these hypotheses, we should be able to answer our research question, and gain new insight of the use of immersive VR in marketing.

3.1.1 Consumer Attitude, Behavioral Intention and Telepresence

As mentioned, there has been varied results from previous research when it comes to VR's effect on consumer attitude and intention. According to studies conducted by Li, Daugherty and Biocca (2002, 2008), different types of virtual experiences lead to more favorable brand attitudes and purchasing intentions. On the other hand, Vekony & Korneliusen (2016) did not find any significant results regarding the main effects of an immersive head-mounted display. They did however find mediated effects of telepresence and enjoyment. Their study was conducted by comparing VR images with 2D images of various tourist destinations. We intend to conduct a similar experiment using VR video of various experiences as we argue that video will have a significant higher effect on consumer attitude, behavioral intention and telepresence. By using video, we will increase sensory breadth, which should lead to a higher degree of telepresence. Multisensory interactions can also more easily create salient experiences that makes the information more accessible and applicable, thus more likely to affect evaluations and behavior (Li et al. 2008). We therefore hypothesize the following:

*H1: Exposure to VR video will have a positive impact on a) **consumer attitude**, b) **behavioral intention** and c) **telepresence**, as compared to 2D video.*

3.1.2 Discrimination Between Alternatives

As previous research on VR has suggested, it can have a positive effect on the emotional engagement of consumers (Yume & Nielsen, 2016). Emotions, depending on its valence, can influence an individual's judgments and attitudes, hence affecting his/her decisions. Damasio (1994) argues that emotions and reason are intimately linked in decisions making, causing the emotional state of a person to significantly influence decision-making processes. Further, the research of Seo & Barrett (2007) indicates that more intense emotions lead to better decision-making performance. There has also been drawn a connection between emotions and the ability to discriminate between choices (Howard et al., 2008), and that large differences in stimuli further increases the ability to discriminate and make more accurate decisions (Jarvstad et al., 2013).

Hence, it is reasonable to assume that immersive technology like VR video will induce emotional engagement, which in turn will lead the viewer to better discriminate between alternatives and thus make more accurate and confident decisions. However, there are no research on the exact relationship between VR and decision-making, and we will therefore examine this closer with the following hypothesis:

H2: Exposure to VR video will have a positive effect on consumers' ability to discriminate between alternatives as compared to 2D video.

3.1.3 Characteristics of Flow

Flow has most commonly been used in relation to activities where there is a balance between difficulty and skill, which leads to a feeling of mastery. Sports, games and other “flow activities” provide goal and feedback structures that make flow more probable. Unlike these activities, watching 2D video is a passive activity with no feedback structure, which facilitates little interaction and engagement (Brown, 2015). This makes it very difficult for 2D video to induce flow. VR video however, gives the viewer the ability to interact more with the experience due mapping of the virtual environment according to his/her movements, thus immersing the him/her in the experience.

We hence argue that the increased feedback structure makes it possible for VR video to artificially simulate flow states by inducing some, but not all factors required for achieving flow. According to Li, Daugherty and Biocca's 2002 article, "*a virtual experience consists of more active cognitive and affective activities than 2D-marketing messages*" (p.45). With VR videos, flow state can be entered passively and achieve some of the characteristics of an optimal experience were the person is somewhat immersed in the activity. Thus, we have come up with the following hypothesis:

*H3: VR video induces a flow state that is a) **more engaging** and b) **distorts the perception of time**, as compared to 2D video.*

4 – Study

After we read up on the existing literature and developed our hypotheses, we started creating stimuli to be used in an experiment designed to test the proposed hypotheses. We created videos for three different experiences for each experimental condition (VR and 2D), closely following five distinct criteria for the stimuli development. After the stimuli were developed, we started on the experimental design. We based the design on our hypotheses to ensure we would get all the answers we needed. With both the stimuli and the experimental design completed, we started the process of gathering data. We conducted a 6-day lab experiment at Høyskolen Kristiania in Bergen, March 2017, with 100 participants. Finally, we processed and analyzed the data to investigate our hypotheses in detail. The flowchart for our study can be viewed below in figure 4.

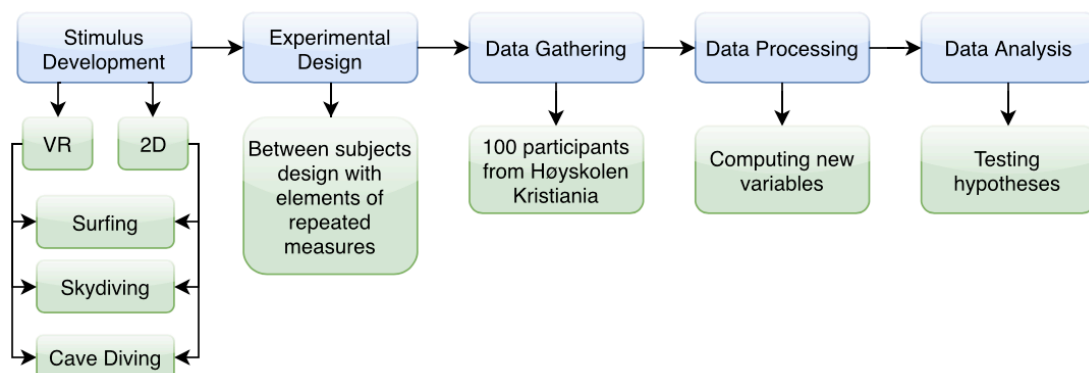


Figure 4, Flowchart of our study

4.1 Methodology

4.1.2 Stimulus Development

For the experiment, we had two Samsung Galaxy S7 and two Samsung Gear VR headsets at our disposal. Although the Gear VR is not a top-tier VR headset like HTC Vive or Oculus Rift, it is among the most affordable and widely adopted ones on the market, and hence a good representation of how most consumers experience VR today. The Galaxy S7 is also a very popular phone, and as smartphones are a prominent platform for watching videos, we regard it as a fitting device to use for the experiment. For a comparison between Samsung Gear VR and the top-tier HMDs HTC Vive and Oculus Rift, see appendix B.

When developing the stimulus to be used in the experiments, we had to keep five important criteria in mind:

1. As we did not have the time or resources to film and develop 360-degree videos ourselves, we were confined to videos created by others and available to download for free on the internet.
2. We believed the real-life experience participants had in their memory would trump the experience they got from the medium, and hence affect their answers in the questionnaire. Therefore, we decided to try to find experiences we believed few people had tried themselves.
3. As the aim of our study was to measure the effects caused by the condition the participants were exposed to, and not by the content itself, it was very important for us from the beginning that the content for both VR and 2D video had to be as similar as possible. That meant that the VR video had to be a comparable substitute of what was presented in the 2D video, and vice versa.
4. To compensate for the lower screen resolution on the Samsung S7 when using the Samsung Gear VR, we had to make sure the quality of the VR-videos was as high as possible.
5. We needed to find three different experiences which would be plausible alternatives to each other on the location of a given scenario.

We considered many different themes for the videos, like sightseeing, travelling and sports, but due to our second criteria of choosing experiences we believed few had tried, we ended up going for extreme sport activities. The availability of high quality VR-videos in this category was good, and so was the selection of comparable 2D videos.

We decided to use YouTube as the source for both VR- and 2D video for two reasons: First, because of its vast library of free, high quality videos of both formats. Second, the wide availability of tools specialized for downloading videos from the site in high quality.

When we began searching for videos, we started with the VR videos as that was the format with the smallest selection. To make sure all the videos we considered satisfied the quality criteria, we limited our search to 4K resolution as the maximum resolution that the Samsung S7 can display is 3840x2160 pixels (4K). We went through hundreds of videos in search of what we considered good VR-experiences, and ended up going for surfing, skydiving and

cave diving, all three being experiences which can be conducted on the same location. After deciding on the VR-videos, we continued by searching for 2D video counterparts. Again, we looked through hundreds of videos and hours of footage to find videos which closely resembled both the content and experience of the VR videos; the videos had to have almost the exact same angles, image quality and color palette, which was essential to satisfy our third criteria. The videos we ended up using can be found in appendix C.

The videos we chose had some shortcomings both in form of audio and image. First, many of the videos featured a logo at the beginning, like GoPro or Samsung, and usually had introductions before the activity itself started. For instance, the surfing VR-video had a long introduction where the surfers drove a car to the coast and then a boat out to the waves before any actual surfing took place. To make all three experiences as similar as possible, we decided to edit the videos to have similar structure and content. We also edited the videos down to the same length for each condition. Second, the videos often had either a music track playing in the background, or very poor audio quality. We decided to replace the audio entirely to avoid any potential emotional effect the music could have, in addition to keep the sound from being a distraction. The same sound effect library was used for both regular and VR-video to keep consistency between both media. We edited the audio carefully to match each video and made sure the audio was consistent with the content. For instance, in the surfing VR-video, when the video cut to another angle, we changed the audio so that it sounded like it was shot from a different angle instead of having the same track play over both clips.

To simplify the procedure of showing the participants the videos during the experiment, we combined all three activities into one long video and added some explanatory title cards before and between the videos. On the VR video, we added instructions at the beginning which explained to the participants how the VR-headset worked, how they could proceed to start the video and how they could adjust the focus relative to their eyesight. In addition, we added a title card before every video saying which activity was about to be shown. At the end of the video, we added a title card telling the participants to remove the headset. The 2D video was more self-explanatory and did not necessitate any instructions at the beginning. We did however keep the title cards with the name of the activities between the videos, and a title card at the end telling the participants to put the phone down.

Finally, to prevent order effects, we created three different versions of both the VR and 2D videos. The three different orders we created were surfing/skydiving/cave diving (S,F,G), skydiving/cave diving/surfing (F,G,S) and cave diving/surfing/skydiving (G,S,F). In the title of the VR-videos we added "_mono360" so that the Samsung Gear VR software would automatically detect the video format and present it to the participants in 360 degrees.

4.1.2.1 Description of Content for Both Conditions

Surfing - The video starts as we watch the surfers dive into the water with their surfboards. We then observe a few waves cresting before the viewer is transported up on the surfboard, riding a couple of big waves. The camera angles are similar in the two conditions. However, the use of multiple camera angles can make it difficult for the viewer in VR at times to coordinate where he or she should be looking.

Skydiving - The video begins in an airborne plane with multiple skydivers, right before the jump. The viewer climbs out the window of the plane and jumps with several other skydivers. The skydivers perform a series of aesthetic formations together before the trigger for the parachute is pulled. The viewer then glides towards the ground and lands safely. There is a lot of audio noise during the video, which can be a bit annoying for the viewer. Also, the fast pace and the many cuts of the video might make it difficult for the viewer keep up with what is going on, especially in VR due to the richness of the media.

Cave diving - The video takes the viewer through a dark underwater cave. There are some fish, interesting cave structure and the hollow sound of the oxygen tanks. The video's slow pace gives the viewer time to look around and explore the cave. The most significant difference between the two conditions is that the VR video is one continuous clip, while the 2D video is composed of a few different clips.

4.1.3 Experimental Design

For our experiment, we chose a between subjects design with some elements of a repeated measures design. Each participant was only subjected to a single condition, and were shown either VR-video or 2D-video. However, all participants were shown video of three different activities, stitched together in a 4,5-minute long presentation. Thus, we designed the experiment to be able to identify differences between the media, as well as differences between the different videos. This design requires the experiments to be conducted in

controlled environments, and is hence suitable to compare direct and indirect effects of the dependent variables between the two conditions. By using this design, we would eliminate extraneous factors that could contaminate our findings, such as fatigue after being subjected to a long series of tests, or that participants would start guessing our hypotheses. The design is illustrated in figure 5. The number of participants in each step is displayed in parentheses, and dashed lines represents random assignment.

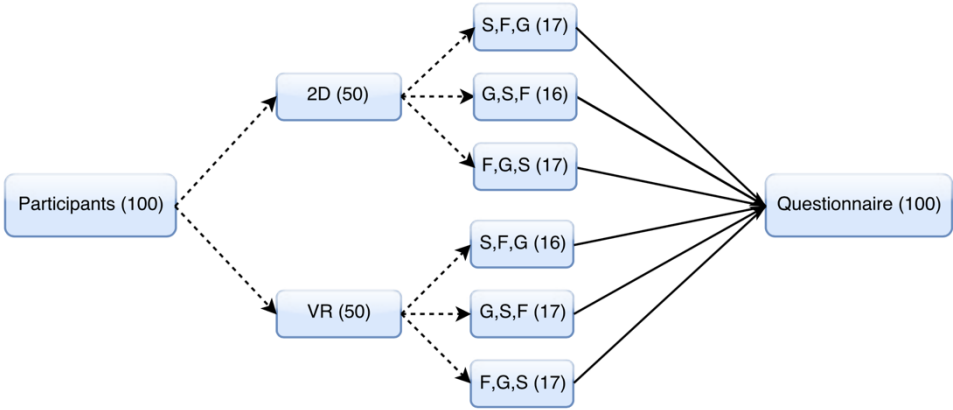


Figure 5, Flowchart of the experimental design

In addition to VR video and 2D video, we considered including images as a third medium. Images would be relevant to include as static media is still used a lot in marketing. It is reasonable to assume that we would see an even bigger difference between VR video and images than VR video and 2D video due to the larger discrepancy in immersiveness. However, with the design we opted for, including another medium would either require a larger sample size or settling for fewer participants in each cell.

We discussed whether we should use a pure repeated measures design instead of the mixed design we opted for. That would mean showing the participants the same experiences in both VR and regular video. There are many advantages for using a repeated measure design. Exposing every participant to multiple conditions would enable us to extract much more information from each participant. Additionally, with such a design, we could include images as a third medium without requiring a larger sample size.

Although there are several benefits from such a design, there are also many drawbacks to consider. Exposure to multiple conditions would require the participant to spend a lot more time, both on the stimuli as well as the questionnaire. The questionnaire would also need to be redesigned to account for several conditions. The participants' reward would need to be of

higher value to reflect the increased time they would have to give up to participate, and due to budgetary constraints, we would then have to decrease our sample size which in turn could affect the validity of the experiment. Finally, due to the large difference in immersiveness between the two conditions, we chose to reject a repeated measures design to avoid any potential order effects. Our reasoning was that the impressions of the VR condition would greatly outweigh the impressions from the 2D condition and thus distort the participants' answers in the questionnaire. Even though it would be interesting to examine such a relationship further, our aim with this thesis is to isolate the sheer effect of the medium, independent from other inputs.

4.1.4 Procedure

We will describe the procedure of conducting our experiment in this section. Every step will be described to its full extent to ensure that the experiment can be replicated. It is furthermore important to present the rationale for the different measures in our questionnaire as it is related to the internal validity of the experiment.

4.1.4.1 Test of Equipment and Rehearsal

To make sure that the data collection would proceed as smoothly as possible, we invited a selected few to try out our experiment in advance. Through the trials, we managed to rehearse and test that the equipment would work as planned during the actual experiments, while receiving valuable feedback on the setup of our procedure. We iterated our experiment manuscript to be as precise and consistent as possible to avoid saying anything that could influence the results, while saving time and increasing efficiency. We also made sure to update the mobile phones software to avoid any future technical difficulties.

4.1.4.2 Recruitment

To reach a satisfying number of participants, we performed extensive preliminary work for recruiting. Our email invitation (appendix D) explained the subtext of the experiment while not revealing anything that could prime the participants for what we were specifically testing for. Due to a similar study that was conducted at NHH by Vekony and Korneliussen during the fall of 2016, we collaborated with CSI researcher Siv Skard to conduct our experiment at Høyskolen Kristiania in Bergen. The invitation was first distributed on internal internet portals to Skard's students and other students taking courses in the Kristiania marketing program. Siv Skard and one of her colleagues, Alexander Sivertsen, also gave a short

presentation of the study in multiple of their lectures. The students were told that they would help the research at the NHH faculty by partaking in the experiment, but also that each participant would receive a gift card at the local bakery Godt Brød with a value of NOK 80 upon completing the study. We figured that the gift card would work as a sufficient incentive to appeal to those who were not intrinsically motivated to participate, as well as counteract any selection bias. Due to very little response from these initial efforts, the invitation was extended to the whole student body of Høyskolen Kristiania, a total of approximately 700 students.

The students were asked to sign up to participate in the study by following a link to an online scheduling tool called Calendly (see appendix E). With Calendly, students could easily pick their preferred date and choose an available time slot during the 6-day period we hosted the experiment. Calendly would send the participant a reminding email before the appointment. If they still happened to forget, we could call them and reschedule. Unfortunately, there was still very little response and we had only 20 students signed up to participate in the study when we were about to start our 6 days of data collection. We were determined to get more participants, and decided to roam the hallways at the college when we had time and pitch the experiment to students that were not busy. After some practice, we were able to persuade many students to partake in the experiment every day. By the end of the 6-day period we had managed to get a total of 100 participants, a number we were finally content with.

4.1.4.3 Random Assignment

Participants were randomly assigned to the experimental conditions to minimize systematic error on our results and thus strengthening the internal validity. To ensure an even distribution of the video order and the media, we made an online spreadsheet to keep track of the distribution in real time. We used the spreadsheet to randomly assign participants to either 2D or VR, and also to randomly assign them to one of the three video orders. Neither the experimental conditions or video order were assigned to a specific room. The two rooms used for the experiment were not identical, but we made sure that the “vibe” of each room were as similar as possible by setting up the rooms in identical fashion. Therefore, the rooms should have no effect on the results. Participants, experimental conditions and video orders were evenly split between the two experimenters. By randomly assigning the participants, there should be no observable or unobservable differences between the two conditions. The only

difference left difference should be the condition the participants were exposed to, thus giving us the ability to find the causal inference from the treatment.

4.1.4.4 Anonymization

Some participants might feel that the experiment was not completely anonymous since the study required the participant to sit and partake in the study face to face with the experimenter. This should however not affect the results between the two conditions since it applied to all participants. Participants were also unable to see who else had signed up to the study, as such information were disclosed to the experimenters only.

The questionnaire the participants had to fill out after the exposure of either condition did not register any information of identification, thus making the questionnaire itself anonymous. The experimenter sat on opposite sides of the table in the rooms, thus making it impossible for the experimenter to see what the participants answered during the questionnaire. Upon completing the questionnaire, the participant received a gift card which also could be used without any identification.

4.1.4.5 Briefing

While briefing the participants of the experiment, everything the experimenters said was scripted to minimize deviance of the experiment process for the participants (see appendix F and G). The experimenters began by welcoming and thanking the participant for partaking in the study, and stated that the experiment is completely voluntary and anonymous. Next, the experimenters explained that the participant would watch a video of different vacation activities. Depending on the condition given, the participant would be exposed to either a 2D video on a smartphone or VR video with a VR headset. Instructions on how to proceed to use either device were consequently given. The specific instructions for the use of the VR headset were more detailed, but the differences were kept to a minimum to make the two conditions as similar as possible. Finally, the participants were told not to worry about memorizing the content or focus on anything specific, as there would be no follow-up questions regarding this aspect.

4.1.4.6 Exposure

For the VR condition, the participants were placed in rotatable chairs to make sure the participant could fully immerse themselves in the virtual reality setting. The chair was placed

so that the participant could rotate the chair freely. Participants were then given the headset ready to play, including a pair of headphones. The video would start with a short tutorial on how to use the headset. The video lasted approximately 4,5 minutes excluding the tutorial. After the video was finished, the screen would say “You can now take of the headset”.

If given the 2D video condition, the participants were to watch a video of the three different activities on the smartphone given to them, including a pair of headphones. The video lasted approximately 4,5 minutes. As mentioned earlier, the 2D video content of the activities were as close substitutes as we could find compared to the VR content. The purpose was to ensure the only difference in both conditions would be whether they watched the video with a VR headset or on a smartphone screen. After the video was finished, a title card on the screen would say “You can now put down the smartphone”.

For the internal validity of the experiment, participants needed to be unaware of the fact that they were assigned to different treatments. It is probable that the participants of the 2D control group would be less excited to watch a video on a smartphone if they knew other participants in the control group were watching the video with a VR headset, especially if they had yet to try this technology. Furthermore, participants from the treatment group may have felt more special knowing that others would not get the same opportunity. Fortunately, the random assignment of the participants occurred behind closed doors, therefore strengthening anonymity.

4.1.4.7 Questionnaire

After exposure to the conditions, the participants were asked to complete a questionnaire regarding the experience they had just seen. They were told that there were no right or wrong answers to the questionnaire and that they should replicate their own opinions. The questions from the questionnaire covered the aspects we intended to further examine. The measurements are discussed in further detail in section 4.1.6.

The questionnaire was completed on a computer, but before it was handed to the participant, the experimenter filled in what condition and what order the participant had been exposed to. The participants were encouraged to ask if they had any questions regarding the questionnaire or if anything was unclear. For the most part this was not an issue and there were few questions asked by participants. For the questionnaire, see appendix H.

4.1.4.8 Debriefing

As a last part of the questionnaire, the participants read a statement regarding that it was important to not reveal what they had experienced during the experiment to other students. Discussing the experiment with others could lead to future participants forming expectations prior to the study, which could affect the internal validity of the data. The participants were therefore told to check the box if they agreed not to discuss the context of the experiment with anyone for 7 days.

4.1.5 Participants

A similar experiment was conducted at NHH the fall of 2016, and we wanted to avoid hypothesis guessing among participants who might have heard about- or participated in the other experiment. Therefore, we conducted the experiment on Høyskolen Kristiania (HK) in Bergen. Over the course of six days, we managed to get 100 participants to take part in the experiment.

Out of these 100 there were 70 women and 30 men, which also seemed to reflect the gender distribution at the institution. As we carried out the experiment in Norwegian, all participants were either native Norwegian or proficient in the language. The age of the participants ranged from 19 to 42, with a mean age of 22,72 years.

4.1.6 Measurements

The questionnaire was designed to give us much information as possible regarding how the participants experienced the exposure and how it affected their evaluations and choices, while asking as few questions as possible. The elements used in the questionnaire and their theoretical aspects are presented in the following sections.

4.1.6.1 Dependent Variables

Consumer Attitude - Brand attitudes are defined as a consumer's overall evaluation of a brand (Keller, 1993). To test the attitudes participants had formed towards the experiences they were exposed to, two items were used. On the first item, the participants had to rank the activities by distributing 100 points between the three of them. The intention of this item was to measure if the participants made more discriminating preferences, depending on which

media they were exposed to. The second item let the participants rate each of the experiences on a scale for 0 to 100, where 0 was "Very bad" and 100 was "Very good".

Behavioral Intention - Behavioral intention is a good measure to predict actual change in consumer behavior. Behavioral intention relates to how willing a person is to try, and how much effort they want to exert to perform a given behavior (Ajzen, 1991). To measure the behavioral intentions the participants had formed towards the experience, we used two items. The first item asked if the participant was more, or less, willing to try the experience after watching the video. We used a five-point scale with 1 being "A lot less likely" and 5 being "A lot more likely". For the second item, we created a scenario of a 15-day vacation on Hawaii. The participants were then asked to allocate the 15 vacation days between 3 different 5-day activities, with the option of choosing one activity multiple times. The activities given were: surfing, skydiving, cave diving, shopping, the beach, hiking, and going out in the city.

Telepresence – On a scale from 0-100 from "To a very little extent" to "To a very high extent", the participant was asked to grade the degree of telepresence they felt from watching the video. The question asked was "To what degree did you feel present during the activity?"

Engagement – The degree of engagement while watching the video content was measured using a five-point scale based on the experienced excitement level of the different activities in the given condition, ranging from "Boring" to "Exciting".

Perception of Time – To test the participants' perception of time, we asked them to evaluate the length of the video using a five-point scale from "Way too long" to "Way too short". The video for both VR and 2D were the same length of approximately 4,5 minutes.

4.1.6.2 Control Variables

Several variables were added to the questionnaire to control for different explanatory effects that were not the prime focus of this study. By measuring these control variables, we intended to better establish the relationships we were investigating.

Sensation Seeking – As the experiment consisted of exposure to various extreme sport activities, we saw it as fit to control for any sensation seeking personality that might make the

participant more inclined to prefer such activities. We used a 20-item nominal test developed by Elaine Aron (2006) to measure the level of sensation seeking for each participant.

Prior Activity Consideration – We considered it important to control if the activity had been considered by the participant prior to exposure. A simple single-item binary scale was used.

Prior Travel Experience – Further, we wanted to control for previous travel experience which might have been related to the sensation seeking personality. The first item was a simple binary yes/no asking whether they had been to Hawaii, the location of the scenario in the experiment. The second item used a five-point scale based on the frequency of travelling compared to their age group, ranging from "Much more seldom" to "Much more often".

Prior VR Experience – We also checked for previous experience with VR headsets. The question was in a binary yes/no form. The measurement was only included under the immersive VR condition, as we did not want to reveal to the control group that we were using a VR headset for the treatment group.

Expected Experience – The participants were asked how they aligned the experience of the content up against the expected experience of the actual real life activity. This was measured using a five-point scale from "A very little degree" to "A very high degree".

Experience Consuming Content – An important control variable was the participants' experience with the exposure itself and the difference of watching the content on a smartphone screen or with a VR headset. A five-point scale was used to ask the participants about any uneasiness while watching the videos, ranging from "Not at all" to "To a very large extent". In addition, the participants were asked to rate the image quality on a scale from 0-100, ranging from "Poor quality" to "Great quality". The two items were measured for both conditions.

Experience with the VR Content – We also wanted to control if the participants felt that the VR video they were shown was a good virtual experience on a general basis. A single item five-point scale ranging from "To a very small extent" to "To a very large extent" was used. The item was only shown to the treatment group.

Demographic Variables – The only demographic variables we measured were age and gender, since the students at Høyskolen Kristiania were a relatively homogenous sample.

Phobias – At last we also controlled for different phobias that could affect our results for the dependent variables, especially behavioral intention. The phobias we tested on a nominal scale were hydrophobia, fear of sharks, claustrophobia, fear of heights, fear of nature, fear of socializing, fear of UV-light and fear of spending money.

4.1.7 Data Processing

To successfully conduct our data analysis, we needed to compute some new variables from the data set. The way we designed the questionnaire gave us a lot of data, but some of it needed to be processed to be useful for the analyses.

4.1.7.1 Sensation Seeking

The way the personality test was set up gave us 20 individual variables where the participants had either checked the item if they agreed with the statement, or left it blank (Aron, 2006). Whether the participants were high, medium or low sensation seeking was dependent on how many of the 20 items they identified with, and the classification also depended on gender. The different classifications of the degree of sensation seeking are displayed in table 1.

	High sensation seeking	Medium sensation seeking	Low sensation seeking
Men	13-20	10-12	0-9
Women	11-20	8-10	0-7

Table 1, Classification thresholds for the High Sensation Seeking-test

To group all participants according to their classification, we computed a new variable using the 20 variables we already had. As each variable consisted on either 0 or 1 depending on the participant's answer, we used a simple summation formula to count all the answers of each participant. After we computed a new variable with just the sum of all 20 items, we continued to assign each participant to either high, medium or low sensation seeking. To achieve this, we used an "If" condition to assign each participant with either 1 for high sensation seeking, 2

for medium sensation seeking or 3 for low sensation seeking, using the gender variable as another condition to account for the different ranges for men and women.

4.1.7.2 Vacation Days

The seven different vacation activities the participants could choose from were displayed in the data set in three different columns, one for each five-day period. The activities were displayed as numbers ranging from 1-7, representing which of the seven activities the participants had chosen for each of the five-day periods. As the data only represented the activity the participant had chosen for each period, we had to separate them into independent variables for each activity. We started by creating seven new variables, one for each activity, and inserted the number of times the corresponding activity occurred in the original three variables. We then multiplied the new variables by five to find the number of vacation days. Finally, we used a formula to replace missing values with 0 to correctly calculate the mean for each of the new variables representing the activities.

4.1.7.3 Discrimination

To be able to check if there was any difference between VR and regular video in terms of discrimination, we created new variables in which we calculated the mean standard deviation for each of the dependent variables. We used a function for calculating standard deviation across the three different variables (surfing, skydiving, cave diving) associated with each dependent variable (ranking, rating, willingness to try etc.).

4.1.7.4 Phobias

After calculating the different number of vacation days each participant had chosen, we decided to control whether any phobias or fears associated with our three main activities would have any impact on whether the participants chose to spend their vacation days on that activity. To test this, we computed a new variable for each activity. We made the new variables reproduce the number of vacation days for each activity, using an "If" condition to only include those participants who had fears or phobias that could be associated with the different activities. For surfing we used fear of water and sharks for the if-condition, for skydiving we used fear of heights, and for cave diving we used fear of water, sharks and claustrophobia.

4.1.8 Data Analysis

We first used repeated measures to test means for the total treatment group (VR) against the control group (2D) across all activities (between-subject). We then tested each activity (within-subject) and compared the means between the conditions for some of the dependent variables. This gave us a deeper insight of H1 and H3. For the computed variables used in H2, we performed two-way ANOVA tests. The analyses conducted for all hypotheses were also repeated with the inclusion of various control variables as covariates.

4.2 Results

4.2.1 Descriptive Statistics

There were 50 observations under both the VR condition and the 2D condition. These were distributed evenly between the three different orders, with 17 observations in two of the orders and 16 observations in one of the orders as can be seen in figure 5. Descriptive statistics for the five dependent variables can be viewed in table 2. An interesting observation from the descriptive statistics worth mentioning, is that the activity cave diving in VR had the highest mean scores for three of the measurements; **rating**, **willingness to try** and **telepresence**.

Dependent Variable	Measurement	Activity	N (VR)	N (2D)	Mean VR	Mean 2D	SD VR	SD 2D
Consumer Attitude	Ranking	Surfing	50	50	29.56	37.18	15.243	16.504
		Skydiving			33.36	37.98	18.447	18.669
		Cave Diving			37.08	24.84	18.221	15.245
	Rating	Surfing	50	50	60.24	66.72	24.927	24.937
		Skydiving			66.86	65.08	24.756	27.215
		Cave Diving			72.14	54.24	25.213	25.624
Behavioral Intention	Willingness to Try	Surfing	50	50	3.78	4.00	.996	.990
		Skydiving			3.68	3.90	1.151	.931
		Cave Diving			4.10	3.64	1.093	1.191

	Vacation Days	Surfing	50	50	2.70	3.30	2.894	2.393
		Skydiving			1.70	2.50	2.597	2.525
		Cave Diving			2.90	1.60	2.690	2.356
Telepresence	Presence	Surfing	50	50	46.54	54.42	25.139	27.166
		Skydiving			60.90	54.76	27.063	25.068
		Cave Diving			71.80	57.20	23.290	28.149
Engagement	Engagement	Surfing	50	50	3.54	3.88	1.129	1.081
		Skydiving			4.12	3.98	.918	.979
		Cave Diving			4.04	3.36	1.160	1.306
Perception of Time	Evaluation of Length	Surfing	50	50	2.96	3.56	.533	.760
		Skydiving			3.06	3.28	.550	.640
		Cave Diving			3.02	3.46	.589	.862

Table 2, Descriptive statistics of the study

4.2.2 Test of Assumptions

In analysis of variance (ANOVA) there are three assumptions that need to be satisfied to avoid biased results (Hair Jr. et al., 2006; Pallant, 2010). These assumptions are independence of observation, normality, and homogeneity of variance.

4.2.2.1 Independence of Observations

To avoid any bias, or tainting and skewing the results of the inference, independence of observations is needed. First, we randomly assigned which treatment each participant was exposed to. Second, the experiments were conducted individually to prevent observations from influencing each other. Finally, the experiment was anonymous and the participants were given clear instructions not to speak with anyone about the contents of the experiment before the end of the data collection.

4.2.2.2 Normal Distribution

To evaluate normality of the distribution of the sample data, we checked for the skewness and kurtosis values. Skewness value indicates whether the scores are skewed to either side of the

distribution. Kurtosis value indicates how concentrated the distribution score is. Values between -1 and 1 indicate that the sample distribution does not deviate substantially from a normal distribution. Multiple of our measurements violated this assumption. However, according Pallant (2010), “*with large enough sample sizes (+30) the violation of this assumption should not cause any major problems*” (p. 206). With our sample size of $n = 100$, the lack of a normal distribution should not affect the validity of our results.

4.2.2.3 Homogeneity of Variance

We conducted the Levene’s test to see if the assumption of homogeneity of variance was satisfied for our variables. The results of the tests showed that some variables rejected the null-hypothesis, meaning the assumption homogeneity of variance were not satisfied for all measurements. However, ANOVA and independent samples T-tests are generally robust when the group sizes are equal and greater than 30 (Pagano, 2004, p. 339). In our case, we have 50 observations for both our conditions, thus the sample should tolerate the violation of the homogeneity assumption.

4.2.3 Test of Consumer Attitudes, Behavioral Intention and Telepresence

Our first hypothesis (H1) intends to examine the main effects of VR video on a) consumer attitude, b) behavioral intentions and c) telepresence, assuming a positive effect on the three dependent variables. All effects were tested using ANOVA repeated measures with surfing, skydiving and cave diving as within-subject factors, and 2D and VR as between-subject factors. The results can be found in table 3, which presents the mean scores for the dependent variables and corresponding p-values. The results show that there were no significant effects for any of the items measuring the dependent variables.

Dependent Variable	Main Effect on Between-subject	Mean VR	Mean 2D	Difference	P-Value
Consumer Attitude (H1a)	Rating	66.413	62.013	4.4	.193
Behavioral Intention (H1b)	Willingness to try	3.853	3.847	0.006	.963
	Vacation Days	2.433	2.467	-0.034	.880
Telepresence (H1c)	Presence	59.747	55.460	4.287	.293

Significance level: * 10%; ** 5%; *** 1%

Table 3, Between-subject effects on H1

The repeated measures test was not applicable for the **ranking** measurement. Since the participants were told to allocate 100 points between the three activities, all means would end up with the same score of 33.33. While the participants rated the experiences higher in VR, the difference of 4,4 was not significant for **rating**. The two means for **willingness to try** were almost identical. Also, the participants would choose a marginally higher **number of vacation days** under the 2D condition, thus rejecting H1b). Finally, the participants felt marginally more present in the VR condition, but again the difference was not significant for **telepresence**. The ANOVA repeated measures therefore concludes that there are no main effects from VR exposure on consumer attitude, behavioral intention and telepresence. H1 is thus not supported.

4.2.3.1 Control Variables

We tested for several of the control variables as covariates in our repeated measures analyses. From our repeated measures ANCOVA analyses we found significant changes of the results for several dependent variables. Looking at the main effect of the control variables, the results show that perceived **image quality** had a negative difference in means between the two groups. The image quality for the 2D condition had an estimated mean of 81.140, while the VR condition's estimated mean only had 58.220, which indicates that the image quality was perceived as significantly lower for the VR video group.

After controlling for perceived image quality, the results for **rating**, **willingness to try** and **telepresence** became significant. This means that if we control for the perceived image quality, H1 a) and c) are supported while H1 b) is partly supported. The results from the

ANCOVA analyses can be seen in table 4. The perceived image quality of the VR HMD has thus cancelled out the positive effects on consumer attitude, behavioral intention and telepresence. This may indicate that the technological advancements of mobile VR are not sufficient at this point.

Dependent Variable	Main Effect on Between-subject	Mean VR	Mean 2D	Difference	P-Value
Consumer Attitude (H1a)	Rating	71.131	57.296	13.835	.000***
Behavioral Intention (H1b)	Willingness to try	4.023	3.677	0.346	.035**
	Vacation Days	2.485	2.415	0.070	.800
Telepresence (H1c)	Presence	66.680	48.257	18.423	.000***

Significance level: * 10%; ** 5%; *** 1%

Table 4, Between-subject effects on H1 with perceived image quality as covariate

4.2.4 Test of Discrimination Between Alternatives

Our second hypothesis states that exposure to VR video should have a positive effect on consumers' ability to discriminate between alternatives. To examine this, we computed several new variables with the mean standard deviation for each of the dependent variables. These new variables contained the mean standard deviation for surfing, skydiving and cave diving from each of the dependent variables, allowing us to test for differences in standard deviation between VR and regular video.

As H2 states that we believe VR to have a positive effect on the ability to discriminate between alternatives, we expect the standard deviation for VR to be higher than for 2D. This would indicate that participants formed stronger and more confident attitudes towards one of the experiences after watching VR-videos.

The effects were tested with a two-way ANOVA, using the new standard deviation-variables for **ranking**, **rating**, **willingness to try** and number of **vacation days** as dependent variables, and the condition as fixed factor. The results can be seen in table 5. We observed few differences between VR and 2D video with only willingness to try being close to significant

(0,065). The mean standard deviation for willingness to try was higher for VR than for 2D, lending support to our hypothesis. However, the lack of significant results implies that the medium does not seem to have any effect on participants' ability to discriminate between alternatives.

Dependent Variable	Main Effect on Between-subject	Mean SD VR	Mean SD 2D	Difference	P-Value
Consumer Attitude (H2)	Ranking	19.8331	19.8406	-0.00755	.996
	Rating	21.0038	20.9320	0.07180	.976
Behavioral Intention (H2)	Willingness to try	.9387	.7568	0.18194	.065*
	Vacation Days	2.8713	2.6558	0.215547	.273

Significance level: * 10%; ** 5%; *** 1%

Table 5, Between-subject effects on H2

To check if these findings could be a result of the stimuli inducing too little emotional engagement, we tested for between-subject effects of **engagement**. From table 6 we can see that the mean score on engagement is higher for VR than for 2D, but the difference is not significant. This may imply that our stimuli failed to evoke sufficient emotional engagement to affect the participants' decision-making.

Dependent Variable	Main Effect on Between-subject	Mean VR	Mean 2D	Difference	P-Value
Engagement	Engagement	3.900	3.714	0.186	.325

Significance level: * 10%; ** 5%; *** 1%

Table 6, Between-subject effects of engagement

We also controlled for different covariates, but still found no significant results, which implies that none of the control variables affected our results. We must therefore conclude that we do not have substantial enough grounds to support H2.

4.2.5 Test of Flow Characteristics

Our third and final hypothesis investigates whether VR video can induce a flow state that a) is more engaging, and b) distorts the perception of time, compared to 2D video. For the analyses, we used both repeated measures ANOVA and independent-samples t-test to measure the different effects both within-subject and between-subject. Like H1, within-subject factors are the activities surfing, skydiving and cave diving, while between-subject factor are VR and 2D. The results from the tests can be seen in table 7 and 8.

Dependent Variable	Main Effect on Between-subject	Mean VR	Mean 2D	Difference	P-Value
Engagement (H3a)	Engagement	3.900	3.714	0.186	.325
Perception of Time (H3b)	Evaluation of Length	3.013	3.433	-0.42	.000***

Significance level: * 10%; ** 5%; *** 1%

Table 7, Between-subject effects on H3

Dependent Variable	Main Effect on Within-Subject	Mean VR	Mean 2D	Difference	P-Value
Engagement (H3a)	Surfing	3.54	3.88	-0.340	.127
	Skydiving	4.12	3.98	0.140	.463
	Cave Diving	4.04	3.36	0.680	.007***

Significance level: * 10%; ** 5%; *** 1%

Table 8, Within-subject effects on H3a

For H3a), although VR had a higher mean for **engagement** of 3.90, the differences were not significant between-subject. Skydiving VR and cave diving VR had the two highest means for **engagement** within-subject respectively (4,12 and 4,04), but only cave diving had a significant difference. Looking at the major difference in engagement, it seems that VR exposure makes cave diving much more engaging and exciting. The low mean score for surfing in VR might come from the use of camera angles, which makes it difficult for the viewer to coordinate his or her vision.

From table 7 we find significant effects for the dependent variable for **perception of time** between-subject. A low mean score for this measurement indicates that the participants

thought the video was too short, while a high score would mean it was too long. The 2D video group perceived the length of the video as significantly longer than the VR group, thus supporting H3b). Apparently, the participants felt that the time passed by faster under the VR condition. The results indicate that H3 is partly supported and that exposure to VR can induce some of the characteristics of a psychological flow state.

4.2.5.1 Control Variables

Like our first hypothesis, the negative difference between perceived image quality affected the dependent variables as covariates. Controlled for perceived image quality, the effects on **engagement** became significant between-subject. This means that if we control for the perceived image quality, H3 is supported. Again, the image quality of the HMD cancelled some of the effects of the VR exposure. The results from the ANCOVA analyses can be seen in table 9.

Dependent Variable	Main Effect on Between-subject	Mean VR	Mean 2D	Difference	P-Value
Engagement (H3a)	Engagement	4.097	3.543	0.554	.003***
Perception of Time (H3b)	Evaluation of Length	2.964	3.482	-0.518	.000***

Significance level: * 10%; ** 5%; *** 1%

Table 9, Between-subject effects on H3 with perceived image quality as covariate

4.2.6 Additional findings

While doing research for our hypotheses, we discovered some additional findings which we decided to look further into. Our analysis mainly consisted of between-subject tests, but as our data set indicated that one of the activities stood out, we decided to run some additional within-subject tests to investigate this further. Our additional analyses found that the cave diving experience had significant positive effects in VR for all five dependent variables. The within-subject tests can be seen in table 10. This indicates that there are elements of the cave diving experience that makes it a lot more engaging for consumers in a virtual reality setting.

Dependent Variable	Item	Main Effect on Within-subject	Mean VR	Mean 2D	Difference	P-Value
Consumer Attitude	Ranking	Cave Diving	37.08	24.84	12.24	.000***
	Rating	Cave Diving	72.14	54.24	17.9	.001***
Behavioral Intention	Willingness to try	Cave Diving	4.10	3.64	0.46	.047**
	Vacation Days	Cave Diving	2.90	1.60	1.30	.012**
Telepresence	Presence	Cave Diving	71.80	57.20	14.60	.006***
Engagement	Engagement	Cave Diving	4.04	3.36	0.68	.007***
Perception of Time	Evaluation of Length	Cave Diving	3.02	3.46	-0.44	.004***

Significance level: * 10%; ** 5%; *** 1%

Table 10, Whithin-subject effects on cave diving

There are some differences in the structure between the videos which may explain the significant results of the cave diving video. The video progresses at a slower pace, allowing for more exploration. Diving is also a more natural setting to look around and explore, taking more advantage of the interactivity aspect of VR. Lastly, the video is in one continuous shot, allowing the viewers to fully immerse themselves in the experience.

4.2.7 Summary of Findings

We have conducted several analyses to investigate our hypotheses. The results initially showed insufficient evidence to support H1. However, after controlling for perceived image quality, we found evidence that VR video can indeed have a positive impact on telepresence, while we found some support for its effect on both consumer attitude and behavioral intention. The findings therefore suggest that there are two opposing effects taking place under the VR condition. The image quality of the HMD cancels out the positive effects of the VR exposure. While not enough to fully support H1, we can conclude that VR can have at least some effect on consumer attitude, behavioral intention and telepresence, given the right conditions.

Furthermore, we found no grounds to support H2, and thus rejected the hypothesis. These findings may be a result of our stimuli's inability to create sufficient emotional engagement. Hence, we found no evidence that exposure to VR video has any effect on people's ability to discriminate between alternatives.

Finally, we found evidence that perception of time was perceived to be significantly faster in VR. Though no significant difference were found between VR and 2D for engagement initially, the difference for the between-subject test became significant after controlling for perceived image quality. Again, the image quality worked as an opposing force against the VR treatment. Hence, we found that exposure to VR can induce some of the characteristics of a flow state.

From H3, there was a significant difference between the two conditions for the activity cave diving from the within-subjects tests. Our additional findings revealed significant effects for cave diving in VR for all five dependent variables. The results indicate that the cave diving content in VR has elements that enhances consumers' engagement more than the other activities.

5 – General Discussion and Conclusion

5.1 Discussion of Findings

The main objective of this thesis has been to investigate how VR can have an impact on experience marketing. Although we do not have the results that fully support our hypotheses, we have been left with some very interesting findings which can help us explain the mechanisms in play during exposure to VR. From H2 we found little evidence to support the claim of how VR could affect consumers' ability to discriminate between alternatives.

On one hand, we could argue that suboptimal image quality under the VR condition has eliminated multiple of the between-subject effects between VR and 2D. Like previous studies measuring the main effects of VR on consumer attitude and behavioral intention, we found no significant results (Nah et al., 2011, Vekony & Korneliussen, 2016). The image quality of the HMDs used in the experiment have affected our results to some extent as evident from the ANCOVA analyses. After we controlled for perceived image quality, significant results for the dependent variables started to appear for consumer attitude, behavioral intention, telepresence and engagement.

On the other hand, it is apparent that there is a difference in the within-subject effects throughout the study. One of the activities used in the study seems to fit particularly well as VR stimulus compared to the others. Looking at the descriptive statistics in table 2, cave diving in VR has some of the highest mean scores for the dependent variables. From our additional findings, we also found that cave diving had significant positive effects in VR for all five dependent variables. Surfing however, received rather low scores under the VR condition for multiple variables. What is very interesting is the correlation between telepresence and engagement in this setting. Cave diving VR has the highest mean score for telepresence of 71.80, while surfing VR has the lowest mean score of only 46.54, even lower than surfing 2D (54.42). Likewise, while there is a significant positive effect on engagement from cave diving VR, there is negative effect on engagement from surfing VR (although not significant, as can be seen in table 8). This indicates that the content of the cave diving VR video enhances the feeling of telepresence, while there may be elements in the surfing VR video which disrupts the ability for the VR exposure to induce the feeling of telepresence. These elements may have affected the main effects for not only engagement and flow, but also for consumer attitude and intention. This assumption is supported by Nah et al. (2011)

which states that telepresence can trigger engagement from the virtual environment and other hedonic outcomes like positive attitudes, from the flow experience.

After reviewing the VR stimulus used in the study more carefully, we argue that the mechanisms in play which causes these differences of within-subject effects are the degree of exploration in the video, the pace of the video, and the use of camera angles and cuts. We believe the slower pace of the cave diving VR experience allows for a higher degree of exploration. Exploration allows the viewer to interact more with the video, which creates higher engagement. This is supported by YuMe & Nilsen's study (2016). Furthermore, since the cave diving VR video has no cuts, it enhances the ability to feel present and immerse oneself in the activity to achieve a flow-like experience. The surfing VR video may not be very fast-paced, but the use of camera angles can make it difficult for the viewer to explore and interact with the video without losing visual attention. Also, the many cuts in the video may “break the spell” of feeling present in the experience. Taking these elements into consideration when developing content may induce higher levels of telepresence. This could also increase the positive effects of VR exposure on consumer attitude and intention, but further research needs to be conducted to support this assumption.

Our interpretation of the results gives us a deeper insight of Steuer's (1992) framework for telepresence. We can blame the quality of the HMD used in the experiment for some of our results, but image quality is only a small part of a bigger picture. Telepresence consists of both vividness and interactivity. Within vividness there is the number of sensory dimensions and the quality of these dimensions. Development in VR technology must work on implementing more of the five sensory dimensions as well as enhancing the quality of these, but the interactivity of the virtual environment needs to be emphasized. Our research indicates that interactivity is important when developing content and stimulus. The development of VR technology has given virtual environments great speed, range and mapping, which allows for high levels of interactivity. However, we have experienced through this study that VR content sometimes lack the requirements that are needed to exploit this factor. We believe that elements such as exploration, pace of content and visual attention can increase interactivity and thus induce higher levels of telepresence.

5.2 Implications

5.2.1 Managerial Implications

Most of our implications are interesting from a managerial perspective. Our findings show that VR technology might not be of sufficient quality just yet. It is important for content creators and marketers to bear in mind that the image quality of commercially available HMDs is still, as previously discussed, too low for immersive VR to have a significant advantage over 2D. As detailed in appendix B, there are high-end HMDs like the HTC Vive and Oculus Rift available on the market, but the price tag and the need for a cabled connection to a PC severely limits their potential outreach and usage situations. Due to far more processing power, better optics and better head tracking, these HMDs would likely yield better results than the Samsung Gear VR HMD we used in our experiments. However, as Digi-Capital (2016), Tractica (2016), Statista (2017) and many other analysts forecast, mobile VR will be the main driver of unit growth in the industry for several years. While we believe it is important for content creators to keep in mind the current limitations of the hardware, the technology is developing rapidly and the gap between mobile VR and tethered PC VR is expected to decrease (Shaver, 2017). Additionally, the launch of Playstation VR in the fall of 2016 offers a high-end VR experience in a price range between mobile VR and top-tier PC HMDs, further bridging the gap. Thus, we believe VR will be a valuable platform for marketers moving forward.

Interactivity can also be a factor to mitigate the negative effects of the image quality of current VR HMDs. After reviewing the VR videos, we have concluded that the cave diving experience may be able to induce higher levels of telepresence and flow because of the viewers' ability to explore the surroundings in the video in a calm and collected manner. This aligns with the findings from YuMe and Nilsen's (2016) research which states that VR content which emphasizes exploration leads to higher emotional engagement. We argue that content focusing on interactivity will benefit greatly from VR, and believe such content could have greater main effects versus traditional marketing. Further we believe that interactivity will more easily induce flow states in the consumers' minds, which in turn will lead to positive hedonic outcomes. This is especially evident from our additional findings for the cave diving experience.

A new perspective on how to create not just marketing content, but also VR content in general will be needed to create immersive experiences which successfully delivers the intended message to the consumer. A big challenge with VR content is to direct the attention of the viewer in the right direction as to not miss the narrative of the experience. To achieve this, content creators must not only develop effective and impactful content that engages the consumer, but will also need to implement different techniques and effects to guide the user through the narrative. Therefore, development of VR content will require a completely new mindset from content creators. To activate the viewer and facilitate exploration, creators should take advantage of the 360-degree field of view VR offers, and display activities in other directions than just straight in front of the viewer. However, when viewers are distributing their attention in several directions, it is important to implement specific cues to guide the viewer's attention in the right direction when the narrative is advancing. This can be achieved by using visual cues in the content itself, or by using overlay graphics to inform the viewer where to pay attention. Additionally, 360-degree spatial audio should be used to guide the viewer in which direction relative to their orientation the narrative is happening.

Our results indicate that VR videos with a slower pace and opportunities to explore the surroundings are more effective than faster, more action-oriented VR videos. We believe the experience itself should be a setting where it is natural to look around, and not just straight forward. For example, in a VR video from a Formula 1 car, one should not expect the viewer to look around as much as in a cave diving video, as people are used to keeping their attention on the road while driving a car. When diving however, exploration is one of the primary features. Thus, content creators should keep in mind the setting of the experience to convey their message as efficiently as possible.

A final managerial takeaway from our research is that through induction of flow, viewers tend to experience VR videos as significantly shorter than 2D videos. This is important for marketers as it allows them to create videos in which they can expose a brand or a product to the consumer for a longer period of time. It is however important to identify the limit where viewers experience fatigue from watching VR. A too long VR experience may result in negative brand attitude for the viewer.

5.2.2 Theoretical Implications

There are a few theoretical implications from our research. First, the interpretations of our findings emphasize the importance of telepresence as a mediator for VR. The results indicate that level of telepresence correlates with engagement as well as the effects on consumer attitude and behavioral intention. We have however not tested for this relationship.

Furthermore, our study suggests that telepresence mediates engagement and other flow-state characteristics such as distorted perception of time. Previous research (Nah et al., 2011) have assumed the connection between telepresence and flow, but no existing literature has actually tested for this relationship, which is a novel contribution. From these findings, we present a revised model where telepresence mediates both flow and consumer attitude and behavioral intention. The revised model is displayed in figure 6.



Figure 6, Revised model

Finally, even though the results found partial support for higher engagement from VR, our study showed no effects on discrimination of choices and preferences. However, with more appropriate stimuli for inducing emotional engagement, one might find a relationship between exposure to VR and discrimination.

5.3 Limitations

There are some possible limitations to our study related to the experimental design. We initially planned to include images as a third medium in the experiment, but eventually decided to proceed with just VR video and 2D video. Including images would probably reveal stronger effects between VR and images than VR and 2D video. Images would also be relevant to include as posters and brochures are still used a lot in marketing. However, we decided against including images as it would require us to either increase the sample size, or settle for fewer participants in each cell.

For our experimental design, we opted for a between subjects design with some features of a repeated measures design. If we had chosen a pure repeated measures design, each participant would have been exposed to both conditions and could hence provide us with a lot more data. This approach would to some extent control for subjective error as any potential subjective biases or prejudices towards the experiences would be evenly distributed across both conditions. Exposing each participant to both VR and 2D would allow us to examine how the participants compared the activities across the conditions. However, we believed that the immediate difference between the two conditions would be too prominent, and decided against this approach to avoid contrast effects.

A repeated measures design could also allow us to include images as a third medium. Due to the extensiveness of such a design, we would have to make some trade-offs if we were to use it. Using this design would require us to redesign our questionnaire, and exposure to the same experiences through three different media would require a substantial amount of time from each participant. This increase in time would either require us to a) shorten the videos, b) shorten the questionnaire or c) increase the value of the gift cards to make it worth the participants' time. We did not feel comfortable of compromising on neither the video length, which was short enough as is, nor the length of the questionnaire, as we felt all the questions were necessary. Because of budget constraints, increasing the value of the reward would mean we could afford fewer gift cards. We would hence have to reduce our sample size, an option that could reduce the validity of our results. Because of these required compromises, we decided to reject the repeated measures design and go for the mixed design we used.

Another limitation of our experiment is that our entire sample consisted of students from the same institution. An important assumption behind our choice of experimental design was that each participant had the same prerequisites and were independent from each other. Although the students studied different fields, they were all about the same age and part of a relatively small student body. Even though we explicitly told the participants it was important that they did not talk to other students about the experiment for a week, the size of the institution may have affected how closely this was followed. This sample selection may have influenced our results due to homogeneity. A homogenous sample would lead to less standard errors and thus skew our results in a positive direction. However, due to the population at Høyskolen Kristiania being representative for the target group of VR, we believe our results provide a relatively accurate representation of the target group's opinions.

As previously discussed, the hardware used in the experiments also poses as a limitation. The Samsung Gear VR, although a good representation of how many consumers would experience VR, is held back by the specifications of the phone used as the display. The Samsung S7 used in our experiment is limited by its processing power, the refresh rate of the display and that it cannot utilize its full resolution as it is primarily designed to be used as a phone. However, future models may overcome these limitations. We would probably see different results if we had used an Oculus Rift or a HTC Vive, but due to budgetary constraints and that the Gear VR is a more representative HMD in terms of availability and price, we chose to use it in our experiment.

After conducting the experiments, we became aware of some potential limitations with our stimulus. As discussed previously, we saw a clear pattern of participants favoring the cave diving video over surfing and skydiving when presented in VR. The two latter videos were composed quite differently than the cave diving video, which we believe affected our results. First, the surfing and skydiving video consisted of several different clips. This forced the viewers to continuously reorient their attention to adjust to the new angles and framing of the video, which could make the viewer more aware of being a spectator. The cave diving video consisted of one continuous clip with nothing to distract the viewer from the experience. Second, the experiences themselves were to different degrees suitable for exploration. When surfing, it is normal to keep focus forward on the direction of movement, not in other directions. For the skydiving experience, the photographer had a camera mounted on his helmet. When the skydiver turned his/her head, the viewer was then forced to follow the skydiver's point of view, decreasing the viewer's ability to interact and affect the experience. The reduced interaction with the medium could affect the feeling of telepresence and thus remind the viewers that they were just spectating. In contrast, diving is a natural setting to explore the surroundings and make use of interaction. Third, due to the slower pace of the cave diving video, we believe it better facilitates exploring than the faster paced surfing and skydiving videos. We argue that the lower intensity of the video is more suitable to watch in a rich medium as VR. Thus, if the intensity and pace of the three videos were closer to the cave diving video, our findings would have possibly been quite different.

5.4 Conclusion

5.4.1 Concluding remarks

The purpose of this thesis has been to investigate the effects of exposure to immersive VR video in areas within marketing and consumer behavior. Our results show that the sub-optimal image quality of the HMD cancels out the effects on consumer attitude, behavioral intention, telepresence and engagement. Further, there was no evidence to support that exposure to VR help consumers make more confident choices, but our findings show characteristics of the psychological state of flow from VR.

The findings also indicate that interactivity needs to be emphasized when creating VR content. Focusing on exploration, pace and visual attention can help creating more immersive and engaging experiences. In short, the image quality of commercially available VR headsets and the content created in VR needs to improve for immersive VR to become an effective marketing tool. However, our results suggest several interesting mechanisms which can be exploited in future VR marketing.

As a final takeaway, our research shows the importance of Steuer's concept of telepresence when it comes to creating optimal VR experiences. This is important knowledge for marketers and content creators in order to maximize the effects of the current technology, and to help reach the full potential of VR in the future.

5.4.2 Further Research

We believe our thesis uncovered some important findings which should be carried on to future studies. Our findings indicate that VR has potential within experience marketing given the right conditions. For future research, we recommend developing VR stimuli which exploits the factor of interactivity in terms of pace, structure, and exploration to a similar degree. A closer resemblance between the different stimuli will provide better prerequisites for isolating and examining the media effect.

As VR is a new medium for most consumers, we believe some guidance is important to help make people fully understand how to use the technology. A challenge for content creators is to guide the viewer's attention in the right direction to deliver their message properly. An interesting topic for further research would be to test two almost identical VR videos, but

include audio/video cues in the form of spatial audio and overlay graphics in the treatment group. This design would be suitable to study the efforts of guiding the viewer's attention.

As we found evidence of VR being able to induce a form of state of flow, we believe this is also a topic that should be researched further. Especially the perception of time is an important topic to identify an optimal length for VR videos.

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Appendices




A. Literature review

Source	Context	Sub-context	Summary	Method	IV	Technology	Med/theo expl for effect	DV	Moderator	Limitations
Li et al. (2002)	Online shopping	Telepresence	Two studies investigate the concept of multisensory online experiences. Results show that 3D advertising has the capability of enhancing presence, as well as product knowledge, brand attitudes and behavioral intentions of consumers.	Experiment	2D vs 3D advertising	3D visualisation	Telepresence	Product knowledge, brand attitude, purchase decision	Product type in terms of salient attributes visual/tactile/behavioral	Only physical products
Suh & Lee (2005)	Online shopping	Telepresence and consumer learning	Investigates how VR can affect consumer learning for virtually high experiential and virtually low experiential products.	Experiment	Interactivity (2D vs 3D)	Interface design in online stores (e-commerce)	Telepresence	Consumer learning (knowledge, attitude, purchase intentions)	Vision and hearing (fit), VHE and VLE products	
Bhatt (2004)	Online Shopping	Virtual Reality	Presents a theoretical framework that highlights the relative importance of interactivity, immersion and connectivity for attracting customers through a web	Descriptive						
Klein (1998)	Online Shopping	Interactive Media	This paper explores the potential of interactive media, proposing a model on consumer information search based on the search/experience/credence paradigm.			Virtual Experiences				
Nah et al. (2011)	Telepresence	Virtual environment	Examine the effects of using 2D vs 3D virtual world environments on telepresence, enjoyment brand equity and behavioral intention. Positive effects through telepresence and enjoyment, but 3D can be distracting due to consumers information processing limitations. Brand equity positively affects behavioral intentions.	Experiment	2D vs 3D	2D and 3D virtual world/tour	Flow aspects, telepresence, enjoyment, brand equity	Telepresence, enjoyment, brand equity, behavioral intention		
Draper et al (1998)	Telepresence	Virtual environment	Identifies three types of telepresence; simple telepresence, cybernetic telepresence and experiential telepresence. Distinguishes between technological approaches and psychological approaches to explain experiential telepresence.	Descriptive		Virtual Reality	User mental constructs and experiences, VE features and VE outcomes may collectively account for			
Lenggenhager et al. (2007)	Telepresence	Bodily self-consciousness	Uses conflicting visual-somatosensory input in virtual reality to induce a sensation of separation of the self and the body.	Experiment	Bodily consciousness	Virtual Reality	Bodily self-consciousness are based on multisensory and cognitive processing of bodily information.	Synchronous/asynchronous conditions		The participants did not feel present in their virtual bodies, but at a distance from their own. Thus, it does not exactly mirror Steuer's concept of
Bailey et al (2012)	Telepresence	Memory recall	The study examined how participants memory was impacted by the feeling of presence in a virtual environment. The study did find evidence of telepresence from the use of VR, but it was negatively correlated with memory recollection.	Experiment	Memory recollection	Virtual Reality	The negative correlation can be explained by limited cognitive capacity, individual differences or mediated	Level of experienced presence		Convenience sample

Steuer (1992)	Virtual Reality	Virtual reality and telepresence	Due to the wide variety of VR technologies and hardware, Steuer argues for a collective definition in terms of telepresence. He suggests that interactivity and vividness affects the degree of telepresence an individual experiences, independent of the VR technology being used.	Descriptive						
YuMe & Nielsen (2016)	Virtual Reality	Forecast	The study compares exposure to VR video, 360-degree video and photos, and examined how emotional engagement, activation of the viewer and attention differed between the media.	Experiment	VR video vs. 360-degree video vs. images	Virtual Reality, 360-degree video, 2D video	Viewers can distribute attention towards other things than just the story being told - leads to more engagement	Biometric engagement, head tracking, eye tracking, movement tracking		
Westerdahl et al (2005)	Virtual Reality	Virtual Reality and Decision Making	The study investigated how employees experienced a VR model of their yet-to-be-build office building. Results showed that the employees felt VR was a useful aid in the decision-making process concerning their future-workplace.	Experiment	Evaluation of information	Virtual Reality	Presentation i VR gives a fairly accurate representation of the real building	Lack of information, predicted future experience		No control group
Persky & Blascovich (2007)	Virtual Reality	Immersive vs non immersive	Experiment testing immersive virtual environment vs traditional desktop computer and the effects on consumers. Results revealed higher levels of aggressive feelings when playing a violent video game on an immersive platform. No gender effects	Experiment	Immersive vs Non-immersive	Immersive platform vs desktop computer		Emotions, platform, gender		
Ganz (2015)	Virtual Reality and Flow	Creativity	Concept and application of the connection between Virtual Reality and Flow. Argues that Virtual Reality technology allows us to trigger flow states on demand. This could possibly unleash a great wave of human creativity.	Descriptive		Virtual Reality				
Vekony & Korneliusson (2016)	Virtual Tourism Marketing	Consumer Behavior	Investigates the direct effects of immersive virtual reality on consumer outcomes, as well as underlying processing mechanisms in a tourist marketing setting. The studies show no significant effect on the dependent variable, but there are indirect effects mediated through telepresence, enjoyment, mental imagery, predicted emotions and predicted	Experiment	Immersive VR images vs 2D images	VR (HMD)	Telepresence, enjoyment, mental imagery	Destination attitude, behavioral intentions, actual purchasing decision	Image quality	
Bateman et al. (2009)	Evaluation of Data	Virtual Reality Choice Experiment	The study uses a split-sample experiment to compare standard presentation with VR visualisations for changes in coastal land use. Results show that preferences elicited in VR are less variable and show a significant reduction in gain-loss asymmetry.	Experiment	Evaluation of choices	Non-immersive VR presentation	Better representation of data allows for reducing gain-loss asymmetry	Reserved, Flooded, Cost	VR presentation	
Goldman Sachs Global Investment Research	Virtual and Augmented Reality	Forecasts in VR/AR	Forecast of the virtual and augmented reality technology through 2025, examination of potential use cases and the markets that could be created and disrupted.	Descriptive		Virtual Reality and Augmented Reality				Long term forecast with a lot of uncertainty. Large deviations between the report's different
Daugherty et al (2008)	Virtual product experience	Consumer behavior	The studies test both single and sequential impact of consumer exposure to indirect, direct and virtual experiences on brand attitude, product knowledge and purchase intention. VR leads to more favorable product knowledge, brand attitudes and purchasing intention than indirect prod. experience.	Experiment	Virtual experience vs. direct or indirect product experience	Presentation of product on computer vs. direct product experience	Channel congruence and attitudes	Product knowledge, brand attitude, purchase intentions		There is no extensive explanation of the mechanisms in play that result in the effects on the consumers







Damasio (1994)*	Decision making	Emotions	Damasio studied over 25 years how people with damage to the right hemisphere of the brain, where emotions are generated, were unable to make decisions. The study also reported other researchers' findings and concluded that decisions are guided by emotions, not logic.	Descriptive			Both the human biology and behavior are regulated by the same brain structures, and are indispensable to normal cognitive processes. Thus, decision making is guided by emotions, not			
Hertwig & Pleskac (2010)*	Decision making	Sample search size	The study examined how people make decisions based on small sample sizes, and how a person's judgements becomes more reliable as the difference between two stimuli grows larger.	Descriptive/experiment	Easiness of choice, preference		"Small samples amplify the difference between the expected earnings associated with the payoff distributions, thus making the options more distinct and choice easier"	Sample size, degree of information, avid searchers vs. frugal searchers		
Jarvstad et al.'s (2013)*	Decision making	Rationality	The study examined how people are able to make more optimal choices when the options became more discriminable.	Experiment	Proportion of optimal choices		"When choices are easy to discriminate, it is because one option is clearly more valuable than the other. Thus, for easily discriminated options, the cost of choosing the suboptimal option can be very high"	Expected value		
Li et al (2008)*	Discrimination	Learning	The study examined how emotional (aversive) learning could affect people's ability to discriminate between previously indistinguishable odors. The use of electric shocks and conditional learning linked to one particular odor were found to positively effect the ability to discriminate it from the other odors.	Experiment	Perception of odors			Electric shock		
Pool et al (2014)*	Discrimination	Learning	The study examined how the use of appetitive learning could affect people's ability to discriminate between two options. The results of the study suggest that emotional learning using positive rewarding stimuli can increase implicit discrimination of perceptually similar odors.	Experiment	Perception of odors			Positive vs. negative conditioning (chocolate)		
Kotler (2014)*	Flow	Optimal Performance	Kotler explores the optimal state of consciousness (flow) where we perform and feel our best. It explains the elements of flow triggers that can radically enhance performance in our lives.	Descriptive						
Csikszentmihalyi (1997)*	Flow	Engagement	Prescriptive guide on how to use the psychology of engagement in every day life to find the psychological state of flow.	Descriptive						
Nakamura & Csikszentmihalyi 2002*	Flow	Optimal Experience	Explains the construct and measurements for the flow model of optimal experience and development	Descriptive						
Furlong et al. (2014)*	Flow	Learning	Csikszentmihalyi suggest to implement virtual reality in schools, in order to cultivate engaged learning and create optimal learning environments	Descriptive						
*Additional literature search										

B. HMD comparison

	HTC Vive	Oculus Rift	Samsung Gear VR
Design:			
Price	\$799	\$599	\$99
Hardware requirements	High-end PC. Estimated cost around \$999	High-end PC. Estimated cost between \$949-\$999 when purchased with Oculus Rift.	Samsung Galaxy S6, S6 Edge, S6 Edge+, Note 5, S7, S7 Edge, S8, S8+. Estimated cost between \$629-\$800 when purchased with a phone, depending on phone model.
Sensors	Gyroscope, accelerometer, laser position sensor, front-facing camera	Gyroscope, accelerometer, optical sensor for peripheral space tracking	Gyroscope, accelerometer, proximity sensor, touchpad for navigation
Resolution	2160x1200 pixels combined	1200x1080 pixels per eye	2560x1440 pixels combined (Experienced resolution will be lower due to the windowed view of the phone's screen)
Refresh rate	90 Hz	90 Hz	60 Hz
Included in the box	Headset, two motion controllers designed for VR, two base stations, a link box, earbuds, alternate face cushion, cleaning cloth, cables and mounts to set everything up.	Oculus Rift headset, Sensor, Xbox One controller, Oculus Remote, cables	Gear VR headset

Source: <http://time.com/4277763/virtual-reality-buyers-guide/>

C. Video Sources Used for Stimulus Development

	VR	2D
Surfing	 <p>Get Barreled in Tahiti with C.J. Hobgood & Samsung Gear VR 360 Surf in Tahiti with CJ Hobgood in this immersive VR 360 experience. Video by Samsung / Rapid VR. Directed by Taylor Steele. For best results please update yo...</p> <p>YOUTUBE.COM</p> <p>https://www.youtube.com/watch?v=7gjR60TSn8Q</p>	 <p>GoPro Awards: Surfing Tahiti With Leif Engstrom Join Leif Engstrom as he shows us just how good the waves are in Teahupo'o, Tahiti. Leif was awarded \$5,000 for editing this video and submitting it to GoPro...</p> <p>YOUTUBE.COM</p> <p>https://www.youtube.com/watch?v=ACrVSxeQwKw</p>
Skydiving	 <p>Samsung Gear 360: Skydiving in Rio in 360° Group skydiving is a team effort. Filmed with the Samsung Gear 360, you're no longer a bystander, you're part of the team as the group makes the jump out of ...</p> <p>YOUTUBE.COM</p> <p>https://www.youtube.com/watch?v=9xn8oB8o2Jc</p>	 <p>Skydive Hawaii -- GoPro Hero4 Black First Video www.skydivehawaii.com Skydive Hawaii 4-Way: Ed Mimi Thi & Randy Shot on 1080s 30FPS PT</p> <p>YOUTUBE.COM</p> <p>https://www.youtube.com/watch?v=SIqNoV-dfSc</p>
Cave Diving	 <p>www.youtube.com PLEASE NOTE: To view the 360° experience please make sure you are watching on the latest version of Google Chrome on your desktop or the latest version of An... YOUTUBE.COM</p> <p>https://www.youtube.com/watch?v=MxiUiteLXLk</p>	 <p>2015 Orchid Island R1 Fun diving in Orchid Island e.g. Ba-Dai-Wan Wreck & Blue hole. Nice trip in Lanyu from Jul.31 to Aug.3 2015.</p> <p>YOUTUBE.COM</p> <p>https://www.youtube.com/watch?v=Awsed4G2qUA</p>

D. Invitation

Informasjonsskriv om eksperiment

Kjære student,

Vi ønsker med dette å invitere deg til å delta i en undersøkelse om forskjellige ferieaktiviteter.

Undersøkelsen tar ca. 10 minutter, og alle som fullfører får et gavekort på Godt Brød til en verdi av 80 kroner.

Undersøkelsen vil finne sted på rom 307 (Telegrafan) og rom 339 (Posten) på Høyskolen Kristiania, og man kan velge dag og tidspunkt som passer best i løpet av uke 10 og 11.

Du kan følge denne linken dersom du ønsker å delta:

<https://calendly.com/masteroppgave/undersokelse/03-08-2017>

Det vil ikke lagres noen personsensitive data i forbindelse med undersøkelsen, og deltakelse er frivillig.

Vi håper å se deg på undersøkelsen!

Vennlig hilsen,

Siv E. Rosendahl Skard og Aleksander Sivertsen

E. Calendly form

Undersøkelse Times are in GMT+01:00 Central European Time

Undersøkelsen varer i ca. 10 minutter, og alle som fullfører får et gavekort på 80 kr på Godt Brød.

Select a Day

Wed
Mar 8

Thu
Mar 9

Fri
Mar 10

Mon
Mar 13

Tue
Mar 14

Wed
Mar 15

Thu
Mar 16

unavailable

----- THIS WEEK ----- | ----- NEXT WEEK -----

◀ Before Mar 8

After Mar 16 ▶

←

Wednesday

March 8, 2017

Times are in Central European Time

Select a Time

am/pm 24 hr

←

Undersøkelse

🕒 09:00 - Wednesday, March 8, 2017

🌍 Central European Time

Undersøkelsen varer i ca. 10 minutter, og alle som fullfører får et gavekort på 80 kr på Godt Brød.

Enter Details

Full Name *

Your e-mail address *

Schedule Event

F. Script 2D

Manus (2D)

- Velkommen til denne undersøkelsen og tusen takk for at du ønsker å delta! Den utføres i forbindelse med forskning på ferieopplevelser, for Center for Service Innovation (ved NHH).
- Undersøkelsen er helt anonym. Etter fullført undersøkelse vil du motta ditt gavekort.

- Du vil nå se en video av ulike aktiviteter som kan gjennomføres på Hawaii. Videoen varer i ca. 4,5 minutter.
- Videoen vil du få se på denne mobiltelefonen.
- Det vil ikke komme noen memoreringsspørsmål eller kunnskapsspørsmål etterpå, så ikke tenk på det.

- Ok, vi vil nå fortsette med et spørreskjema.
- Den inneholder noen spørsmål du skal svare på. Det er ingen riktige eller gale svar. Du skal huke av for det alternativet som best representerer hva du mener og føler.
- Når du blir ferdig, eller dersom du har noen spørsmål, kan du henvende deg til meg.

- Tusen takk! Her er ditt gavekort.
- Det er svært viktig at du ikke snakker med noen om noe av det som har skjedd på denne undersøkelsen før neste uke. Det gjelder både hva du ble spurt om og hva du har blitt vist. Dette er for å unngå at resultatene av påfølgende tester blir påvirket på noen som helst måte. Neste uke kan du fritt diskutere alt om undersøkelsen. Ha en fin dag videre!

G. Script VR

Manus (VR)

- Velkommen til denne undersøkelsen og tusen takk for at du ønsker å delta! Den utføres i forbindelse med forskning på ferieopplevelser, for Center for Service Innovation (ved NHH).
- Undersøkelsen er helt anonym. Etter fullført undersøkelse vil du motta ditt gavekort.

- Du vil nå se en 360-graders video av ulike aktiviteter som kan gjennomføres på Hawaii. Videoen varer i ca. 4,5 minutter.
- Du vil straks få ta på deg headset og hodetelefoner for å se videoen. Med headsettet kan du se i alle retninger og snu hodet fritt. Du kan også bruke stolen til å snu deg rundt, men bli sittende.
- Instruksjoner for bruk av headsettet vil komme opp på skjermen når du får det på deg. Hvis du bruker briller med mye styrke kan det være lurt å ha disse på under. Får du problemer kan du henvende deg til meg.
- Det vil ikke komme noen memoreringsspørsmål eller kunnskapsspørsmål etterpå, så ikke tenk på det.

- Ok, vi vil nå fortsette med et spørreskjema.
- Den inneholder noen spørsmål du skal svare på. Det er ingen riktige eller gale svar. Du skal huke av for det alternativet som best representerer hva du mener og føler.
- Når du blir ferdig, eller dersom du har noen spørsmål, kan du henvende deg til meg.

- Tusen takk! Her er ditt gavekort.
- Det er svært viktig at du ikke snakker med noen om noe av det som har skjedd på denne undersøkelsen før neste uke. Det gjelder både hva du ble spurt om og hva du har blitt vist. Dette er for å unngå at resultatene av påfølgende tester blir påvirket på noen som helst måte. Neste uke kan du fritt diskutere alt om undersøkelsen. Ha en fin dag videre!

H. Questionnaire

NHH



Hvilket medie ble respondentene vist opplevelsene i?

Virtual reality

Vanlig video

Bilder

Hvilken versjon av rekkefølge ble respondentene vist?

S,F,G

F,G,S

G,S,F

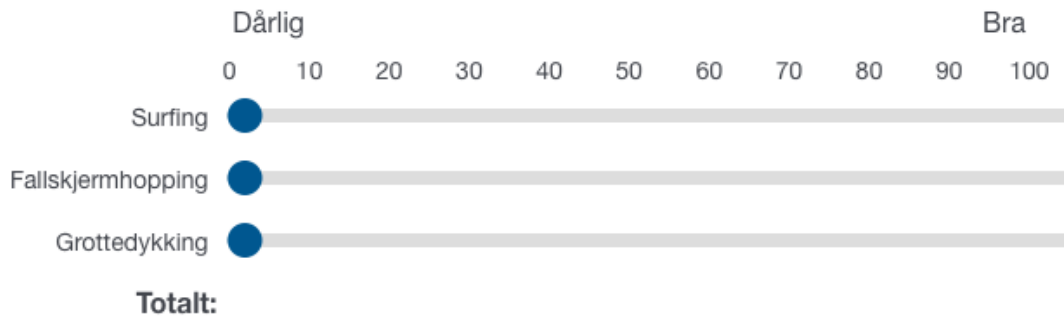
Velg dato:

← May 2017 →						
Su	Mo	Tu	We	Th	Fr	Sa
30	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10



Hvordan vil du rangere aktivitetene du ble vist ut ifra hva du likte best?

Fordel 100 poeng mellom de tre aktivitetene



Hvordan vil du vurdere aktivitetene du ble vist?

Vurder hver aktivitet fra veldig dårlig (0) til veldig bra (100)





Fikk du mer eller mindre lyst til å prøve aktivitetene du ble vist?

	Mye mindre lyst	Litt mindre lyst	Uendret	Litt mer lyst	Mye mer lyst
Surfing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fallskjermhopping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grottedykking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I hvilken grad føler du at du var til stede under aktiviteten?

Vurder hver aktivitet fra "i svært liten grad" (0) til "i svært stor grad" (100)

0 10 20 30 40 50 60 70 80 90 100

Surfing



Fallskjermhopping



Grottedykking



I hvilken grad føler du at presentasjonen av aktivitetene stemmer overens med dine forventninger til hvordan det vil være å oppleve aktiviteten selv?

•

I svært liten grad I liten grad I noen grad I stor grad I svært stor grad



Hvordan opplevde du bildekvaliteten?

Vurder hver aktivitet fra "dårlig kvalitet" (0) til "god kvalitet" (100)

0 10 20 30 40 50 60 70 80 90 100

Surfing



Fallskjermhopping



Grottedykking



Opplevde du aktivitetene som ubehagelig å se på?

	Overhodet ikke	I liten grad	I noen grad	I stor grad	I svært stor grad
Surfing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fallskjermhopping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grottedykking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hva synes du om presentasjonen av aktivitetene?

	Kjedelig	Litt kjedelig	Helt passe	Litt spennende	Spennende
Surfing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fallskjermhopping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grottedykking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



I følgende spørsmål skal du se for deg at du er på ferie i Hawaii. Du skal være der 15 dager, og kan velge mellom en rekke ulike aktiviteter å bruke feriedagene til. Hver aktivitet varer i 5 dager av gangen, og du kan enten velge å gjøre samme aktivitet flere ganger, eller velge å oppleve flere ulike aktiviteter. Du kan ikke gjøre mer enn én aktivitet per 5-dagers periode.

Du er på Hawaii og skal fordele 15 feriedager, hvilke aktiviteter ville du valgt?

Velg én aktivitet i hver kolonne slik at totalt antall dager blir 15. Du kan velge samme aktivitet flere dager på rad, men kun én for hver 5-dagers periode.

	Fallskjemhopping	Surfing	Fjelltur	Tur på byen	Grottedykking	Avslapping på stranden	Shopping
Første 5 dager	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Neste 5 dager	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Siste 5 dager	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NHH



Har du vurdert å prøve noen av disse aktivitetene tidligere?

Surfing

Fallskjermhopping

Grottedykking



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Huk av boksen hvis utsagnet stemmer noenlunde med hva du føler, la den være blank hvis den i liten grad beskriver hvordan du føler. Du kan velge flere utsagn.

Hvis det var trygt, ville jeg likt å prøve et legemiddel som ville gi meg underlige nye opplevelser

Jeg kan nesten bli smertefullt lei av enkelte samtaler

Jeg vil heller dra til et nytt sted som jeg kanskje ikke liker fremfor å dra tilbake til et sted jeg vet jeg liker

Jeg vil gjerne prøve en sport som skaper en fysisk spenning, som ski, fjellklatring, eller surfing

Jeg blir rastløs hvis jeg er hjemme for lenge

Jeg liker ikke å vente uten å ha noe å gjøre

Jeg ser sjeldent en film mer enn én gang

Jeg liker det ukjente

Hvis jeg ser noe uvanlig, vil jeg strekke meg langt for å sjekke det ut

Jeg blir lei av å tilbringe tid med de samme personene hver dag

Vennene mine sier det har vanskelig å forutsi hva jeg vil ha lyst til å gjøre

Jeg liker å utforske et nytt område

Jeg unngår å ha en daglig rutine

NHH



Er du spesielt engstelig for...

høyde

omgås andre mennesker

klaustrofobi

UV-stråler

overdreven pengebruk

vann

omgås i naturen

haier



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Hvor ofte reiser du utenlands sammenlignet med andre på din alder?

Mye sjeldnere Sjeldnere Tilsvarende Oftere Mye oftere

Har du vært på Hawaii?

Ja

Nei



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Kjønn

Mann

Kvinne

Alder

Det er svært viktig at du ikke snakker med noen om det som har skjedd på denne undersøkelsen før neste uke. Det gjelder både hva du ble spurt om og hva du har blitt vist. Dette er for å unngå at resultatene av påfølgende tester blir påvirket på noen som helst måte.

Klikk her for å bekrefte at du har forstått utsagnet ovenfor

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