How does the element of surprise influence the emotional response to viral videos?

An experiment into the influence of the emotion surprise
on viral videos

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BDM Master Thesis

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Preface

"Focus on the journey, not the destination. Joy is found not in finishing an activity but in doing it."

Greg Anderson

The last year of my master study Business Communication and Digital Media flew by. While most of my fellow students were busy starting their courses in September 2012, I was participating in a committee of the study association Asset | Marketing. I spent the whole month of October in South Korea to conduct a market research for a Dutch company. This market research was a great experience to apply my theoretical knowledge to real life situations. In addition, my interest in marketing also resulted in participating in the Markethings magazine committee as editor within Asset | Marketing. Joining this study association and participating in these committees gave me the opportunity to meet new friends, gained me a lot of experience and shaped me as a person.

Besides my interest in marketing I have always been interested in computers and internet. I can still remember when I was building my first website with a friend in elementary school. Since then, I have always been fascinated by the internet and digital media. This is one of the reasons why I signed up for the Master Business Communication and Digital Media.

I was very glad when I received the email that I could start writing my thesis about the topic I liked the most. I was also very glad that Sander Wubben was my thesis supervisor. Sander supported me from the start with great ideas and provided me with excellent feedback to help me startup with my thesis. Further, I am also very thankful for his technical support. Besides the formal discussions I would also like to thank Sander for the pleasant informal discussions we had about shared interests and experiences, for example our holidays to the West Coast of the United States. I would also like to thank Bart Joosten for his tips about the CERT software, programming scripts and enthusiasm. Furthermore, I would like to thank my parents and friends for their support. Finally, I especially want to thank all participants who were kind enough to participate in my experiment.

Tilburg, February 2014
Vincent

Abstract

We live in a highly social world where people spend more time on social network sites than any other category of sites. In addition, Youtube managed to reach more US adults than any cable network. Furthermore, the interconnections between users of social network sites allow content to spread rapidly and reach a huge network. Content is more likely to spread by worth-of-mouth communication when the emotion of surprise is elicited. However, surprise is considered to be a short-lived emotion and research in the field of surprise and marketing is scant and limited. The previous studies measured emotions by manual coding.

Recent developments in the field of computer software allow researchers to interpret and measure emotions automatically. The Computer Expression Recognition Toolbox (CERT) is one of the few state-of-the-art tools which is publicly available. This thesis is the first to explore whether automatic facial recognition software (CERT) can be used to measure the emotional response to viral videos. In order to investigate this, 40 students participated in the experiment. The participants were randomly divided in two groups of each 20 participants, a spoiled and unspoiled group, respectively. The only difference between both groups was that the spoiled group received a spoiler about the video they were going to view. The participants of both groups viewed ten identical unbranded short viral videos and answered a questionnaire after each video. Further, the viral videos that were used for the experiment were acquired on Youtube.

The findings of this study indicate that viral videos containing the element of surprise elicit higher levels of emotions and are more likely to be shared. Further, it appeared that videos which have been seen before are still able to evoke a high level of surprise. The results did also reveal that males are more likely to share videos compared to females. A correlation between the results of the questionnaire and CERT showed a moderate negative correlation, which indicates that CERT was not able to measure the emotion accurately. Therefore, more research in the field of automatic facial expression recognition is needed to create a better understanding of the efficiency and utilities.

Finally, we can conclude that the success of viral videos is strongly influenced by the emotion of surprise. In addition, the emotion of surprise seemed to increase the opportunity for a video to go viral on the internet. In order for marketers to create a successful viral video they should include surprise as one of the key ingredients and think thoroughly whether they want to target males or females.

Table of contents

Preface **2**

Abstract **3**

Chapter 1: Introduction **5**
1.1. Research question 6
1.2. Thesis outline 7

Chapter 2: Theory **8**
2.1. Social media and online video sharing 8
2.2. Viral marketing and viral videos 9
2.3. Emotion and persuasion. 10
2.4. Emotion of surprise 12
2.5. Automatic facial expression recognition software 14

Chapter 3: Methods **15**
3.1. Participants 15
3.2. Pretest 15
3.3. Results of the pretest 15
3.4. Design 15
3.5. Materials 16
3.6. Procedure 18
3.7. Statistical analysis 19

Chapter 4: Results **20**
4.1. Scores on surprise. 20
4.2. Sharing behavior of videos that contain the element of surprise 21
4.3. Comparison of videos that have been seen before and videos that have not been seen before 21
4.4. Sharing behavior of male and females 22
4.5. Facial expressions measured with CERT 22
4.6. Using automatic facial recognition software to measure the emotional response to videos 27

Chapter 5: Discussion **28**
5.1. Discussing hypothesis 28
5.2. Theoretical and practical implications 29
5.3. Future Research 30

Chapter 6: Conclusion **31**

References **32**

Appendix **36**

Chapter 1: Introduction

"Our brightest blazes of gladness are commonly kindled by unexpected sparks"

Samuel Johnson

Nowadays social media is quite common and many internet users use social media. Research[1] showed that nearly one in four people worldwide have used social networking sites in 2013. Currently, Facebook is the largest social networking site (Nielsen, 2012) and in the United States Youtube[2] managed to reach more adults within the age of 18-34 than any cable network.

Videos that become very popular in a short amount of time and spread through internet sharing from person-to-person are also known as viral videos (Broxton, Interian & Wattenhofer 2010). Spreading a viral video on social media is considered cheaper and more effective than traditional media (Berger & Milkman, 2009). Companies and marketers are now trying to figure out how to utilize viral videos in order to persuade consumers to buy products (Broxton et al., 2010).

Recent developments in computer software allow researchers to interpret and measure human emotions automatically (Littlewort, 2011). An example of such software system is the Computer Expression Recognition Toolbox (CERT). This software tool allows interpreting the facial expressions at the level of basic emotions.

The aim of this study is to investigate whether the element of surprise influences the emotional response to viral videos. This study contributes to the knowledge of computer scientist, companies and marketers to better understand emotional responses to viral videos. The insights in using automatic software for emotion measurement will be of scientific relevance and contributes to understanding the cognitive neuroscience of emotion (Bartlett, 2010). The understanding of people's emotional responses to viral videos has practical relevance and support companies and marketers to create a successful viral video. This study is focused on viral videos, thus not on the overarching topic of viral marketing. Despite the potential value of viral videos, understanding of the relation between the emotion of surprise and viral videos is scarce.

Nevertheless, many studies have been conducted in the field of emotion and persuasion. The study of Ekman & Friesen (2003) showed that people from all over the world use six primary basic facial expressions of emotions: anger, disgust, fear, happiness, sadness and surprise. Further, the investigation of Kim & Matilla (2010) showed that intrinsic arousal or felt emotions will be experienced as stronger with the emotion of surprise. In addition, positive surprise leads to an extreme level of satisfaction (Vanhamme & Snelders, 2001).

Next, several studies have been conducted in the field of viral marketing. According to Dobele,

[1] http://investor.fb.com/releasedetail.cfm?ReleaseID=761090
[2] http://www.youtube.com/yt/press/statistics.html

Lindgreen, Beverland, Vanhamme & Van Wijk (2007) successful viral campaigns link emotions to their message, in order to encourage people to respond. Furthermore, the referral behavior of content is strongly influenced by the emotion of surprise (Derbaix & Vanhamme, 2003). Besides the emotion of surprise, it seemed that content which contains a high level of positive or negative arousal are more likely to become viral (Berger & Milkman, 2009). Research of Eckler & Bols (2011) showed that content with a positive tone elicit a stronger intention to forward content in comparison to content with a negative tone. In addition, Ketelaar, Lucassen & Kregting (2010) stated that viral campaigns with a high level of amusement are most successful related to forwarding behavior. Finally, results show that men are more likely to share content on social media that reflect their personality (Mazman, Usluel & Cevik, 2009).

The previous studies measured emotions by manual coding, questionnaires and by analyzing online data sets. This study is the first to measure emotions automatically by using state of the art facial expression recognition software in combination with a questionnaire.

1.1. Research question

How does the element of surprise influence the emotional response to viral videos?

Lindgreen & Vanhamme (2003) stated that research about the emotion of surprise in marketing is scant and limited. The research of Kim & Matilla (2010) showed that felt emotions will be experienced as stronger with surprise. Therefore the following hypothesis is created:

> Does the element of surprise in a video elicit more emotions?
> *H1: Videos that contain the element of surprise elicit more emotional response compared to videos that do not contain the element of surprise*

The study of Derbaix & Vanhamme (2003) indicated that referral behavior is strongly influenced by the emotion of surprise. Despite the research of Derbaix & Vanhamme (2003) not many studies have been conducted that looked in to sharing behavior of viral videos with the emotion of surprise. To create more understanding we formulated the following hypothesis:

> Are people more likely to share a video if it contains the element of surprise?
> *H2: Videos that contain the element of surprise are more likely to be shared.*

Several videos remain popular and have been watched over and over. In order to gain more knowledge about the effect of videos that have not been seen before we posed the third hypothesis:

> Do videos that have never been seen before evoke higher surprise?
> *H3: Videos that has been never seen before score higher on surprise compared to videos that have been seen before*

According to Mazman et al. (2009) males consider personal decisions more important compared to females. Therefore we created the following hypothesis:

> Are males more likely to share videos compared to females?
> *H4: Videos are more often shared by males compared to females*

Most understandings of emotional responses to viral marketing originate from manual coding. The progress in computer hardware and software allows researchers to measure facial expressions automatically. Using automatic facial recognition software could speed up research.

> To what extent can automatic facial expression recognition software be used to measure the emotional response to videos with surprise?
> *H5: The emotions measured with automatic facial expression recognition software correlate with the outcomes of the emotions experienced by the participants.*

1.2. Thesis outline

Chapter 2 describes the theory about the following topics: social media and online video sharing, viral marketing and viral videos, emotion and persuasion, emotion of surprise and automatic facial recognition software. Next, chapter 3 describes the method that is applied during the experiment. The results are described in chapter 4. Afterwards the results are discussed in chapter 5 and chapter 6 presents the final conclusion.

Chapter 2: Theory

2.1. Social media and online video sharing

We live in a highly social online world where social media is integrated in the daily lives of many people. Kaplan & Haenlein (2010) define social media as a group of internet-based applications that build on the ideological and technological foundations of web 2.0, and that allow the creation and exchange of user generated content. Figure 1 displays the different kind of social media.

Figure 1. Classification of social media (adapted from Kaplan & Haenlein, 2010).

		Social presence/ Media richness		
		Low	Medium	High
Self-presentation/ Self-disclosure	High	Blogs	Social networking sites (e.g., Facebook)	Virtual social worlds (e.g., Second Life)
	Low	Collaborative projects (e.g., Wikipedia)	Content communities (e.g., YouTube)	Virtual game worlds (e.g., World of Warcraft)

According to Nielsen (2012), people spend more time on social network sites than on any other category of sites. Facebook is the most popular social network site and registered[3] more than 665 million active users on average in March 2013. Furthermore, 100 hours of video are uploaded[4] to Youtube every minute. Social networking sites and communities allow users to create personal profiles, invite friends, send emails and instant message between each other. Furthermore, these sites allow users to include any type information: photos, videos, audio files and blogs. In addition, Twitter is a social media platform that allows users to send out short text based posts of 140 characters or less. These short messages are called tweets and can include photos, videos or audio files. Twitter displays shared videos as hyperlinks without a screenshot. Videos shared on Facebook are displayed as hyperlinks including a screenshot of the video.

Research of (Broxton et al., 2010) showed that 25% of the views on Youtube come from person-to-person sharing (e.g. an emailed link). Within the first week of a new video upload the amount of views that come from person-to-person sharing increases to 45% (Broxton et al., 2010). The most popular categories on Youtube are music, entertainment and comedy. Further, the categories music and entertainment have the highest level of sharing (Broxton et al., 2010). Within these categories the videos that are uploaded under the comedy and entertainment category are mostly videos with a video length less than 200 seconds (Cheng et al., 2007).

Finally, the research of Mazman et al. (2009) showed that the social influence on the decisions of females is higher than personal decisions. In contrast, the male condition showed that personal decisions are more dominant over social influence in males (Mazman et al., 2009). Therefore, males are more likely to share content that reflect their personal interests or personality.

[3] http://investor.fb.com/releasedetail.cfm?ReleaseID=761090
[4] http://www.youtube.com/yt/press/statistics.html

2.2. Viral marketing and viral videos

Social network sites such as Facebook and Youtube allow people to share content, reviews and opinions within a short amount of time. The interconnections between users of social network sites allow content to spread like a virus and reach a huge network of people. Marketers attempt to utilize these opportunities by using viral marketing. Laudon & Traver (2001) describe viral marketing as the process of getting customers to pass along a company's marketing message to friends, family, colleagues and others. Nowadays, many companies and brands added viral marketing and viral videos to their marketing strategy, including Heineken, Levi's, Nestle and Procter and Gamble (Dobele et al., 2007).

To understand why some videos are shared and spread it is important to figure out what it means for videos to be popular. Fiske (1989) states that there is a distinction between mass culture, that is culture which is mass produced, and distributed and popular culture, which is culture which has been integrated into the everyday lives of consumers. In the new digital economy content is not likely to spread if it does not engage and serves the interests of both consumers and producers. Consumers recommend content they like to their friends who recommend it to their friends. However when the content does not engage and serves the interests of the consumer, the circulation gets blocked by one side, which results in consumers who are refusing to spread the content (Cova, Kozinets & Shankar, 2007).

Research of Dwyer, Hiltz & Passerini (2007) argued that trust and usage affect the sharing behavior of people. They stated that Facebook users expressed more trust in Facebook than Myspace users did in Myspace and therefore are more willing to share information on Facebook. Furthermore, their research showed that a large group of people did not share their online profile information publicly to maintain social privacy.

Most videos that have spread successfully contain humor (Jenkins, Krauskopf & Grean, 2009). The success of humor should come as no surprise: we intuitively understand that sharing funny anecdotes is an easy way to build fellowship (Jenkins et al., 2009). However, humor or jokes that people do not understand can lead to awkward situations. Douglas (1991) has noted that there is a very thin line between a joke and an insult: a joke is something the community is ready to hear, an insult expresses something the community does not want to talk about. The emotion of surprise can be used to evoke humor, which elicit the feeling of delight and happiness (Dobele et al., 2007). A viral which contains disgust or fear is more likely to be forwarded by male recipients than female recipients (Dobele et al., 2007). Achieving a connection between a campaign and emotions is important to increase the chance of forwarding.

Emotions are key in driving viral marketing campaigns. Research showed that emotional responses account for about 30% of the explained variance of referral behavior (Maute & Dubé, 1999). Referral behavior of content is strongly influenced by the emotion of surprise (Derbaix & Vanhamme, 2003). Furthermore, the intensity of emotions is also positively related to the social sharing of

emotions (Rimé, Finkenhauer, Luminet, Zech, & Philippot, 1998). The more surprised a consumer is, the more likely it is that he or she will spread the content by worth-of-mouth communication (Derbaix & Vanhamme, 2003). If companies think thoroughly about eliciting (positive) surprise, consumers will probably advertise their experience. Viral marketing is considered cheaper than traditional marketing and probably more credible (Derbaix & Vanhamme, 2003).

2.3. Emotion and persuasion

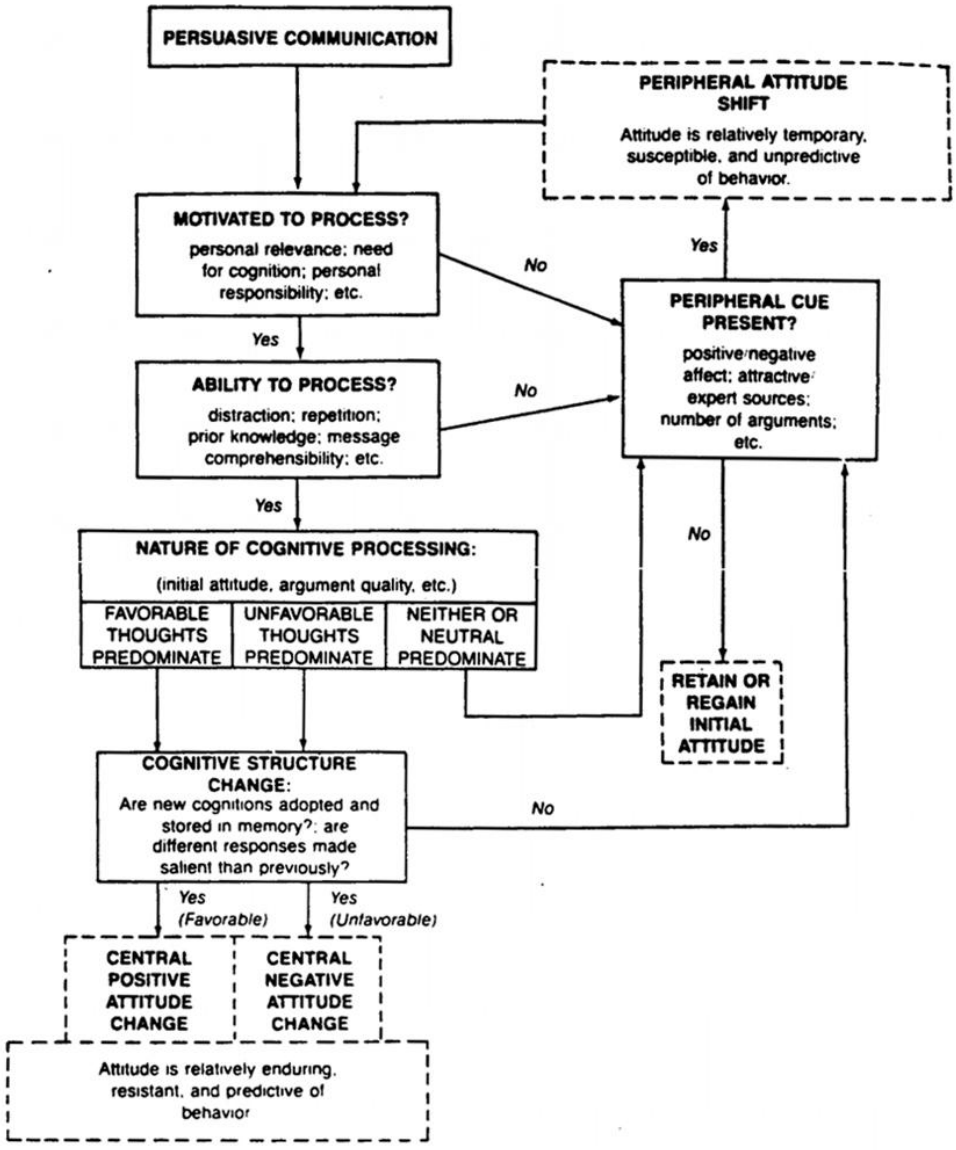
There have been many studies on the responses of consumers to advertising and how advertising works; e.g., Krugman (1965), Ray et al. (1973), Houston and Rothschild (1978), Vaughn (1979) Petty & Cacioppo (1983), Cohen (1990). Among these studies, Petty & Cacioppo's (1983) Elaboration Likelihood Model (ELM) seems to be the most comprehensive and popular cited in research about social psychology, consumer research and advertising. The ELM describes two different routes of persuasion that consumers follow when they come across persuasive communication: the central route and the peripheral route. Viral videos use the peripheral route because they mostly focus on contextual cues (elicit emotional response) and focus less on personal relevance. When consumers are interested and want to find more information they can visit the company website.

The central and peripheral routes of the ELM are shown in Figure 2. Consumers use the central route when the involvement or perceived personal relevance is high. Central cues as existing beliefs and initial attitude are important to determine persuasion effects in this situation. The path of the central route starts in Figure 2 on the top with persuasive communication and moves straight down to central positive or negative attitude change. If the involvement of consumers is low, persuasion occurs via the peripheral route. The path of the peripheral route is visible in Figure 2 when the user answers no instead of yes. In contrast to the central route, there are many routes that lead to the peripheral route. The peripheral route differs from the process of through the central route in that the consumer focuses on less message related cues and more on contextual cues. These contextual cues can be for example the spokesperson, music, humor or graphics. Overall, the central route is more likely to exert a long-term influence on the consumer's attitudes and beliefs (Cook & Coupey, 1998).

In addition to the ELM model the six principles of persuasion examined by Cialdini (2001) will be described. The principles describe six cues that are responsible for influencing and convincing people. Reciprocity is the first principle and recognizes that people generally aim to return favors or pay back debts. The next principle is social proof, when people are uncertain about their action they tend to look around them to guide their actions. Commitment and consistency is the third principle, people strive for consistency on their commitments and are more likely to do something they agreed on. Next is the principle of liking, people are more likely to be influenced by people they like or are familiar. Authority is the fifth principle, people want to follow real experts and they respect authority. The last principle is scarcity, when things are limited they are more attractive. These six principles can work positively as well as negatively. When applying these principles it is important to use them

honestly instead of misleading or deceiving people (Cialdini, 2001). Creating customer loyalty and getting a good reputation takes a long time to build, but can be lost in a small amount of time. Satisfaction is one of the core elements in creating customer loyalty (Ruyter & Bloemer, 1999). However, Rust et al. (1996) state that business needs to move beyond mere satisfaction, to customer delight. They describe customer delight as the highest level of customer satisfaction and is believed to result in higher customer retention and loyalty (Oliver et al., 1997; Rust et al., 1996).

Figure 2. The Elaboration Likelihood Model of persuasion (adapted from Petty & Cacioppo, 1986).



Research shows that there is a relationship between positive surprise and satisfaction (Vanhamme & Snelders, 2001). Furthermore, positive surprise leads to an extreme level of satisfaction; surprise is also believed to trigger delight (Vanhamme & Snelders, 2001). Plutchchik (1980) suggests that delight results from a combination of surprise and joy. Nevertheless, surprise also seems to amplify negative emotions. Surprise linked to the feelings of anger and upset are associated with the lowest satisfaction levels of consumption (Vanhamme & Snelders, 2001). Further, negative moods can be a threat to people's well-being because these moods are more disruptive and aversive. People in a

negative mood are more likely to change their mood than in a positive (Fiske & Taylor, 2007).

As mentioned, surprise often leads to an extreme level of satisfaction. Therefore, many organizations focus on surprising their customers in a creative way (Heilman et al., 2002).

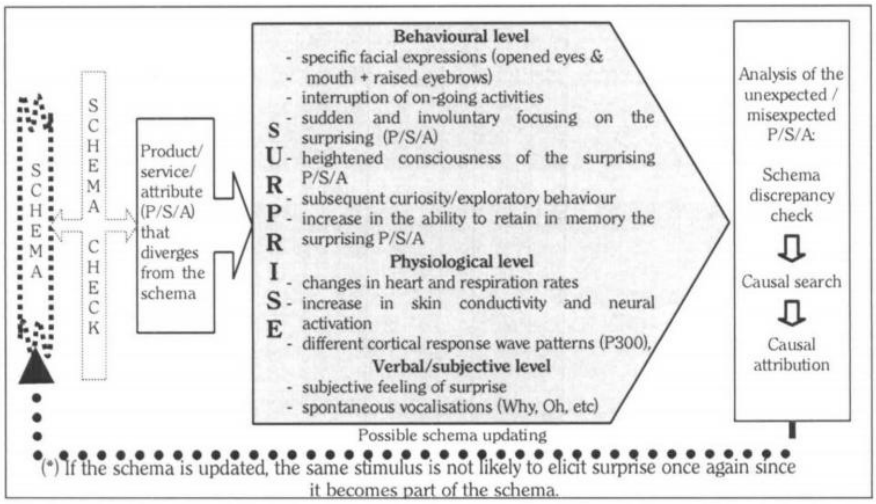
2.4. Emotion of surprise

Before defining the emotion of surprise a description of common basic emotions is given. Many researchers have been trying to investigate whether facial expressions of emotion are the same for people from all over the world. This topic is investigated by Eibl-Eibesfeldt (1970), Izard (1971) and Ekman & Friesen (2003). Their results showed that people from all over the world use universal facial expressions of emotion. In addition, Ekman & Friesen (2003) showed that only six primary basic facial expressions are universally the same. These basic emotions are: anger, disgust, fear, happiness, sadness and surprise. However, the study of Russel (1994) questions the claim that people from all over the world use universal facial expressions of emotion. Furthermore, Russel (1994) states that facial expressions and emotion labels are associated but may vary with culture. Nevertheless, the basic emotions of Ekman & Friesen (2003) are one of the most commonly used for classifying emotions (Bann & Bryson, 2012).

Research about the emotion of surprise in a marketing context is scant and limited; most understandings originate from psychology literature (Lindgreen & Vanhamme, 2003). Nevertheless, Heilman et al. (2002) states that surprise plays a critical role in customer satisfaction.

Surprise is considered to be a neutral (i.e. neither positive nor negative) and short-lived emotion (Charlesworth 1969; Ekman & Friesen 1975; Izard 1977; Plutchik 1980). In a marketing context this short lived emotion is elicited by unexpected or misexpected products or services (Ekman & Friesen 1975; Meyer et al., 1994; Scherer 1984). Vague and undefined expectations about products and services are listed as unexpected. Expectations about products or services that do not occur denote misexpected situations. Surprise is described as a collection of reactions, as shown in Figure 3 (Vanhamme, 2000) .Individuals constantly check if they have a proper representation of the reality by matching their schema with the inputs coming from the surrounding environment. If the inputs diverge from the schema in Figure 3, surprise is elicited (Vanhamme, 2000).

Figure 3. The emotion of surprise (adapted from Vanhamme, 2000).



One major characteristic of surprise is the interruption of ongoing activities (Meyer et al., 1991). The interruption of ongoing activities, focusing of attention and heightened consciousnesses of the surprising stimulus are supposed to help the individual to process the surprising event (Schützwohl, 1998). Furthermore, a surprising stimulus results also in better memory retention (Meyer et al., 1997) and increases the curiosity behavior (Charlesworth, 1969). Surprise itself is a neutral emotion. However, it is often followed by a positive or negative emotion (Ekman & Friesen, 1995; Meyer et al., 1994). This explains the role of surprise as an amplifier of accompanying emotions (Westbrook & Oliver, 1991). Intrinsic arousal or felt emotions will be experienced as higher with surprise. This leads to more polarized evaluations, for example, higher satisfaction or dissatisfaction (Kim & Matilla, 2010).

Figure 4. Four types of surprise (adapted from Ekman & Friesen, 2003).



Table 1. Four types of surprise

Questioning surprise (fig. 4A)	Only the eyes and eyebrow movements of the full-face surprise expression occur
Amazed surprise (fig. 4B)	Only the eyes and mouth movements of the full-face surprise expression occur
Dazed surprise (fig. 4C)	Only the eyebrow and mouth movements from the full-face surprise expression occur
Full surprise (fig. 4D)	Is displayed when all three facial areas are involved

These felt emotions are also recognizable in the human face. The appearance of surprise can be analyzed in three facial areas: the eyebrows, eyes and lower face (Ekman & Friesen, 2003). During a reaction due to surprise the eyebrows are raised, the skin below the brow is stretched, horizontal wrinkles go across the forehead, the eyelids are opened and the jaw drops open. There are four types of surprise that can be distinguished, viz. (A) questioning surprise, (B) amazed surprise, (C) dazed surprise and (D) full surprise (Ekman & Friesen, 2003). Figure 4A displays a questioning surprise, this

facial expression is the same as in Figure 4D, except that the mouth is in a neutral position. Figure 4B shows an amazed surprise, this facial expression is the same as in Figure 4D, except for the eyebrows/ forehead. Figure 4C displays a dazed surprise, this facial expression is the same as in Figure 4D, except for the eyes. The last figure 4D shows a full surprise expression, with all facial areas involved. In Table 1 there is displayed a description of the distinctions of the four types of surprise (Ekman & Friesen 2003).

2.5. Automatic facial expression recognition software

The research of Ekman & Friesen (2003) showed several results of facial expression recognition that were obtained by manual coding. Recognizing facial expressions, is an ongoing area of research. Various researchers have tried to do this automatically (Amelsvoort, Joosten, Krahmer & Postma, 2013; Martens 2012; Littlewort, Bartlett, Fasel, Susskind & Movellan, 2006). Attempts have been made at various levels, i.e., basic emotion recognition, action unit recognition, facial expressions pertaining to a specific context (Joosten, 2011). These systems can interpret facial expressions at the level of basic emotions (Ekman & Friesen, 2003); happiness, sadness, anger, disgust, surprise or fear. Furthermore, it is also possible to analyze facial expressions at the level of individual muscle movements (facial action units) of the face, as described by the Facial Action Coding System (FACS) (Ekman & Friesen, 1978). In the behavioral sciences, FACS is one of the most widely used and versatile methods for measuring and describing facial expressions. The system was developed by Ekman & Friesen (1978) as a comprehensive method to objectively code facial expressions. The FACS measurement units are called Action Units (AUs). These action units are based on the intensity of movements which correspond to individual facial muscles.

Despite the substantial progress in the field of automatic facial expression recognition software there are not many automatic software applications with state-of-the-art accuracy publicly available. One of the tools that works fully automatically is the Computer Expression Recognition Toolbox (CERT) (Littlewort, 2011). CERT is a software system that provides real-time fully automatic coding of facial expressions. The system can process live video by using a webcam. The system allows automatic recognition of 19 facial action units as well as the six universal basic emotions that are stated by Ekman & Friesen (1978).

In order to extract the intensity of the basic emotions CERT follows a few stages. In the first stage CERT has to detect a face in the video. Only the largest found face is used for further processing. The Viola & Jones (2004) approach is used during the first stage. This approach for face detection minimizes the computation time and achieves a higher detection accuracy. The second stage is to detect facial features of the initial face such as the eyes, eyebrows, nose and the mouth. In the finale stage CERT uses a classifier for the measurement of the presence and intensity of the found feature. The classifier measurements are compared to features of a standard AU-template. After processing these stages CERT produces a data file which contains all features that CERT tested on. During automatic facial expression recognition the CERT system achieves an accuracy of nearly 80%. The CERT system has been successfully applied to accurate estimate driver fatigue and emotional reactivity such as pain reactions (Littlewort, 2011).

Chapter 3: Methods

This chapter describes the experiment that is performed to answer the research question.

3.1 Participants

Four students participated (75% male; *M*age = 25) in our pretest. These four participants did not participate in the definitive experiment. In total, 40 students (55% male; *M*age = 23) participated in the definitive experiment. The students were recruited on the campus of Tilburg University and volunteered for the experiment. Most of the participants were studying communication and information sciences or marketing management at Tilburg University. All participants were Dutch speaking students and their ages were between 18 and 27.

3.2. Pretest

In order to prevent errors or ambiguities in the test materials we tested the experiment with four participants. The participants completed the experiment in a secluded room and were asked to provide feedback during and after the experiment. When a process, sentence, sequence or instruction was unclear they were asked to communicate this immediately. Furthermore, the experiment leader stayed in the secluded room to observe and write down the feedback of the participants.

3.3. Results of the pretest

Conducting a pretest resulted in many new insights to improve the experiment. There were two arguments about the structure of the questions during the experiment. The participants explained that the five-point Likert scale was not clear because the statements and sentences were too long and in some cases unclear. Furthermore, there was one question that stated; "this video fits my interests", participants indicated this as an unclear statement because the topics of the video were quite general in some cases. Next, some participants argued that it was not clearly defined how to proceed to the next page. They also mentioned that some sentences were written in capitals and therefore more difficult to read. Finally, there was one aspect that was noticed during the observations by the experiment leader. There were some participants who put their hands to their faces during the experiment due to the lack of instructions. This was undesirable because CERT cannot measure facial expressions when the hands are covering parts of the face. All of the improvements that were mentioned and observed were changed and applied in the definitive experiment.

3.4 Design

A between subjects design was used during the experiment. The participants were divided in two groups (spoiled and unspoiled) of twenty each. The spoiled group received a description and a spoiler

of the video they were going to view. The unspoiled group only received a description of the video they were going to view, thus they did not receive the plot (surprising factor) of the video.

Furthermore, two subgroups of ten participants each were created within both groups. The subgroups were created to investigate whether the sequence of videos affected the scores on surprise. It appeared that the order of videos did not have a large effect on the overall scores of surprise. All participants in both groups were asked to view ten viral videos with a short video length that was under 45 seconds, as shown in Appendix A and C. Both groups viewed the same viral videos. All participants were asked to answer a short questionnaire after each video, thus each participant filled out ten surveys after finishing the experiment. To measure the sharing behavior of the participants we used questions, such as, "I share videos because I think my friends will also like". The level of surprise was measured by questions, such as, "I was surprised by this video". Furthermore, we did also measure the intensity of the emotional response by using questions, such as, "The intensity of the feeling is". The complete overview of the survey questions are displayed in Appendix B. In addition, the questions were presented by using a five-point Likert scale.

The experiment was created with OpenSesame, a graphical experiment builder. OpenSesame was used because it is freely available and allows functionalities as video playback in combination with questionnaires. In addition, OpenSesame offers one of the most intuitive and extensive graphical user interface currently available (Mathôt, Schreij & Theeuwes, 2011).

3.5 Materials

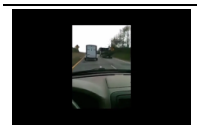
The stimuli were ten short videos. As shown in Figure 5, five videos contained an element of surprise; the five residual videos were neutral and did not contain a surprise. To keep the participants attentive, a combination of surprising and neutral videos was chosen. In addition, the surprising and neutral videos were divided randomly. This decreased the likeliness that participants would expect a surprise or neutral element in the next video.

The videos were acquired on Youtube and selected because they were most likely to elicit surprising or neutral emotions. Furthermore, the videos which elicit surprise were selected based on the following criteria: uncommon interruption of an ongoing activity, interruption takes place in a very short time frame (within 3 seconds), combined with a negative or positive emotion, unbranded, video length less than 45 seconds, English spoken, popular but unknown to participants and without background music. Unbranded videos were chosen to avoid and exclude any influence of brands on the received emotions. The video length of 45 seconds maximum was chosen because Cheng et al. (2007) stated that most viral videos have a video length less than 200 seconds, except for music videos. Furthermore, to decrease the possibility that participants had seen the video before, most successfully spread viral videos were not selected.

To make sure the classification of the videos was clear the videos were tested with participants before running the experiment. Three participants judged each video and indicated whether they

thought the video was surprising or neutral. The outcome of this test resulted in a Cohen's kappa of 1.0. The results indicate that the selected videos elicited the required emotions.

Figure 5. Screenshot of the ten selected videos

	Video 1: Television reporter Description: V*ideo were you will see a television reporter. Halfway the reporter will get interrupted by a plastic bag which will fly in his face.* Video Length: 11 seconds Surprise: Yes *Timeframe surprising moment in video: 0.08-0.11*
	Video 2: Frontflip tree Description: *Video were a boy doing a stunt. He will run towards the tree and succesfully do a frontflip via the tree.* Video Length: 10 seconds Surprise: No *Timeframe surprising moment in video: 0.08-0.11*
	Video 3: Boy in fitness gym Description: *It seems like the boy will pickup a dumb-bell, in contrast, he picks up a girl. Then he will lift the girl above his head and drops her like she is a dumb-bell.* Video Length: 42 seconds Surprise: Yes *Timeframe surprising moment in video: 0.32-0.35*
	Video 4: Scooter wheely Description: *Boy doing a stunt on his bike. The boy will succesfully perform a wheely on the back wheel of his bike.* Video Length: 17 seconds Surprise: No *Timeframe surprising moment in video: 0.14-0.17*
	Video 5: Two people using a para-engine to take off Description: V*ideo were two people take off with a para-engine. The two people will start off on the beach and will fly away above the sea.* Video Length: 23 seconds Surprise: No *Timeframe surprising moment in video: 0.15-0.18*
	Video 6: Wooden stick flies into car window Description: *You are going to see a dashcam of a car driver. The car driver is driving behind another car. Then suddenly there will fly a wooden stick through his car window.* Video Length: 8 seconds Surprise: Yes *Timeframe surprising moment in video: 0.03-0.06*
	Video 7: Speedboat crash Description: *Group of people standing in a speedboat going very fast. Halfway the movie the steersman loses control and a heavy boat crash will follow.* Video Length: 25 seconds Surprise: Yes *Timeframe surprising moment in video: 0.17-0.20*
	Video 8: Girl performing stunt with leaf blower Description: *During this stunt the girl is holding a leaf blower. She uses the leaf blower while lying on the chair turning circles.* Video Length: 25 seconds Surprise: No *Timeframe surprising moment in video: 0.22-0.25*
	Video 9: Girls miming a song Description: *The girl on the right side is miming with a bottle of shampoo. The shampoo cup was loose, suddenly the girl gets a huge splash of shampoo in her mouth.* Video Length: 19 seconds Surprise: Yes *Timeframe surprising moment in video: 0.16-0.19*
	Video 10: Train passing a dangerous crossing Description: *During the video there will pass by a train of the Dutch railways approaching from the right side.* Video Length: 16 seconds Surprise: No *Timeframe surprising moment in video: 0.06-0.09*

The videos were displayed on a laptop in a secluded room. The elicited emotional expressions of the participants were captured (1920 x 1080 pixels) with the webcam of the laptop. The webcam began filming when the participant started the experiment and ended at the moment the participant finished the experiment. Figure 6 displays a webcam capture of a participant. After running all experiments the webcam captures were sliced from the moment the videos started to play until they finished, thus in total ten parts were sliced for each participant.

The ten parts varied in length because most videos had a different video length. The shortest video had a duration of eight seconds and the longest had a duration of 42 seconds. The ten videos all contained a moment when the surprise activity occurred or something unexpected could happen. This time frame is investigated for each video and is displayed in Figure 5. A time frame of three seconds is chosen because the research of Ekman & Friesen (1975) indicated that the emotion of surprise is a very short lived emotion. All webcam captures were sliced at the exact same time frame when the surprise or unexpected activity could occur, as shown in Figure 5.

Next, the webcam captures of each three seconds were analyzed with the CERT software. The CERT software produced a range of values for every capture that was analyzed. The output is transformed in a mean value for each capture. A mean score is chosen because we assumed that comparing minimum or maximum scores would be far more time consuming, due to a limited period of time this would not have been possible. Furthermore, the option within CERT to analyze the basic emotions is used. Appendix F displays the design of the CERT data file which is used for this experiment. In Figure 7 there is a screenshot of the CERT software system, the detected facial expressions are displayed on the right side of the screen.

Figure 6. The facial expression of two participants during the experiment (Webcam captures).

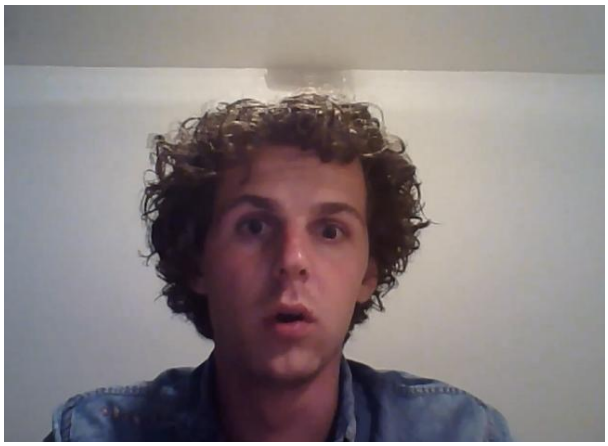
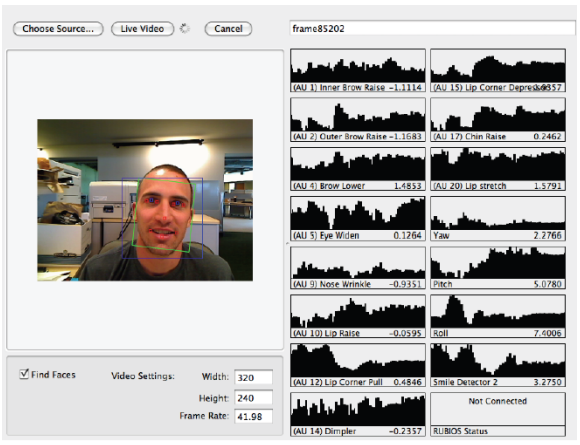


Figure 7. Screenshot of CERT (adapted from Littlewort, 2011).



3.6 Procedure

Most participants were received in a secluded room at the Tilburg University library. They were asked to sit in front of the laptop and were instructed to avoid putting their hands to their faces. Next, the experiment leader started the webcam capture. Then the experiment, which was created with

OpenSesame was started. On the first slide of the experiment there was an instruction about the experiment. The participants were allowed to ask questions during the instructions. When everything was clear the participant could start the experiment by viewing the first video. The experiment leader sat discretely in a corner and checked once a while if the participants kept their hands from their faces. The ten videos were always presented in the same order except in subgroup 1 and in subgroup 2, in these subgroups the order of the videos was exactly the opposite, thus the first one as last and the last one as first video.

3.7 Statistical analysis

The questions that were answered during the experiment were saved by the OpenSesame software and processed as a CSV document file. The files of all participants were merged together and analyzed in an SPSS data file. An independent-samples t-test is used to compare the two groups of participants.

The following step was to edit and analyze the webcam captures. The webcam captures of three seconds each per video were individually analyzed with CERT. The data was merged into one CSV document file and categorized per participant. In the end the data was compared and analyzed in a SPSS data file.

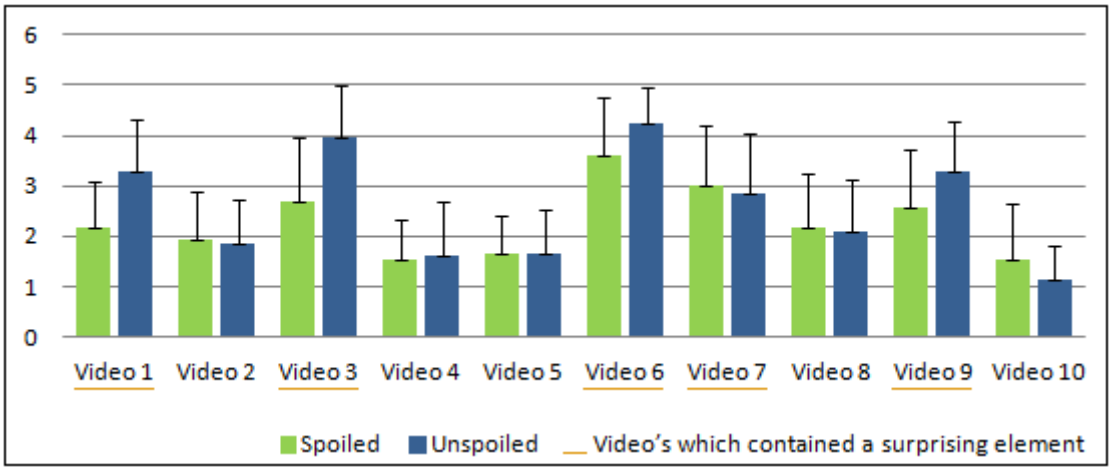
Chapter 4: Results

The first section presents the scores on surprise collected by the questionnaire, which was presented after each video. The next section shows the sharing behavior of videos that contain the element of surprise. The third section consists a comparison between videos that have been seen before and videos that not have been seen before. In the fourth section we describe the sharing behavior of male and females. The fifth section contains a comprehensive description of the emotions that were analyzed with CERT. Finally, the sixth section contains the correlations between the questionnaire and CERT.

4.1 Scores on surprise

The first hypothesis stated that videos containing the element of surprise elicit more emotional response. Figure 8 presents the differences in surprise that were elicited during each video per group. Video 1,3,6,7 and 9 contained a surprising element and resulted in higher scores on surprise than videos that did not contain a surprising element. As figure 8 shows, the unspoiled group experienced a higher level of surprise during video 1,3,6 and 9 which contained a surprising element, except for video 7. Furthermore, the results indicate that small differences were found between both groups on video 2, 4, 5, 8 and 10 which did not contain a surprising element, except for video 10.

Figure 8. Scores on surprise per group



An independent-samples t-test was conducted for each video to compare the differences in surprise that were elicited in the spoiled and unspoiled group. The highest level of surprise was experienced in the unspoiled group on video 6. There was a significant difference in the scores for the spoiled group (M = 3.60, SD = 1.14) and the unspoiled group (M = 4.25, SD = 0.72); t(38) = -2.16, p =.04. Furthermore, there were also significant differences in the scores for video 1, 3 and 9 as shown in table 2.

Table 2. Scores on surprise per group

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	2.15	0.93
		Unspoiled	3.30**	1.03
2	No	Spoiled	1.95	0.95
		Unspoiled	1.85	0.88
3	Yes	Spoiled	2.70	1.26
		Unspoiled	3.95**	1.05
4	No	Spoiled	1.55	0.76
		Unspoiled	1.60	1.10
5	No	Spoiled	1.65	0.75
		Unspoiled	1.65	0.88
6	Yes	Spoiled	3.60	1.14
		Unspoiled	4.25*	0.72
7	Yes	Spoiled	3.00	1.21
		Unspoiled	2.85	1.18
8	No	Spoiled	2.15	1.09
		Unspoiled	2.10	1.02
9	Yes	Spoiled	2.55	1. 19
		Unspoiled	3.30*	0.98
10	No	Spoiled	1.55	1.10
		Unspoiled	1.15	0.67

*Note. * p <.05; ** p < .01;*

4.2 Sharing behavior of videos that contain the element of surprise

Our second hypothesis assumed that videos containing the element of surprise are more likely to be shared. The results on sharing indicate that videos containing the element of surprise are more likely to be shared by the participants. We verified for this effect by measuring the sharing behavior on basis of a questionnaire, thus the participants did not share these videos in real life. Table 3 represents the mean scores on the questionnaire of both groups per video.

Table 3. Sharing behavior of the spoiled and unspoiled groups

	Video 1	Video 2	Video 3	Video 4	Video 5	Video 6	Video 7	Video 8	Video 9	Video 10
Mean	1.83	1.5	2.45	1.25	1.23	2.23	2.45	1.6	2.55	1.25
σ	0.99	0.75	1.29	0.67	0.52	1.28	1.29	1.02	1.04	0.11

Furthermore, the differences in sharing behavior of the spoiled and unspoiled group were investigated. The independent-samples t-test showed that there was a significant difference in the scores of video 9 for the spoiled group (M = 2.90, SD = 0.97) and the unspoiled group (M = 2.20, SD = 1.11); t(38) = 2.13, p = .04. No significant effect was found in all other conditions.

4.3 Comparison of videos that have been seen before and videos that have not been seen before

The third hypothesis of our study assumed that videos that have been never seen before score higher on surprise. This hypothesis was investigated by comparing participants that had seen the video before and those who had never seen the video before. Participants were asked if they had seen the video before. These results showed that 35 observations (11,43%) from the total amount of 400

observations were seen before by a participant. The results indicated that videos which have been never seen before scored slightly higher on (M = 2,43) surprise compared to videos that have been seen before (M = 2,37). Nevertheless, no significant difference was found between videos that have been seen before and videos that have been seen before.

4.4 Sharing behavior of male and females

The fourth hypothesis stated that videos are more often shared by males compared to females.

To investigate the differences in gender and sharing behavior an independent-samples t-test was conducted. The scores on sharing behavior showed that there was a significant difference on the scores of video 3, 6, 7 and 8 between the male and female condition, as shown in Table 4. The topics of the videos that differ significantly were: guy in the fitness gym, stick flying through car window, speedboat crash and girl with leaf blower on desk chair.

Table 4. Sharing behavior per video per gender

Video	Gender	Mean	Std. Deviation
1	male	1.95	1.00
	female	1.67	0.97
2	male	1.55	0.80
	female	1.44	0.71
3	male	3.05**	1.21
	female	1.72	1.07
4	male	1.36	0.80
	female	1.11	0.47
5	male	1.36	0.58
	female	1.11	0.51
6	male	2.86***	1.25
	female	1.44	0.78
7	male	2.95**	1.13
	female	1.83	1.20
8	male	1.91*	1.19
	female	1.22	0.55
9	male	2.64	0.95
	female	2.44	1.25
10	male	1.05	0.21
	female	1.00	0

*Note. * p <.05; ** p < .01; *** p < .001;*

4.5 Facial expressions measured with CERT

This part provides a comprehensive description of facial expressions that were measured with CERT. The following emotions have been analyzed: anger, contempt, disgust, fear, joy, sad, neutral and surprise. Appendix F contains a list of all the labels of variables that were measured by CERT.

4.5.1 Anger

Table 5 presents the emotion of Anger measured by CERT. The results show that no significant differences were found between the spoiled and unspoiled conditions. The highest score on anger (M = 0.31, SD = 0.05) was found in the unspoiled group on video 8, which displayed a girl with a leaf blower on a desk chair. However, the differences on fear per video were relatively small.

Table 5. Scores on Anger measured by CERT

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	0.28	0.09
		Unspoiled	0.26	0.05
2	No	Spoiled	0.22	0.06
		Unspoiled	0.24	0.06
3	Yes	Spoiled	0.28	0.08
		Unspoiled	0.26	0.09
4	No	Spoiled	0.21	0.09
		Unspoiled	0.24	0.06
5	No	Spoiled	0.18	0.07
		Unspoiled	0.23	0.06
6	Yes	Spoiled	0.19	0.06
		Unspoiled	0.19	0.05
7	Yes	Spoiled	0.25	0.08
		Unspoiled	0.27	0.06
8	No	Spoiled	0.20	0.10
		Unspoiled	0.31	0.05
9	Yes	Spoiled	0.20	0.07
		Unspoiled	0.30	0.12
10	No	Spoiled	0.21	0.11
		Unspoiled	0.25	0.08

4.5.2 Contempt

The results of Contempt are shown in Table 6. The scores indicate that relatively low levels of contempt were elicited. The highest level of contempt was found in the spoiled group on video 9 (M = 0.07, SD = 0.02), which displayed two girls miming a song. Nevertheless, no significant differences were found in the scores of contempt.

Table 6. Scores on Contempt measured by CERT

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	0.03	0.01
		Unspoiled	0.02	0.01
2	No	Spoiled	0.04	0.01
		Unspoiled	0.01	0.01
3	Yes	Spoiled	0.04	0.01
		Unspoiled	0.02	0.01
4	No	Spoiled	0.03	0.01
		Unspoiled	0.02	0.01
5	No	Spoiled	0.06	0.02
		Unspoiled	0.02	0.01
6	Yes	Spoiled	0.06	0.02
		Unspoiled	0.01	0.01
7	Yes	Spoiled	0.03	0.02
		Unspoiled	0.03	0.03
8	No	Spoiled	0.02	0.02
		Unspoiled	0.02	0.01
9	Yes	Spoiled	0.07	0.02
		Unspoiled	0.02	0.02
10	No	Spoiled	0.04	0.02
		Unspoiled	0.01	0

4.5.3 Disgust

As table 7 shows, disgust was the emotion which was elicited less. The highest scores of disgust were all analyzed in the unspoiled groups for the scores on video 3 (M = 0.03, SD = 0.02), video 7 (M = 0.03, SD = 0.03) and video 8 (M = 0.03, SD = 0.01). The topics displayed in these videos were: boy in the fitness gym, speedboat crash and girl with leaf blower on desk chair. Further, no significant differences were found in the scores on disgust.

Table 7. Scores on Disgust measured by CERT

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	0.01	0.01
		Unspoiled	0.01	0.01
2	No	Spoiled	0.01	0.01
		Unspoiled	0.02	0.02
3	Yes	Spoiled	0.01	0.01
		Unspoiled	0.03	0.02
4	No	Spoiled	0.01	0.01
		Unspoiled	0.02	0.01
5	No	Spoiled	0.01	0.01
		Unspoiled	0.01	0
6	Yes	Spoiled	0.01	0.01
		Unspoiled	0.02	0.03
7	Yes	Spoiled	0.01	0.01
		Unspoiled	0.03	0.03
8	No	Spoiled	0.02	0.02
		Unspoiled	0.03	0.01
9	Yes	Spoiled	0.02	0.01
		Unspoiled	0.02	0.02
10	No	Spoiled	0.01	0.01
		Unspoiled	0.01	0.01

4.5.4 Fear

Table 8 shows the results of the scores on fear measured by CERT. The results show a significant difference between the spoiled and unspoiled group on video 4 and 8. The first significant difference was found on video 4 in the scores for the spoiled group (M = 0.16, SD = 0.09) and the unspoiled group (M = 0.01, SD = 0.01); t(38) = 2,40, p =.02. Next, the second significant difference was found on video 8 for the spoiled group (M = 0.24, SD = 0.09) and the unspoiled group (M = 0.05, SD = 0.02); t(38) = 2,43, p =.02. These videos displayed a scooter wheely and a girl with a leaf blower on a desk chair. In addition, the highest score on fear (M = 0.24, SD = 0.09) was found on video 8 in the spoiled group. The results of the other videos did not significantly differ.

Table 8. Scores on Fear measured by CERT

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	0.12	0.06
		Unspoiled	0.02	0.01
2	No	Spoiled	0.02	0.01
		Unspoiled	0.03	0.02
3	Yes	Spoiled	0.08	0.05
		Unspoiled	0.13	0.07
4	No	Spoiled	0.16*	0.09
		Unspoiled	0.01	0.01
5	No	Spoiled	0.02	0.01
		Unspoiled	0.01	0.01
6	Yes	Spoiled	0.01	0.02
		Unspoiled	0.09	0.07
7	Yes	Spoiled	0.11	0.06
		Unspoiled	0.13	0.05
8	No	Spoiled	0.24*	0.09
		Unspoiled	0.05	0.02
9	Yes	Spoiled	0.15	0.08
		Unspoiled	0.18	0.14
10	No	Spoiled	0.19	0.17
		Unspoiled	0.11	0.08

*Note. * p <.05*

4.5.5 Joy

One significant difference was found in the scores on joy, as shown in Table 9. This result was found on video 9 for the spoiled group (M = 0.12, SD = 0.06) and the unspoiled group (M = 0.05, SD = 0.04); t(38) = 2,39, p =.02. Further, the highest score on joy was analyzed on video 5 in the unspoiled group (M = 0.15, SD = 0.09). In this video two people took off with a para-engine.

Table 9. Scores on Joy measured by CERT

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	0.11	0.06
		Unspoiled	0.06	0.03
2	No	Spoiled	0.10	0.05
		Unspoiled	0.12	0.03
3	Yes	Spoiled	0.10	0.06
		Unspoiled	0.10	0.03
4	No	Spoiled	0.11	0.05
		Unspoiled	0.11	0.04
5	No	Spoiled	0.09	0.04
		Unspoiled	0.15	0.03
6	Yes	Spoiled	0.09	0.04
		Unspoiled	0.12	0.06
7	Yes	Spoiled	0.11	0.07
		Unspoiled	0.10	0.04
8	No	Spoiled	0.13	0.05
		Unspoiled	0.11	0.03
9	Yes	Spoiled	0.12*	0.06
		Unspoiled	0.05	0.04
10	No	Spoiled	0.09	0.05
		Unspoiled	0.13	0.05

*Note. * p <.05*

4.5.6 Sadness

The results on sadness were relatively low, as shown in Table 10. No significant differences were found in the results of all videos. The highest level of sadness was analyzed in the unspoiled group on video 6 (M = 0.10, SD = 0.04). In this video a wooden stick flies into a car window.

Table 10. Scores on Sadness measured by CERT

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	0.01	0.02
		Unspoiled	0.04	0.01
2	No	Spoiled	0.01	0.01
		Unspoiled	0.02	0.01
3	Yes	Spoiled	0.01	0
		Unspoiled	0.04	0.03
4	No	Spoiled	0.02	0.01
		Unspoiled	0.03	0.01
5	No	Spoiled	0.01	0.01
		Unspoiled	0.03	0.01
6	Yes	Spoiled	0.02	0.02
		Unspoiled	0.10	0.04
7	Yes	Spoiled	0.01	0.01
		Unspoiled	0.07	0.04
8	No	Spoiled	0.02	0.02
		Unspoiled	0.06	0.02
9	Yes	Spoiled	0.01	0.01
		Unspoiled	0.05	0.02
10	No	Spoiled	0.01	0.01
		Unspoiled	0.03	0.01

4.5.7 Neutral

Table 11 shows that no significant differences were found in all videos. Further, the highest scores on neutral emotions were found analyzed in the spoiled group on video 1 (M = 0.10, SD = 0.04) and the unspoiled group of video 4 (M = 0.10, SD = 0.04) and video 5 (M = 0.10, SD = 0.04). These videos display a video reporter, scooter wheely and two people with a para-engine.

Table 11. Scores on Neutral measured by CERT

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	0.13	0.07
		Unspoiled	0.11	0.03
2	No	Spoiled	0.11	0.04
		Unspoiled	0.06	0.03
3	Yes	Spoiled	0.09	0.04
		Unspoiled	0.08	0.03
4	No	Spoiled	0.09	0.04
		Unspoiled	0.13	0.03
5	No	Spoiled	0.10	0.03
		Unspoiled	0.13	0.06
6	Yes	Spoiled	0.13	0.06
		Unspoiled	0.06	0.04
7	Yes	Spoiled	0.11	0.05
		Unspoiled	0.07	0.02
8	No	Spoiled	0.06	0.03
		Unspoiled	0.11	0.06
9	Yes	Spoiled	0.10	0.06
		Unspoiled	0.08	0.03
10	No	Spoiled	0.07	0.04
		Unspoiled	0.11	0.04

4.5.8 Surprise

As figure 9 shows the overall difference in the scores on surprise per group were quite small. This indicates the spoiler received by the spoiled group did not have a large effect on the scores between the spoiled and unspoiled group. Although, one significant difference has been found in the scores on video 6 for the spoiled group (M = 0.50, SD = 0.23) and the unspoiled group (M = 0.34, SD = 0.19); $t(38) = 2.31$, $p = .03$. In addition, the highest overall scores of surprise were also found in the scores of the spoiled group on video 6 (M = 0.50, SD = 0.23). In this video a wooden stick flies into a car window.

Furthermore, it appeared that many participants also scored high on surprise during videos that did not contain a surprise in the video, as Table 12 shows. The scores of video 2 and 5 which did not contain a surprise were relatively high compared to video 7 and 8 which contained a surprise. After the experiment the participants were able to write down feedback in a comment box. Some participants expected or anticipated on the neutral videos as on the videos that contained a surprise. Therefore, they explained to be surprised that the neutral videos did not contain a surprising element. They explained that the videos without surprise reminded them of other videos they have seen in the past with similar situations that went wrong.

Figure 9. Scores on surprise per group measured with CERT

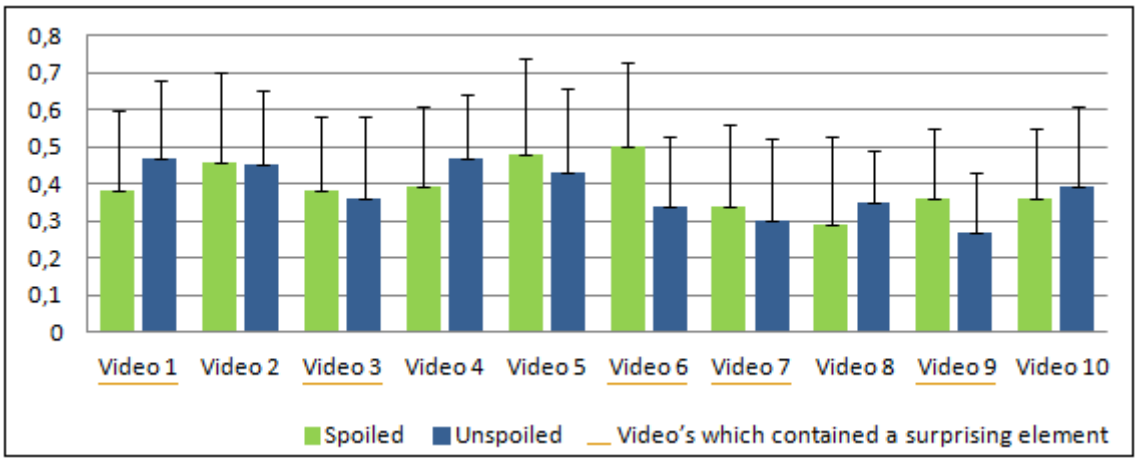


Table 12. Scores on surprise per group measured with CERT

Video	Surprise in video	Group	Mean	Std. Deviation
1	Yes	Spoiled	0.38	0.22
		Unspoiled	0.47	0.21
2	No	Spoiled	0.46	0.24
		Unspoiled	0.45	0.20
3	Yes	Spoiled	0.38	0.20
		Unspoiled	0.36	0.22
4	No	Spoiled	0.39	0.22
		Unspoiled	0.47	0.17
5	No	Spoiled	0.48	0.26
		Unspoiled	0.43	0.23
6	Yes	Spoiled	0.50*	0.23
		Unspoiled	0.34	0.19
7	Yes	Spoiled	0.34	0.22
		Unspoiled	0.30	0.22
8	No	Spoiled	0.29	0.24
		Unspoiled	0.35	0.14
9	Yes	Spoiled	0.36	0.19
		Unspoiled	0.27	0.16
10	No	Spoiled	0.36	0.19
		Unspoiled	0.39	0.22

*Note. * p <.05;*

4.6 Using automatic facial recognition software to measure the emotional response to videos

Our fifth hypothesis assumed that emotions measured with automatic facial expression recognition software correlate with the outcomes of the emotions experienced by the participants. The Spearman's rho correlation was used to investigate the relationship between the results measured with CERT and the results of the questionnaire.

The Spearman's rho revealed no statistical significance between the results on surprise in the spoiled group of the questionnaire and CERT, $r_s(10)$, = -.498, p >.05. Furthermore, the Spearman's rho indicated that the results of surprise in the unspoiled group of the questionnaire and CERT were also unrelated, $r_s(10)$, = -.473, p >.05. Nevertheless, the results of both conditions show a negative correlation, when one score increases as the other decreases. When the scores in the questionnaire increase the scores in CERT will decrease and contrariwise.

Chapter 5: Discussion

In this chapter the results of the previous chapter will be discussed. Further, the answers to the research question will be discussed. Finally, the implications of the findings will be discussed and points of improvement will be described for future research.

5.1 Discussing hypothesis

The goal of this study was to investigate how the element of surprise influences the emotional response to viral videos. The first hypothesis assumed that videos which contained the element of surprise elicit more emotional response. Results of the questionnaire confirmed our hypothesis largely. The results revealed a significant difference between the spoiled and unspoiled group on all videos that contained the element of surprise, except for video 7. In addition, the unspoiled group experienced higher levels of surprise.

Our second hypothesis assumed that videos containing the element of surprise are more likely to be shared. In line with our assumption, the results showed that videos containing the element of surprise were more likely to be shared by participants compared to the videos that did not contain the element of surprise.

The third hypothesis investigated whether videos that have never been seen before scored higher on surprise. The results of the questionnaire did not confirm our assumption. Videos which have never been seen before scored slightly higher on surprise in compared to videos that have been seen before. In addition, no significant results were found between both groups. Some participants argued that despite they had seen the video before they were still surprised by the video. Several participants shared this opinion, especially for video 8, which was about a speedboat crash.

Fourthly, we assumed that viral videos are more often shared by males in comparison to females. Similar to our expectations males scored higher on sharing in all conditions for each video. In addition, there was found a significant difference on video 3, 6, 7 and 8. The topics in the videos that significantly differed were: guy in the fitness gym, stick flying through car window, speedboat crash and girl with leaf blower on desk chair. The topics might influence these significant results, since men are generally more attracted to videos that contain sports, cars and gadgets. It seems that these topics were more likely to attract males and therefore better fitted their interest, thus more likely to be shared.

Finally, the last hypothesis stated that emotions measured with automatic facial expression recognition software would correlate with the results on surprise of the questionnaire. The Spearman's rho correlation did not show a significant difference, thus our last hypothesis is not confirmed. The results analyzed with CERT showed a moderate negative correlation between the spoiled and unspoiled group. It appeared that when the scores on the questionnaire increase the scores in CERT will decrease and contrariwise. This result reflects on both the spoiled and unspoiled group. It is possible that participants in the spoiled group revealed more facial expressions of surprise because

they were more focused on the surprising element that they were going to view. The participants were probably unaware of the fact that they slightly exaggerated the element of surprise. Another possible explanation might be the method used in this experiment. The values of the CERT output were transformed into a mean score. It is possible that analyzing the minimum or maximum scores on surprise reveal different outcomes. Furthermore, the CERT output was normalized and divided in tables, including value labels. This process helped to avoid redundancies and inconsistencies.

Furthermore, the emotions: anger, contempt, disgust, fear, joy, sad, neutral and surprise were analyzed in CERT. It appeared that the highest scores on emotions were found in the scores on surprise. This result indicates that the selected videos elicited the emotion of surprise. Anger was the second most elicited emotion. This result is conspicuous because most of the selected videos did not elicited anger. During the measurements with CERT it seemed that in many cases the software processed neutral facial expressions as anger. This might explain the high scores on anger.

Finally, three significant results were found. The first significant difference was found on fear for video 4 and video 8. It seemed that the spoiled group experienced higher levels of fear during these videos. The topics of these videos were a scooter wheely and a girl with leaf blower on a desk chair. Despite the fact that the participants were spoiled they seem to express high levels of fear. A possible explanation might be that the acts in these videos were quite dangerous in comparison to the rest of the videos. Next, one significant difference was found in the scores on joy for video 9. The spoiled group scored significantly higher on joy compared to the unspoiled group. In video 9 two girls were miming a song. The last significant difference was found in the scores on surprise for video 6. The spoiled group scored significantly higher. The topic of this video was a wooden stick that flies into a car window. We possibly think that the spoiled group scored higher on joy for video 9 and on surprise for video 9 because the participants exaggerated the elicited emotion. In this case it was easier for CERT to recognize the elicited emotion.

5.2 Theoretical and practical implications

In total there were 40 participants. Each of them watched 10 videos, thus in total there were 400 observations to analyze. This study was an exploring research study in the field of viral videos and the element of surprise. Future research should conduct an experiment with a larger group of participants to increase the validity and to find more significant differences between groups. The research of Derbaix & Vanhamme (2003) showed that online referral behavior is strongly influenced by the element of surprise. Our study showed that videos containing the element of surprise are most likely to be shared; these results are in line with the results of Derbaix & Vanhamme (2003). Therefore, marketers and managers should take notion of these results to improve the chance to create a successful viral video. Further, they should carefully think about their target group and topics that addresses them. Our study showed that topics influence the sharing behavior between males and females.

5.3 Future Research

The findings of the study indicated that there was a contrast between the results on surprise for the questionnaire and the measure with CERT. It seemed that the topic of the videos affected the likeliness to share a video. To get a better understanding of the influences of topics it would be recommended to conduct research into a specific topic or categories of videos. In order to gain more knowledge about the influence of videos that have been seen before it is recommended to create equally divided groups of participants that have been seen the video before and participants who did not. Next, in our study we told the participants that the webcam was running during the experiment. All of them agreed that the video captures were used for analyzing the data. It is possible that the notion of the webcam captures influenced the facial expressions of the participants during the experiment. It might be a solution for the following studies to ask permission about the webcam captures afterwards. Finally, this research analyzed the basic emotions measured with CERT. In the future it would be interesting to also take into account specific facial action units, which can also be measured with CERT. According to Ekman & Friesen (1975) the emotion of surprise is a very short lived emotion. Therefore it is possible that analyzing certain facial action units reveal more specific information.

Chapter 6: Conclusion

The social media landscape is constantly changing, and becomes more and more integrated in the marketing and communication strategies of many businesses. Creating a viral video is in most cases more affordable in comparison to a traditional television advertisement. In addition, marketers tend to see credibility of viral videos as an advantage. Further, when a viral video seems to be successful it is capable of reaching a large group of people within a short amount of time. In addition, sharing behavior is strongly influenced by the emotion of surprise. This study is the first to demonstrate the relation between the emotion of surprise and viral videos.

The research question of this study was: *how does the element of surprise influence the emotional response to viral videos?* Our results indicated that viral videos containing the element of surprise are more likely to elicit higher levels of emotional response. Next, we conclude that videos are more likely to be shared if they contain the element of surprise. Further, no significant difference was found in the scores between videos that have been seen before and videos that have never been seen before. This indicates that a video which has been seen before, is still capable of evoking a high level of surprise. This might be the reason why some successful viral videos remain popular over time and watched over and over by people because they anticipate on the video. When people recognize a certain video and experienced it as positive, it is very likely that they anticipate on the video and look forward to see the activity again. Furthermore, the results on gender and sharing behavior revealed that males are more likely to share videos compared to females. Results of the CERT analysis indicate that a moderate negative correlation was found between the scores of the questionnaire and CERT. Therefore, the results of CERT did not correlate with the emotions experienced by the participants. More research is needed to create a better understanding in the use of facial automatic recognition for measuring emotional responses.

Nevertheless, we can argue that this study showed that the emotion of surprise is of important influence and increases the chance for a video to go viral on the internet. Therefore, in order for business to create a successful viral video, the element of surprise should be included as one of the key ingredients.

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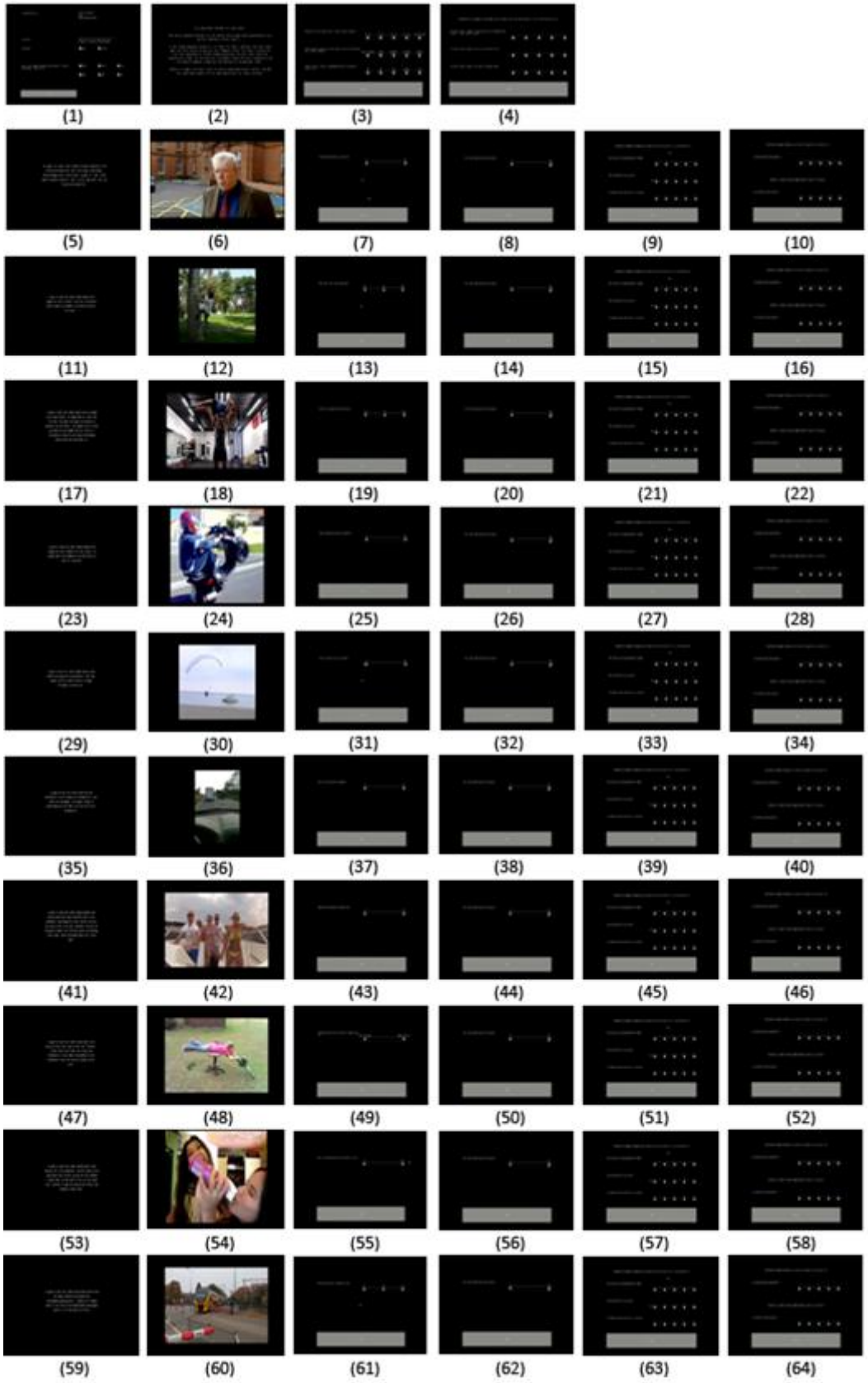
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Appendix A:

Screenshots experiment spoiled group, subgroup 1 (included spoiler). The experiment of subgroup 2 was identical the same except for the sequence of the videos. The sequence of all videos was reversed. In subgroup 2 figure A.60 showed up as the first video and figure A.6 was shown last, and so on.



Appendix B:

The verbatim instructions of the experiment shown in Appendix A. These instructions were used for the spoiled group, subgroup 1. The instructions for the spoiled group, subgroup 2 were identical the same, except the fact that the description from Appendix figure A.5 till Appendix figure A.64 was reversed, because the videos appeared in the opposite sequence.

Appendix A figure 1.
Proefpersoonnummer (In te vullen door de experimentleider)
Klik hier om je leeftijd in te vullen en sluit af met enter
Geslacht (Man, vrouw)
Wat is je hoogst genoten opleiding? (MAVO, HAVO, VWO, MBO, HBO, WO)
Number of participant (Experiment leader has to fill in this number)
Click here to fill in your age and continu pressing enter
Gender (Male, female)
What is your highest level of education? (Lower General Secondary Education, Higher General Secondary Education, Pre-University Education, Vocational Education, University of Applied Sciences of College, University)

Appendix A figure 2.
Dit experiment bestaat uit twee delen:Het eerste gedeelte bestaat uit een aantal basisvragen welke gerelateerd zijn aan het onderwerp online video's. In het tweede gedeelte worden er in totaal 10 video's getoond. Aan elke video gaat een korte beschrijving over het fragment vooraf. De video's worden één voor één afgespeeld en worden eenmalig getoond. Na elke video volgt één inhoudelijke vraag, let dus goed op! Vervolgens volgt een korte vragenlijst met een aantal algemene vragen met betrekking tot de getoonde video. Indien er vragen zijn kunt u deze nu aan de experimentleider stellen.
This experiment consists of two parts: The first part contains several basic questions realted to online videos.
In the second part there will be shown 10 videos. There will be a short description about the videos before each one. De videos will be played one by one and will be shown only once. After each video there will be one content related question, so look carefully! Next, there will follow a short questionairre with general questions related to the displayed video. If anything is not clear, you can aks the experiment leader right now.

Appendix A figure 3.
Hoeveel uur per week kijk je naar online video's? (0-4, 4-8, 8-12, 12-16, 16-40 uur)
Welke websites gebruik je het meest voor het bekijken voor online video's? (Daily motion, Vimeo, Dumpert, Youtube, anders)
Online video's deel ik gemiddeld een of meerdere keren per (uur, dag, week, maand, jaar)
How many hours per week do you spend watching online videos? (0-4, 4-8, 8-12, 12-16, 16-40 hours)
Which of the following websites do you use most of the time to watch online videos? (Daily motion, Vimeo, Dumpert, Youtube, other)
I share online videos every (our, day, week, month, year)

Appendix A figure 4.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Ik deel video's omdat ik denk dat mijn vrienden deze leuk zullen vinden (1,2,3,4,5)
Ik deel alleen video's die ik interessant vind (1,2,3,4,5)
Ik deel alleen video's die mijn vrienden delen (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I share videos because I think my friends will also like them (1,2,3,4,5)
I only share videos that I think are interesting (1,2,3,4,5)
I only share videos which are shared by my friends (1,2,3,4,5)

Appendix A figure 5.
Je gaat nu naar een video kijken waarbij een televisiereporter een verslag uitbrengt. Halverwege het interview vliegt er een rond dwarrelende plastic zak in het gezicht van de televisiereporter.
You are going to watch a video were you will see a television reporter. Halfway the reporter got interrupted by a plastic bag flying in his face.

Appendix A figure 6.
Video 1 - (video met een surprise effect)
Video 1 - (video with surprising effect)

Appendix A figure 7.
Had de televisiereporter een bril op? (Ja, nee)
Was the television reporter wearing glasses? (Yes, no)

Appendix A figure 8.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

Appendix A figure 9.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 10.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 11.
Je gaat nu naar een video kijken waarbij een jongen een stunt uithaalt. Hij rent richting de boom en maakt vervolgens via de boom succesvol een salto.
You are going to see a boy doing a stunt. He will run towards the three and succesfully do a frontflip via the three.

Appendix A figure 12.
Video 2 - (video zonder surprise effect)
Video 2 - (video without surprise effect)

Appendix A figure 13.
Welke kleur t-shirt had de jongen aan? (Geel, wit, zwart)
What was the color of the shirt the boy was wearing? (Yellow, white, black)

Appendix A figure 14.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

Appendix A figure 15.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 16.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 17.
Je gaat nu naar een video kijken van een jongen in de sportschool. De jongen bukt en reikt naar de vloer. Hij pakt vervolgens een meisje op inplaats van een halter. Vervolgens tilt hij haar op alsof hij een halter aan het liften is. Uiteindelijk laat hij het meisje hardhandig vallen alsof het een halter is.
You are going to see a boy in the fitness gym. It seems like the boy will pickup a dumb-bell, in contrast, he picks up a girl like you lift a dumb-bell. Then he will lift the girl above his head and drops her like she is a dumb-bell.

Appendix A figure 18.
Video 3 - (video zonder surprise effect)
Video 3- (video without surprising effect)

Appendix A figure 19.
Welke kleur schoenen had het meisje aan? (Rood, wit, blauw)
Which color were the girls shoes? (Red, white, blue)

Appendix A figure 20.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

Appendix A figure 21.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 22.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 23.
Je gaat nu naar een video kijken waarbij een jongen een stunt uithaalt op zijn scooter. De jongen maakt een wheely op zijn achterwiel en doet dit succesvol.
You are going to view a boy doing a stunt with his bike. The boy will succesfully perform a wheely on the back wheel of his bike.

Appendix A figure 24.
Video 4 - (video zonder surprise effect)
Video 4 - (video without surprising effect)

Appendix A figure 25.
Had de jongen op de scooter een helm op? (Ja, nee)
Was the boy wearing a helmet? (Yes, no)

Appendix A figure 26.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

Appendix A figure 27.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 28.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 29.
Je gaat nu naar een video kijken waarbij twee mensen opstijgen met een paramotor. Deze twee mensen starten op een strand en stijgen vervolgens op boven zee.
You are going to see a video were two people take off with a para-engine. The two people will start off on the beach and will fly away above the sea.

Appendix A figure 30.
Video 5 - (video zonder surprise effect)
Video 5 - (video without surprising effect)

Appendix A figure 31.
Was er een boot te zien in de video? (Ja, nee)
Was there a boat in the video? (Yes, no)

Appendix A figure 32.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

Appendix A figure 33.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 34.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 35.
Je gaat nu naar een video kijken van een automobilist op de snelweg. De automobilist rijdt achter een aanhanger. Vervolgens vliegt er plotseling een stuk hout in de voorruit van de automobilist.
You are going to see a dashcam of a car driver. The car driver is driving behind another car. Then suddenly there will fly a wooden stick through his car window.

Appendix A figure 36.
Video 6 - (video met surprise effect)
Video 6 - (video with surprising effect)

Appendix A figure 37.
Reed er een auto naast de aanhanger? (Ja, nee)
Was there a truck driving next to the car?

Appendix A figure 38.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

Appendix A figure 39.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 40.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 41.
Je gaat nu naar een video kijken waarbij een groep mensen met hoge snelheid varen in een speedboot. Halverwege de video stuitert de boot een aantal keer op en neer. Hierdoor verliest de stuurman de macht over de boot waarna een heftige crash volgt. Alle inzittende maken een flinke klap.
You are going to view a group of people standing in a boat that moves very fast. Halfway the movie the steersman loses control and a heavy boat crash will follow. Everyone in the boat falls down.

Appendix A figure 42.
Video 7 - (video met surprise effect)
Video 7 - (video with surprising effect)

Appendix A figure 43.
Hadden alle inzittende een zonnebril op? (Ja, nee)
Did everyone wear a pair of sunglasses? (Yes, no)

Appendix A figure 44.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)
Appendix A figure 45.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 46.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 47.
Je gaat nu naar een video kijken waarin een meisje op een stoel ligt en een stunt uithaalt. Tijdens deze stunt heeft het meisje een bladblazer in haar hand. Doormiddel van de bladblazer draait het meisje rondjes op een stoel.
You are goint to view a girl lying on a chair doing a stunt. During this stunt the girl is holding a leaf blower. She uses the leaf blower while lying on the chair turning circles.

Appendix A figure 48.
Video 8 - (video zonder surprise effect)
Video 8 - (without surprising effect)

Appendix A figure 49.
Draaide het meisje met de klok mee of tegen de klok in? (Met de klok mee, tegen de klok in)
Was the girl turning circles clockwise or counterclockwise? (Clockwise, counterclockwise)

Appendix A figure 50.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

Appendix A figure 51.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 52.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 53.
Je gaat nu naar een video kijken waarin twee meisjes een lied playbacken. Aan het einde van de video heeft het rechter meisje een fles shampoo in haar hand. De dop van de fles zit niet goed vast. Hierdoor krijgt het meisje een flinke slok shampoo in haar mond.
You are going to see two girls miming a song. The girl on the right side will use the bottle of shampoo like a microphone. The shampoo cup was loose, so suddenly it goes wrong and the girl gets a huge splash of shampoo in her mouth.

Appendix A figure 54.
Video 9 - (video met surprise effect)
Video 9 - (video with surprising effect)

Appendix A figure 55.
Was er een derde persoon op de achtergrond te zien? (Ja, nee)
Did you see a third person in the background? (Yes, no)

Appendix A figure 56.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

Appendix A figure 57.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 58.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 59.
Je gaat nu naar een video kijken waarin een trein met hoge snelheid een gevaarlijke spoorwegovergang passeert. Tijdens dit filmpje komt er een trein van de Nederlandse Spoorwegen voorbij. De trein komt van rechts.
You are going to see a train passing a dangerous crossing. During the video there will pass by a train of the Dutch railways approaching from the right side.

Appendix A figure 60.
Video 10 - (video zonder surprise effect)
Video 10 - (video withou surprising effect)

Appendix A figure 61.
Hoeveel personen zag je tijdens de video? (Een, twee, drie)
How many people did you see in the video? (One, two , three)

Appendix A figure 62.
Heb je deze video weleens eerder gezien? (Ja, nee)
Have you seen this video before? (Yes, no)

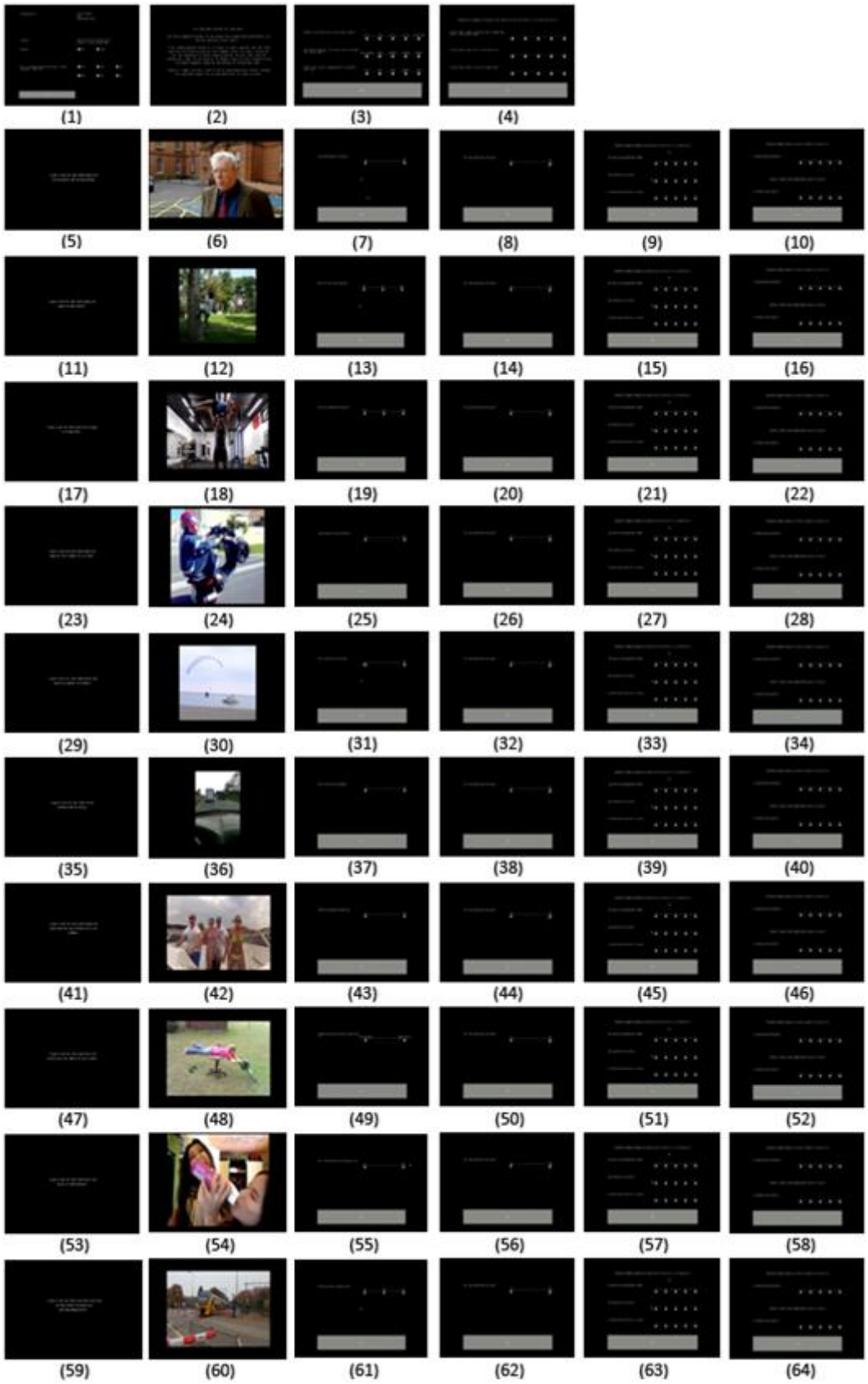
Appendix A figure 63.
Beoordeel de volgende stellingen op een schaal van sterk mee oneens (1) tot sterk mee eens (5)
Deze video zou ik graag delen met vrienden (1,2,3,4,5)
Deze video heeft mij erg verrast (1,2,3,4,5)
De inhoud van deze video vond ik interessant (1,2,3,4,5)
Rate the following statements on a scale from strongly disagree (1) to strongly agree (5)
I would like to share this video with my friends (1,2,3,4,5)
I was surprised by this video (1,2,3,4,5)
The content of the video was interesting to me (1,2,3,4,5)

Appendix A figure 64.
Beoordeel de volgende stelling op een schaal van negatief (1) tot positief (5)
Het gevoel dat deze video opwekt is (1,2,3,4,5)
Beoordeel de volgende stelling op een schaal van laag (1) tot hoog (5)
De intensiteit van het gevoel is (1,2,3,4,5)
Rate the following statements on a scale from negative (1) to positive (5)
The feeling that this video elicit is (1,2,3,4,5)
Rate the following statements on a scale from low (1) to high (5)
The intensity of the feeling is (1,2,3,4,5)

Appendix A figure 65.
Bedankt voor deelname
Thank you for participating in this experiment

Appendix C:

Screenshots experiment for the unspoiled group, subgroup 1 (did not receive a spoiler). The experiment of subgroup 2 was identical the same except for the sequence of the videos. In subgroup 2 figure D.60 showed up as the first video and figure D.6 was shown last, and so on.



Appendix D:

The verbatim instructions for the unspoiled group (subgroup 1 and 2) were identically the same as described in Appendix B, except that the instructions on the ten slides before each video did not contain a spoiler. Therefore, the instructions in experiment 1 were different for the following ten slides in Appendix C, figure: 5, 11, 17,23, 29, 35, 41, 47, 53, 59. The content that was different is described underneath.

Appendix C figure 5.
Je gaat nu naar een video kijken waarbij een televisiereporter een verslag uitbrengt.
You are going to watch a video were you will see a television reporter.

Appendix C figure 11.
Je gaat nu naar een video kijken waarbij een jongen een stunt uithaalt.
You are going to see a boy doing a stunt.

Appendix C figure 17.
Je gaat nu naar een video kijken van een jongen in de sportschool.
You are going to see a boy in the fitness gym.

Appendix C figure 23.
Je gaat nu naar een video kijken waarbij een jongen een stunt uithaalt op zijn scooter.
You are going to view a boy doing a stunt with his bike.

Appendix C figure 29.
Je gaat nu naar een video kijken waarbij twee mensen opstijgen met een paramotor.
You are going to see a video were two people take off with a para-engine.

Appendix C figure 35.
Je gaat nu naar een video kijken van een automobilist op de snelweg.
You are going to see a dashcam of a car driver.

Appendix C figure 41.
Je gaat nu naar een video kijken waarbij een groep mensen met hoge snelheid varen in een speedboot.
You are going to view a group of people standing in a boat that moves very fast.

Appendix C figure 47.
Je gaat nu naar een video kijken waarin een meisje op een stoel ligt en een stunt uithaalt.
You are goint to view a girl lying on a chair doing a stunt.

Appendix C figure 53.
Je gaat nu naar een video kijken waarin twee meisjes een lied playbacken.
You are going to see two girls playbacking a song.

Appendix C figure 59.
Je gaat nu naar een video kijken waarin een trein met hoge snelheid een gevaarlijke spoorwegovergang passeert.
You are going to see a train passing a dangerous crossing.

Note: The instructions for the unspoiled group, subgroup 2 were identical the same as described in Appendix B, except the fact that the description from Appendix figure C.5 till Appendix figure C.64 was reversed, because the videos appeared in the opposite sequence. Further, the descriptions before each video were changed, like described.

Appendix E:

Instructions:
You are going to view ten videos, please indicate whether you were surprised by the video or not.



Video 1: Television reporter
The content in this video surprised me
Yes / No



Video 2: Frontflip tree
The content in this video surprised me
Yes / No



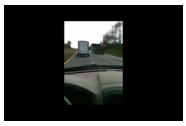
Video 3: Boy in fitness gym
The content in this video surprised me
Yes / No



Video 4: Scooter wheely
The content in this video surprised me
Yes / No



Video 5: Two people using a para-engine to take off
The content in this video surprised me
Yes / No



Video 6: Wooden stick flies into car window
The content in this video surprised me
Yes / No



Video 7: Speedboat crash
The content in this video surprised me
Yes / No



Video 8 Video 8: Girl performing stunt with leaf blower
The content in this video surprised me
Yes / No



Video 9: Girls miming a song
The content in this video surprised me
Yes / No



Video 10: Train passing a dangerous crossing
The content in this video surprised me
Yes / No

Results:

	Video 1	Video 2	Video 3	Video 4	Video 5	Video 6	Video 7	Video 8	Video 9	Video 10
Participant 1	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No
Participant 2	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No
Participant 3	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No

Appendix F

Overview CERT measurement

Column	CERT measurement
1	Mouth Imp X
2	Mouth Imp Y
3	Left Eye Imp X
4	Left Eye Imp Y
5	Right Eye Imp X
6	Right Eye Imp Y
7	Mouth Left Corner Imp X
8	Mouth Left Corner Imp Y
9	Right Eye Nasal Imp X
10	Right Eye Nasal Imp Y
11	Mouth Right Corner Imp X
12	Mouth Right Corner Imp Y
13	Right Eye Temporal Imp X
14	Right Eye Temporal Imp Y
15	Left Eye Temporal Imp X
16	Left Eye Temporal Imp Y
17	Left Eye Nasal Imp X
18	Left Eye Nasal Imp Y
19	Nose Imp X
20	Nose Imp Y
21	Left Eye X
22	Left Eye Y
23	Left Eye: Nasal X
24	Left Eye: Nasal Y
25	Left Eye: Temporal X
26	Left Eye: Temporal Y
27	Mouth X
28	Mouth Y
29	Mouth Left Corner X
30	Mouth Left Corner Y
31	Mouth Right Corner X
32	Mouth Right Corner Y
33	Nose X
34	Nose Y
35	Right Eye X
36	Right Eye Y
37	Right Eye: Nasal X
38	Right Eye: Nasal Y
39	Right Eye: Temporal X
40	Right Eye: Temporal Y
41	(AU 1) Inner Brow Raise
42	(AU 2) Outer Brow Raise
43	(AU 4) Brow Lower
44	(AU 5) Eye Widen

Column	CERT measurement
45	(AU 9) Nose Wrinkle
46	(AU 10) Lip Raise
47	(AU 12) Lip Corner Pull
48	(AU 14) Dimpler
49	(AU 15) Lip Corner Depressor
50	(AU 17) Chin Raise
51	(AU 20) Lip stretch
52	(AU 6) Cheek Raise
53	(AU 7) Lids Tight
54	(AU 18) Lip Pucker
55	(AU 23) Lip Tightener
56	(AU 24) Lip Presser
57	(AU 25) Lips Part
58	(AU 26) Jaw Drop
59	(AU 28) Lips Suck
60	(AU 45) Blink/Eye Closure
61	Fear Brow (1+2+4)
62	Distress Brow (1, 1+4)
63	AU 10 Left
64	AU 12 Left
65	AU 14 Left
66	AU 10 Right
67	AU 12 Right
68	AU 14 Right
69	Gender
70	Glasses
71	Yaw
72	Pitch
73	Roll
74	Smile Detector
75	Anger (v3)
76	Contempt (v3)
77	Disgust (v3)
78	Fear (v3)
79	Joy (v3)
80	Sad (v3)
81	Surprise (v3)
82	Neutral (v3)