SOUND IN DIFFERENT ENVIRONMENTS

SOUND LEVELS AND SOUND PERCEPTION IN DUTCH CINEMAS AND THE EFFECT OF WARNING MESSAGES

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STUDY: COMMUNICATION STUDIES

Summary

Sound levels and sound perception are interesting topics which can be studied in almost any environment where sound exists. However, the focus of this study is quite exceptional. The objective of the first study was to get insight in the actual sound levels in Dutch cinemas during an action movie and how visitors perceive these sound levels. Sound levels in cinemas have been studied rarely and results from these studies are not unambiguous. High sound levels can result in Noise Induced Hearing Loss and yet it was not clear if these sound levels were reached in Dutch cinemas. Next to that, sound perception of visitors has not been measured. In other words, it was not clear if visitors of cinemas are satisfied with the current sound levels.

Warning messages are commonly used within society and are applied on many products and in many environments. For example the tobacco products, chemical products and toy products are easy examples of products which use warning messages. But not only on products warning messages are used, considering constructions areas and warning messages for content on television. As far as is known warning message are hardly used within sound level environments. The second study investigated what kind of influence warning messages have whenever they are used in sound level environments.

By selecting four completely different cinemas a sample was set up in order to conduct the sound level measurements and investigate the sound perception of the visitors. Every cinema was visited six times, diffused over week, weekend, midday, eve and evening show times. Summarized, twenty-four shows of the same movie were visited to construct a reliable sample. In total 359 respondents participated on study one after the sound levels of the movie were measured.

A small auditory room with a high end sound system was arranged to divide the 120 participants randomly in four experimental groups (70 dBA with warning / 70 dBA without warning / 90 dBA with warning / 90 dBA without warning). The participants watched a short trailer before they answered the questionnaire.

The sound levels during an action movie are not hazardous for the visitors, since the sound levels stayed beneath the limits of definitive NIHL. The average sound level (64.30 dBA) can be described as comfortable. Nevertheless the sound levels in Dutch cinemas can be annoying, especially the maximum sound levels. During the study an absolute maximum sound level of 106 dBA was measured and this sound level is for a lot of people annoying; however visitors are only exposed to these kinds of sound levels for a short period. The perception of the visitors during the action movie is in line with the objective measurement. The average sound level is reviewed as comfortable by most of the respondents, while a majority of the respondents think the maximum sound level as loud. The maximum sound level is assessed as too loud or painfully loud by a quarter of the respondents. Yet it can be stated that the sound levels are a part of the cinema experience, since most of the respondents would not change their visiting behavior nor change the change sound level.

It turns out that the warning message had a minor influence on the sound perception of the participants. Whenever the participants were warned, they perceived the sound level slightly more comfortable. Thereby the presence of the warning message was appreciated and enhanced the knowledge of the participants, even more whenever the respondents were exposed to higher sound levels.

Samenvatting

Geluidsniveaus en geluidsperceptie zijn interessante onderzoeksonderwerpen die in bijna alle omgevingen uitgevoerd kunnen worden, mits er geluid aanwezig is. Deze studie zal echter een uitzonderlijke focus hebben. Het doel van de eerste studie is om inzicht te krijgen in de actuele geluidsniveaus in de Nederlandse bioscoop tijdens een actiefilm, evenals de geluidsperceptie van de bezoekers tijdens deze film. Vooralsnog zijn geluidsniveaus in de bioscoop nauwelijks onderzocht en de resultaten zijn niet eenduidig. Het is bekend dat hoge geluidsniveaus gehoorschade kunnen opleveren en het is niet duidelijk of dit het geval is in de Nederlandse bioscoop. Daarnaast is het niet bekend of de bezoekers content zijn met de huidige geluidsniveaus in de Nederlandse bioscoop.

Waarschuwingsberichten worden veelvuldig gebruikt in de maatschappij. Bekende voorbeelden hiervan zijn tabak, chemische stoffen en kinderspeelgoed. Maar niet alleen producenten maken gebruik van waarschuwingsberichten, ook bouwbedrijven en televisie maken gebruik van waarschuwingsberichten. Voor zover bekend worden waarschuwingsberichten nauwelijks toegepast in harde geluidsomgevingen. De tweede studie zal onderzoeken wat voor effect waarschuwingsberichten hebben wanneer ze worden toegepast in geluidsomgevingen.

Vier bioscopen zijn geselecteerd om te onderzoeken hoe het gesteld is met de geluidsniveaus en de geluidsperceptie van de bezoekers. Elke bioscoop is zes keer bezocht, waarbij onderscheid is gemaakt tussen week-, weekend-, middag-, vooravond- en avondvoorstellingen. In totaal is dezelfde film 24 keer bezocht om op deze manier betrouwbare data te verzamelen. Daarnaast hebben 359 respondenten deelgenomen aan de eerste studie.

Voor de tweede studie is een klein auditorium met een hoogwaardige geluidsinstallatie ingericht. De 120 deelnemers zijn random verdeeld over vier verschillende groepen met verschillende condities (70 dBA met waarschuwing / 70 dBA zonder waarschuwing / 90 dBA met waarschuwing / 90 dBA zonder waarschuwing). De deelnemers hebben een korte trailer bekeken alvorens zij de vragenlijst hebben ingevuld.

Uit de resultaten blijkt dat de geluidsniveaus tijdens een actiefilm in de Nederlandse bioscoop niet schadelijk zijn voor het gehoor, aangezien de geluidsniveaus onder de niveaus blijven waar gehoorschade ontstaat. Het gemiddelde geluidsniveau kan beschreven worden als comfortabel. Dit neemt niet weg dat de geluidsniveaus storend kunnen zijn voor de bezoeker, voornamelijk het hardste geluidsniveau. Tijdens de studie werd een geluidsniveau van 106 dBA waargenomen en de meeste mensen ervaren een dergelijk geluidsniveau als storend. Daar dient bij vermeld te worden dat bezoekers slechts een korte periode worden blootgesteld aan dergelijke geluidsniveaus. Dit is in lijn met de resultaten van de geluidsperceptie. Het merendeel van de respondenten ervaart het gemiddelde geluidsniveau comfortabel, terwijl een groot deel van de respondenten het hardste geluidsniveau als hard ervaart. Een kwart van de respondenten is van mening dat het hardste geluidsniveau te hard of pijnlijk hard is. Aan de andere kant kan gesteld worden dat de respondenten dit ervaren als een onderdeel van de bioscoopervaring, aangezien ze het bezoekgedrag, noch de keuze om het geluidsniveau te veranderen niet zullen aanpassen.

Het blijkt dat het waarschuwingsbericht enige invloed heeft gehad op de geluidsperceptie van de deelnemers. Wanneer deelnemers waren gewaarschuwd beleefden zij het geluid als iets comfortabeler. Daarnaast werd het waarschuwingsbericht op prijs gesteld en verhoogde het de kennis van de deelnemers, in het bijzonder voor de deelnemers die werden blootgesteld aan hoge geluidsniveaus.

Preface

29-07-2012, Yosemite National Park – About 06.00 in the morning six young fellas from Twente are looking infatuated around in the valley of the Yosemite National Park, California, USA. Today's mission: Hiking the Half Dome, a granite rock in the center of the enormous Yosemite National Park. The hikers, including myself, have read and heard the stories about this climb. As rumors go, the track would be impassable, heavy and extensive and on top of it, the final climb would concern a mountaineering component of 300 meters along the cables. As inexperienced hikers we are confident that this hike could hardly be a challenge for us. How on earth is it possible that a hike of 14 kilometers is that heavy? Runners, football players, cyclists and even swimmers are convinced that the stories are exaggerated by the American people.

At the start of the track I consulted a park ranger about the entrance of the track. Spooked two American newlyweds turned their heads towards us and ask if we are planning on hiking the Half dome in one day. As confident as we are, we confirm ''Yes''. ''Good luck guys'' is their supporting message, when we start our hike in a firm goose-step. The day starts prosperous. Around 10.00 a.m. the point of return is reached and we are still confident that the hike is heavily exaggerated. Gorgeous views and shining waterfalls cross our track, while the track gets slightly steeper. As closer as we get to the rock, the steeper the track gets. The air starts to get thin and the temperature runs slowly to 35 degrees Celsius. These factors correlate with the frequency of the ''viewing'' moments and more over we are ''enjoying the view'' during a break. Once we approach the rock we only can acknowledge that the warnings were justified. The first part of the rock needed to be climbed on a slippery surface, whereby the small trees in the valley emphasize the immense depths. At last we reach the final part of Half Dome, the cables. Hanging on 200 meters in the air on the cables, without any safety fuse, the adrenaline is rushing through my body. Once we reach the top, the view is magnificent; however the thought of descending is keeping me busy all the time. During the descent the cables are much more crowded and when I reach the foot of the mountain I am for sure that this was a once upon a lifetime experience. The return seemed to be even tougher than the first part of the journey, moreover because the hiking shoes do not entirely fit. Whenever I reach our RV I am completely demolished; however I now look back on of my greatest moments during our road trip through the USA and I would never wanted to miss this experience.

The above standing narrative partly reveals how I have experienced the writing of a master thesis. The elements of underestimations, setbacks and labor have revealed to me what is expected of a master student. Eventually I am looking back at a great result and a special period. Before you start reading my thesis I want to express my gratitude to certain people, who made it possible to write the thesis. First of all I want to thank my supervisors, Joris van Hoof and Mirjam Galetzka. Without their assistance and valuable feedback I would never had completed my thesis. Next to that, I would like to thank Ilke Jellema and Annerike Gorter of the Nationale Hoorstichting for their input with the regards to sound level research. Third, I would like to thank the people who assisted me by the recruiting of the respondents: Mechteld Ensink, Laurens van Herwijnen, Anne de Jong, Benny Scholte Lubberink, Manon Scholte Lubberink and Mirjam Scholte Lubberink. Finally I would like to thank the Culture department ''de Vrijhof'' for facilitating the auditory room and Bastian- and Joris Wolbert for facilitating the necessary equipment.

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1. Introduction

Sound levels have been a topic of study for several years. Especially in workplace environments regulations have been set up in order to protect employees from high and dangerous sound levels. Not only during labor people can be confronted with high sound levels. It is known that during certain leisure activities people can be exposed to extremely high sound levels, whereby music often takes an influential position. Sound levels of MP3 players, sound levels during concerts and sound levels in discotheques have been topic of study (Clark, 1991). Clark (1991) found that these sound levels can be harmful for hearing since sound levels of above 100 dBA have been reported on many leisure activities, like concerts and hunting activities. Sound levels in cinemas have not been a great topic of interest of researchers yet. With the exception of the study of Warszawa and Sataloff (2010) no study could be found regarding sound levels in cinemas. Warszawa and Sataloff (2010) found that the sound levels in cinemas could be harmful; however no definitive conclusions have been drawn.

Sound levels are expressed in decibels, a derivative from the original bel invented by Alexander Graham Bell. The most common measurement is the dBA, an abbreviation of the term decibel with the addition of A. Other dB measurement techniques are not applicable for humans, since the human ear does not observe these sound levels. Whenever sound levels are expressed in dBA 0 is the absolute nothing and the threshold for pain is at about 120 dBA. A simple mnemonic to remember these thresholds is to compare them with the scale of Fahrenheit, with 0 being very cold and 120 as very hot. Comfortable sound levels lie between 60 and 80 dBA (Gray, 2000). dBA is reported in logarithmic units (Gray, 2000). This means that it is not possible to easily calculate decibels for analysis. For example, whenever a vacuum cleaner produces 70 dBA, two vacuum cleaners do not produce 140 dBA. This would be a simple calculation since the amount of identical sound sources also multiplies. In this example two vacuum cleaners would produce 73 dBA, since the logarithmic scale defines dBA as ''10log'' multiplied with the quantity of the identical sound source. This means that 10 times the log of 2 is 3, which is 3 dBA. Whenever someone would put 10 vacuum cleaners together it would mean that the sound level is 80 dBA, because 10 times the log of 10 is 10 dBA. Sound level measurements can be executed in any environment.

The study wants to investigate whether sound levels are perceived differently in different environments. Since no study regarding sound levels in Dutch cinemas could be found it is interesting what the actual sound levels in Dutch cinemas are and in which way the visitors perceive these sound levels. It is expected that these sound levels are questionable, since Warszawa and Sataloff (2010) discovered interesting high sound levels in cinemas. Next to that, a Dutch television program called Tros Kompas/Radar published results which conclude that the sound levels in Dutch cinemas are not harmful, but can be perceived as loud and annoying (Skaarhoj).

The first part of the study will consist out of an objective measurement during one movie in different cinemas using different showtimes, which is a unique research design. During these measurements the sound perception of the visitors of the same cinema will be measured through a short questionnaire. The second part of the study consists out of an experiment which investigates whether warning messages have any effect on the sound perception of people and in which way emotions can be related to different sound levels. The following research question has been formulated and will be the foundation of the study:

- *How are sound levels perceived and influenced in different environments?*

The sub questions will be answered to develop a solid base which can answer the research question of the study. The following sub questions will be answered:

- *What is the average and maximum sound level in a Dutch cinema during an action movie?*
- *Which differences are there with the regard to the different days, show times and different cinemas?*
- *How do cinema visitors perceive the sound level during an action movie?*
- *What kind of influence does a warning message have on people when exposed to different sound levels?*

2. Theoretical framework

One of the most famous action movies of all times premiered at the end of October of 2012, namely the new James Bond movie; *Skyfall*. This movie had a lot of media attention, many visitors and there were a lot of different show times in different cinemas (Julen, 2012).In this chapter an overview of different related topics such as noise induced hearing loss, cinemas, sound experience and warning messages will elaborated. These topics form the context which provided guidelines and the base for the study.

2.1. Noise induced hearing loss

Noise induced hearing loss (NIHL) is a tiresome disease which can affect anyone who is exposed to noise. Every day people are exposed to different kind of noises, starting up with the sound of their televisions till the noise of military jets flying over. It seems that NIHL is just an issue for a tiny part of the society; however it is an issue which deserves more notice since a significant amount of people is confronted with problems considering their hearing. In total, 250 million people all over the world experience hearing loss, which defines hearing loss as the ''fifteenth most serious health problem'' in the world (Nelson, Nelson, Concha-Barrientos, & Fingerhut, 2005). It could be stated that hearing loss is a neglected issue, since the effect of hearing loss does not impair the patient and therefore other diseases demand more attention (Thurston, 2012). Next to that NIHL has been more of an issue growing over the years. Since the beginning of the industrial revolution the human civilization has evolved into a realm of machinery. The use of machinery in daily life is indispensable and has not only made the lives of people more pleasant, but also far more effective and efficient. Due to these developments people are more and longer exposed to loud noise, which could have tremendous effects on hearing and result in NIHL.

2.1.1. Definition of NIHL

NIHL is a disease which develops over the years. It could be defined as ''loss of hearing secondary to over-stimulation by sound energy'' (Seidman, 1999). NIHL can occur when people are exposed to sound levels equal or exceeding 85 dBA (Zhao, Manchaiah, French, & Price, 2010); however the actual causation of NIHL is much more complicated. The timeframe wherein people are confronted with the sound exposure and the actual sound level are of significant interest for the seriousness of the disease. Next to that, the frequency of the noise is a variable which influences NIHL. Nevertheless, there are two different kinds of hearing loss. The first one is a temporary threshold shift (TTS) and the second one is a permanent threshold shift (PTS) (Seidman, 1999). Whenever someone experiences TTS it is usually caused through extreme loud noise exposure, like a concert or a heavy blast. After this exposure people often have complaints about tinnitus *(the perception of sound within the human ear in the absence of corresponding external sound)* or aural fullness, although the complaints often diminish after a certain period. Obviously PTS contains a permanent hearing loss and unrecoverable damage within the ear. Whenever people are more and longer exposed to extensive noise levels the probability to develop NIHL increases. The noise levels which are hazardous for the human ear are starting from 85 dBA until 105 dBA. Whenever a person is exposed to such or a higher sound level for a certain period hearing loss eventually becomes inevitable (Seidman, 1999). Taking this in consideration it could be concluded that some daily activities of humans could be harmful for the ear.

2.1.2. Music venues and NIHL

Some leisure activities, like visiting a concert, the stadium, the theater or the cinema could be a potential threat (Clark, 1991). In contrast to the workplace environments most leisure venues are not subjected to any kind of regulations regarding sound levels. Besides, people choose to go to these venues, which makes it their own decision to be subjected to high sound levels. Especially music related activities are a source of high sound levels. In some discotheques and during some concerts the sound levels reach 120 – 130 dBA and continuously reach the level of 100 dBA. These levels are considered as unsafe for fifteen minutes when someone does not wear any kind of ear protection (Zhao et al. 2010). Ear protection within music venues is one approach to reduce the possibility of NIHL. It seems that people which are often exposed to high sound levels in music venues are prepared to use ear protection (Beach, Williams, & Gilliver, 2011; Chung, Des Roches, Meunier, & Eavey, 2005); however they also assume that it should be common sense of people to protect themselves from high sound levels, not only by using ear protection but also by determining the most ideal location for the ear (Vogel, van der Ploeg, Brug, & Raat, 2009). Since it seems that the sound levels in music venues are excessively exceeding the safety limits of the ear it is not remarkable that most of the awareness is focusing on sound levels in music venues. However this attention is completely justified, it is interesting how matters stand in other leisure venues.

2.1.3. Movies and NIHL

Ryberg (2009) evaluated sound levels in Sweden in different types of leisure environments, like concert halls, restaurants, cinemas and theaters. In 24% of the establishments the recommended sound level (the sound level limit in Sweden is an average of 90 dBA in environments directed at children under 13 and an average 100 dBA in locations where children under 13 do not have access) was exceeded; however cinemas did not exceed the limit. This is in line with the study of Allen (1998), who studied samples of movies in order to investigate whether movies could be harmful, which was concluded that it was hardly hazardous. However, the focus of the study was based upon the creators, in which the creators of the movies delivered the movies for the research. Another study (Warszawa & Sataloff, 2010) indicates that the sound levels in movie theaters may be harmful for hearing. During this study the highest sound level detected by the microphone was during the movie *Transformers*, which was 144.7 dBA however this was not the maximum sound level. The maximum sound level was reported as 133.9 dBA. Both meters are clearly potential hazardous for visitors, although further study is necessary to establish definitive conclusions (Warszawa & Sataloff, 2010). The contradictions between the studies of Warszawa and Sataloff (2010) and Ryberg (2009) and Allen (1998) indicate that sound levels in cinemas are an area with certain question marks and make it worth studying since it could be a source for hearing loss without knowing. Hence, it could be a valuable input for organizations regarding legislation, compliance and health since they could undertake action regarding sound levels whenever it turns out that visitors are exposed to possible health issues.

2.2. Sound levels in cinema

Since the development of the cinema in the early 20th century the cinema has been an important leisure activity in the society. It is likely that almost every person in the civilized world will visit the cinema, and it seems that the popularity of the movies are still increasing. With a box office result of $2,782.3 million dollars *Avatar* is the most lucrative movie ever made (Mojo, 2012), pointing out the magnitude of the industry. It is obvious that such a wealthy industry is able to develop new

technologies to improve the cinema experience. However these developments have led to astonishing cinema experiences like 3D cinema and digital surround systems, it is remarkable that such a multimillion industry only has reached the attention of a few studies.

2.2.2. Characteristics and cinemas

Warszawa and Sataloff (2010) analyzed 25 different movies to measure the sound levels of the movies in a cinema. They concluded that there are no differences between the genres and that the sound levels of movies are potently hazardous for visitors. Although they acknowledged the differences between different movie theaters and types of sound installations, they conducted their study in different cinemas and measured different movies once. It is unclear from which position they have conducted their measurement and which characteristics the particular cinema possessed. The characteristics of the cinema could be of significant value for the results of the study; however Warszawa and Sataloff (2010) did not find any differences between the theaters and the audience size. Ryberg (2009) measured the sound level from the position where the sound level pressure was the highest, however they do not report which actual position can be considered as the location with the highest sound level pressure. According to van Hengel (2012) the most ideal location is in the center of the cinema because it should reduce the possibility of the reflection of sound and it is the most representative seat in the cinema. This indicates that sound levels measured in the center of the cinema would provide the most reliable information, and that there could be differences between the sound levels considering the location of the measurement. Since Warszawa and Sataloff (2010) measured different movies one time it is interesting whether there are differences between the different cinema characteristics and locations, since Warszawa and Sataloff (2010) could not find such differences. To provide a consistent analysis of these characteristics it is necessary to measure one and the same movie multiple times in the same and in different cinemas. Next to that it is possible to investigate the differences in sound levels between the shows whenever one movie is measured on multiple times and dates in the same cinema. As a result it makes it possible to compare weekend shows with shows during the week and compare different timeframes.

2.2.3. Movie genre and sound levels

However Warszawa and Sataloff (2010) did not find differences between genres the movie with the highest sound level was *Transformers*, a movie labeled as action/sci-fi/thriller. One could argue that action movies have higher sound levels than for example romantic movies or comedies; however no available literature could be brought up to support this statement. In order to support such a statement multiple movies in multiple theaters should be studied like Warszawa and Sataloff did. Nevertheless it is probable that the sound level of an action movie is one of the highest in the movie industry since these movies produce scenes with car crashes, gunfire and explosions. In reality it is assumable that these conditions can be compared with the loudest sound levels, like a formula one car or the engine of a jet aircraft. Therefore it is interesting what the actual sound levels of an action movie are.

2.3. Sound experience and sound perception

Sound levels could be measured in every environment. Due to these measurements it is possible to determine whether sound levels are harmful for hearing. Sound experience of people is a subject which is different than sound levels. People can experience sound levels in many different ways but it is fair to state that whenever the sound level is louder, people will perceive these sound levels as

louder. For example, Gray (2000) states that an increase of 10 dB is perceived as a doubling of the loudness.

H1: *Higher sound levels lead to higher sound level perception.*

The sound perception is a personal indication of the sound level and therefore the sound perception refers to subjective perception of the sound level and not to the actual sound level, which can be measured. Whenever someone indicates a certain sound as annoying it is not assured that the same sound is harmful for hearing or that other people will indicate it as annoying (van Hengel, 2012). Thereby, some sound sources are perceived more annoying than other sound sources. For example, a study from Fields and Walker (1982) already exposed results in which people determine noise from railways less annoying than noise from road traffic or aircraft traffic at the same sound level. However multiple explanations could be brought up, people always will experience sound in their own way. Therefore the sound experience and perception say hardly anything about the noxiousness of the sound level, but they could be a subjective indicator of the sound level and how people experience it. Experiences are always very personal and in some cases it has proven to be necessary to warn people before they are explored to certain origins. It is for sure that emotions are highly related to sound experience.

2.3.1 Sound and emotion

Sound, experience and emotion are aspects which are closely related to each other. As stated, every person perceives sound differently. Especially music is an important sound source in our society whereby emotion is an important factor (Koelsch & Siebel, 2005); however the conclusions about the actual effect of music on emotion are not unambiguous (Juslin & Västfjäll, 2008). Because of the comprehensiveness of the definitions ''emotion'' and ''music'' it is explainable that conclusions are not unambiguous. But not only in music sound is important for the experience. During other leisure activities, for instance attending a football match in the stadium, the sound experience is an important contribution to the entire football experience (Durrant & Kennedy, 2007). The study of Durrant and Kennedy (2007) acknowledged the sensitivity of the relationship between image and sound during sports on television. Other activities like visiting clubs or music venues also highly depend on the sound experiences in order to provide the visitor a worthwhile visit; however the sound experience contains multiple elements. Bruner (1990) evaluates the different elements of sound and states that the sound experience is influenced by multiple factors, for example rhythm, melody and tempo. Whenever the volume is involved the louder sound levels are associated with excitement and the softer sound levels are associated with sentiment, but the sound levels are a fragment of the total sound experience. Taking the value of sound experience during leisure activities in consideration it could be stated that the sound experience, sound levels and emotions are of significant value for cinemas, since they contribute to the entire experience.

However it seems clear that emotions would have a certain influence on sound experience it is of interest which emotions can be identified for a cinematic environment. Plantinga (2009) emphasizes the importance of sound and emotion during movies. For example, a horror movie would be completelty unexciting whenever the sound effects are removed since these effects evoke certain emotions. Obviously the aim of a horror movie is to scare the viewer, and without sound effects this would be hardly possible. Considering the PAD model, originally designed by Mehrabian & Russell (1974), three emotional dimensions can be distincted, namely Pleasure, Arousal and Dominance. Each dimension exists out of six pairs representing the entire dimension, which are orginally rated on

a 9-point scale. The PAD model has widely been used to evaluate emotions in different environments and confronted with different stimuli. PAD provides an easy way to quickly assess the pleasure, arousal and dominance associated with the persons emotional reaction to an event (Bradley & Lang, 1994), thus it is possible to use the PAD model in a cinematic environment. During the research PAD will be used in study two, since it is impossible to use PAD during study one due to the time challenges.

2.3.2. Sound experience and cinemas

Some studies about cinema experience have been conducted. The research is mostly focused upon the 3D experiences from the visitor (Pölönen, Salmimaa, Takatalo, & Hakkinen, 2012; Pölönen M., Salmimaa, Aaltonen, Häkkinen, & Takatalo, 2009). Some other studies have been focusing on the motivations of people to visit the cinema (Hubbard, 2003; Ravenscroft, Chua, & Keng Neo Wee, 2001) It is interesting that hardly any study can be found which is focusing on other issues regarding the customer experience and other variables regarding the cinema, like service quality, online reviewers and movie decisions and sound experiences. It seems cinemas in the Netherlands are aware of the significance of the sound experience for visitors. Especially some high-end cinemas emphasize the importance of the sound experience in their cinema and try to optimize the experience, whereby the cinema visitor needs to be ''trapped'' in the movie. According to Plantinga (2009) the scenes of a movie depend for an important part on the music and the sound. Without any sound effects a movie could not evoke any emotions and therefore would be much more dull. Next to that, it would be hardly possible to communicate the right message, since sound and music enhance the total movie experience, which is the essential element of the cinema experience.

2.4. Sound perception and warning messages

Warning messages are a common method to send people messages about risks and potential hazards from products or in environments. Perhaps, the most discussed warning messages are the messages printed on cigarettes. But not only in sinful controversial organizations (like alcohol, tobacco and gambling) are warning messages used. The construction business is a well-known area for all sorts of warning messages and also television programs use warning message to warn the viewers for the potential hazard of the content. In most cases symbols are used to identify the potential hazard, however there are a lot of different symbols and they are used in many different ways. Unfortunately, no studies regarding warning messages and sound perception or sound environments during movies could be found.

2.4.1. Warning messages

In most cases warning messages use symbols which are easy recognizable for people. Due to these symbols people understand the nature of the hazard and the symbols make it possible to process the information better (Bettman, Payne, & Staelin, 1986). The goal of a warning message is to warn people for potential hazards in their environment.

H2: *Warning messages lead to awareness of the potential hazard*

The warning message has to be clear and effective. The tobacco industry is a good example of effective messages. Multiple studies provide results that an effective anti-smoking message increases the perception of health risks and the intention to stop smoking (Hammond, Fong, Borland, & Cummings, 2006; White, Webster, & Wakefield, 2008; Hammond D. , Fong, McDonald, Brown, &

Cameron, 2004). Hammond (2011) wrote that the warning messages on tobacco products are more effective when the messages are larger and pictorial exposed on the sides of the packages, instead of short text – only messages. This is in line with the study of Bettman et al. (1986) and with the study of Wogalter, Jarrard, & Simpson (1994), who reporterted that destinctive warning messages as in words could raise the hazard perceptions by people. Most studies recognize the effect of warning messages on the receivers and that the warning message is an effective method to emplify the potential hazardous of products or areas. This is also awknodged by Davies, Haines, Norris, & Wilson (1997) , however it is important that if pictograms or symbols are used, the pictograms need to be understandable, readable and visual, yet most studies seem to focus on products and their actual potential hazards. It is expected that whenever people are forewarned for high sound levels and exposed to high sound levels (±90 dBA), they perceive these sound levels louder. This is caused through an effective warning message about the loud sound level, thus emphasizes the potential hazard and the attention of people to the sound level, and that they will perceive the sound level louder than people who are not warned for loud sound levels.

H3: *Warning messages in a high sound level environment (90 dBA) induce higher sound level perception.*

The height of the sound level is an essential condition for the evaluation of the warning message and the sound level, since people actually need to perceive the sound level as loud. Considering Gray (2000) and Seidmad (1999) 90 dBA can be defined as loud, but not as harmful as long as the exposure period does not exceed 8 hours.

When people are exposed to the warning message and a medium sound level it is probable that they perceive the sound level less loud. This is caused by the effect that if the message is contrary to the own view of the person, the person is less likely to change opinion (Allyn & Festinger, 1961). If people are forewarned for high sound levels, it is likely that the person will be prepared for the high sound level since they organise their own position regarding the subject. Petty & Cacioppo (1977) refer to this as: ''A person who is forewarned, is forearmed''. Because the actual sound level of 70 dBA can not be considered as high, it is likely that the warning message is considered as overdone and is contrast to their expectation.

H4: *Warning messages in a medium sound level environment (70 dBA) induce lower sound level perception.*

3. Methods study 1

The following chapter will elaborate on the different materials and methods used in study one. First, the materials and methods of the sound level measurement will be illustrated, followed by the sound perception of the visitors.

3.1. Corpus

The cinemas have been selected through a convenience sample. This means that the cinemas which were selected were appropriate to the researcher's budget but also fitting to the study. Differences have been made in the size of the different cinemas, the geographic location and which techniques the cinemas use. The first cinema (A) can be described as a multiplex, a cinema complex which exists out of a lot of theaters. The second cinema (B) can be described as a small city center cinema of an average size. The third cinema (C) can be described as a high-end cinema, with latest and most modern techniques to experience the ultimate movie experience. The fourth cinema (D) can be described as a classical cinema in the city center. Since the mystery character of the research, the cinemas will not be revealed. Appendix A provides an overview of the visiting scheme of the cinemas to give a clear illustration of the research.

3.2. Procedures

Measuring sound levels in cinemas could be seen as a sensitive subject due to the fact that sound levels in cinemas could have a direct influence on the wellbeing of the visitor. Whenever sensitive subjects regarding the wellbeing of people are being studied it is possible that the research is being influenced by social desirable behavior. For instance, this kind of behavior has been found in studies regarding alcohol sales, were shop managers tended to sketch a more positive representation of the actual alcohol sales (Gosselt, van Hoof, de Jong, & Prinsen, 2007). However alcohol sales are completely different from sound levels in cinemas it is possible that people tend to act social desirable whenever they are confronted with a sensitive subject (Vos, 2009). Someone could state that sound levels in cinema are not a sensitive subject, since it has nothing to do with an illegal or an embarrassing topic. Nevertheless it is plausible that the study will be influenced by cinema personal when they are aware of the measurements. Therefore it is wise to complete the sound level measurements through a mystery method, whereby the cinemas are unaware of the researcher's attendance and intentions in order to prevent the influence of the cinema personal on the sound level. Due to this method it is possible to obtain a factual reflection of sound levels in cinemas.

3.2.1 Procedure mystery measuring sound levels

During the study four cinemas have been visited six times. Since the researcher has visited the same cinema multiple times it was of interest to hold on to a protocol (Appendix B) to maintain the mystery cover. Next to that the protocol provided guidelines for the researcher to enhance the similarity of the different measurements. Due to the protocol it was possible to analyze the results of the measurements, however not only the protocol was an important document. The researcher also completed a checklist (Appendix C) with characteristics of the cinema which made it possible to derive conclusions about the cinema characteristics. Factors like the audience size, how far the researcher was located from the boxes and how large the cinema is could be of influence for the sound levels and were noted on the checklist.

In the different cinemas which were visited the researcher did not require a specific seating. One of the reasons to do so was the argumentation that a cinema visitor also does not require the exact same seating whenever a person visits the cinema. Next to that, it is hardly impossible to obtain the same seating every time since multiple actors, uncontrollable, can influence the process of gaining a cinema ticket. As stated, the protocols and the checklist made it possible to maintain the mystery cover and to control these different influences. To make sure that the researcher gained a ticket for the show, a reservation was made prior to the show.

When the researcher entered the cinema the sound level meter was covered under the researcher's coat. After obtaining the ticket, the researcher entered the cinema, located to his position and waited until the cinema was cloaked into darkness. Subsequently the sound level meter was exposed and the researcher started measuring when the sound advertisements started viewing. During the break the researcher stayed in position and waited until the movie started again. The meter was stopped measuring during the break, since the break is no part of the actual show. When the last part of *Skyfall:007* started the researcher stopped measuring and concealed the meter again. During the study the researcher was not revealed.

3.2.2. Procedure flyer – questionnaire

During the first part of the study the sound perception of the visitors of *Skyfall: 007* of the same show as the objective measurement was measured. It is impossible to determine the exact population of this group, due to the fact that visitors of the cinema are hardly registered or could be traced after visiting the cinema. It is obvious that it is impossible to determine the exact population of the visitors of the action movie *Skyfall:007* before the movie premiers. Not only due to this limited information about the population the researcher was forced to conquer multiple challenges regarding the gaining of a representative sample of the population.

It is known that the visitors of a movie are probably in the cinema for about 4 hours max. The most visitors will enter the cinema approximately 30 minutes before the show starts and they will leave the cinema when the movie has ended. During this period the researcher had to conduct the measurement and had to complete the surveys. Whenever the visitors left the cinema it was impossible to trace the same visitors again. Therefore the time limitation was a severe threat to the research. Another threat to the research was that the researcher was confronted with the whole population when they were available for the research. In other words, whenever people visit a movie they enter the room at the same time, they have a break at the same time and they leave the cinema at the same time. Due to these circumstances the researcher was always confronted with an abundance of people and therefore it was impossible to approach everybody. Next to that, in most cinemas multiple movies are shown at the same time which made it difficult to determine whether a visitor belongs to the population or not. The questions were positioned on each side of an A6 designed card (Appendix D). Respondents could easily rip in the sides of the card to indicate their answers. To clarify the purpose of the research a small introduction was written in the center of the card. Next to that, the questions regarding the sound level of the movie were shaded with colors to clarify and emphasize the answer possibilities. The answer possibilities started off in a blue color on the soft sides, whereas it faded to red when the answer possibilities came to the loud side. However color studies are extensive, red can associated with something loud and blue can be associated with something calm (Kaya & Epps, 2004). Due to the flyer-questionnaire it was possible to approach a

large number of people in a short time, which resulted in an adequate sample of the population. The last challenge confronting the researcher was to keep the survey secret to the cinemas. If the cinema owners would discover the survey the cover of the mystery measuring would have been blown. Considering these challenges it is clear that certain measures had to be taken to conduct study one.

The researcher waited almost until the end of the movie and then proceeded to the exit door of the cinema, before the movie was ended. The researcher approached the people who came outside and asked if they had visited the movie *Skyfall.* If the person confirmed this question the researcher handed over the flyer-questionnaire. The researcher collected them directly afterwards and secured the questionnaires immediately. During six different performances an acquaintance of the researcher assisted with the handing out of the flyer-questionnaire to enhance the response.

The contingency plan whenever the researcher was completely discovered during the research was to finish the measurement, when allowed, and the flyer-questionnaire and then remove the specific cinema from the research and replace it by another, similar kind of cinema. These conditions were also reported in the protocol thus the researcher always knew exactly how to handle situations. Luckily, the mystery status of the researcher was not revealed and therefore the mystery research as such can be considered a success.

The flyer-questionnaire can also be considered as a great success. In total 359 respondents filled in the questionnaire after they had watched the movie *Skyfall.* It turned out that the threshold to fill in the questionnaire was very low because of the easy design and the short time it took the respondent to handle it. During the research, the researcher was confronted with two disadvantages. First, for some people the type of the card was too small to read. Second, in some cases the respondents did not have enough light in the evenings to read the text properly. Unfortunately these disadvantages prevented the researcher for obtaining more respondents.

3.3. Measures

Since the objective of study one is diverse, two different measurement techniques have been designed to provide information for the study.

3.3.1. Measuring sound levels

To construct a representative overview of the sound levels of an action movie and the possibility of obtaining NIHL the greater part of the movie needs to be measured. According to Seidman (1999) and van Hengel (2012) people can conceive different kinds of hearing loss, manly caused by two different kinds of origins. The first origin is the peak load confronting the ear, the maximum sound capacity the human ear experiences during the exposure of the sound level. These kinds of exposures can cause TTS. The second origin is the full load of sound which is confronting the ear. This is the amount of sound in which a person is exposed for a certain period. In order to measure these two kinds of sound levels it is necessary to measure the entire movie, in line with the study of Warszawa and Sataloff (2010). Otherwise it could be possible that the highest sound level will not be registered. Ryberg (2009) measured 60 minutes during a leisure activity, since legislation did not allow longer measurements. Moreover, it is unclear which protocols Ryberg (2009) exactly used during the study. Subjects like movie or theater were not reported, since the focus of their study was the compliance of legislation regarding sound levels. Nevertheless one could state that a measurement of the greater part of the movie is an essential condition to withdraw reliable conclusions about sound levels in a

cinema, otherwise important parts of the movie would not be registered, thus conducting incomplete measurements. Therefore it is likely that Warszawa and Sataloff (2010) and Ryberg (2009) chose for longer and multiple measurements. Next to that, multiple measurements in the same cinema from the same movie provide reliable information about the sound level of the movie itself.

In order to retrieve the necessary information about the sound levels in cinemas a sound level meter has been used (New Instruments BG-5 ®). This type II sound level meter matches the requirements (IEC 651) which are necessary to measure sound levels. All measurements were made with an A-weighting (dBA), fast averaging and a 0.1 dBA exchange rate. The meter has been used in a high sound level environment. The sound level meter has been connected with a USB cable to a laptop to outsource the data which was recorded on the sound level meter. Thus it was possible to examine the data after the measurement. During the show the entire movie was measured. The following three measurements were made:

- The maximum sound level. The maximum sound level has been registered by the sound level meter and outsourced through the corresponding software.
- The minimum sound level. The minimum sound level has been registered by the sound level meter and outsourced through the corresponding software.
- The average sound level. The average sound level was determined by the software and based upon the sound level of every second.

3.3.2. Measures flyer – questionnaire

The questionnaire which is used can be explained as a flyer-questionnaire. Since the researcher was confronted with the challenges described it was of interest to develop a questionnaire which was easy to complete, took hardly any time to complete (since the population is only available for a very short time) and was easy to distribute. The flyer-questionnaire existed out of four questions derived from chapter 2.3. The exact questions were:

- What do you think about the sound during the entire movie?

The response options for the visitors were based upon a 7 point Likert scale. The following options were prepared: Unintelligible soft, too soft, soft, pleasant, loud, too loud, painfully loud.

- What do you think about the loudest sound during the movie?

The response options for the visitors were also based upon a 7 point Likert scale. The following options were prepared: Unintelligible soft, too soft, soft, pleasant, loud, too loud, painfully loud.

- If I could choose the sound level in the cinema, I would turn the sound ……..

The response options for the visitors for this question were based upon a 5 point Likert scale. The following options were prepared: A lot softer, softer, the same, louder, a lot louder.

- If the sound in the cinema was turned down, I would visit the cinema …….

The response options for the visitors for this question were based upon a 5 point Likert scale. The following response options were prepared: A lot less, less, the same, more often, much more often.

4. Results study 1

The results found in study one are outlined in the following chapter. The first section of the results will describe the results considering the sound levels, while the second part will elaborate on the sound perception results.

4.1. Determined sound levels

Study one of the research contained the mystery measuring of the sound levels during the movie *Skyfall* in the sample. Table 4.1 provides an overview of the results in the different cinemas obtained during the measurements.

Table 4.1. Sound levels of the different cinemas.

			Average sound level (in dBA)		Minimum sound level (in dBA)		Maximum sound level (in dBA)		
		N	Average	SD	Average	SD	Average	SD	Maximum
Cinema	A	6	65.47	1.19	34.92	2.40	94.80	.58	95.60
	B	6	61.24	1.84	37.22	1.58	91.53	1.15	92.50
	C	6	68.94	1.20	36.68	2.25	100.17	3.31	106.00
	D	6	61.55	2.09	36.35	1.55	95.88	1.07	97.20
	Total	24	64.30	1.58	36.29	1.95	95.60	1.53	97.83

The study shows that the mean average of the sound levels of the entire sample was 64.30 dBA. As the results indicate, differences between the different cinemas can be noticed. Cinema C is the cinema with the highest sound levels, since the mean sound level and the maximum sound level of this cinema is the highest. With a mean of 100.17 dBA of the maximum sound level the sound level in this cinema is considerably higher than the other cinemas. In cinema C a maximum sound level of 106 dBA was registered. Cinema B can be described as the cinema with the lowest sound level, since the mean sound level of 61.24 dBA was the lowest mean sound level. Thereby the mean maximum sound level of 91.53 dBA of cinema B is also the lowest. It should be noted that the sound level meter registered the sound level every second; where due the highest maximum sound level and the minimum sound level are a value of one second. One of the objectives of the study was to determine whether differences could be found between different showtimes on the timeframe and days. Table 4.2 provides an overview of the sound levels and the different show times.

Table 4.2. Sound levels of the different showtimes.

			Average sound level (in dBA)		Minimum sound level (in dBA)		Maximum sound level (in dBA)		
		N	Average	SD	Average	SD	Average	SD	Maximum
Showtimes	Midday week show	4	64.98	2.90	37.18	1.51	95.43	2.13	97.60
	Eve week show	4	64.41	3.18	36.68	1.41	94.98	4.74	101.00
	Evening week show	4	63.43	4.06	37.50	1.78	95.38	3.01	99.10
	Midday weekend show	4	64.51	3.06	35.30	2.06	97.35	6.03	106.00
	Eve weekend show	4	63.35	4.35	34.68	3.16	94.33	2.09	96.70
	Evening weekend show	4	65.12	5.51	36.43	1.52	96.13	3.87	100.60
	Total	24	64.30	3.84	36.29	1.91	95.60	3.65	100.17

The results clarify that the differences between the different showtimes are very small. Only in the mean minimum sound level and the mean maximum sound level some differences could be indicated, however these differences are very slight.

Study one contained a flyer questionnaire regarding the sound perception of the visitors of the cinema. Table 4.3 provides an overview of the sound perception of all respondents.

Table 4.3. Sound perception of cinema visitors.

		N	%	Average	SD
Entire sound judgment	unintelligible soft	0	0.0%		
	Too soft	1	0.3%		
	Soft	7	1.9%		
	Pleasant	208	57.9%		
	Loud	115	32.0%		
	Too loud	25	7.0%		
	Painfully loud	3	0.8%		
	Total	359	100.0%	4.46	0.703
Maximum sound judgment	unintelligible soft	0	0.0%		
	Too soft	0	0.0%		
	Soft	5	1.4%		
	Pleasant	120	33.4%		
	Loud	151	42.1%		
	Too loud	71	19.8%		
	Painfully loud	12	3.3%		
	Total	359	100.0%	4.90	0.845
Volume choice of respondent	Much less loud	10	2.8%		
	Less loud	79	22.0%		
	Same	248	69.1%		
	Louder	20	5.6%		
	Much louder	2	0.6%		
	Total	359	100.0%	2.79	0.606
Visits of respondent	Much less often	7	1.9%		
	Less often	73	20.3%		
	Same	252	70.2%		
	More often	25	7.0%		
	Much more often	2	0.6%		
	Total	359	100.0%	2.84	0.590

The results indicate that 57.9% of the respondents assess the sound level during the entire movie as pleasant, while 32% think it as loud and 7.8% think it is too loud or painfully loud. When it comes to the maximum sound level of the movie 33.4% of the respondents assess it as pleasant, while 42.1 % think it is loud. In total 23.1% think that the maximum sound level is too loud or painfully loud. Whenever the respondents could determine the sound level by themselves 24.8% would mute the

sound level. This 24.8% is in line with the 23.1% who consider the maximum sound levels to be too loud or painfully loud, however such conclusions should be considered carefully since the correlations have not yet been analyzed. It is fair to state that almost one quarter of the respondents would mute the sound levels, which is in contrast with the visiting behavior. It seems that the visiting behavior of the respondents has hardly anything to do with the sound levels. 70.2% would visit the cinema equal, while only 7% would visit the cinema more often when the sound levels are turned down. Surprisingly 20.3% of the respondents would visit the cinema less often when the sound levels are lower.

4.2. Relations and differences between sound levels and sound perception

The sound levels and the sound perception both showed interesting results regarding the sound levels and the sound perception of visitors. Correlative results between these two topics have not been reported yet.

Table 4.4. Correlation analysis regarding sound levels and sound perception

	7	6	5	4	3	2	1
1. Average sound level	.16**	-.20**	.18**	.21**	.80**	.71**	-
2. Minimum sound level	.12*	-.20**	.16**	.16**	.73**	-	
3. Maximum sound level	.16**	-.17**	.16**	.17**	-		
4. Entire sound judgment by respondent	.31**	-.65**	.63**	-			
5. Maximum sound judgment by respondent	.32**	-.58**	-				
6. Volume choice by respondent	-.47**	-					
7. Visits of respondent	-						

***. P < .01, *. P < .05*

Table 4.4 shows that the correlation between the all actual sound levels and the judgments of the sound levels respondent are weak (r = .21, n = 359, p < 0.01)(r = .16, n = 359, p < 0.01)(r = .17, n = 359, p < 0.01) (r = ,18, n = 359, p < 0.01) (r = .16, n = 359, p < 0.01) (r = .16, n = 359, p < 0.01). This indicates that the objective measured sound levels did not have a relationship with the perception of the sound levels of the respondents. In other words, no evidence could be found that the respondent would answer different when the sound levels were different. A positive large correlation has been found between the entire sound judgment and the maximum sound level judgment (r = .63, n = 359, p < 0.01). 63% of the respondents answered the first question about the entire sound level of the movie they perceived in line with the question about the maximum sound level they perceived during the movie. A negative large correlation has been found between the entire sound level of the movie and the volume choice of the respondents (r = -.65, n = 359, p < 0.01). This negative correlation can be explained due to the fact that the question about the volume choice and the visits of the respondent were mirrored. This means that it was expected that most of the respondents would answer the first two questions on the right side of the flyer questionnaire, while the second two questions would be answered on the left side of the flyer questionnaire. This also explains the negative large correlation between the maximum sound level and the volume choice by the respondent (r = -.58, n = 359, p < 0.01). These two negative large correlations indicate that the respondents, who experienced the entire sound level (65%) and the maximum sound level (58%) as too loud, are the same respondents who would mute the sound level. The volume choice of the respondent also has a medium negative correlation with the visits of the respondents (r =-.47, n =

359, p = 0.01). Surprisingly, the answers of the respondents regarding their visiting behavior were not in line with the expectation. As table 4.3 shows, most results lie between ''less often'' and ''same''. Therefore the positive correlations of the item ''visits of the respondent'' can be explained; however these correlations are very weak and could not indicate strong relationships.

Since there are differences between the sound levels and the different cinemas (table 4.1) it is interesting if the respondents also perceived the sound levels louder or softer in the different cinemas. The study shows that there are significant differences between the respondents of the different cinemas on three items.

Table 4.5. Differences of sound experience between cinemas.

		Entire sound level judgment by respondent			Maximum sound level judgment by respondent			Volume choice by respondent			Visits of respondent		
		Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Cinema	A	4.38	.719	101	4.77	.823	101	2.90	.520	101	2.84	.543	101
	B	4.31	.565	78	4.74	.763	78	2.85	.583	78	2.72	.643	78
	C	4.67*	.743	129	5.12*	.866	129	2.62*	.652	129	2.93	.562	129
	D	4.33	.653	51	4.84	.857	51	2.92	.595	51	2.78	.642	51

*N = 359, *P < .05*

First the entire sound level judgment of the respondent has a significant difference [F (3, 355) = 6.22, p = 0.000]. Second, the maximum sound level judgment by the respondent had a significant difference between the four cinemas [F (3, 355) = 4.92, p = 0.002]. The last significant difference can be found in the volume choice of the respondent [F (3, 355) = 5.76, p = 0.001]. The item ''visits of respondent'' did not have any significant differences between the different cinemas. Post hoc comparisons using a Bonferroni test indicate that these significant differences are caused through cinema C. However no strong correlations between the objective measurements and the subjective perception could be found, the respondents have perceived the sound levels differently since there are differences between the different cinemas. These differences have been pointed out in table 4.7. Cinema C is the cinema which scores higher on the ''entire sound level judgment by the respondent'' (M = 4.67, SD = 0.74) and the ''maximum sound level judgment by respondent'' (M = 5.12, SD = 0.87). Cinema C scores lower on the volume choice of the respondents (M = 2.62, SD = 0.652), which indicates that the respondents would mute the sound in cinema C more than in the other cinemas.

Table 4.9. Differences of sound experience between show times.

		Entire sound cinema			Maximum sound cinema			Volume choice by respondent			Visits of respondent		
		Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Show time	Midday week show	4.71	.686	17	5.12	.857	17	2.76	.437	17	2.76	.562	17
	Eve week show	4.27	.596	66	4.64*	.835	66	2.86	.552	66	2.70	.632	66
	Evening week show	4.50	.842	80	4.85	.873	80	2.85	.677	80	2.83	.652	80
	Midday weekend show	4.47	.735	43	4.93	.828	43	2.81	.588	43	2.84	.615	43
	Eve weekend show	4.40	.599	53	4.92	.829	53	2.77	.542	53	2.85	.601	53
	Evening weekend show	4.54	.673	100	5.06*	.814	100	2.70	.644	100	2.95	.479	100
	Total	4.46	.703	359	4.90	.845	359	2.79	.606	359	2.84	.590	359

*N = 359, *P < .05*

While the differences between the cinemas are apparent the differences in sound levels between the different shows were very slight (table 4.2). Through judging the results there is only one item which indicates significant differences between the different performances. Only the ''maximum sound judgment by the respondent'' indicates significant difference [F (3, 355) = 2.35, p = 0.041] between two shows. Whenever the means are analyzed the differences between the means are smaller between the different shows, in line with the results of the ANOVA analysis. Table 4.9 provides an overview of the means.

4.3. Explanation of the results of study 1

The results show that the mean sound level during an action movie in Dutch cinemas can be described as comfortable, according to Gray (2000). With an average sound level of 64.30 dBA it is not likely that the average sound level meets the threshold of pain. This means that the average sound level should be comfortable for everybody, in contrast to the maximum sound level. During the shows the mean maximum sound level was 97.83 dBA. The absolute maximum sound level was 106 dBA. According to Gray (2000) 100 dBA can be described as uncomfortably high and the maximum sound levels were around the 100 dBA; however there were differences between the cinemas. The measurements reported in table 4.1 provide information that the sound level in cinema C was considerably higher than in the other cinemas. The maximum sound level (106 dBA) was also measured in cinema C, and the average maximum sound level in cinema C was higher than in the other cinemas. This also applies for the average sound level. It should be noted that the cinema C is a cinema which is known for their high sound levels. The results show that the differences between the sound levels on different shows were very small and no interesting differences could be found.

During study one the sound perception research among the people who visited the same show as the researcher was measured. The results show that 57.9% of the people assess the average sound level in the cinema as pleasant. This result is in line with the average sound level of 67.30 dBA, which is considered comfortable. 32% of the respondents consider the sound level as loud, however considering the sound level as loud does not mean that these respondents consider it as uncomfortable. Only 7.8% consider the average sound level as too loud or painfully loud and it is fair to assume that these people consider the sound level as uncomfortable. This cannot be said about the maximum sound level experience. In total 23.2% of the respondents assess the maximum sound level as too loud or painfully loud, while 42.1% think it is loud and only 33, 4% consider the maximum

sound level as pleasant. These results are in line with the objective measurements, were the average maximum sound level was 97.3 dBA. It is obvious that the maximum sound level is perceived louder, since the maximum sound level is considerably louder than the average sound level. However the respondents were only exposed to the maximum sound level for a few seconds, it is interesting that 23.2% consider the maximum sound level as too loud or painfully loud. Therefore it is logical that 22.0% of the respondents would mute the sound, and the large negative correlation (r = -.58, n = 359, $p < 0.01$) between the maximum sound judgment and the volume choice by the respondents supports this assumption. Thereby it should be noted that 69.1% of the respondents would not change the sound level. It is noteworthy that 20.3% of the respondents would visit the cinema less often when the sound levels were muted. Therefore it seems that most of the respondents accept the sound levels and consider these sound levels as a part of the movie experience.

5. Methods study 2

Study two includes an experiment regarding sound perception, emotions and a warning message. The experiment has been executed from 30-01-2013 until 06-02-2013 at the University of Twente at the Vrijhof Culture Department.

5.1. Participants

Respondents were recruited among students from the University of Twente. Since every person can be confronted with certain sound levels in daily live no other preconditions were necessary. The participants were invited through personal invitations, social media and flyers. In total 66 men and 54 women participated on the experiment.

5.2. Procedure

The participants were randomly divided over four groups. In the group with the lower sound level and the warning condition the participants were confronted with the warning message (figure 5.1), which was mounted before the start of the trailer *Skyfall*. Before the trailer started, the groups with the warning conditions were confronted with the message for 10 seconds. After these 10 seconds the trailer started. This was also done with the group with the higher sound level and the warning condition. The other two groups, lower sound level and higher sound level without warning condition were not confronted with the warning message. The sound levels were divided over different timeframes, which means that the higher sound levels and the lower sound levels were exposed to the participants in the morning and the afternoon. Due to this distribution the groups were equally spread over several days. All participants had the option to use a hearing protector whenever they thought that the sound level was unacceptable or painful. 5 participants actually used the protector.

A small auditory room with a high end sound system was arranged to control the sound level and the trailer. A beamer was used to project the trailer on a projection screen and the participant was situated 2.5 meters from the screen. When the participants entered the room they were told that they were going to watch the trailer of *Skyfall* for about 2.5 minutes. After they were told about the trailer the researcher dimmed the light and started the trailer. The participants were not informed about the objective of the experiment; they only knew that the experiment was about movie experience. Thus it was possible to analyze the actual effect of the warning message.

Whenever warning messages are used it is of interest that the message is easy to understand. Using symbols can be of more effect than written messages, since people will understand the message better (Bettman, Payne, & Staelin, 1986). Whenever people process information regarding hazards better, the information will be more utilized. Unfortunately, in the Netherlands no standard symbol for loud sound environments has been developed. Therefore the symbol which is used in construction areas was used during the research. This standard symbol refers to the obligation of using hearing protection in a loud environment. The symbol looks like a person who wears headphones to protect the ears and it is likely that everybody has seen the symbol once. Thus the respondents also knew that they could use the available headphone as protection unit to protect their ears. Next to that, the international warning symbol was used. However the warning symbol for loud sound levels is not officially accepted as a warning message, the warning symbol is an international accepted symbol and is used in different environments. Under the symbols a message was written informing the audience that they were about to be confronted with high sound levels.

Combining the symbols and the brief textual message makes it very unlikely that participants did not understand the message.

Figure 5.1: Warning message

5.3. Measures

The experiment is constructed in order to explore whether warning messages have any effect on the perception of actual sound levels. The design of the experiment is a between-within subjects design. The between factors are the warning messages (warning message versus no warning message) and within factors are the different sound levels (90 dBA versus 70 dBA) whereby the New Instruments BG-5 ® sound level meter was used to determine the sound level. After the participants were finished watching the trailer they were asked to fill out a questionnaire (Appendix E) containing questions about the sound perception, emotions (PAD model), avoidance/approach and the warning message. The questions about the sound perception contained 5 single questions, explicitly:

- In which way did you perceive the sound level of the trailer?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’way too soft’’ until ‘’way too loud’’

- In which way did you perceive the sound level as pleasant?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’totally not’’ until ‘’ totally so’’

- In which way did you perceive the sound level as painful?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’totally not’’ until ‘’ totally so’’

- If you could determine the sound level of the trailer, how would you have determined the sound level?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ''much less louder'' until ''much louder''.

- What grade would you appoint to the sound level of the trailer from 1 until 10?

The PAD model contained 3 constructs existing out 6 questions adapted to the Dutch language, whereby the respondents had the possibility to answer on a 7 point Likert scale. The following items for the different constructs have been used:

Pleasure
Unhappy – Happy
Annoyed – Pleased
Unsatisfied – Satisfied
Melancholic – Contended
Despairing – Hopeful
Bored – Relaxed

Arousal
Relaxed – Stimulated
Calm – Excited
Sluggish – Frenzied
Dull – Jittery
Sleepy – Wide awake
Unaroused – Aroused

Dominance
Controlled – Controlling
Influenced – Influential
Cared for – In control
Awed – Important
Submissive – Dominant
Guided - Autonomous

The six items representing the construct ''pleasure'' proved to be a reliable construct ($\alpha = .83$) just as the construct ''arousal'' ($\alpha = .75$). In the construct ''dominance'' the item ''controlled – controlling'' was deleted to enhance the reliability ($\alpha = .75$). To measure the ''avoidance/approach behavior'' 5 single questions were developed. The following questions were included in the questionnaire:

- To which extend were you tended to use the ear protection?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ''totally not'' until '' totally so''

- To which extend were you tended to leave the room?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’totally not’’ until ‘’ totally so’’

- You want to leave the room as quickly as possible?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’totally disagree’’ until ‘’totally agree’’.

- If you were informed about the sound level before the experiment started, you still would have participated on the experiment.

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’totally disagree’’ until ‘’totally agree’’.

- In the future you would participate on similar experiments?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’totally disagree’’ until ‘’totally agree’’.

To analyze the warning message, two single questions were used, namely:

- You appreciated the warning message prior to the experiment?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’totally disagree’’ until ‘’totally agree’’.

- Through the warning message you knew what to expect?

The respondents had the possibility to answer the question on a 7 point Likert scale, starting from ‘’totally disagree’’ until ‘’totally agree’’.

6. Results study 2

The results of study two will be elaborated in this chapter. All the results will be discussed on the basis of the different groups.

6.1. Sound perception between different groups

Study two of the research consisted out of an experiment in order to investigate what kind of effect a warning message could have on emotions and on the sound perception. Table 6.1 provides an overview of the mean scores of the sound perception between the different groups.

Table 6.1 Sound perception between the different groups

	70 dBA				90 dBA			
	with warning		without warning		with warning		without warning	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Loudness of sound level	4.07*	.87	4.17*	.75	5.43*	.86	5.90*	.76
Pleasantness of sound level	5.00*	1.44	5.00*	1.08	3.27*	1.28	2.57*	1.19
Soreness of sound level	1.80*	1.13	1.93*	1.31	3.60*	1.75	3.67*	1.75
Volume choice by participant	4.10*	.96	3.73*	.94	2.60*	1.07	2.37*	.81
Grade of the sound level	7.57	1.21	7.52	1.30	5.22	2.07	4.57	1.74

*N = 120, *P < .05*

Table 6.1 shows that the mean scores of the 70 dBA groups are neutral (*M* = 4.07, *SD* = .87; *M* = 4.17, *SD* = .75). This indicates that most participants assess the sound level as acceptable, since the mean of pleasantness in both groups of 70 dBA is 5. It could be considered that these means are in line with the other three items regarding the sound evaluation. The mean score on the soreness of the sound level is considerably lower (*M* = 1.80, *SD* = 1.13; *M* = 1.93, *SD* = 1.31) and the mean of the volume choice by the participant was around neutral (*M* = 4.10, *SD* = .96; *M* = 3.73, *SD* = .94). The mean grade which was assigned to the sound levels of 70 dBA was considered fine (*M* = 7.57, *SD* = 1.21; *M* = 7.52, *SD* = 1.30). Turning to the 90 dBA groups some differences can be noticed. Obviously the mean of the loudness of the sound level is higher (*M* = 5.43, *SD* = .86; *M* = 5.90, *SD* = .76), the sound level is indeed higher. Thereby the means of the pleasantness of the sound is lower than in the 70 dBA groups (*M* = 3.27, *SD* = 1.28; *M* = 2.57, *SD* = 1.19) and the mean soreness of the sound level is higher (*M* = 3.60; *M* = 3.67). Whenever the participants could determine the volume, most of the participants would mute the sound level since the means are beneath the neutral level (*M* = 2.60, *SD* = 1.07; *M* = 2.37, *SD* = .81). Next to that, the mean grade of the high sound levels is evaluated as insufficient (*M* = 5.22, *SD* = 2.07; *M* = 4.57, *SD* = 1.74). It is interesting however; that the scores of the groups which are warned (70 dBA with warning and 90 dBA with warning) are on almost every item more towards a positive evaluation than on the groups without warning (70 dBA without warning and 90 dBA without warning). Nevertheless, such conclusions should be drawn carefully, since the differences are very slight.

Table 6.1 shows differences between the 4 different groups of the experiment regarding sound level experience. By conducting a two-way between-groups analysis of variance the effect of the different dBA groups and the different warning message groups on sound perception have been analyzed. Results show that there is significant main effect of the sound perception between the dBA groups on the item ''loudness of sound level'' [F (3, 116) = 109.87, p < 0.001], with a partial eta-squared (η^2) of .468. The participants in the 70 DBA groups rated the item significantly lower (*M* = 4.07, *SD* = .87; *M* = 4.17, *SD* = .75) than the participants in the 90 dBA groups (*M* = 5.43, *SD* = .86; *M* = 5.90, *SD* =

.76).There is also a significant main effect between the different dBA groups on the item ''pleasantness of sound level'' [*F* (3, 116) = 82.43, *p* < 0.001], with a partial eta-squared (*η²)* .415. The participants in the 70 dBA groups rate the item significantly higher (*M* = 5.00, *SD* = 1.44; *M* = 5.00, *SD* = 1.08) than the participants in the 90 dBA group (*M* = 3.27, *SD* = 1.28; *M* = 2.57, *SD* = 1.19). On the item ''soreness of the sound level'' the main effect between the different dBA groups is significant [*F* (3, 116) = 41.06, *p* < 0.001], with a partial eta-squared (*η²)* of .261. Between these groups the 70 dBA groups scores significantly lower (*M* = 1.80, *SD* = 1.13; *M* = 1.93, *SD* = 1.31) than the 90 dBA groups (*M* = 3.60, *SD* = 1.75; *M* = 3.67, *SD* = 1.75). The item ''volume choice by participant'' has a significant main effect between the dBA groups [*F* (3, 116) = 68.26, *p* > 0.001], with a partial eta-squared (*η²)* .370. The 70 dBA groups score significantly higher (*M* = 4.10, *SD* = .96; *M* = 3.73, *SD* = .94) than the 90 dBA groups (*M* = 2.60, *SD* = 1.07; *M* = 2.37, *SD* = .81).

There is no significant main effect [*F* (3, 116 = 3.67, *p* = 0.058], with a partial eta-squared (*η²)* of .031, between the warning message groups and the without warning message groups on the item '' 'loudness of sound level''. The scores of the warning message group (*M* = 4.07, *SD* = .87) in the 70 dBA group and the without warning message group (*M* = 4.17, *SD* = .75) do not statistically differ. This also applies for the 90 dBA group with warning message (*M* = 5.43, *SD* = .86) and the 90 dBA group without warning message (*M* = 5.90, *SD* = .76). The item ''pleasantness of sound level'' also had no significant main effect [*F* (3, 116 = 2.33, *p* = 0.130], with a partial eta-squared (*η²)* of .020 between the different message groups. The 70 dBA warning message group (*M* = 5.00, *SD* = 1.44) does not significantly differ from the 70 dBA without warning message group (*M* = 5.00, *SD* = 1.08), as does the 90 dBA warning message group (*M* = 3.27, *SD* = 1.28) not significantly differ from the 90 dBA without warning message group (*M* = 2.57, *SD* = 1.19). On the item ''soreness of sound level'' no significant main effect between the different message groups has been found [*F* (3, 116) = .132, *p* = .717], with a partial eta-squared (*η²)* of .001. The 70 dBA group with warning message group (*M* = 1.80, *SD* = 1.13) did not significantly differ from the 70 dBA group without warning message (*M* = 1.93, *SD* = 1.31) just as the 90 dBA warning message group (*M* = 3.60, *SD* = 1.75) did not significantly differ from the 90 dBA without warning message group (*M* = 3.67, *SD* = 1.75). The item ''volume choice by participant'' had no significant main effect between the different message groups [*F* (3, 116) = 2.990, *p* = 0.86], with a partial eta-squared (*η²)* of .025, whereby the 70 dBA warning message group (*M* = 4.10, *SD* = .96) not significantly differ from the 70 dBA without warning message group (*M* = 3.73, *SD* = .94). This also applies for the 90 dBA warning message group (*M* = 2.60, *SD* = 1.07) and the 90 dBA without warning message group (*M* = 2.37, *SD* = .87).

There was no interaction effect between the different dBA groups and the different warning message groups on any item. The item ''loudness of sound level'' scored [*F* (3, 116) = 1.537, *p* = .218], with partial *η²* = .013. The item ''pleasantness of sound level'' had an interaction effect of [*F* (3, 116) = 2.327, *p* = .130], partial (*η²)* = .020. The interaction effect of the item ''soreness of sound level'' was [*F* (3, 116) = .015 *p* = .904, partial (*η²)* = .000. The item ''volume choice by participant'' also had no interaction effect between the different dBA groups and the different message groups [*F* (3, 116) = .148, *p* = .701].

6.2. Emotional dimensions between different groups

Another objective of the experiment was to study whether the warning message had any effect on the emotions of the participants. Table 6.2 shows the mean scores of the emotional dimensions. The study shows that the differences between the means of the different groups are very slight. The dimension ''pleasure'' is the dimension close to a pleasures evaluation and the other two dimensions ''arousal'' and ''dominance'' are closer to a neutral evaluation.

Table 6.2. Emotional dimensions between the different groups

	70 dBA				90 dBA			
	With warning		Without warning		With warning		Without warning	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pleasure	2.69	.72	2.84	.53	2.91	1.06	3.21	.89
Arousal	3.72	1.08	3.54	.69	3.46	.75	3.54	.88
Dominance	3.54	.86	3.81	.78	3.98	.80	4.06	.66

*N = 120, *P < .05*

By executing a two-way between-groups analysis of variance the effects of the dBA groups and of the different warning message groups on the different emotional dimensions have been analyzed. No significant main effect have been found between the dBA groups and the construct ''pleasure'' [F (3, 116) = 3.755, p = .055], partial (η^2) = .031. Also no significant main effect could be found between the different dBA groups and the construct ''arousal'' [F (3, 116) = .719, p = .398], partial (η^2) = .006. The construct ''dominance'' does not show a significant main effect between the different dBA groups [F (3, 116) = 3.343, p = .070], partial (η^2) = .028.

No significant main effect could be found between the different warning message groups on the emotional dimensions. The construct ''pleasure'' does not show a significant main effect [F (3, 116) = 2.234, p = .138], partial (η^2) = .019, between the different warning message groups, as does the main effect [F (3, 116) = .101, p = .751, partial (η^2) = .001, of the construct ''arousal''. The construct ''dominance'' also does not have a significant main effect [F (3, 116) = .410, p = .523], partial (η^2) = .004.

No interaction effect has been found between the different dBA groups and the different warning message groups on the construct ''pleasure'' [F (3, 116) = .286, p = .594], partial (η^2) = .002. On the construct ''arousal'' the results did not show an interaction effect [F (3, 116) = .719, p = .398], partial (η^2) = .006, between the different dBA groups and the different warning message groups. The last construct regarding emotions, ''dominance'', does not provide an interaction effect [F (3, 116) = .301, p = .584], partial (η^2) = .003.

Although the 5 questions concerning ''avoidance/approach'' do not actually form a construct, it is interesting whether the mean scores of these items are in line with the results on the emotional dimensions, since one could state that if you had a very negative experience the three ''avoidance'' items should score negative and the two ''approach'' items should score positive. Table 6.3 provides an overview of these means.

Table 6.3. Approach / avoidance items between the different groups

	70 dBA				90 dBA			
	With warning		Without warning		With warning		Without Warning	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Tend to use ear protection	1.97*	1.81	1.87*	1.59	3.17*	2.15	2.67*	2.04
Tend to stop research	1.07	.37	1.13	.73	1.13	.35	1.57	1.19
Tend to leave room immediately	1.33*	.76	1.73*	1.14	2.30*	1.42	2.83*	1.80
Participating with foreknowledge	6.23*	1.81	6.60*	0.72	5.73*	1.44	5.07*	1.80
Future participation	6.47*	.73	6.07*	.98	5.77*	.97	5.13*	1.76

*N = 120, *P <. .05*

The mean scores presented in table 6.3 are somewhat in line with the results of the emotional dimensions. The avoidance items: ''Tend to use ear protection'', ''Tend to stop research'' and ''Tend to leave room immediately'' all score a negative mean score in every group. Next to that, the approach items: ''Participating with foreknowledge'' and ''Future participation'' all score a positive score in every groups. This suggests that the participants did not experienced the experiment negative, also because the emotional dimension ''pleasure'' (table 6.2) tends to be valued positive.

By conducting a two-way between-groups analysis of variance a significant main effect [F (3, 116) = 8.222, p = .005], partial (η^2) = .066, has been found on the item ''Tend to use ear protection'' between the 70 dBA groups (M = 1.97, SD = 1.81; M = 1.87, SD = 1.59) and the 90 dBA groups (M = 3.17, SD = 2.15; M = 2.67, SD = 2.04). A significant main effect [F (3, 116) = 17.951 p < .000], partial (η^2) = .134, also has been found between the 70 dBA groups (M = 1.33, SD = .76; M = 1.73, SD = 1.14) and the 90 dBA groups (M = 2.30, SD = 1.42; M = 2.83, SD = 1.80) on the item ''Tend to leave room immediately''. On the item ''Participating with foreknowledge'' a significant main effect [F (3, 116) = 13.609, p < .000], partial (η^2) = .105, has been found between the 70 dBA groups (M = 6.23, SD = 1.81; M = 6.60, SD = .72) and the 90 dBA groups (M = 5.73, SD = 1.44, M = 5.07, SD = 1.80). There is a significant main effect [F (3, 116) = 14.491, p < .000] on item ''Future participation'' between the 70 dBA group (M = 6.47, SD = .73; M = 6.07, SD = .98) and the 90 dBA groups (M = 5.77, SD = .97; M = 5.13, SD = 1.76). The only item which did not had a significant main effect [F (3, 116) = 3.390, p = .068, partial (η^2) = .028, was ''tend to stop research'', with only small differences between the 70 groups (M = 1.07, SD = 1.81; M = 1.13, SD = .73) and the 90 dBA groups (M = 1.13, SD = .35; M = 1.57, SD = 1.19).

No significant main effect [F (3, 116) = .740, p = .391], partial (η^2) = .006 has been found between the warning message groups in the 70 dBA group (M = 1.97, SD = 1.81) and in the 70 dBA group without warning message (M = 1.87, SD = 1.59) on the item ''Tend to use ear protection''. This also applies for the 90 dBA warning message group (M = 3.17, SD = 2.15) and the 90 dBA without message group (M = 2.67, SD = 2.04). There is no significant main effect [F (3, 116) = 3.390, p = .068], partial (η^2) = .028 between the 70 dBA warning message group (M = 1.07, SD = .37) and the 70 dBA without warning message group (M = 1.13, SD = .73) on the item ''Tend to stop research'', which also occurs with the 90 dBA warning message group (M = 1.13, SD = .35) and the 90 dBA without warning message group (M = 1.57, SD = 1.19). The item ''Tend to leave room immediately'' does not have a significant main effect [F (3, 116) = 3.661, p = 0.58], partial (η^2) = .134 between the 70 dBA warning message group (M = 1.33, SD = .76) and the 70 dBA without warning message group (M = 1.73, SD = 1.14) and between the 90 dBA warning message group (M = 2.30, SD = 1.42) and the 90 dBA without warning message group (M = 2.83, SD = 1.80. There is also no significant main effect [F (3, 116) = .296, p = .587), partial (η^2) = .003, between the 70 dBA warning message group (M = 6.23, SD = 1.81)

and the 70 dBA without warning message group (*M* = 6.60, *SD* = 0.72) on the item ''Participation with foreknowledge'', which also applies for the 90 dBA warning message group (*M* = 5.73, *SD* = 1.44) and the 90 dBA without warning message group (*M* = 5.07, *SD* = 1.08). A significant main effect [*F* (3, 116) = 5.800, *p* = .018], partial (η^2) = .048, has been found on the item ''Future participation'' between the 70 dBA warning message group (*M* = 6.47, *SD* = .73) and the 70 dBA without warning message group (*M* = 6.07, *SD* = .98) and between the 90 dBA warning message group (*M* = 5.77, *SD* = .97) and the 90 dBA without warning message group (*M* = 5.13, *SD* = 1.76) .

No interaction effect [*F* (3, 116) = .329, *p* = .567], partial (η^2) = .003 has been found between the different dBA groups and the warning message groups on the item ''Tend to use ear protection'', no interaction effect [*F* (3, 116) = 1.823, *p* = .180], partial (η^2) = .015, has been found between the different dBA groups and the warning message groups on the item ''Tend to stop research'' and no interaction effect [*F* (3, 116) = .075, *p* = .785], partial (η^2) = .001, has been found between the different dBA groups and warning message groups on the item ''Tend to leave the room immediately''. The approach item, ''Participating with foreknowledge'', has no interaction effect [*F* (3, 116) = 3.515, *p* = .063], partial (η^2) = .029, between the different dBA groups and the different warning message groups. The other approach item, ''Future participation'', also has no interaction effect [*F* (3, 116) = .296, *p* = .588] with the different dBA groups and the warning message groups.

6.3. Warning message between the different groups

It is of interest to analyze how the participants experienced the warning message. Table 6.4 gives an impression of the evaluation of the warning message.

Table 6.4. Warning message items between the different groups

	70 dBA						90 dBA					
	With warning			Without warning			With warning			Without warning		
	Mean	SD	Missing (N)	Mean	SD	Missing (N)	Mean	SD	Missing (N)	Mean	SD	Missing (N)
Appreciation warning message	4.34	2,11	1			30	5.44	1.50	3			30
Knowledge through warning message	4.83	1,91	1			30	5.67	1.30	3			30

*N = 120, *P < .05*

Table 6.4 shows that the participants, who were exposed to the warning message, appreciated the warning message reasonable positive (*M* = 4.34, *SD* = 2.11; *M* = 5.44, *SD* = 1.50). The mean scores between the two different groups are on both items considerable. In the 70 dBA group with warning message the mean scores tend to be more neutral (*M* = 4.34, *SD* = 2.11; *M* = 4.83, *SD* = 1.91) than the scores in the 90 dBA group with warning message (*M* = 5.44, *SD* = 1.50; *M* = 5.67, *SD* = 1.30), which tend to be more positive. An independent sample t-test was conducted in order to find out whether there was significant difference regarding the evaluation of the warning message between the two different groups (70 dBA with warning message and 90 dBA with warning message). The item ''appreciation warning message'' showed a significant difference between the 70 dBA group and 90 dBA group (*t*) (54) = -2.26, *p* = .028. The item ''Knowledge through warning message'' did not show any significant difference (*t*) (54) = -1.93, *p* = .059. It is remarkable that, in total, 4 participants who

were exposed to the warning message did not recall seeing the message, since they selected the same answer as the participants who were not exposed to the warning message.

6.4. Cinema related subjects between different groups.

Since study one was conducted in the cinemas, and the sound levels during the experiment were based upon the actual sound levels in the cinemas, information which could have been of valuable has been collected.

Table 6.5. Overview of cinema related subjects

				Sound level compared to cinema			Sensitivity to sound levels	
				N	Average	SD	Average	SD
Group	70 dBA with warning	Visited Skyfall in the cinema	Yes	22	3.09	1.27	4.27	1.45
			No	8	2.88	1.36	4.25	.89
	70 dBA without warning	Visited Skyfall in the cinema	Yes	19	3.26	.87	4.05	1.84
			No	11	3.64	.92	4.45	1.37
	90 dBA with warning	Visited Skyfall in the cinema	Yes	12	4.83	1.19	4.33	1.15
			No	18	4.44	1.29	4.72	1.13
	90 dBA without warning	Visited Skyfall in the cinema	Yes	15	5.60	1.06	4.53	1.30
			No	15	5.13	1.64	4.47	1.68
	Total			120	4.11	1.20	4.39	1.35

The participants who watched the movie *Skyfall* in the cinema are of a greater number (*N* = 68) than the participants who did not watch the movie in the cinema (*N* = 62). Considering the total mean of the sound levels during the experiment one could say that the sound level during the experiment was almost exact the same as the sound level in the cinema (*M* = 4.11, *SD* = 1.20). The participants who were exposed to 70 dBA consider the sound level in general less loud than in the cinema (M = 3.09, *SD* = 1.27; *M* = 2.88, *SD* = 1.36; *M* = 3.26, *SD* = .87; *M* = 3.64, *SD* = .92) and the participants who were exposed to the 90 dBA consider the sound level louder than in the cinema (*M* = 4.83, *SD* = 1.19; *M* = 4.44, *SD* = 1.29; *M* = 5.60, *SD* = 1.06; *M* = 5.13, *SD* = 1.64). These averages can be explained, since the 70 dBA groups are in line with the entire average sound level and the 90 dBA groups are in line with the maximum sound level in the cinemas. Reviewing the sensitivity of the sound levels it could be stated that there are hardly any differences between the means of the participants of the different groups, and the mean of the sensitivity to sound levels for any group is close to neutral. Therefore it is unlikely that the sensitivity of the participants had any influence on the experiment.

6.5. Explanation of the results of study 2

The results of the sound perception show that the participants of the experiment perceived the higher sound levels indeed higher than the medium sound levels. After analyzing the items regarding the sound perception it can be concluded that the 90 dBA groups perceived the sound level significantly louder and more unpleasant than the 70 dBA groups. This is acknowledged by the main effects between the two sound level groups on every item regarding sound perception (table 6.1). These results confirm the obvious hypothesis 1, which states that people perceive sound levels louder whenever the sound level is louder.

The warning message used during the experiment was appreciated by the participants. As well as in the 70 dBA group with warning message as in the 90 dBA group with warning message the warning

message was appreciated positively (table 6.5). The warning message also informed the participants about the potential hazard, since the scores on the item ''knowledge through warning message'' was classified positive in both sound level groups. These results confirm hypothesis 2, warning messages lead to higher awareness of the potential hazard.

The results of study two provide evidence which cannot confirm the third hypothesis, warning messages in higher sound environments induce higher sound perception. The score of the 90 dBA sound level group with warning message was lower than the score of the 90 dBA sound level group without warning message. If all the items regarding the sound perception are studied (table 6.1), it could be stated that the participants subjected to 90 dBA and the warning message perceive the sound more positive than the participants subjected to the 90 dBA and no warning message, although no significant main effects between the warning message groups have been found. Besides, no interaction effect between the 90 dBA groups and the warning message has been found.

One objective contained in study two was to investigate whether warning messages in medium sound environments induce lower sound perception, described as hypothesis 4. The results of study two supports this hypothesis, since the 70 dBA group with warning message evaluates the sound level more positive than the 70 dBA group without warning message; however the differences between the two 70 dBA groups are very slight (table 6.1). If all the items regarding the sound level perception and the two 70 dBA groups and the warning messages groups are studied, no significant main effect on any item between the two 70 dBA groups could been found. Also, no interaction effect has been found between the 70 dBA groups and the warning message.

The four experimental groups were also confronted with the emotional dimensions. In these groups no significant main effect occurred on any emotional dimension. Furthermore, no interaction effect was found between the two dBA groups and the two warning message groups. The results for every dimension hardly differ per group, indicating that the experiment did not have any effect on these three emotional dimensions, regardless the conditions subjected to the participant.

The results of the ''avoidance/approach'' dimension provide information that the participants of every group did not want to avoid the experiment; however significant main effects have been found between the two dBA groups on two of the three items regarding avoidance. On these items the 70 dBA groups score significantly more negative than the 90 dBA groups. Considering the two approach items, on both items a significant main effect occurs between the two dBA groups, whereby the 70 dBA group scores significant higher. One main effect of the warning message has been found on the ''approach'' item: ''Future participation''. The 90 dBA groups without warning message score significantly lower than the 90 dBA group with warning message; however in every case, the scores are still positive. No other main effects of the warning messages on the ''avoidance/approach'' items have been found and no interaction effect between the dBA groups and the warning message groups has been found.

7. Discussion and limitations

The results in the two studies provide enough material for discussion. However the research topics of both studies are in line with each other both studies have their own character. Study one focused upon sound levels in Dutch cinemas and the sound perception of these visitors and study two has focused upon sound perception, emotions and warning messages.

7.1. Study 1: Sound levels in cinemas and sound experience

The first study included a measurement of the sound levels in four different cinemas across the Netherlands. Every cinema was visited six times to acquire reliable measurements of the actual sound levels in that cinema, summarized twenty-four measurements of the movie *Skyfall*. For every cinema three week shows and three weekend shows were selected, whereby the starting time of the show was as consistent as possible for every cinema. Overall the sound levels in the cinemas were not hazardous for visitors. The high sound levels which were measured occurred temporarily and the average sound level can be described as comfortable according to Gray (2000) and Seidman (1999). The high sound levels can be described as loud and are potentially hazardous; however the visitors of a cinema are only exposed to such sound levels for a short period. Zhao et al. (2010) reported that Noice-Indused-Hearing Loss (NIHL) can occur whenver people are exposed to sound levels exceeding 85 dBA, however at this level, it will only occur whenever a person is exposed to the sound level for certain hours. Thereby people can obtain NIHL whenever they are exposed to certain peak sound levels. Inmediate NIHL can occur whenever a person is exposed to sound levels exceeding 120 dBA for 15 minutes (Zhao, Manchaiah, French, & Price, 2010; Gray, 2000). Since the average sound level and the maximum sound levels of the cinemas studied during this study are beneath these levels it is fair to conclude that the sound levels in Dutch cinemas during an action movie are hardly hazardous and governmental measures regarding the sound levels in cinemas are yet superfluous.

Nevertheless, it is remarkable how straightforward high sound levels can be achieved by cinemas. Therefore it is wise to monitor the sound levels of cinemas, thus makes it possible to prevent cinemas achieving hazardous sound levels. Besides, it is interesting how matters stand with other leisure activities. It is hard to imagine that sound levels in clubs and discotheques are not hazardous, but also theathers, fairs and stadiums could be a potential source for NIHL. Partly because there were also differences between the different cinemas in this study.

It is interesting that the sound levels differ between the different cinemas. The sound levels measured in cinema C were significantly louder than the other cinemas. It seems that cinemas determine their sound level carefully, possibly based upon the demand of the visitors or their technical possibilities. This presumption is acknowledged by cinema C, a cinema which emphasizes its technical possibilities. It would be interesting whether these differences also occur whenever a larger sample is studied.

Reviewing the results of the showtimes there are hardly any differences between the different shows. It seems that the results are almost exactly the same for every show time and that the slight differences could be caused by the different seat in which the researcher was in. No other interesting results have been found between the different seating's and the other cinema characteristics, just as the research of Warszawa & Sataloff (2010) concluded.

Comparing the results of the sound levels with the study of Warszawa & Sataloff (2010) it can be concluded that the sound levels in the Dutch cinemas are considerably lower than in the cinemas reported by Warszawa & Sataloff, who reported dBA's exceeding 110 dBA in 22 of the 25 movies.

Such sound levels were not measured once during this study. The sound levels during the study are more in line with the results of Ryberg (2009) and Allen (1998), while Ryberg (2009) did not find maximum sound levels exceeding 110 dBA or an average of 90 dBA in Swedish cinemas. Ryberg (2009) reported that cinemas did meet the guidelines of sound levels of the Swedish government meaning that the soud levels in cinemas are hardly hazardous for the visitors, a statement supported by this study.

Sound levels and sound perception are two completely different topics. During study one the sound perception of the visitors was measured. Most of the respondents consider the average sound level of the cinema as pleasant , while a considerable part think it is loud. Only a small percentage consider the sound level as too loud or painfully loud. Keeping the results in mind it is fair to consider that the average sound levels meet the expectation of the visitor of the cinema. The average sound levels could be defined as comfortable and it seems that the visitors share this opinion. Whenever the respondents evaluated the maximum sound level it is obvious that they have perceived this sound level louder. A large part of the visitors consider the maximum sound level as loud, while almost a quarter of the visitors define the maximum sound level as too loud or painfully loud. Once again, keeping the results of the sound level measurements in mind, it is possible that the maximum sound levels are considered as uncomfortable since these maximum sound levels reach questionable levels defined by Gray (2000) and Seidman (1999). Only one third of the visitors consider the maximum sound level as pleasant. Interestingly, it seems that the sound perception has hardly any influence on the personal behavior of the visitors. If the visitors could change the sound level, most of the visitors would not change it. In fact, a considerable part of the respondents would visit the cinema lest often whenever the sound levels are muted. These results indicate that the respondents consider the sound levels as a part of the total cinema experience, even while they experience the maximum sound level as loud. As Plantinga (2009) discussed, sound effects could evoke emotions and enhance the cinema experience, and it seems that louder sound levels contribute to this experience. Nevertheless cinema visitors could be annoyed by the sound levels and during the study two participants admidded to have used earpluggs to avoid the high sound levels in cinemas. As Gray (2000) pointed out, dBA's are somewhat like the Fahrenheit scale. Each person experiences temperature differently, some people consider 100 Fahrenheit as unacceptable hot, while other people consider 100 Fahrenheit as pleasant. Some people experience 100 dBA as unacceptable, while other people expierence 100 dBA as pleasant and part of the cinema experience.

There are significant differences between the perception of sound levels by the respondents between cinema C and the other cinemas, whereby cinema C is evaluated significaltly louder than the others. Obviously this explainable, since the actual sound levels in cinema C were considerably louder and people were subjected to louder sound levels; however it indicates that the sound perception in a louder sound environment is considered differently.

Just as the sound level measurement, it is of interest in which way the sound perception is experienced during other leisure activities. Almost one quarter of the respondents during this study considered the maximum sound level as uncomfortable. If the same numbers turn out during other leisure activities, like theater visits, it might be wise to conduct large-scaled research about sound perception during leisure activities in order to get insight in customer experience. From there on it might be possible to enhance experiences in other ways than turning up sound levels.

7.2. Study 2: Sound perception, emotions and warning messages

In the second study two objectives were included. First of all, the experiment needed to provide an answer to the question what kind of influence the warning message had on the participants of the experiment. In order to do so, four hypotheses had been formulated on the basis of existing literature. Next to that, the experiment needed to evaluate the influence of the warning message and the different sound levels on different emotional dimensions.

The two different sound levels used during the experiment of study two (70 dBA / 90 dBA) differ considerably in loudness. Results showed that whenever the sound levels are louder, people will perceive these sound levels louder, a result also found in study one. Next to that, the warning messages which were used during the experiment have lead to more awareness of the potential hazard, the higher sound level. These results are obvious, since the guidelines for perception of louder sound levels (Seidman, 1999) are widely accepted and it is commonly accepted that warning messages lead to higher attention of the potential hazard (Bettman, Payne, & Staelin, 1986).

More interesting are the results of the actual effects of the warning message on the sound perception in a 90 dBA sound level environment. It was expected that the sound perception would be higher whenever people are warned for the high sound level. This effect is proven upon other health-related issued, like smoking, whereby the knowledge of the noxiousness increases the negative attitude towards the product (Hammond, Fong, Borland, & Cummings, 2006; White, Webster, & Wakefield, 2008; Hammond D. , Fong, McDonald, Brown, & Cameron, 2004). Suprisingly, the participants in the high sound level group with warning message rated the sound level softer than the participants in the high sound level group without warning message; however the results on the sound perception between the two warning message groups were not significant. Nevertheless it is interesting that the group with warning message assessed a more positive score towards the sound perception on any item. This could indicate that the warning message had a small effect and instead of rising the attention, it had the effect of ''forearming'', described by Petty & Cacioppo (1977) wheredue the participants were prepared for the high sound level. In the medium sound environment the results show that people also perceive the sound level softer whenever they are warned for the sound level; however these results are very slight and not significant.

Although the results are not all significant it is of interest that the warning message groups have evaluated the sound perception more positive than the without warning groups, in that sense that they have perceived the sound level more comfortable. Especially with the high sound level group the warning message seems to have a positive effect on the sound perception. Next to that, the warning message was appreciated in both warning message groups. This is in line with the study of Wogalter et al.(1994) who reported that warning messages could enhance the attitude from consumers towards the potential hazards of products. However the experiment did not involve any products, the respondents did appreciate the warning message for the potential hazard. It is of interest what kind of effect the warning message would have when it is exposed to cinema public. Considering the sound perception of the maximum sound level of the respondents of study one and the effect of the warning message in study two it might be an interesting method to enhance the maximum sound perception by cinema public. In other words, what kind of effect would a warning message have whenever it is used in the cinema?

Unfortunatly the warning message has had hardly any influence on the emotions of the respodents in any group. No significant differences between any of the three emotional dimensions and the four

experimental groups have been found. This indicates that the neither the sound levels, or the warning message had any effect on the PAD emotional dimensions.

Reviewing the ''avoidance/approach'' items it seems that the respondents did not had a negative experience on the research since the avoidance items were ranked negative and the approach items were ranked positive. Obviously there were significant differences between the 70 dBA groups and the 90 dBA groups ,since the perception is also different. The fact remains that every group evaluated the experiment as positive.

However the results regarding the emotions, sound levels and warning message are limited it is possible that the warning message had some effect which was not measured. During the research some participants indicated that the warning message spooked them before seeing the trailer. It might be possible that warning messages regarding sound levels spook people, however this was not measured. Next to that, every warning message has the possible effect of the ''forbidden fruit'' theory, which means that people are attracted to things which can cause harm when they are warned. Especially in subjects with regard to the content of the television program, the forbidden fruit theory can arise (Pechmann & Shih, 1999; Bushman & Stack,1996). It is not likely that forbidden fruit theory regarding warning messages and sound level will erase, but it is a possiblity. Just these two examples of possible side-effects indicate that a lot of research regarding warning messages concercing sound levels needs to been done before actually implementing these warning messages.

7.3. Conclusion and limitations

The objective of the first study was to get insight in the actual sound levels in Dutch cinemas during an action movie and how the visitors perceived these sound levels. The sound levels during an action movie are not hazardous for the visitors, since the sound level stay beneath the limits of definitive NIHL. The average sound level (64.30 dBA) can be described as comfortable (Seidman, 1999; Gray, 2000) Nevertheless the sound levels in Dutch cinemas can be annoying, especially the maximum sound levels. During the study an absolute maximum sound level of 106 dBA was measured and this sound level is for a lot of people annoying; however visitors are only exposed to these kinds of sound levels for a short period. The perception of the visitors during the action movie is in line with the objective measurement. The average sound level is reviewed as comfortable by most of the respondents, while a majority of the respondents consider the maximum sound level as loud. The maximum sound level is evaluated as too loud or painfully loud by a quarter of the respondents. Yet it can be stated that the sound levels are a part of the cinema experience, since most of the respondents would not change their visiting behavior nor change the change sound level.

During the second study the effect of a warning message regarding sound levels has been investigated. It turns out that the warning message had a small influence on the sound perception of the participants. Whenever the participants were warned, they perceived the sound level slightly more comfortable. Thereby the presence of the warning message was appreciated and it enhanced the knowledge of the participants, even more whenever the respondents were exposed to higher sound levels.

It would be of interest what kind of effects a warning message would have when it is actually used in cinemas; however it is necessary to establish a solid base before using warning messages.

Just like any research project this study had its limitations. The sound levels were measured in four different cinemas across the Netherlands. Since there are much more cinemas in the Netherlands, and differences between the four cinemas have been described, it is hard to determine whether the sound levels would be different in other cinemas in the Netherlands. Although there is no reason to

assume that the results would differ if the study was executed in other cinemas there is no certainty regarding this issue. Next to that, all the measurements occurred during the movie *Skyfall.* However the consideration to measure only one movie has been elaborated in chapter 2.2.2 the sound levels were coherent with the movie. This means that the measurements were consistent, but it is also obvious that another movie would generate different results regarding the sound levels and possibly also on the sound perception, however Warszawa & Sataloff (2010) did not find any of these differences. During study 2, the experiment, participants were only recruited from students studying at the University of Twente, while students might be more used to be confronted with higher sound levels than other people. Therefore they would have influenced the results, since they are accustomed to high sound levels. Next to that, the perception of sound levels in a small audio room can differ from sound levels in cinemas.

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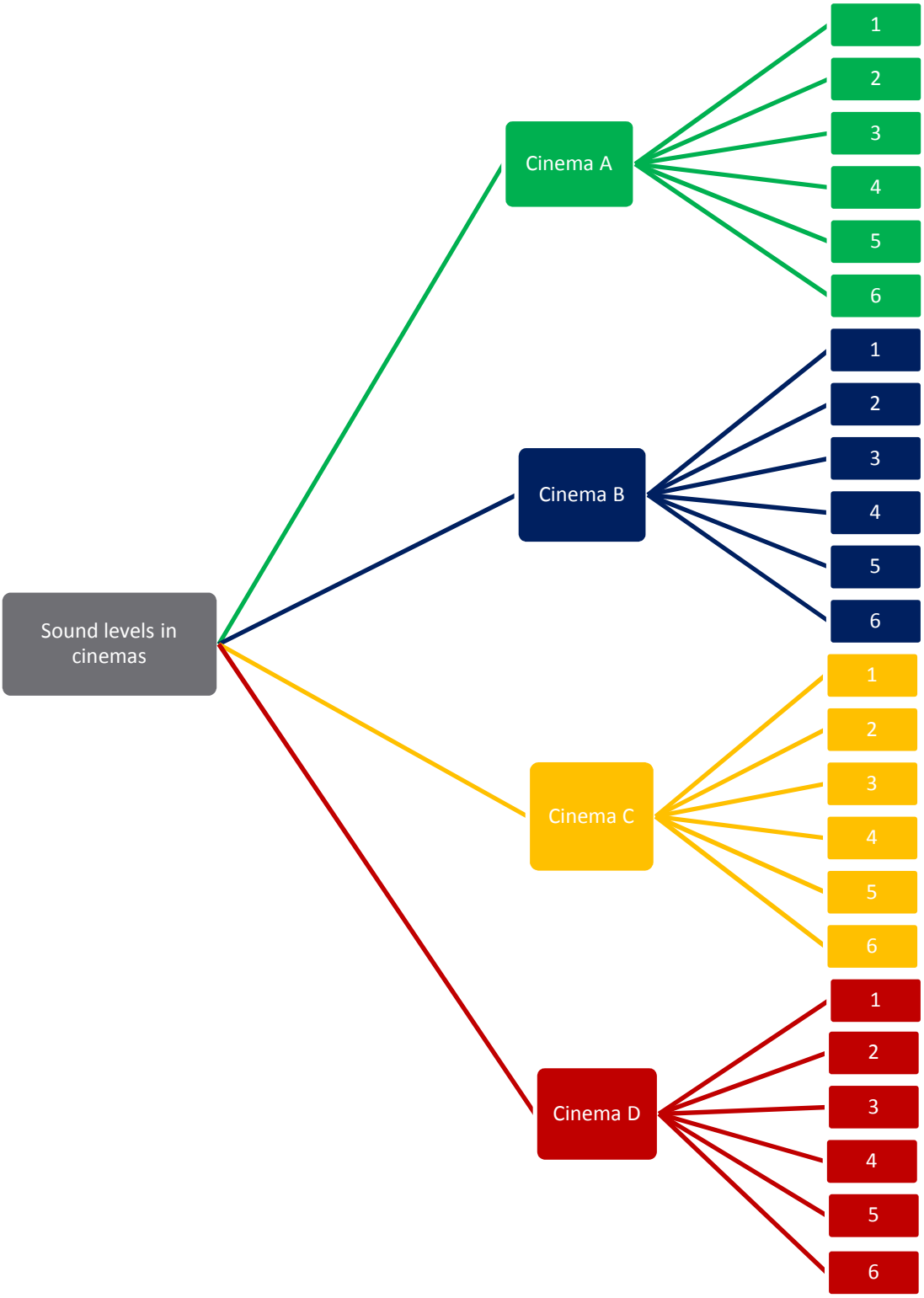
Appendixes

1. Appendix A: Visiting scheme cinemas



2. Appendix B: Protocols study 1

Phase 1; Sound levels in cinemas

1. The researcher will reserve a ticket for the movie one day before the show.

2. The ticket will be bought at the desk with the shortest queue, whenever multiple desks are free, the desk located closest to the entrance will be chosen. However, when tickets are bought at the same cinema, it is of interest to avoid purchase at the same cashier in order to avoid suspicion.

3. The researcher will not ask for specific seating.

4. The researcher will not reveal the sound level meter until he is located in his seat.

5. During the first minutes, when the advertisements start, the researcher will start using the sound level meter.

6 The sound levels will be registered and saved by the sound level meter.

7. The researcher will leave the cinema 5 minutes before the end of the movie to prepare for phase 2 of the research.

8. Whenever an employee of the cinema discovers the researcher during the measurement, the researcher will complete phase 1 and phase 2, but the specific cinema will be replaced by a different but similar cinema.

9. The checklist of the cinema will be completed directly after the visit in the cinema.

10. The cinemas will not be revealed in order to sustain their anonymity.

Phase 2; Sound experience visitor

1. During the break of the movie the researcher will ask the audience if they are willing to fulfill the questionnaire at the end of the movie to complete phase 2.

2. 5 minutes before the end of the movie the researcher will exit the cinema.

3. The researcher will stay 10 meters from the entrance of the cinema and approach people to complete the flyer-questionnaire.

4. The researcher will try to gain as much flyer-questionnaires as possible.

5. Whenever a cinema employee asks after the motives of the researcher, the researcher will answer with a pretext (handing out flyers for a certain student party) but will also leave the premises. The researcher will try to remain the mystery cover at all cost, but whenever the researcher needs to hand over a copy of the flyer-questionnaire the cinema will be disclosed from the research and replaced by a different but similar cinema.

3. Appendix C: Checklist of the cinema

Size of the cinema

- o 1 – 5 theaters
- o 5 – 10 theaters
- o 10 – 15 theaters
- o 15 – theaters

Size of the theater

- o 0 – 100 seating's
- o 100 – 200 seating's
- o 200 – 300 seating's
- o 300 – 400 seating's
- o 400 – seating's

Visual available boxes.

…….

Supposed sound system

- o Surround system
- o Boxes just in the back
- o Boxes just in the front
- o Boxes in the front and the back

Distance seating till the closest box

- o 0 – 5 meters
- o 5 – 10 meters
- o 10 – 20 meters
- o 20 meters or more

Audience size

- o 0 – 100 seating's
- o 100 – 200 seating's
- o 200 – 300 seating's
- o 300 – 400 seating's
- o 400 – or more seating's

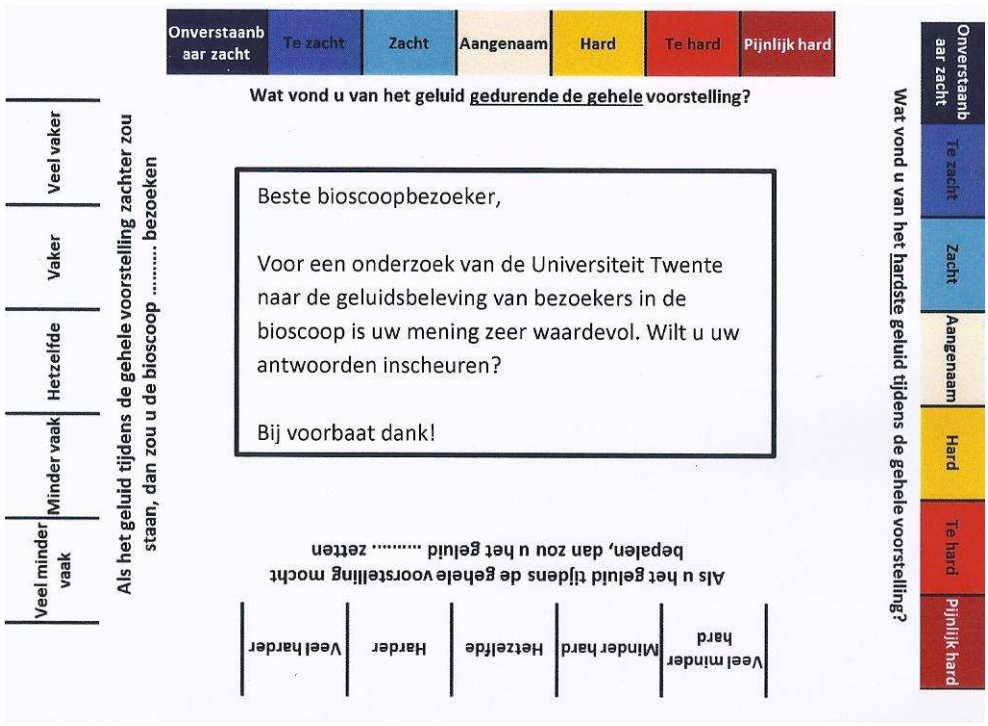
Date of visit

…….

Size of the cinema

- o Midday week show
- o Eve week show
- o Evening week show
- o Midday weekend show
- o Eve weekend show
- o Evening weekend show

4. Appendix D: Flyer – Questionnaire



5. Appendix E: Questionnaire

Beste deelnemer,

Hartelijk dank voor uw deelname aan het filmbelevingsexperiment. De onderstaande vragen hebben allemaal betrekking op de trailer die u heeft gezien. Kruis telkens het antwoord aan dat het best uw mening weer geeft.

De onderstaande vragen hebben betrekking op de beleving van de trailer. Vul het antwoord in dat het dichtste in de buurt komt van wat u heeft ervaren. Kleur bolletje 1 in indien u het geluid als veel te zacht heeft ervaren en bolletje 7 indien u het geluid als veel te hard heeft ervaren. De bolletjes tussenin zijn ook mogelijk

1. **Hoe hebt u het geluidsniveau van de trailer ervaren?**

Veel te zacht O O O O O O O Veel te hard

2. **In welke mate vond u het geluidsniveau aangenaam?**

Helemaal niet O O O O O O O Helemaal wel

3. **In welke mate vond u het geluidsniveau pijnlijk?**

Helemaal niet O O O O O O O Helemaal wel

4. **Als u het geluid van het filmpje zelf had kunnen bepalen, hoe had u het geluid dan ingesteld?**

Veel minder hard O O O O O O O Veel harder

5. **Welk rapportcijfer geeft u aan het geluidsniveau van het filmpje? (van 1 t/m 10)**

.....

Hieronder worden een aantal verschillende emoties omschreven. Sommige woordcombinaties lijken misschien wat vreemd, maar één van de twee woorden zal meer van toepassing zijn. Kleur het bolletje tussen de twee woorden in dat het beste uw gevoel op dit moment omschrijft.

1. Op dit moment voel ik me?

Gelukkig	O	O	O	O	O	O	O	Ongelukkig
Verheugd	O	O	O	O	O	O	O	Geïrriteerd
Tevreden	O	O	O	O	O	O	O	Ontevreden
Voldaan	O	O	O	O	O	O	O	Melancholisch
Hoopvol	O	O	O	O	O	O	O	Wanhopig
Ontspannen	O	O	O	O	O	O	O	Verveeld
Geprikkeld	O	O	O	O	O	O	O	Ontspannen
Opgewonden	O	O	O	O	O	O	O	Kalm
Opgefokt	O	O	O	O	O	O	O	Lusteloos
Onrustig	O	O	O	O	O	O	O	Saai
Wakker	O	O	O	O	O	O	O	Slaperig
Alert	O	O	O	O	O	O	O	Sloom
Overheersend	O	O	O	O	O	O	O	Gecontroleerd
Invloedrijk	O	O	O	O	O	O	O	Beinvloed
Leidend	O	O	O	O	O	O	O	Volgzaam
Belangrijk	O	O	O	O	O	O	O	Onder de indruk
Dominant	O	O	O	O	O	O	O	Onderdanig
Onafhankelijk	O	O	O	O	O	O	O	Gestuurd

1. **In welke mate heeft u op het punt gestaan om de koptelefoon op te zetten?**

Helemaal niet O O O O O O O Helemaal wel

2. **In welke mate heeft u tijdens de trailer op het punt gestaan om de ruimte te verlaten?**

Helemaal niet O O O O O O O Helemaal wel

3. **U zou het liefst de ruimte zo snel mogelijk willen verlaten.**

Helemaal oneens O O O O O O O Helemaal eens

4. **Als u vóór het zien van de trailer op de hoogte was geweest van het geluidsniveau tijdens het onderzoek, dan zou u aan het onderzoek hebben deelgenomen.**

Helemaal oneens O O O O O O O Helemaal eens

5. **In de toekomst zou u wederom deelnemen aan een soortgelijk onderzoek.**

Helemaal oneens O O O O O O O Helemaal eens

1. **De waarschuwing voorafgaand aan de trailer heeft u op prijs gesteld (indien u de waarschuwing niet heeft gezien dan kunt u n.v.t. invullen).**

Helemaal oneens O O O O O O O Helemaal eens O N.V.T.

2. **Door de waarschuwing wist u wat u te wachten stond (indien u de waarschuwing niet heeft gezien dan kunt u n.v.t. invullen).**

Helemaal oneens O O O O O O O Helemaal eens O N.V.T.

3. **Als u het geluid van de trailer vergelijkt met het geluid in de bioscoop, dan vond u dit geluidsniveau …….**

Veel minder hard O O O O O O O Veel harder

4. **Heeft u de film Skyfall in de bioscoop gezien?**

O Ja
O Nee

5. **Welke opleiding volgt u momenteel of wat is uw opleidingsniveau (waar u ook een diploma van heeft)?**

O Middelbare school
O MBO
O HBO
O WO
O PhD

6. **Kunt u aangeven welke studierichting u heeft gekozen?**

O Onderwijs
O Taalwetenschappen, geschiedenis en kunst
O Sociale wetenschappen
O Bedrijfskunde en administratie
O Rechten
O Natuurwetenschappen, wiskunde en informatica
O Techniek, industrie en bouwkunde
O Landbouw en diergeneeskunde
O Gezondheidszorg en welzijn
O Persoonlijke dienstverlening, vervoer, milieu en veiligheid
O Niet van toepassing