Effects of Framing and Temporal Distance in Health Risk Messages on Attitudes and Intentions Toward Hearing Protection Adoption

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Abstract

Due to the ever-increasing number of people worldwide performing unsafe listening practices, 1 in 4 of the projected global population (2.5 billion people), will suffer from hearing loss. Therefore, informing people about adopting effective hearing protection is crucial to prevent unsafe listening practices from damaging their auditory system. The aim of this study is to investigate the effects of framing (gain vs. loss) and temporal distance (short vs. long), on people's attitudes toward hearing protection and intentions to adopt hearing protection among Dutch citizens. Data collection was carried out through an online experiment among people aged 18 to 65 years and older (N = 146). Participants first reported prior experience with hearing protection and hearing damage to measure the possible influence. Participants' attitudes toward and intentions to adopt hearing protection were measured before and after the stimulus. To test the hypotheses a 2 × 2 between-subject design was used. In contrast to our hypotheses, framing and temporal distance in risk messages about hearing protection did not impact participants' attitudes and intentions. However, regardless of framing and temporal distance, intentions to adopt hearing protection increased after seeing the risk message. Thus, this study shows that risk messages increased intentions to adopt hearing protection, despite no effect from framing or temporal distance.

Keywords: attitude, construal level theory, framing, hearing protection, intention, prospect theory, temporal distance

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Effects of Framing and Temporal Distance in Health Risk Messages on Attitudes and Intentions Toward Hearing Protection Adoption

In an ever-changing world, where we are continuously exposed to noise, concerns are growing about the potential permanent damage it does to our hearing. By 2050, nearly 1 in 4 of the projected global population (2.5 billion people) will suffer from hearing loss (United Nations, n.d.; WHO, 2021). After age-related hearing loss, noise-induced hearing loss (NIHL) is the most common type of sensorineural hearing loss, caused by exposure to excessive loud noise in work and recreational-related environments (e.g., construction sites or music festivals) (Natarajan et al., 2023). Research suggests an increase in unsafe listening practices within the population, particularly among adolescents and young adults between 12 and 34 years old (Dillard et al., 2022). An estimated 0.67–1.35 billion adolescents and young adults engage in unsafe listening practices, with the majority attributed to excessive noise at entertainment venues (48.20%) and personal listening devices (23.81%) (Dillard et al., 2022; Gupta et al., 2022). Hence, informing people about adopting effective hearing protection is crucial to prevent unsafe listening practices from damaging their auditory system.

Recognizing the significance of early intervention is crucial to preventing hearing damage and preserving the auditory system from potential harm. Using earplugs, a common recreational hearing protection device that reduces noise by 10 to 30 dB, depending on fit and quality (Bonnet et al., 2019; Ramakers et al., 2016; Williams, 2012) helps to protect against loud environments. Earplugs are opted for after experiencing (temporary) hearing damage from loud noise exposure or due to concerns about potential future hearing damage (Hunter, 2017; Hunter, 2018). However, others avoid earplugs despite being aware of the high-volume levels at music venues (Hunter, 2018) for several factors. Their lack of awareness about hearing damage and prioritizing other health concerns (Hunter, 2018) leads to neglecting hearing health. Additionally, their attitude towards hearing health importance (Gilliver et al.,

2013), visual attractiveness, comfortability, music quality (Hunter, 2017), and peer behavior (Hunter, 2018) influenced intentions to use earplugs. Thus, addressing these attitudes and intentions is essential for effectively promoting hearing protection and reducing potential damage.

Designing effective risk communication strategies for promoting health-related products such as hearing protection is therefore crucial. These risk messages aim to overcome several barriers such as people who feel less vulnerable to loud noise and base their safe listening levels on immediate symptoms rather than long-term consequences. Additionally, perceived disadvantages of preventive measures and general hearing loss knowledge provide further challenging barriers (Diviani et al., 2019). A promising strategy for promoting hearing protection is to vary the risk frame. Based on the prospect theory (Tversky & Kahneman, 1986), risks can be framed as gains or losses, influencing how people evaluate similar outcomes. Relative to their reference point, people become risk-seeking when presented with a loss frame to minimize losses and risk-aversive with a gain frame to secure certain gains (Evstigneev et al., 2013). An example of the two frames: 10,000 people are at risk of sustaining severe hearing damage. In the gain frame, 9,000 people are saved. In the loss frame, 1,000 people suffer immediately severe hearing damage. Research indicates that a gain frame is commonly associated with influencing behavior in prevention contexts (e.g., using sunscreen for reducing the risk of skin cancer), and loss frames generally work in detection contexts (e.g., breast cancer screening) (Rothman et al., 2006). However, the effects of gain and loss frames in the context of hearing damage prevention are still unclear.

Next to risk framing in messages about promoting hearing protection, considering whether the risks apply to the short or long term is also important. Using construal level theory, which explains how psychological distance affects perception and decision-making (Trope & Liberman, 2010), this study examines the temporal distance, or the change of

perceptions over time. Short-term, a low construal level is when events are perceived as close and concrete (e.g., tonight or this week), leading to less risky behavior. While long-term, high construal-level events are perceived as distant and abstract (e.g., in six months or a year), leading to more risk-taking. Research on hearing protection has traditionally focused on work-related hearing damage, with limited studies on recreational activities. To the best of current knowledge, only one study examined the link between message framing and temporal distance in the hearing damage prevention context. It found that a loss frame with short-term consequences encouraged safer listening practices the most (De Bruijn et al., 2016). However, this study focused on the intention to listen to music at a reduced volume to prevent hearing damage, rather than on promoting hearing protection like earplugs. Nonetheless, the findings suggest an influence of framing combined with temporal distance, indicating the potential for further research. Nonetheless, the findings suggest that the influence of risk framing on attitudes and intentions might vary based on the temporal distance of the risks presented (e.g., short vs. long-term consequences).

Due to the rising number of people who suffer from hearing damage (WHO, 2021), especially adolescents and young adults who increasingly exhibit unsafe listening behavior (Dillard et al., 2022), adequate risk communication about hearing protection is needed. This study aims to enhance awareness among the younger generation on the importance of wearing hearing protection in loud environments. Therefore, the following research question will be addressed: *What are the effects of framing (gain versus loss) and temporal distance (short vs. long-term) in health risk messages on people's attitudes toward hearing protection and intentions to adopt hearing protection?*

Theoretical Framework

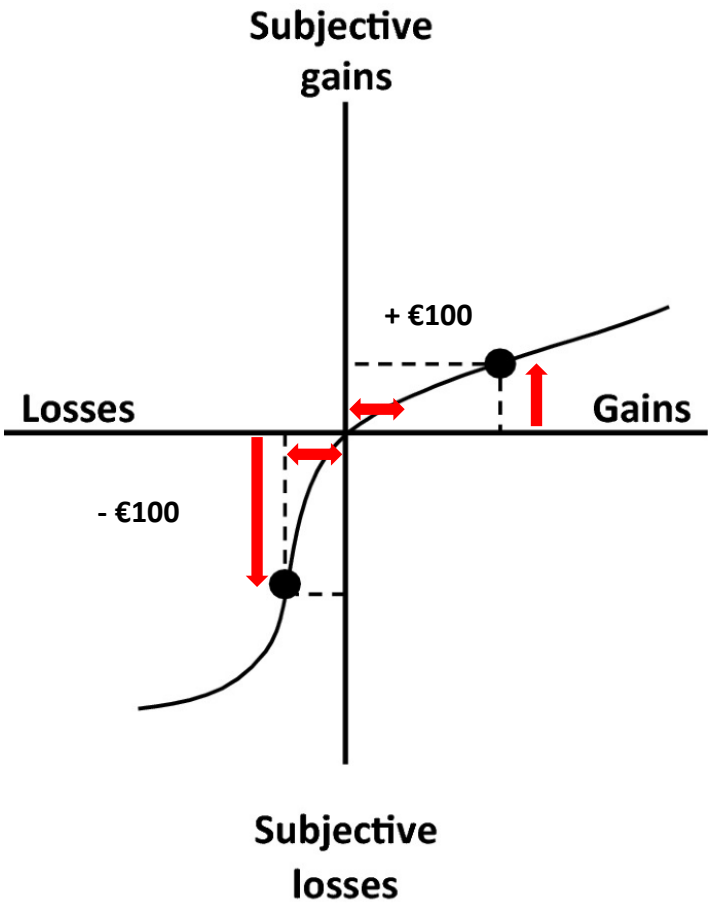
Prospect Theory

The effects of risk framing in the prevention context can be best explained by the prospect theory (Tversky & Kahneman, 1986). The theory proposed that when presented with multiple options, people prioritize certainty over alternatives that offer higher rewards with less certain outcomes. Here, decision-making is influenced by subjective perceptions rather than objective rationality. The decision-making process consists of two phases. First, all options and corresponding outcomes are analyzed, and second, what they perceive as the most favorable option is selected. In this process, the certainty effect or loss-aversive behavior occurs, where people minimize risks when presented with guaranteed gains, but become risk-seeking when faced with guaranteed losses to minimize potential losses (Evstigneev et al., 2013). Additionally, the isolation effect occurs, leading to inconsistent preferences when the same choice is presented in different forms. In the decision-making process, the fear of losing outweighs the satisfaction of winning or receiving the same amount of, for example, money. Figure 1, initially adapted by Saunders (2023) from the 'Prospect Theory: An Analysis of Decision Under Risk' (1979), has been further modified to illustrate this.

The figure displays the value function, or S-curve, with value on the Y-axis and outcome on the X-axis and on the crossing of axis is the reference point, from which the S-curve diverges. An example illustrating the value function is a scenario where you will either receive or lose 100 euros. Although the value received or lost is the same (i.e., 100 euros), the perceived value or impact is not. The curve is steeper when losses than for gains, meaning that the same amount of money holds more value when lost compared to gained. Additionally, when moving away from the reference point, the curve flattens out more when receiving money than losing it, meaning that over time the impact decreases.

Figure 1

The prospect theory S-curve



When people are presented with identical outcomes framed as gains or losses, their decision-making is influenced by the framing. A classic experiment by Tversky & Kahneman (1981) illustrates this through a medical scenario in which readers choose the best intervention program to prevent 600 people from dying during a disease outbreak. As shown in Table 1, the two problems only differ in wording for the same outcome. For problem 1, program A, guaranteed to save 200 lives, is preferred over program B in which all lives could be saved but also risks losing more as people are risk-aversive. For problem 2, program B is preferred because when confronted with certain losses, people become risk-seeking to save lives instead of accepting the death of 400 people (Tversky & Kahneman, 1981).

Table 1

Disease outbreak intervention programs

Problem 1 – Gain frame		Problem 2 –Loss frame	
Program A	Program B	Program A	Program B
200 people will be saved	There is a one-third probability that 600 people will be saved and a two-thirds probability that no one will be saved	400 people will die	There is a one-third probability that no one will die and a two-thirds probability that 600 people will die

Despite extensive research on the prospect theory in a health-related context, little is known about its potential effects on hearing damage and hearing protection. Additionally, depending on the context, it is unclear which frame (gain vs. loss) is most effective in influencing behavior and thereby avoiding or reducing potential health risks.

Applications of the Framing in Prevention Contexts

Preventing hearing damage or avoiding situations in which it could occur is related to the attitude toward loud noise and the intention to adopt hearing protection such as earplugs. However, evidence on the effects of risk framing in various prevention contexts (e.g., coal mining industry, safe sex and smoking) is mixed.

Research in the coal mining industry, where workers are exposed to loud noises daily, indicates that a gain frame prevents the development of (enhanced) hearing damage (Stephenson et al., 2005; Quick et al., 2008). In a longitudinal study encouraging coal miners to voluntarily use hearing protection, physical postcards with a positive (gain) framed message led to higher usage rates than negative (loss) framed messages (Stephenson et al.,

2005). The gain-framed messages were also more effective in preventing defense mechanisms than negative and neutral-framed messages. Additionally, Quick et al. (2008) examined the antecedents of influencing hearing protection behavior, showing that attitudes and subjective norms predicted the miners' intention to wear hearing protection, confirmed by a follow-up survey six weeks later. Both findings suggest that a gain frame effectively alters occupational coal miners' intention to use hearing protection when surrounded by loud noises at work. Which may offer insights into similar approaches among recreational users and settings.

In the health domain, studies on sexual decision-making from a safety perspective show mixed results as to which frame most effectively influences behavior (Macapagal et al., 2015; Harrington & Kerr, 2016). The study of Harrington & Kerr (2016) conducted two experiments on reading a hypothetical scenario of a sexually transmitted disease (STD), with messages varying in curability (easily vs. deadly), risks (high vs. low) and frames (gain vs. loss). Both experiments found that participants preferred gain-framed messages with certain (low-risk) outcomes, not dependent on the curability. But despite this preference, it did not imply actual safer sexual behavior and intentions. In contrast, a study on sexual decision-making among young adults on condom use showed a preference for loss-framed messages (Macapagal et al., 2015). Participants were exposed to both frames (gain vs. loss) in which they listened to a hypothetical story varying on the risk of transmitting a sexual infection by their partner (high vs. low) and were then asked to rate their intentions to have sex with them. A loss-framed message reduced intentions to have sex with a high-risk partner significantly, while it did not for the gain-framed message. Listening to gain-framed first even increased their intention to have sex with a hypothetical partner, regardless of the risk of an infection. Despite this, respondents confronted with a gain frame were more likely to accept or agree with the message, while their behavior contradicted this. These mixed findings suggest a

complicated link between actual behavior, which does not always lead to safer sex behavior and the framing of the message. Additionally, whether they first encountered a gain or loss frame may also affect their decision-making process.

Research on preventing various health risks such as skin cancer, smoking and obesity consistently indicates that a gain frame is more effective than a loss frame (Detweiler et al., 1999; Gallagher & Updegraff, 2011; Latimer et al., 2008). A study on obesity prevention promoted moderate to vigorous physical activity with messages emphasizing the negative consequences (loss frame) of not participating, the positive effects (gain frame) of participating and a mixed-framed message (Latimer et al., 2008). Results show that for week 2, gain and mixed framed message increased the physical activity, in week 9 this was only valid for gain. Suggesting that a gain frame increases the long-term impact on obesity prevention. Similarly, a meta-analysis on health message framing, focusing on behavior, attitudes, and intention (Gallagher & Updegraff, 2011) confirmed this. Here, gain-framed messages showed a greater impact on preventing skin cancer, boosting self-efficacy for quitting smoking, and encouraging physical activity to prevent related health issues. Further research on sunscreen use indicated that the gain-framed brochure more effectively influenced positive attitudes and intentions towards prevention (Detweiler et al., 1999). Where participants were more likely to ask for and apply sunscreen repeatedly and use factor 15 or higher at the beach. To thus protect their skin despite being exposed to the sun and thereby reduce the risk of skin cancer. Based on the aforementioned studies, the following hypotheses were proposed:

> *H1: Participants exposed to a gain-framed message regarding hearing protection will exhibit more positive attitudes toward hearing protection compared to those exposed to a loss-framed message.*

H2: Participants exposed to a gain-framed message regarding hearing protection will exhibit more positive intentions to adopt hearing protection compared to those exposed to a loss-framed message.

Construal Level Theory

The effects of temporal distance in the prevention context are best explained by the construal level theory (Trope & Liberman, 2010). The theory explores the psychological distance of people between a certain event such as an object, entity, or situation and themselves (Trope & Liberman, 2010). It explains how people construct perspectives on events, such as the past, future or those of others with themselves as the reference point. Psychological distance operates from a self-centered standpoint where we perceive events in the present time and the various ways an event can be distant from that point.

The distance can be geographical, hypothetical, or social, but this study focusses on temporal distance. Referring to the time gap between a future event and the present, and how distance influences an individual's decision-making (Trope & Liberman, 2003). With short temporal distance (low construal level), people think more concretely, focusing on the detailed aspects of an event and preparing in advance. Ensuring fewer risks are taken because the consequences occur in the foreseeable future. Conversely, with a long temporal distance (high construal level), events are perceived as distant and abstract. This causes people to focus on the core aspects of an event, leading to more risk-taking as there are no immediate consequences. A hypothetical vacation to Spain illustrates both temporal distances. If the vacation is scheduled one week from now, a short-term distance, you are focused on detailed preparations you still need to make, such as packing your suitcase or printing important documents. However, if the vacation is scheduled four months from now, a long-term distance, you are not yet focused on those specific tasks and are instead thinking about the overall experience, wanting to have a good time and looking forward to it.

Applications of Temporal Distance in Prevention Contexts

Research on temporal distance in health-related preventive actions shows a mixed pattern. Encountering consequences at a short-term distance motivates preventive actions more than at a long-term distance (Berezowska et al., 2017; Liu & Yang, 2020; Saxton et al., 2024). A study on personalized nutrition services among students found that a short temporal distance of health outcomes resulted in a higher perceived personalization benefit, greater intentions to adopt and a lower perceived privacy risk compared to the long-term distance to health outcomes (Berezowska et al., 2017). Immediately confrontation with consequences increased the intention to prevent these, a strategy that could also be applied to hearing damage awareness and the promotion of hearing protection. Moreover, a study on discouraging e-cigarette use through narrative persuasion also showed that communicating short-term distance to the consequences, participants had a more negative attitude towards e-cigarettes and a lower behavioral intention to start e-smoking compared to long-term distance (Liu & Yang, 2020). This effect was stronger when prior to the experiment, the participant had never smoked an e-cigarette. Contrary, a study on the willingness to vaccinate against COVID-19 found opposite results (Saxton et al., 2024), showing that the sentiment around the vaccine was perceived as abstract and that the willingness to get vaccinated was higher after seeing a long-term over a short-term distance message. Even though a long-term distance message best aligns with why people should take a vaccine, the short-term distance is needed to inform them of actions that need to be taken.

Although most studies show that temporal distance influences attitudes or intentions towards negative health behavior, this is not always the case (Lin, 2015). Taiwan wanted to encourage healthier behavior among their citizens through advertising, to prevent the onset of cancer as the already higher occurrence of cancer among citizens increased the national health costs. The advertisements incorporated (promotion vs. prevention) with a temporal

distance of one month or year and a graphic-text ratio (more graphic than text vs. more text than graphic). Although temporal distance did not affect their behavior, it did reveal that the information was easier to understand when the graphics were more present than the text and when it was more consistent with the regulatory health rules stated in Taiwan.

Combining Framing with Temporal Distance in Prevention Contexts

Previously mentioned research on hearing and other health-related topics showed the effectiveness of one frame over the other (gain vs. loss) and the preference for a temporal distance (short vs. long). However, combining these factors has also been explored in several studies. Primarily showing that a gain frame combined with a short-term temporal distance reinforces each other, further positively influencing the desired behavior. Understanding this interaction can provide insights for future hearing health communication.

A study among Dutch adolescents measured their risk perception, intention to listen to music at a reduced volume and (digital) music player usage two weeks prior to being exposed to the persuasive message. After exposure, results revealed that a loss frame combined with a short-term distance is associated with an increased willingness and therefore intention to reduce the volume when listening to music (De Bruijn et al., 2016). Here, the effective loss frame contrasts with general literature but does align based on the temporal distance. Nonetheless, these findings could be used to explore hearing protection promotion, as they similarly influence attitudes and intentions towards hearing preservation.

Beyond a study on hearing protection, research has also been conducted on cigarette package warning labels and encouraging efforts to stop or minimize cigarette intake. In an experiment with textual warning labels containing long-term -or short-term consequences combined with a frame (gain or loss), the intention and attitude to quit smoking was the highest in a gain frame combined with short-term consequences. (Mollen et al., 2016). Another study explored the potential influence of deterrent graphics on the packages. Here,

the graphics were found to be more daunting than text only, but only in combination with a loss frame where temporal distance had no influence (Nan et al., 2014). The advice to apply either frame and temporal distance consequences on the warning labels varies between text and graphics but further exploration may be useful within the context of hearing.

Furthermore, an online study tested the moderation of autonomy (low vs. high) on message frames (gain vs loss), combined with short- or long-term outcomes of their alcohol intake. Participants (N = 335) assessed their autonomy levels at time 1, at time 2 they indicated their baseline alcohol intake and were then shown one of the messages. The findings only revealed a significant result for people with low autonomy combined with short-term outcomes using a loss frame (Churchill et al., 2016). Participants self-reported their alcohol intake 7 days after time 2, confirming previously found effects on behavior change.

Additionally, a study on persuading people to undergo lung cancer screening through advertising and maximize early prevention compared the effectiveness of temporal distance (short vs. long) by showing the bigger picture or details combined with the prospect theory (promote gain vs. prevent loss). Participants were more susceptible to undergoing lung cancer screening when confronted with the advertisement containing a long-term distance that promoted the benefits of participating over the other three advertisements (Monu et al., 2022). These findings could be used within research on hearing damage, where instead of using an image, the wording can be utilized to convey the story through positive aspects.

At last, another study examined the influence of framing and temporal distance on the intention to take a vaccine against the human papillomavirus (HPV), which could cause cancer or warts around the genital area. Especially among participants who had no prior knowledge about HPV, a combination of a loss frame with a long-term distance and a gain frame with a short-term distance was effective in conveying the danger the virus holds (Wen

& Shen, 2016). This prompted a positive attitude towards the message and a higher intention to vaccinate against HPV. It is noteworthy that only these cross-linked combinations were found to be significant and thus both frames and temporal distances work in combination with each other. Based on the aforementioned studies, the following hypotheses were proposed:

H3: Participants exposed to a gain-framed message in combination with a short temporal distance regarding hearing protection will exhibit more positive attitudes toward hearing protection compared to those exposed to a loss-framed message and long temporal distance.

H4: Participants exposed to a gain-framed message in combination with a short temporal distance regarding hearing protection will exhibit more positive intentions to adopt hearing protection compared to those exposed to a loss-framed message and long temporal distance.

Methods

Design

This study aimed to investigate whether risk framing (gain vs. loss) and temporal distance (short vs. long), affected participants' attitudes toward hearing protection and their intentions to adopt hearing protection, as the dependent variables. Measured two times, before and after exposure to the health risk message. Therefore, to test the hypotheses a 2 × 2 between-subject design was used, resulting in four conditions: gain frame with a short-term distance, gain frame with a long-term distance, loss frame with a short-term distance and loss frame with a long-term distance. All instructions, materials and health risk messages were presented in Dutch since the survey was conducted in the Netherlands among Dutch citizens. Data collection was carried out through an online experiment using Qualtrics survey software and analyzed using statistical software (SPSS).

Sample

Research has shown that NIHL through unsafe listening practices is most common among adolescents and young adults but occurs at all ages (Dillard et al., 2022). Therefore, this study focused on people aged 18 to 65 years and older. Participants under 18 were unable to participate in the survey. Due to limited access to the full population, a sample was used to generalize findings. Recruitment of participants was done through convenience sampling. In total, 180 respondents clicked on the survey link. Out of all respondents, 3 (1.7%) did not give their informed consent, and 31 (17.2%) did not complete the survey. Thus, 146 participants (81.1%) were included in the analysis. The sample included 61 males (41.8%), 84 females (57.5%), and 1 (0.7%) who preferred not to say. The largest age group was 25 to 34 years, (28.8%, 42 respondents) and the most common education level was applied university (HBO), with 72 respondents (49.3%).

Of the respondents, 112 (76.7%) owned hearing protection such as earplugs, while 34 (23.3%) did not. Furthermore, 116 (79.5%) had used earplugs, 26 (17.8%) reported experiencing hearing issues, 18 (12.3%) were unsure, and 102 (69.9%) had no hearing problems. Lastly, 101 (69.2%) indicated that peers use hearing protectors, 21 (14.4%) reported they did not and 24 (16.4%) were unsure.

Materials

The stimulus consisted of four health risk messages, one for each condition and altered to the type of framing (gain vs. loss) and temporal distance (short vs. long). Each message used a beep to illustrate hearing impairment because it is the first symptom experienced when hearing damage occurs, assuming that the hearing is not immediately more severely impaired (Leefomgeving, 2023). A beep, often described as a ringing or humming sound can last short-lived, when continuing for an extended period it is referred to it as a chronic condition known as tinnitus (Baguley et al., 2013). Furthermore, for illustrative

purposes, each condition contained the same image of unbranded earplugs. All four conditions can be seen in Appendix A.

The operationalization of framing was based on the approach of Tversky and Kahneman (1981). In the gain frame, a scenario was presented emphasizing the reduced risk of hearing damage associated with wearing hearing protection, operationalized by the term 'verminder' (reduce). Conversely, the loss frame presented a scenario focused on the increased risk of hearing damage from not wearing hearing protection, indicated by the term 'vergroot' (increase).

The manipulation of the temporal distance was divided into short-term and long-term distance and the framework was based on a prior study conducted by Liberman et al. (2002). Using the word ‘morgen’ (tomorrow) suggested a short temporal distance. The wording 'ergens volgend jaar’ (sometime next year) conveyed a sense of long temporal distance. All conditions can be seen in Table 2, see Figure 2 for an example of the health risk message.

Table 2

Overview of all health risk message conditions

Condition	Combination	Stimulus – Dutch	Stimulus – English
1	Gain frame & long-term	Door gehoorbescherming te dragen, verminder je het risico op gehoorbeschadiging in de vorm van een irritante piep ergens volgend jaar als het festival voorbij is.	By wearing hearing protection, you reduce the risk of hearing damage in the form of an irritating beep sometime next year when the festival is over.
2	Gain frame & short-term	Door gehoorbescherming te dragen, verminder je het risico op gehoorbeschadiging in de vorm van een irritante piep morgen als het festival voorbij is.	By wearing hearing protection, you reduce the risk of hearing damage in the form of an irritating beep tomorrow when the festival is over.
3	Loss frame & long-term	Door geen gehoorbescherming te dragen, vergroot je het risico op gehoorbeschadiging in de vorm van een irritante piep ergens volgend jaar als het festival voorbij is.	By not wearing hearing protection, you increase the risk of hearing damage in the form of an irritating beep sometime next year when the festival is over.
4	Loss frame & short-term	Door geen gehoorbescherming te dragen, vergroot je het risico op gehoorbeschadiging in de vorm van een irritante piep morgen als het festival voorbij is.	By not wearing hearing protection, you increase the risk of hearing damage in the form of an irritating beep tomorrow when the festival is over.

Figure 2

The health risk message for condition 1: Gain frame and a long temporal distance

Measures

Attitudes Toward Hearing Protection

A subset of the Dutch version of the Beliefs about Hearing Protection and Hearing Loss (BAHPHL) scale was used to assess participants' attitudes toward hearing protection. The BAHPHL scale was developed by the US National Institute for Occupational Safety and Health (NIOSH) to understand beliefs on hearing protection and hearing damage. Items were measured on a 5-point Likert scale from 1 ('totally disagree') to 5 ("totally agree"). This scale includes 24 items across seven categories (Gilles & Van De Heyning, 2014; Keppler, 2010). Of the seven categories, two categories focused on measuring attitude and were therefore selected. Category three, 'the benefits of preventive action' (3 items) and category four, 'barriers to preventive action' (4 items). A total of 7 items from the BAHPHL were used to measure the attitudes toward hearing protection. (e.g., "Hearing protectors are uncomfortable to wear"). All items are listed in Appendix D. The scale had a good reliability for attitudes toward hearing protection ($\alpha = .89$).

Intentions to Adopt Hearing Protection

Once more, the BAHPHL scale assessed the intentions to adopt hearing protection, using a 5-point Likert scale. Of the seven categories, only category five, 'behavioral intentions' focused on measuring intention, which consisted of three items. Two items were selected to measure intentions to adopt hearing protection as one item that related to the current use of hearing protection was already asked as a measure for background variables. The scale had a good reliability for intentions to adopt hearing protection ($\alpha = .81$).

Background Variables

The online experiment included demographic questions on participants' age, gender, and level of education. Age was assessed with the question "How old are you?" using seven response options (e.g., 18 to 24). Gender was asked with "What is your gender?", with four

response options that included non-binary and the preference not to say. Education level was assessed with "What is the highest level of education you have completed?" with choices ranging from none (e.g., “no school”) to highly educated (e.g., “scientific education (university)”).

Additionally, four questions assessed prior experience with hearing protection to capture potential differences when present or absent. These related to the possession of hearing protection (e.g., "Do you own earplugs?”), the usage of hearing protection, experience with hearing issues and if peers use hearing protection. All questions allowed for a "yes" or "no" response, see Appendix B for all questions. Prior experience was of interest as it may influence attitudes toward hearing protection and the intentions to adopt it.

Procedure

Participants in the online experiment proceeded through the survey in the following manner. First, they were presented with an introductory text explaining the purpose of the study conducted by a master's student at Tilburg University, see Appendix C for the full text. Next, consent for data collection was asked. Participants who did not consent were thanked for their efforts and could not continue, those who did proceeded in the online experiment. Then, the background variables were measured. These questions were prioritized at the beginning of the survey, as research indicates that respondents provide more accurate information when asked earlier in the online experiment (Teclaw et al., 2011). Next, participants answered nine questions that related to their attitudes toward hearing protection and their intentions to adopt hearing protection, see Appendix D.

Participants were then asked to imagine attending an outdoor festival featuring their favorite music, the full scenario can be found in Appendix E. Afterwards, they were randomly assigned and evenly distributed to one of the four conditions and presented with a health risk message, such as seen in Figure 2 or Appendix A for all four conditions. To

ensure that participants took their time to read the health risk message, they were unable to continue the online experiment until 20 seconds passed. After reading the health risk message, they were once more presented with previously asked questions that measured the attitudes toward hearing protection and the intentions to adopt hearing protection. Upon completion of these questions, they were thanked for their participation with an explanation of the purpose of the study.

Data Analysis

The online experiment data was analyzed as follows. First, participants completed the survey prior to being exposed to the stimulus, which determined their baseline attitudes toward hearing protection and intentions to adopt hearing protection. After exposure to the stimulus, they answered the same questions, allowing a comparison to be made. By comparing the pre-and post-exposure scores, the study examined the potential influence of each individual condition as well as the combined effect of all conditions on attitude and intention. Furthermore, the analysis considered the demographics (gender, age, education) and prior experiences with hearing protection.

To test the hypotheses (H1-H4), a mixed analysis of variance (ANOVA) was performed, with risk framing and temporal distance as between-subject variables, and pre-and post-attitudes toward hearing protection and intentions to adopt hearing protection as within-subject variables. To measure the influence of prior experience, add the prior experience item along with the frames and temporal distance values as between-subject variables.

Results

Attitudes Toward Hearing Protection

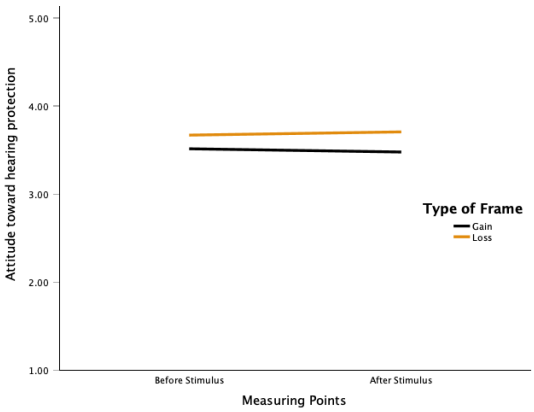
The full descriptives for people's attitudes toward hearing protection in each experimental condition can be found in Table 3. The Mixed ANOVA showed no significant effect on attitude before and after viewing any of the four health risk messages, $F(1, 142) =$

1.96, p = .163, partial eta² = .014. This indicates that, compared to before, no identifiable differences were found in the participant's mean attitude scores after the health risk message, regardless of the condition they were in (see Figure 3). There was also no significant main effect of the type of framing (measured before and after the health risk message) on attitudes, $F(1, 142) = 1.79$, p = .183, partial eta² = .012. Furthermore, no significant main effect of the type of temporal distance (measured before and after the health risk message) on attitude, $F(1, 142) = 1.96$, p = .163, partial eta² = .014. Lastly, there was also no significant interaction effect between framing and temporal distance (measured before and after the health risk message) on attitude, $F(1, 142) = 0.00$, p = .985, partial eta² = .000. Therefore, H1 and H3 were not supported by the data. Although the difference was not significant, it is worth noting that in the short temporal distance condition, the loss frame scores were slightly higher, while in the long temporal distance condition, the gain frame scores were higher.

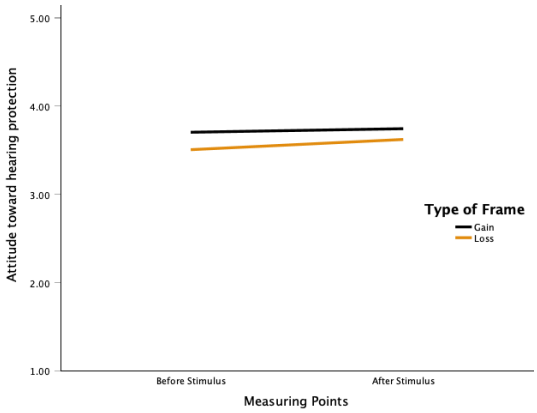
Figure 3

Change in attitude as a function of framing (gain versus loss) for temporal distance

A – Temporal distance: Short



B – Temporal distance: Long



Intentions To Adopt Hearing Protection

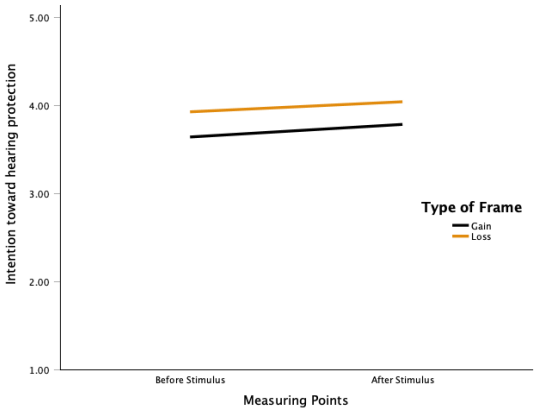
The mixed ANOVA showed a significant effect on intention before and after viewing any of the four health risk messages, $F(1, 142) = 5.87$, p = .017, partial eta² = .04. This indicates that participants mean intention scores increased from 3.85 before viewing any of

the four health risk messages to 3.97 after viewing them (see Table 2 and Figure 4). However, there was no significant main effect of the type of framing (measured before and after the health risk message) on intention, $F(1, 142) = 0.31$, $p = .579$, partial $\eta^2 = .002$. Similarly, no significant main effect was observed for the type of temporal distance (measured before and after the health risk message) on intention, $F(1, 142) = 0.01$, $p = .917$, partial $\eta^2 = .000$. Lastly, there was also no significant interaction effect found between framing and temporal distance (measured before and after the health risk message) on intention, $F(1, 142) = 0.66$, $p = .417$, partial eta$^2 = .005$. Therefore, H2 and H4 were not supported by the data. Although the difference is not significant, it is again worth noting that in the short temporal distance condition, the loss frame scores are slightly higher, while in the long temporal distance condition, the gain frame scores are higher.

Figure 4

Change in intention as a function of framing (gain versus loss) for temporal distance

A – Temporal distance: Short



B – Temporal distance: Long

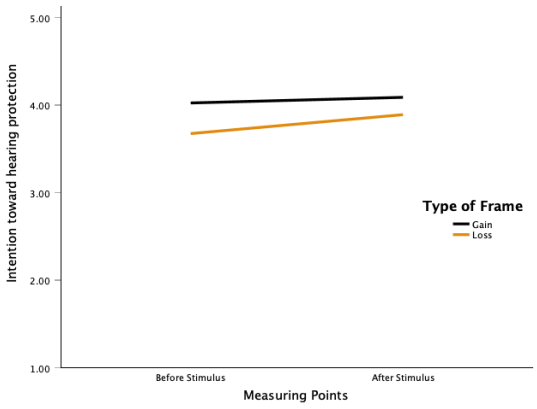


Table 3

Mean scores and standard deviations (in parentheses) of attitude and intention by frame and temporal distance

	Gain frame			Loss frame		
	Long	Short	Total	Long	Short	Total
Attitude – Before Stimulus	3.71 (0.51)	3.51 (0.45)	3.62 (0.49)	3.51 (0.57)	3.67 (0.54)	3.59 (0.56)
Attitude – After Stimulus	3.74 (0.57)	3.48 (0.40)	3.62 (0.51)	3.62 (0.60)	3.71 (0.59)	3.66 (0.59)
Intention – Before Stimulus	4.03 (0.83)	3.64 (0.92)	3.85 (0.89)	3.68 (0.94)	3.93 (0.81)	3.80 (0.88)
Intention – After Stimulus	4.09 (0.66)	3.79 (0.73)	3.97 (0.71)	3.89 (0.88)	4.04 (0.72)	3.97 (0.81)

Exploratory Analyses: Prior Experience

These results should be interpreted with caution due to the uneven distribution of prior experiences among participants, which may distort the data. This imbalance might have influenced the outcomes, which therefore not fully capture the relationship between attitudes toward hearing protection and intentions to adopt hearing protection.

Although no significant result was initially found for attitude, a significant result emerged when accounting for three prior experiences. The Mixed ANOVA showed a significant effect on attitude before and after viewing any of the four health risk messages for owning hearing protection $F(1, 138) = 4.41$, $p = .038$, partial eta² = .031. Indicating that participants' attitudes after seeing one of the four health risk messages are influenced by their ownership of hearing protection. The change was primarily observed among participants who owned hearing protection, their mean attitude scores increased from 3.65 before to 3.71 after viewing any of the four health risk messages. Additionally, a significant effect on attitude before and after viewing any of the four health risk messages for peers using hearing protection was found $F(1, 134) = 4.71$, $p = .011$, partial eta² = .066. This shows that participants' attitudes after seeing one of the four health risk messages are influenced by either having, or not having peers that use hearing protection or not knowing if they use it. Not having used hearing protection only showed a significant effect in combination with the loss frames $F(1, 138) = 5.27$, $p = .023$, partial eta² = .037. When participants indicated not having used hearing protection and having seen either loss frame, their mean attitude scores increased from 3.58 to 3.66.

For the intentions to adopt hearing protection, the Mixed ANOVA still showed a significant effect on intention before and after viewing any of the four health risk messages for owning and not owning hearing protection $F(1, 138) = 25.21$, $p < .001$, partial eta² = .154. Participants who did not possess hearing protection had a higher mean intention score of 3.45

compared to the earlier 3.14. This shows that for this group in particular, the stimulus proved to be effective. Having used hearing protection also showed to be significant $F(1, 138) = 22.81$, $p < .001$, partial $eta^2 = .142$. Primarily driven by participants who did not use hearing protection who had a higher mean intention score, increasing from 3.05 before the health risk message to 3.43 after.

Discussion

This study aimed to investigate the effects of the framing (gain vs. loss frame) and temporal distance (short vs. long) in risk messages on people's attitudes toward hearing protection and intentions to adopt hearing protection. Contrary to our hypotheses, neither framing nor temporal distance influenced people's attitudes and intentions. However, regardless of framing and temporal distance (and when controlling for prior experience with hearing protection), people's intentions to adopt hearing protection increased after being exposed to the risk message. Such an increase was also found in people's attitudes, but only when controlling for prior experiences.

In contrast with our hypotheses (H1 and H2), no significant difference was found between a gain and loss frame in influencing the attitudes toward hearing protection and the intentions to adopt hearing protection. Studies in other contexts that could be associated with hearing damage, such as in the coal mining industry (Stephenson et al., 2005; Quick et al., 2008) or encouraging physical activity to prevent obesity (Latimer et al., 2008), have shown gain frames to be more effective. A possible explanation for this discrepancy could be that the health risk messages in this study were not presented in the intended environment (e.g., outdoor festival), as previously mentioned studies did. Research indicates that presenting a message in a realistic context yields results that more accurately reflect actual decisions, as opposed to hypothetical scenarios (FeldmanHall et al., 2012). Also known as hypothetical bias (Loomis, 2011), experiencing an outdoor festival with loud music in real life could

therefore reflect actual behavior more when seeing a health risk message. Additionally, it is possible that previously mentioned barriers to wearing hearing protection (e.g., insufficient awareness and hearing health importance) were not adequately addressed. Which may be related to the hypothetical context in which the hearing could not be damaged.

Contrary to our hypotheses (H3 and H4), no significant difference was observed between framing (gain vs. loss) and temporal distance (short vs. long) in terms of their effect on attitudes toward hearing protection and the intentions to adopt it. Research on combining framing and temporal distance shows mixed effectiveness for encouraging safer listening practices (loss-frame and short-term) (De Bruijn et al., 2016), intention to vaccinate against HPV (gain-frame and short-term) (Wen & Shen, 2016) and minimizing cigarette intake (gain-frame and short-term) (Mollen et al., 2016). Like other studies, the temporal distance was manipulated by changing the wording, but it did not take visuals or other elements reinforcing the danger into account, apart from showing the earplugs. For example, Mollen's (2016) study placed the manipulation on the warning labels of replicated cigarette packs and another study also incorporated deterrent graphics on the packages to emphasize the dangers (Nan et al., 2014). Research on visual persuasion showed higher effectiveness when photographs and positive images were used, indicating the effectiveness could be beneficial for primarily gain framed messages (Seo, 2020).

Although none of the hypotheses were significant, significant results were found. The intentions to adopt hearing protection increased after viewing any of the four health risk messages. The mean intention scores prior to exposure to health risk messages were already high, which could be due to many of the participants having a higher level of education, which relates to healthier habits, more knowledge of potential risks and less risk-taking (Viinikainen et al., 2022). However, their scores still increased significantly, which could be explained by the reinforcement effect (Ferster & Skinner, 1957). Stating that even though the

baseline scores are high, by reminding people what they already found important, in this case, their positive attitudes toward hearing protection, it increases even more. Thus, reconnecting to earlier reinforces their beliefs, possibly explaining the further increase in their intentions to adopt hearing protection.

Additionally, the results show that when considering prior experiences, there was a significant change in attitudes toward hearing protection after viewing any of the four health risk messages, where previously no effects were found. This change was observed among participants who owned hearing protection and all peers related answer options together but not individually. Additionally, not having used hearing protection was significant when combined with either of the loss-framed conditions, but not for the gain-framed conditions. A possible explanation on why when taking prior experience into account does reveal significant results on attitude consists of several factors. Participants who owned hearing protection, particularly those who purchased it, already had a more positive attitude, which even further increased as the product held more value for them (Geller, 2016). The significance of collective but not individual responses regarding peers could be caused by unconsciously considering the interests of others in their responses (Bicchieri, 2005). Therefore, answering more favorable after seeing the health risk message, a small change only observed as a whole. Lastly, participants who had not used hearing protection had a more positive attitude after viewing loss-over-gain-framed messages. Here, having less experience with hearing protection could have created some type of insecurity, in which they are more susceptible to loss-framed messages (Hart et al., 2020).

Implications

Theoretical Implications

The result of this study contributes to the limited knowledge in influencing the attitudes toward hearing protection and intentions to adopt hearing protection in non-work or

recreational related environments. By applying framing (gain vs. loss) of the prospect theory and temporal distance (short vs. long) of the construal level theory, the research examined the impact of a health risk message on hearing protection, presented in a hypothetical outdoor festival setting. Research on preventing hearing damage through promoting the use of hearing protection has traditionally focused on work-related situations (e.g., constant exposure to loud noises in a coal mine, construction or working next to loud machinery). While these studies are important for preventing occupational hearing damage, increased noise exposure in recreational settings, such as festivals, clubs, and pubs also poses significant risks. This study represents an important initial step into a largely unexplored scope, contributing valuable insights into encouraging hearing protection during recreational activities. Since none of the hypotheses were supported, it is difficult to connect it to the limited available research or to place it in the broader scope of health-related studies. Non-hypothesized findings do suggest that prior experiences may influence the susceptibility to a health risk message. Specifically, a loss frame appears more effective in increasing attitudes among participants who have never used hearing protection. While loss frames generally effective in detection contexts (Rothman et al., 2006), they might also be useful in prevention context of hearing health.

Practical Implications

This study provided several insights based on the effects found on the intentions to adopt hearing protection, which can be used for generating future hearing loss prevention messages or public health campaigns. Because the intentions to adopt hearing protection increased across all four conditions and no link could be made between a specific combination of frames (gain vs. loss) or temporal distance (short vs. long), it allows for a more flexible approach towards designing a message or campaign. This means that creators can focus on the overall effectiveness of all messages rather than being constrained to a specific combination of framing and temporal distance. Here, attention could be given to the

visuals that go with the text, as the efficacy of it was demonstrated in earlier research on smoking (Nan et al., 2014). Or making the text more persuasive for each condition to potentially enhance the effectiveness. Additionally, health risk messages aimed at people who have no prior experience with hearing protection, loss frames could be utilized. Since this study indicates that these people are potentially more sensitive to loss frames than to gain frames, it is advisable to employ and loss frames in health risk messages or campaigns

Furthermore, as one of the first studies to emphasize the recreational aspect of hearing damage prevention, this research provides valuable insights into the materials and theoretical applications. For future researchers, this study lends itself to replication and with that improvements, which can be used as a starting point for further efforts to reduce hearing damage risk by promoting hearing protection.

At last, event organizations expecting loud noises are advised to make hearing protection products more widely available at their event. At festivals, various products are offered to protect you from the sun (e.g., sunglasses, sunscreen, hat) or to maintain fresh (e.g., deodorant). And ponchos, rain gear or umbrellas to protect you in the event of rainy weather. While these examples are starting to be considered as normal, the same should apply to hearing protection products such as earplugs. Though it is already available at some events, it is the exception rather than the norm.

Limitations

There are several limitations to this study, starting with an educational bias among the sample. The most common educational level was applied university (HBO), which is above average, despite the increased number of highly educated people in the Netherlands (Van Der Mooren & De Vries, 2022). As previously mentioned, higher education relates to healthier habits, more knowledge of potential risks and less risk-taking (Viinikainen et al., 2022). Suggesting that the majority of the participants were already aware of the risks that hearing

damage proposes, therefore respond differently to health risk messages compared to those who are less educated and aware.

Next, the health risk message was tested through a hypothetical scenario in which participants had to imagine being at an outdoor festival while they were not in that real-life environment. Given the time constraints of conducting this study and the challenges of testing health risk messages at a real-life outdoor festival, imagining a hypothetical scenario was the best alternative. This does however involve the uncertainty of not knowing the extent to which people place themselves in that scenario and respond accordingly. Additionally, people tend to give more favorable responses in hypothetical scenarios compared to their actual behavior when faced with the same situation in real life (Bostyn et al., 2018). Meaning that people show less positive behavior and are less willing to take action or make changes to prevent hearing damage in real-life compared to what was measured in the hypothetical scenarios.

Moreover, the health risk message that was altered accordingly for each of the four conditions was not validated. Due to a lack of time, there was no opportunity to test with the targeted audience whether it was placed in a thinkable scenario. Also, whether the frames and temporal distance were clear and came across as intended, observing possible differences was therefore not possible. Lastly, becoming aware of the purpose behind the experiment might have occurred. Because participants were instructed to complete the same questions twice, before and after one of the four conditions, they are likely to have made the connection that the study was measuring differences between these two points. Being aware of this could lead them to be more conscious of their previous answers and, as a result, respond in a more socially desirable way than they would have if they hadn't realized this connection.

Suggestions for Future Research

Based on the insights gained from this study, several recommendations are made for future research. First, it is advisable to replicate this research to validate the results and identify potential errors (Mackey, 2012), even though none of the hypotheses were supported. Mainly to verify the non-hypothesized significant results, as they were based on small differences, and the small sample size makes it premature to draw firm conclusions for future research.

Second, it is recommended to perform this study on a larger scale at an actual outdoor festival, as described in the hypothetical scenario. Although studies like Bruijn's (2016) did not test the manipulation in real-world settings, conducting the study in such an environment more accurately observes their attitude and intention. For instance, a study in France compared the outcomes of experiments conducted in a lab and in the field, where participants received health information on canned tuna. The field experiment revealed a greater decrease in the intention to buy canned tuna compared to the lab experiment (Marette et al., 2008), highlighting the importance of conducting research in real life.

Third, to accurately assess the impact of the stimulus on actual behavior, a follow-up or long-term study is recommended. While immediate responses can indicate an initial direction, actual behavior change can only be measured after the intervention. This can be performed by relying on the research of Latimer et al (2008) in which they promoted physical activity, measured at weeks 2 and 9 post-intervention. In which the mixed framed message was effective at week 2, but no longer effective at week 9. Highlighting the importance of monitoring for the long term or having follow-ups further from the intervention.

Conclusion

To conclude, this study aimed to investigate the effects of framing (gain vs. loss) and temporal distance (short vs. long), on people’s attitudes toward hearing protection and

intentions to adopt hearing protection. In contrast to our hypotheses, no significant differences were found for framing or temporal distance. Meaning that neither the type of framing nor temporal distance influenced their attitudes or intentions. However, there was a significant increase in intentions to adopt hearing protection before and after viewing any of the four health risk messages. Additionally, when considering prior experiences, a significant effect was found on attitudes toward hearing protection, and the significant effects on intention remained. Future research should investigate how framing and temporal distance can positively impact attitudes toward and intentions to adopt hearing protection, aiming to reduce hearing damage. Practical, real-world testing and reiterating health risk messages will offer valuable feedback to prevent the rising number of people suffering from hearing damage from increasing.

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Appendix

Appendix A

Stimulus Condition 1 – Gain Frame & Long Temporal Distance

Door gehoorbescherming te dragen, verminder je het risico op gehoorbeschadiging in de vorm van een irritante piep ergens volgend jaar als het festival voorbij is.

Stimulus Condition 2 – Gain Frame & Short Temporal Distance

Door gehoorbescherming te dragen, verminder je het risico op gehoorbeschadiging in de vorm van een irritante piep morgen als het festival voorbij is.

Stimulus Condition 3 – Loss Frame & Long Temporal Distance

Door geen gehoorbescherming te dragen, vergroot je het risico op gehoorbeschadiging in de vorm van een irritante piep ergens volgend jaar als het festival voorbij is.

Stimulus Condition 4 – Loss frame & Short Temporal Distance

Door geen gehoorbescherming te dragen, vergroot je het risico op gehoorbeschadiging in de vorm van een irritante piep morgen als het festival voorbij is.

Appendix B

Dutch – Demographic Questions

Wat is je leeftijd?

- 18 tot 24
- 25 tot 34
- 35 tot 44
- 45 tot 54
- 55 tot 64
- 65 of ouder

Wat is uw geslacht?

- Man
- Vrouwelijk
- Non-binaire / derde geslacht
- Zeg ik liever niet

Wat is het hoogste onderwijsniveau dat je hebt gevolgd?

- Geen (of enkele klassen lager onderwijs)
- Basisonderwijs (Basisschool)
- Lager Beroepsonderwijs (LBO)
- Middelbaar Algemeen Voortgezet Onderwijs (MAVO, MULO)
- Middelbaar Beroeps Onderwijs (MBO)
- Hoger Algemeen Voortgezet Onderwijs (HAVO, Atheneum, Gymnasium)
- Hoger Beroeps Onderwijs (HBO)
- Wetenschappelijk Onderwijs (Universiteit)
- Anders, namelijk:

1) Bent u in het bezit van oordopjes?
    a) Ja
    b) Nee
2) Heb je ooit oordopjes gebruikt?
    a) Ja
    b) Nee
3) Heeft u op dit moment gehoorproblemen?
    a) Ja
    b) Nee
    c) Weet ik niet
    d) Wil ik niet delen
4) Gebruiken uw vrienden gehoorbeschermers, zoals oordoppen of earplugs?
    a) Ja
    b) Nee
    c) Weet ik niet
    d) Wil ik niet delen

English – Demographic Questions

What is your age?

- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 or over

What is your gender?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

What is the highest level of education you have completed?

- None (or a few classes of primary education)
- Primary Education (Elementary school)
- Lower vocational Education (LBO)
- Secondary General Secondary Education (MAVO, MULO)
- Secondary Vocational Education (MBO)
- Higher General Secondary Education (HAVO, Athenaeum, Gymnasium)
- Applied University (HBO)
- Scientific Education (University)
- Other, namely:

1) Do you own earplugs?
    a) Yes
    b) No
2) Have you ever used earplugs?
    a) Yes
    b) No
3) Do you currently have hearing issues?
    a) Yes
    b) No
    c) I don't know
    d) I don't want to share
4) Do your friends use hearing protectors, such as earplugs or earplugs?
    a) Yes
    b) No
    c) I don't know
    d) I don't want to share

Appendix C

Dutch – Introductory Text Survey

Titel: Communiceren van risico's op gehoorschade

Beste deelnemer,

Hartelijk dank voor uw interesse in dit onderzoek. Deze pagina bevat informatie over het onderzoek. Wij vragen u eerst deze pagina te lezen voordat u een keuze maakt om wel of niet mee te doen.

Aan de hand van deze vragenlijst wordt geprobeerd inzicht te verkrijgen in de houding en intentie van mensen (zoals u) gerelateerd aan gezondheidsrisico's op gehoorschade en het mogelijk dragen van beschermende middelen.

De vragenlijst bestaat uit vier onderdelen. Het eerste onderdeel bestaat uit een aantal vragen over uw achtergrond en eventuele eerdere ervaringen met betrekking tot de gezondheidsrisico boodschap. Daarna krijgt u een aantal stellingen te zien waarbij u aangeeft wat het beste bij u past. Vervolgens krijgt u de gezondheidsrisico boodschap te zien. Wederom dezelfde stellingen als voor het zien van de boodschap krijgt u daarna te zien waarbij wederom gevraagd wordt om aan te geven welke het beste bij u past. In het onderzoek bestaan er geen goede of foute antwoorden, beantwoord elke vraag zo nauwkeurig mogelijk. Het invullen van de enquête zal naar schatting 5 minuten duren.

De deelname aan dit onderzoek is geheel vrijwillig. U kunt zich op ieder moment terugtrekken of besluiten niet deel te nemen aan het onderzoek. Dit kan ook wanneer u al

bezig bent met het invullen van de vragenlijst. Voor zover bekend zijn er geen risico's verbonden aan de deelname van dit onderzoek.

Uw gegevens worden volledig anoniem gerapporteerd, vertrouwelijk behandeld en uitsluitend gebruikt voor dit onderzoek. Voor een duur van 6 maanden worden uw gegevens bewaard op een beveiligde server van Tilburg University. Wanneer u de keuze maakt om het onderzoek af te breken en daarmee niet af te maken worden de gegevens die tot dat moment in zijn gevuld automatisch verwijderd.

Uw deelname aan dit onderzoek draagt bij aan mijn masterthesis voor de opleiding Communicatie- en Informatiewetenschappen aan de Universiteit van Tilburg, Tilburg School of Humanities and Digital Sciences.

Indien er vragen zijn die betrekking hebben tot dit onderzoek kan er contact worden opgenomen via het e-mailadres m.strackx@tilburguniversity.edu

Alvast bedankt, vriendelijke groeten,

Mart Strackx

English – Introductory Text Survey

Title: Communicating risks of hearing damage

Dear participant,

Thank you for your interest in this study. This page contains information about the study. We ask that you read this page before making a decision whether or not to participate.

With the help of this questionnaire, we try to gain insight into the attitudes and intentions of people (like you) related to health risks of hearing damage and the possible wearing of protective equipment.

The questionnaire consists of four sections. The first section consists of a number of questions about your background and any prior experiences related to the health risk message. Next, you are presented with a number of statements in which you indicate what suits you best. Next, you will be shown the health risk message. Again the same statements as before seeing the message are then shown to you again asking you to indicate which one suits you best. In the survey there are no right or wrong answers, answer each question as accurately as possible. The survey will take an estimated 5 minutes to complete.

Participation in this survey is completely voluntary. You can withdraw or decide not to participate in the survey at any time. This is possible even if you are already in the process of completing the questionnaire. As far as we know, there are no risks associated with the participation in this study.

Your data will be reported completely anonymously, kept confidential and used exclusively for this study. For a duration of 6 months your data will be stored on a secure server of Tilburg University. When you make the choice to drop out of the study and thus not complete it, the data entered up to that point will be automatically deleted.

Your participation in this study contributes to my master's thesis for the Communication and Information Sciences program at Tilburg University, Tilburg School of Humanities and Digital Sciences.

If there are any questions related to this research, please contact me at the email address m.strackx@tilburguniversity.edu

Thanks in advance, kind regards,

Mart Strackx

Appendix D

Dutch version – Beliefs about Hearing Protection and Hearing Loss

Original item number	Section	Question
Item 1	4	Ik denk dat gehoorbeschermers te veel druk op mijn oren zetten.
Item 3	5	Ik heb niet de intentie om gehoorbescherming te dragen wanneer ik in lawaaierige omstandigheden vertoef.
Item 5	3	Ik denk dat het dragen van gehoorbescherming elke keer ik lawaai vertoef belangrijk is.
Item 7	4	Ik vind gehoorbescherming dragen oncomfortabel.
Item 14	3	Ik ben ervan overtuigd dat ik gehoorverlies kan voorkomen wanneer ik in lawaaierige omstandigheden gehoorbeschermers draag.
Item 16	4	Gehoorbeschermers beperken mijn mogelijkheden om met andere te communiceren.
Item 18	3	Als ik gehoorbeschermers draag, bescherm ik mijn gehoor.
Item 19	4	Gehoorbescherming dragen is vervelend.
Item 24	5	Ik ben van plan gehoorbescherming te dragen.

English version – Beliefs about Hearing Protection and Hearing Loss

Original item number	Section	Question
Item 1	4	I think earmuffs put too much pressure on my ears.
Item 3	5	I do not intend to wear hearing protectors when I am in loud environments.
Item 5	3	I think wearing hearing protectors every time I am in loud environments is important.
Item 7	4	Hearing protectors are uncomfortable to wear.
Item 14	3	I am convinced I can prevent hearing loss by wearing hearing protectors whenever I am in loud environments.
Item 16	4	Hearing protectors limit my ability to communicate with others.
Item 18	3	If I wear hearing protection, I can protect my hearing.
Item 19	4	Wearing hearing protectors is annoying.
Item 24	5	I plan to wear hearing protection when I am in loud environments.

Appendix E

Dutch – Stimulus scenario

Voor dit onderdeel vragen we u zo goed als mogelijk het onderstaande scenario in te beelden. Ga pas na het lezen en inbeelden van het scenario door naar de volgende pagina.

Stelt u voor dat u deze zomer op een outdoor festival bent waar al uw favoriete muziek gedraaid wordt. De zon schijnt volop en u loopt samen met uw vrienden en/of vriendinnen tussen de festivalgangers, op weg naar een van de podia waar jullie graag naartoe willen. Tijdens het lopen komen jullie een bord van de organisatie tegen waarop het volgende te zien is…

English – Stimulus scenario

For this section, we ask you to imagine the scenario below as best you can. Only after reading and imagining the scenario, proceed to the next page.

Imagine you are at an outdoor festival this summer where all your favorite music is being played. The sun is shining brightly and you and your friends and/or girlfriends are walking among the festival-goers, heading for one of the stages you love. While walking, you come across a sign from the organization showing the following