Impact of prior affect on risk perception

Bachelor's Thesis

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Datum: 19.01.2011

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Abstract

Various studies have focused on the influence of negative or positive affects on risk perception. The theory of transfer of excitation as well as the priming paradigm, yields for the assumption that transfer of prior affect can account for people's variance in risk-perception. Accordingly, the purpose of this study is to investigate if an affect from a prior stimulus can be transferred to the risk perception of a following one. Ninety-nine subjects participated in a quasi experiment that compares the personal risk perception of a stimulus with regards to a prior induced negative or positive emotional state. In the first experimental group, the emotion manipulating stimulus and the target risk shared associated features, whereas in the second experimental group no close semantic relationship has been established. Findings suggest that prior affect can be transferred to risk perception and that common features of the affect-manipulating stimulus and the target risk can moderate the effect-size. Nevertheless, the semantic relationship is not necessarily required in order to transfer affect.

Samenvatting

Er zijn verschillende onderzoeken die zich richten op de invloed van negatieve of positieve emoties op risicoperceptie. Zowel de theorie 'Transfer van Excitatie' als de priming paradigma leiden tot de assumptie dat de transfer van voorafgaande emoties de risicoperceptie van de mensen kan beïnvloeden. De reden voor dit experiment is dus te onderzoeken: of een emotie, veroorzaakt door een voorafgaande stimulus, de risicoperceptie van een opvolgende stimulus kan veranderen. Negenennegentig proefpersonen hebben deel genomen aan een quasi-experiment dat de persoonlijke risicoperceptie van een stimulus, gerelateerd aan een voorafgaand geïnduceerde positieve of negatieve emotie, vergelijkt. In de eerste experimentele groep waren de emotieveranderende stimulus en het doel risico semantisch gerelateerd. Daarentegen werd er bij de tweede experimentele groep geen semantische relatie tussen de twee stimuli gecreëerd. Uitkomsten suggereren dat voorafgaande emotie kan worden overgedragen aan de risicoperceptie van een opvolgende stimulus en dat gemeenschappelijke kenmerken van een emotieveranderende stimulus de grootte van het effect kunnen beïnvloeden. Niettemin, de semantische relatie is geen voorwaarde om emoties over te dragen.

Introduction

Imagine the following hypothetical situation: It is state-election time. Two rival parties politicize the lifetime expansion of nuclear power plants as their major topic. One side argues against the expansion, the other side vindicates the point of view that the expansion would strengthen the economy. Facts and recent discussions are presented in the daily news in order to give indecisive voters crucial information. Imagine that a young child has been raped and murdered at this point of time and that the news-report about this sad fate is broadcasted shortly before the report about lifetime expansion of nuclear power plants. It is conceivable that the viewers are in a bad mood, caused by the child's fate, when they start watching the lifetime expansion report. What if the prior emotional state has been unconsciously transferred to the perception of nuclear risks, resulting in an increased perception of power plants as being high risk? If people think that they are high at risk to become victim of a nuclear disaster, they would fancy the party, which offers restrictions. The bottom-line would be: on the average level of all voters, a slight change in risk perception could change the election result.

Consequently, the communication of information about risks was never as important as in our modern society, where facts about any event are filtered and framed by the media. The way information is presented can strongly influence our risk perception and by doing so it can influence our behaviors and attitudes. Scientific research on risks of the last 25 years basically focused on risk assessment and risk management. The prior aimed to identify, quantify and to characterize risks, the latter aimed to communicate risks, inhibit ramifications and to provide guidelines how to make decisions concerning a particular risk. Central to all kinds of risk research is the study of risk-perception, which is a complex amalgam of factors that are

interrelated and vary between individuals. Nowadays, there are three prominent perspectives to evaluate people's perception of potential risks. In the next section, an overview about those theories and their implications for this research will be presented.

According to the psychometric approach, attitudes and perception of people towards risks can be quantified in order to predict risk perception. This model focuses on perceived dread, knowledge about the topic and magnitude of the consequences in order to gain knowledge about the individual perception of risks. The extent, to which someone is exposed -voluntarily or not, - is seen as very important as well (Fischhoff, Slovic, Lichtenstein, Read & Combs, 1978). However, the psychometric approach highlights, which characteristics are important when people judge if a situation might be dangerous: How serious is the danger to estimate? What do I know about the issue in question? To which extend is the issue discussed in the media? Am I voluntarily exposed? Do I trust information sources? Bottom-line: the total amount of fear, the knowledge about the risk and magnitude of people affected by the risk are the most important factors when predicting people's reactions. Consequently, an event would be perceived as risky when it happens close to one's home, if many people are involuntarily exposed and if laypersons do not possess enough knowledge to make a judgment based on rational information. The psychometric approach offers a tool to quantify risk and to use averages in order to forecast people's reactions. Of course, those factors are moderated on the subjective level through personal experience and emotion (Slovic, Finucane, Peters & MacGregor, 2002).

Criticism exists about the way Slovic focuses on the intra-personal dimension of information processing. According to Joffe (2003), representative for the social representation approach, Slovic does not take the social context and social interaction into account. According

to her, he focuses too much on atomized individuals with no social composition, which results in some kind of cognitive algebra and can not reflect the daily-life reality. It is not possible to use quantitative measurements in order to categorize people's conviction and to use those results to forecast their reaction, as we might be able to do within the field of robotic (Joffe, 2003). Instead, the social representation approach focuses on the way in which people acquire and reflect on social representations which results in different ways of thinking with regards to the socio-cultural interaction, own experiences and the role of mass media. According to the theory, media influences perception strongly through communicating meaning and values via emotionally loaded symbols. Thereby, media influences our perceptions to a large extend (Joffe, 2003).

Compared with the socio-cultural and psychometric perspective, the psychosomatic approaches focuses on the individual, cognitive level of making decisions about a specific risk. Central to many of those theories is the point of view that individual affect influences one's perception of risk. Research indicates that people tend to make use of an affect heuristic when confronted with a risky event. Finucane, Alhakami, Slovic and Johnson (2000) found that people tend to infer a risk as being high, if the associated affect is negative and as being low if the associated affect is positive. Research suggests that logical thinking and emotions work somehow together. Eppstein, Lipson, Holstein and Huh (1992), for example, suggest a dual process model, which consists of an experiential and analytic system. The prior is seen as a relict, emerged by evolution, which helps us making quick decisions based on our feelings and emotions. Long before analytical thinking about risks, based on probabilistic information, was useable for mankind, experiential thinking provided a variety of shortcuts to enable human

beings to survive during a long time of evolution. As a function of the increase of life's complexity, mankind developed more analytic strategies in order to boost the efficiency of their risk-evaluation. The latter uses prior experiences and gained knowledge to provide a conscious, logical representation of the risk. Generally, this process demands more cognitive effort, which results in slower processing (Eppstein et al., 1992).

Research indicates that the analytic and experiential system are not independent; rather they interact with each other. For example, Damasio (1994) states, that thought largely consists out of images, that refer to symbolic and perceptual representations. During a lifetime of learning, people associate their images with experienced body states, so as feelings and emotions. A negative affect with regard to nuclear power, for example, would increase one's risk perception of nuclear power plants. In other words: Affect is essential to rational action. Finucane et al. (2000) state, that "Using an overall readily available affective impression can be easier and more efficient than weighing the pros and cons of various reasons or retrieving relevant examples from memory, especially when the required judgment or decision is complex or mental resources are limited" (p.3). It is conceivable that affect has a big impact on laypeople's risk-perception in our modern society because many risks emerged from man-made technology and are only completely understood by few experts. Even those risks, which are rooted in nature, are often framed by the media as being results of global warming. This complexity makes it hard to evaluate potential risk on the basis of logical thinking, making it hard for laypeople to estimate the real risk. Therefore: The more complex a risk becomes, the more important becomes associated affect in risk perception on the individual level.

The experimental paradigm of priming, in which the exposure to one stimulus, the so

called prime, alters participant's perception of a target stimulus, yields for the question if the affect with regards to a risk in question can be primed by a prior stimulus. More specifically, the affective priming theory assumes that the prime would strengthen cognitive associations between mental representations and affect, which then become more important with regards to the target risk (Klauer & Musch, 2003). A crucial part of priming is the concept of spreading activation that implies that the effect of priming increases as closer semantic features of the prime and the target risk are related. Taking this into account, it is relevant to investigate, if a prior affect could influence the individual's perception of a risk in case that the sources of prior affect and the following risk have general features in common. For example, think about a video clip, showing a child suffering from the bombing of Hiroshima, as source of a prior negative affect and a video clip about nuclear power plant lifetime expansion as the target risk. Obviously, both refer to the same concept of radiation. It is conceivable that this semantic relationship would increase the negative, affective associations with regards to concept in question. In contrast could a stimulus, which is related to radiation but evokes positive emotions, for example jokes, increase positive, affective associations.

The first and second hypothesis thus will be:

H1: An induced negative affect, which is semantically related to the target risk, will boost personal risk- perception compared with the positive affect condition.

H2: An induced negative affect, which is semantically related to the target risk, will increase negative feelings about the risk compared with the positive affect condition.

Nevertheless, it is conceivable that affect does not have to be directly related with the risk in question. One can assume that prior emotional states could be transferred to a following

situation and therefore might influence the perception of a risk, without being linked to common features. This assumption seems to be conceivable when taking implications of the excitation-transfer theory into account. The assumption, that "Residual excitation from essentially any excited emotional reaction is capable of intensifying any other excited emotional reaction" (Zillmann, 2006, p.223), is nowadays used to investigate the relationship between violent media content and possible effects on the real life behavior of media consumers. Zillermann's research (1983) shows, that the transfer of excitation requires the presence of at least three components: First of all, the second stimulus should occur before the arousal from the first stimulus faded away. Secondly, we expect a misattribution of arousal, which means that the individual would interpret the prior arousal as coming from the second stimulus. Thirdly, the individual didn't reach an excitatory threshold until the second stimulus is presented, that is, the amount of arousal should not be extraordinary high in order to make misattribution possible (Zillmann, 1983). With regards to the transfer of excitation, it seems to be conceivable that a prior emotional state might influence the following one, regardless of the content and thereby influence risk-perception. Cerully & Klein (2010) found, that an emotional state alters people's behavioral responsiveness to personal risk feedback with regards to influenza. An important feature of this research is that watching funny or sad movies induced the emotional states. There was no semantic relationship between the trigger of emotion and the risk-feedback on influenza.

Taking those implications into account, the third and fourth hypothesis will thus be:

H3: An induced negative affect, which has no semantic relationship with the target risk, will boost personal risk-perception compared with the positive affect condition.

H4: An induced high negative affect, which has no semantic relationship with the target risk, will

increase negative feelings about the risk compared with the positive affect condition.

Based on the assumption, that a prior negative affect that has no semantic relationship with the target risk, will boost personal risk perception, a question that emerges is, why people are able to watch the news which largely consist of negative coverage, without being extremely negatively aroused after about 15 minutes of negative excitement transfer? Slovic (2010) suggests the concept of psychological numbing to explain why people can perceive information about genocides without feeling strongly affected. According to him, main components are the way imagery emerges and the attention one pays to the presented material: “Imagery and feelings are lacking when large losses of life are represented simply as numbers or statistics” (p.41). His approach is grounded in a concept, nowadays known as ‘Weber’s Law’, which generally states that people’s ability to detect changes in a physical stimulus rapidly decreases as the magnitude of the stimulus increases (Weber, 1834). Various researches confirmed this thesis and put further emphasis on the relation between proportional- and number- based information about death-rates of a particular disaster and the impact on peoples affect. Findings suggest that people tend to feel more affected when confronted with proportions than pure numbers (Slovic, Finucane, Peters & MacGregor, 2004). Bottom-line: people don’t feel affected by negative news because too many terrible disasters and potentially dangerous developments are presented as statistics, missing the individual, emotional aspect, which would catch our attention and feelings. Consequently, affect cannot be transferred if it has not been emerged at all.

Nevertheless, the concept of psychological numbing does not contradict to the assumption that transfer of emotion can influence risk-perception. Instead, it clearly defines which requirements the first, affect inducing stimulus have to fulfill in order to evoke negative

emotions. First of all, it should highlight a disaster's consequences for a single person behind the presentation of numbers. This implies, for example, that the destiny of a single child would elicit more affect than a picture that shows thousands of people marching through a desert, trying to escape from terror.

To give a decent conclusion at this point: the purpose of this study is to investigate if transfer of affect can account for variance in people's risk perception. Furthermore it intends to investigate whether a semantic relationship between the source of affect and the target risk is necessary in order to influence personal risk perception.

Method

Design

Two quasi experiments have been designed, featuring two experimental groups. The first yields for two separate conditions, labeled 'positive affect / related risk' and 'negative affect / related risk' and accordingly, the second yields for the conditions 'positive affect / unrelated risk' and 'negative affect / unrelated risk'.

The basic design is an online-quasi-experiment among German residents that consists of those two experimental groups, which are divided into two conditions, one with an induced positive affect, one with an induced negative affect. Each condition can be subdivided into two parts. The first consists of the emotion-manipulating stimulus, followed by a questionnaire that measures the emotional state. The second part starts with a video about either lifetime expansion of nuclear power plants or flooding in Germany, followed by a questionnaire that inquires the respondent's personal risk perception of the prior risk as shown in the video and a questionnaire that inquires feelings with regards to the risk. In the first group, the emotion-manipulating stimuli

are semantically related to the target risk of nuclear power expansion. In the second group, the same stimuli are used but the target risk change to flooding in Germany, eliminating the semantic relationship.

Participants

The data has been collected via the internet-experiment provider thesistools.com, which randomly assigned people to one of the four experimental conditions. German social networks have been used to spread the link. It has been sent to round about 100 people, asking them to participate and to remit the link to other friends or family members. Consequently, a response rate could not be established. Over 115 responses have been registered. Due to missing values, 16 responses have been dropped. Consequently, 99 data samples were useable for the analysis. In the first experimental group, 48 people participated, equally distributed over both conditions. In the second group, 51 people participated, 25 in the 'negative affect / unrelated risk' condition and 26 in the 'positive affect / unrelated risk' condition. Over all, 57,6% males and 42,4% females participated. The average age was twenty-five, with a minimum of twelve and a maximum of 65.

Procedure

People were asked to participate in this study in order to help a student to finish his bachelor thesis. After clicking on a link, they were redirected to thesistools.com and randomly assigned to one of the four conditions. First of all, they were informed that the experiment would take about 15 minutes and that the data is going to be kept confidential. The introduction highlighted that the experiment consists of two independent tests that aim to evaluate specific media behavior. In the next step, age and gender were inquired.

In the ‘positive affect’ conditions, participants were told that the following test intends to evaluate their kind of humor. They were instructed to rate six funny pictures about nuclear power on a five point Likert-Scale, in order to ensure that they really paid attention to the presented material. After that, they were asked to fill in a questionnaire about their current feelings in general, which aims to evaluate the efficiency of affect manipulation. In the next step they were informed that they completed the first experiment and reached half time of the whole study. The next part varied according to the condition. People in the ‘positive affect / related risk’ condition were instructed to watch a short movie about power plant lifetime expansion in Germany, followed by a questionnaire about their personal risk-perception of power plants. Participants in the ‘positive affect / unrelated risk’ condition were instructed to watch a short movie about flooding in Germany, followed by a questionnaire about their personal risk-perception of flooding.

In the ‘negative affect’ conditions, participants were instructed to watch a movie carefully that consisted of pictures showing children, sometimes crying and sometimes suffering from consequences of nuclear disasters. Every few seconds, an atomic mushroom cloud faded in, highlighting the source of their suffering. The visual material was accompanied by slow, emotional music. After the participants watched the movie, they were asked to fill in a questionnaire about their current feelings in general. In the next step they were informed that they completed the first experiment and reached half time of the whole study. The next part varied according to the condition. People in the ‘negative affect / related risk’ condition were instructed to watch a short movie about power plant lifetime expansion in Germany, followed by a questionnaire about their personal risk-perception of power plants. Participants in the ‘negative

affect / unrelated risk' condition were instructed to watch a short movie about flooding in Germany, followed by a questionnaire about their personal risk-perception of flooding.

Each condition ended with debriefs. The participants were informed about the real purpose of the study and asked not to tell the real aim of the experiment to others until the data collection has ended. See Appendix for the printed version of the experiment with all conditions.

Apparatus

A scale that intends to measure the effectiveness of affect manipulation has been created (Appendix). It inquires the participants feelings after the first stimuli in general. It consists of seven items, representing adjectives with regards to feelings that can be rated on a 5-point Lickert scale, ranging from "strongly disagree" to "strongly agree". Four of them are worded negatively, like "I feel angry", the others are worded positively, like "I feel happy", and are scored reversely. Consequently, if one scores with a "2" it would represent a positive emotional state, whereas a "4" would represent a more negative emotional state.

The scale that inquires personal risk perception is a modified version of the PROmO questionnaire, used to evaluate people's perception of flooding in the Netherlands (Appendix). It consists out of six statements that can be rated on a 5-point Likert scale, ranging from "I strongly disagree" to "I strongly agree". Items that were relevant have been translated into German and formulations discussed with German students in order to reduce a possible language bias and to increase face validity. Two different versions have been created, one measuring personal risk perception of nuclear power plants, one measuring risk perception of flooding.

The scale that measures feelings with regards to the risk of power plants or flooding is a modified version of the PROmO as well, consisting out of five statements that measure

emotional worries about the risk in question, similar to the effectiveness of manipulation scale but with focus on the emotion regarding the particular risk (Appendix).

A scale reliability analysis has been done for each scale and the values of Cronbach's alpha are above the critical threshold of .70 (see table 1).

Table 1 :

Scale reliability analysis.[1]

	Experimental condition	
	Related (Group1)	Unrelated (Group2)
Induced affect controll scale	.93	.88
Personal risk perception scale	.76	.71
Emotion target risk scale	.85	.89

Data analysis

The data has been analyzed with the statistical program SPSS. Missing values have not been added according to the average mean but have been dropped. According to the Skewness and Kurtosis analysis, negative affect after the first stimuli, personal risk perception of the target risk and emotions with regards to the target risk are normally distributed. Due to the design of this quasi-experiment, variables concerning the second part of the experiment can only be compared within two major groups, one with the related, and the other with the unrelated target risk. Consequently, a parametric independent two-sample t-test has been used to compare the conditions. Because of the same reason, the scale reliability analysis has been done for each

[1] Values refer to Cronbach's alpha.

experimental group separately. Due to the assumption of both hypotheses, which claim that the 'negative affect' condition scores significantly higher on personal risk perception, the 2-tailed SPSS significance level has been divided by "2". In order to evaluate the effectiveness of affect manipulation, all conditions which share the negative affect inducement, and all which share the positive affect inducement were pooled together.

Results

Overall effectiveness of affect manipulation

Statistical evidence supports the assumption that the inducement of either a positive or a negative affect was successful (see table 2). Participants in the positive condition rated their affect on average with "2.31" which resembles a more positive affect, whereas subjects in the negative condition rated their affect on average with "3.87", which definitely accounts for a negative emotional state. According to Cohens's d, the effect size of the treatment can be seen as very large, yielding for more than 81.1 % of no overlap of both distributions (see table 2).

Table 2:

Means, standard deviations, t-value, the statistical significance and Cohen's d.[2]

	Mean		Standard deviation		df	T	p	Cohen's d
	Positive	Negative	Positive	Negative				
Induced affect	2.31	3.87	0.64	0.59	97	-12.618	0.001	2.53

[2] For the comparison of the 'positive affect' and 'negative affect' conditions, abbreviated as 'positive' and 'negative'. The p-value refers to an alpha of .05, one-tailed.

First experimental group: semantic relationship

Statistical evidence supports the first hypothesis, that a induced negative affect, which is semantically related to the target risk, will boost personal risk perception compared with the positive affect condition ($T(46)= -3{,}117$, $p<0{,}001$). Participants in the ’negative affect / related risk’ condition rated the personal risk perception of nuclear power plants on average higher than participants in the ‘positive affect / related risk’ condition (see table 3). According to Cohen’s d, the effect size can be estimated as being large, yielding for more than 47,4% of no overlap of both distributions (see table 4).

No statistical evidence supports the second hypothesis, the assumption that participants in the ‘high negative affect / related risk’ condition would feel more concerned about the target risk ($T(46)=0{,}382$, $p=0{,}37$). Participants in the ‘negative affect / related risk’ condition did not rate their emotions with regards to nuclear power plant lifetime expansion significantly more negatively than participants in the ‘positive affect / related risk’ condition (see table 3).

Correlation between the personal risk perception and the prior induced suggest that only a negative affect correlates highly with individual risk perception (see table 5). No correlations were found between personal risk perception, induced affect or feelings about the target risk in the ‘positive affect / related risk’ condition, whereas strong, significant correlations were found in the ‘negative affect / related risk’ condition (see table 5).

Table 3:

Overview about means and standard deviations for both experimental groups.

	Semantic relationship (Experimental group 1)				No semantic relationship (Experimental group 2)			
	Mean		SD		Mean		SD	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Risk perception	3.01	3.58	0.61	0.66	2.09	2.54	0.65	0.75
Induced affect	2.24	3.85	0.68	0.66	2.39	3.89	0.61	0.52
Emotion target - risk	3.68	3.59	0.70	0.94	2.78	3,04	1.06	1.05

Table 4:

T-value, the statistical significance and Cohen's d for both experimental groups. [3]

	Semantic relationship (Experimental group 1)				No semantic relationship (Experimental group 2)			
	df	T	p	Cohen's d	df	T	p	Cohen's d
Risk perception	46	-3.117	0.001	0.89	49	-2,337	0,012	0.64
Induced affect	46	-8.309	0.001	2.40	49	-9,537	0,001	2.64
Emotion target -	46	0.382	0.37	0.11	49	-0,862	0,37	0.24

[3] The p-value refers to an alpha of .05, one-tailed.

Table 5:

Correlations for both experimental groups.[4]

	Semantic relationship (Experimental group 1)		No semantic relationship (Experimental group 2)	
	Positive	Negative	Positive	Negative
Risk perception – Induced affect	.155	.606**	.249	.546**
Risk perception – Emotion target risk	-.151	.430*	.078	.232
Induced affect – Emotion target risk	.025	.423*	.375	.365

Second experimental group: no semantic relationship

Statistical evidence supports the third hypothesis, that a induced negative affect, which has no semantic relationship the target risk, will boost personal risk- perception compared with the positive affect condition (T(49)= -2.337 , p=0,012). Participants in the 'negative affect / related risk' condition rated the personal risk perception of flooding on average higher than participants in the 'positive affect / related risk' condition (see table 3). According to Cohen's d, the effect size can be estimated between medium and large, yielding for more than 38.2% of no overlap of both distributions (see table 4).

[4] **. Correlation is significant at the 0.001 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed). Positive affect' and 'negative affect' conditions are abbreviated as 'Positive' and 'Negative'.

No statistical evidence supports the fourth hypothesis, the assumption that participants in the ‘negative affect / unrelated risk’ condition would feel more concerned about flooding (T(49)= -0.862 , p=0,37). Participants in the ‘negative affect / unrelated risk’ condition did not rate their emotions with regards to nuclear power plant lifetime expansion significantly more negatively than participants in the ‘positive affect / unrelated risk’ condition (see table 3).

Similar to findings from the first experimental group, correlations in the second group suggest that the induced affect influences personal risk perception of flooding only in the ‘negative affect’ condition. Nevertheless, correlations between personal risk perception of flooding and emotions with regards to the target risk were not significant as well as induced affect and target risk emotions, which is contradictory to the first experimental group (see table 5 and table 3).

Additional findings

Age had no significant effect on the negative affect after the first stimuli (F(20)=1,301 , p=0,204) or on the personal risk perception (F(20)=0,669 , p=0,844).

Gender had no significant effect on the negative affect after the first stimuli (F(1)=0,43 , p= 0,541) or on the personal risk perception (F(1)=2,857 , p=0,094).

Discussion

Findings suggest that a negative emotional state can be transferred to the risk perception of a following stimulus. Participants rated the personal risk of nuclear power plant expansions or flooding systematically higher when they were in the high negative affect conditions. This supports the assumption that the concept of transfer of excitation, as used in media psychology, can account for variance with regard a person’s risk perception.

Furthermore, the affect inducing stimulus and the target risk do not have to share common features, like - in this case - radiation. The difference between the positive and negative affect condition was significant, regardless of a semantic relationship. Nevertheless it seems to moderate the result, as indicated by a larger effect size in the first experimental group, where the affect inducing stimulus and the target risk shared the feature of radiation. Consequently, it is conceivable that an association between the source of negative affect and the target risk facilitates the increase in personal risk perception. Accordingly, it is not surprising that the correlations between all measured variables were only highly significant in the high negative affect condition, where the semantic relationship was given between seeing children suffering from nuclear disasters and the news report about nuclear power plant lifetime expansion. A plausible explanation, grounded in Damasio's (1994) view, that during a lifetime of learning, people associate their images with experienced body states, so as feelings like negative affect, could be the activation and especially the amplification of nuclear power related associations through the first stimulus which then has been transferred to risk perception of nuclear power plant lifetime expansion.

Implications

With regards to the importance of proper risk communication, as mentioned in the introduction, findings of this experiment deliver a crucial factor that has to be taken into account when evaluating people's perception of a risk, especially when relevant information can only be received via the media. The theory of social amplification or risk (SARF), for example, takes into account, that the media, as amplifying station, communicate risk information via emotionally loaded symbols, which may vary to media policy's, resulting in different framings,

that can account for a high degree of people's variance in perception of the risk in question. Findings of this study suggest that it is not sufficient to have a look at risk characteristics and they way the information is decoded by the media in terms of framing policies. Instead, the position of the news report about a particular risk within the daily news can have a great impact itself. Just think about the hypothetical example as presented in the introduction: if people watch the report about the rape and murder of a single child before getting informed about power plant lifetime expansion, maybe for more than a week, it could alter the population's average risk perception of the lifetime expansion towards more negative, magnifying the perception beyond the real risk, maybe resulting in serious economic consequences.

Limitations and future considerations

First of all, this experiment is mainly based on inquiring emotions via a survey. It displays the general problem that due to the subjective nature of emotion, there is a lot of space for bias and other sources of error, emerged through the process of self-ratings. Further research should thus make use of advanced technologies, like skin response or heartbeat measurements, in order to confirm affect manipulation or perceived feelings with regards to the target risk. Nevertheless, sample and effect size of the different conditions still yield for the assumption that a transfer of affect had happened.

Furthermore, this experiment was not able to demonstrate that a prior affect would result in increased negative feelings with regards to the particular risk. This is surprising because the hypotheses that state an increase in personal risk perception were strongly confirmed and the correlation between prior affect, personal risk perception and feelings towards the risk in question indicate that they are somehow related. One possible explanation could be the time

interval between presentation of the target risk and the inquiry of related affect. It is conceivable that answering the questions about personal risk perception confounded the associated emotion, because they faded away during the process of concentrating on answering questions.

With regards to the hypothetical situation as presented in the introduction, further research should investigate the influence of long-term exposure on actual risk perception. Based on findings of this experiment, it cannot be concluded that the increase, caused by a transfer of affect, results in an actual change of perception that lasts over time.

References

Cerully, J.L., & Klein, W.M.P. (2010). Effects of emotional state on behavioral responsiveness to personal risk feedback. *Journal of Risk Research, 13*, 591 – 598.

Damasio, A.R. (1994). *Descartes' error: Emotion, reason, and the human brain*. New York: Avon.

Epstein, S., Lipson, A., Holstein, C., & Huh, E. (1992). Irrational reactions to negative outcomes: Evidence for two conceptual systems. *Journal of Personality and Social Psychology, 62*, 328–390.

Finucane, M.L., Alhakami, A., Slovic, P., & Johnson, S.M. (2000). The affect heuristic in judgments of risks and benefits. *Journal of Behavioral Decision Making, 13*, 1–17.

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S., & Combs, B. (1978). How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. *Policy Sciences, 9 (2)*, 127-152.

Joffe, H. (2003). Risk: From perception to social representation. *British Journal of Social Psychology, 42,* 55-73.

Klauer, K.C., & Musch, J. (2003). *The psychology of evaluation: affective processes in cognition and emotion*. Mahwah, New Jersey: Lawrence Erlbaum.

Slovic, P., Finucane, M.L., Peters, E., & MacGregor, D.G. (2002). The affect heuristic. In T. Gilovich, D. Griffin, & D.Kahnemann (eds.), *Heuristic and biases: The psychology of intuitive judgement* (pp. 397-420). New York: Cambridge University Press.

Slovic, P., Finucane, M.L., Peters, E., & MacGregor, D.G. (2004). Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality. *Risk Analysis, 24 (2),*

311-322.

Slovic, P. (2010). If I Look at the Mass I Will Never Act: Psychic Numbing and Genocide. *Emotions and Risky Technologies, 5,* 37-59.

Zillmann, D. (2006). Dramaturgy for emotions from fictional narration. In J. Bryant & P. Vorderer (eds.), *Psychology of entertainment* (pp. 215- 238). New Jersey: Lawrence Erlbaum.

Zillmann, D. (1983). Transfer of excitation in emotional behavior. In J. T. Cacioppo & R. E. Petty (eds.), *Social psychophysiology: A sourcebook* (pp. 215-240). New York: Guilford Press.

Weber, E. H. (1834). *De pulsu, resorptione, auditu et tactu.* Leipzig: Koehler.

APPENDIX

The following pages consist of a printed version of each experimental condition.

The order is as followed:

Positive affect / related risk (nuclear power plant)

Negative affect / related risk

Positive affect / unrelated risk (flooding)

Negative affect / unrelated risk

The embedded video clips can be watched on the attached DVD .