

CONDITIONS OF RISK PERCEPTION CONCERNING EMF AND ITS DEPENDENCY ON DIFFERENT TYPES OF KNOWLEDGE TRANSFER

R.W. Scholz & D. Grasmück
ETH Zurich, Switzerland
(Principal contact: grasmueck@uns.umnw.ethz.ch)

Abstract: To influence risk perception of laypersons and increase acceptance towards a new technology numbers of probability or detailed description of the technology are insufficient. In this interview-based study we like to investigate the effects of different types of knowledge transfer on the perceived risk concerning EMF (Electro Magnetic Fields). Depending on the experimental setting the participants get a brochure containing either "knowledge about this new technology" or "knowledge about the risk context". Participants are split in an exposed (living near a transmitter) and a non-exposed group. Further variables such as personal concernment, motivational profile, information-processing mode, trust and confidence will be considered as well.

Introduction

Empirical findings could obviously clarify that laypersons do not understand risk simply as the product of probability and harm. They do include various peripheral characteristics (Slovic, Fischhoff & Lichtenstein, 85; Slovic, 87; Slovic, 92).

1.1 Unknown and complex technology

Mobile communication still can be understood as a new technology, where the risk has to be considered as hypothetical or vague. People have little knowledge how it really works, what type of radiation it is, how potent transmitters are and in how far health effects are possible. Experts probably think that the low acceptance of a technology is the result of a lack of knowledge. And if a new and unknown technology causes negative feelings among people then a transfer of knowledge about the technology would make it less unknown and therefore more acceptable. In our point of view the transfer of knowledge about the technology does not increase the acceptance significantly on its own. In addition knowledge about the risk context has to be transferred and social trust has to be considered as well.

1.2 Risk context

In our investigation we compare systematically two types of knowledge transfer. A brochure containing "knowledge about this new technology" and another brochure containing "knowledge about the risk context" will be designed and distributed among our participants. The latter brochure includes comparisons of different types of risks, a clear and vivid representation of probabilities, a brief summary of the ongoing discussion in the area of EMF and considerations concerning the construction of risk notion (Rohrman, 98). Usually lay-

persons are confused with probabilities, therefore an adequate representation of frequencies or a comparison with other sources of risks will be advantageous (Scholz, 87; Gigerenzer, 97; Nothbaum, 97). The influences of the social context should be a part of the brochure as well: In the year 1912 e.g. people were warned that the regularly use of a phone might provoke mania diseases.

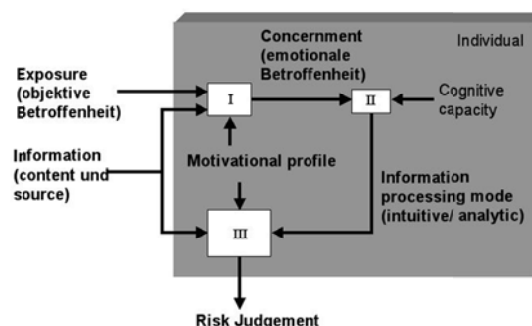
1.3 Methodic Design

This will be a 2x4 Design, where each group contains at least 20 persons. To investigate the effect of exposure participants are split in an exposed, who are living near a GSM-transmitter, and a non-exposed group. To evaluate systematically the effect of the knowledge transfer one group gets the brochure about the technology, the second group gets the brochure about the risk context, the third group gets both brochures and the fourth group is the control group, what means they don't get any brochure. Participants are interviewed before the knowledge transfer, shortly after and a view month after.

1.4 A psychological model of risk perception

Why exposed people often perceive risk in a different way than non-exposed people? Why some exposed people are extremely concerned about the risk while other exposed people are not concerned at all? Which motivational and cognitive processes trigger that difference? What is the relationship between exposure, concernment and risk perception? To answer these questions we investigate risk perception on an individual level.

Fig. 1: Supposed model of the causal relationship between variables



In a risk communication context a change of risk perception/risk acceptance on the individual level depends directly on the content and the source of the information,

the information processing mode (analytic versus intuitive) and the motivational profile in the sense of a subjective weight. The information-processing mode results from the personal concernment and the cognitive capacity. Personal concernment depends on the content and source of the information, the fact to be exposed or not and the motivational profile.

Variables as the personal concernment and the motivational profile will be assessed by various interview items (Figner & Grasmück, 99). It is very important to say that the personal concernment or involvement is not simply a reflection of the fact of to be exposed or not. More than that it is the result of an interaction of the information, the exposure and the motivational profile (Grasmück, Hürlimann & Scholz, 01).

In addition to the content of the information the source or the sender of the information plays also an important role in a risk communication context (e.g. Jungermann, H., Pfister, H.-J., & Fischer, K. 1996). A dual-mode model of social trust and confidence is suggested (Earle, T. C., Siegrist, M., & Gutscher, H., 01), where social trust is based on a value similarity and confidence is based on the past performance of the actor. Both influence the risk acceptance and the willingness to cooperate. In the sense of an interaction social trust can influence the confidence via the perception of the performance. In agreement with Prof. Gutscher and Dr. Siegrist we will use the same items as them.

Beside the content and the source of the information, the kind of information processing has to be considered as well: analytic versus intuitive (Scholz, 87), heuristic versus systematic (Chaiken, Liberman & Eagly, 87) or central versus peripheral (Petty & Caccioppo, 86). In the analytical mode information is evaluated carefully and rational. In the intuitive mode information is judged rather superficial by the use of simple heuristics. A famous example of such a heuristic is the inconsiderate and non-critical acceptance of an argument, only because I trust very much in the source of the information. The idea that this kind of information processing affect the Risk judgement was not really new but recently revitalized by Trumbo (99) or by Griffin et al. (99). The personal concernment and the cognitive capacity influence the information-processing mode. We suppose a curvilinear relationship between concernment and the probability to be in an analytic information processing mode or a reverse curvilinear relationship between concernment and the probability to be in an intuitive information-processing mode. If the concernment of a person is very low then it is just too bored to invest too much energy in the topic. If the concernment of a person is very high than it is just too activated and stressed to look carefully at the things (Jepson & Chaiken, 90). In a medium range of concernment or activation an optimal analytic information processing takes place, according to the Yerkes-Dodson-rule (08). In our investigation we don't pay attention to the cognitive capacity as a variable.

Regarding the motivational profile an interesting double function is suggested. On the one hand it determines the degree of the personal concernment and the way in which the information is processed. On the other hand the

motivational profile directly affects the risk perception and acceptance in the sense of a subjective weight of the information content (Lopes, 95). The relationship between the perceived benefit and the risk judgement is supposed to be inverse (Alhakami & Slovic, 94).

Conclusion

Which information has to be transferred for an optimized impact on risk perception? Knowledge about the technology and/or knowledge about the risk context? In how far the knowledge transfer is influenced or interacts with psychological parameters of the individual?

Thus, the main goals of this social science project are 1st to get a better understanding of the risk perception concerning mobile communication (more precisely GSM radiation) on the individual level and 2nd to investigate the impacts of different types of knowledge transfer in risk communication.

According to our hypotheses the transfer of "knowledge about this new technology" does not increase the acceptance significantly on its own. Whereas the transfer of "knowledge about the risk context" should have a major effect, which could be modulated by the exposure, the personal concernment, the motivational profile, the information-processing mode, the social trust in the Mobile Communication Corporations and the confidence in the content of the information material.

References

- [1] Slovic, P., Fischhoff, B. & Lichtenstein, S. (1985). Characterizing perceived risk. In: Kates, R.W., Hohenemser, C. & Kasperson, J.X. (Hrsg.). Perilous progress: Managing the hazards of technology. Boulder: Westview.
- [2] Slovic, P. (1987). Perception of risk. Science 236, 280-285.
- [3] Slovic, P. (1992). Perception of risk: Reflections on the psychometric paradigm. In: D. Golding & S. Krimsky (Hrsg.). Theories of risk (117-152). London: Praeger.
- [4] Rohrmann, B. (1998). The risk notion: Epistemological and empirical considerations. In: M.G. Steward & R.E. Melchers (Hrsg.): Integrated risk assessment: Applications and regulations: (39-46). Rotterdam: Balkama..
- [5] Gigerenzer, G. (1997). Ecological intelligence: an adaption for frequencies. Psychologische Beiträge, 39, 107-125.
- [6] Nothbaum, N. (1997). Experten-Entscheidung unter Unsicherheit. Kognitive Didaktik und situative Rahmung bei der Erhebung von Verteilungswissen. In: H.W. Crott & R.W. Scholz (Hrsg.), Psychologie des Entscheidungsverhaltens und des Konfliktes, Vol. 8, Frankfurt: Peter Lang.
- [7] Scholz, R.W. (1987). Cognitive Strategies in Stochastic Thinking. Reidel:Dordrecht.
- [8] Figner, B. & Grasmück, D. (1999b). Kismet - ein computergestützter Fragebogen zur Erhebung von Motivkennwerten. [Unveröffentlichtes Computer-

programm]. Psychologisches Institut der Universität Zürich.

- [9] Grasmück, D., Hürlimann, M. & Scholz R.W. (2001). Betroffenheit und ihr Einfluss auf die Risikowahrnehmung. 21. MPK in Zürich. (14.9. - 15.9.2001).
- [10] Jungermann, H., Pfister, H.-J., & Fischer, K. (1996). Credibility, Information Preferences, and Information. *Risk Analysis*, 16(2), 251-261.
- [11] Earle, T. C., Siegrist, M., & Gutscher, H. (2001). Trust and confidence: A dual-mode model of cooperation. Manuscript submitted for publication.
- [12] Siegrist, M., Cvetkovich, G., & Roth, C. (2000). Salient value similarity, social trust, and risk/benefit perception. *Risk Analysis*, 20, 353-362.
- [13] Chaiken, S., Liberman, A. & Eagly, A.H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In: J.S. Vleeman & J.A. Bargh (Hrsg.). *Unintended Thought*. New York: Guilford.
- [14] Petty, R.E. & Cacioppo, J.T. (1986). The elaboration likelihood model of persuasion. In: L. Berkowitz (Hg.), *Advances in Experimental Social Psychology* (vol. 19, 123-205). New York: Academic Press.
- [15] Trumbo, C.W. (1999). Heuristic-Systematic Information Processing and Risk Judgment. *Risk Analysis*, 19 (3), 391-400.
- [16] Griffin, R.J., Dunwoody, S. & Neuwirth, K. (1999). A Proposed Model of the Relationship of Risk Information Seeking and Processing to the Development of Preventative Behaviors. *Environ. Res.* 80, 230-245.
- [17] Jepson, C. & Chaiken, S. (1990). Chronic issue-specific fear inhibits systematic processing of persuasive communications. *Journal of Social Behavior and Personality*. 5(2). 61-84.
- [18] Yerkes, R.M. & Dodson, J.D. (1908). The Relation of Strength of Stimulus to Rapidity of Habit-Formation. *Journal of Comparative Neurology and Psychology*, 18, 459-482.
- [19] Lopes, L.L: (1995). On modeling risky choice: Why reasons matter. In: J.P. Caverni, F.H. Baron & H. Jungermann (Eds.). *Contributions to decision making*. Amsterdam: Elsevier.
- [20] Alhakami, A. & Slovic, P. (1994). A psychological study of the inverse relationship between perceived risk and perceived benefit. *Risk Analysis*, 14, 1085-1096.
- [21] Mosler, H.-J. , Ammann, F. & Gutscher, H. (1998). Simulation des Elaboration Likelihood Model (ELM) als Mittel zur Entwicklung und Analyse von Umweltinterventionen. *Zeitschrift für Sozialpsychologie*, 29, 20-37.