The Impact of the Information Frames on Laypersons' Risk Appraisal

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Abstract: Risk communication is crucial if uncertainty in scientific knowledge regarding health risks still exists. One example is the current debate on radiofrequency electromagnetic fields and health risk below the limit values. Consequently, the question is raised whether different strengths of evidence can be communicated effectively. To meet this question, this experimental study investigates the impacts of different information frames on laypersons' risk appraisal. Different information frames of current risk communication strategies are tested.

Backed up with the experimental findings, conclusions will be drawn for effective risk communication.

Introduction

Gaps in the scientific knowledge and the crucial question about the strengths of evidence

The need of communication approaches regarding uncertainties in scientific knowledge continues to be an important role. Dealing with uncertainty is a part of risk science (cf. Row, 1994) but its significance increases due to fast-developing technologies. In particular taking up the precautionary perspective the gaps in the scientific knowledge draw the attention (cf. Wiedemann & Brüggemann, 2001; Wiedemann et al., 2001).

Although guidelines and tools based on theoretical knowledge in the social and communication sciences are nicely developed (cf. Covello et al., 1989; Jungermann, Rohrmann & Wiedemann, 1991; Wiedemann, 1999; Wiedemann & Schütz, 2000) deficits of empirical studies is to be pinpointed regarding this issue.

There are still many open questions in risk communication if scientific knowledge lacks. A good example of uncertainty in the scientific knowledge is the intention felt issue of radiofrequency electromagnetic fields (EMF). As shown in a recent dialogue project there are still uncertainty in scientific knowledge and a lot of open

questions (cf. Wiedemann, Schütz & Thalmann, in press). In the centre of the debate is the question whether there are health risks below the limit values or not

Furthermore, regarding risk communication the question is raised how to communicate effectively different strengths of evidence to laypersons. However, communication tools are given. But they are not proven. Exactly this deficit in scientific research presents the key point in my investigation.

Current Risk communication approaches in the EMF-Debate

According to current EMF-Debate, several risk assessments were realised in the last years and various communication strategies could be identified in Europe. Each of them attempts to communicate the current state of knowledge to laypersons. Two examples of communication tools in Germany are from the Ecolog-Institut (2002) or the Strahlenschutzkommission (2001a,b). Both institutions utilise specific characteristics regarding the information tools: On the one side, tables to present the scientific knowledge in a compressed way and on the other side, a system describing the strengths of evidence.

In the first series the experimental study will predominantly focus on the communication strategy by Ecolog, later on the focus will be on the SSK brochure.

As figured below, Ecolog uses a table-format and a specific system describing the strengths of evidence (cf. figure 1). Ecolog lists different endpoints about the subject cancer and assesses the strengths of evidence by following five evidence-categories: "proof", "consistent hint", "strong hint", "hint" and "weak hint". Based on this strategy, Ecolog visualises the current state of art in scientific knowledge concerning EMF and health risk below the limit values.

Wirkung/Effekt	Methode	S (W/m²) / SAR (W/kg)	Klass	Klassifizierung		
			Schwa			eise
	Hinweise					
	starke Hinweise					
Konsistente Hinweise						
		Nach	weis			
Krebs						
Krebs, insgesamt	Epidemiologie				+	
	Experiment, Tier	0,5/			+	
Leukämie	Epidemiologie				+	
Lymphdrüsenkrebs	Epidemiologie					+
	Experiment, Tier	3/0,01			+	
Gehirntumoren	Epidemiologie				+	
	Experiment, Tier	0,01/				+
Lungenkrebs	Epidemiologie					+
Brustkrebs	Epidemiologie, Frauen					+
	Epidemiologie, Männer					
	Experiment, Tier	10/0,3				+
Augenkrebs	Epidemiologie					+
Hodenkrebs	Epidemiologie				+	
Hautkrebs	Experiment, Tier	10/1,2				+
andere Krebsformen	Epidemiologie					+
	Experiment, Tier	/0,5	$\neg \neg$			+

Fig. 1: Table of the Ecolog – Institute

Obviously, the approaches of Ecolog or SSK serve as good issues for investigations. Based on theoretical considerations, two research questions are in the centre of interest: Firstly, do different information frames provoke differences in appraising risks among laypersons? Secondly, how do laypersons perceive different strengths of evidence-categories?

Design

In several experiments a 2 x 2 x 2 Design will be used. Each group contains at least 15 young persons (17 to 28 years). To investigate the effects of the information frames one half of the participants will get the information in a table format, the other half in a text format. To control different aspect a systematic variation of two other factors will be done in both group: quantity (four vs. ten arguments) and the quality of arguments (weak hint vs. strong hint).

To test the laypersons' perception of the different strengths of evidence categories the participants have to assess the five categories by Ecolog on a rating-scale varying from 0% to 100% strength of evidence.

Theoretical Background

Under a theoretical perspective the Elaboration-Likelihood-Model of persuasion (ELM) from Petty and Cacioppo (1981; 1986) offers a good conception to understand the complexity of information processing process which has an influence on the effectiveness of communication.

As shown in the figure below the main assumption of the ELM points out that there are two possibilities of processing: a central route and a peripheral route

(cf. figure 2). The choice depends mainly on two factors: First the motivation, personal relevance, and the involvement, second the competence of proofing the information.

If people are interested and motivated to focus on a information and do an accurate processing and proofing of the information, the central route will be activated. If that isn't the case, based on a deficit of competence or motivation, the periphery route will be activate. Consequently, incidental cues (e.g. amount of arguments attractiveness of design etc.) gets more important in the information process and influence the appraisal about an issue.

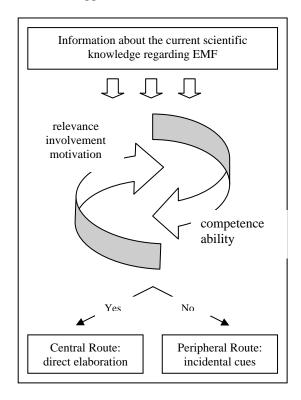


Fig. 2: ELM adapted from Petty & Cacioppo (1981)

Outlook

Accurate tools and guidelines to communicate the knowledge in a clear, transparent, and understandable way is one of the crucial keys for an effective risk communication.

This investigation answer the following questions:
(1) Do different information frames provoke differences in appraising risks among laypersons?
(2) How do laypersons perceive different strengths of evidence-categories

Backed up with the experimental findings, conclusions will be drawn for an enhanced communication of uncertainties in the scientific knowledge (e.g. EMF) to laypersons.

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