The Impact of Different Precautionary Measures and Scientific Uncertainties on Layperson's EMF Risk Perception

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Abstract: The proposed experimental study examines whether, and if so, how different regulative measures invoked to implement the precautionary principle (PP) in regulations on cellular phones may influence the layperson's risk perception. In addition, it is tested whether risk perception is affected by disclosing uncertainties in risk assessments regarding EMF. The sample consists of 500 predominately young adults from Switzerland, a German speaking sample and a French speaking sample.

Introduction

Two crucial issues prevail in the controversy about cellular phones. The first issue refers to the effects of revealing uncertainties of risk assessments. Does it amplify risk perceptions and influence the trustworthiness of the risk assessors? The second issue refers to the question whether and if precautionary measures should be invoked to mitigate potential hazards beyond the exposure limits. On the first glance there is - in principle - a consensus that the precautionary principle (PP) should be taken (see the EU opinion on the PP). However, the current risk reduction regimes provide quite different answers to the question of precaution in Europe (e.g. NISV in Switzerland versus 26. BImSchV in Germany). It is still unknown what ripple effects PP measures will provoke (or already have provoked). Two different effects might be expected: Either PP will amplify risk perception, or - on the contrary - the PP will strengthen the trust in the regulatory bodies, mitigate public outrage, and decrease risk perception.

Underlying Theoretical Principles and Hypothesis

It can be hypothesized that the implementation of PP-measures (e.g. protecting of sensitive areas) is perceived as a "warning signal" indicating that a "real" hazard exists. Consequently, the risk perception among laypersons might increase. This can be explained by the mechanism of availability (MacGregor, Slovic & Morgan, 1994; Morgan, Slovic, Nair, Geisler, MacGregor, Fischhoff, Lincoln & Florig, 1985).

Alternatively, evidence is given that trust-inducing measures is likely to reduce risk perception (Drottz-Sjöberg & Sjöberg, 1991; Figueiredo & Drottz-Sjöberg, 2000; Wiedemann & Schütz, in prep.; see also Sigrist, Earle & Gutscher, 2003). Based on these assumptions, an initial explorative study has shown that different PP-measures provoke differences in risk perception.

Similar contrary expectations are given when it comes to decide whether to disclose or to conceal uncertainty of knowledge concerning potential risks caused by EMF. In order to support a clear and transparent risk communication, it is demanded to disclose existing uncertainties in risk assessment (MacGregor et al., 1994; McMahan, Witte & Meyer, 1998; Thompson, 2002; Neus, Ollroge, Schmidt-Höpfner & Kappos, 1998). Contrarily, it is assumed that disclosing uncertainty is likely to increase risk perception.

Research Question

This study investigates how PP-measures and scientific uncertainties affect EMF risk perception in the public. Backed up by findings of an initial study conducted by Wiedemann and Schütz (in prep.), two alternative pairs of hypothesis can be stated:

(1a) Implementing PP-measures will be perceived as a warning signal and increases risk perception (compared to the information that no precautionary measures are taken).

(1b) Implementing PP-measures will enhance trust in the regulation authorities which further on reduces risk perception.

(2a) Disclosing of uncertainty in knowledge increases risk perception (compared to concealing of uncertainty in knowledge).

(2b) Disclosing of uncertainty in knowledge has no significant impact on risk perception.

Design and Method

The study uses a two-factorial experimental design. Factor 1 is expressed in five variations; factor 2 is represented in two alternative versions.

Factor 1 pertains to the different PP measures (no PP measures, absence of base stations in sensitive areas, exposure minimisation as overarching strategy, implementation of precautionary limit values, and citizen participation in the siting process of base stations).

Factor 2 addresses the uncertainty in risk assessments. The question is whether the existing limit values provide sufficient protection (no health effects beyond exposure limits proven vs. health effects can not be excluded).

The dependent variable is risk perception. Using short paragraphs including different information, the respondents assess the risk. The dependent variable "risk perception" will be measured on a seven-point rating scale. The intervening variable is trust in regulative authorities. In the combination of these two factors results in ten treatments (cells; compare Figure 1).

5 X 2 Design

No PP-measures		Exposure minimization as overarching strategy		Implementation of pre-cautionary limit values		Absence of base stations in sensitive areas		Citizen participation in the siting process of base station	
C	UC	C	UC	C	UC	C	UC	C	UC

Factor 1: **Certainty** (C) vs. **Uncertainty** (UC)

Factor 2: **Management measures**

Figure 1: Experimental Design

25 individuals are to be tested in each experimental treatment. The study is planed to be conducted with two samples, a German and a French speaking sample. In total 500, predominately young adults (age: 18 - 27 yrs.) are calculated to participate in the study.

Outlook

The outcomes of this study will contribute to deal attentively with precautionary measures and to issues concerning the communication of uncertainties.

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