

# EMF exposure and risk perception: Challenges and needs of the next decade



19<sup>ième</sup> Journée Interaction Onde Personne.

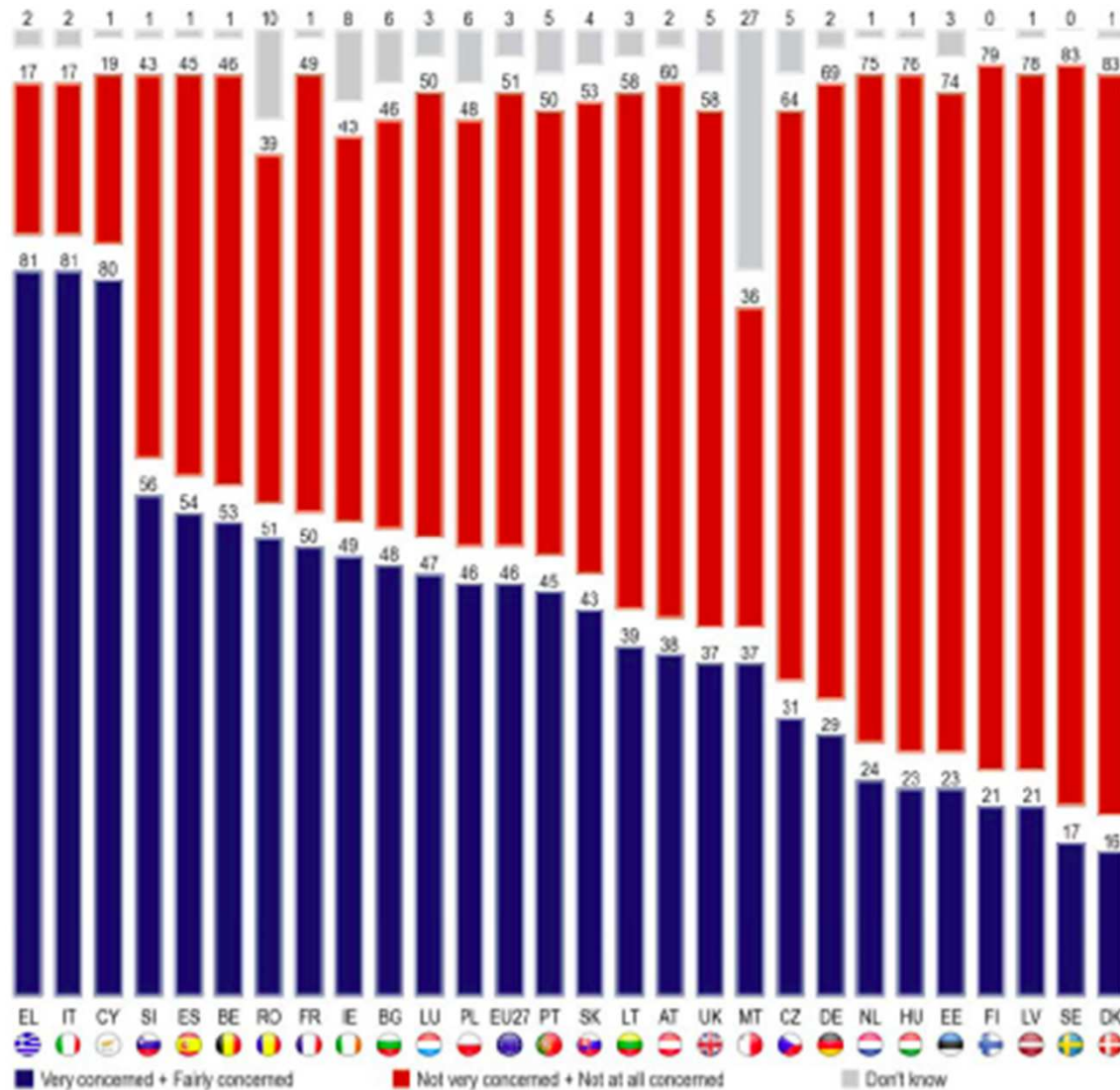


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# Can you trust in risk perception surveys?

How concerned are you about the potential health risks of electromagnetic fields?



Eurobarometer 2010

# Overview

- Why is risk perception important?
- How to measure risk perception?
- Is there a good theory that explains risk perception?
- How should we approach risk and exposure perceptions?

# Why is perception important?



„If men define situations as real, they are real in their consequence“

Tomas Theorem, 1929



Risk is everywhere. Risk perception is selective.



# Risk perceptions differ from risk assessment



# The scientific community is divided





# The perception that the scientific community is diveded might be distorted

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Swedish article on inadequacies with the CEFALO study ( Children and mobile phone use)

November 3, 2011 in [-Mailing List](#), [Cell phone news](#), [Epidemiology](#) by [EMFacts](#)

From investigative journalist Mona Nilsson:

This article will be published in Swedish this week in *Miljömagasinet* and on my page [www.mobiltelefonitv.se](http://www.mobiltelefonitv.se)

**Mobile phones and children's brain tumour risks: Researchers found the highest risk in Sweden –but dismissed the risks based on under-reported Swedish brain tumour statistics.**

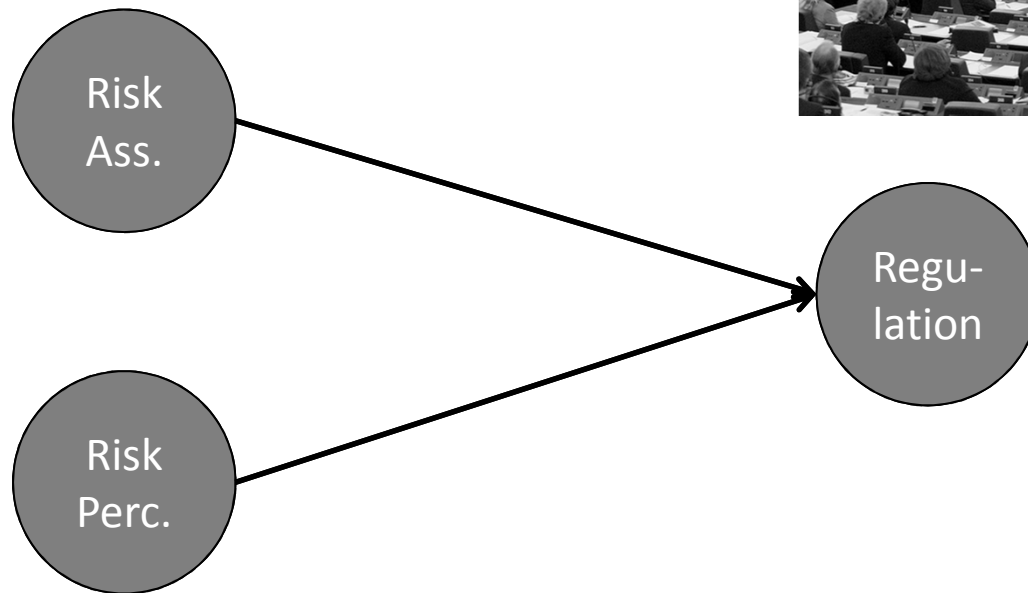


# Risk is a battlefield!

Risk perception drives protest.



# Risk perception affects risk regulation



- Exposure limits
- Precautionary measures
- Information policies
- Research funding

# How to measure risk perception?



# Focus groups

## Main features

- Qualitative data
- Based on introspections

## Output

- Subjective views on issues
- Insight into reasons, but not causes

## Caution

- Psychological processes are relatively inaccessible to introspection



# Population surveys

## Main features

- Shows the distribution of opinions, beliefs and attitudes

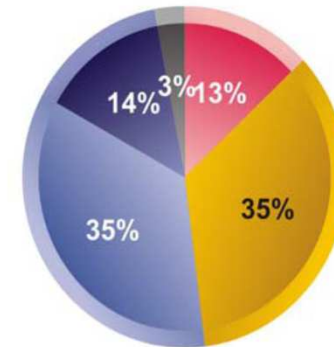
## Output:

- Representative data set

## Caution

- No causal explanations possible
- Limited insights into psychological processes

Question: QB2. Are you concerned over the potential health risks of electromagnetic fields?



Source: Special Eurobarometer 2006

# Psychometric Paradigm

## Main features

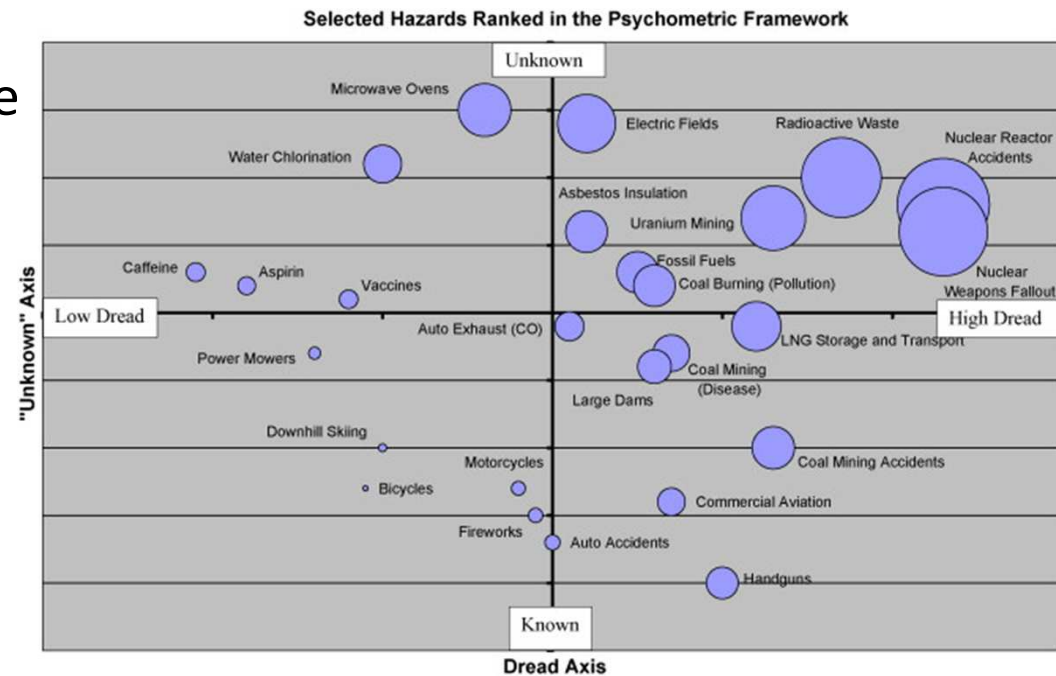
- Seeks to determine the effects of various qualitative factors on risk perception

## Output

- Main correlates of risk perceptions
- Explains some variance between different risk sources

## Caution

- Instigates into correlations, but no causations



Source: Singleton, Herzog & Ansolabehere, 2009

# Experimental studies

## Main features

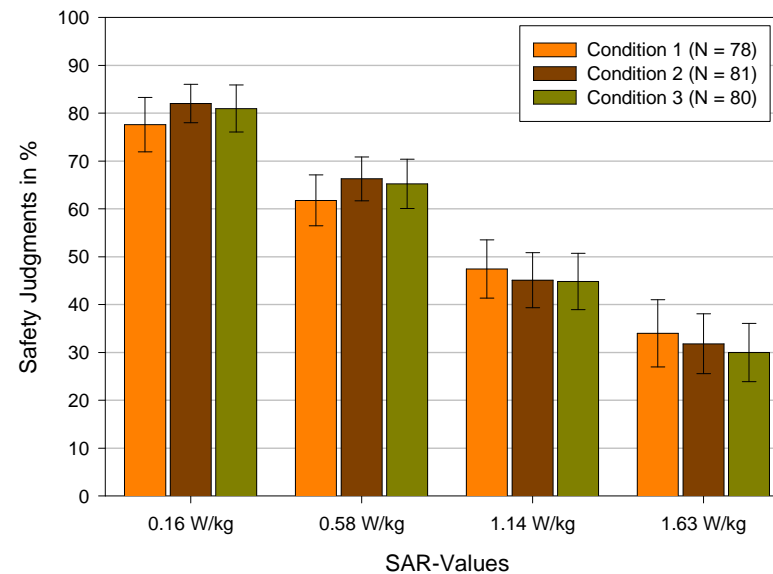
- Controlled conditions
- causal inference possible

## Output

- Test of causal hypotheses
- Insight into psychological processes

## Caution

- External validity: Extrapolation to other subjects and to the everyday-world



Source: Wiedemann, Schütz & Clauberg 2008



# Some insights from risk perception studies

- Lay people approach risk questions different to experts.
- The applied study methods determine the perspective and therefore the findings.
- Key is how we conceptualize risk perception, i.e. the underlying psychological assumptions.
- Risk perception  $\neq$  perception.
- Risk perception is a judgment.
  - It is fast & frugal
  - based on heuristic's, not on analytical reasoning
  - different heuristics can lead to the same risk judgment
  - might differ in terms of focus, intensity, stability, and changeability

Is there a good theory that explains risk perception?



# A good theory

A good scientific theory of risk perception

- is a prohibition: it forbids certain things to happen. The more a theory forbids, the better it is.
- specifies the psychological processes that underlie risk judgments
- is not at odds with generic judgment theories
- is testable and refutable.



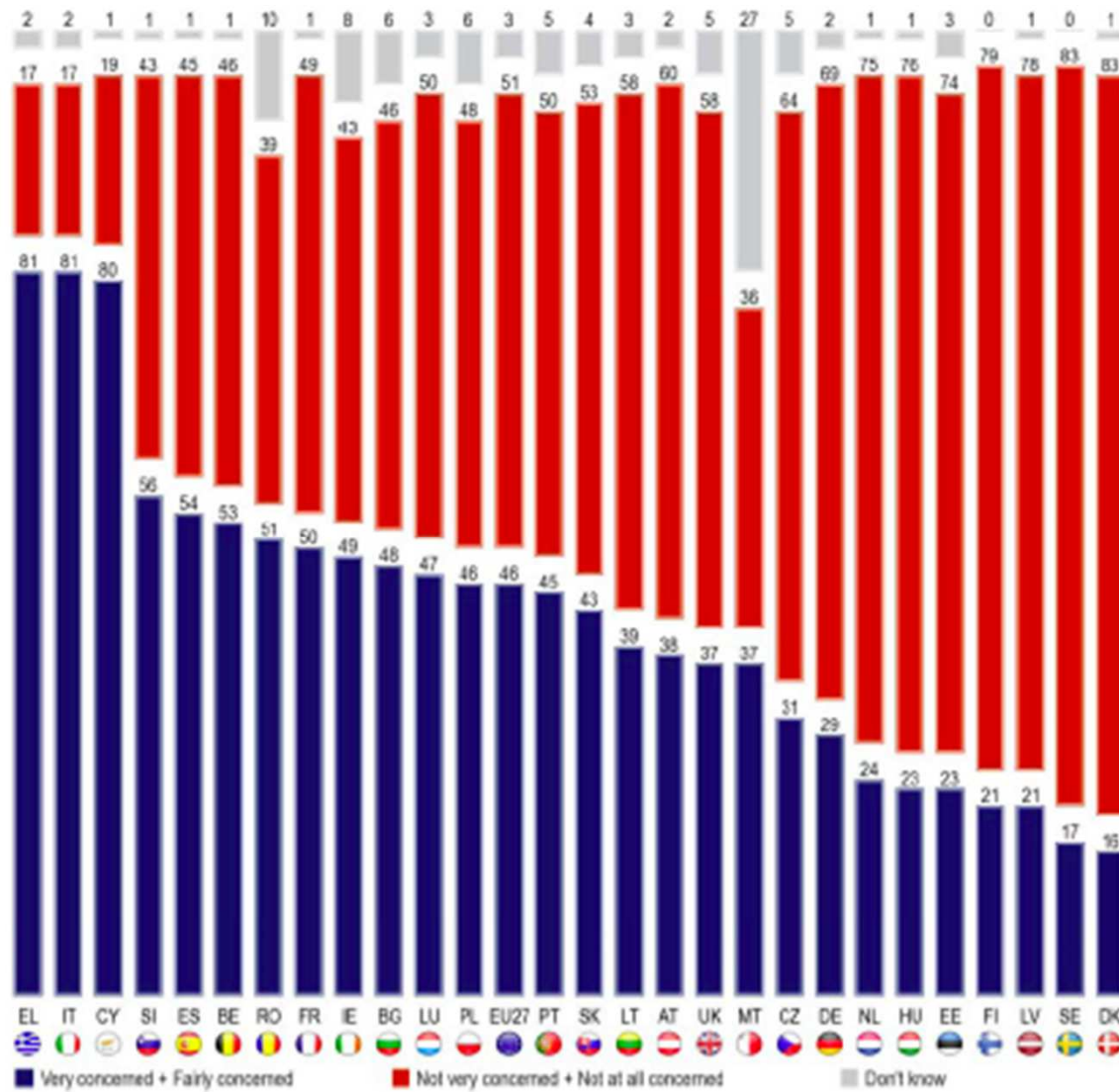
# A good theory

- Construal level theory
  - Theory of mental construction
  - Any object can be mentally represented in different ways
  - Psychologically more distant objects are construed on a higher, more abstract level.
  - Psychological distance covers
    1. Social distance
    2. Spatial distance
    3. Temporal distance
    4. Hypothetical distance
    5. Experiential distance

# Social distance

- Is EMF a personal relevant risk ?
  - Risk for me
  - Risk for my family & friends
  - Risk for the others

How concerned are you about the potential health risks of electromagnetic fields?



Eurobarometer 2010

# Social distance

Risks that are socially close are more relevant.

Intensity	1	2	3	4	5
Me				0	
Family			0		
Others			0		

Personal relevant risk:  $M \geq F \geq O$

# Social distance

Risks that are socially distant are less relevant.

Intensity	1	2	3	4	5
Me		o			
Family		o			
Others				o	

Personal irrelevant risk:  $M \leq F < O$

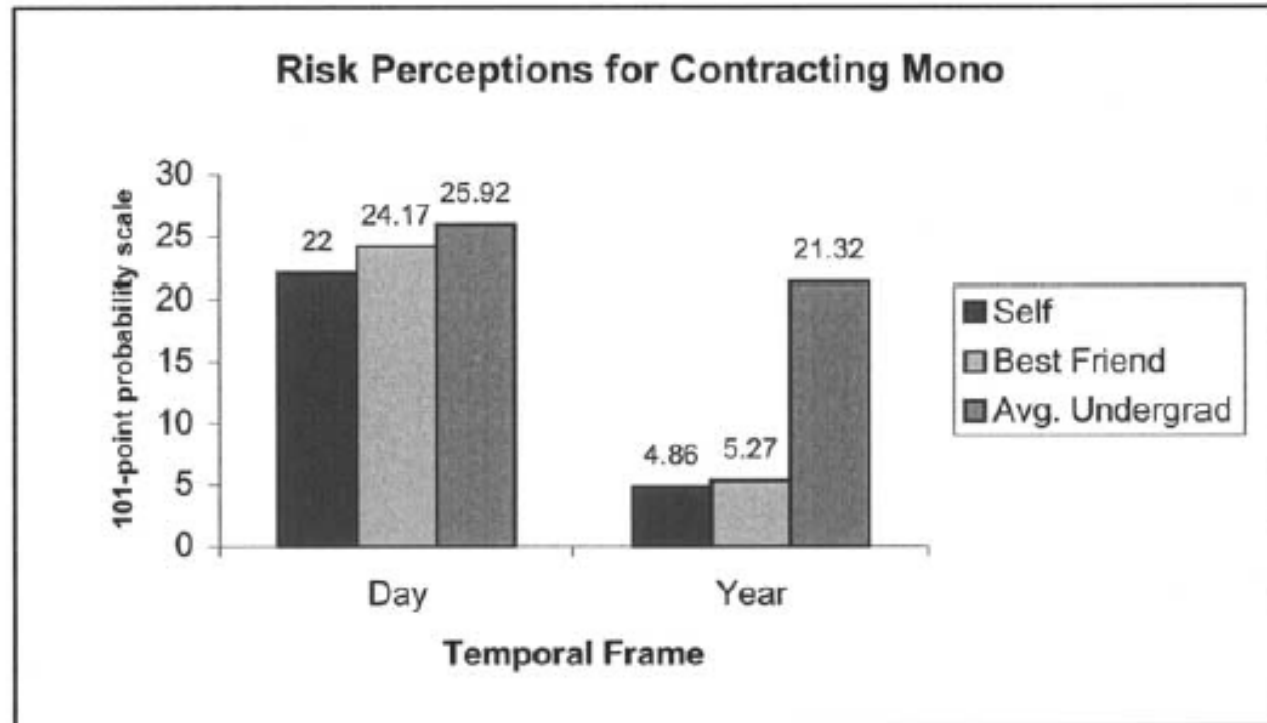
However, people might respond to personal relevant risk with an optimism bias.



# Temporal distance

Risk information  
(Mononucleosis)

- Day frame
- Year frame

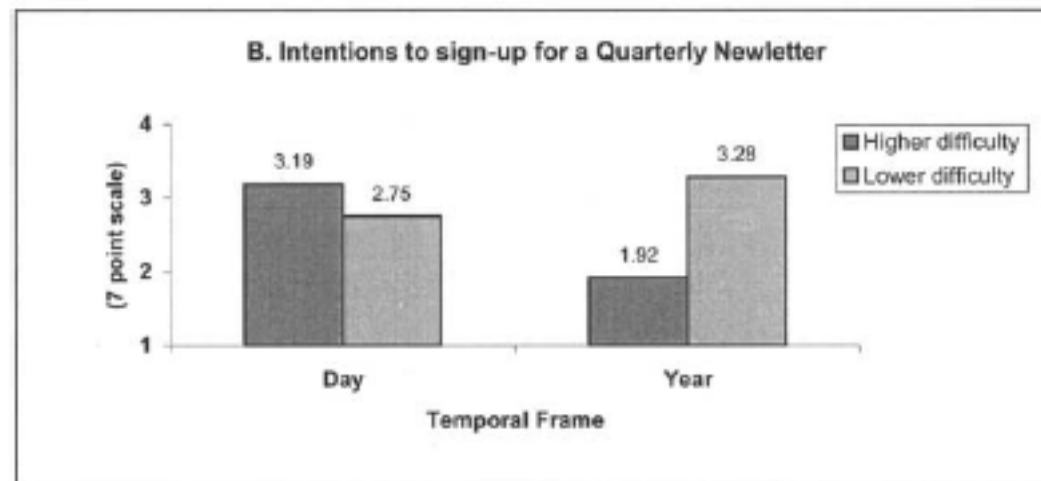
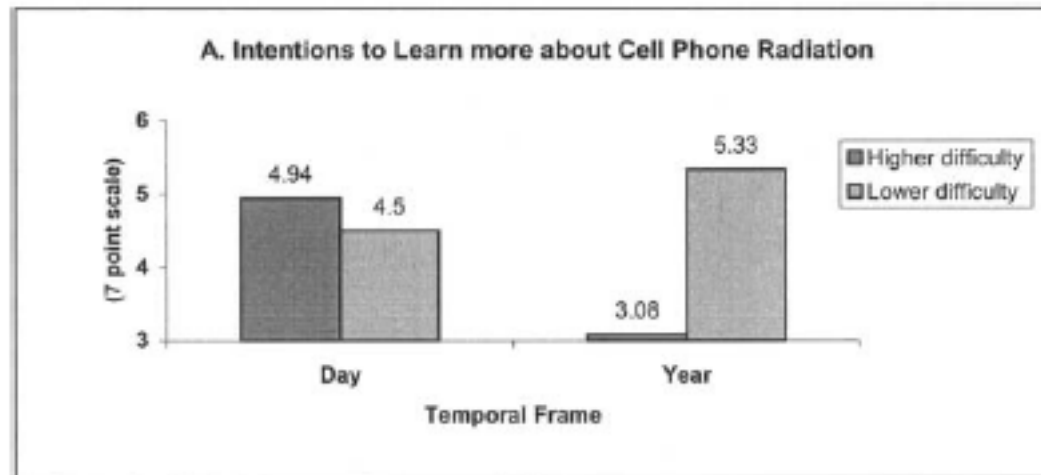


Source: Chadran & Menon, 2006

When does it strike, who does it affect, and how does it  
act?

- Every <day/year>, a significant number of people of people fall prey to Mono.
- Every <day/year>, a significant number of these happen to be high school and college students.
- Every <day/year>, a significant number of these happen to contract the virus by person-to-person contact, via saliva (on hands or toys, or by kissing) or by blood transfusion (in very rare cases).
- Every <day/year>, a significant number happen to suffer symptoms like fever, sore throat, swollen glands, and fatigue. Sometimes, the liver and spleen are affected. This could last from one to several weeks, and the disease is very rarely fatal.

# Temporal distance



Source: Chadran & Menon, 2006

# Hypothetical distance

- Reading a detailed, as opposed to more general, description of a future event increased the estimated probability that the event would actually occur.

Sherman, Zehner, Johnson, and Hirt (1983)

- Diseases described in either a more concrete or abstract manner result in different likelihood of actually contracting the disease.

Higher for those who imagined concrete symptoms

Sherman, Cialdini, Schwartzman, and Reynolds (1985)

# Experiential distance

- Risk perception of a car accident are different depending on
  - Sitting in a car
  - Sitting in a chair
- Risk perception - based on immediate experience-rich construals vs. based on abstract construals
- Makes a difference



How should we approach risk and exposure perceptions?



# How should we approach risk and exposure perceptions?

Constructing a good EMF risk perception study

Starting point:

- From exposure to risk construals

# Exposure construals



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Science 3 December 2004:  
Vol. 306 no. 5702 pp. 1776-1780  
DOI: 10.1126/science.1103572

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REPORT

## A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method

Daniel Kahneman<sup>1</sup>, Alan B. Krueger<sup>1,2</sup>, David A. Schkade<sup>3,\*</sup>, Norbert Schwarz<sup>4</sup> and Arthur A. Stone<sup>5</sup>

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# Exposure construals

## Exposure sources and usage

- Tablet (iPad)
- Cell phone (surfing in the internet)
- Cell phone (making or receiving a call)
- Cell phone (reading mails)
- WIFI at home/ work
- Laptop with WLAN
- Wireless joystick
- Camera with WLAN

# Risk construals

How dangerous do you consider this situation to be for the involved person?



How dangerous do you consider this situation to be for the person reading the newspaper?



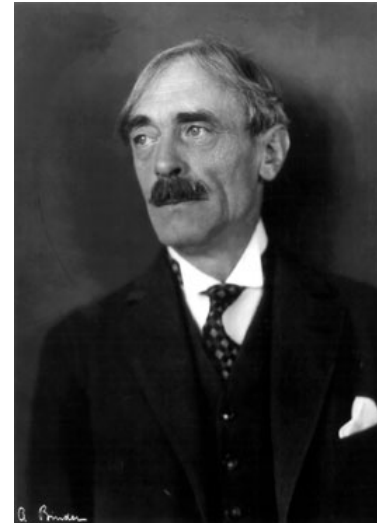
# risk magnitude construals

The potential health risks of electromagnetic fields from sources like mobile phones depends on

- Duration of the exposure
- Frequency of exposure
- Proximity of a exposure source
- Strength of the field emitted by the exposure source
- Number of exposure sources in close proximity
- The time of the day
- Physical size of the source

“What is simple is wrong,  
what is complex is useless.”

Paul Valéry



Thank you very much for your attention!

Questions?

