“In this world there is nothing certain but death and taxes"
Benjamin Franklin

Public (Mis)Perception of Food Risks

Wolfgang Gaissmaier
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HARDING CENTER FOR RISK LITERACY

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"The risks that upset people are completely different than the risks that kill people."

Peter Sandman

Actual Risks

Perceived Risks

Actual Risks

Perceived Risks

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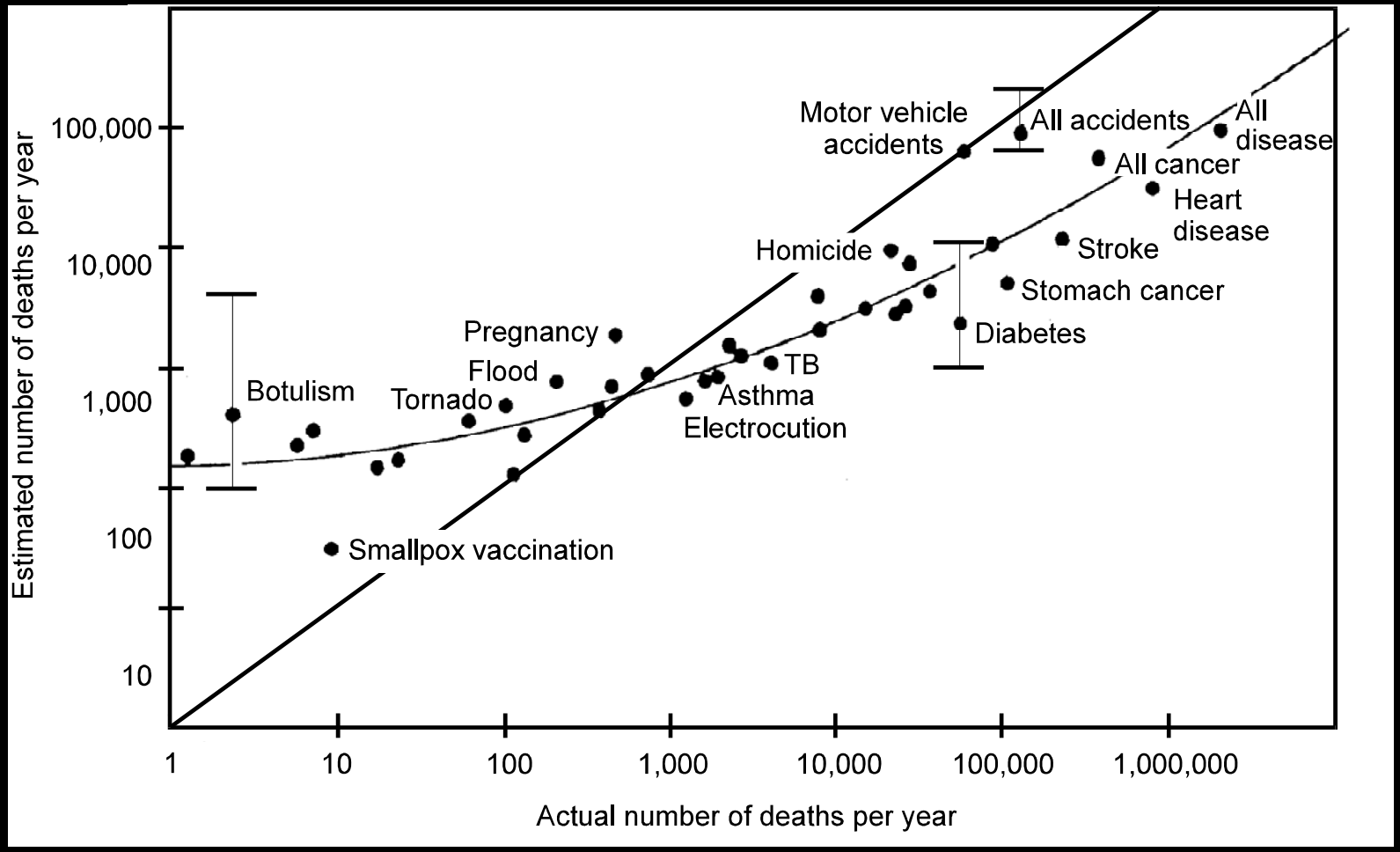
Perception of Risk



Slovic, Fischhoff, & Lichtenstein, 1982

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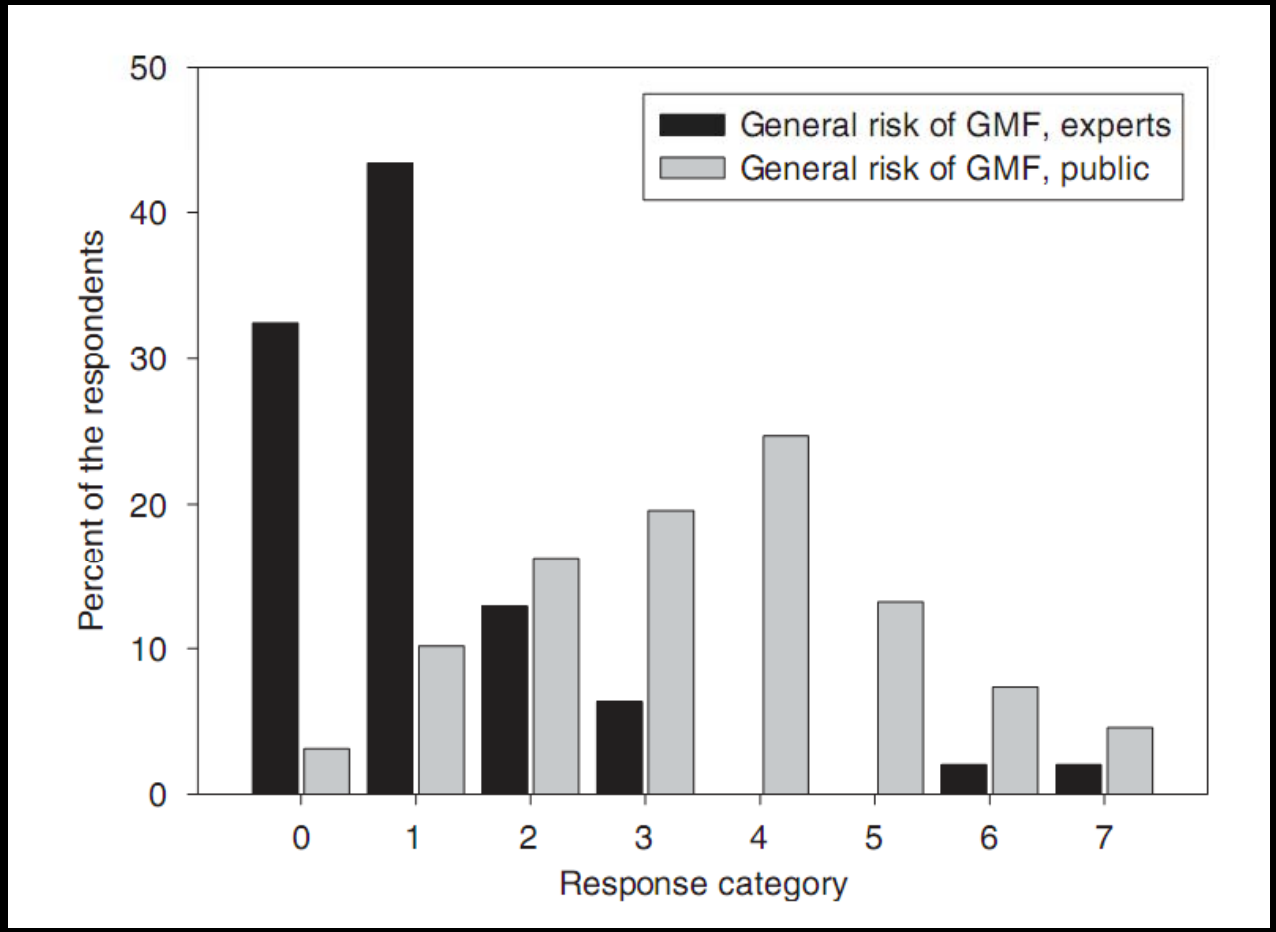
Experts vs. Public

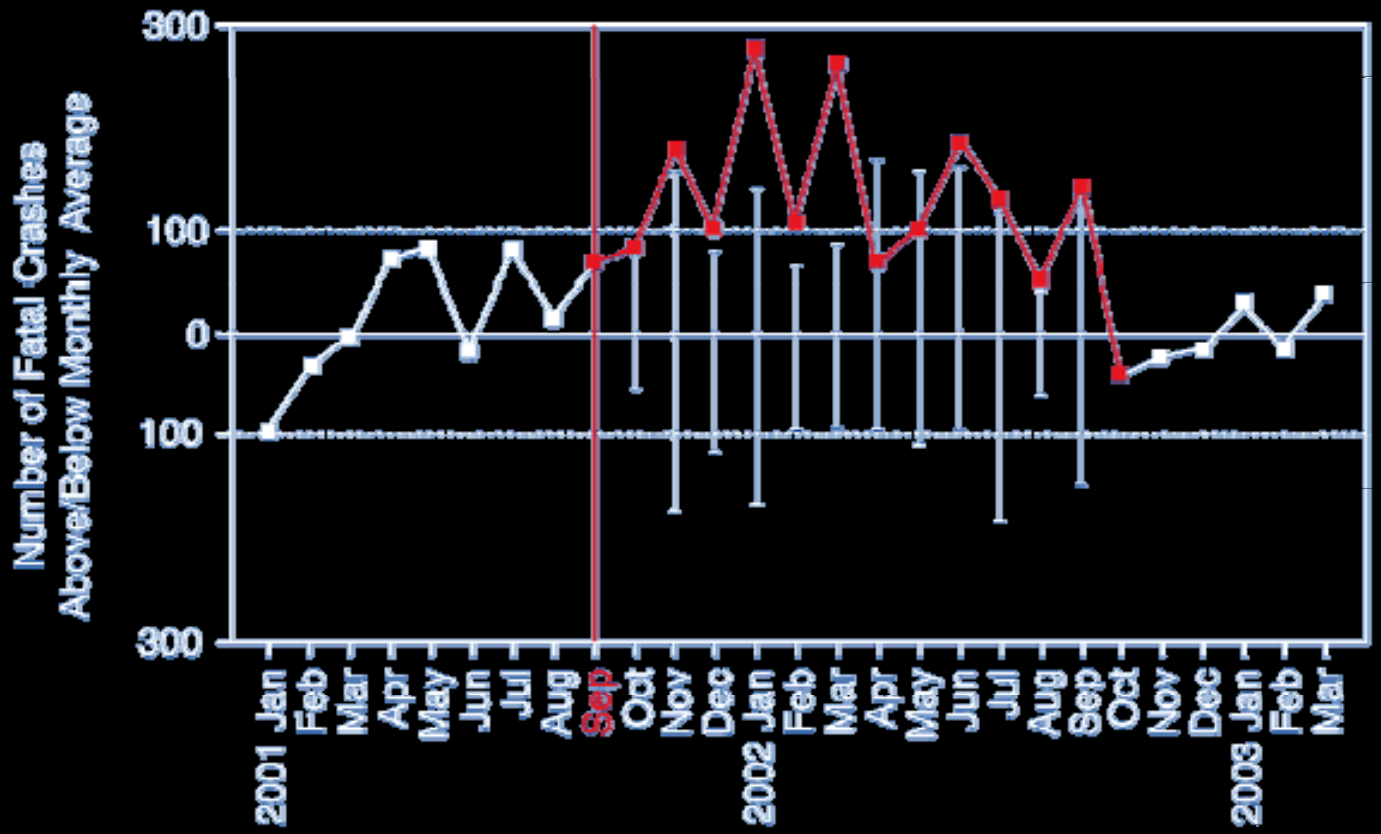


Sjöberg, 2008

Causes

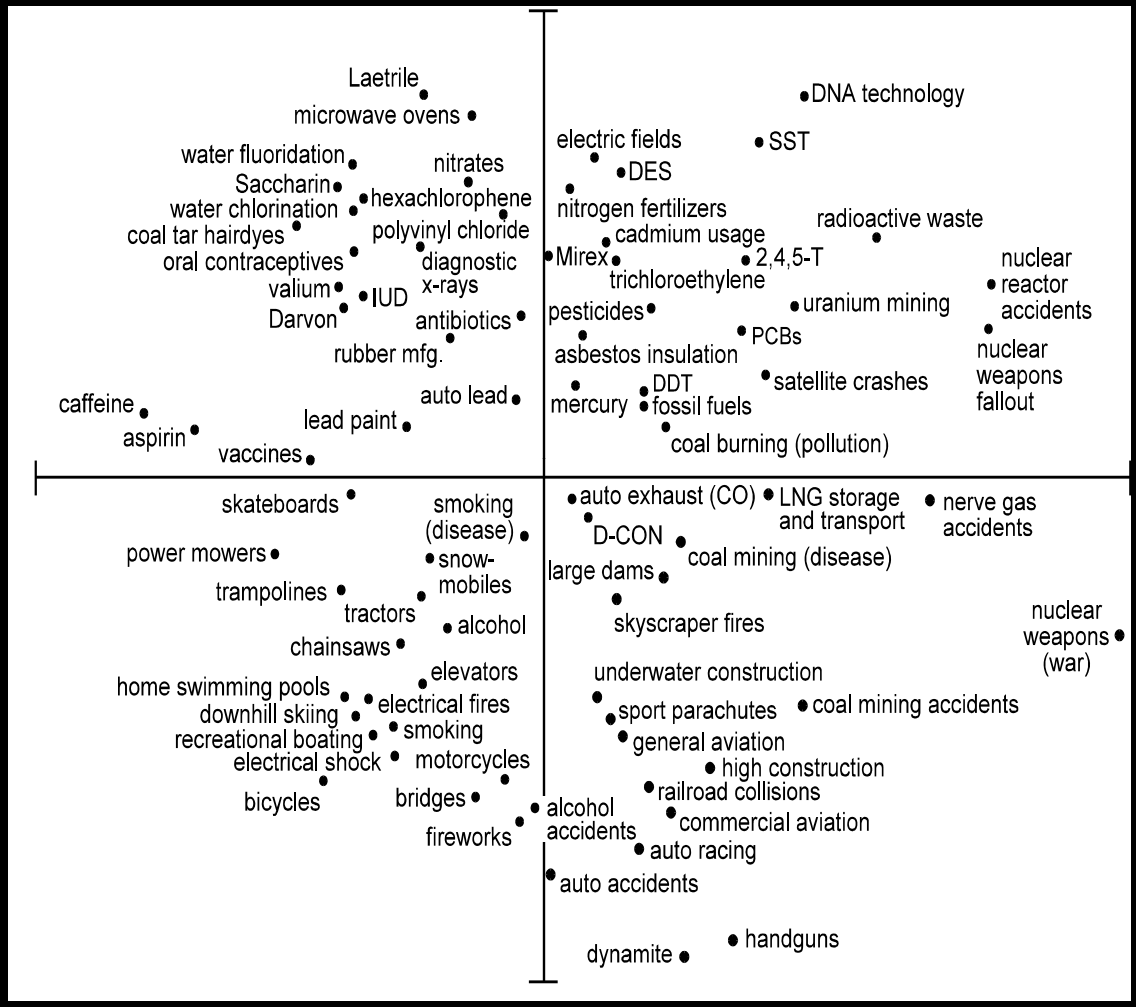
- People do not understand the psychology of their fears
- Illusion of certainty
- Defensive decision making
- Misleading risk communication

About 1,500 Americans died on the roads by trying to avoid the risk of flying after 9/11



Gigerenzer (2006)

UNKNOWN RISK



DREAD RISK

Slovic, 1987

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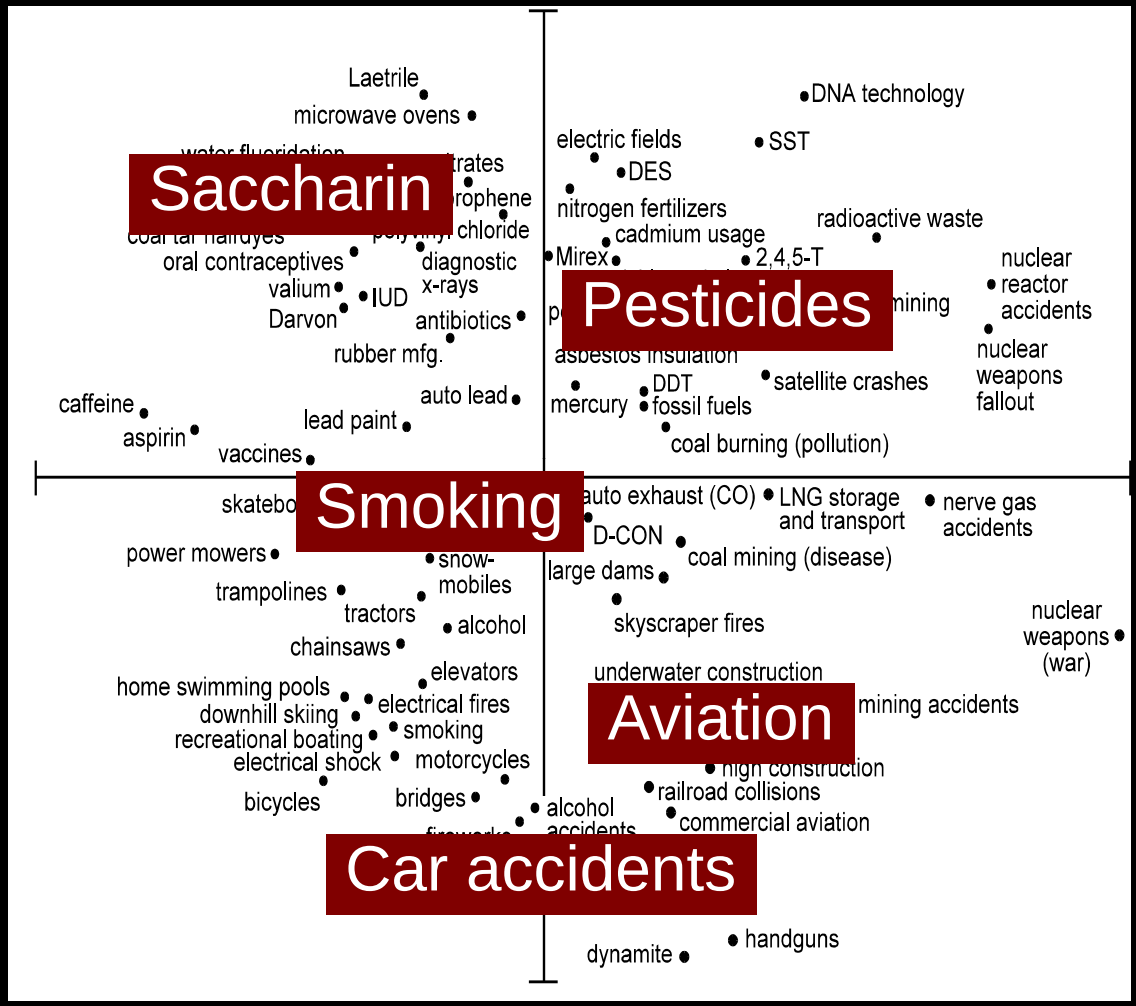
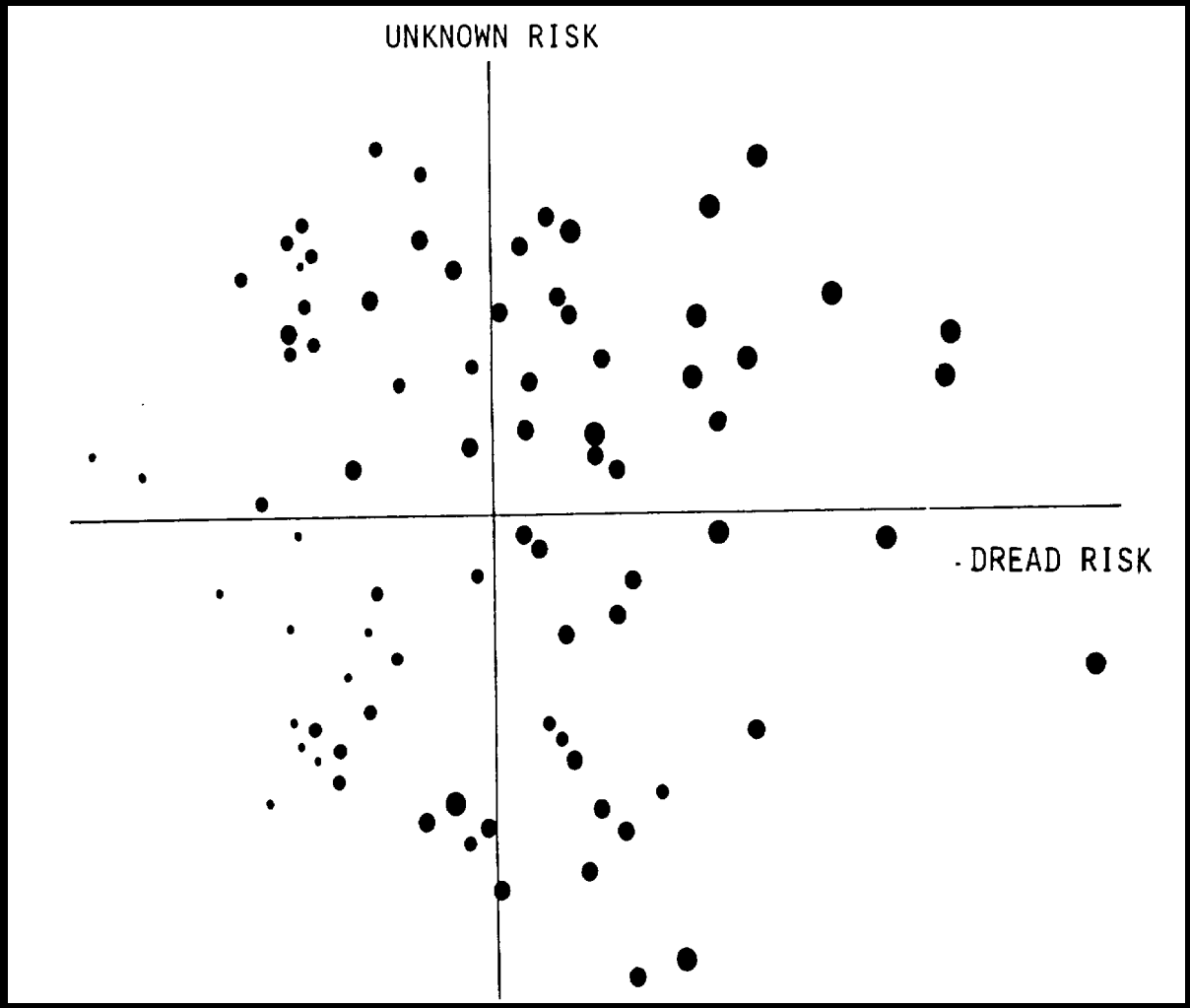
UNKNOWN RISK



DREAD RISK

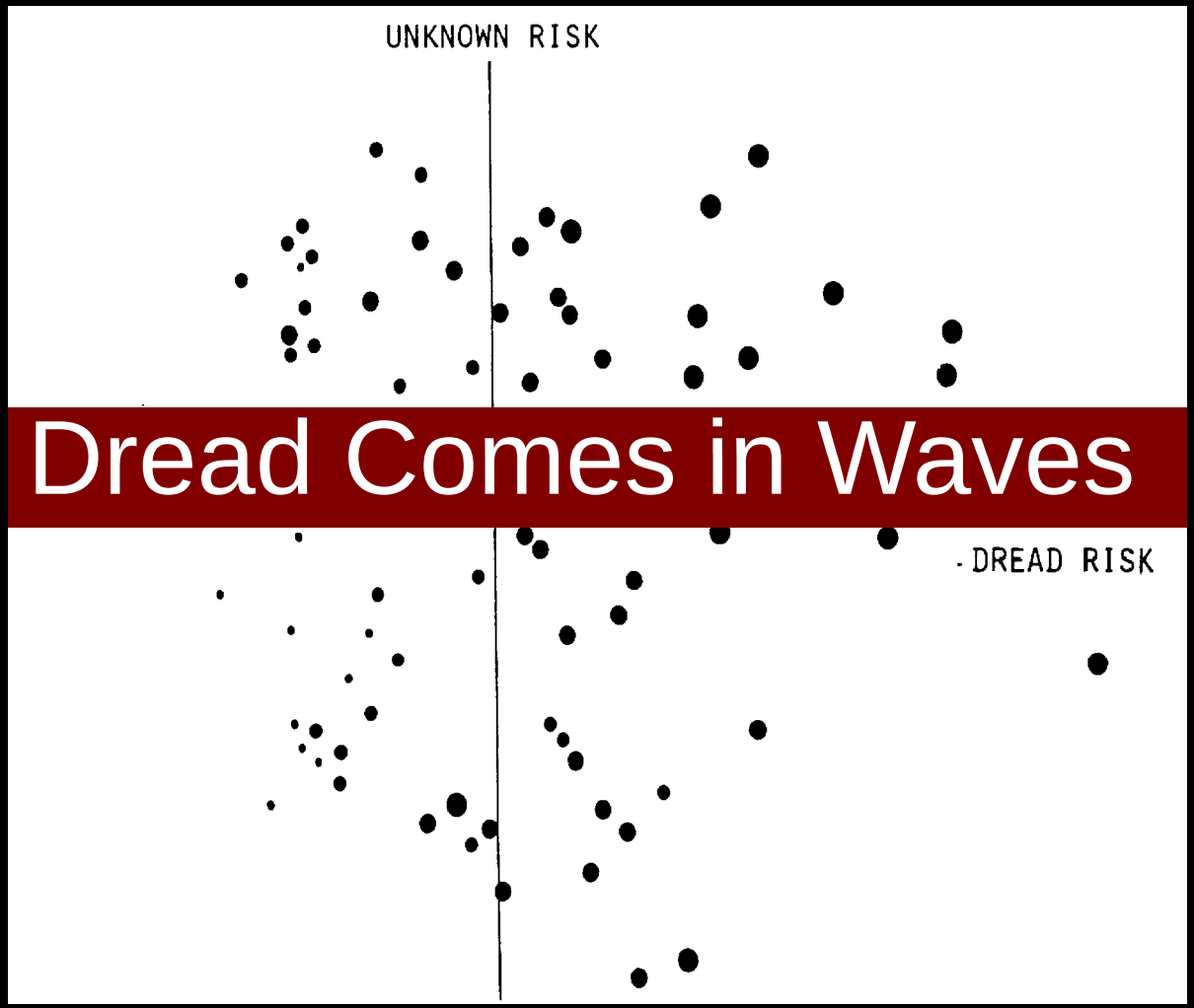
Slovic, 1987

Acceptance of Regulation



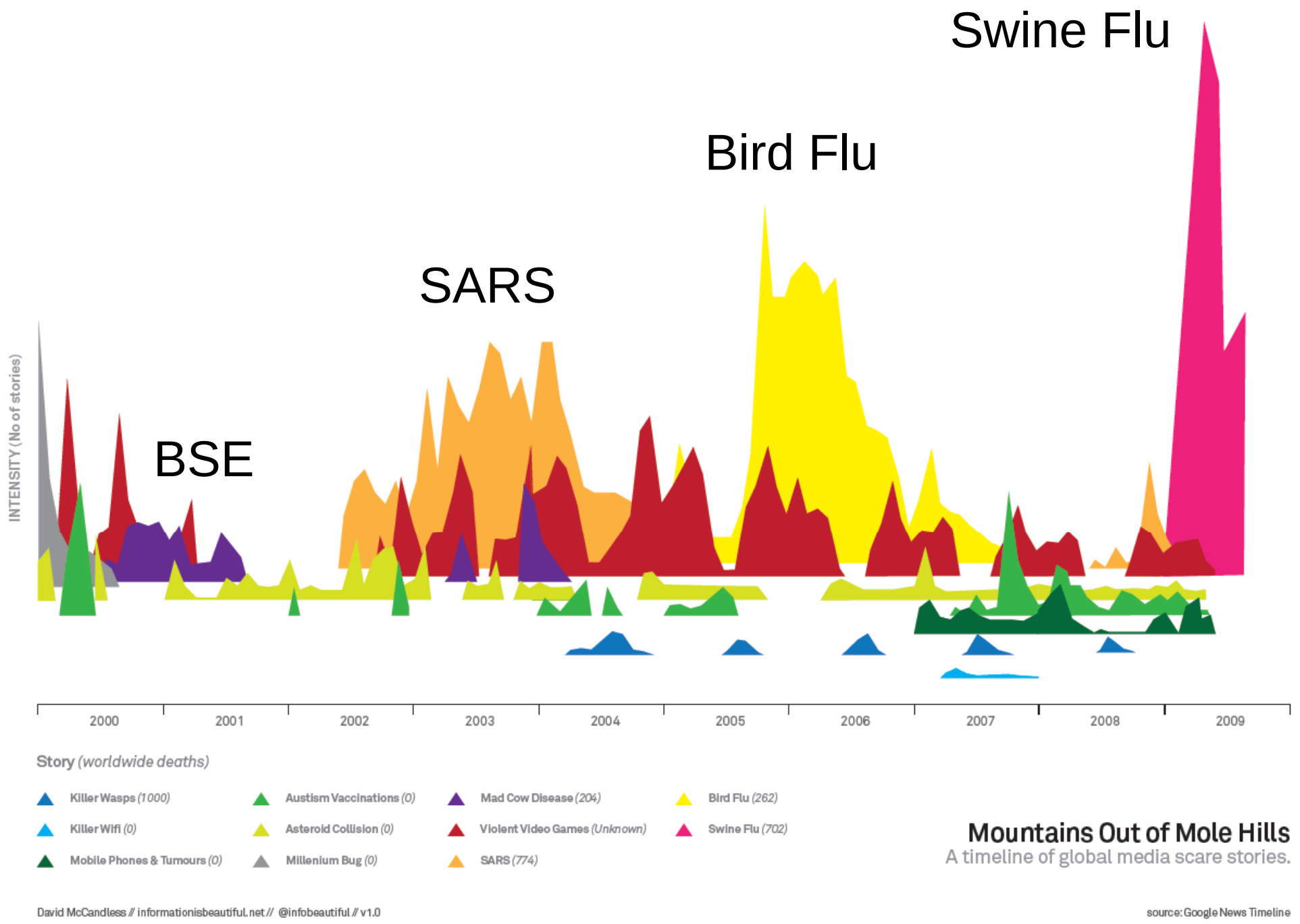
Slovic, 1987

Acceptance of Regulation



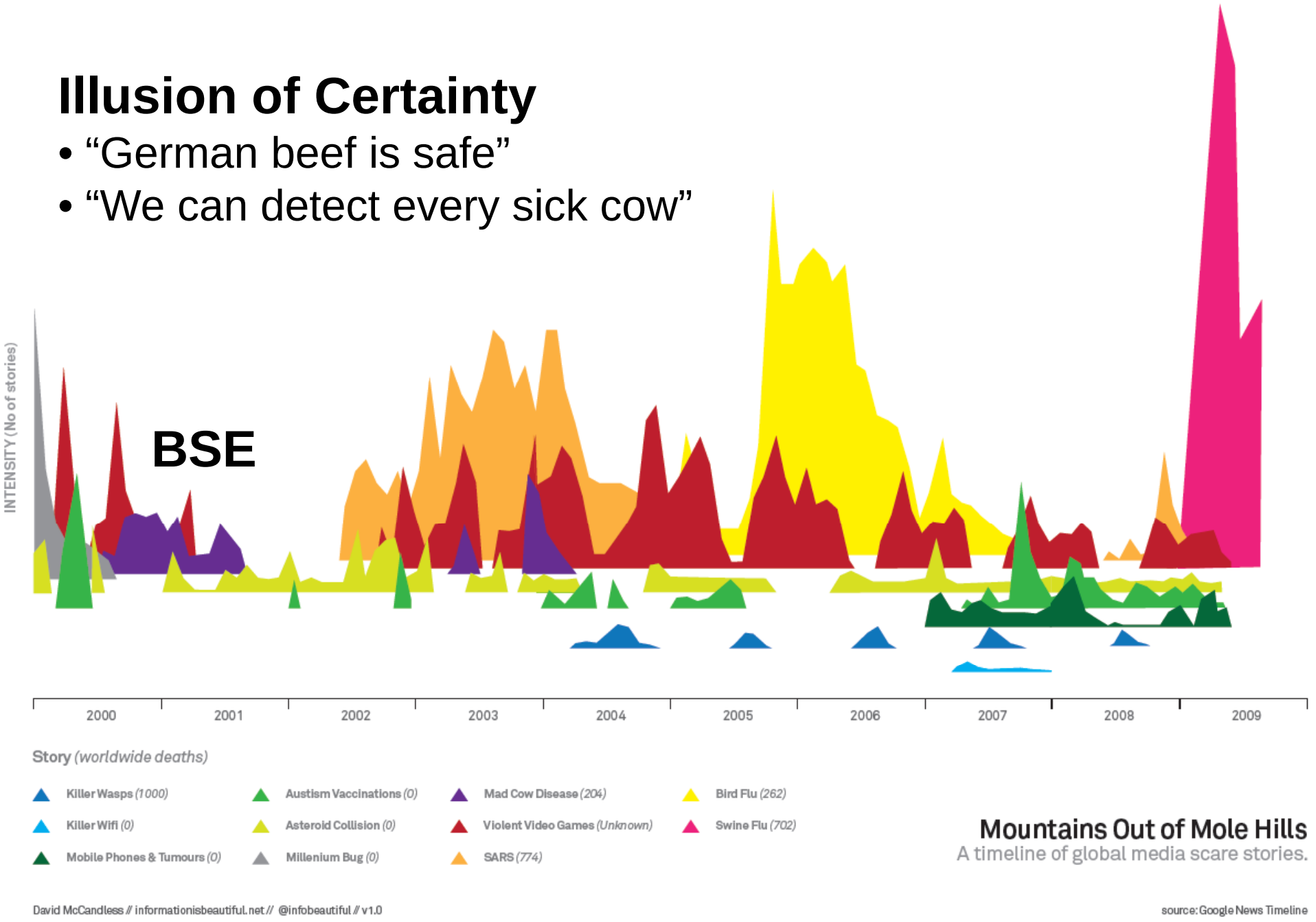
Dread Comes in Waves

Slovic, 1987

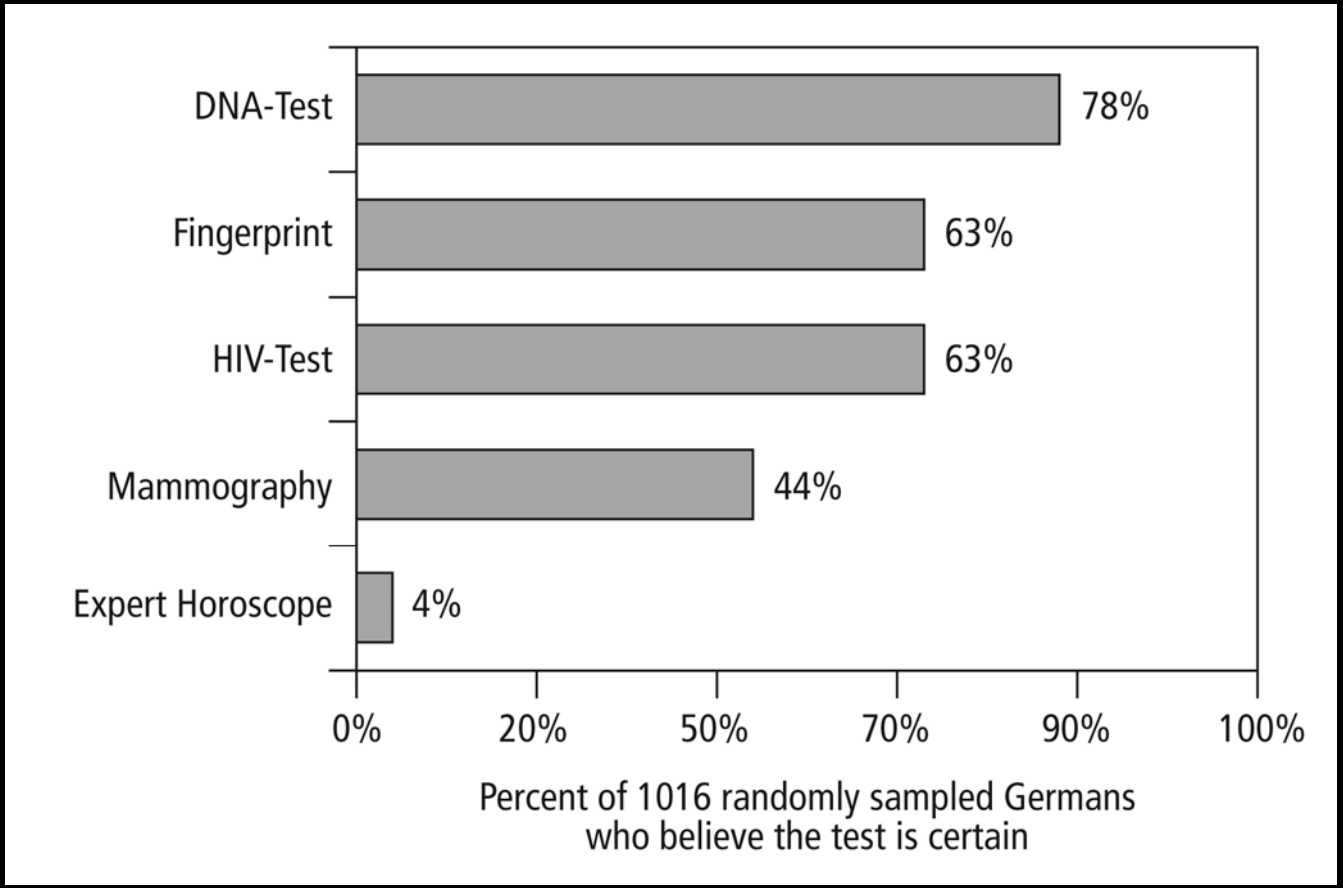

Swine Flu
Bird Flu
SARS
BSE
INTENSITY (No of stories)
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Story (worldwide deaths)
Killer Wasps (1000)
Killer Wifi (0)
Mobile Phones & Tumours (0)
Austism Vaccinations (0)
Asteroid Collision (0)
Millenium Bug (0)
Mad Cow Disease (204)
Violent Video Games (Unknown)
SARS (774)
Bird Flu (262)
Swine Flu (702)
Mountains Out of Mole Hills
A timeline of global media scare stories.
David McCandless // informationisbeautiful.net // @infobeautiful // v1.0
source: Google News Timeline

Illusion of Certainty

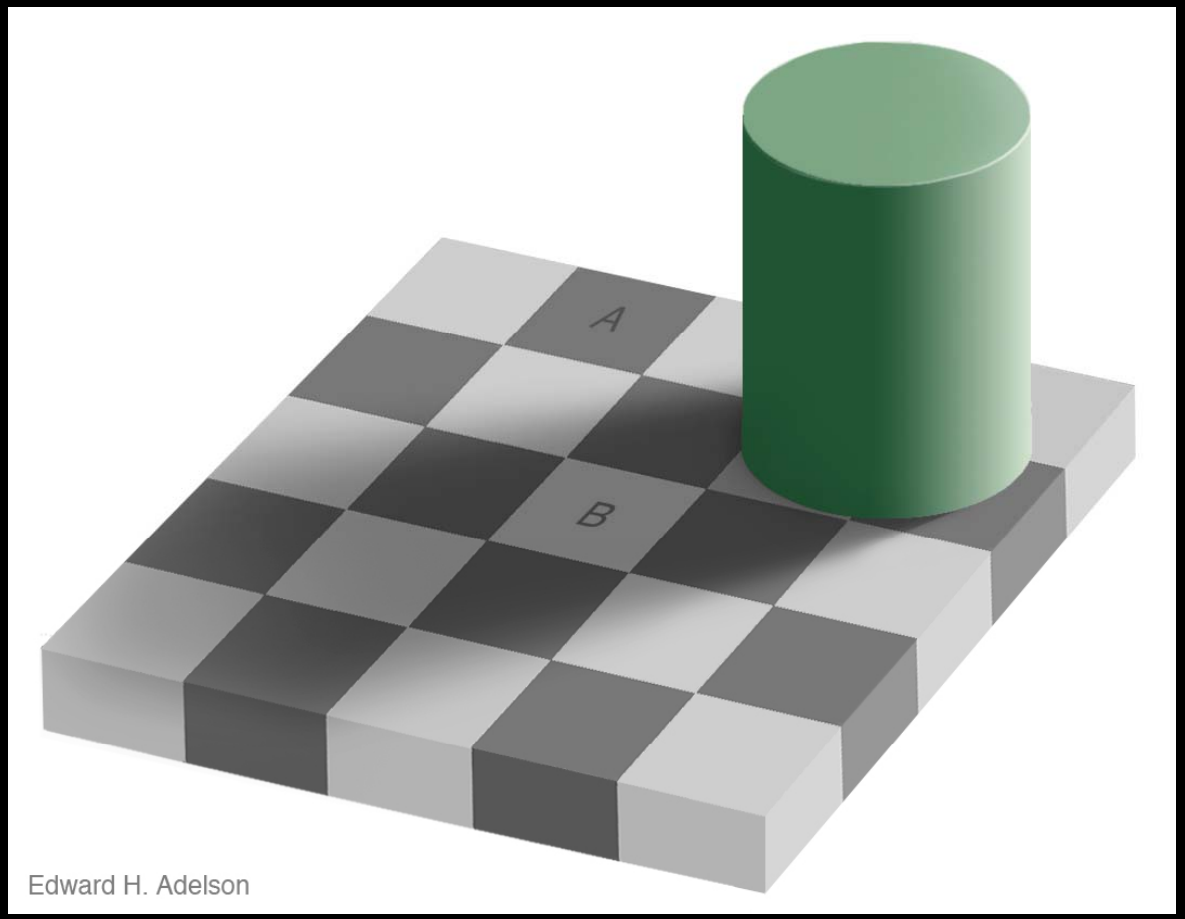
- “German beef is safe”
- “We can detect every sick cow”



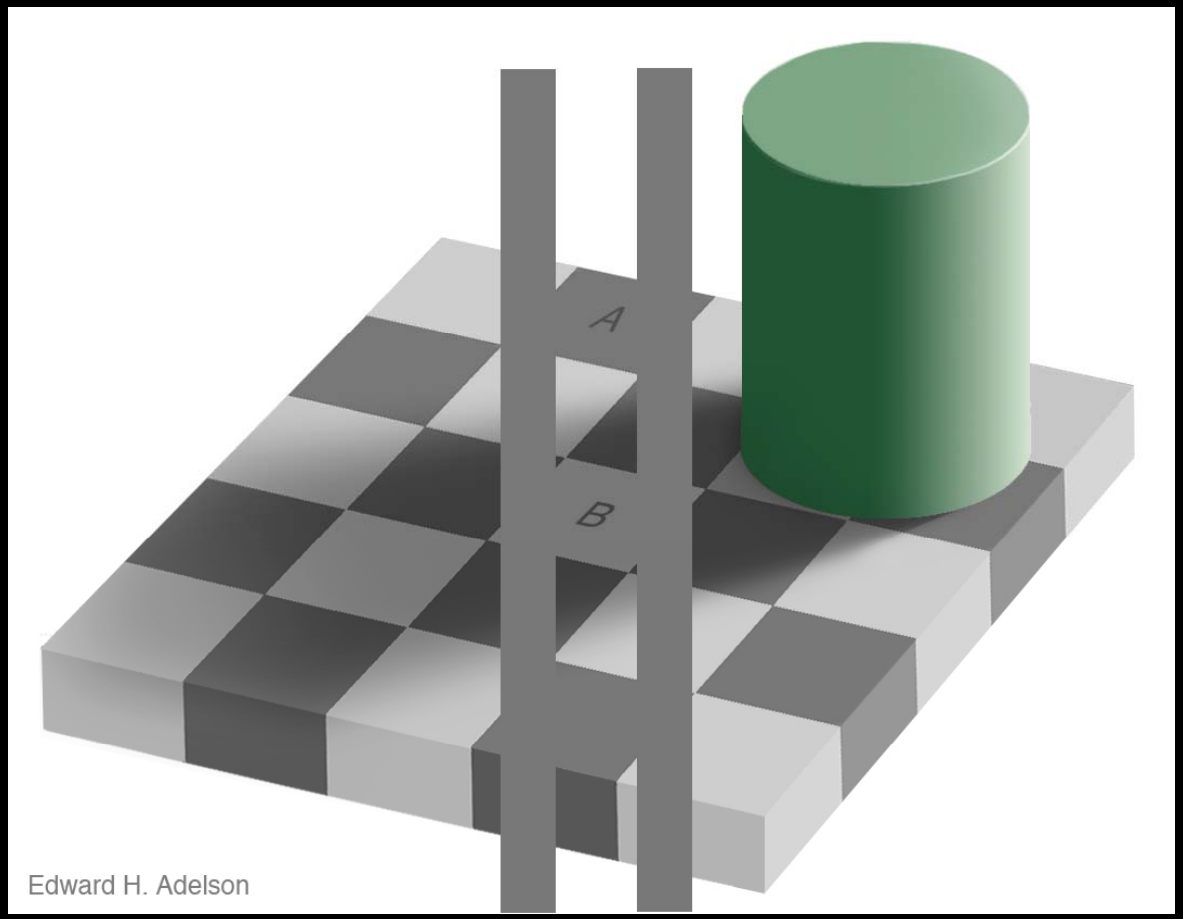
Blind Trust in Technology



Gigerenzer, Gaissmaier,Kurz-Milcke, Schwartz, & Woloshin, 2007



Edward H. Adelson

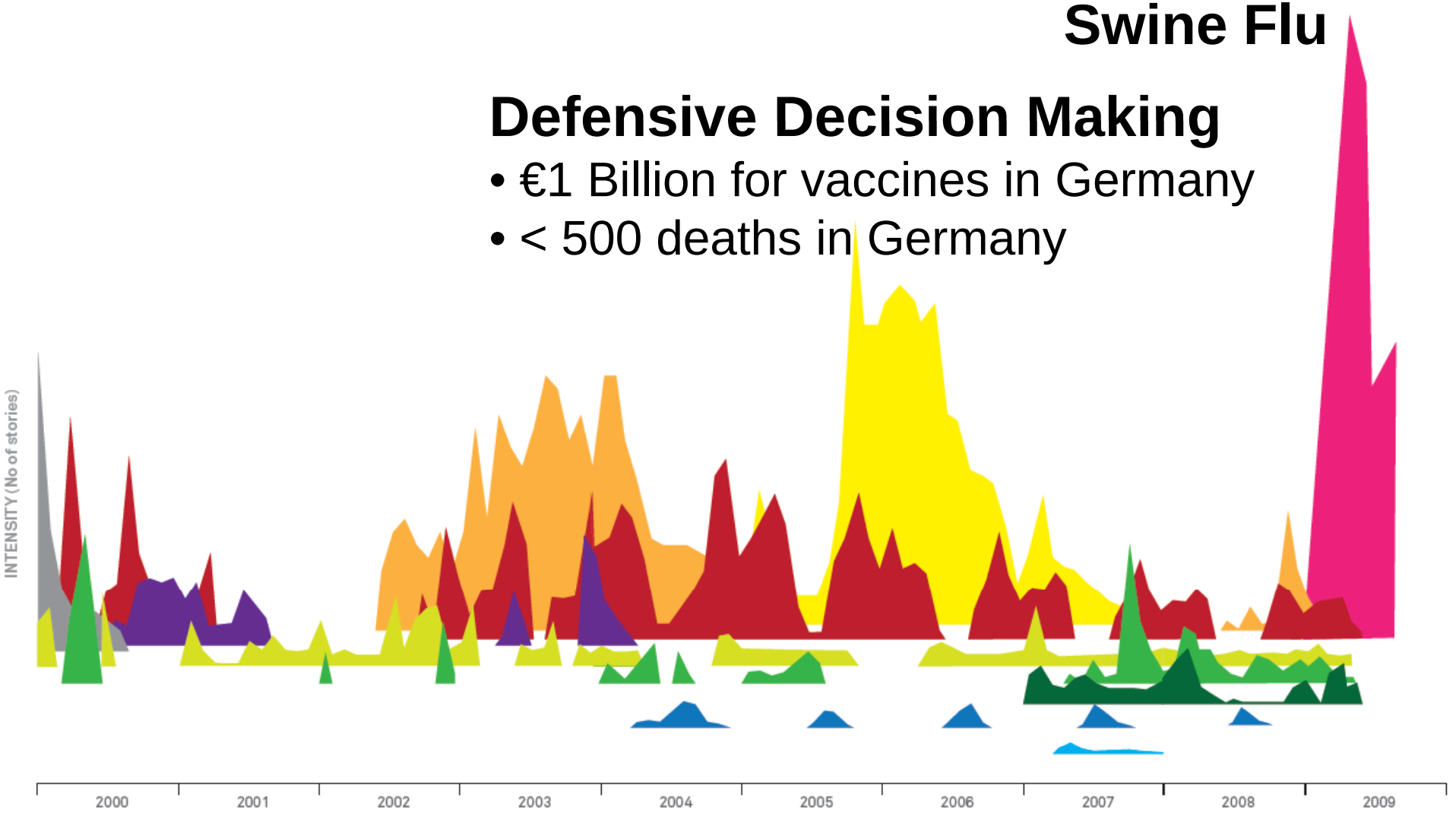


Even vision creates illusionary certainty!

Swine Flu

Defensive Decision Making

- €1 Billion for vaccines in Germany
- < 500 deaths in Germany



Mountains Out of Mole Hills
A timeline of global media scare stories.

David McCandless // informationisbeautiful.net // @infobeautiful // v1.0

source: Google News Timeline

Even if Uncertainties are communicated,
Things can go utterly wrong

THE LANCET

LONDON: SATURDAY, JANUARY 2, 1937

MATHEMATICS AND MEDICINE

STATISTICS are curious things. They afford one of the few examples in which the use, or abuse, of mathematical methods tends to induce a strong emotional reaction in non-mathematical minds. This is because statisticians apply, to problems in which we are interested, a technique which we do not understand. It is exasperating, when we have

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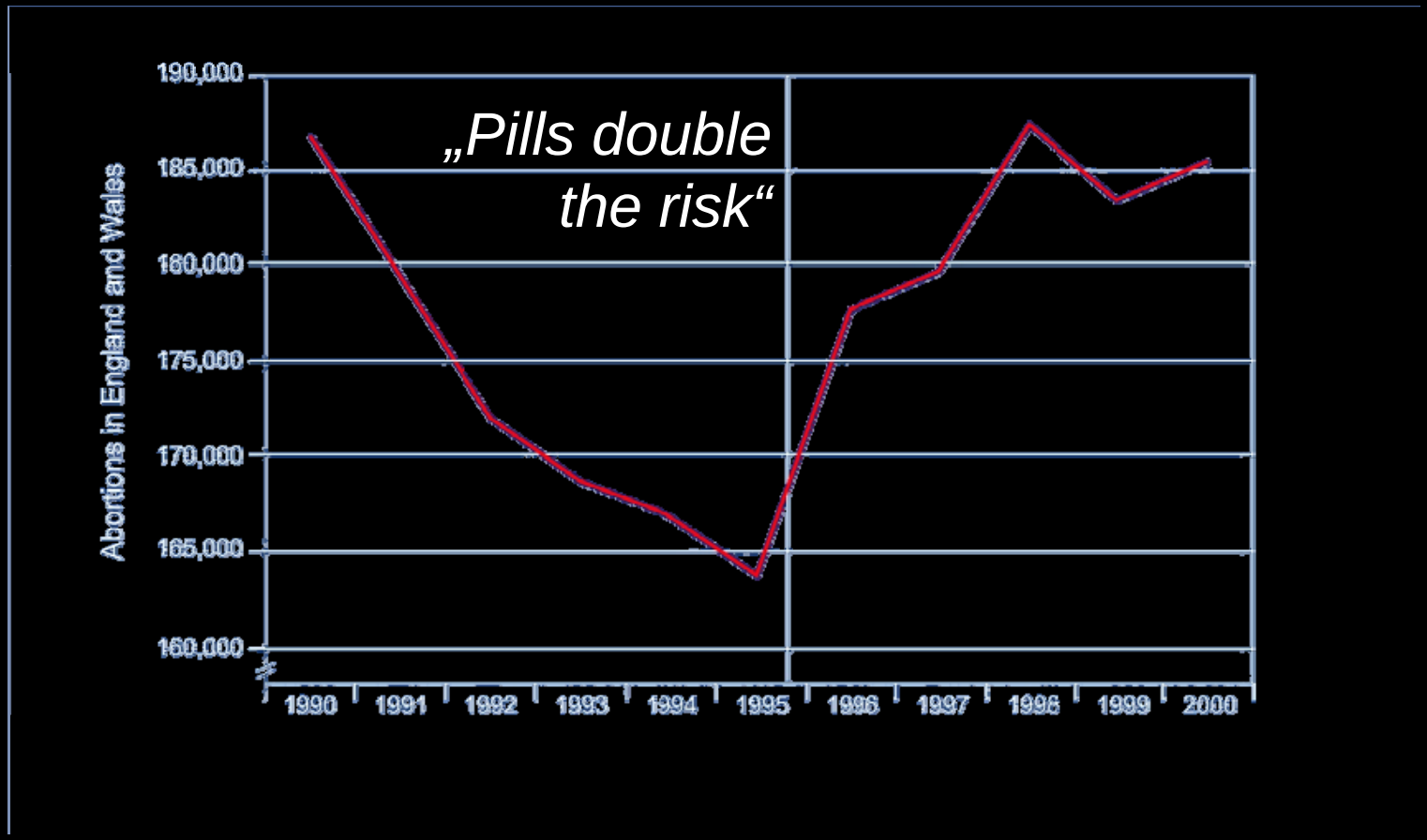
How Statistics create Fear

Official announcement:

"Contraceptive pills double the risk of venous thromboembolism!" (UK Committee on the Safety of Medicines, 1995)

Pill Scare


„Pills double the risk“
Abortions in England and Wales
190,000
185,000
180,000
175,000
170,000
165,000
160,000
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000

How Statistics create Fear

Official announcement:

"Contraceptive pills double the risk of venous thromboembolism!" (UK Committee on the Safety of Medicines, 1995)

Relative Risk

Transparent format:

"Contraceptive pills increase the risk of venous thromboembolism from 1 to 2 women out of every 7,000 women."

Absolute Risk

Furedi (1999)

There is a Demand and an Opportunity to communicate Food Risks

Answers: WORRIED

Eurobarometer: Top Food Concerns

Pesticides

Greece	87%
Italy	86%
Hungary	80%
France	76%
Portugal	76%
Slovenia	75%
European Union (25)	71%
Germany	69%
Spain	63%
Finland	59%

Residues

Cyprus	88%
Greece	87%
European Union (25)	68%
Belgium	66%

New Viruses

Malta	84%
Latvia	75%
European Union (25)	66%
The Netherlands	53%

Bacteria

Czech Republic	75%
Luxembourg	75%
Slovakia	72%
European Union (25)	65%

Hygiene

Poland	82%
United Kingdom	75%
Denmark	71%
European Union (25)	69%
Ireland	69%
Spain	63%

Additives

Lithuania	79%
Estonia	65%
European Union (25)	61%

GMF

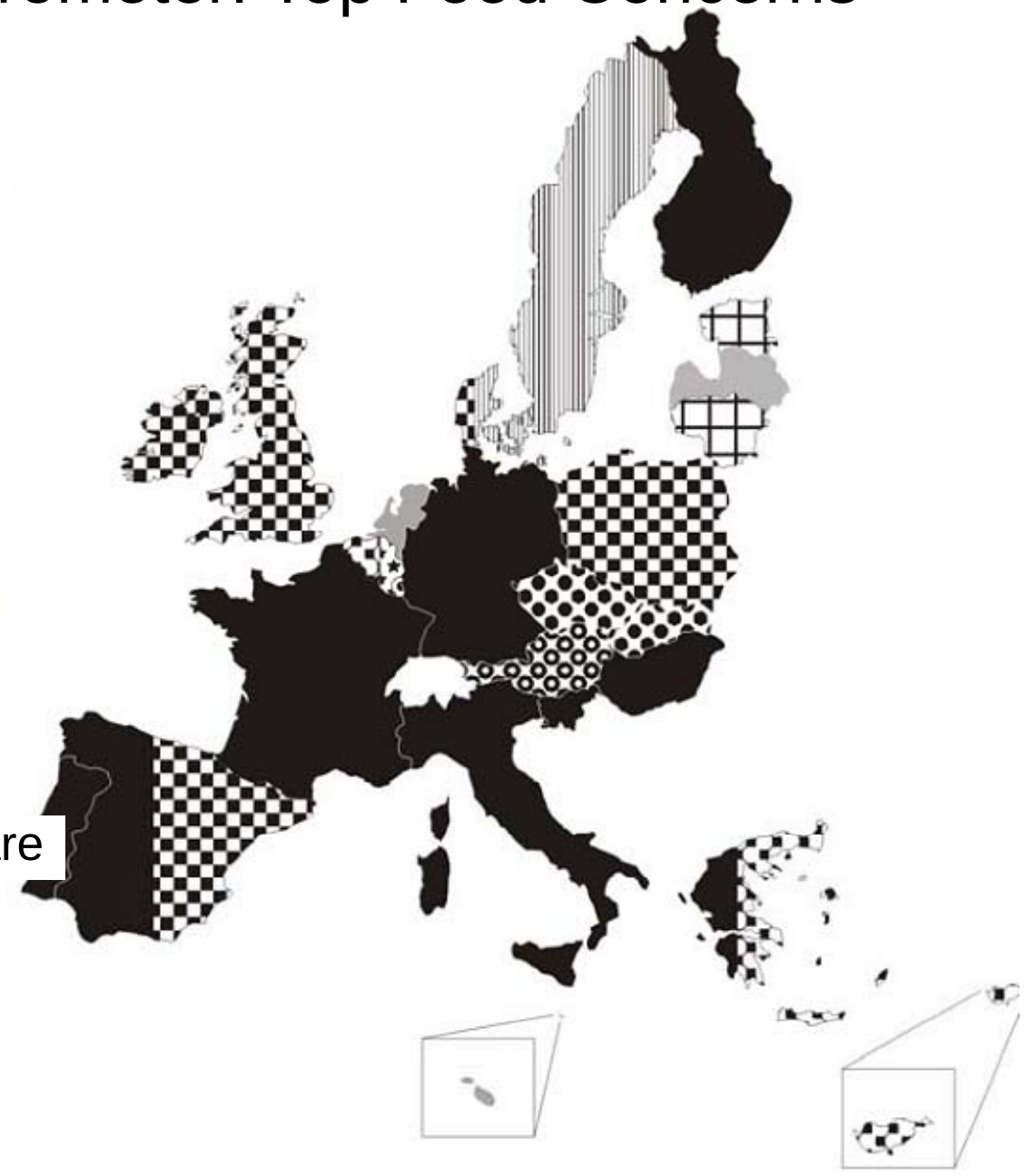
Austria	69%
European Union (25)	62%

Animal welfare

Denmark	71%
Sweden	67%
European Union (25)	60%

Pollutants

Belgium	66%
European Union (25)	63%

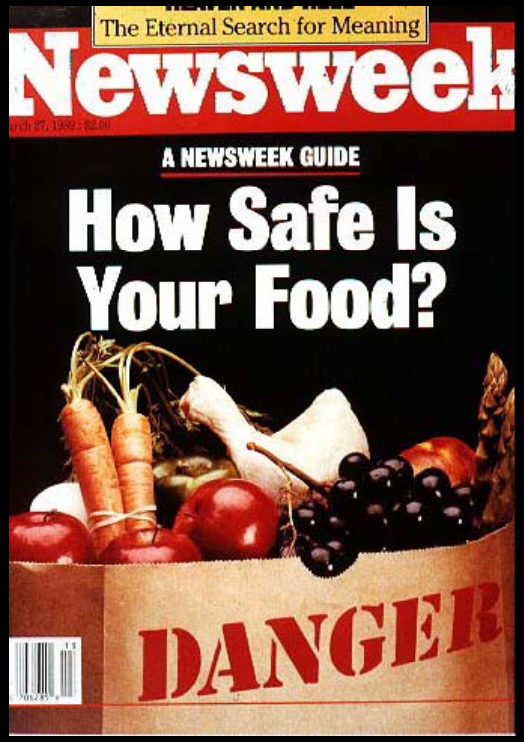


Foodborne Diseases

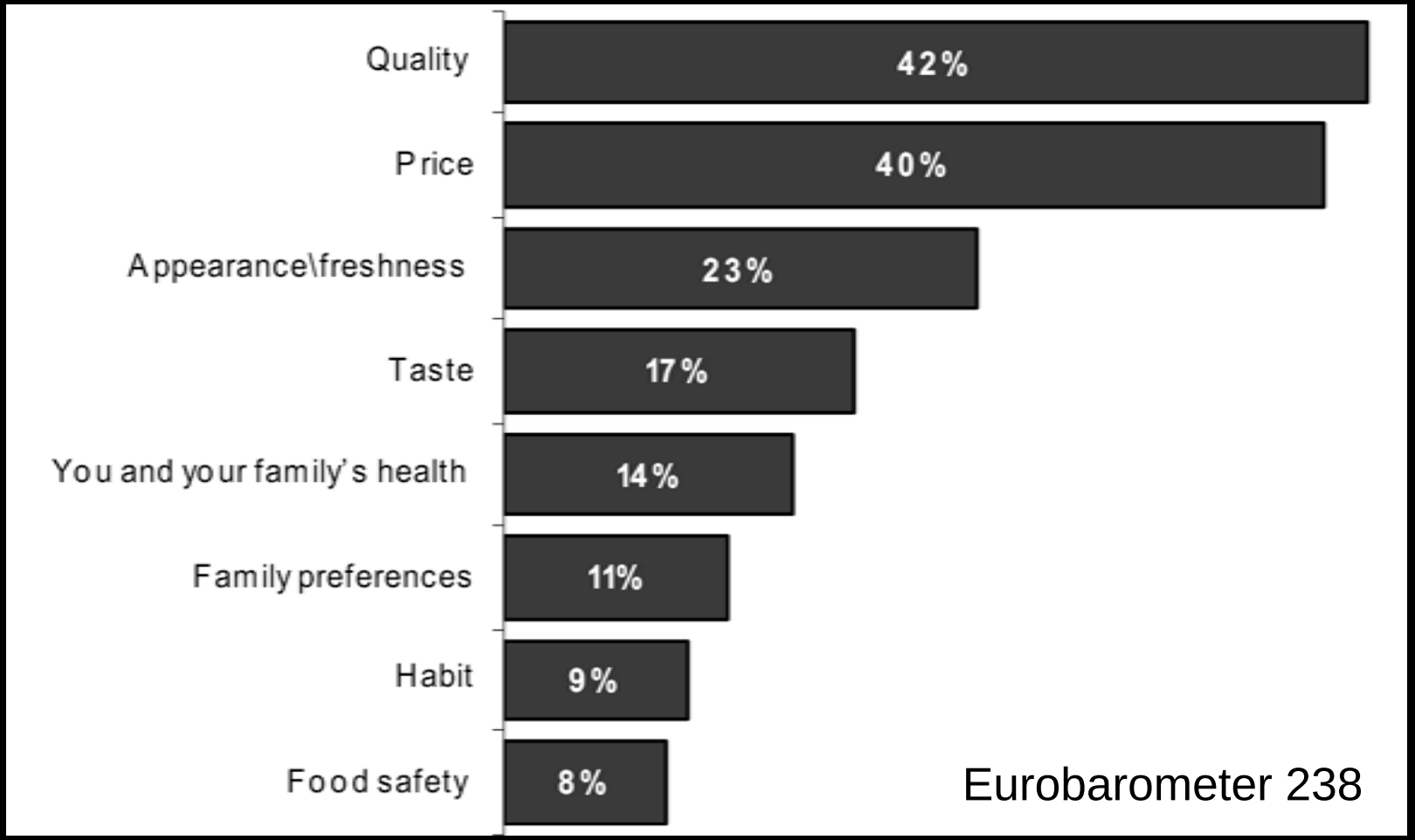
Per year in the USA

- 76 Million illnesses
- 325,000 hospitalizations
- 5,000 deaths

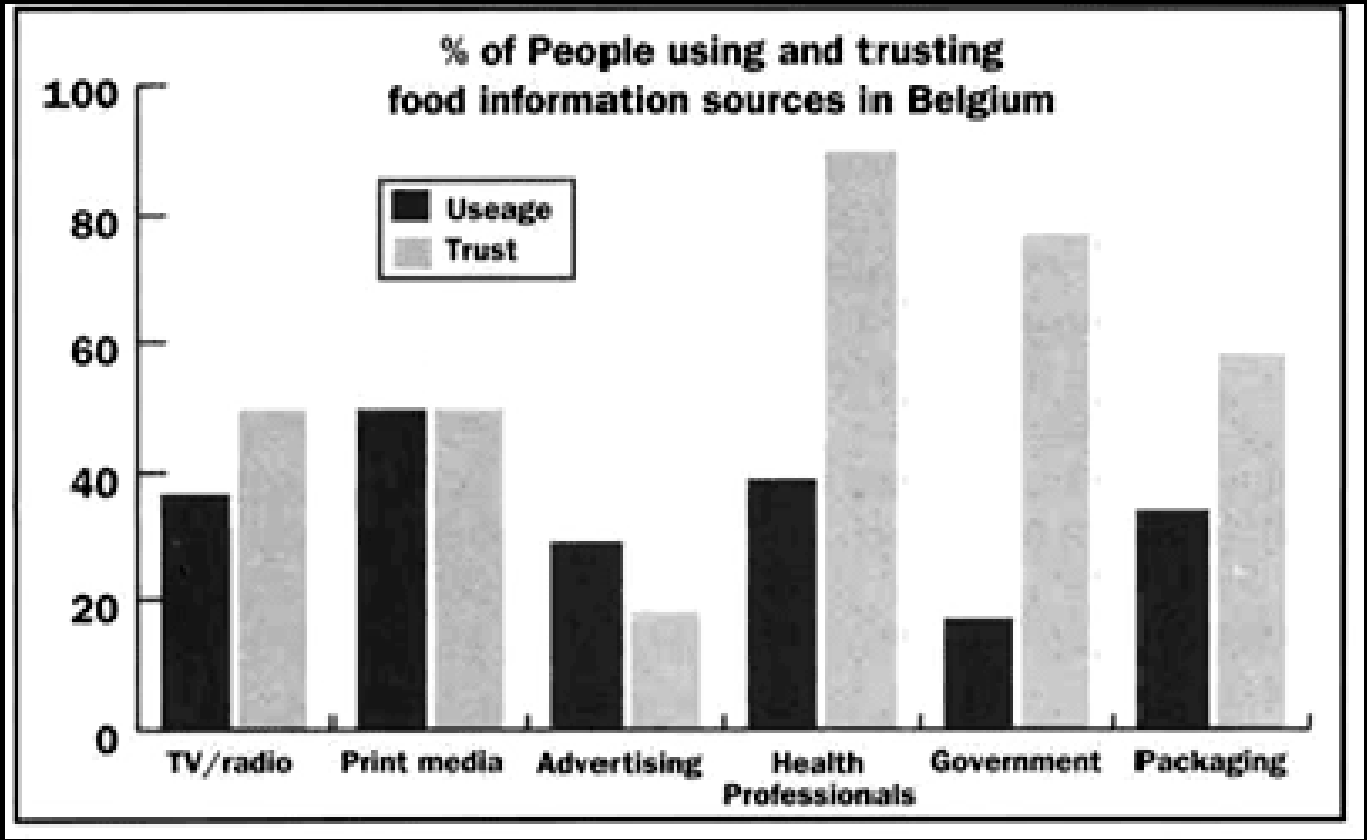
Mead et al., 1999



Safety not so important for Food Choice



Opportunity Gap: Trust vs. Usage



Source: EUFIC

Keep Information simple!

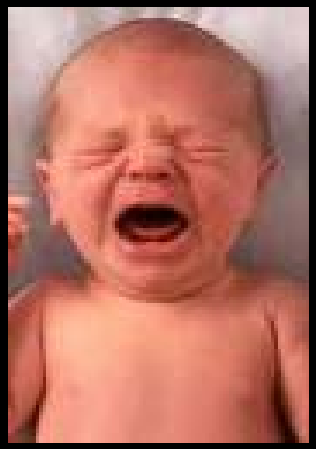
Too much choice & information already

Keep Information simple!

Too much choice & information already

Stress factors

+



Drug Fact Box

Question	Men aged 55–69 y	
	Not screened	Screened† for 9 years
What is the benefit of screening?		
European Trial		
Lower 9-y risk of dying from prostate cancer (0.7 less deaths for every 1000) (11)	0.37% 3.7 in 1000	0.30% 3.0 in 1000
PLCO Trial		
No lowering of 9-y risk of dying from prostate cancer (12)	About 0.23% in both groups 2.3 in 1000	
What are the harms?		
Higher chance of having at least one false-positive screening exam resulting in a biopsy (50–200 more for every 1000 screened) (11,13)	—	5%–20%‡ 50–200 in 1000
Higher chance of having unnecessary diagnosis and treatment for prostate cancer (10–30 more overdiagnosis for every 1000 screened) (11,12)	—	1%–3% 10–30 in 1000

Woloshin & Schwartz, 2009

The Dream of Risk Literacy

- People are often afraid of things that do not threaten them, but sometimes do not fear actual dangers

- Public authorities
  - should act on **good evidence** about actual risks
  - communicate actual risks in a **simple** and **transparent** manner to close the gap between actual and perceived risks

- This is undermined by defensive decision making and spreading illusionary certainty

Knowing Your Chances

When might a positive HIV test be wrong? Are your chances of surviving cancer better in the U.S. or in England? Learn how to put aside unjustified fears and hopes and how to weigh your real risk of illness—or likelihood of recovery

By Gerd Gigerenzer, Wolfgang Gaissmaier, Elke Kurz-Milcke, Lisa M. Schwartz and Steven Woloshin

In a 2007 campaign advertisement, former New York City mayor Rudy Giuliani said, "I had prostate cancer, five, six years ago. My chances of surviving prostate cancer—and thank God, I was cured of it—in the United States? Eighty-two percent. My chances of surviving prostate cancer in England? Only 44 percent under socialized medicine." Giuliani used these statistics to argue that he was lucky to be living in New York and not in York. This statement was big news. As we will explain, it was also a big mistake.

In 1938 in *World Brain* (Methuen & Co.), English writer H. G. Wells predicted that for an educated citizenship in a modern democracy, statistical thinking would be as indispensable as reading and writing. At the beginning of the 21st century, nearly everyone living in an industrial society has been taught reading and writing but not statistical thinking—how to understand information about risks and uncertainties in our technological world. That lack of understanding is shared by many physicians, journalists and politicians such as Giuliani who, as a result, spread misconceptions to the public.

Statistical illiteracy is not rooted in inherent intellectual deficits—say, in the lack of a "math gene"—but rather in societal and emotional forces. These influences include the paternalistic nature of the doctor-patient relationship, the illusion of certainty in medicine, and the practice of presenting health information in opaque forms that erroneously suggest big benefits and small harms from interventions. When citizens do not understand the numbers, they are susceptible to political and commercial manipulation of their anxieties and hopes. The result can be serious damage to physical health and emotional well-being.

We show you how to spot three types of statistical manipulation and confusion in medicine, to translate opaque figures into ones that make sense and to use that information to make better medical decisions. To avoid such misunderstandings in the first place, we argue that medical journals, the media and others should communicate risk in more easily understood forms. In addition, we recommend introducing young children to statistical thinking and teaching statistics as a way of solving real-world problems rather than as a purely mathematical discipline.

Trust Your Doctor?

Medicine has held a long-standing antagonism toward statistics. For centuries, treatment was based on an ethic of personal trust as opposed to quantitative facts, which were dismissed as impersonal or irrelevant to the individual. Even today many doctors think of themselves as artists, relying more on intuition and faith in their own judgment than on numbers. For their part, many patients prefer to trust their doctors rather than even asking for data to analyze. For example, in a 2008 unpublished survey by one of us (Gigerenzer) and his colleagues, two thirds of more than 100 American economists said they had not weighed any pros and cons of getting a prostate cancer screening test but simply followed their doctor's recommendation.

PANELS FROM LEFT: AGE FOTOSTOCK; GETTY IMAGES; ERHUGGAPER PHOTOGRAPHY INC.; ECOMBIS; GETTY IMAGES; DEGI LEV MEL (istockphoto

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