

Risk Perception and Communication

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Risk Communication

- Qualitative Understanding
 - Aware of key aspects of risk behavior
 - Concepts linked sensibly
- Quantitative Assessment
 - Accurate estimates of risks
 - Comparable assessments of options

Qualitative Barriers

- People simplify
- Hard to change minds
- Remember what we see
- Cannot detect omissions
- Disagree about what “risk” is

People Simplify

- Decisions require many details
- Think “safe” is all or nothing
- Don't appreciate uncertainty in science
- Good guys vs. bad guys
- Easier to cope, but biased decisions

Hard to Change Minds

- Once people's minds are made up, it's hard to change them
- Underestimate need to seek contrary evidence
- Uncertainty of negative information may be exploited
 - Interpreted as consistent with beliefs

Remember What We See

- Can track events that come to our attention
- OK if appropriate facts get through
- Firsthand knowledge of risks is rare
- Must decipher incomplete reports

Cannot Detect Omissions

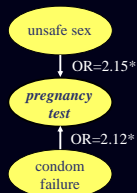
- People cannot readily detect omissions in the evidence they receive
- Try to account for own biases
- But cannot know how much they are missing
- Missing information may be revealed by other experiences or sources
- Or it may not

Qualitative Failures

- New information may not make sense
- Uncertainty may undermine beliefs
- Overconfidence may lead to insensitivity to new information
- Conceptual misunderstanding can lead to incorrect inferences

Seek Information After Risk

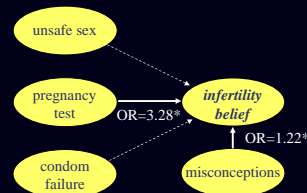
prior to baseline



Draw Reasoned Conclusion

prior to baseline

at baseline

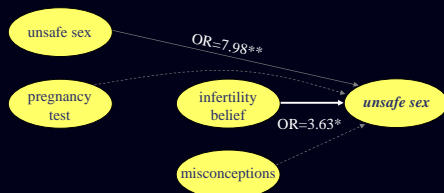


Act on Inferences

prior to baseline

at baseline

six months after baseline



(Downs, Bruine de Bruin, Murray & Fischhoff, 2004)

Quantitative Barriers

- Risk is hard to measure
- Numbers not always intuitive
- Biases in assessing one's own risk
 - Optimistic bias
 - Unrealistic optimism
- Uncertain, delayed outcomes

Measuring Risk

- Quantitative estimates of risk
 - Explaining risk to people
 - Eliciting people's beliefs of their own risk
- Numeracy
 - Some people are less comfortable with numbers
 - Possible barrier to understanding risk

Assessing Numeracy

- Toss a fair coin 1,000 times
 - How many times will it come up heads?
- Chance of winning a prize is 1%
 - If 1,000 play, how many will win?
- Chance of winning a prize is 1 in 1,000
 - What percent of players win the prize?

Risk Perception & Numeracy

- Poor numeracy impedes understanding
 - Appreciation of risk reduction
- Avoiding quantitative measures reduces effect of numeracy
 - Qualitative assessments
 - Relative to other people or other conditions
- Improve quantitative measures of risk

Optimistic Bias

- See less risk for ourselves
- Know risk of smoking, but...
 - Less at risk than the "typical smoker"
(McCoy et al., 1992)
 - Think they can avoid risk
(Arnett, 2000; Segerstrom et al., 1993)

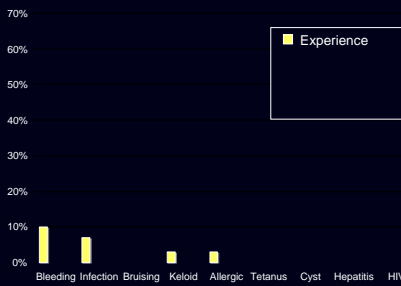
Unrealistic Optimism

- Some who seem optimistic are realistic
 - Their health may actually be very good
 - Some are aware of their high risk
- Tie estimates to actual health
 - Mismatch is often optimistic
 - These people are particularly resistant to efforts to change behavior
(Klein, 1996)

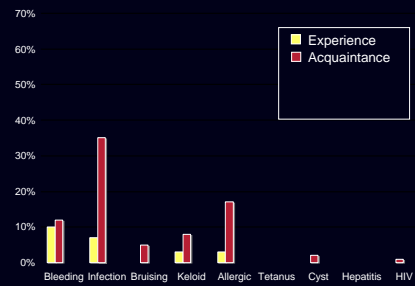
Relative vs. Absolute Risk

- Relative risk
 - Easier to measure
 - More predictive
 - Optimistic bias is relative
- Absolute estimates
 - More sensitive to poor numeracy
 - Often much, much too high

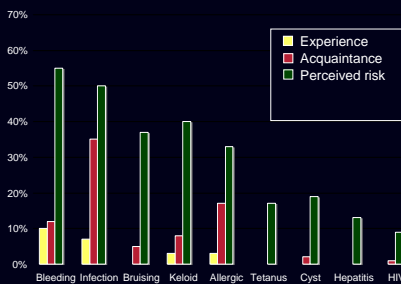
Risks of Body Piercing



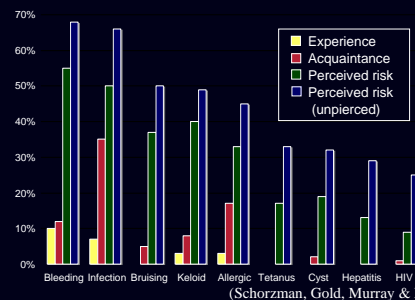
Risks of Body Piercing



Risks of Body Piercing



Risks of Body Piercing



(Schorzman, Gold, Murray & Downs, 2005)

Behavior and Risk Perception

- Risky behavior precedes lowered perception of risk
 - Experience may correct misperceptions
 - Or may give false confidence
- Perceived risks go down
- Perceived benefits go up

Why Do We Take Risks

- Trade off costs (or risks) and benefits
 - Time horizon
 - Probabilistic
 - Conventional wisdom about risk-taking
 - Risk-takers fail to appreciate risks
 - Led by perceptions of invulnerability
- (Fischhoff, Parker, Bruine de Bruin, Downs, Palmgren, Dawes, & Manski 2000)

Food Safety

- Qualitative risk
 - How does contamination occur?
- Quantitative risk
 - How likely is this food to be (un)safe?
- Relevance of past behavior
 - Have I eaten this before?
 - Was this safe before?
 - How much do I value this food?

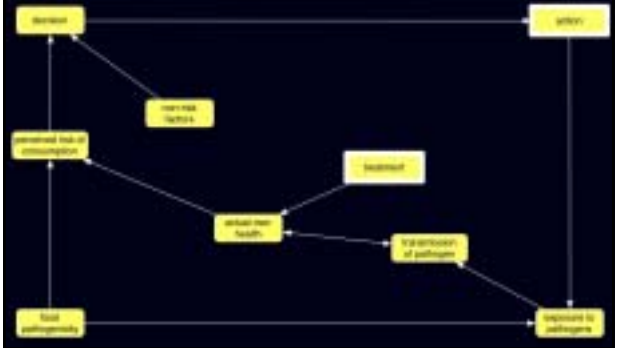
Mental Models Approach

- Formal analysis of information from topic experts
 - Integrated assessment of the science
- Compare with target audience
 - Interviews
 - Surveys
- Identify gaps, misconceptions, problems

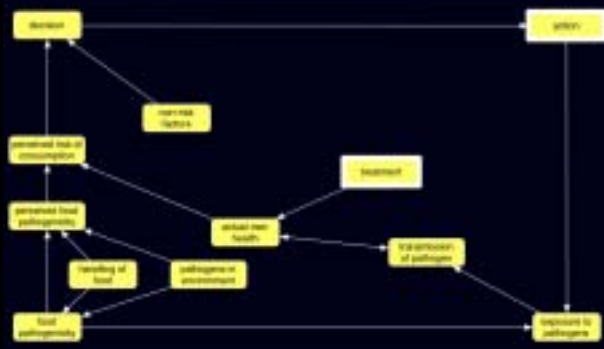
Mental Models: Integrated Assessment

- Formal analysis of domain
- Integrate expertise across disciplines
- Apply to Decision
 - May refocus target for communication
- Assess Existing Communications
 - Preliminary gauge of completeness

Exposure Risk: General Model



Exposure Risk: Food Safety



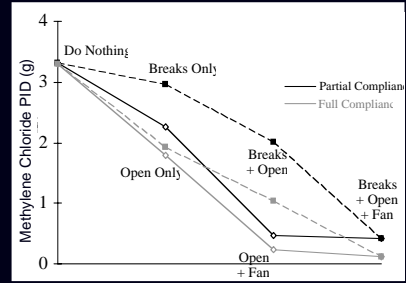
Exposure Risk: Health



Exposure Risk: Benefits

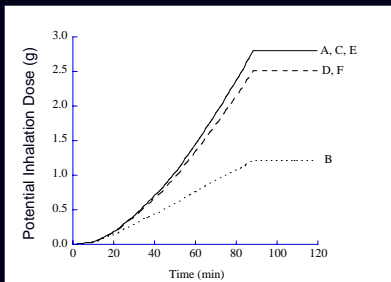


Apply Assessment to Decision



(Riley, Fischhoff, Small & Fischbeck, 2001)

Existing Communications



(Riley, Fischhoff, Small & Fischbeck, 2001)

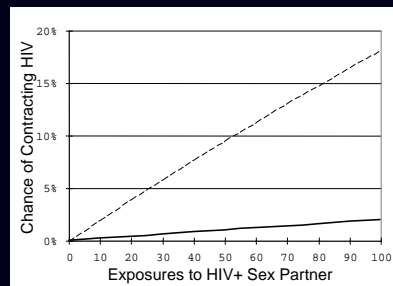
Mental Models: Interviews

- Qualitative information and insights
 - Start general
 - Follow up with probes
 - Target specific concepts
- Characterize knowledge in terms of the integrated assessment

Mental Models: Interventions

- Provide framework for understanding
- Avoid unnecessary repetition of prior knowledge
- New information relevant to decisions
- Framework to integrate additional information

Mental Models Interventions: Illustrating Cumulative Risk



The first time you have sex, you may or may not get HIV. But the more times you have sex, the more chances you have of getting it. This graph shows the chance of getting HIV from having sex with a person who has it. The more times a person has sex, the more chance they have of getting HIV. This is true with or without a condom. But the chances go up much more quickly without a condom.

Mental Models: Evaluation

- Has intervention achieved goal?
 - Knowledge
 - Attitudes, Self-Efficacy, etc.
 - Self-Reported Behavior
 - Objective (e.g., Clinical) Outcomes
- High-quality control group
 - Not organized by mental models concepts

Mental Models Evaluation: Sexual Behavior Intervention

- Girls watching *What Could You Do?* benefited compared to controls
 - Twice as likely to become abstinent*
 - Condoms failed less than half as often*
 - 45% less likely to report contracting a infection six months later*
 - Fewer tested positive for *Chlamydia trachomatis*

* $p < .05$

(Downs, Murray, Bruine de Bruin, Penrose, Palmgren & Fischhoff, 2004)

Mental Models Interventions

- Emphasize risk reduction
- Provide information that fits into the target audience's existing understanding
- Change behavior consistent with shared goals of communicator and audience

Recommendations

- Forensic accounts
 - Contribute to integrated assessments
- Interviews
 - Differentiate between food types
 - Models of contamination and spread
- Communication
 - Address misconceptions & gaps in understanding

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