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Concepts of Risk

Peter Winch

Health Behavior Change at the Individual, Household and Community Levels
224.689
Overview of the lecture

- Meanings of risk
- 4 perspectives on risk
  1. Risk psychology
  2. Values as mediating factors in response to risk
  3. Cultural theory of risk
  4. Risk discourse
Meanings of risk
What does ‘risk’ mean?

- “The concept of risk has different meanings according to who is using the term. The proliferation of usages of the term in both vernacular and professional applications means that its meanings are both complex and confusing”

Some meanings of risk

1. An *unwanted event* which may or may not occur
2. The *cause* of an unwanted event which may or may not occur
3. The *probability* of an unwanted event which may or may not occur

Meanings of risk

1. An *unwanted event* which may or may not occur
   - “Lung cancer is one of the major risks that affect smokers.”

2. The *cause* of an unwanted event which may or may not occur
   - “Smoking is by far the most important health risk in industrialized countries.”
Meanings of risk

3. The *probability* of an unwanted event which may or may not occur
   - “The risk that a smoker's life is shortened by a smoking-related disease is about 50%.”
Pervasiveness of risk

- Risk is a key concept and focus of scholarship in many (most?) academic disciplines
- Risk is pervasive in popular culture: Film, television, literature, sports
- “Using the word ‘risk’ instead of ‘danger’ has the rhetorical effort of providing neutrality, bearing with it the ‘aura of science’” Lupton 1995, page 80
Some academic fields where you are at risk of a lecture on risk

- Psychology
- Sociology
- Anthropology
- Political Science
- Foreign Relations
- Management
- Economics
- Banking/insurance
- Civil engineering
- Aeronautics
- Seismology
- Statistics
- Epidemiology
- Medicine, Surgery, Anesthesia etc.
- Agriculture
- Ecology/environment
- Meteorology
- Literature
- Film Studies
- Hospitality/tourism
- ++++
Perspectives on risk

1. Risk psychology
2. Values as mediating factors in response to risk
3. Cultural theory of risk
4. Risk discourse
Perspective #1: Psychology of risk ("Psychometric model") Slovic and others
Epistemology: What is it possible for us to know?

- A term we will talk about all the time in the two qualitative courses (224.690 & 224.691)
- Refers to perspectives on what it is possible for us to know, and how we come to know it
- Two **epistemologies**
  - **Objectivist**: Typical of epidemiology. It is possible make accurate measurements, if we make efforts to minimize bias
  - **Constructivist**: Typical of many qualitative researchers. We can’t avoid bias, need to acknowledge it and discuss it
1. Psychology of risk: Slovic & others

- The dominant paradigm in thinking about how people respond to risk
- Understanding of how knowledge is produced (epistemology) is objectivist:
  - Real risks exist and can be measured, this are the ‘objective risks’ or facts
  - People’s perceptions of risk differ from objective assessment (bias, fear)
  - Perceptions of risk can be measured precisely through presentation of standardized scenarios, games etc.
"Real" risk, measured "objectively"

Perceived risk

Gap between real and perceived risk due to:

- Cognitive biases
- Bounded rationality
  - Heuristics
  - Fear
  - Limitations on what can be observed etc.
Models of human behavior that assume that human behavior can be reasonably approximated or described as “rational”

However, humans are “bounded” in their capacity to make rational choices by:
- limited quantity and quality of information available
- limited ability to process that information
People use heuristics or ‘rules of thumb’ to estimate risks, but they are often misleading, becoming ‘cognitive biases’.

Heuristics:
- Availability heuristic
- Anchoring heuristic
Examples of heuristics

- **Availability heuristic**
  - Events more easily imagined judged more likely than events not easily imagined.

- **Anchoring heuristic**
  - People start with piece of known information then adjust it to create an estimate of an unknown risk -- but adjustment inaccurate
Other observations on decisions people make about risk

- **Asymmetry between losses and gains**
  - People are risk averse for gains (prefer to keep what they have), but risk seeking for losses (willing to gamble to eliminate loss)

- **Threshold effects**
  - People prefer to move from 10% to zero risk (uncertainty to certainty) than from 20% to 10% risk
Because of heuristics, cognitive biases, and limited information (or information that is difficult to understand), people do a poor job of accurately assessing actual risk.
Actual vs. Perceived Risks

Estimated number of deaths per year vs. Actual number of deaths per year.

- Overestimation of number of deaths
- Underestimation of number of deaths

Adapted by CTLT from Slovic et al. Figure 2.
Actual vs. Perceived Risks

Estimated number of deaths per year

Actual number of deaths per year

Overestimation of number of deaths

Underestimation of number of deaths

Adapted by CTLT from Slovic et al. Figure 2.
<table>
<thead>
<tr>
<th>Overestimated</th>
<th>Underestimated</th>
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</thead>
<tbody>
<tr>
<td>All accidents</td>
<td>Diabetes</td>
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<tr>
<td>Motor vehicle accidents</td>
<td>Stomach cancer</td>
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<tr>
<td>Pregnancy, childbirth,</td>
<td>Lightning</td>
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<tr>
<td>abortion</td>
<td>Stroke</td>
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<tr>
<td>Tornadoes, floods</td>
<td>Tuberculosis</td>
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<tr>
<td>Botulism</td>
<td>Asthma</td>
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<tr>
<td>All cancer</td>
<td>Emphysema</td>
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<tr>
<td>Fire and flames</td>
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<tr>
<td>Venomous bite or sting</td>
<td></td>
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<tr>
<td>Homicide</td>
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</tbody>
</table>
Difficulty in perceiving risk of climate change: Kristof

- See article by Nicholas Kristof, New York Times, July 2, 2009 (cites Slovic)
- Good topic for your Response Paper, if you haven’t started yet
- We have stone age brains, and therefore respond immediately and emotionally to:
  - Snakes, lions
  - Crime
  - Terrorism
  - Flag-burning
Difficulty in perceiving risk of climate change: Kristof

- Threats that get our attention are:
  - Personalized and individual
  - Disgusting or immoral e.g. flag burning
  - Imminent. We prefer less money now than more money later (hyperbolic discounting)
  - Immediate rather than gradual
Risk compensation and risk homeostasis
Risk compensation


Risk compensation: Eaton and Kalichman 2007

- “An inadvertent increase in risk behaviors following the application of a risk reduction technology is termed behavioral disinhibition or risk compensation”
- “Risk compensation threatens the potential benefits of newly developed and emerging HIV prevention technologies, no single one of which will likely exceed 60% protection.”
Risk homeostasis

- “Risk homeostasis is defined as a system in which people accept a certain level of subjectively estimated risk to their health and safety in exchange for the benefits they expect to receive from that activity.”
  - Wilde quoted in Eaton & Kalichman 2007
- A person has in-built acceptable level of risk
  - Ideal balance of benefits and costs
  - “Set point”, hence homeostasis
Explain this diagram

This diagram was removed because JHSPH OpenCourseWare was unable to secure permission for its use.

To view the diagram visit
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2937204/figure/F1/

Source: Figure 1, Eaton and Kalichman 2007
“There is no evidence that circumcision increases or decreases the risk of HIV transmission by HIV-infected men.

However, risk compensation by HIV-infected circumcised men will substantially increase the risk of transmission to their sex partners.

This suggests that, in the short term at least, circumcision would
- reduce the incidence of HIV among men,
- but increase the incidence among women,
- translating to incr. prevalence among women,
- which in turn translates to greater risk to men.”
Risk homeostasis: Taxi example

- Munich taxicab study
  - Antilock brakes installed in half the cabs
  - Accident rate for cabs with and without ABS stayed the same
  - Assume that drivers of ABS cabs took more risks knowing they had better brakes
Time horizon, locus of control and income
Time horizon

- How far we plan for the future, or even see the future
- Analysis of corporate behavior
  - Companies with limited financial resources have short-term focus
  - Companies with vast resources have long-term focus; plan far ahead to mitigate risks
Locus of control

- The belief about who or what controls behaviors, events, decisions, things that happen in your life

- Can be internal or external
  - **Internal**: I believe I control my own behaviors and decisions
  - **External**: I believe factors in my environment, a higher power, or other people control my behaviors and decisions
Locus of control vs. self-efficacy

- **Locus of control**: the belief about who or what controls a specific behavior or situation

- **Self-efficacy**: the belief in being able to successfully execute a specific behavior

For example, you may believe that studying hard for biostats would improve your performance on the test (an internal locus of control orientation) but not believe that you are capable of studying that hard (a low sense of self-efficacy).
Locus of control

- People have a higher level of tolerance for risk when they perceive it to be within their control
  - Ex: Driving vs. flying

- Or, people may be more likely to adopt preventive behaviors when they believe they are within their control
  - Ex: Condom use
Locus of control: Differences between high and low income countries/low income settings
The experience of work in low income countries and settings

“Risk discourse tends to assume universal experience and ignores social differentiations, such as ethnicity and social class. Yet there is a class difference in the manner that people are exposed to risk: wealth may buy safety from risk while poverty attracts risk. This is particularly the case in relation to occupational risk... In such situations, the threat of losing one’s job is a greater risk than is the danger of exposure to workplace hazards” Lupton 1995, page 85
Nature of work in high and low income countries/settings

**High income**
- Type of work can be chosen
- Minimal physical threats or coercion
- Source of personal fulfilment
- Work chosen based on both income and potential for personal growth

**Low income**
- Work often unpaid or involuntary: coercion, or sometimes slavery
- Threat of physical violence from boss/landowner/slaveowner/family if work not performed
- Work as punishment
# Control and boundaries

<table>
<thead>
<tr>
<th></th>
<th>High income</th>
<th>Low income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal locus of control</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Boundaries of threats</td>
<td>Highly circumscribed in time and space</td>
<td>Uncircumscribed, omnipresent, continuous</td>
</tr>
<tr>
<td>Time horizon of threats</td>
<td>Long term</td>
<td>Daily, immediate</td>
</tr>
<tr>
<td>Risk-taking as recreation, fun</td>
<td>Often</td>
<td>Sometimes</td>
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</tbody>
</table>
Perspectives on risk

1. Risk psychology: Slovic and others
   - Risk perception, heuristics
   - Risk compensation, risk homeostasis
   - Time horizon, locus of control

2. Values as mediating factors in response to risk

3. Cultural theory of risk

4. Risk discourse
Perspective #2:
Values as mediating factors in response to risk
Argument of Slimak & Dietz 2006 (1)

- Psychometric model (i.e. Slovic et al.) dominates the field of risk perception
- “The theory seeks to explain differences in how risks are perceived rather than differences in how individuals perceive risks”
- “That is, most work in the psychometric tradition examines characteristics of risk that drive risk perception.”
“However, environmental and technological conflict results not so much from differences in perceptions across risks but in differences in perceptions across individuals (Dietz, 2001).

Here the psychometric paradigm, valuable as it may be for explaining differences across risks, is of limited value.”

Psychometric model explains 20% of the variation in risk perception
Argument of Slimak & Dietz 2006 (3)

- 2 modes of making decisions:
  - “*System 1*”: Conclusions reached quickly, with little deliberation, highly susceptible to influence of heuristics and biases
  - “*System 2*”: More time is spent, process is reflexive and deliberate, influence of heuristics and biases is less
## Ways of reaching decisions: System 1 and System 2

<table>
<thead>
<tr>
<th></th>
<th>System 1</th>
<th>System 2</th>
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</thead>
<tbody>
<tr>
<td>Time to reach conclusion</td>
<td>Rapid</td>
<td>Slow</td>
</tr>
<tr>
<td>Deliberation</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Influence of heuristics and biases</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Influence of personal values, values as a filter</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Example of typical decision governed by this “system”</td>
<td>How fast to drive on a given road when it starts raining</td>
<td>Response to long-term environmental threats</td>
</tr>
</tbody>
</table>
Value-Belief-Norm (VBN) Theory
Stern et al. 2000

- Values, including NEP, are at the core of perceptions of the environment and environmental risks
  - Values, more than risk perceptions, shape environment-related behaviors
- Values act as a filter when processing new information about environmental threats
What is NEP?
2 models for environmental values: Dunlap and Van Liere


- **Human Exceptionalism Paradigm**
  - Humans are such a uniquely superior species that they are exempt from environmental forces

- **New Ecological Paradigm**
  - Humans are part of the ecosystem, and must respect it
New Ecological Paradigm

- In the 1970s, a new paradigm, the NEP, was adopted by many Americans:
  - Fragility of nature
  - Natural limits of growth
  - Need for steady state rather than endlessly expanding economy
- Dunlap and colleagues developed scale to measure adherence to this new paradigm
Examined perceptions of 24 global environmental risks

NEP and Schwartz’ altruism accounted for 19-46% of variance in risk ratings

Other demographic and social variables accounted for little variance: religiosity, political leanings, age, gender, education etc.
System #1

Immediate risks

Information provision & personal observations

Assessment based on heuristics, past experiences etc.

System #2

Global environmental threats

Filtering of information based on personal values, world views, spiritual beliefs (VBN)

Personal response to risks/threats
Model tested by Slimak & Dietz 2006
Differences in rankings between lay public and experts:

- **Lay public** more concerned with low-probability high-consequence risks such as hazardous waste sites, sewage, radiation

- **Risk professionals** more concerned with risks having global consequences, including population growth, loss of wildlife habitat, global warming, ozone depletion.
Perspectives on risk

1. Risk psychology: Slovic and others
2. Values as mediating factors in response to risk: Stern; Slimak and Dietz; Dunlap et al.
   - System 1 and System 2
   - New Ecological Paradigm
   - Lay public and expert perceptions
3. Cultural theory of risk
4. Risk discourse
Perspective #3: Cultural Theory of Risk
Mary Douglas

RISK AND CULTURE
MARY DOUGLAS and AARON WILDAVSKY
3. Cultural Theory of Risk

- Developed from work of Mary Douglas, anthropologist studying African religion
- Rather than economic and cognitive influences, CTR examines structures of social organization and how they influence conceptions of risk
- Different societies concerned about different types of threats, this is related to the structure of each society
Group and Grid

- People associate threats to society (disease, famine, floods, droughts) with behavior that transgresses societal norms.
- Those who violate norms are to blame for problems that occur.
- Societies and their response to threats classified according to Group and Grid.
Group

- **High Group**
  - High degree of collective control
  - Related to interdependent self-construal

- **Low Group**
  - Low degree of collective control
  - Related to independent self-construal
  - Emphasis on individual self-sufficiency
Grid

- **High Grid**
  - High degree of social stratification in roles and authority

- **Low Grid**
  - Low degree of social stratification
  - More egalitarian
Group and Grid

• Five groupings of societies, according to their degree of Group and Grid
  – Individualist
  – Egalitarian
  – Hierarchist
  – Fatalist
  – Autonomous
Cultural Theory of Risk: Individualist

- Low Group, variable Grid: USA is good example
- Choices relatively unconstrained by society
- Ties to other people less close
- Value placed on individual initiative
- Confidence that system can maintain its own equilibrium if left alone
- Examples of risks of most concern:
  - Government control e.g. socialized medicine, “the public option”, gun control
  - Control by world body like UN
RONALD REAGAN
speaks out against SOCIALIZED MEDICINE
RONALD REAGAN speaks out against SOCIALIZED MEDICINE
Why does socialized medicine constitute a risk?
Cultural Theory of Risk: Hierarchist

- High Grid, High Group
- Caste system in India taken as example
- Each member needs well-defined role
- Well-defined system of rules also necessary
- Examples of perceived risks:
  - Social deviance can disrupt rules
  - Collapse of entire system if deviation from rules surpasses certain limits
Cultural Theory of Risk

- Key point: Different societies identify/are concerned about different types of threats
- Lupton: Nothing is a “risk” until we define it as such
- Different ways of identifying and framing “risk”
Criticisms of Cultural Theory of Risk

- Hard in practice to categorize societies/cultures according to their degree of Group or Grid

- Highly functionalist: Structures, institutions in a society each exist for a reason, analogous to organs in a body

- CTR characterizes environmentalists (low Grid, high Group) as having unwarranted fear of environmental disaster
Perspectives on risk

1. Risk psychology: Slovic and others
2. Values as mediating factors in response to risk: Stern; Slimak and Dietz; Dunlap et al.
3. Cultural theory of risk: Mary Douglas
   - Different societies concerned about different threats/risks
   - Group and Grid
   - 5 types of societies, classified by G&G
4. Risk discourse
Perspective #4: Risk discourse
Deborah Lupton
Understanding risk: Risk psychology vs. Risk discourse

**Risk psychology**
- e.g. Slovic et al.
- Psychology
- Objectivist
- Key concepts:
  - Biases in perception
  - Heuristic

**Risk discourse**
- e.g. Deborah Lupton
- Sociology/anthropology
- Constructivist
- Key concepts:
  - Risk discourse
  - Privileging of rationality
  - Externally and internally imposed risk
Lupton: Risk discourse

- Understanding of how knowledge is produced (epistemology) is constructivist:
  - “...the category of risk is purely socially constructed, for nothing is a risk in itself until it is judged to be a risk”
  - Risk cannot be objectively measured, there are too many uncertainties at each level of measurement
Lupton: Risk discourse

- Discourse:
  - Institutionalized way of thinking
  - Vocabulary, metaphors and images used to frame a topic
  - Social boundary defining what can be said about a specific topic/“limits of acceptable speech”

- Example
  - Freedom fighters versus terrorists
Lupton: Risk discourse

“The incursion of health risk discourse into almost all areas and institutions of life, and the vested interests it supports, has rarely been challenged or questioned from within mainstream public health” Lupton 1995 page 83
Concerns about risk discourse

- Actual evidence of risk and benefit often lacking
  - Ex: removal of asbestos in walls
- Experience of being labeled ‘at risk’ may be harmful to people
- Unwarranted incursion into people’s private lives in the interest of risk reduction
Internal vs. External risk

- **External risk**
  - Environmental hazards such as pollution, terrorist attacks, nuclear waste, etc.
  - Equivalent to being sinned against

- **Internal risk**
  - “Lifestyle choices”, behaviors such as eating too much of the wrong foods, not wearing seatbelts, or practicing “risky sexual behavior”
  - Equivalent to sinning
Focus on modifiable risks

- Being male is a huge risk factor for having a heart attack, but we don’t focus on it because it is not modifiable.
- Easier to focus on modifiable risks such as behaviors, particularly at the individual level.
- Tends to focus on internal risk – possibly labeling, stigmatizing people.
Concerns about risk discourse

- “...risk discourse provides a powerful rationale, cloaked in the ‘neutral’ language of public health and health promotion, to cast blame upon stigmatized minority groups for the state of their health” Lupton 1995 page 92
What concerns do you have about risk discourse in public health?
Perspectives on risk

1. Risk psychology: Slovic and others
2. Values as mediating factors in response to risk: Stern; Slimak and Dietz; Dunlap et al.
3. Cultural theory of risk: Mary Douglas
4. Risk discourse: Deborah Lupton
   - Risk discourse
   - Privileging of rationality
   - Externally and internally imposed risk
Risk Communication
Risk communication

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Risk Communication

- A growth industry, proliferation of experts and organizations specializing in risk communication
- Generally works within Perspective #1: Psychology of risk.
- Applies findings of research on psychology of risk to different problems
Typical recommendations for applying Psychology of Risk to Interventions

- People use risk heuristics to process information
  - Understand and reshape the heuristic
- People have difficult time matching perceived risk to actual risk
  - Develop messages on risk that people can understand
- Internal locus of control = better health behavior
  - Reinforce perception of control
- Risk can be fun
  - Use harm reduction approaches, don’t eliminate the fun associated with the behavior
Risk can be fun
Applying these concepts to scenarios for final assignment
Final assignment: Scenario #1

- Treatment of malaria in Tanzania

- What risks are patients likely to be concerned about? Medical practitioners? Others?

- What concepts discussed today might be applicable?