



## Risk: Perception, Reality and the Policy Process

*"Risk does not exist 'out there', independent of our minds and culture, waiting to be measured. Human beings have invented the concept of risk to help them understand and cope with the dangers and uncertainties of life. Although these dangers are real there is no such thing as "real risk" or "objective risk."* Paul Slovic.<sup>1</sup>

*"If we become incapacitated by an inability to take risks, we will be unable to ensure future generations will have opportunities of their own."* David Kane.<sup>2</sup>

### **What is Risk, Then?**

Risk is a socially constructed, complex concept that humans have developed to deal with the fear of unknown events that may happen in their lives. Fear is the dominant word, which itself is a basic human reaction to a threat, which can be real (in the moment) or perceived (may happen). People choose what to fear and how to fear it. Culturally, it is powerful glue that creates part of the framework for preferred patterns of social relations and associations. These relations are the place where values, beliefs, and perceptions about the world are established and nurtured. All of these ultimately work together to drive policy preferences about our social and economic structures.<sup>3</sup>

The use of mathematics has become one method to reduce the idea of risk to its simplest form, which is denoted and explained as states of the world that may prevail and the precise

probability of each state.<sup>4</sup> Risk, as a concept has evolved within the public policy context, is usually seen as the probability of a bad outcome.

$$\text{Risk} = \sum(\text{state} * \text{probability})$$

The above formula makes calculating risk look deceptively simple. It is not.

Before exploring the answer to why it is not easy to determine risk, there is a need to understand some other definitions that are important elements of risk.

**Uncertainty:** describes (a) the level of precision – how close a measured value is to the actual/true value; it is an indicator of the specificity of information – how close the measured values are to each other – about a state; and (b) the level of accuracy/correctness of information about that state.

**Benefits:** are both real and perceived. For something to be real it must be an observable and measurable (noticeable and definite) good, service or activity. There are also perceived benefits, which are psychological in nature and thus largely unmeasurable. Importantly, they are also the main substance of politics.

**Ignorance:** is a state of being uninformed in terms of a complete list of events, the probability of an event, and/or the magnitude of an event (usually described as damages). Ignorance can be willful (i.e., we choose to not acknowledge it) or it can be a truly an unknown unknown.<sup>5</sup>

<sup>1</sup> Paul Slovic and Elke U. Weber, "Perception of Risk Posed by Extreme Events," Centre for Decision Sciences, Columbia University, 2002.

<sup>2</sup> David Kane, Science and Risk: How Safe is Safe Enough, Harper Academic review, 1992.

<sup>3</sup> Linda Steg, "Cultural Theory of Individual Perceptions of Environmental Risks", Council for the Environment, The Hague,

the Netherlands, Environment and Behaviour, Vol 32, No.2 March 2000, pp. 248-267.

<sup>4</sup> David Kane, Science and Risk: How Safe is Safe Enough, Harper Academic Review, 1992.

<sup>5</sup> Project Management Institute: Risk events are classified as unknown unknowns or known unknowns, where unknown unknowns are risks that were are not identified and accounted

**Risk Perception**

Most people believe there is far more risk in the world than actually exists. What they fear the most is inversely related to the actual experience they will have with that event. In fact, every day people do things that put them in danger and about which they should be afraid but, because the risk has been normalised or obscured, they view it as minor or acceptable. Driving cars, for example, kills vastly more people than does flying, yet the latter is perceived to be more risky, in part because people believe they control the former whereas they do not have any control of a plane.

Humans find it difficult to imagine and comprehend the unknown. As such, what is unknown tends to get more scrutiny. People often amplify the danger of poorly understood issues or matters over which they have little or only indirect control. They also tend to attach a higher risk to these activities, even if the chance of something negative occurring is small. In fact, what people fear the most is being a victim, whether as an individual or collectively. This is a natural response. Victims are more concerned about losses (the negative) than gains (the positive); and most people orient strongly around avoiding or preventing loss. Risk analysis, which is always related to a choice between two or more things, has thus evolved to become focused on the negative, even though there are usually positive elements associated with most decisions.

People also tend to assume that something is good or bad based on the behaviour of others. They don't have to think about the details or difficult trade-offs. It is easier to follow others.

for, while known unknowns are risks that were identified and provisions were made for them.

<sup>6</sup> Paul Slovic, Melissa Finucane, Ellen Peters and Donald G MacGregor, "Risk as Analysis and Risk as Feelings: Some thoughts

If someone imparts something that is distasteful or indicates that something terrible might happen, the odds are the receiver of that information will agree, not because either of the parties has or may have experienced the event but, rather because the expectation has been set by the description. It requires no mental energy to join a protest about a pipeline or mine or to belong to a group that opposes any other type of project or economic/social policy. Humans herd. Once this anchor has been set it is difficult (but not impossible) to change.

**Anchor Effect**  
*It occurs when people consider a particular value for an unknown quantity before estimating that quantity.*  
 Source: Daniel Kahneman

The perception of risk relies heavily and almost exclusively on intuitive judgements – or subjective feelings. A majority of people use these to make decisions – it is quick, requires little effort, and is largely involuntary. For example, arriving at conclusions about the risks of big projects takes very little information. There are existing messages about things that may have gone wrong somewhere else (e.g., Exxon Valdez in relation to tankers and oil transportation, Lac Megantic rail accident, 2013 Alberta floods, etc.). It is easy to access an image from memory of the negative and induce

*The ease with which ideas of various risks come to mind and the emotional reactions to these risks are inextricably linked ... frightening thoughts and images occur to us with particular ease and thoughts of danger are fluent and vivid and exacerbate fear.*  
 Source: Paul Slovic

a feeling of dread. This is a major determinant of public perceptions of risk<sup>6</sup> and it often has a significant influence on how decision-makers do their jobs.

In the struggle to present a realistic picture of risk in relation to the development of projects or changes to the economy or shifts in policies and programs, government and business like to emphasize the facts. They try to educate,

about Affect, Reason, Risk and Rationality," Risk Analysis, Volume 24, No. 2, 2004.

inform, persuade and motivate. They talk in terms of what has been and can be measured and its accuracy, the performance of

*Our investment in our beliefs is much stronger than any other affiliation ... the likelihood about agreement on facts becomes smaller and smaller as the personal investment in the problem grows.*

*Source: Daniel Ariely, Predictable Irrational: Hidden Forces that Shape Our Decisions, 2008*

an action or activity in relation to what is permitted in regulation, and they draw on expert judgment about the acceptability of risk. These methods frequently fail in the public domain because the issues are usually technical and complicated, the science and facts are not available and/or are controversial (unknown outcomes), the experts may/do disagree, there are many individuals and groups with diverse interests and priorities surrounding the matter at hand, the benefits of proposals/solutions are either uncertain or largely unknowable, and leaders are under intense pressure to make the “right” decision with certainty.

The public/laypeople, on the other hand, are animated by values rather than by science or facts. They are afraid and want to be assured of the competence and trustworthiness of government officials and industry leaders who are making decisions on their behalf (i.e., credibility). They want to compare the acceptability of risks and benefits at a broad and undetailed level, and they desire a fair outcome that balances risks and benefits (i.e., options and equity) and they want this done through due process and open communication.

As a result, facts and values often clash. Governments and business typically offer up more facts or emphasize the benefits, many of which are not easily measured. As well, the task of influencing perceptions of risk is even harder given that most adults are uninformed or simply do not understand basic scientific or analytical

constructs.<sup>7</sup> As a result, governments and business often are unable to make much difference in changing public perceptions of risk.

In the absence of sufficient knowledge or the ability to understand information, society turns to “experts.” They are trusted as having done the analytical work and possessing the knowledge required to make informed judgements. The idea of trust is a shortcut method of reducing complexity. As shown in the box below, to a layperson a decision or action becomes more acceptable when trust is high.<sup>8</sup>

<i>Influences on the Acceptability of Risk</i>	
<u>Less Acceptable</u>	<u>More acceptable</u>
Low trust	High trust
Benefits not clear	Benefits understood
Not controllable	Individual control
Involuntary exposure	Voluntary exposure
No alternatives	Alternatives available
Unfair distribution	Common consequence
Dreaded consequence	Affects everyone
Affects children	Natural origin
Human origin	Low media concern
High media concern	Low symbolism
High symbolism	

*Source: Slovic, Fischhoff et al as synthesized by Decision Partners*

However, there can also be conflicts between science and the public. Science is supposed to provide information, express uncertainty within confidence limits, and provide an agnostic contribution to policy development. Unfortunately, what has emerged in the public discourse is that some scientists are mixing content with opinion. In effect, some experts introduce their own bias into the dialogue about risk, which further blurs the line between objectivity and rhetoric.

<sup>7</sup> The Council of Canadian Academies, Science Culture: Where Canada Stands, Expert Panel on the State of Canada’s Science Culture, 2014.

<sup>8</sup> Michael Siegart and George Cvetkovic, “Perception of Hazards: The Role of Social Trust and Knowledge”, Risk Analysis, Volume 20, No. 5. 2000.

Also unfortunate is that discussions of risk are further warped by the nature of media coverage. All media, including social media, has a built in novelty factor.<sup>9</sup> This is what sells. The news narrative is expressly designed to persuade and impress – it arrives largely by way of images of the unpleasant consequences of some action or activity. Given people’s instinctive draw toward the negative<sup>10</sup> and fixation on the unknown as a way to avoid being a victim, the media serves to elevate the perception of risk through extensive coverage of unusual, low-probability, high-consequence events like oil spills, extreme weather, and dam breaches. Media stories on such events tend to steer clear of objective analysis and ignore nuanced details. There are many with an interest in keeping the risk dial on high on a daily basis.

**The Litany**

*The environment is in poor shape here on Earth. Our resources are running out. The population is ever growing, leaving less and less to eat. The air and water are becoming ever more polluted. The planet’s species are becoming extinct in vast number - we kill off more than 40,000 each year. The forests are disappearing, fish stocks are collapsing and coral reefs dying.*

**Environmental Risk**

In terms of environmental risk, environmental groups are inclined to promote what the writer Bjorn Lomborg calls the Litany.<sup>11</sup> There is constant reinforcement of the negative state of the world. This keeps the potential for emotional reaction to issues on high alert. Combined with continuously available and reinforcing doomsday media messages, people have a ready-made and self-sustaining perception that things are going from bad to worse, and quickly. Anyone who tries to present an alternate view is apt to be seen as a denier of the obvious.

But let’s be honest, in general, society doesn’t really know that much about risk and the environment. There are large unknown unknowns in terms of what will happen if issues are ignored, and there is little knowledge or practical experience with how to prevent or solve problems.<sup>12</sup> Furthermore, an individual’s or a community’s primary knowledge of the environment is “close to” both spatially and temporally. Fear, on the other hand, is “far away,” both physically and mentally. That doesn’t mean action shouldn’t be taken. But it does mean that whatever is done needs to be measured and, importantly, not be oriented around the usually unattainable idea of “zero” risk.

**Managing Risk**

So what’s a well-intentioned policy analyst to do? For starters, admit that risk aversion and risk “analysis paralysis” is an epidemic among decision-makers. Elected officials cannot and must not shirk their duty and avoid making hard decisions. Doing so only creates chaos and exacerbates uncertainty.

In terms of the environment, which has a high level of perceived risk partly because knowledge and understanding are so limited, there is a need

*The pursuit of a zero risk society is not possible and threatens political and economic stability.*

*Source: Slovic, Fischhoff, Lichtenstein*

to learn about and understand four belief structures - The Myths of Nature<sup>13</sup> (see box). These help to explain much about how individuals and groups react to environmental issues, including preferred policy choices. This will help frame both research and responses to risk.

<sup>9</sup> Daniel Kahneman, Thinking, Fast and Slow, Double Day Canada, 2011, p. 38.

<sup>10</sup> Ibid., p. 301.

<sup>11</sup> Bjorn Lomborg, The Skeptical Environmentalist, Measuring the Real State of the World, 2002, p. 4.

<sup>12</sup> Linda Steg, Inge Sievers, “Cultural Theory of Individual Perceptions of Environmental Risks”, Environment and Behaviour, Volume 32, No. 2, 2000.

<sup>13</sup> Ibid.

There is also a need to acknowledge that communication plays a big role. After all, given that individuals are predisposed to being a bit lazy and use intuitive judgements to make decisions, the emotional intensity of messages that are constantly in flow in an information-rich world have substantial sway. Well done, communications can support sound decision-making. Poorly done it undermines progress and creates friction that can easily become uncontrollable.

### **Risk Analysis Tool Kit**

Aside from using the obvious risk analysis tools such as influence diagrams, decisions trees and other probabilistic assessments, matrices, risk registers and so on, ultimately all policy and policy choices are about people. Thinking about risk and risk analysis can be improved.

- Understand that risk is relative, and thus when presented with an issue that is characterized as a problem, ask “in relation to what?”
- Challenge assumptions, because even the experts have biases.
- Encourage and enable lateral thinking across disciplines.
- Avoid doomsday language in the discussion of risk.
- Practice framing problems in more than one way. Different words mean different things to different people. For example, 20 in 100 is the same as a 20% chance, but empirical evidence shows that people see the latter as a more accurate estimate of likelihood.
- Provide anecdotes to tell a story. A story does two things: (1) the words create an image in memory about the subject matter, and, (2) the image created is tagged with an emotion – both are easily recallable. Do not assume understanding of even the simplest concepts.

### **Myths of Nature/**

#### **General Beliefs Towards Environmental Issues**

##### **Capricious (fatalist)**

- *Views on nature: Unmanageable and inefficient system*
- *View on resources: Lottery and unpredictable*
- *How to makes ends meet: Resignation to stringent controls on behaviour*
- *Risk perception: What you don't know can't harm you*
- *Preferences for strategies to manage risk: Coping*

##### **Perverse/Tolerant (hierarchist)**

- *Views on nature: Unstable equilibrium*
- *View on resources: Scarce*
- *How to makes ends meet: Resource can be controlled, needs cannot*
- *Risk perception: Acceptable risks, determined by experts*
- *Preferences for strategies to manage risk: Regulation and control and limits to growth*

##### **Benign (individualist)**

- *Views on nature: Stable and global equilibrium*
- *View on resources: Abundant*
- *How to makes ends meet: Resources and needs can be controlled*
- *Risk perception: Risks are opportunities*
- *Preferences for strategies to manage risk: Less bothered by environment problems, opposed to collective control and prefer market strategies*

##### **Ephemeral (egalitarian)**

- *Views on nature: Precarious balance*
- *Views on resources: Finite and depleting*
- *How to makes ends meet: Radical changes in behaviour*
- *Risk perception: Aversion and see risk as hidden, irreversible and inequitable*
- *Preferences for strategies to manage risk: Equality of outcomes for current and future generation*

- Be cautious and deliberate about what is accepted as the truth. News is not truth; it usually consists of disparate incidents that remain unconnected and unexplained relative to trends and background information.
- Be clear that most decisions involve trade-offs, whether they are made by individuals, businesses or governments.
- Ensure there is collaboration among science, technical, management and communications professionals to avoid “camps.”
- Be deliberate about understanding what people already believe about options and why they believe it.
- Be faithful to continuous information updating. Successful risk management relies on quick reactions (i.e., gather more

information) to signals. Then, it takes steps to moderate an outcome in case it turns out differently than expected.

- Do rather than talk about risk analysis. Most government agencies talk about risk based regulation and approaches to decision-making, but in reality do not do it. There is no real use of systematic structuring of scenarios<sup>14</sup> to help understand the extremes.

Risk analysis is not a magic wand. Hard choices are still hard choices made without full information and amid a nuanced collection of competing interests.

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<sup>14</sup> Elisabeth Pate-Cornell, On “Black Swans” and “Perfect Storms”: Risk Analysis and Management When Statistics Are Not Enough,

Stanford University, [Risk Analysis](#), Volume 32, Issue 11, pp. 1823-1833, November 2012.